

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

General Description

The GPAK product family is based around Dialog Semiconductor's proprietary Zero Static Power ASM (Asynchronous State Machine). This machine is fault tolerant and operates continuously over a wide voltage range with very low latency. The SLG46880/81 provides a small, low power component for commonly used mixed-signal functions. The user creates their circuit design by programming the one time Non-Volatile Memory (NVM) to configure the interconnect logic, the IO Pins and the macrocells of the SLG46880/81. This highly versatile device allows a wide variety of mixed-signal functions to be designed within a very small, low power single integrated circuit.

Key Features

- Two High Speed General Purpose Rail-to-Rail Analog Comparators (ACMPxH)
- Two Low Power General Purpose Rail-to-Rail Analog Comparators (ACMPxL)
- Two Voltage References
 - Two Vref Outputs
- Twelve Combination Function Macrocells
 - One Selectable DFF/Latch or 2-bit LUT
 - Four Selectable DFF/Latches or 3-bit LUTs
 - One Selectable Pipe Delay or Ripple Counter or 3-bit LUT
 - One Selectable Programmable Pattern Generator or 2-bit LUT
 - Four Selectable 8-bit CNT/DLYs or 3-bit LUTs
 - One Selectable 16-bit CNT/DLY or 4-bit LUT
- Asynchronous State Machine
 - Twelve States
 - Four Dynamic Memory Macrocells
 - f(1) Computation Macrocell with dedicated ACMP
- Serial Communications
 - I²C Protocol Interface
- Programmable Delay with Edge Detector Output
- Deglitch Filter or Edge Detector
- Three Oscillators
 - 2.048 kHz Oscillator
 - 2.048 MHz Oscillator
 - 25 MHz Oscillator
- Crystal Oscillator
- Analog Temperature Sensor
- Power-On Reset
- Wide Range Power Supply
 - 2.5 V (±8%) to 5 V (±10%) V_{DD}
 - 2.5 V (±8%) to 5 V (±10%) V_{DD2} (V_{DD2} ≤ V_{DD}) for SLG46880
 - 1 V (±5%) to 1.8 V (±10%) V_{DD2} for SLG46881
- Operating Temperature Range: -40°C to 85°C
- RoHS Compliant/Halogen-Free
- 32-pin STQFN: 4 mm x 4 mm x 0.55 mm, 0.4 mm pitch

Applications

- Personal Computers and Servers
- PC Peripherals
- Consumer Electronics
- Data Communications Equipment
- Handheld and Portable Electronics
- Smartphones and Fitness Bands
- Notebook and Tablet PCs

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1 Block Diagram

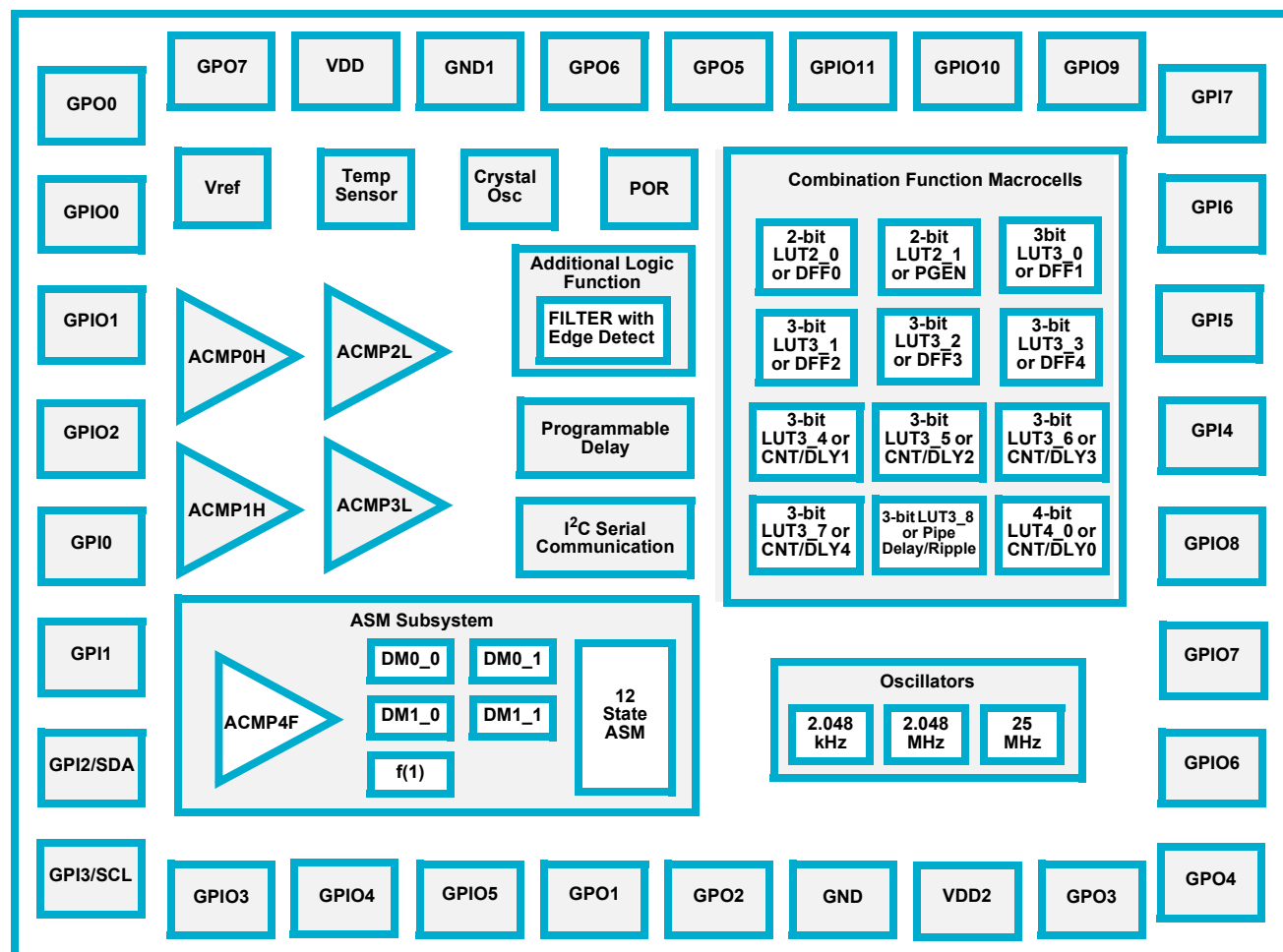


Figure 1: Block Diagram

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2 Pinout

2.1 PIN CONFIGURATION - STQFN- 32L

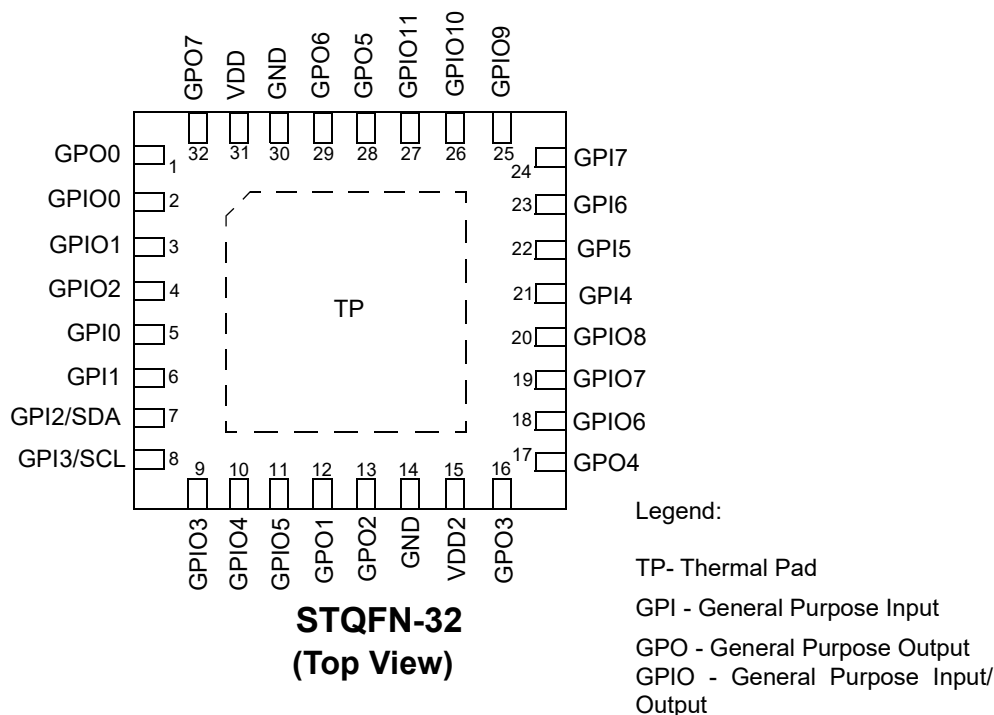


Table 1: Functional Pin Description

STQFN Pin #	Pin Name	Function
1	GPO0	General Purpose Output or ACMP4F Input 1 or ASM1 output
2	GPIO0	General Purpose IO or ACMP4F Input 2
3	GPIO1	General Purpose IO or ACMP4F Input 3
4	GPIO2	General Purpose IO or VrefO1 or Din LATCH (en1)
5	GPI0	General Purpose Input or Din LATCH (en0)/ext_CLK0
6	GPI1	General Purpose Input or Din LATCH (en0)/ext_CLK1/Vref IN
7	GPI2/SDA	General Purpose Input/I ² C SDA
8	GPI3/SCL	General Purpose Input/I ² C SCL
9	GPIO3	General Purpose IO or Din LATCH (en1)
10	GPIO4	General Purpose IO or I ² C exp0 output
11	GPIO5	General Purpose IO or I ² C exp1 output
12	GPO1	General Purpose Output or ASM2 output
13	GPO2	General Purpose Output or ASM3 output
14	GND	Ground
15	V _{DD2}	Power Supply
16	GPO3	General Purpose Output or ASM4 output

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Table 1: Functional Pin Description(Continued)

STQFN Pin #	Pin Name	Function
17	GPO4	General Purpose Output or ASM5 output
18	GPIO6	General Purpose IO or Din LATCH (en1) or I ² C exp2 output
19	GPIO7	General Purpose IO or Din LATCH (en1) or I ² C exp3 output
20	GPIO8	General Purpose IO or ACMP4F Input 7
21	GPI4	General Purpose Input (XTAL IN) or Din LATCH (en0)/ext_CLK2
22	GPI5	General Purpose Input (XTAL OUT) or Din LATCH (en0)/ext_CLK3
23	GPI6	General Purpose Input or ACMP4F Input 4
24	GPI7	General Purpose Input or ACMP4F Input 5
25	GPIO9	General Purpose IO or ACMP4F Input 6 or VrefO0
26	GPIO10	General Purpose IO or ACMP0H
27	GPIO11	General Purpose IO or ACMP1H
28	GPO5	General Purpose Output or ACMP2L or ASM6 output
29	GPO6	General Purpose Output or ACMP3L or ASM7 output
30	GND	Ground
31	V _{DD}	Power Supply
32	GPO7	General Purpose Output or ACMP4F Input 0 or ASM0 output
TP	TP	Thermal Pad. Must be connected to GND externally

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3 Characteristics

3.1 ABSOLUTE MAXIMUM RATINGS

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, so functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification are not implied. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

Table 2: Absolute Maximum Ratings

Parameter	Min	Max	Unit
Supply Voltage on V_{DD} relative to GND	-0.3	7	V
DC Input Voltage	GND - 0.5 V	$V_{DD} + 0.5$ V	V
Maximum Average or DC Current (Through V_{DD} or GND pin)	--	90	mA
Current at Input Pin	-1.0	1.0	mA
Input leakage Current (Absolute Value)	--	1000	nA
Storage Temperature Range	-65	150	°C
Junction Temperature	--	150	°C
ESD Protection (Human Body Model)	2000	--	V
ESD Protection (Charged Device Model)	1300	--	V
Moisture Sensitivity Level	1		

3.2 RECOMMENDED OPERATING CONDITIONS

Table 3: Recommended Operating Conditions for SLG46880/81

Parameter	Condition	Min	Max	Unit
Supply Voltage (V_{DD})		2.3	5.5	V
Supply Voltage 2 (V_{DD2})	$V_{DD2} \leq V_{DD}$ for SLG46880	2.3	5.5	V
Supply Voltage 2 (V_{DD2})	$V_{DD2} \leq V_{DD}$ for SLG46881	0.95	1.98	V
Operating Temperature		-40	85	°C
Maximal Voltage Applied to any PIN in High Impedance State		--	$V_{DD} + 0.3$ (Note 1)	V
Capacitor Value at V_{DD}		0.1	--	μF
Analog Input Common Mode Range	Allowable Input Voltage at Analog Pins	0	V_{DD}	V

Note 1 GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7 are powered from V_{DD} and GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4 are powered from V_{DD2} .

3.3 ELECTRICAL CHARACTERISTICS

Table 4: EC for SLG46880 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted

Parameter	Description	Condition	Min	Typ	Max	Unit
V_{IH}	HIGH-Level Input Voltage	Logic Input (Note 2)	$0.7 \times V_{DD}$ (Note 1)	--	$V_{DD} + 0.3$ (Note 1)	V
		Logic Input with Schmitt Trigger	$0.8 \times V_{DD}$ (Note 1)	--	$V_{DD} + 0.3$ (Note 1)	V
		Low-Level Logic Input (Note 2)	1.25	--	$V_{DD} + 0.3$ (Note 1)	V

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Table 4: EC for SLG46880 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted(Continued)

Parameter	Description	Condition	Min	Typ	Max	Unit
V _{IL}	LOW-Level Input Voltage	Logic Input (Note 2)	GND-0.3	--	0.3x V _{DD} (Note 1)	V
		Logic Input with Schmitt Trigger	GND-0.3	--	0.2x V _{DD} (Note 1)	V
		Low-Level Logic Input (Note 2)	GND-0.3	--	0.5	V
V _{HYS}	Schmitt Trigger Hysteresis Voltage	V _{DD} = 2.5 V +/- 8 %	0.32	0.43	0.56	V
		V _{DD} = 3.3 V +/- 10 %	0.36	0.46	0.57	V
		V _{DD} = 5 V +/- 10 %	0.46	0.58	0.74	V
V _{OH}	HIGH-Level Output Voltage	Push-Pull, I _{OH} = 100 µA, 1X Drive, V _{DD} = 2.5 V +/- 8%	2.286	2.292	--	V
		Push-Pull, I _{OH} = 3 mA, 1X Drive, V _{DD} = 3.3 V +/- 10%	2.704	2.790	--	V
		Push-Pull, I _{OH} = 5 mA, 1X Drive, V _{DD} = 5 V +/- 10%	4.154	4.247	--	V
		Push-Pull, I _{OH} = 100 µA, 2X Drive, V _{DD} = 2.5 V +/- 8%	2.294	2.297	--	V
		Push-Pull, I _{OH} = 3 mA, 2X Drive, V _{DD} = 3.3 V +/- 10%	2.857	2.896	--	V
		Push-Pull, I _{OH} = 5 mA, 2X Drive, V _{DD} = 5 V +/- 10%	4.329	4.373	--	V
V _{OL}	LOW-Level Output Voltage	Push-Pull, I _{OL} = 100 µA, 1X Drive, V _{DD} = 2.5 V +/- 8%	--	0.006	0.025	V
		Push-Pull, I _{OL} = 3 mA, 1X Drive, V _{DD} = 3.3 V +/- 10%	--	0.158	0.217	V
		Push-Pull, I _{OL} = 5 mA, 1X Drive, V _{DD} = 5 V +/- 10%	--	0.212	0.297	V
		Push-Pull, I _{OL} = 100 µA, 2X Drive, V _{DD} = 2.5 V +/- 8%	--	0.003	0.013	V
		Push-Pull, I _{OL} = 3 mA, 2X Drive, V _{DD} = 3.3 V +/- 10%	--	0.079	0.107	V
		Push-Pull, I _{OL} = 5 mA, 2X Drive, V _{DD} = 5 V +/- 10%	--	0.099	0.136	V
		NMOS OD, I _{OL} = 100 µA, 1X Drive, V _{DD} = 2.5 V +/- 8%	--	0.003	0.011	V
		NMOS OD, I _{OL} = 3 mA, 1X Drive, V _{DD} = 3.3 V +/- 10%	--	0.063	0.087	V
		NMOS OD, I _{OL} = 5 mA, 1X Drive, V _{DD} = 5 V +/- 10%	--	0.079	0.114	V
		NMOS OD, I _{OL} = 100 µA, 2X Drive, V _{DD} = 2.5 V +/- 8%	--	0.001	0.002	V
		NMOS OD, I _{OL} = 3 mA, 2X Drive, V _{DD} = 3.3 V +/- 10%	--	0.033	0.046	V
		NMOS OD, I _{OL} = 5 mA, 2X Drive, V _{DD} = 5 V +/- 10%	--	0.041	0.061	V

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Table 4: EC for SLG46880 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted(Continued)

Parameter	Description	Condition	Min	Typ	Max	Unit
I _{OH}	HIGH-Level Output Current	Push-Pull, V _{OH} = V _{DD} - 0.2, 1X Drive, V _{DD} = 2.5 V +/- 8%	1.55	2.14	--	mA
		Push-Pull, V _{OH} = 2.4 V, 1X Drive, V _{DD} = 3.3 V +/- 10%	5.54	7.48	--	mA
		Push-Pull, V _{OH} = 2.4 V, 1X Drive, V _{DD} = 5 V +/- 10%	19.89	24.83	--	mA
		Push-Pull, V _{OH} = V _{DD} - 0.2, 2X Drive, V _{DD} = 2.5 V +/- 8%	3.08	4.21	--	mA
		Push-Pull, V _{OH} = 2.4 V, 2X Drive, V _{DD} = 3.3 V +/- 10%	10.92	14.72	--	mA
		Push-Pull, V _{OH} = 2.4 V, 2X Drive, V _{DD} = 5 V +/- 10%	38.89	48.60	--	mA
I _{OL}	LOW-Level Output Current	Push-Pull, V _{OL} = 0.15 V, 1X Drive, V _{DD} = 2.5 V +/- 8%	1.66	2.19	--	mA
		Push-Pull, V _{OL} = 0.4 V, 1X Drive, V _{DD} = 3.3 V +/- 10%	5.26	7.00	--	mA
		Push-Pull, V _{OL} = 0.4 V, 1X Drive, V _{DD} = 5 V +/- 10%	7.15	9.76	--	mA
		Push-Pull, V _{OL} = 0.15 V, 2X Drive, V _{DD} = 2.5 V +/- 8%	3.32	4.29	--	mA
		Push-Pull, V _{OL} = 0.4 V, 2X Drive, V _{DD} = 3.3 V +/- 10%	10.40	13.69	--	mA
		Push-Pull, V _{OL} = 0.4 V, 2X Drive, V _{DD} = 5 V +/- 10%	14.06	18.98	--	mA
		NMOS OD, V _{OL} = 0.15 V, 1X Drive, V _{DD} = 2.5 V +/- 8%	4.15	5.38	--	mA
		NMOS OD, V _{OL} = 0.4 V, 1X Drive, V _{DD} = 3.3 V +/- 10%	12.90	17.14	--	mA
		NMOS OD, V _{OL} = 0.4 V, 1X Drive, V _{DD} = 5 V +/- 10%	16.98	23.70	--	mA
		NMOS OD, V _{OL} = 0.15 V, 2X Drive, V _{DD} = 2.5 V +/- 8%	7.89	10.40	--	mA
		NMOS OD, V _{OL} = 0.4 V, 2X Drive, V _{DD} = 3.3 V +/- 10%	24.47	33.02	--	mA
		NMOS OD, V _{OL} = 0.4 V, 2X Drive, V _{DD} = 5 V +/- 10%	31.20	45.10	--	mA
T _{SU}	Startup Time	From V _{DD} rising past PON _{THR}	--	1.13	1.72	ms
T _{WR}	NVM Page Write Time		--	--	20	ms
T _{ER}	NVM Page Erase Time		--	--	20	ms
PON _{THR}	Power-On Threshold	V _{DD} Level Required to Start Up the Chip	1.64	1.84	2.11	V
POFF _{THR}	Power-Off Threshold	V _{DD} Level Required to Switch Off the Chip	0.98	1.25	1.49	V
R _{PULL}	Pull Up or Pull Down Resistance	1 M for Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD}	0.74	1.04	1.50	MΩ
		100 k for Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD}	87	104	132	kΩ
		10 k For Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD}	7	10	17	kΩ
C _{IN}	Input Capacitance			4		pF

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Table 4: EC for SLG46880 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted(Continued)

Parameter	Description	Condition	Min	Typ	Max	Unit
Note 1 GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7 are powered from V _{DD} and GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4 are powered from V _{DD2} . Note 2 No hysteresis.						

Table 5: EC for SLG46881 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted

Parameter	Description	Condition	Min	Typ	Max	Unit
V _{IH1}	HIGH-Level Input Voltage (GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11)	Logic Input (Note 2)	0.7x V _{DD}	--	V _{DD} + 0.3	V
		Logic Input with Schmitt Trigger	0.8x V _{DD}	--	V _{DD} + 0.3	V
		Low-Level Logic Input (Note 2)	1.25	--	V _{DD} + 0.3	V
		Ultra-Low Power Digital Input (Note 2)	0.7x V _{DD2}	--	V _{DD2} + 0.3	
V _{IH2}	HIGH-Level Input Voltage (GPIOs 4, 5, 6, 7)	Ultra-Low Power Digital Input (Note 2)	0.7x V _{DD2}	--	V _{DD2} + 0.3	V
V _{IL1}	LOW-Level Input Voltage (GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11)	Logic Input (Note 2)	GND- 0.3	--	0.3x V _{DD}	V
		Logic Input with Schmitt Trigger	GND- 0.3	--	0.2x V _{DD}	V
		Low-Level Logic Input (Note 2)	GND- 0.3	--	0.5	V
		Ultra-Low Power Digital Input (Note 2)	GND- 0.3	--	0.42x V _{DD2}	V
V _{IL2}	LOW-Level Input Voltage (GPIOs 4, 5, 6, 7)	Ultra-Low Power Digital Input (Note 2)	GND- 0.3	--	0.42x V _{DD2}	V
V _{HYS1}	Schmitt Trigger Hysteresis Voltage (GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11)	V _{DD} = 2.5 V +/- 8%	0.27	0.43	0.59	V
		V _{DD} = 3.3 V +/- 10%	0.32	0.46	0.59	V
		V _{DD} = 5 V +/- 10%	0.42	0.58	0.76	V
V _{OH1}	HIGH-Level Output Voltage (GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7)	Push-Pull, I _{OH} = 100 μA, 1X Drive, V _{DD} = 2.5 V +/- 8%	2.29	2.49	--	V
		Push-Pull, I _{OH} = 3 mA, 1X Drive, V _{DD} = 3.3 V +/- 10%	2.69	3.11	--	V
		Push-Pull, I _{OH} = 5 mA, 1X Drive, V _{DD} = 5 V +/- 10%	4.14	4.77	--	V
		Push-Pull, I _{OH} = 100 μA, 2X Drive, V _{DD} = 2.5 V +/- 8%	2.29	2.50	--	V
		Push-Pull, I _{OH} = 3 mA, 2X Drive, V _{DD} = 3.3 V +/- 10%	2.85	3.21	--	V
		Push-Pull, I _{OH} = 5 mA, 2X Drive, V _{DD} = 5 V +/- 10%	4.32	4.88	--	V

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Table 5: EC for SLG46881 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted(Continued)

Parameter	Description	Condition	Min	Typ	Max	Unit
V _{OH2}	HIGH-Level Output Voltage (GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4)	Push-Pull, I _{OH} = 100 μA, 1X Drive, V _{DD2} = 1.0 V +/- 5%	0.923	0.957	--	V
		Push-Pull, I _{OH} = 100 μA, 1X Drive, V _{DD2} = 1.5 V +/- 5%	1.479	1.486	--	V
		Push-Pull, I _{OH} = 100 μA, 1X Drive, V _{DD2} = 1.8 V +/- 10%	1.780	1.886	--	V
		Push-Pull, I _{OH} = 100 μA, 2X Drive, V _{DD2} = 1.0 V +/- 5%	0.937	0.966	--	V
		Push-Pull, I _{OH} = 100 μA, 2X Drive, V _{DD2} = 1.5 V +/- 5%	1.489	1.493	--	V
		Push-Pull, I _{OH} = 100 μA, 2X Drive, V _{DD2} = 1.8 V +/- 10%	1.789	1.893	--	V
V _{OL1}	LOW-Level Output Voltage (GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7)	Push-Pull, I _{OL} = 100 μA, 1X Drive, V _{DD} = 2.5 V +/- 8%	--	0.006	0.012	V
		Push-Pull, I _{OL} = 3 mA, 1X Drive, V _{DD} = 3.3 V +/- 10%	--	0.156	0.233	V
		Push-Pull, I _{OL} = 5 mA, 1X Drive, V _{DD} = 5 V +/- 10%	--	0.197	0.295	V
		Push-Pull, I _{OL} = 100 μA, 2X Drive, V _{DD} = 2.5 V +/- 8%	--	0.003	0.005	V
		Push-Pull, I _{OL} = 3 mA, 2X Drive, V _{DD} = 3.3 V +/- 10%	--	0.078	0.116	V
		Push-Pull, I _{OL} = 5 mA, 2X Drive, V _{DD} = 5 V +/- 10%	--	0.100	0.151	V
		NMOS OD, I _{OL} = 100 μA, 1X Drive, V _{DD} = 2.5 V +/- 8%	--	0.003	0.004	V
		NMOS OD, I _{OL} = 3 mA, 1X Drive, V _{DD} = 3.3 V +/- 10%	--	0.062	0.094	V
		NMOS OD, I _{OL} = 5 mA, 1X Drive, V _{DD} = 5 V +/- 10%	--	0.080	0.122	V
		NMOS OD, I _{OL} = 100 μA, 2X Drive, V _{DD} = 2.5 V +/- 8%	--	0.001	0.002	V
		NMOS OD, I _{OL} = 3 mA, 2X Drive, V _{DD} = 3.3 V +/- 10%	--	0.032	0.051	V
		NMOS OD, I _{OL} = 5 mA, 2X Drive, V _{DD} = 5 V +/- 10%	--	0.042	0.067	V

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Table 5: EC for SLG46881 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted(Continued)

Parameter	Description	Condition	Min	Typ	Max	Unit
V _{OL2}	LOW-Level Output Voltage (GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4)	Push-Pull, I _{OL} = 100 µA, 1X Drive, V _{DD2} = 1.0 V +/- 5%	--	0.015	0.022	V
		Push-Pull, I _{OL} = 100 µA, 1X Drive, V _{DD2} = 1.5 V +/- 5%	--	0.012	0.018	V
		Push-Pull, I _{OL} = 100 µA, 1X Drive, V _{DD2} = 1.8 V +/- 10%	--	0.011	0.017	V
		Push-Pull, I _{OL} = 100 µA, 2X Drive, V _{DD2} = 1.0 V +/- 5%	--	0.007	0.011	V
		Push-Pull, I _{OL} = 100 µA, 2X Drive, V _{DD2} = 1.5 V +/- 5%	--	0.006	0.011	V
		Push-Pull, I _{OL} = 100 µA, 2X Drive, V _{DD2} = 1.8 V +/- 10%	--	0.006	0.008	V
		NMOS OD, I _{OL} = 100 µA, 1X Drive, V _{DD2} = 1.0 V +/- 5%	--	0.015	0.022	V
		NMOS OD, I _{OL} = 100 µA, 1X Drive, V _{DD2} = 1.5 V +/- 5%	--	0.012	0.018	V
		NMOS OD, I _{OL} = 100 µA, 1X Drive, V _{DD2} = 1.8 V +/- 10%	--	0.011	0.017	V
		NMOS OD, I _{OL} = 100 µA, 2X Drive, V _{DD2} = 1.0 V +/- 5%	--	0.007	0.011	V
		NMOS OD, I _{OL} = 100 µA, 2X Drive, V _{DD2} = 1.5 V +/- 5%	--	0.006	0.010	V
		NMOS OD, I _{OL} = 100 µA, 2X Drive, V _{DD2} = 1.8 V +/- 10%	--	0.006	0.008	V
I _{OH1}	HIGH-Level Output Current (GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7)	Push-Pull, V _{OH} = V _{DD} - 0.2, 1X Drive, V _{DD} = 2.5 V +/- 8%	1.48	2.37	--	mA
		Push-Pull, V _{OH} = 2.4 V, 1X Drive, V _{DD} = 3.3 V +/- 10%	5.30	11.12	--	mA
		Push-Pull, V _{OH} = 2.4 V, 1X Drive, V _{DD} = 5 V +/- 10%	19.27	30.24	--	mA
		Push-Pull, V _{OH} = V _{DD} - 0.2, 2X Drive, V _{DD} = 2.5 V +/- 8%	2.91	4.67	--	mA
		Push-Pull, V _{OH} = 2.4 V, 2X Drive, V _{DD} = 3.3 V +/- 10%	10.47	21.89	--	mA
		Push-Pull, V _{OH} = 2.4 V, 2X Drive, V _{DD} = 5 V +/- 10%	37.75	59.04	--	mA
I _{OH2}	HIGH-Level Output Current (GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4)	Push-Pull, V _{OH} = 2/3 V _{DD2} , 1X Drive, V _{DD2} = 1.0 V +/- 5%	1.16	1.55	--	mA
		Push-Pull, V _{OH} = 2/3 V _{DD2} , 1X Drive, V _{DD2} = 1.5 V +/- 5%	2.84	3.40	--	mA
		Push-Pull, V _{OH} = 2/3 V _{DD2} , 1X Drive, V _{DD2} = 1.8 V +/- 10%	3.55	4.52	--	mA
		Push-Pull, V _{OH} = 2/3 V _{DD2} , 2X Drive, V _{DD2} = 1.0 V +/- 5%	2.32	3.07	--	mA
		Push-Pull, V _{OH} = 2/3 V _{DD2} , 2X Drive, V _{DD2} = 1.5 V +/- 5%	5.57	6.74	--	mA
		Push-Pull, V _{OH} = 2/3 V _{DD2} , 2X Drive, V _{DD2} = 1.8 V +/- 10%	6.99	8.95	--	mA

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Table 5: EC for SLG46881 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted(Continued)

Parameter	Description	Condition	Min	Typ	Max	Unit
I _{OL1}	LOW-Level Output Current (GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7)	Push-Pull, V _{OL} = 0.15 V, 1X Drive, V _{DD} = 2.5 V +/- 8%	1.58	2.26	--	mA
		Push-Pull, V _{OL} = 0.4 V, 1X Drive, V _{DD} = 3.3 V +/- 10%	4.94	7.24	--	mA
		Push-Pull, V _{OL} = 0.4 V, 1X Drive, V _{DD} = 5 V +/- 10%	6.65	9.82	--	mA
		Push-Pull, V _{OL} = 0.15 V, 2X Drive, V _{DD} = 2.5 V +/- 8%	3.07	4.43	--	mA
		Push-Pull, V _{OL} = 0.4 V, 2X Drive, V _{DD} = 3.3 V +/- 10%	9.63	14.18	--	mA
		Push-Pull, V _{OL} = 0.4 V, 2X Drive, V _{DD} = 5 V +/- 10%	12.86	19.13	--	mA
		NMOS OD, V _{OL} = 0.15 V, 1X Drive, V _{DD} = 2.5 V +/- 8%	3.83	5.55	--	mA
		NMOS OD, V _{OL} = 0.4 V, 1X Drive, V _{DD} = 3.3 V +/- 10%	11.92	17.72	--	mA
		NMOS OD, V _{OL} = 0.4 V, 1X Drive, V _{DD} = 5 V +/- 10%	15.81	23.84	--	mA
		NMOS OD, V _{OL} = 0.15 V, 2X Drive, V _{DD} = 2.5 V +/- 8%	7.18	10.72	--	mA
		NMOS OD, V _{OL} = 0.4 V, 2X Drive, V _{DD} = 3.3 V +/- 10%	22.17	34.11	--	mA
		NMOS OD, V _{OL} = 0.4 V, 2X Drive, V _{DD} = 5 V +/- 10%	28.68	45.34	--	mA
I _{OL2}	LOW-Level Output Current (GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4)	Push-Pull, V _{OL} = 1/3 V _{DD2} , 1X Drive, V _{DD2} = 1.0 V +/- 5%	1.37	1.85	--	mA
		Push-Pull, V _{OL} = 1/3 V _{DD2} , 1X Drive, V _{DD2} = 1.5 V +/- 5%	3.26	4.00	--	mA
		Push-Pull, V _{OL} = 1/3 V _{DD2} , 1X Drive, V _{DD2} = 1.8 V +/- 10%	4.09	5.27	--	mA
		Push-Pull, V _{OL} = 1/3 V _{DD2} , 2X Drive, V _{DD2} = 1.0 V +/- 5%	2.70	3.67	--	mA
		Push-Pull, V _{OL} = 1/3 V _{DD2} , 2X Drive, V _{DD2} = 1.5 V +/- 5%	6.42	7.93	--	mA
		Push-Pull, V _{OL} = 1/3 V _{DD2} , 2X Drive, V _{DD2} = 1.8 V +/- 10%	8.08	10.44	--	mA
		NMOS OD, V _{OL} = 1/3 V _{DD2} , 1X Drive, V _{DD2} = 1.0 V +/- 5%	1.38	1.85	--	mA
		NMOS OD, V _{OL} = 1/3 V _{DD2} , 1X Drive, V _{DD2} = 1.5 V +/- 5%	3.24	4.00	--	mA
		NMOS OD, V _{OL} = 1/3 V _{DD2} , 1X Drive, V _{DD2} = 1.8 V +/- 10%	4.08	5.27	--	mA
		NMOS OD, V _{OL} = 1/3 V _{DD2} , 2X Drive, V _{DD2} = 1.0 V +/- 5%	2.70	3.67	--	mA
		NMOS OD, V _{OL} = 1/3 V _{DD2} , 2X Drive, V _{DD2} = 1.5 V +/- 5%	6.43	7.92	--	mA
		NMOS OD, V _{OL} = 1/3 V _{DD2} , 2X Drive, V _{DD2} = 1.8 V +/- 10%	8.09	10.44	--	mA
T _{SU}	Startup Time	From V _{DD} rising past PON _{THR}	--	1.13	1.72	ms
PON _{THR}	Power-On Threshold	V _{DD} Level Required to Start Up the Chip	1.64	1.84	2.11	V

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Table 5: EC for SLG46881 at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted(Continued)

Parameter	Description	Condition	Min	Typ	Max	Unit
POFF _{THR}	Power Off Threshold	V _{DD} Level Required to Switch Off the Chip	0.98	1.25	1.49	V
R _{PULL}	Pull Up or Pull Down Resistance	1 M for Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD}	0.85	1.048	1.32	MΩ
		100 k for Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD}	87	104.4	131	kΩ
		10 k for Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD}	7	10.36	14	kΩ
		1 M for Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD2}	0.85	1.05	1.35	MΩ
		100 k for Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD2}	88	112.5	150	kΩ
		10 k for Pull Up: V _{IN} = GND; for Pull Down: V _{IN} = V _{DD2}	9	14.14	22	kΩ
C _{IN}	Input Capacitance			4		pF
Note 1 GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7 are powered from V _{DD} and GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4 are powered from V _{DD2} . Note 2 No hysteresis.						

Table 6: EC of the I²C Pins at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted

Parameter	Description	Condition	Fast-Mode		Fast-Mode Plus		Unit
			Min	Max	Min	Max	
V _{IL}	LOW-level Input Voltage		-0.5	0.3V _{DD}	-0.5	0.3 V _{DD}	V
V _{IH}	HIGH-level Input Voltage		0.7V _{DD}	5.5	0.7V _{DD}	5.5	V
V _{HYS}	Hysteresis of Schmitt Trigger Inputs		0.05V _{DD}	--	0.05V _{DD}	--	V
V _{OL1}	LOW-Level Output Voltage 1	(open drain or open collector) at 3mA sink current V _{DD} > 2 V	0	0.4	0	0.4	V
V _{OL2}	LOW-Level Output Voltage 2	(open drain or open collector) at 2 mA sink current V _{DD} ≤ 2 V	0	0.2V _{DD}	0	0.2V _{DD}	V
I _{OL}	LOW-Level Output Current (Note 1)	V _{OL} = 0.4 V, V _{DD} = 2.3 V	3	--	19.28	--	mA
		V _{OL} = 0.4 V, V _{DD} = 3.0 V	3	--	20	--	mA
		V _{OL} = 0.4 V, V _{DD} = 4.5 V	3	--	20	--	mA
		V _{OL} = 0.6 V	6	--	--	--	mA
t _{of}	Output Fall Time from V _{IHmin} to V _{ILmax} (Note 1)		14x (V _{DD} /5.5V)	250	10x (V _{DD} /5.5V)	120	ns
t _{SP}	Pulse Width of Spikes that must be suppressed by the Input Filter		0	50	0	50	ns

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Table 6: EC of the I²C Pins at T = -40 °C to +85 °C, VDD = 2.3 V to 5.5 V Unless Otherwise Noted(Continued)

Parameter	Description	Condition	Fast-Mode		Fast-Mode Plus		Unit
			Min	Max	Min	Max	
I _i	Input Current each IO Pin	0.1V _{DD} < V _I < 0.9V _{DDmax}	-10	+10	-10	+10	μA
C _i	Capacitance for each IO Pin		--	10	--	10	pF

Note 1 Does not meet standard I²C specifications: t_{of} = 20x(VDD/5.5V) (min); For Fast-mode Plus I_{OL} = 20 mA (min) at V_{OL} = 0.4 V.

Note 2 For Fast-mode Plus SDA pin must be configured as 2x NMOS open drain, see registers [737:736] in section 21.

Table 7: I²C Pins Timing Characteristics at T = -40 °C to +85 °C, VDD = 2.3 V to 5.5 V Unless Otherwise Noted

Symbol	Parameter	Condition/Note	Fast-Mode		Fast-Mode Plus		Unit
			Min	Max	Min	Max	
F _{SCL}	Clock Frequency, SCL		--	400	--	1000	kHz
t _{LOW}	Clock Pulse Width Low		1300	--	500	--	ns
t _{HIGH}	Clock Pulse Width High		600	--	260	--	ns
t _I	Input Filter Spike Suppression (SCL, SDA)	V _{DD} = 2.5 V ± 8%	--	95	--	168	ns
		V _{DD} = 3.3 V ± 10%	--	95	--	157	
		V _{DD} = 5.0 V ± 10%	--	111	--	156	
t _{AA}	Clock Low to Data Out Valid		--	900	--	450	ns
t _{BUF}	Bus Free Time between Stop and Start		1300	--	500	--	ns
t _{HD_STA}	Start Hold Time		600	--	260	--	ns
t _{SU_STA}	Start Set-up Time		600	--	260	--	ns
t _{HD_DAT}	Data Hold Time		0	--	0	--	ns
t _{SU_DAT}	Data Set-up Time		100	--	50	--	ns
t _R	Inputs Rise Time		--	300	--	120	ns
t _F	Inputs Fall Time		--	300	--	120	ns
t _{SU_STO}	Stop Set-up Time		600	--	260	--	ns
t _{DH}	Data Out Hold Time		50	--	50	--	ns

Note 1 Timing diagram can be found in the [Figure 134](#).

Table 8: Asynchronous State Machine Specifications at T = 25°C

Parameter	Description	Condition	Min	Typ	Max	Unit
t _{st_out_delay}	Asynchronous State Machine Output Delay Time	V _{DD} = 2.5 V ± 8 %	133	--	277	ns
		V _{DD} = 3.3 V ± 10%	96		190	
		V _{DD} = 5.0 V ± 10 %	70	--	123	

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Table 8: Asynchronous State Machine Specifications at T = 25°C(Continued) (Continued)

Parameter	Description	Condition	Min	Typ	Max	Unit
t_{st_out}	Asynchronous State Machine Output Transition Time	$V_{DD} = 2.5\text{ V} \pm 8\%$	--	--	165	ns
		$V_{DD} = 3.3\text{ V} \pm 10\%$	--	--	70	
		$V_{DD} = 5.0\text{ V} \pm 10\%$	--	--	46	
t_{st_pulse}	Asynchronous State Machine Input Pulse Acceptance Time	$V_{DD} = 2.5\text{ V} \pm 8\%$	28	--	--	ns
		$V_{DD} = 3.3\text{ V} \pm 10\%$	19	--	--	
		$V_{DD} = 5.0\text{ V} \pm 10\%$	12	--	--	
t_{st_comp}	Asynchronous State Machine Input Complete Time	$V_{DD} = 2.5\text{ V} \pm 8\%$	--	--	10	ns
		$V_{DD} = 3.3\text{ V} \pm 10\%$	--	--	7	
		$V_{DD} = 5.0\text{ V} \pm 10\%$	--	--	5	
$t_{st\_sequen-tial\_delay}$	Asynchronous State Machine Sequential Output Delay Time	$V_{DD} = 2.5\text{ V} \pm 8\%$	229	--	485	ns
		$V_{DD} = 3.3\text{ V} \pm 10\%$	162	--	330	
		$V_{DD} = 5.0\text{ V} \pm 10\%$	119	--	208	
$t_{st\_dmlatch\_delay}$	Asynchronous State Machine Dynamic Memory Latch Delay	$V_{DD} = 2.5\text{ V} \pm 8\%$	229	--	485	ns
		$V_{DD} = 3.3\text{ V} \pm 10\%$	162	--	330	
		$V_{DD} = 5.0\text{ V} \pm 10\%$	119	--	208	

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Table 9: Typical Current Estimated for Each Macrocell at T = -40 °C to +85 °C

Parameter	Description	Note	V _{DD} = 2.5 V	V _{DD} = 3.3V	V _{DD} = 5.0V	Unit
I	Current	Chip Quiescent (I ² C enable)	0.11	0.13	0.20	μA
		Chip Quiescent (I ² C disable)	0.10	0.12	0.20	μA
		Vref (SourceNone, SourceTempSensor)	0.39	0.43	0.53	μA
		Vref (ACMPxH or ACMPxL, 0.32 mV)	4.03	4.16	4.43	μA
		ACMP0H, 100 μA disabled, hysteresis disabled, gain 1 or 0.25, +IN - GPIO10, Vref = 32 mV	21.21	21.59	22.87	μA
		ACMP0H, 100 μA disabled, hysteresis disabled, gain 1, Buffered +IN - GPIO10, Vref = 32 mV	24.59	24.99	26.40	μA
		ACMP0,1H, 100 μA disabled, hysteresis disabled, gain 1, +IN - GPIO10, GPIO11, Vref = 32 mV	34.97	35.67	38.02	μA
		ACMP0,1H 100 μA disabled, ACMP2, 3L, hysteresis disabled, gain 1, +IN - GPIO10, GPIO11, GPO5, GPO6, Vref = 32 mV	36.32	36.96	39.37	μA
		ACMP0H, 100 μA disabled, hysteresis disabled, gain 1, +IN - V _{DD} , Vref = 32 mV	37.06	38.41	41.99	μA
		ACMP0H, 100 μA enabled, hysteresis disabled, gain 1, +IN - GPIO10, Vref = 32 mV	46.59	48.00	51.52	μA
		ACMP2L, hysteresis disabled, gain 1 or 0.25, +IN - GPO5, Vref = 32 mV	1.61	1.65	1.78	μA
		ACMP2,3L, hysteresis disabled, gain 1, +IN - GPO5, GPO6, Vref = 32 mV	1.86	1.91	2.04	μA
		OSC2 25 MHz, pre-divider = 1	111.45	150.85	244.34	μA
		OSC2 25 MHz, pre-divider = 4	42.67	54.93	84.46	μA
		OSC2 25 MHz, pre-divider = 8	30.94	38.56	57.16	μA
		OSC1 2.048 MHz, pre-divider = 1	16.20	17.52	20.42	μA
		OSC1 2.048 MHz, pre-divider = 4	13.83	14.37	15.60	μA
		OSC1 2.048 MHz, pre-divider = 8	13.42	13.83	14.78	μA
		OSC0 2.048 kHz, pre-divider = 1 or 4 or 8	0.39	0.43	0.53	μA
		1x push-pull + 4 pF @ 25 kHz	0.4	5	16	μA
		1x push-pull + 4 pF @ 2 MHz	22	47	106	μA
		Temperature Sensor, range 0.75 to 1.2, Source Matrix	4.64	4.74	4.85	μA
		Temperature Sensor, range 0.62 to 0.99, Source Matrix or Register	4.60	4.71	4.82	μA
		Temperature Sensor, range 0.62 to 0.99, Source Matrix or GPIO11	4.15	4.41	6.73	μA

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3.4 TIMING CHARACTERISTICS

Table 10: Typical Delay Estimated for Each Macrocell at T = 25°C

Parameter	Description	Note	V _{DD} = 2.5 V		V _{DD} = 3.3 V		V _{DD} = 5 V		Unit
			Rising	Falling	Rising	Falling	Rising	Falling	
tpd	Delay	DFF Q	19	20	13	15	9	11	ns
tpd	Delay	DFF nQ	20	19	14	15	10	11	ns
tpd	Delay	DFF nRESET Q	--	23	--	16	--	11	ns
tpd	Delay	DFF nRESET nQ	23	--	15	--	10	--	ns
tpd	Delay	DFF nSET Q	23	--	15	--	10	--	ns
tpd	Delay	DFF nSET nQ	--	23	--	17	--	12	ns
tpd	Delay	DFF1 Second Q	20	21	14	15	9	11	ns
tpd	Delay	DFF1 Second nQ	21	20	14	15	9	10	ns
tpd	Delay	LATCH Q	18	20	13	14	9	10	ns
tpd	Delay	LATCH nQ	20	18	14	14	8	10	ns
tpd	Delay	LATCH nRESET Q	23	24	16	17	11	12	ns
tpd	Delay	LATCH nRESET nQ	24	24	16	17	11	13	ns
tpd	Delay	LATCH nSET Q	21	21	14	16	9	12	ns
tpd	Delay	LATCH nSET nQ	21	21	15	16	10	11	ns
tpd	Delay	LATCH1 second Q	20	21	14	15	9	11	ns
tpd	Delay	LATCH1 second nQ	21	20	15	15	10	11	ns
tpd	Delay	2-bit LUT	18	17	12	12	8	8	ns
tpd	Delay	3-bit LUT	22	24	16	18	11	13	ns
tpd	Delay	4-bit LUT	22	24	16	17	11	13	ns
tpd	Delay	DM 2-bit LUT IN0	16	18	11	13	7	9	ns
tpd	Delay	DM 3-bit LUT IN0 to 2-bit LUT IN0	18	21	13	15	9	10	ns
tpd	Delay	DM 3-bit LUT IN0 to CNT One Shot to 2-bit LUT IN1	52	55	38	39	26	26	ns
tpd	Delay	DM 3-bit LUT IN1 to 2-bit LUT IN0	17	19	12	14	8	9	ns
tpd	Delay	DM 3-bit LUT IN2 to 2-bit LUT IN0	18	19	12	14	8	10	ns
tpd	Delay	DM CNT Edge detect to 2-bit LUT IN1	41	42	29	30	20	20	ns
tpd	Delay	DM CNT Frequency detect to 2-bit LUT IN1	54	55	38	39	27	27	ns
tpd	Delay	DM CNT One Shot to 2-bit LUT IN1	52	54	37	38	25	26	ns
tpd	Delay	DM CNT Delay to 2-bit LUT IN1	44	44	31	32	21	22	ns
tpd	Delay	Low Voltage Digital input to PP 1X	42	224	29	152	20	96	ns
tpd	Delay	Digital input to with Schmitt Trigger to PP 1x	35	37	23	26	16	18	ns
tpd	Delay	Digital input to PP 1x	35	37	23	26	16	18	ns
tpd	Delay	Digital input to PP 2x	30	35	21	24	14	17	ns
tpd	Delay	PP 1x 3-State (Z to 0)	--	30	--	21	--	15	ns
tpd	Delay	PP 1x 3-State (Z to 1)	34	--	23	--	16	--	ns
tpd	Delay	PP 2x 3-State (Z to 0)	--	29	--	20	--	14	ns
tpd	Delay	PP 2x 3-State (Z to 1)	31	--	22	--	15	--	ns
tpd	Delay	Digital input to NMOS 1x	--	33	--	23	--	16	ns
tpd	Delay	Digital input to NMOS 2x	--	32	--	22	--	15	ns

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Table 10: Typical Delay Estimated for Each Macrocell at T = 25°C(Continued)

Parameter	Description	Note	V _{DD} = 2.5 V		V _{DD} = 3.3 V		V _{DD} = 5 V		Unit
			Rising	Falling	Rising	Falling	Rising	Falling	
tpd	Delay	Ripple UP CLK CNT Q0	19	18	13	14	9	10	ns
tpd	Delay	Ripple UP CLK CNT Q1	24	26	17	19	12	15	ns
tpd	Delay	Ripple UP CLK CNT Q2	31	26	22	19	16	15	ns
tpd	Delay	Ripple DOWN CLK CNT Q0	18	18	13	14	9	10	ns
tpd	Delay	Ripple DOWN CLK CNT Q1	29	24	21	18	14	13	ns
tpd	Delay	Ripple DOWN CLK CNT Q2	29	31	21	23	15	17	ns
tpd	Delay	Ripple UP nSET CNT Q0	25	--	17	--	11	--	ns
tpd	Delay	Ripple UP nSET CNT Q1	24	--	17	--	11	--	ns
tpd	Delay	Ripple UP nSET CNT Q2	25	--	18	--	12	--	ns
tpd	Delay	Ripple DOWN nSET CNT Q0	25	--	17	--	11	--	ns
tpd	Delay	Ripple DOWN nSET CNT Q1	24	--	17	--	11	--	ns
tpd	Delay	Ripple DOWN nSET CNT Q2	25	--	17	--	12	--	ns
tpd	Delay	PGen CLK	18	18	12	13	8	10	ns
tpd	Delay	PGen nRESET (Z to 0)	--	20	--	15	--	11	ns
tpd	Delay	PGen nRESET (Z to 1)	22	--	15	--	10	--	ns
tpd	Delay	Pipe Delay Q	22	22	16	16	11	12	ns
tpd	Delay	Pipe Delay nQ	22	24	16	18	11	13	ns
tpd	Delay	Filter Q	165	144	112	101	71	68	ns
tpd	Delay	Filter nQ	145	164	101	113	67	72	ns
tpd	Delay	Edge detect	24	25	16	17	12	11	ns
tpd	Delay	Edge detect Delayed	242	243	177	179	129	130	ns
tw	Width	Edge detect	241	241	160	160	118	118	ns

Table 11: Typical Delay Estimated for F(1) at T = 25°C

Parameter	Description	Note	V _{DD} = 2.5 V	V _{DD} = 3.3 V	V _{DD} = 5 V	Unit
tpd	Delay	Delay 0	159	111	71	ns
tpd	Delay	Delay 1	424	362	313	ns
tpd	Delay	Delay 10	786	722	672	ns
tpd	Delay	Delay 20	1185	1111	1070	ns
tpd	Delay	Delay 100	4395	4323	4264	ns
tpd	Delay	LOOP without Delay data	147	101	65	ns
tpd	Delay	LOOP with 0 Delay data	159	111	72	ns
tpd	Delay	LOOP with 1 Delay data	424	362	314	ns
tpd	Delay	LOOP with 10 Delay data	785	723	672	ns
tpd	Delay	LOOP with 20 Delay data	1186	1123	1071	ns
tpd	Delay	LOOP with 100 Delay data	4395	4324	4263	ns
tpd	Delay	INV	161	111	70	ns
tpd	Delay	AND	160	109	69	ns
tpd	Delay	OR	161	109	69	ns
tpd	Delay	XOR	160	109	69	ns

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Table 11: Typical Delay Estimated for F(1) at T = 25°C(Continued)

Parameter	Description	Note	V _{DD} = 2.5 V	V _{DD} = 3.3 V	V _{DD} = 5 V	Unit
tpd	Delay	LOADx	322	219	137	ns
tpd	Delay	OUTx	163	110	69	ns
tpd	Delay	POP	160	109	69	ns
tpd	Delay	PUSH0	161	111	70	ns
tpd	Delay	RESET (Time for OUT0)	74	52	34	ns
tpd	Delay	RESET (Time to f1 init)	89	61	41	ns

Table 12: Programmable Delay Expected Delays and Widths (Typical) T = 25 °C

Parameter	Description	Note	V _{DD} = 2.5 V	V _{DD} = 3.3V	V _{DD} = 5.0V	Unit
time1	Pulse Width, 1 cell	mode: (any) edge detect, edge detect output	325	150	110	ns
time1	Pulse Width, 2 cell	mode: (any) edge detect, edge detect output	740	300	225	ns
time1	Pulse Width, 3 cell	mode: (any) edge detect, edge detect output	1020	450	340	ns
time1	Pulse Width, 4 cell	mode: (any) edge detect, edge detect output	1350	600	450	ns
time2	Delay, 1 cell	mode: (any) edge detect, edge detect output	44	18	14	ns
time2	Delay, 2 cell	mode: (any) edge detect, edge detect output	44	18	14	ns
time2	Delay, 3 cell	mode: (any) edge detect, edge detect output	44	18	14	ns
time2	Delay, 4 cell	mode: (any) edge detect, edge detect output	44	18	14	ns
time1	Pulse Width, 1 cell	mode: delayed (any) edge detect, delayed edge detect output	340	150	110	ns
time1	Pulse Width, 2 cell	mode: delayed (any) edge detect, delayed edge detect output	670	300	220	ns
time1	Pulse Width, 3 cell	mode: delayed (any) edge detect, delayed edge detect output	1000	450	335	ns
time1	Pulse Width, 4 cell	mode: delayed (any) edge detect, delayed edge detect output	1340	600	450	ns
time2	Delay, 1 cell	mode: delayed (any) edge detect, delayed edge detect output	570	220	140	ns
time2	Delay, 2 cell	mode: delayed (any) edge detect, delayed edge detect output	570	220	140	ns
time2	Delay, 3 cell	mode: delayed (any) edge detect, delayed edge detect output	570	220	140	ns
time2	Delay, 4 cell	mode: delayed (any) edge detect, delayed edge detect output	570	220	140	ns
time2	Delay, 1 cell	mode: both edge delay, edge detect output	382	375	126	ns
time2	Delay, 2 cell	mode: both edge delay, edge detect output	713	169	237	ns
time2	Delay, 3 cell	mode: both edge delay, edge detect output	1045	318	350	ns
time2	Delay, 4 cell	mode: both edge delay, edge detect output	1370	466	460	ns
time2	Delay, 1 cell	mode: both edge delay, delayed edge detect output	900	613	250	ns
time2	Delay, 2 cell	mode: both edge delay, delayed edge detect output	1250	520	360	ns
time2	Delay, 3 cell	mode: both edge delay, delayed edge detect output	1600	680	480	ns
time2	Delay, 4 cell	mode: both edge delay, delayed edge detect output	1900	815	600	ns

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Table 13: Typical Filter Rejection Pulse Width at T = 25°C

Parameter	V _{DD} = 2.5 V	V _{DD} = 3.3V	V _{DD} = 5.0V	Unit
Filtered Pulse Width	< 123	< 84	< 52	ns

Table 14: Typical Counter/Delay Offset Measurements at T = 25°C

Parameter	OSC Freq	OSC Power	V _{DD} = 2.5 V	V _{DD} = 3.3V	V _{DD} = 5.0V	Unit
Power-ON time	25 MHz	auto	0.13	0.13	0.13	μs
Power-ON time	2.048 MHz	auto	0.3	0.4	0.4	μs
Power-ON time	2.048 kHz	auto	660	570	480	μs
frequency settling time	25 MHz	auto	4	4	8	μs
frequency settling time	2.048 MHz	auto	0.3	0.4	0.4	μs
frequency settling time	2.048 kHz	auto	660	570	480	μs
variable (CLK period)	25 MHz	forced	0-40	0-40	0-40	μs
variable (CLK period)	2.048 MHz	forced	0-0.5	0-0.5	0-0.5	μs
variable (CLK period)	2.048 kHz	forced	0-488	0-488	0-488	μs
tpd (non-delayed edge)	25 MHz/ 2.048 kHz	either	35	14	10	ns

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3.5 OSCILLATOR CHARACTERISTICS

Table 15: Oscillator0 2.048 kHz Frequency Limits

Power Supply Range (V _{DD}), V	Temperature Range			
	+25 °C		-40 °C to +85 °C	
	Minimum Value, kHz	Maximum Value, kHz	Minimum Value, kHz	Maximum Value, kHz
2.5 V ±8 %	2.026	2.071	1.907	2.088
3.3 V ±10 %	2.025	2.070	1.906	2.088
5 V ±10 %	2.025	2.071	1.905	2.087
2.5 V to 4.5 V	2.026	2.071	1.906	2.088
2.3 V to 5.5 V	2.025	2.071	1.905	2.088

Table 16: Oscillator0 2.048 kHz Frequency Error (Error Calculated Relative to Nominal Value)

Power Supply Range (V _{DD}), V	Temperature Range			
	+25 °C		-40 °C to +85 °C	
	Error (% at Minimum)	Error (% at Maximum)	Error (% at Minimum)	Error (% at Maximum)
2.5 V ±8 %	-1.07 %	1.12 %	-6.91 %	1.95 %
3.3 V ±10 %	-1.09 %	1.09 %	-6.94 %	1.94 %
5 V ±10 %	-1.12 %	1.11 %	-6.96 %	1.92 %
2.5 V to 4.5 V	-1.09 %	1.10 %	-6.96 %	1.95 %
2.3 V to 5.5 V	-1.12 %	1.12 %	-6.96 %	1.95 %

Table 17: Oscillator1 2.048 MHz Frequency Limits

Power Supply Range (V _{DD}), V	Temperature Range			
	+25 °C		-40 °C to +85 °C	
	Minimum Value, MHz	Maximum Value, MHz	Minimum Value, MHz	Maximum Value, MHz
2.5 V ±8 %	2.021	2.068	1.987	2.088
3.3 V ±10 %	2.024	2.069	1.990	2.089
5 V ±10 %	2.026	2.072	1.994	2.092
2.5 V to 4.5 V	2.022	2.071	1.988	2.090
2.3 V to 5.5 V	2.021	2.072	1.987	2.092

Table 18: Oscillator1 2.048 MHz Frequency Error (Error Calculated Relative to Nominal Value)

Power Supply Range (V _{DD}), V	Temperature Range			
	+25 °C		-40 °C to +85 °C	
	Error (% at Minimum)	Error (% at Maximum)	Error (% at Minimum)	Error (% at Maximum)
2.5 V ±8 %	-1.32 %	0.96 %	-2.98 %	1.93 %
3.3 V ±10 %	-1.14 %	1.01 %	-2.80 %	2.01 %

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Table 18: Oscillator1 2.048 MHz Frequency Error (Error Calculated Relative to Nominal Value)(Continued)

Power Supply Range (V _{DD}), V	Temperature Range			
	+25 °C		-40 °C to +85 °C	
	Error (% at Minimum)	Error (% at Maximum)	Error (% at Minimum)	Error (% at Maximum)
5 V ±10 %	-1.03 %	1.18 %	-2.61 %	2.13 %
2.5 V to 4.5 V	-1.27 %	1.09 %	-2.91 %	2.04 %
2.3 V to 5.5 V	-1.32 %	1.18 %	-2.98 %	2.13 %

Table 19: Oscillator2 25 MHz Frequency Limits

Power Supply Range (V _{DD}), V	Temperature Range			
	+25 °C		-40 °C to +85 °C	
	Minimum Value, MHz	Maximum Value, MHz	Minimum Value, MHz	Maximum Value, MHz
2.5 V ±8 %	24.588	25.238	23.622	25.669
3.3 V ±10 %	24.668	25.261	23.678	25.732
5 V ±10 %	24.736	25.353	23.723	25.803
2.5 V to 4.5 V	24.620	25.288	23.656	25.769
2.3 V to 5.5 V	24.588	25.353	23.622	25.803

Table 20: Oscillator2 25 MHz Frequency Error (Error Calculated Relative to Nominal Value)

Power Supply Range (V _{DD}), V	Temperature Range			
	+25 °C		-40 °C to +85 °C	
	Error (% at Minimum)	Error (% at Maximum)	Error (% at Minimum)	Error (% at Maximum)
2.5 V ±8 %	-1.65 %	0.96 %	-5.51 %	2.68 %
3.3 V ±10 %	-1.33 %	1.05 %	-5.29 %	2.93 %
5 V ±10 %	-1.06 %	1.42 %	-5.11 %	3.21 %
2.5 V to 4.5 V	-1.52 %	1.16 %	-5.38 %	3.08 %
2.3 V to 5.5 V	-1.65 %	1.42 %	-5.51 %	3.21 %

3.5.1 OSC Power-On Delay

Table 21: Oscillators Power-On Delay at T = 25 °C, OSC Power Mode: "Auto Power-On"

Power Supply Range (V _{DD}), V	Oscillator0 2.048 kHz		Oscillator1 2.048 MHz		Oscillator2 25 MHz		Oscillator2 25MHz Start with Delay	
	Typical Value, µs	Maximum Value, µs	Typical Value, µs	Maximum Value, µs	Typical Value, µs	Maximum Value, µs	Typical Value, µs	Maximum Value, µs
2.3	702.100	879.295	0.314	0.329	0.034	0.040	0.131	0.142
2.5	663.423	824.027	0.291	0.308	0.029	0.035	0.130	0.140
2.7	632.868	779.510	0.274	0.291	0.025	0.029	0.128	0.139
3	597.220	728.822	0.322	0.972	0.021	0.024	0.127	0.137

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Table 21: Oscillators Power-On Delay at T = 25 °C, OSC Power Mode: "Auto Power-On"

Power Supply Range (V _{DD}), V	Oscillator0 2.048 kHz		Oscillator1 2.048 MHz		Oscillator2 25 MHz		Oscillator2 25MHz Start with Delay	
	Typical Value, μ s	Maximum Value, μ s	Typical Value, μ s	Maximum Value, μ s	Typical Value, μ s	Maximum Value, μ s	Typical Value, μ s	Maximum Value, μ s
3.3	569.862	690.555	0.411	0.842	0.018	0.020	0.126	0.139
3.6	548.042	660.574	0.434	0.454	0.015	0.019	0.126	0.139
4	525.124	628.266	0.423	0.441	0.013	0.015	0.126	0.139
4.2	515.409	615.041	0.418	0.437	0.012	0.015	0.127	0.141
4.5	502.266	596.996	0.412	0.431	0.011	0.015	0.128	0.142
5	481.578	570.706	0.404	0.422	0.010	0.011	0.129	0.143
5.5	457.522	539.814	0.397	0.415	0.010	0.010	0.129	0.143

3.6 ANALOG COMPARATOR CHARACTERISTICS

Table 22: Analog Comparator Specifications at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted

Parameter	Description	Note	Condition	Min	Typ	Max	Unit
V _{ACMP}	ACMP0H, ACMP1H, ACMP2L, ACMP3L Input Voltage Range	Positive Input	V _{DD} = 2.5 V ± 5 %	0	--	V _{DD}	V
		Negative Input		0	--	2.016	V
		Positive Input	V _{DD} = 3.3 V ± 10 %	0	--	V _{DD}	V
		Negative Input		0	--	2.016	V
		Positive Input	V _{DD} = 5.0 V ± 10 %	0	--	V _{DD}	V
		Negative Input		0	--	2.016	V
V _{offset}	ACMP0H, ACMP1H Input Offset Voltage	V _{hys} = 0 mV, Gain = 1, V _{ref} = 32 mV to 2016 mV	T = 25°C	0	--	5.68	mV
				0	--	6.33	mV
	ACMP2L, ACMP3L Input Offset Voltage		T = 25°C	0	--	5.09	mV
				0	--	5.55	mV
t _{start}	ACMP0H, ACMP1H Start Time	ACMP Power-On delay, Minimal required wake time for the “Wake and Sleep function”	T = 25°C	--	25.0	36.3	μs
				--	26.2	51.4	μs
	ACMP2L, ACMP3L Start Time		T = 25°C	--	139.3	233.3	μs
				--	144.6	326.6	μs

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Table 22: Analog Comparator Specifications at T = -40 °C to +85 °C, VDD = 2.3 V to 5.5 V Unless Otherwise Noted

Parameter	Description	Note	Condition	Min	Typ	Max	Unit
V_{HYS}	ACMP0H, ACMP1H Built-in Hysteresis	$V_{HYS} = 32 \text{ mV}$	$T = 25^{\circ}\text{C}$	23.60	--	36.74	mV
		$V_{HYS} = 64 \text{ mV}$	$T = 25^{\circ}\text{C}$	56.32	--	66.79	mV
		$V_{HYS} = 196 \text{ mV}$	$T = 25^{\circ}\text{C}$	189.50	--	196.00	mV
		$V_{HYS} = 32 \text{ mV}$		21.16	--	38.84	mV
		$V_{HYS} = 64 \text{ mV}$		52.77	--	67.32	mV
		$V_{HYS} = 196 \text{ mV}$		180.62	--	196.00	mV
	ACMP2L, ACMP3L Built-in Hysteresis	$V_{HYS} = 32 \text{ mV}$	$T = 25^{\circ}\text{C}$	26.46	--	34.43	mV
		$V_{HYS} = 64 \text{ mV}$	$T = 25^{\circ}\text{C}$	56.58	--	67.38	mV
		$V_{HYS} = 196 \text{ mV}$	$T = 25^{\circ}\text{C}$	185.24	--	197.32	mV
		$V_{HYS} = 32 \text{ mV}$		22.28	--	36.86	mV
		$V_{HYS} = 64 \text{ mV}$		54.49	--	68.02	mV
		$V_{HYS} = 196 \text{ mV}$		183.47	--	197.32	mV
R_{sin}	Series Input Resistance	Gain = 1x		--	100.0	--	$M\Omega$
		Gain = 0.5x		--	1.0	--	$M\Omega$
		Gain = 0.33x		--	0.8	--	$M\Omega$
		Gain = 0.25x		--	1.0	--	$M\Omega$
PROP	Propagation Delay, Response Time for ACMP0H, ACMP1H	Gain = 1, $V_{ref} = 32 \text{ mV}$ to 2016 mV, Overdrive = 5 mV	Low to High	--	2.53	4.73	μs
			High to Low	--	1.88	9.48	μs
		Gain = 1, $V_{ref} = 32 \text{ mV}$ to 2016 mV, Overdrive = 10 mV	Low to High	--	1.75	3.20	μs
			High to Low	--	1.36	2.30	μs
		Gain = 1, $V_{ref} = 32 \text{ mV}$ to 2016 mV, Overdrive = 100 mV	Low to High	--	0.81	7.42	μs
			High to Low	--	0.55	0.84	μs
	Propagation Delay, Response Time for ACMP2L, ACMP3L	Gain = 1, $V_{ref} = 32 \text{ mV}$ to 2016 mV, Overdrive = 5 mV	Low to High	--	74.91	139.75	μs
			High to Low	--	72.28	213.26	μs
		Gain = 1, $V_{ref} = 32 \text{ mV}$ to 2016 mV, Overdrive = 10 mV	Low to High	--	49.54	70.23	μs
			High to Low	--	46.92	68.44	μs
		Gain = 1, $V_{ref} = 32 \text{ mV}$ to 2016 mV, Overdrive = 100 mV	Low to High	--	18.41	29.06	μs
			High to Low	--	16.54	26.87	μs
G	Gain error (including threshold and internal V_{ref} error)	G = 1,		--	1	--	
		G = 0.5,		0.497	--	0.504	
		G = 0.33,		0.330	--	0.337	
		G = 0.25,		0.247	--	0.253	

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Table 22: Analog Comparator Specifications at T = -40 °C to +85 °C, V_{DD} = 2.3 V to 5.5 V Unless Otherwise Noted

Parameter	Description	Note	Condition	Min	Typ	Max	Unit
V _{ref}	V _{ref0} Output Capacitance Loading		Resistance Load = 1 MΩ	--	--	5	pF
			Resistance Load = 560 kΩ	--	--	10	pF
			Resistance Load = 100 kΩ	--	--	40	pF
			Resistance Load = 10 kΩ	--	--	80	pF
			Resistance Load = 2 kΩ	--	--	120	pF
			Resistance Load = 1 kΩ, V _{ref} = 32 mV to 1024 mV	--	--	150	pF
V _{ref}	V _{ref1} Output Capacitance Loading		Resistance Load = 1 MΩ	--	--	15	pF
			Resistance Load = 560 kΩ	--	--	27	pF
			Resistance Load = 100 kΩ	--	--	64	pF
			Resistance Load = 10 kΩ	--	--	120	pF
			Resistance Load = 2 kΩ	--	--	180	pF
			Resistance Load = 1 kΩ, V _{ref} = 32 mV to 1024 mV	--	--	210	pF
I _s	Input Current Source		V _{in} = V _{DD} - 0.7 V	83.3	95.4	109.8	μA

3.7 ANALOG TEMPERATURE SENSOR CHARACTERISTICS

Temperature Sensor typical nonlinearity ±0.29 % for output range 1 and ±0.27 % for output range 2 at V_{DD} = 3.3 V.

Table 23: TS Output vs Temperature (Output Range 1)

T, °C	V _{DD} = 2.5 V		V _{DD} = 3.3 V		V _{DD} = 5.0 V	
	Typical, mV	Accuracy, %	Typical, mV	Accuracy, %	Typical, mV	Accuracy, %
-40	1186	±0.54	1187	±0.50	1187	±0.60
-30	1158	±0.29	1158	±0.29	1158	±0.29
-20	1131	±0.26	1131	±0.27	1131	±0.27
-10	1104	±0.26	1104	±0.26	1104	±0.25
0	1076	±0.37	1076	±0.37	1076	±0.37
10	1049	±0.36	1049	±0.37	1049	±0.37
20	1021	±0.36	1021	±0.35	1021	±0.37
30	994	±0.24	994	±0.25	994	±0.25
40	966	±0.34	966	±0.33	966	±0.33
50	938	±0.46	938	±0.47	938	±0.47

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Table 23: TS Output vs Temperature (Output Range 1)(Continued)

T, °C	V _{DD} = 2.5 V		V _{DD} = 3.3 V		V _{DD} = 5.0 V	
	Typical, mV	Accuracy, %	Typical, mV	Accuracy, %	Typical, mV	Accuracy, %
60	910	±0.63	910	±0.64	910	±0.64
70	881	±0.75	881	±0.75	881	±0.75
80	852	±0.93	852	±0.93	852	±0.92
85	838	±1.02	838	±1.03	838	±1.02

Table 24: TS Output vs Temperature (Output range 2)

T, °C	V _{DD} = 2.5 V		V _{DD} = 3.3 V		V _{DD} = 5.0 V	
	Typical, mV	Accuracy, %	Typical, mV	Accuracy, %	Typical, mV	Accuracy, %
-40	997	±0.45	997	±0.45	997	±0.45
-30	973	±0.22	973	±0.22	973	±0.22
-20	950	±0.28	950	±0.28	950	±0.29
-10	927	±0.21	927	±0.20	927	±0.21
0	905	±0.30	905	±0.30	905	±0.30
10	882	±0.28	882	±0.28	882	±0.28
20	859	±0.27	859	±0.27	859	±0.28
30	836	±0.21	836	±0.21	836	±0.21
40	813	±0.29	813	±0.28	813	±0.28
50	790	±0.32	790	±0.32	790	±0.32
60	766	±0.52	766	±0.52	766	±0.51
70	743	±0.62	743	±0.62	743	±0.61
80	719	±0.82	719	±0.82	719	±0.82
85	707	±0.82	707	±0.82	707	±0.82

Table 25: TS Output Error (Output Range 1)

V _{DD} , V	Error at T							
	-40°C, %	-20°C, %	0°C, %	20°C, %	40°C, %	60°C, %	80°C, %	85°C, %
2.30	±0.62	±0.27	±0.37	±0.35	±0.34	±0.63	±0.94	±1.02
2.50	±0.54	±0.26	±0.37	±0.36	±0.34	±0.63	±0.93	±1.02
2.70	±0.72	±0.26	±0.37	±0.36	±0.34	±0.62	±0.94	±1.03
3.00	±0.41	±0.26	±0.37	±0.36	±0.33	±0.64	±0.93	±1.02
3.30	±0.50	±0.27	±0.37	±0.35	±0.33	±0.64	±0.93	±1.03
3.60	±0.66	±0.26	±0.37	±0.36	±0.34	±0.64	±0.93	±1.02
4.00	±0.82	±0.26	±0.37	±0.36	±0.34	±0.64	±0.93	±1.03
4.20	±0.43	±0.27	±0.37	±0.36	±0.34	±0.64	±0.92	±1.02
4.50	±0.72	±0.27	±0.37	±0.37	±0.34	±0.64	±0.92	±1.02
5.00	±0.60	±0.27	±0.37	±0.37	±0.33	±0.64	±0.92	±1.02
5.50	±0.58	±0.27	±0.37	±0.36	±0.34	±0.64	±0.93	±1.03

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Table 26: TS Output Error (Output Range 2)

V _{DD} , V	Error at T							
	-40°C, %	-20°C, %	0°C, %	20°C, %	40°C, %	60°C, %	80°C, %	85°C, %
2.30	±0.44	±0.28	±0.30	±0.28	±0.29	±0.52	±0.82	±0.82
2.50	±0.45	±0.28	±0.30	±0.27	±0.29	±0.52	±0.82	±0.82
2.70	±0.46	±0.28	±0.30	±0.27	±0.28	±0.52	±0.84	±0.84
3.00	±0.45	±0.29	±0.30	±0.27	±0.28	±0.53	±0.82	±0.82
3.30	±0.45	±0.28	±0.30	±0.27	±0.28	±0.52	±0.82	±0.82
3.60	±0.45	±0.28	±0.31	±0.27	±0.28	±0.53	±0.82	±0.82
4.00	±0.45	±0.28	±0.30	±0.27	±0.28	±0.52	±0.82	±0.82
4.20	±0.44	±0.28	±0.30	±0.28	±0.28	±0.52	±0.82	±0.82
4.50	±0.45	±0.28	±0.30	±0.27	±0.28	±0.51	±0.82	±0.82
5.00	±0.45	±0.29	±0.30	±0.28	±0.28	±0.51	±0.82	±0.82
5.50	±0.44	±0.28	±0.30	±0.28	±0.28	±0.51	±0.82	±0.83

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4 User Programmability

The SLG46880/81 is a user programmable device with a One-Time-Programmable (OTP) memory array that is used to configure the 12 state ASM, logic, and mixed-signal circuits. Three of the IO Pins provide a connection for the bit patterns into the OTP on board memory. A programming development kit allows the user the ability to create initial devices. Once the design is finalized, the programming code (.gpx file) is forwarded to Dialog Semiconductor to integrate into a production process.

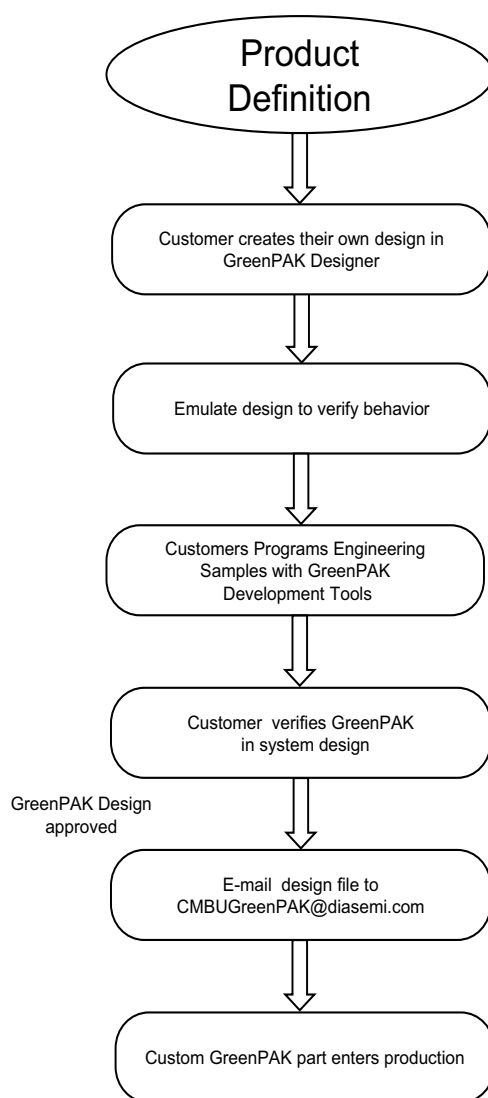


Figure 2: Steps to Create a Custom GreenPAK Device

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5 IO Pins

5.1 IO PINS

The SLG46880/81 has a total of 12 GPIO, 8 GPI, and 8 GPO pins, which can function either as a user defined Input or Output, or as a special function (such as outputting the voltage reference), as well as a signal for programming of the on-chip Non Volatile Memory (NVM). Refer to Section 2 for pin definitions.

GPIs 0, 1, 2, 3, 4, 5, 6, 7, GPIOs 0, 1, 2, 3, 8, 9, 10, 11, GPOs 0, 5, 6, 7 are powered from V_{DD} and GPIOs 4, 5, 6, 7, GPOs 1, 2, 3, 4 are powered from V_{DD2} . All internal macrocells are powered from V_{DD} . Voltage on V_{DD2} Pin must be less or equal voltage on V_{DD} Pin.

In case V_{DD2} floating and any Pin powered from V_{DD2} is configured as input, ESD pin protection diodes must be considered when applying an input signal to the pin. This will cause a significant current leakage.

In case V_{DD2} floating and any Pin powered from V_{DD2} is configured as Output, the pin will behave as NMOS Open Drain.

It is not recommended to connect V_{DD2} to the GND.

5.2 PULL UP/DOWN RESISTORS

All IO Pins have the option of user-selectable resistors that can be connected to the pin structure. The selectable values on these resistors are 10 k Ω , 100 k Ω and 1 M Ω . The internal resistors can be configured as either pull-up or pull-downs.

5.3 100 NS DEBOUNCE DELAY

100 ns debounce can be enabled for GPI0, GPI1, GPI5, and GPI6 by setting registers [536], [537], [538], and [539], respectively.

5.4 FAST PULL-UP/DOWN DURING POWER UP

During power-up, IO pull-up/down resistance will switch to 2.6 k Ω initially and then it will switch to normal setting value. This function is enabled by register [670].

5.5 DIGITAL INPUT LATCH

Digital Input Latch can be enabled for GPI0, GPI1, GPI4, GPI5, GPIO2, GPIO3, GPIO6, GPIO7. For timing diagram refer to Figure 3.

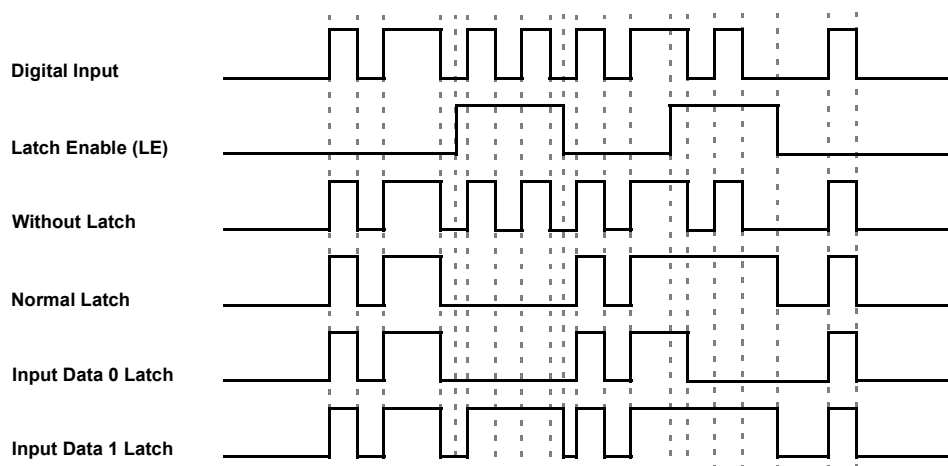


Figure 3: Digital Input Latch Timing Diagram

5.6 GPO OUTPUT SKEW

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Output Skew function can be enabled for GPOs 0 to 7. Once enabled for any GPO (register [671]), Output Skew becomes valid for all GPOs. All eight GPOs are grouped in pairs: GPO0 and GPO7, GPO1 and GPO2, GPO3 and GPO4, GPO5 and GPO6. Output Skew allows to delay each pair before setting HIGH or LOW consequently. See [Figure 4](#).

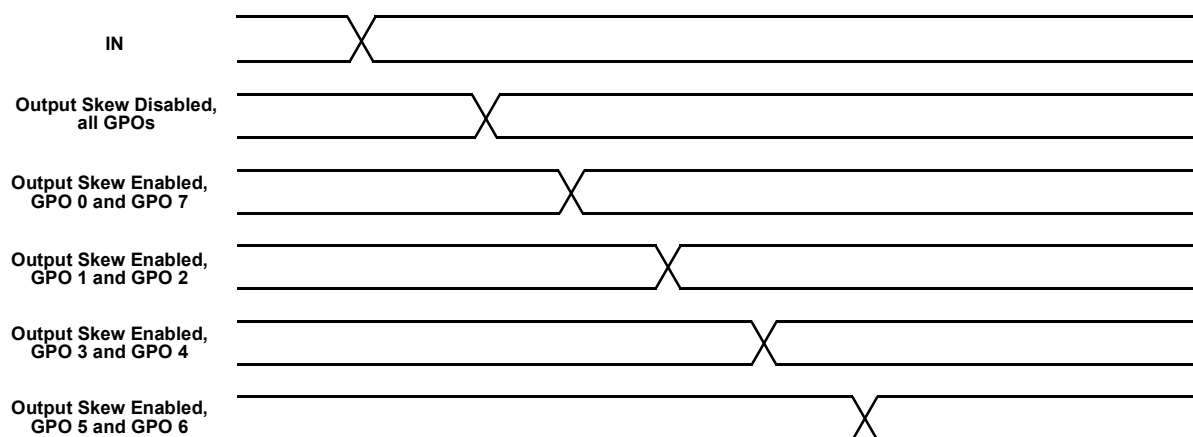


Figure 4: Output Skew Timing Diagram

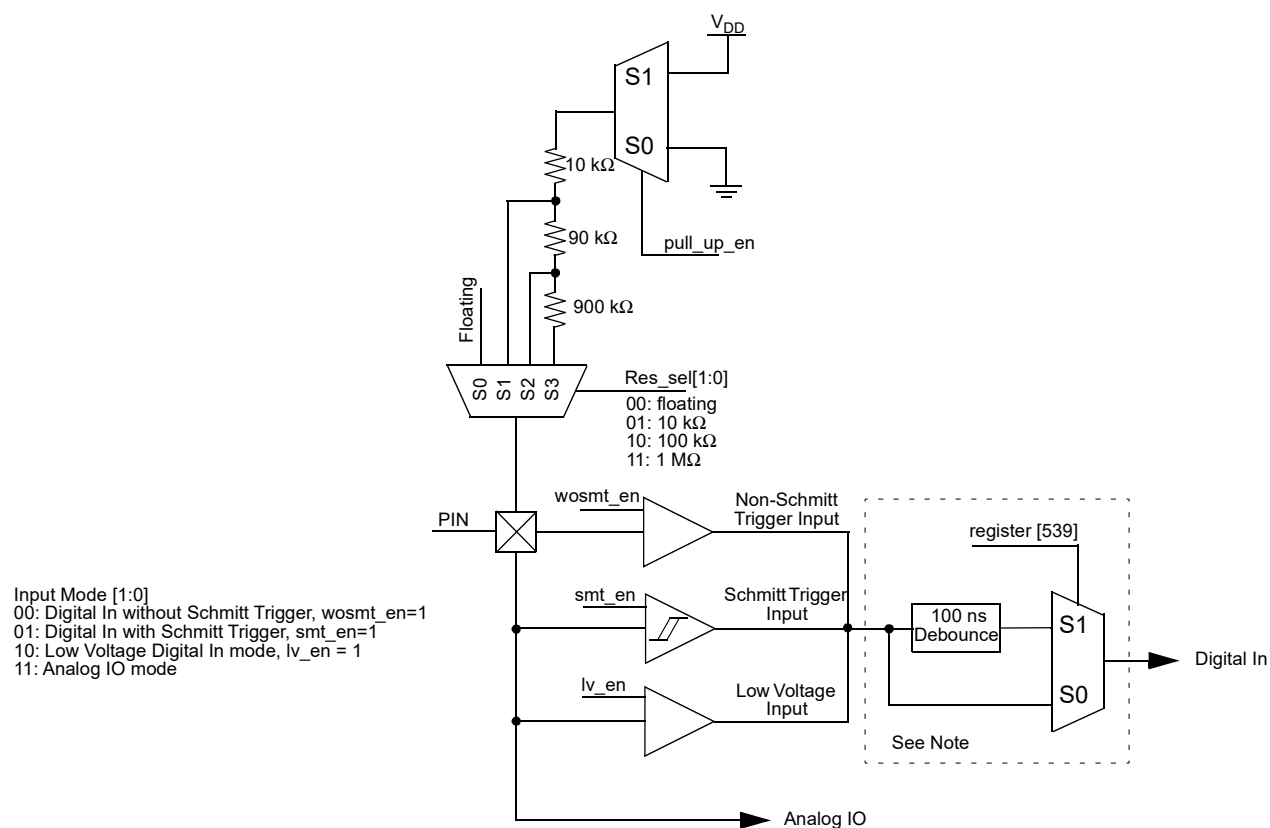
5.7 ULTRA-LOW POWER DIGITAL INPUT (SLG46881 ONLY)

SLG46881 has an Ultra-Low Power Digital Input option that can be applied to GPIOs 0 to 11 and GPIs 1 to 7. Note that when Ultra-Low Power Digital Input is enabled, pull-up resistors for GPIOs 0 to 3, 8 to 11, GPIs 1 to 7 switch from V_{DD} to V_{DD2} .

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5.8 GPI IO STRUCTURE (V_{DD})

5.8.1 SLG46880 GPI IO Structure (for GPIs 6, 7)

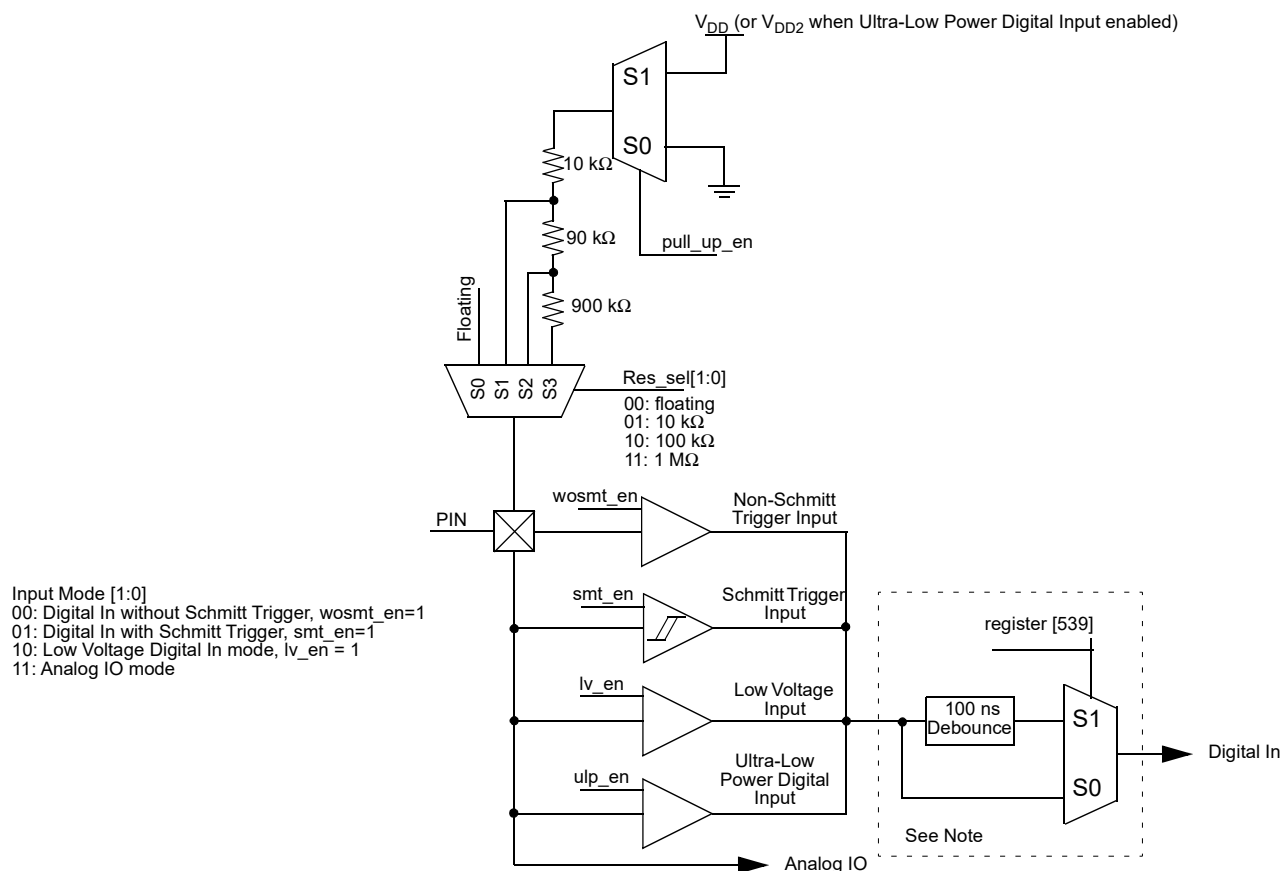


Note: 100 ns debounce is available for GPI6 only

Figure 5: SLG46880 GPI IO Structure Diagram

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5.8.2 SLG46881 GPI IO Structure (for GPIs 6, 7)



Note: 100 ns debounce is available for GPI6 only

Figure 6: SLG46881 GPI IO Structure Diagram

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5.9 GPI WITH INPUT LATCH IO STRUCTURE (V_{DD})

5.9.1 SLG46880 GPI with Input Latch IO Structure (for GPIs 0, 1)

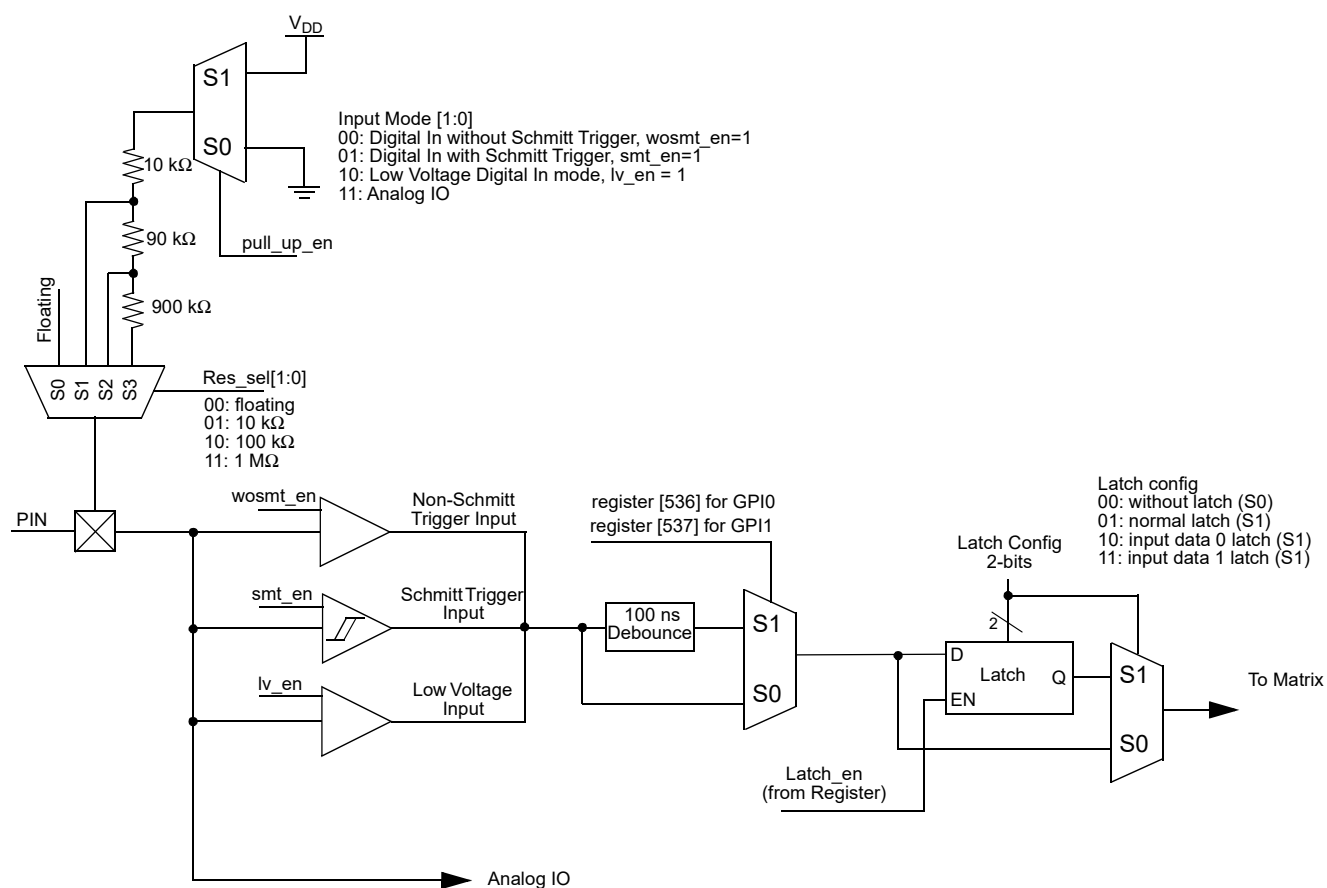


Figure 7: SLG46880 GPI with Input Latch Structure Diagram

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5.9.2 SLG46881 GPI with Input Latch IO Structure (for GPIs 0, 1)

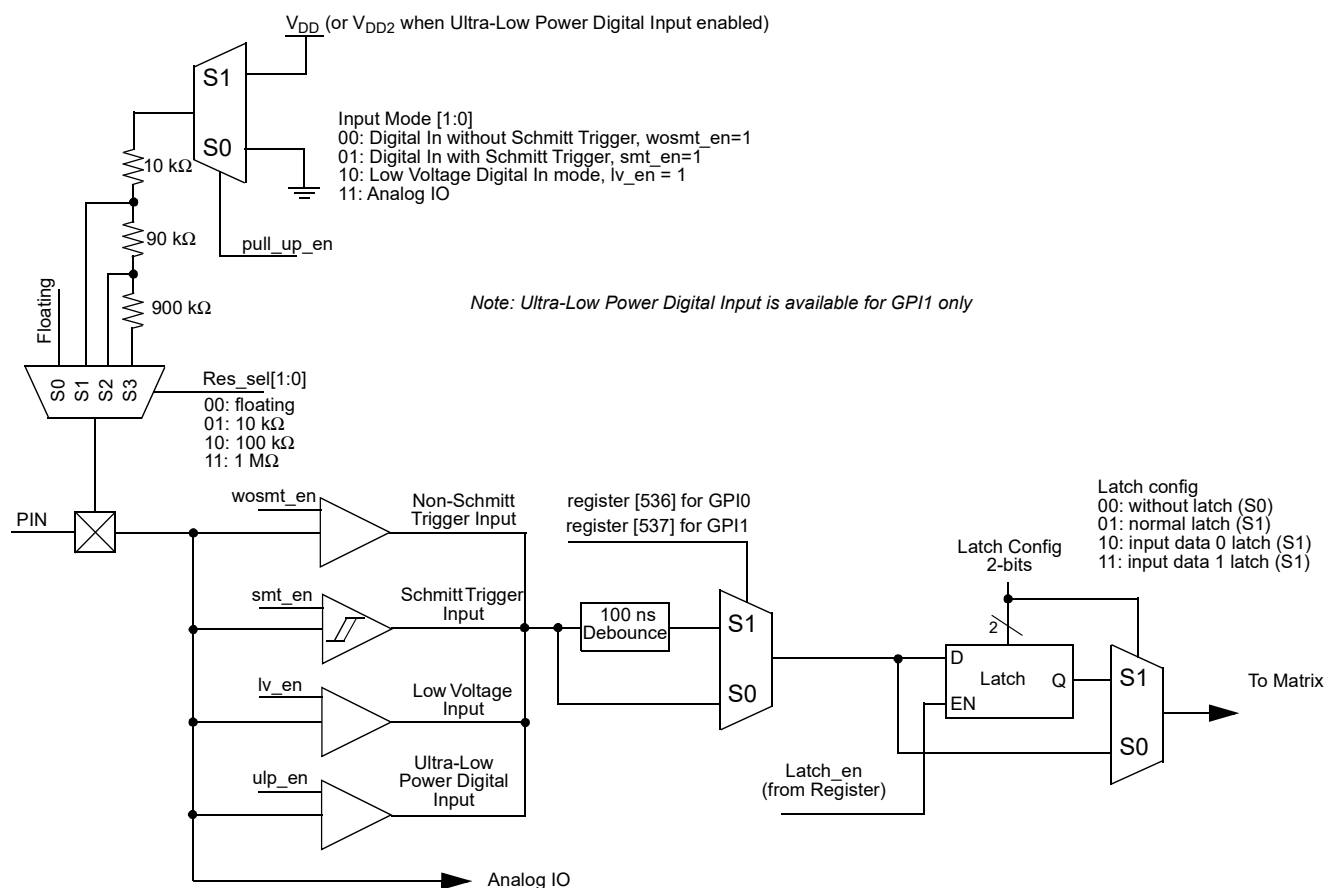


Figure 8: SLG46881 GPI with Input Latch Structure Diagram

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5.10 GPI WITH I²C MODE IO STRUCTURE (V_{DD})

5.10.1 SLG46880 GPI with I²C Mode Structure (for GPIs 2, 3)

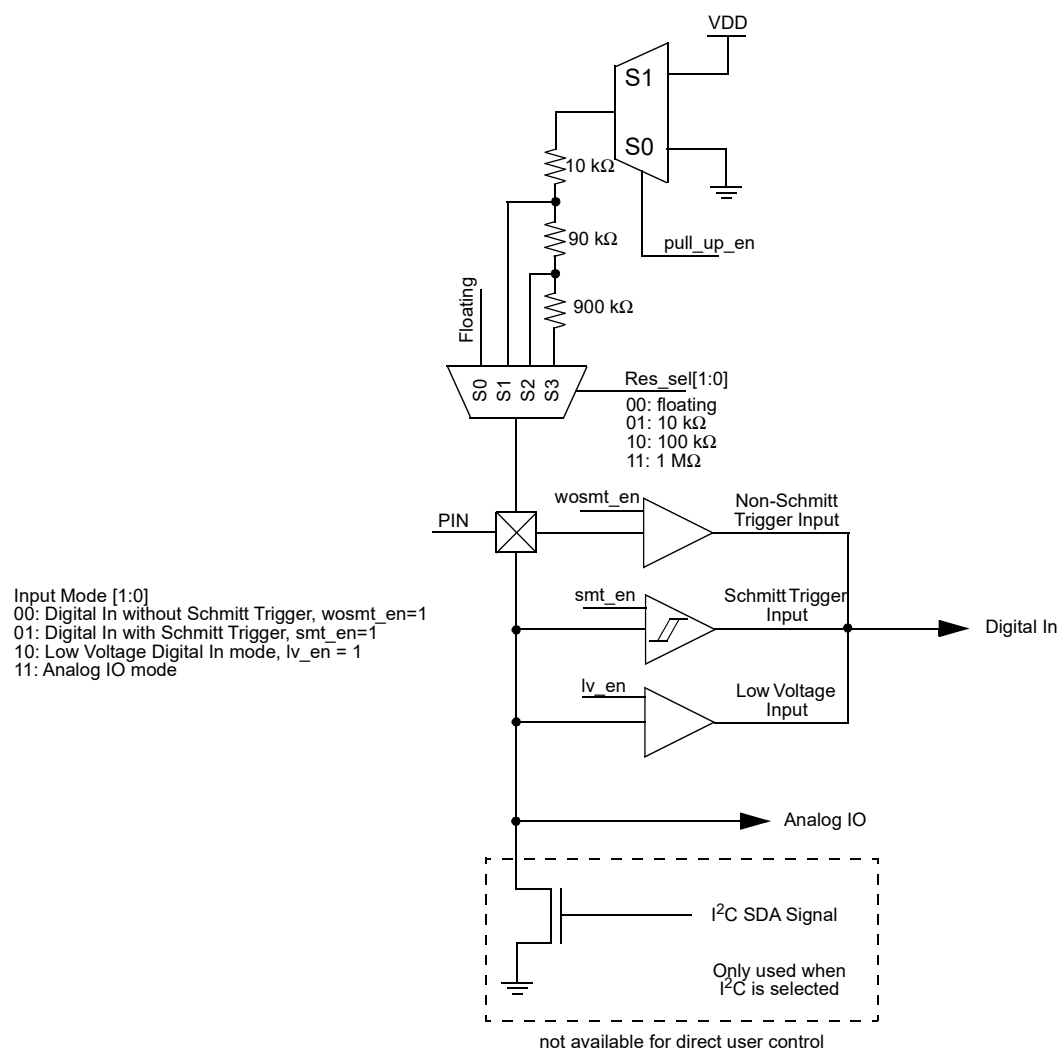


Figure 9: SLG46880 GPI with I²C Mode IO Structure Diagram

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5.10.2 SLG46881 GPI with I²C Mode Structure (for GPIs 2, 3)

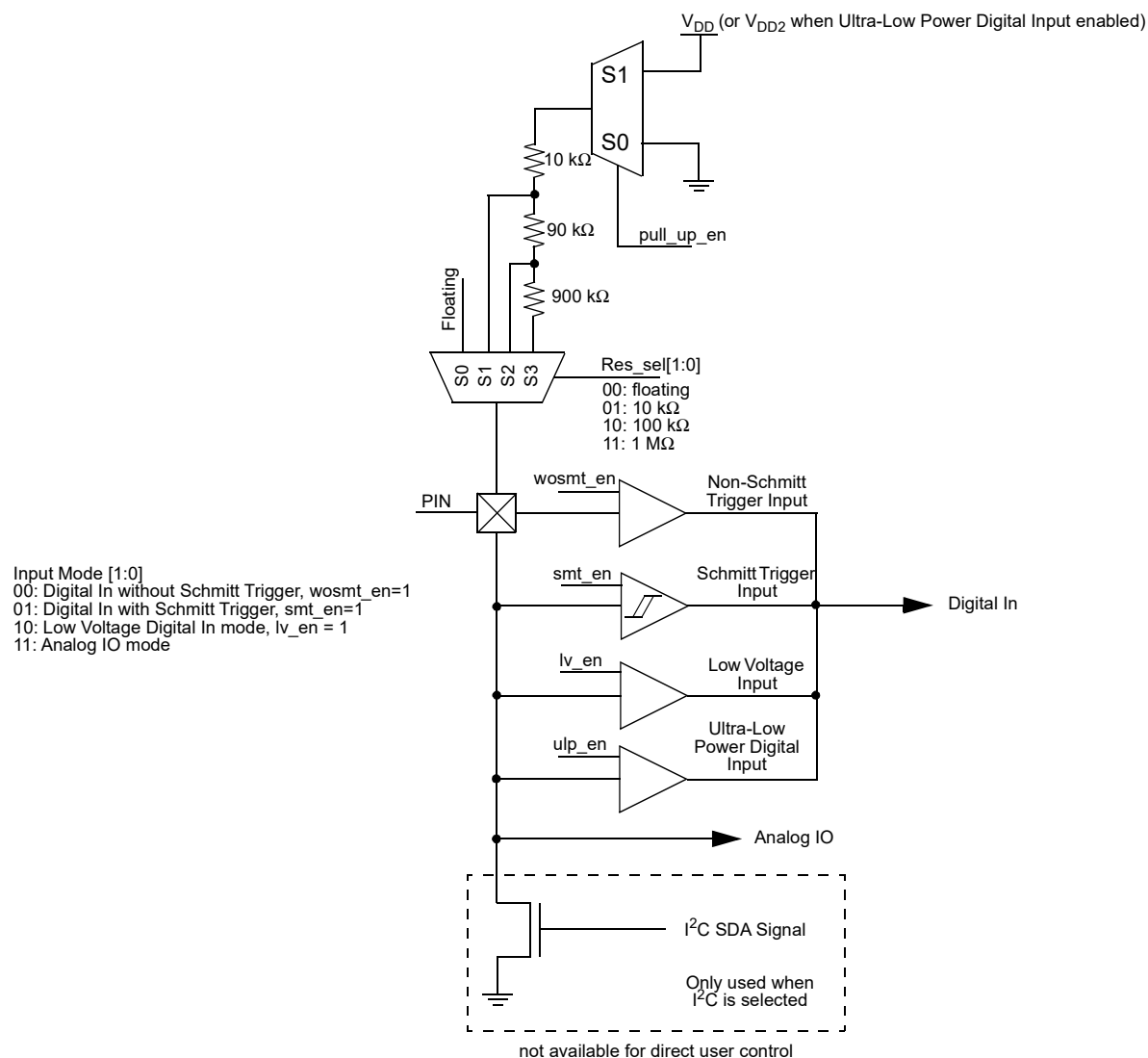
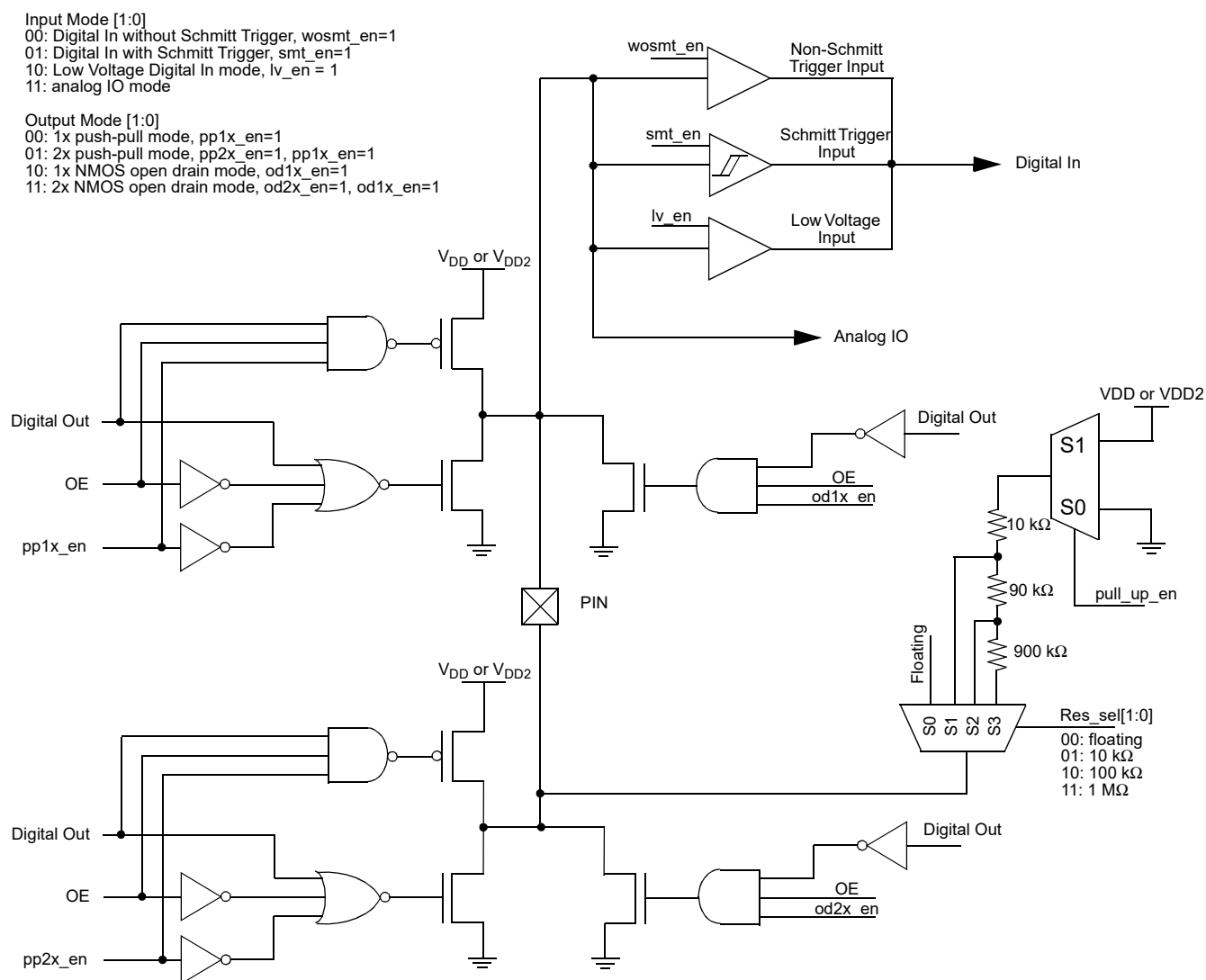


Figure 10: SLG46881 GPI with I²C Mode IO Structure Diagram

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5.11 GPIO WITH MATRIX OE IO STRUCTURE (V_{DD} OR V_{DD2})

5.11.1 SLG46880 GPIO with Matrix OE IO Structure (for GPIOs 0, 1, 8, 9, 10, 11 with V_{DD} , and GPIOs 4, 5 with V_{DD2})



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5.11.2 SLG46881 GPIO with Matrix OE IO Structure (for GPIOs 0, 1, 8, 9, 10, 11 with V_{DD} , and GPIOs 4, 5 with V_{DD2})

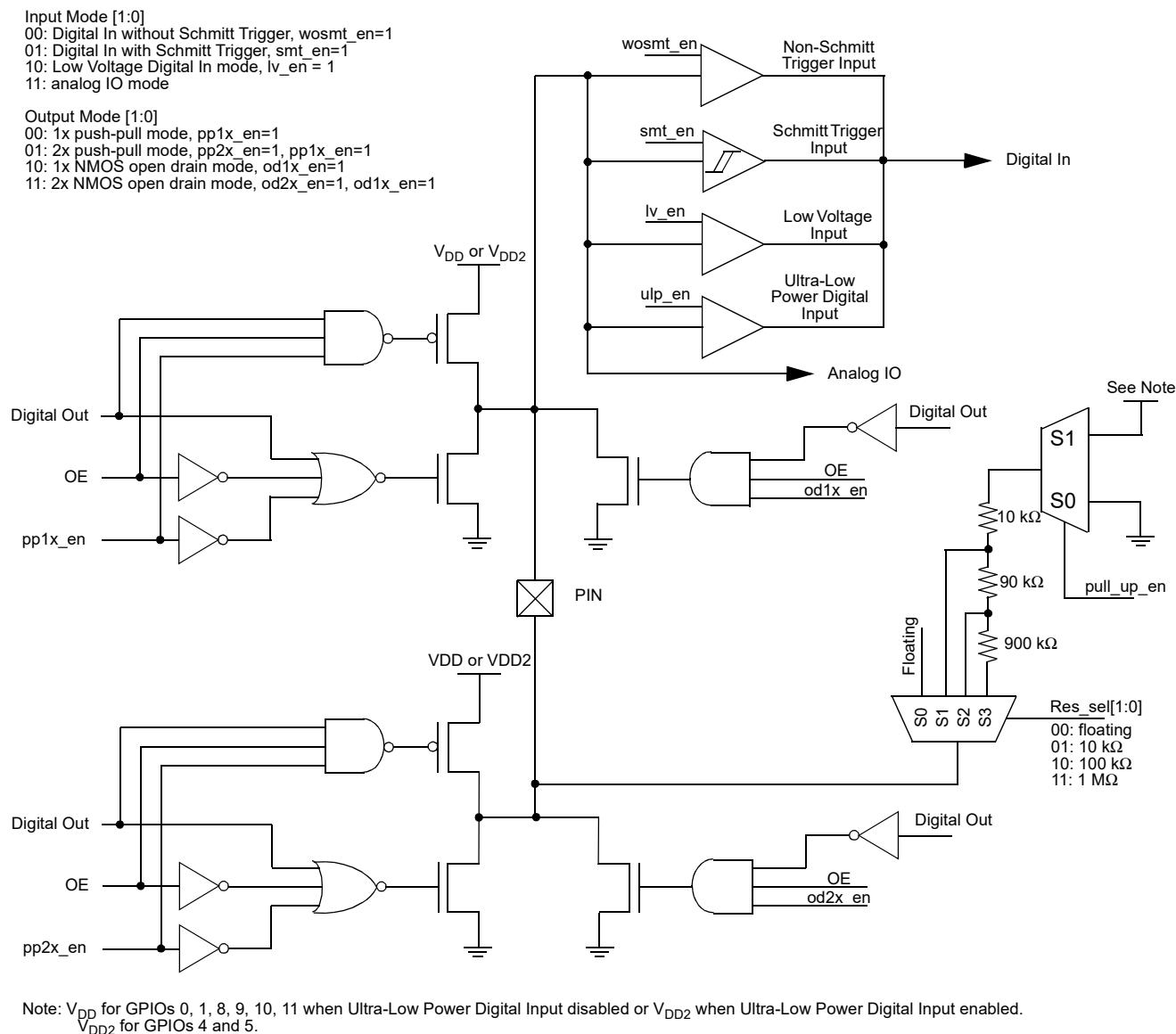


Figure 12: SLG46881 GPIO with Matrix OE IO Structure Diagram

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5.12 GPIO WITH MATRIX OE AND INPUT LATCH IO STRUCTURE (V_{DD} OR V_{DD2})

5.12.1 SLG46880 GPIO with Matrix OE and Input Latch IO Structure (for GPIOs 2, 3 with V_{DD} , GPIOs 6, 7 with V_{DD2})

Input Mode [1:0]
 00: Digital In without Schmitt Trigger, wosmt_en=1
 01: Digital In with Schmitt Trigger, smt_en=1
 10: Low Voltage Digital In mode, lv_en = 1
 11: analog IO mode

Output Mode [1:0]
 00: 1x push-pull mode, pp1x_en=1
 01: 2x push-pull mode, pp2x_en=1, pp1x_en=1
 10: 1x NMOS open drain mode, od1x_en=1
 11: 2x NMOS open drain mode, od2x_en=1, od1x_en=1

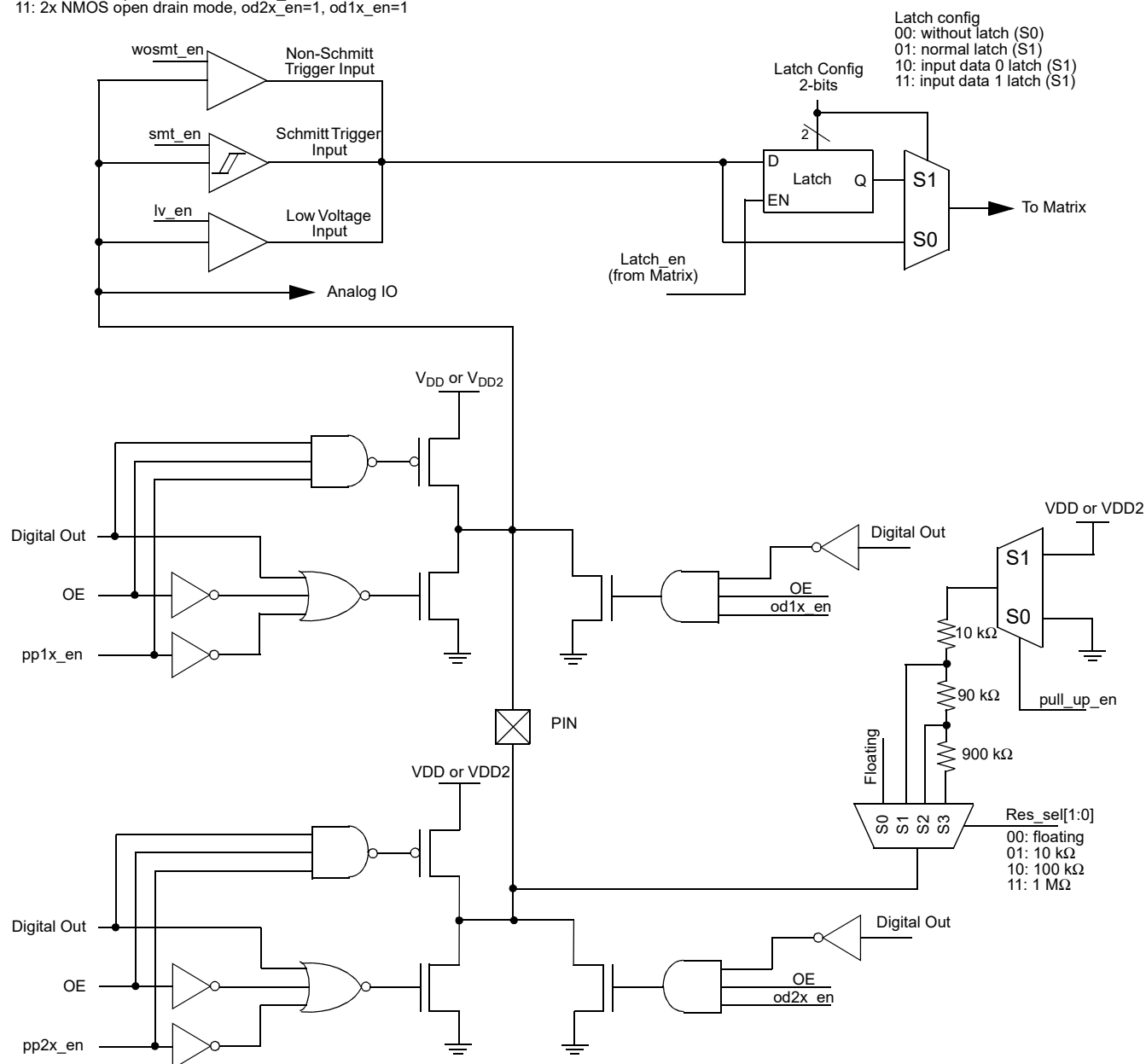


Figure 13: SLG46880 GPIO with Matrix OE and Input Latch IO Structure Diagram

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

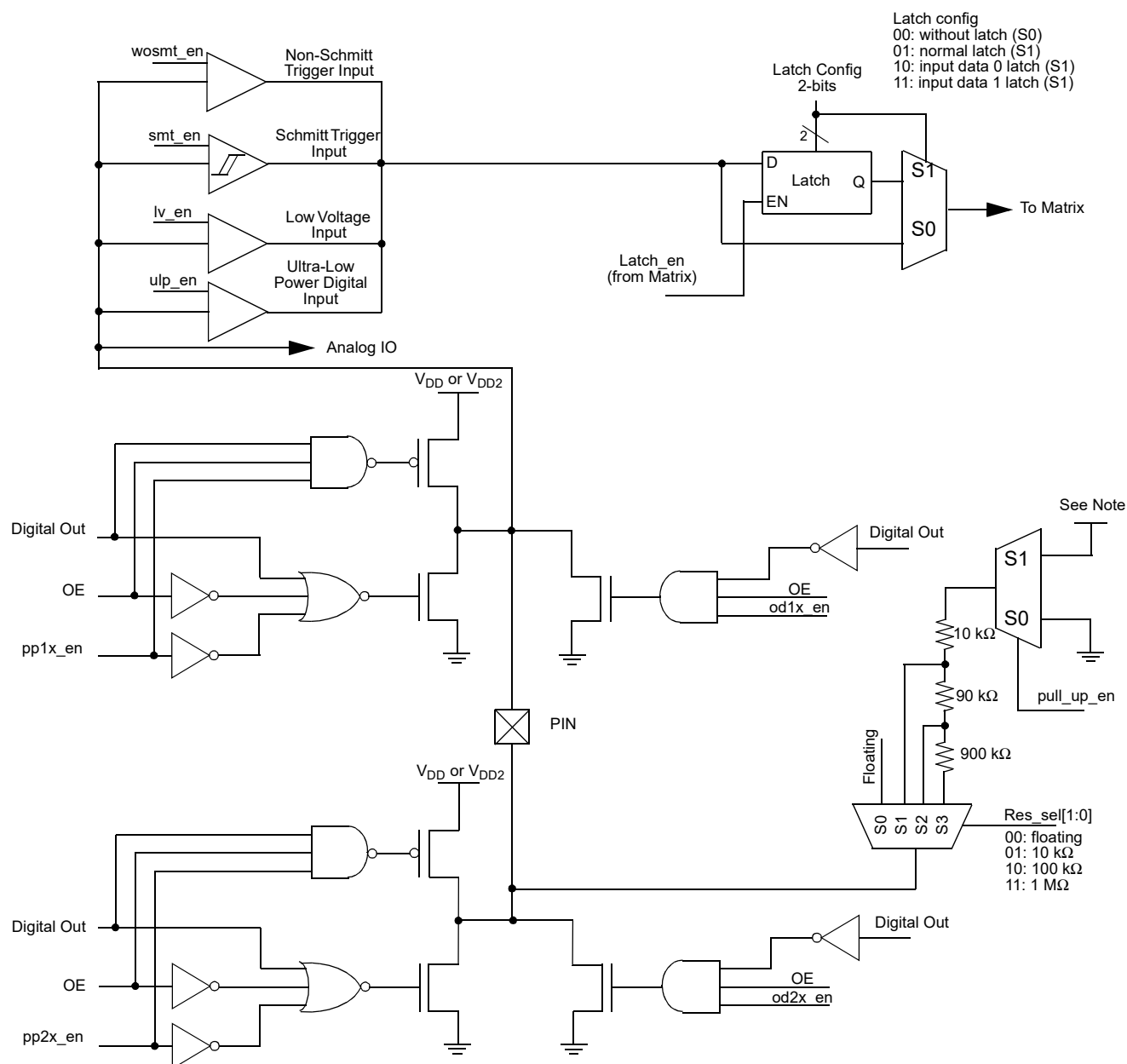
5.12.2 SLG46881 GPIO with Matrix OE and Input Latch IO Structure (for GPIOs 2, 3 with V_{DD} , GPIOs 6, 7 with V_{DD2})

Input Mode [1:0]

00: Digital In without Schmitt Trigger, $wosmt\_en=1$
 01: Digital In with Schmitt Trigger, $smt\_en=1$
 10: Low Voltage Digital In mode, $lv\_en=1$
 11: analog IO mode

Output Mode [1:0]

00: 1x push-pull mode, $pp1x\_en=1$
 01: 2x push-pull mode, $pp2x\_en=1$, $pp1x\_en=1$
 10: 1x NMOS open drain mode, $od1x\_en=1$
 11: 2x NMOS open drain mode, $od2x\_en=1$, $od1x\_en=1$



Note: V_{DD} for GPIOs 2 and 3 when Ultra-Low Power Digital Input disabled or V_{DD2} when Ultra-Low Power Digital Input enabled.
 V_{DD2} for GPIOs 6 and 7.

Figure 14: SLG46881 GPIO with Matrix OE and Input Latch IO Structure Diagram

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5.13 GPI WITH INPUT LATCH AND CRYSTAL INPUT IO STRUCTURE (V_{DD})

5.13.1 SLG46880 GPI with Input Latch and Crystal Input IO Structure (for GPIs 4, 5)

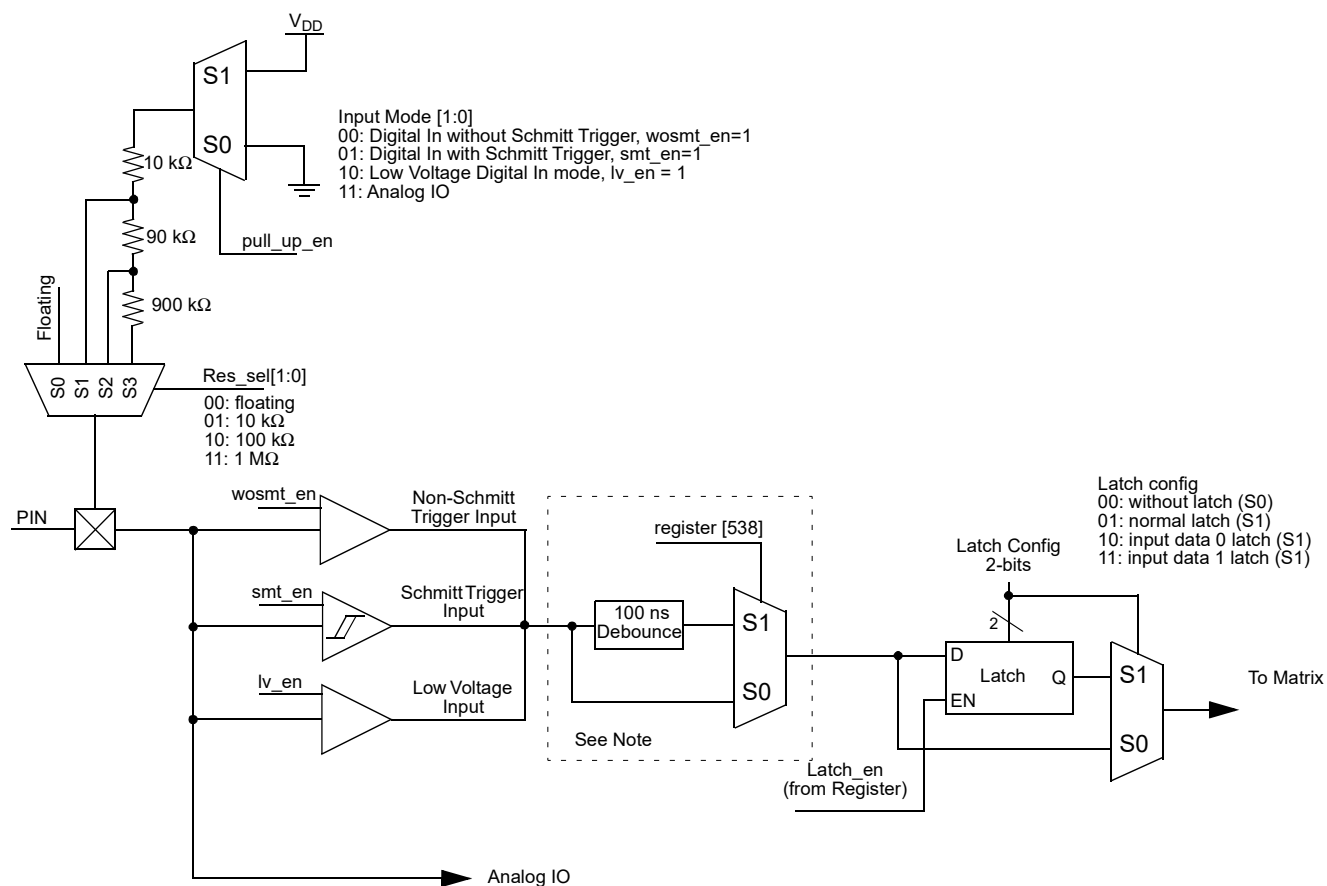


Figure 15: SLG46880 GPI with Input Latch and Crystal Input IO Structure Diagram

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

5.13.2 SLG46881 GPI with Input Latch and Crystal Input IO Structure (for GPIs 4, 5)

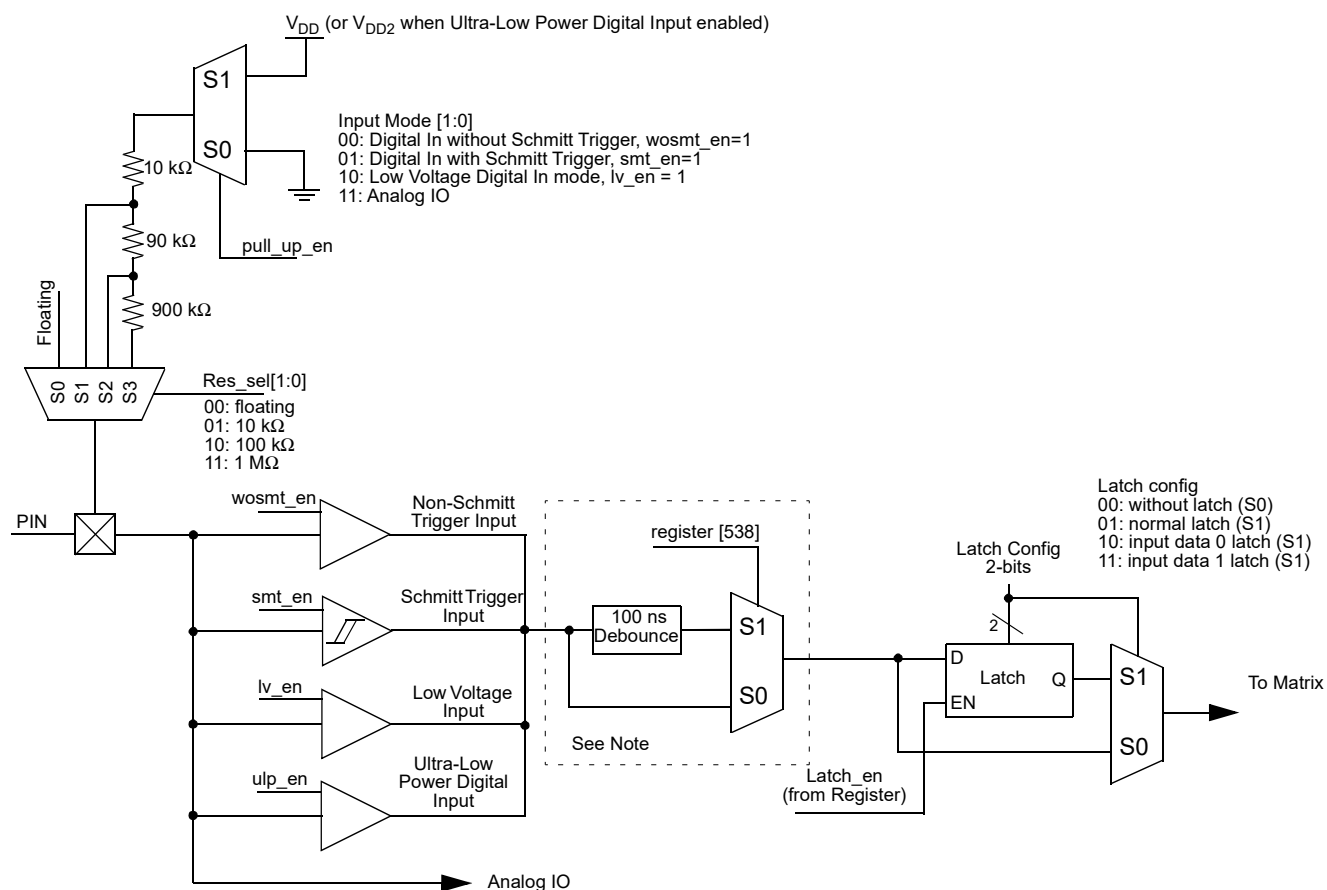


Figure 16: SLG46881 GPI with Input Latch and Crystal Input IO Structure Diagram

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

5.14 GPO REGISTER OE IO STRUCTURE (V_{DD} OR V_{DD2})

5.14.1 GPO Register OE IO Structure (for GPOs 0, 5, 6, 7 for V_{DD} , and GPOs 1, 2, 3, 4 for V_{DD2})

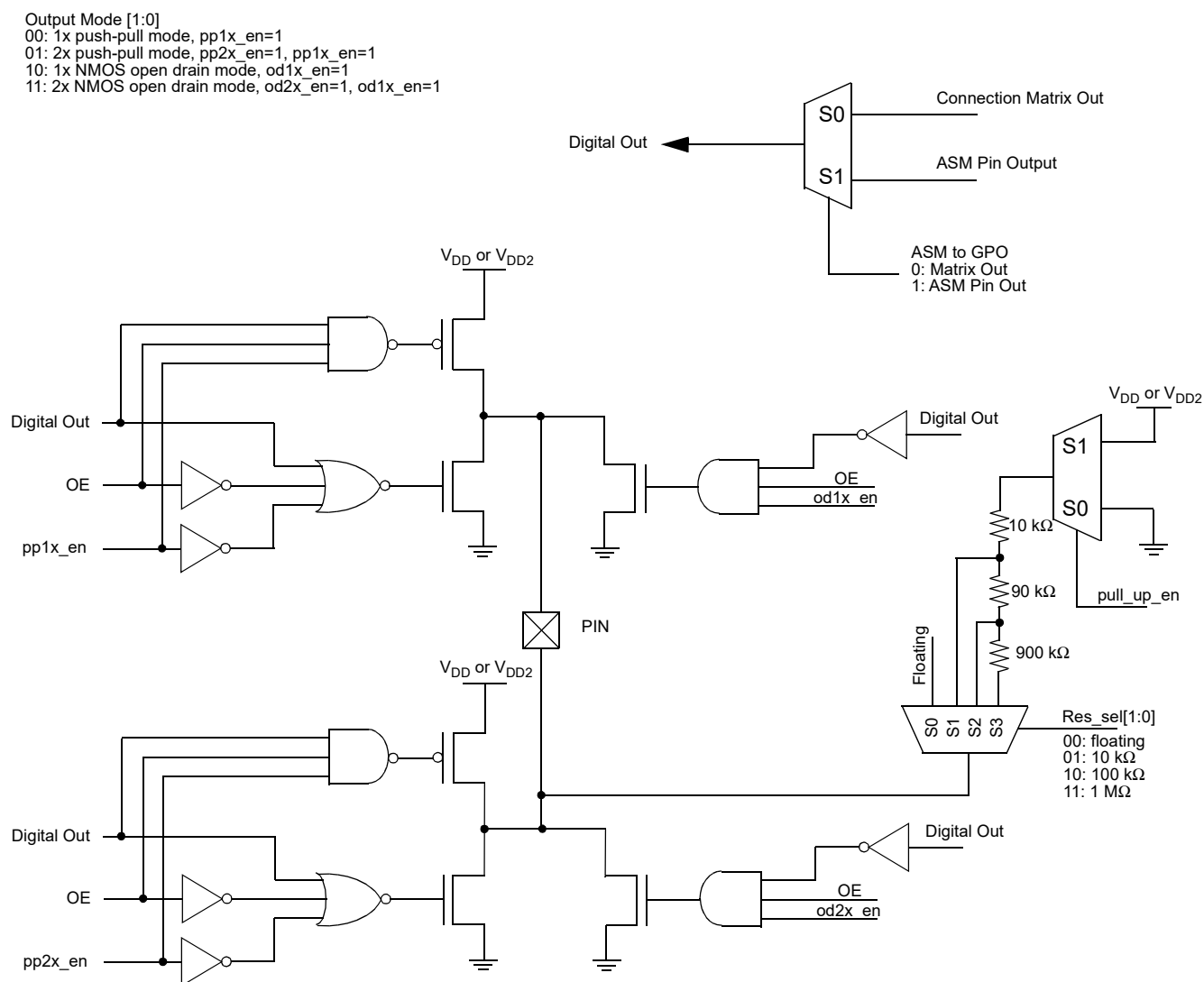


Figure 17: SLG46880/81 GPO Register OE IO Structure Diagram

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

5.15 IO TYPICAL PERFORMANCE

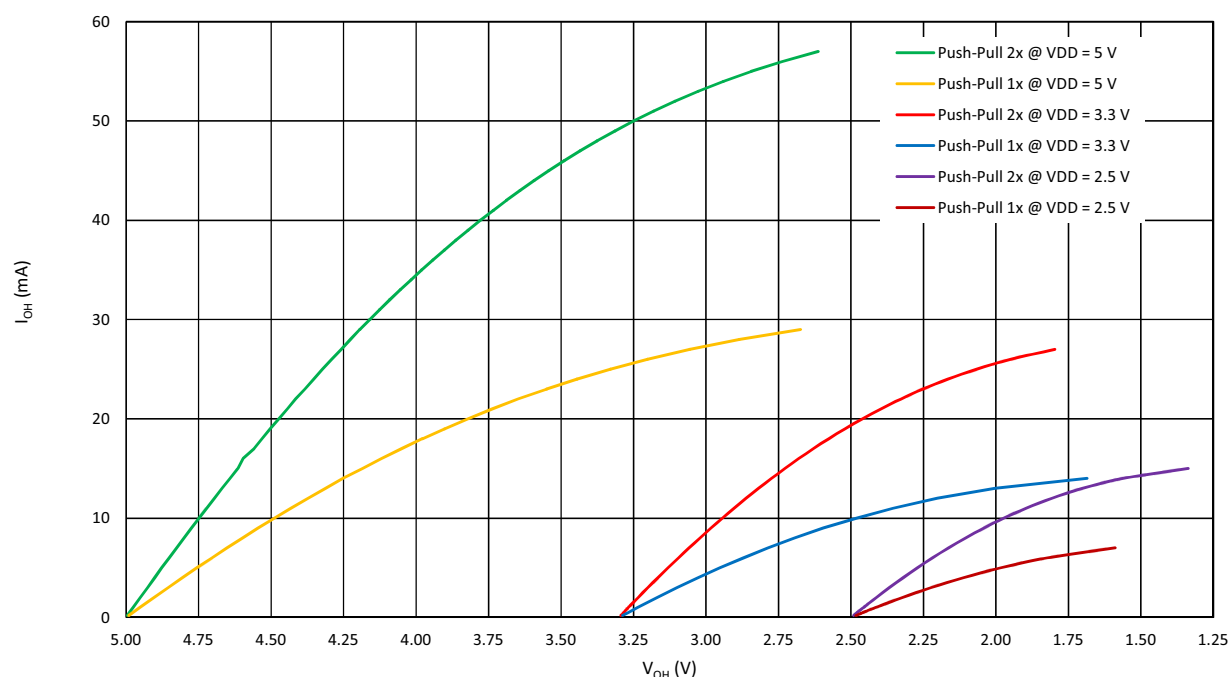


Figure 18: Typical High Level Output Current vs. High Level Output Voltage at T = 25 °C

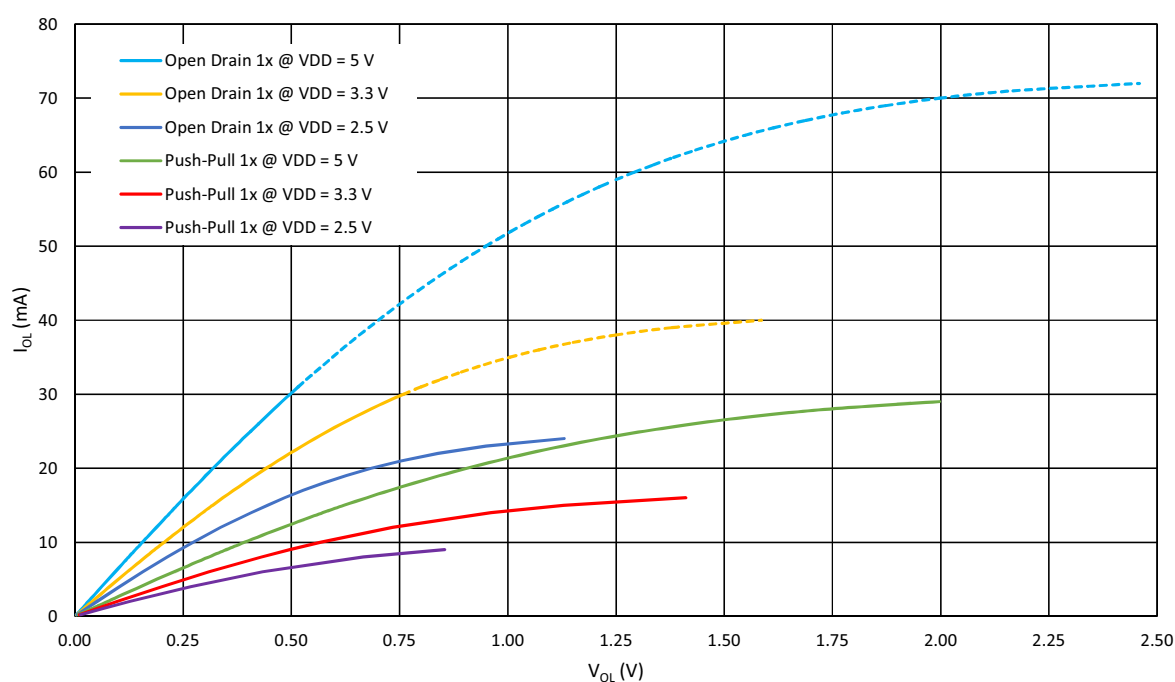


Figure 19: Typical Low Level Output Current vs. Low Level Output Voltage, 1x Drive at T = 25 °C, Full Range

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

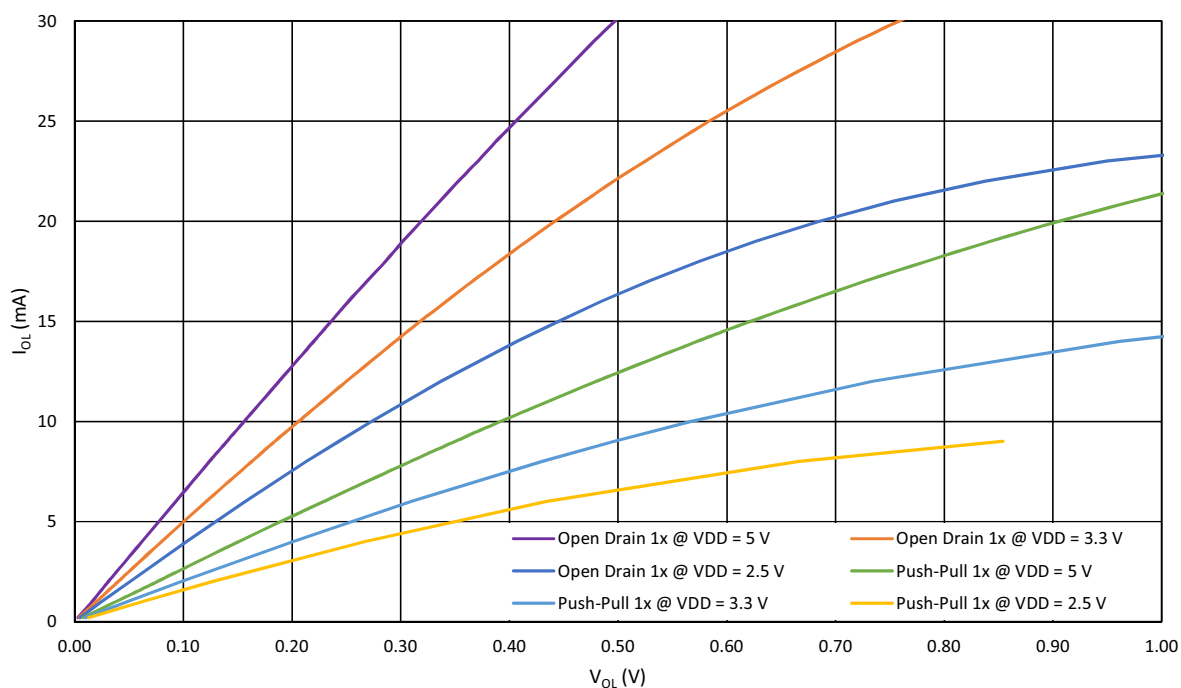


Figure 20: Typical Low Level Output Current vs. Low Level Output Voltage, 1x Drive at T = 25 °C

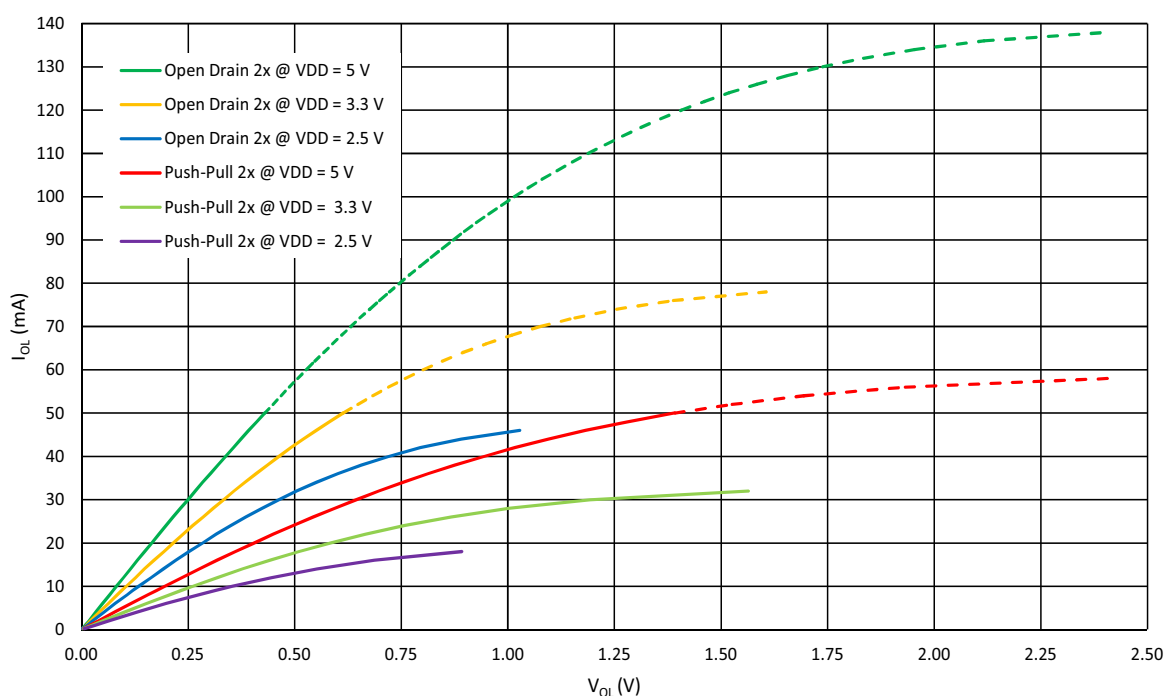


Figure 21: Typical Low Level Output Current vs. Low Level Output Voltage, 2x Drive at T = 25 °C, Full Range

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

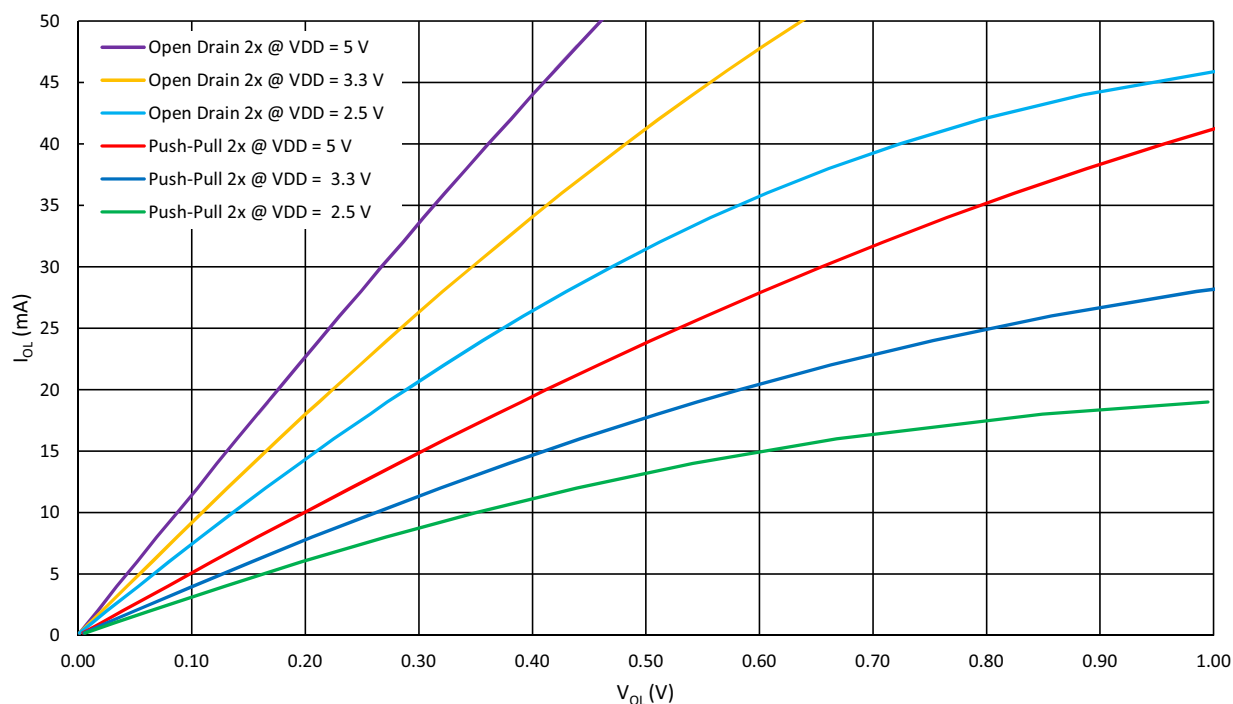


Figure 22: Typical Low Level Output Current vs. Low Level Output Voltage, 2x Drive at T = 25 °C

6 Connection Matrix

The Connection Matrix in the SLG46880/81 is used to create the internal routing for internal functional macrocells of the device once it is programmed. The registers are programmed from the one-time NVM cell during Test Mode Operation. The output of each functional macrocell within the SLG46880/81 has a specific digital bit code assigned to it that is either set to active “High” or inactive “Low” based on the design that is created. Once the 4096 register bits within the SLG46880/81 are programmed a fully custom circuit will be created.

The Connection Matrix has 64 inputs, 84 outputs and 17 state dependent outputs. Each of the 64 inputs to the Connection Matrix is hard-wired to the digital output of a particular source macrocell, including IO pins, LUTs, analog comparators, other digital resources and V_{DD} and GND. The input to a digital macrocell uses a 6-bit register to select one of these 64 input lines.

For a complete list of the SLG46880/81’s register table, see Section 21.

Matrix Input Signal Functions	N						
GND	0						
GPIO0 Digital In	1						
GPIO1 Digital In	2						
GPIO2 Digital In	3						
⋮	⋮						
nRST_core (POR)	62						
VDD	63						
Matrix Inputs	N	0	1	2	-----	83	
	Registers	register [5:0]	register [11:6]	register [17:12]	-----	registers [503:498]	
	Function	Matrix OUT: IN0 of LUT2_0 or Clock Input of DFF0	Matrix OUT: IN1 of LUT2_0 or Data Input of DFF0	Matrix Out: IN0 of LUT2_1 or Clock Input of PGEN	-----	DM EXT CLK1	
Matrix Outputs							

Figure 23: Connection Matrix

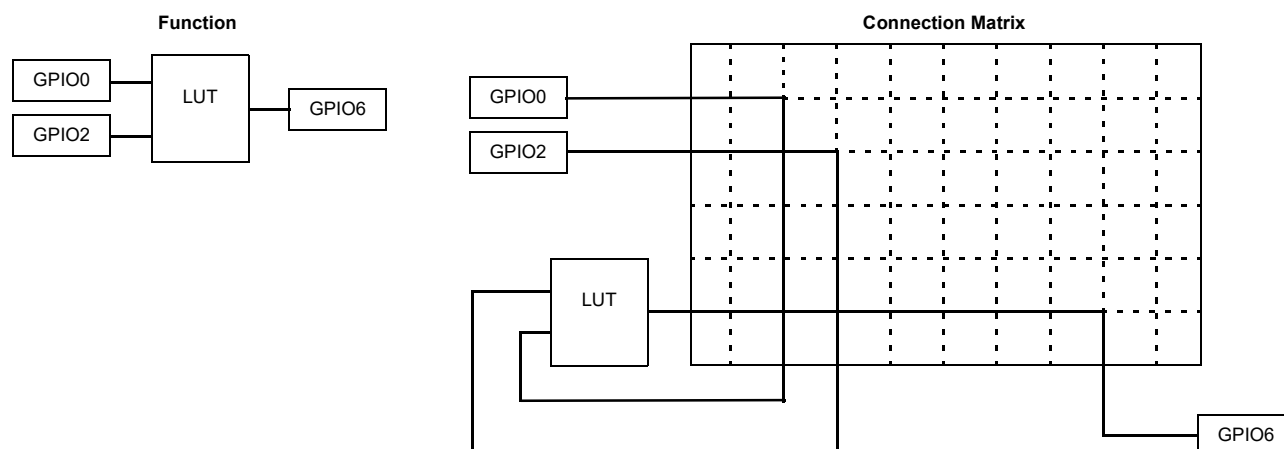


Figure 24: Connection Matrix Example

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

6.1 MATRIX INPUT TABLE

Table 27: Matrix Input Table

Matrix Input Number	Matrix Input Signal Function	Matrix Decode					
		5	4	3	2	1	0
0	GND	0	0	0	0	0	0
1	GPIO0 Digital Input	0	0	0	0	0	1
2	GPIO1 Digital Input	0	0	0	0	1	0
3	GPIO2 Digital Input	0	0	0	0	1	1
4	GPIO Digital Input	0	0	0	1	0	0
5	GPI1 Digital Input	0	0	0	1	0	1
6	GPIO3 Digital Input	0	0	0	1	1	0
7	GPIO4 Digital Input	0	0	0	1	1	1
8	LUT2_0/DFF0 Output	0	0	1	0	0	0
9	LUT2_1/PGEN Output	0	0	1	0	0	1
10	LUT3_0/DFF1 Output	0	0	1	0	1	0
11	LUT3_1/DFF2 Output	0	0	1	0	1	1
12	LUT3_2/DFF3 Output	0	0	1	1	0	0
13	LUT3_3/DFF4 Output	0	0	1	1	0	1
14	LUT3_4/CNT_DLY1(8bit) Output	0	0	1	1	1	0
15	LUT3_5/CNT_DLY2(8bit) Output	0	0	1	1	1	1
16	LUT3_6/CNT_DLY3(8bit) Output	0	1	0	0	0	0
17	LUT3_7/CNT_DLY4(8bit) Output	0	1	0	0	0	1
18	LUT4_0/CNT_DLY0(16bit) Output	0	1	0	0	1	0
19	LUT3_8/Pipe Delay Output0/Ripple CNT Output0	0	1	0	0	1	1
20	Pipe Delay Output1/Ripple CNT Output1	0	1	0	1	0	0
21	Internal 2.048 MHz Osc Output	0	1	0	1	0	1
22	Internal 2.048 kHz Osc Output	0	1	0	1	1	0
23	Internal 25 MHz Osc Output	0	1	0	1	1	1
24	Filter/Edge Detect Output/Ripple CNT Output2	0	1	1	0	0	0
25	Programmable Delay with Edge Detector Output	0	1	1	0	0	1
26	F(1) Function Output0	0	1	1	0	1	0
27	F(1) Function Output1	0	1	1	0	1	1
28	F(1) Function Output2	0	1	1	1	0	0
29	DM0_0 Macrocell Output0	0	1	1	1	0	1
30	DM0_0 Macrocell Output1	0	1	1	1	1	0
31	DM0_0 Macrocell Output2	0	1	1	1	1	1
32	GPI2/SDA Digital Input or I ² C_virtual_0 Input	1	0	0	0	0	0
33	GPI3/SCL Digital Input or I ² C_virtual_1 Input	1	0	0	0	0	1
34	I ² C_virtual_2 Input	1	0	0	0	1	0
35	I ² C_virtual_3 Input	1	0	0	0	1	1
36	I ² C_virtual_4 Input	1	0	0	1	0	0
37	I ² C_virtual_5 Input	1	0	0	1	0	1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Table 27: Matrix Input Table(Continued)

Matrix Input Number	Matrix Input Signal Function	Matrix Decode					
		5	4	3	2	1	0
38	I ² C_virtual_6 Input	1	0	0	1	1	0
39	I ² C_virtual_7 Input	1	0	0	1	1	1
40	DM0_1 Macrocell Output0	1	0	1	0	0	0
41	DM0_1 Macrocell Output1	1	0	1	0	0	1
42	DM0_1 Macrocell Output2	1	0	1	0	1	0
43	ASM Connection Matrix Output RAM 0	1	0	1	0	1	1
44	ASM Connection Matrix Output RAM 1	1	0	1	1	0	0
45	ASM Connection Matrix Output RAM 2	1	0	1	1	0	1
46	ASM Connection Matrix Output RAM 0	1	0	1	1	1	0
47	GPIO5 Digital Input	1	0	1	1	1	1
48	GPIO6 Digital Input	1	1	0	0	0	0
49	GPIO7 Digital Input	1	1	0	0	0	1
50	GPIO8 Digital Input	1	1	0	0	1	0
51	GPI4 Digital Input/Crystal OSC	1	1	0	0	1	1
52	GPI5 Digital Input	1	1	0	1	0	0
53	GPI6 Digital Input	1	1	0	1	0	1
54	GPI7 Digital Input	1	1	0	1	1	0
55	GPIO9 Digital Input	1	1	0	1	1	1
56	ACMP0H Output	1	1	1	0	0	0
57	ACMP1H Output	1	1	1	0	0	1
58	ACMP2L Output	1	1	1	0	1	0
59	ACMP3L output	1	1	1	0	1	1
60	GPIO10 Digital Input	1	1	1	1	0	0
61	GPIO11 Digital Input	1	1	1	1	0	1
62	nRST_core (POR) as matrix input	1	1	1	1	1	0
63	V _{DD}	1	1	1	1	1	1

6.2 MATRIX OUTPUT TABLE

Table 28: Matrix Output Table

Register Bit Address	Matrix Output Signal Function	Matrix Output Number
[5:0]	Matrix Out 0: IN0 of LUT2_0 or Clock Input of DFF0	0
[11:6]	Matrix Out 1: IN1 of LUT2_0 or Data Input of DFF0	1
[17:12]	Matrix Out 2: IN0 of LUT2_1 or Clock Input of PGEN	2
[23:18]	Matrix Out 3: IN1 of LUT2_1 or nRST of PGEN	3
[29:24]	Matrix Out 4: IN0 of LUT3_0 or Clock Input of DFF1	4
[35:30]	Matrix Out 5: IN1 of LUT3_0 or Data Input of DFF1	5
[41:36]	Matrix Out 6: IN2 of LUT3_0 or nRST (nSET) of DFF1	6
[47:42]	Matrix Out 7: IN0 of LUT3_1 or Clock Input of DFF2	7
[53:48]	Matrix Out 8: IN1 of LUT3_1 or Data Input of DFF2	8

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Table 28: Matrix Output Table(Continued)

Register Bit Address	Matrix Output Signal Function	Matrix Output Number
[59:54]	Matrix Out 9: IN2 of LUT3_1 or nRST (nSET) of DFF2	9
[65:60]	Matrix Out 10: IN0 of LUT3_2 or Clock Input of DFF3	10
[71:66]	Matrix Out 11: IN1 of LUT3_2 or Data Input of DFF3	11
[77:72]	Matrix Out 12: IN2 of LUT3_2 or nRST (nSET) of DFF3	12
[83:78]	Matrix Out 13: IN0 of LUT3_3 or Clock Input of DFF4	13
[89:84]	Matrix Out 14: IN1 of LUT3_3 or Data Input of DFF4	14
[95:90]	Matrix Out 15: IN2 of LUT3_3 or nRST (nSET) of DFF4	15
[101:96]	Matrix Out 16: IN0 of LUT3_4 or Delay1 Input (or Counter1 nRST Input)	16
[107:102]	Matrix Out 17: IN1 of LUT3_4 or External Clock1 Input of Delay1 (or Counter1)	17
[113:108]	Matrix Out 18: IN2 of LUT3_4	18
[119:114]	Matrix Out 19: IN0 of LUT3_5 or Delay2 Input (or Counter2 nRST Input)	19
[125:120]	Matrix Out 20: IN1 of LUT3_5 or External Clock1 Input of Delay2 (or Counter2)	20
[131:126]	Matrix Out 21: IN2 of LUT3_5	21
[137:132]	Matrix Out 22: IN0 of LUT3_6 or Delay3 Input (or Counter3 nRST Input)	22
[143:138]	Matrix Out 23: IN1 of LUT3_6 or External Clock1 Input of Delay3 (or Counter3)	23
[149:144]	Matrix Out 24: IN2 of LUT3_6	24
[155:150]	Matrix Out 25: IN0 of LUT3_7 or Delay4 Input (or Counter4 nRST Input)	25
[161:156]	Matrix Out 26: IN1 of LUT3_7 or External Clock1 Input of Delay4 (or Counter4)	26
[167:162]	Matrix Out 27: IN2 of LUT3_7	27
[173:168]	Matrix Out 28: IN0 of LUT3_8 or Input of Pipe Delay	28
[179:174]	Matrix Out 29: IN1 of LUT3_8 or nRST of Pipe Delay	29
[185:180]	Matrix Out 30: IN2 of LUT3_8 or Clock of Pipe Delay	30
[191:186]	Matrix Out 31: IN0 of LUT4_0 or Delay0 Input (or Counter0 nRST Input)	31
[197:192]	Matrix Out 32: IN1 of LUT4_0 or External Clock Input of Delay0 (or Counter0)	32
[203:198]	Matrix Out 33: IN2 of LUT4_0 or UP Input of FSM0	33
[209:204]	Matrix Out 34: IN3 of LUT4_0 or KEEP Input of FSM0	34
[215:210]	Matrix Out 35: ACMP0H Power Down	35
[221:216]	Matrix Out 36: ACMP1H Power Down	36
[227:222]	Matrix Out 37: ACMP2L Power Down	37
[233:228]	Matrix Out 38: ACMP3L Power Down	38
[239:234]	Matrix Out 39: GPO7 DOUT	39
[245:240]	Matrix Out 40: GPO0 DOUT	40
[251:246]	Matrix Out 41: GPIO0 DOUT	41
[257:252]	Matrix Out 42: GPIO0 DOUT OE	42
[263:258]	Matrix Out 43: GPIO1 DOUT	43
[269:264]	Matrix Out 44: GPIO1 DOUT OE	44
[275:270]	Matrix Out 45: GPIO2 DOUT	45
[281:276]	Matrix Out 46: GPIO2 DOUT OE	46
[287:282]	Matrix Out 47: GPIO3 DOUT	47

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Table 28: Matrix Output Table(Continued)

Register Bit Address	Matrix Output Signal Function	Matrix Output Number
[293:288]	Matrix Out 48: GPIO3 DOUT OE	48
[299:294]	Matrix Out 49: GPIO4 DOUT	49
[305:300]	Matrix Out 50: GPIO4 DOUT OE	50
[311:306]	Matrix Out 51: GPIO5 DOUT	51
[317:312]	Matrix Out 52: GPIO5 DOUT OE	52
[323:318]	Matrix Out 53: GPO1 DOUT	53
[329:324]	Matrix Out 54: GPO2 DOUT	54
[335:330]	Matrix Out 55: GPO3 DOUT	55
[341:336]	Matrix Out 56: GPO4 DOUT	56
[347:342]	Matrix Out 57: GPIO6 DOUT OE	57
[353:348]	Matrix Out 58: GPIO6 DOUT	58
[359:354]	Matrix Out 59: GPIO7 DOUT	59
[365:360]	Matrix Out 60: GPIO7 DOUT OE	60
[371:366]	Matrix Out 61: GPIO8 DOUT OE	61
[377:372]	Matrix Out 62: GPIO8 DOUT	62
[383:378]	Matrix Out 63: GPIO9 DOUT OE	63
[389:384]	Matrix Out 64: GPIO9 DOUT	64
[395:390]	Matrix Out 65: GPIO10 DOUT OE	65
[401:396]	Matrix Out 66: GPIO10 DOUT	66
[407:402]	Matrix Out 67: GPIO11 DOUT OE	67
[413:408]	Matrix Out 68: GPIO11 DOUT	68
[419:414]	Matrix Out 69: GPO5 DOUT	69
[425:420]	Matrix Out 70: GPO6 DOUT	70
[431:426]	Matrix Out 71: ASM nRST	71
[437:432]	Matrix Out 72: OSC0 ENABLE	72
[443:438]	Matrix Out 73: OSC1 ENABLE	73
[449:444]	Matrix Out 74: OSC2 ENABLE	74
[455:450]	Matrix Out 75: Filter/Edge detect input	75
[461:456]	Matrix Out 76: F1 interrupt	76
[467:462]	Matrix Out 77: Programmable delay/edge detect input	77
[473:468]	Matrix Out 78: Temp sensor/Crystal OSC Power Down	78
[479:474]	Matrix Out 79: GPI Latch enable	79
[485:480]	Matrix Out 80: GPIO Latch enable	80
[491:486]	Matrix Out 81: BG enable	81
[497:492]	DM_EXT_CLK0	82
[503:498]	DM_EXT_CLK1	83
Note: For each Address, the two most significant bits are unused.		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

6.3 CONNECTION MATRIX VIRTUAL INPUTS

As mentioned previously, the Connection Matrix inputs come from the outputs of various digital macrocells on the device. Eight of the Connection Matrix inputs have the special characteristic that the state of these signal lines comes from a corresponding data bit written as a register value via I²C. This gives the user the ability to write data via the serial channel, and have this information translated into signals that can be driven into the Connection Matrix and from the Connection Matrix to the digital inputs of other macrocells on the device. The I²C address for reading and writing these register values is at 0x1DB (475).

Six of the eight Connection Matrix Virtual Inputs are dedicated to this virtual input function. An I²C write command to these register bits will set the signal values going into the Connection Matrix to the desired state. A read command to these register bits will read either the original data values coming from the NVM memory bits (that were loaded during the initial device startup), or the values from a previous write command (if that has happened).

Two of the eight Connection Matrix Virtual Inputs are shared with Pin digital inputs (GPI3/SCL Digital Input or I²C_virtual_1 Input), and (GPI2/SDA Digital Input or I²C_virtual_0 Input). If the virtual input mode is selected, an I²C write command to these register bits will set the signal values going into the Connection Matrix to the desired state. A read command to these register bits will read either the original data values coming from the NVM memory bits (that were loaded during the initial device startup), or the values from a previous write command (if that has happened). The I²C disable/enable register bit [4084] selects whether the Connection Matrix input comes from the Pin input or from the virtual register.

- Select SCL & Virtual Input 1 or GPI3/SCL.
- Select SDA & Virtual Input 0 or GPI2/SDA.

See [Table 29](#) for Connection Matrix Virtual Inputs.

Table 29: Connection Matrix Virtual Inputs

Matrix Input Number	Matrix Input Signal Function	Register Bit Addresses (d)
32	I ² C_virtual_0 Input	[3800]
33	I ² C_virtual_1 Input	[3801]
34	I ² C_virtual_2 Input	[3802]
35	I ² C_virtual_3 Input	[3803]
36	I ² C_virtual_4 Input	[3804]
37	I ² C_virtual_5 Input	[3805]
38	I ² C_virtual_6 Input	[3806]
39	I ² C_virtual_7 Input	[3807]

6.4 CONNECTION MATRIX VIRTUAL OUTPUTS

The digital outputs of the various macrocells are routed to the Connection Matrix to enable interconnections to the inputs of other macrocells in the device. At the same time, it is possible to read the state of each of the macrocell outputs as a register value via I²C. This option, called Connection Matrix Virtual Outputs, allows the user to remotely read the values of each macrocell output. The I²C addresses for reading these register values are 0x1D7 (471) to 0x1DE (478). Write commands to these same register values will be ignored (with the exception of the Virtual Input register bits at 0x1DB (475)).

7 Combination Function Macrocells

The SLG46880/81 has 12 combination function macrocells that can serve more than one logic or timing function. In each case, they can serve as a Look Up Table (LUT), or as another logic or timing function. See the list below for the functions that can be implemented in these macrocells.

- One macrocell that can serve as either 2-bit LUT or as D Flip Flop
- Four macrocells that can serve as either 3-bit LUTs or as D Flip Flops with Set/Reset Input
- One macrocell that can serve as either 3-bit LUT or as Pipe Delay/Ripple Counter
- One macrocell that can serve as either 2-bit LUT or as Programmable Pattern Generator (PGEN)
- One macrocell that can serve as either 4-bit LUT or as 16-Bit Counter/Delay/FSM
- Four macrocells that can serve as either 3-bit LUTs or as 8-Bit Counter/Delays

Inputs/Outputs for the 12 combination function macrocells are configured from the connection matrix with specific logic functions which are defined by the state of NVM bits.

When used as a LUT to implement combinatorial logic functions, the outputs of the LUTs can be configured to any user defined function, including the following standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR). Inputs/Outputs for the 11 combination function macrocells are configured from the connection matrix with specific logic functions being defined by the state of NVM bits.

When used as a LUT to implement combinatorial logic functions, the outputs of the LUTs can be configured to any user defined function, including the following standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR).

7.1 2-BIT LUT OR D FLIP-FLOP MACROCELLS

There is one macrocell that can serve as either 2-bit LUT or as D Flip Flop. When used to implement LUT functions, the 2-bit LUT takes in two input signals from the connection matrix and produces a single output, which goes back into the connection matrix. When used to implement D Flip Flop function, the two input signals from the connection matrix go to the data (D) and clock (CLK) inputs for the Flip Flop, with the output going back to the connection matrix.

The operation of the D Flip-Flop and Latch will follow the functional descriptions below:

- DFF: CLK is rising edge triggered, then $Q = D$; otherwise Q will not change
- Latch: when CLK is Low, then $Q = D$; otherwise Q remains its previous value (input D has no effect on the output, when CLK is High)

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

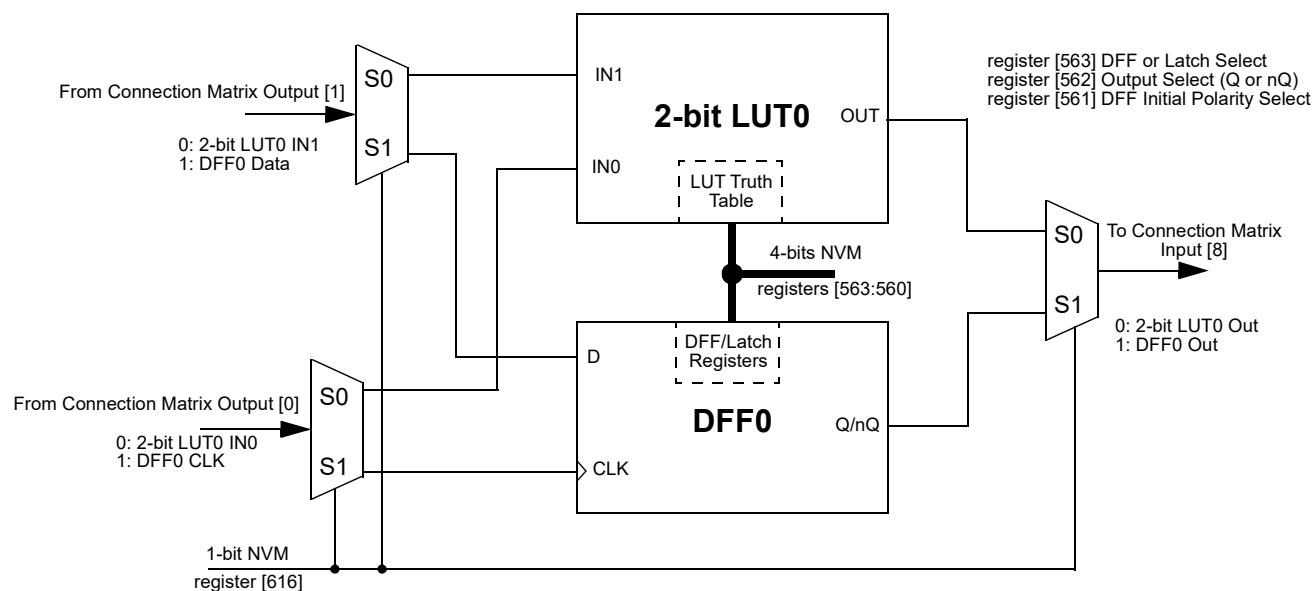


Figure 25: 2-bit LUT0 or DFF0

7.1.1 2-Bit LUT or D Flip-Flop Macrocell Used as 2-Bit LUT

Table 30: 2-bit LUT0 Truth Table

IN1	IN0	OUT	
0	0	register [560]	LSB
0	1	register [561]	
1	0	register [562]	
1	1	register [563]	MSB

This Macrocell, when programmed for a LUT function, uses a 4-bit register to define their output function:

2-Bit LUT0 is defined by registers [563:560]

The Table 31 shows the register bits for the standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR) that can be created within each of the 2-bit LUT logic cells.

Table 31: 2-bit LUT Standard Digital Functions

Function	MSB			LSB
AND-2	1	0	0	0
NAND-2	0	1	1	1
OR-2	1	1	1	0
NOR-2	0	0	0	1
XOR-2	0	1	1	0
XNOR-2	1	0	0	1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

7.1.2 Initial Polarity Operations

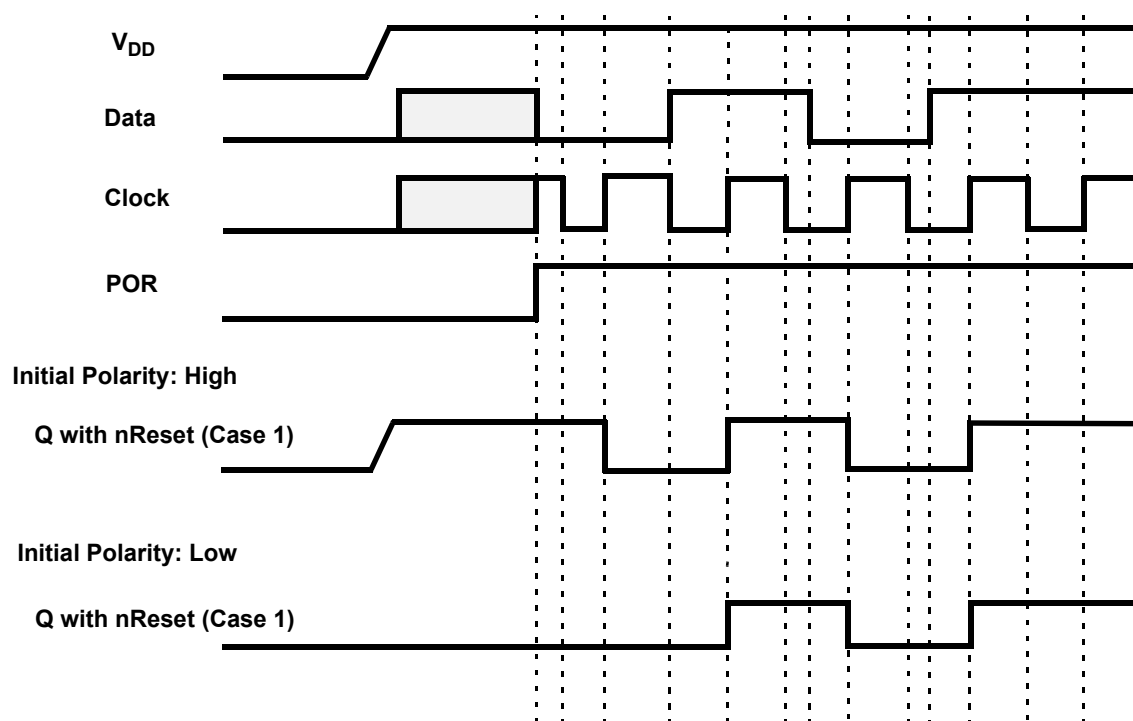


Figure 26: DFF Polarity Operations

7.2 2-BIT LUT OR PROGRAMMABLE PATTERN GENERATOR

The SLG46880/81 has one combination function macrocell that can serve as a logic or timing function. This macrocell can serve as a Look Up Table (LUT), or Programmable Pattern Generator (PGEN).

When used to implement LUT functions, the 2-bit LUT takes in two input signals from the connection matrix and produces a single output, which goes back into the connection matrix. When used as a LUT to implement combinatorial logic functions, the outputs of the LUT can be configured to any user defined function, including the following standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR). The user can also define the combinatorial relationship between inputs and outputs to be any selectable function.

When operating as a Programmable Pattern Generator, the output of the macrocell with clock out a sequence of two to sixteen bits that are user selectable in their bit values, and user selectable in the number of bits (up to sixteen) that are output before the pattern repeats.

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

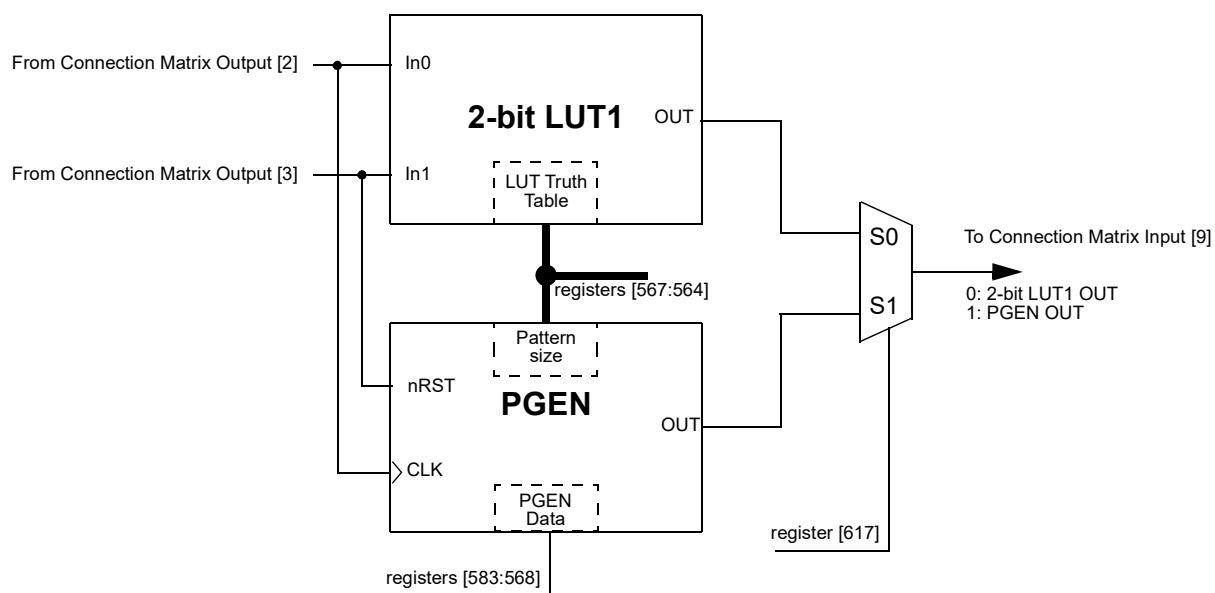


Figure 27: 2-bit LUT1 or PGEN

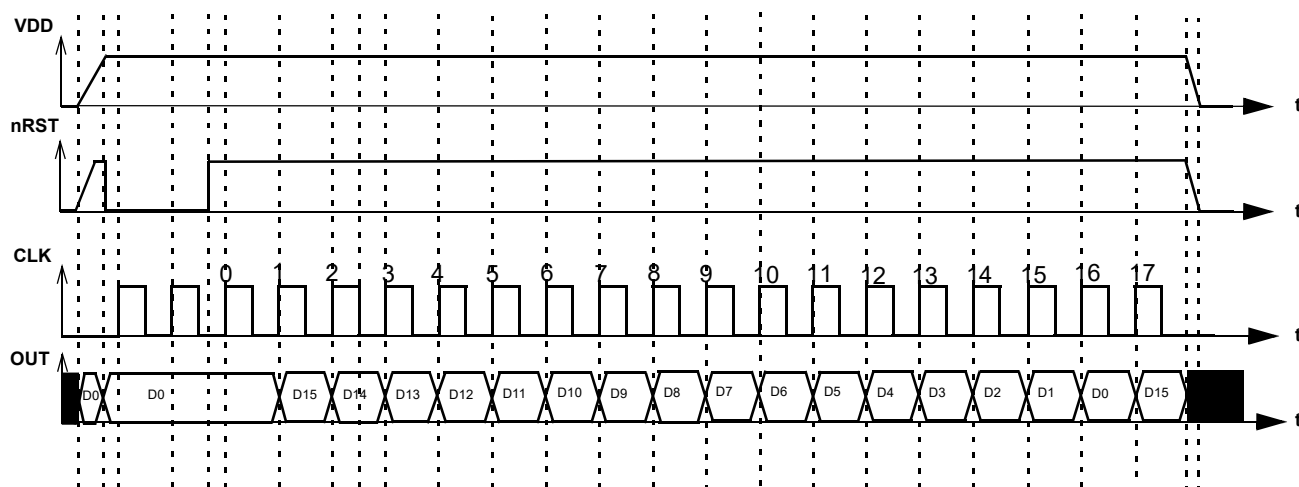


Figure 28: PGEN Timing Diagram

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

7.2.1 2-Bit LUT or PGEN Macrocell Used as 2-Bit LUT

Table 32: 2-bit LUT1 Truth Table

IN1	IN0	OUT	
0	0	register [564]	LSB
0	1	register [565]	
1	0	register [566]	
1	1	register [567]	MSB

This Macrocell, when programmed for a LUT function, uses a 4-bit register to define their output function:

2-Bit LUT1 is defined by registers [567:564]

The [Table 33](#) shows the register bits for the standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR) that can be created within each of the 2-bit LUT logic cells.

Table 33: 2-bit LUT Standard Digital Functions

Function	MSB			LSB
AND-2	1	0	0	0
NAND-2	0	1	1	1
OR-2	1	1	1	0
NOR-2	0	0	0	1
XOR-2	0	1	1	0
XNOR-2	1	0	0	1

7.3 3-BIT LUT OR D FLIP-FLOP WITH SET/RESET MACROCELLS

There are four macrocells that can serve as either 3-bit LUTs or as D Flip Flops with Set/Reset inputs. When used to implement LUT functions, the 3-bit LUTs each take in three input signals from the connection matrix and produce a single output, which goes back into the connection matrix. When used to implement D Flip Flop function, the three input signals from the connection matrix go to the data (D) and clock (CLK) and Set/Reset (nRST/nSET) inputs for the Flip Flop, with the output going back to the connection matrix.

DFF1 functionality is different from the other DFFs. DFF1 operation will flow the functional description below:

- if register [619] = 0, and the CLK is rising edge triggered, then Q=D, otherwise Q will not change
- if register [619] = 1, then data from D is written into the DFF by the rising edge on CLK and output to Q by the falling edge on CLK

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Latch: when CLK is Low, then $Q = D$; otherwise Q remains its previous value (input D has no effect on the output, when CLK is High).

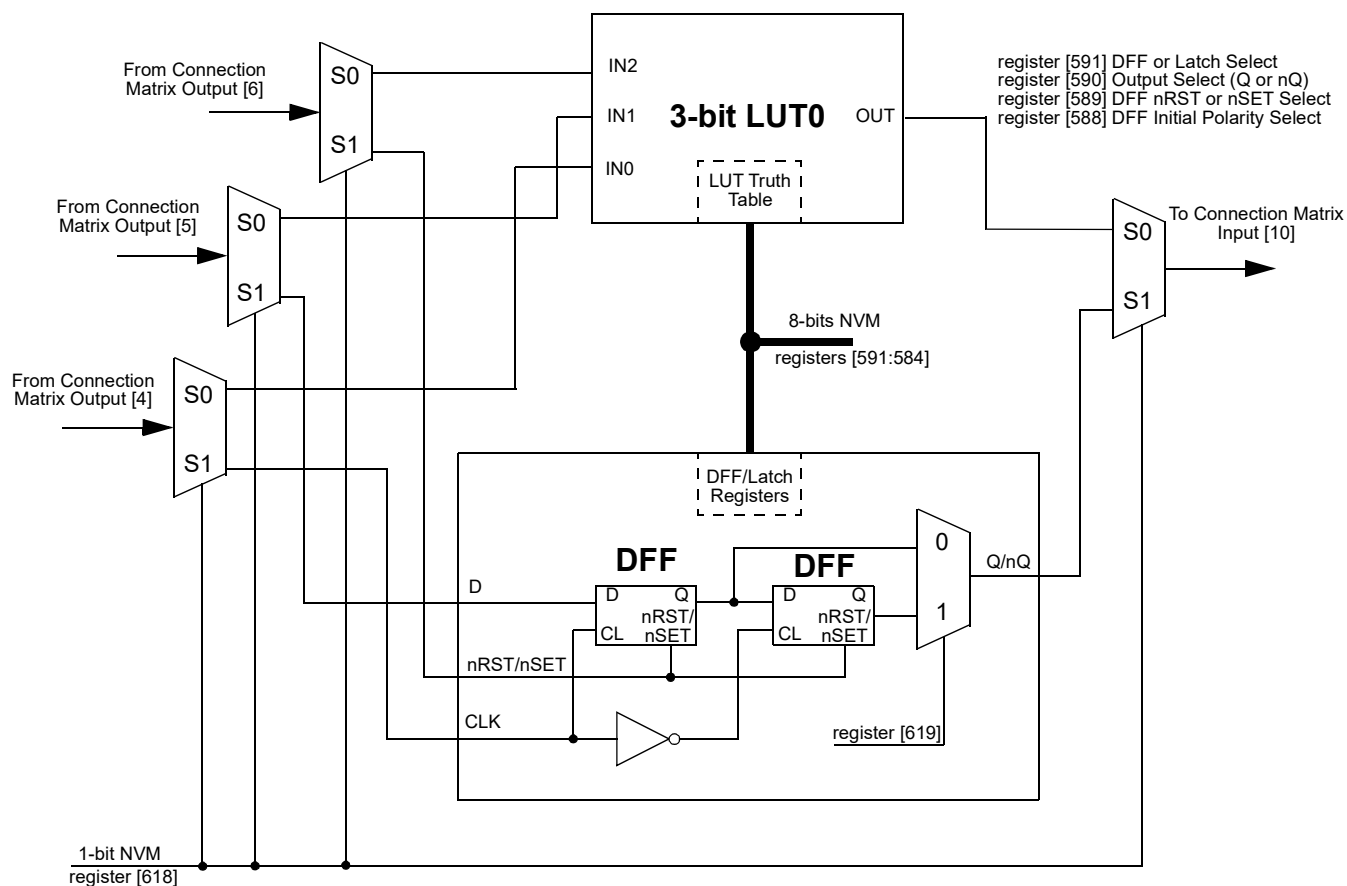


Figure 29: 3-bit LUT0 or DFF1

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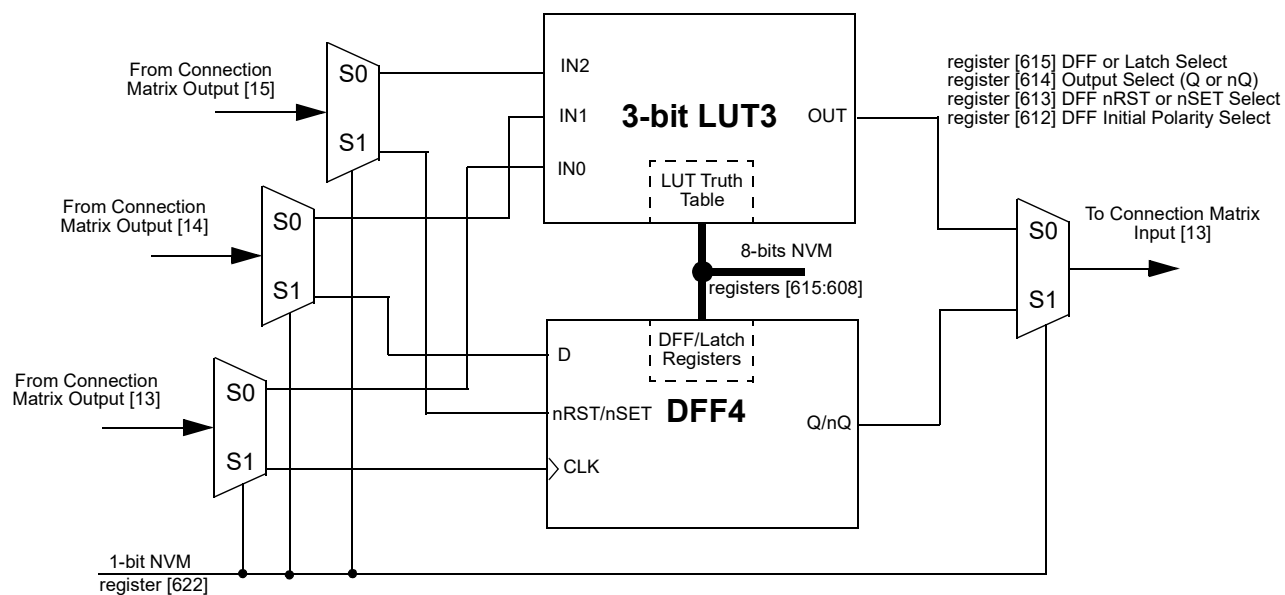


Figure 32: 3-bit LUT3 or DFF4

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7.3.1 3-Bit LUT or D Flip-Flop Macrocells Used as 3-Bit LUTs

Table 34: 3-bit LUT0 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [584]	LSB
0	0	1	register [585]	
0	1	0	register [586]	
0	1	1	register [587]	
1	0	0	register [588]	
1	0	1	register [589]	
1	1	0	register [590]	
1	1	1	register [591]	MSB

Table 35: 3-bit LUT1 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [592]	LSB
0	0	1	register [593]	
0	1	0	register [594]	
0	1	1	register [595]	
1	0	0	register [596]	
1	0	1	register [597]	
1	1	0	register [598]	
1	1	1	register [599]	MSB

Table 36: 3-bit LUT2 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [600]	LSB
0	0	1	register [601]	
0	1	0	register [602]	
0	1	1	register [603]	
1	0	0	register [604]	
1	0	1	register [605]	
1	1	0	register [606]	
1	1	1	register [607]	MSB

Table 37: 3-bit LUT3 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [608]	LSB
0	0	1	register [609]	
0	1	0	register [610]	
0	1	1	register [611]	
1	0	0	register [612]	
1	0	1	register [613]	
1	1	0	register [614]	
1	1	1	register [615]	MSB

Each Macrocell, when programmed for a LUT function, uses a 8-bit register to define their output function:

3-Bit LUT0 is defined by registers [591:584]

3-Bit LUT1 is defined by registers [599:592]

3-Bit LUT2 is defined by registers [607:600]

3-Bit LUT3 is defined by registers [615:608]

The [Table 38](#) shows the register bits for the standard digital logic devices (AND, NAND, OR, NOR, XOR, XNOR) that can be created within each of the four 3-bit LUT logic cells.

Table 38: 3-bit LUT Standard Digital Functions

Function	MSB							LSB
AND-3	1	0	0	0	0	0	0	0
NAND-3	0	1	1	1	1	1	1	1
OR-3	1	1	1	1	1	1	1	0
NOR-3	0	0	0	0	0	0	0	1
XOR-3	1	0	0	1	0	1	1	0
XNOR-3	0	1	1	0	1	0	0	1

7.3.2 Initial Polarity Operations

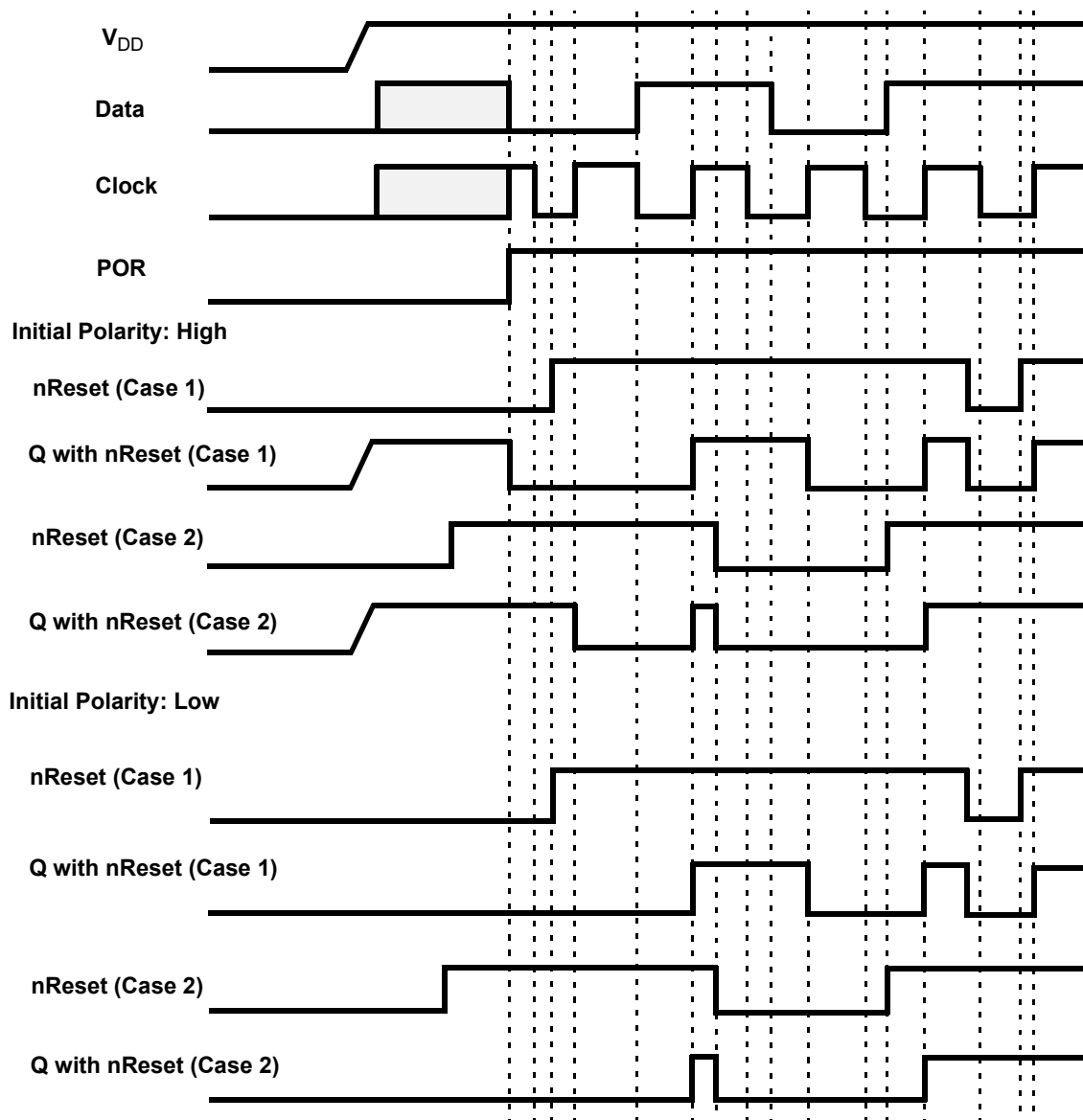


Figure 33: DFF Polarity Operations with nReset

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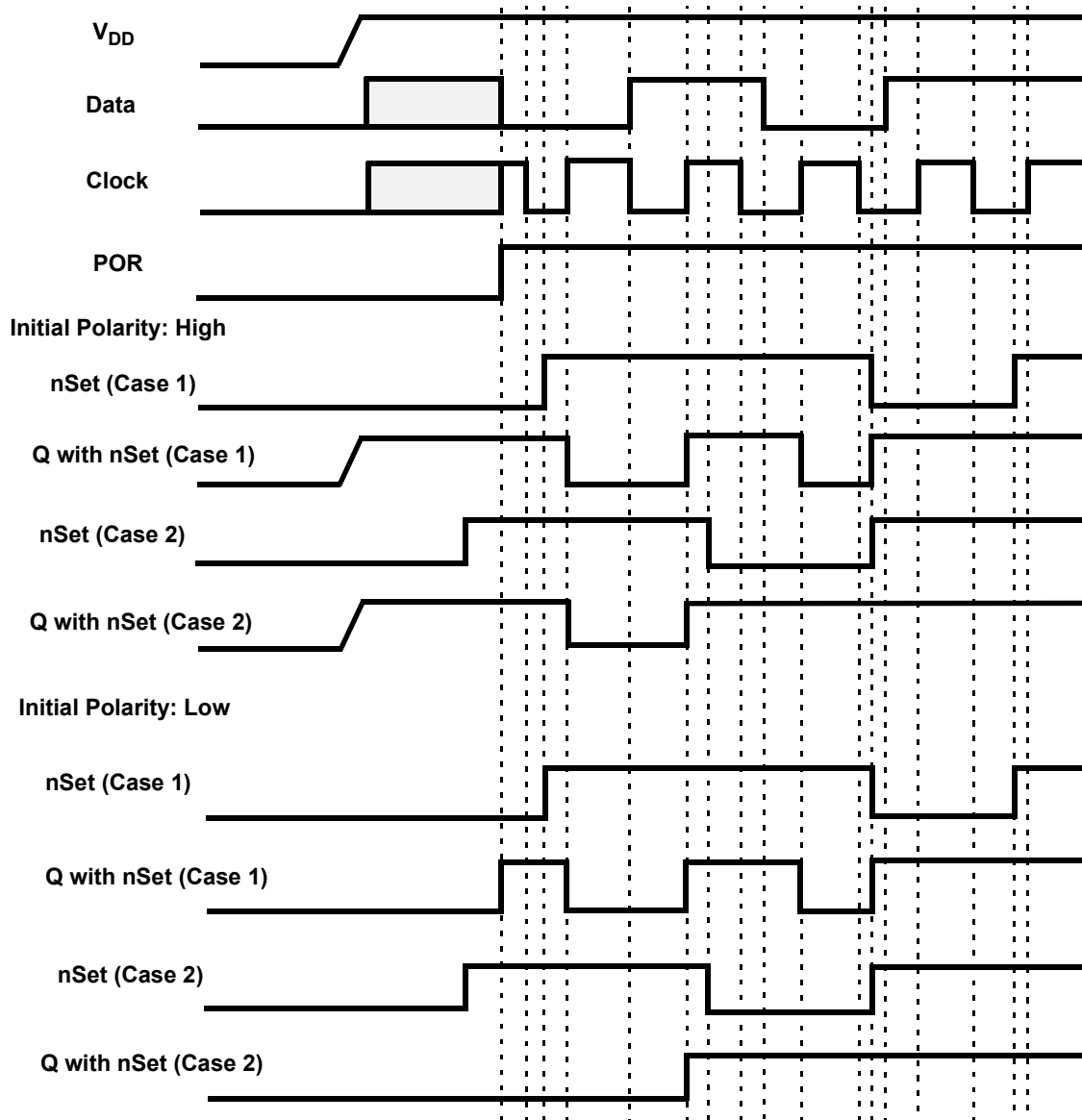


Figure 34: DFF Polarity Operations with nSet

7.4 3-BIT LUT OR PIPE DELAY/RIPPLE COUNTER MACROCELL

There is one macrocell that can serve as either a 3-bit LUT or as a Pipe Delay/Ripple Counter.

When used to implement LUT functions, the 3-bit LUT takes in three input signals from the connection matrix and produces a single output, which goes back into the connection matrix.

When used as a pipe delay, there are three input signals from the matrix, Input (IN), Clock (CLK) and Reset (nRST). The pipe delay cell is built from 16 D Flip-Flop logic cells that provide the three delay options, two of which are user selectable. The DFF cells are tied in series where the output (Q) of each delay cell goes to the next DFF cell input (IN). Both of the two outputs (OUT0 and OUT1) provide user selectable options for 1 to 16 stages of delay. There are delay output points for each set of the OUT0 and OUT1 outputs to a 4-input mux that is controlled by registers [547:544] for OUT0 and registers [551:548] for OUT1. The 4-input mux is used to control the selection of the amount of delay.

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The overall time of the delay is based on the clock used in the SLG46880/81 design. Each DFF cell has a time delay of the inverse of the clock time (either external clock or the Oscillator within the SLG46880/81). The sum of the number of DFF cells used will be the total time delay of the Pipe Delay logic cell. OUT1 Output can be inverted (as selected by register [552]).

In the Ripple Counter mode there are 3 options for setting, which use 7 bits. There are 3 bits to set **nSET value (SV)** in range from 0 to 7. It is a value, which will be set into the Ripple Counter outputs when nSET input goes LOW. **End value (EV)** will use 3 bits for setting outputs code, which will be last code in the cycle. After reaching the EV, the Ripple Counter goes to the first code by the rising edge on CLK input. The **Functionality mode** option uses 1 bit. This setting defines how exactly Ripple Counter will operate.

The user can select one of the functionality modes by register: RANGE or FULL. If the RANGE option is selected, the count starts from SV. If UP input is LOW the count goes down: $SV \rightarrow EV \rightarrow EV-1 \dots SV+1 \rightarrow SV$ etc (if SV is smaller than EV) or $SV \rightarrow SV-1 \dots EV+1 \rightarrow EV \rightarrow SV$ (if SV is bigger than EV). If UP input is HIGH, count starts from SV up to EV etc.

In the FULL range configuration the Ripple Counter functions as follows. If UP input is LOW, the count starts from SV and goes down to 0. Then current counter value jumps to EV and goes down to 0 etc.

If UP input is HIGH, count goes up starting from SV. Then current counter value jumps to 0 and counts up to EV etc. see Ripple counter functionality example in [Figure 36](#).

Every step is executed by the rising edge on CLK input.

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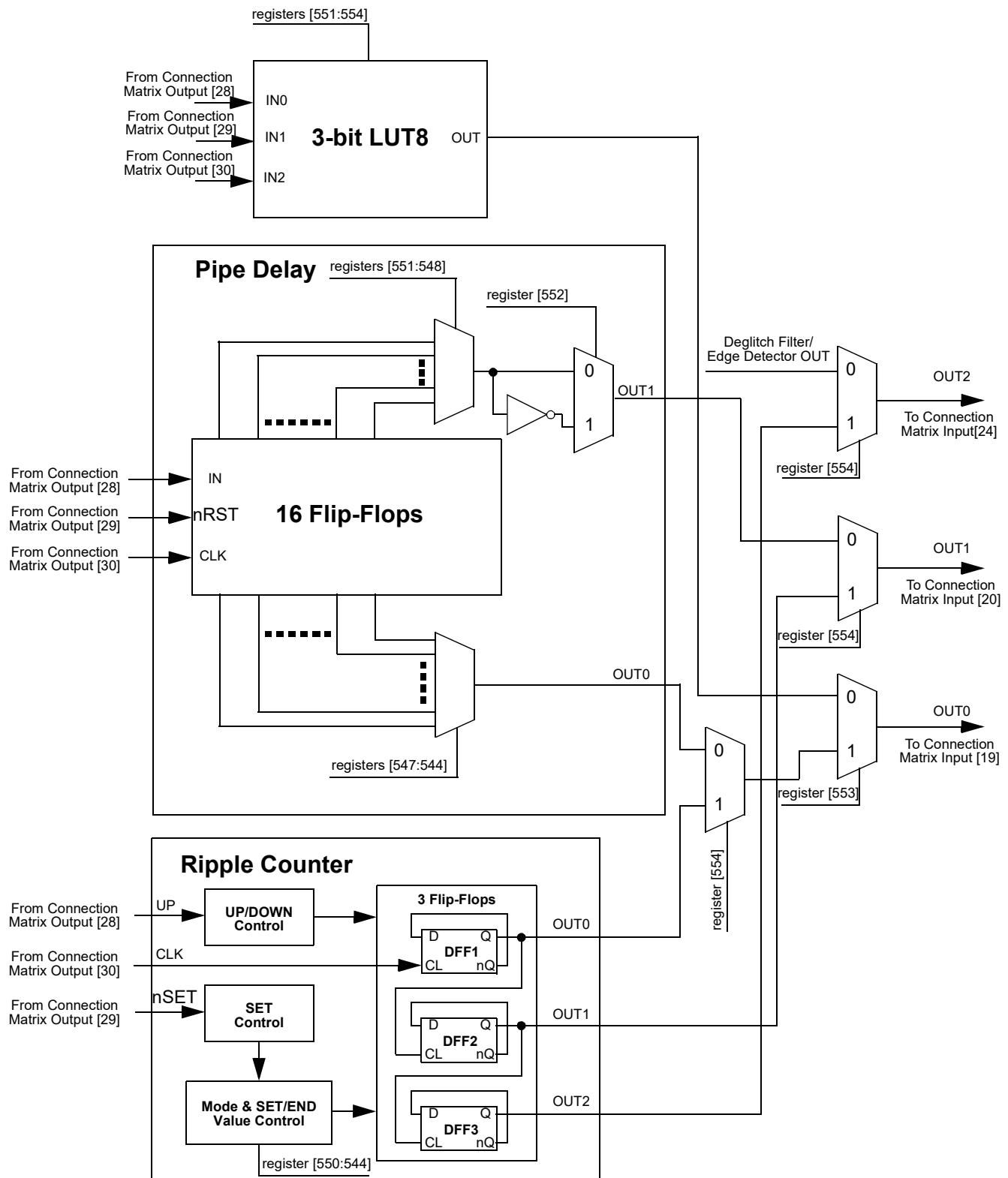


Figure 35: 3-bit LUT8/Pipe Delay/Ripple Counter

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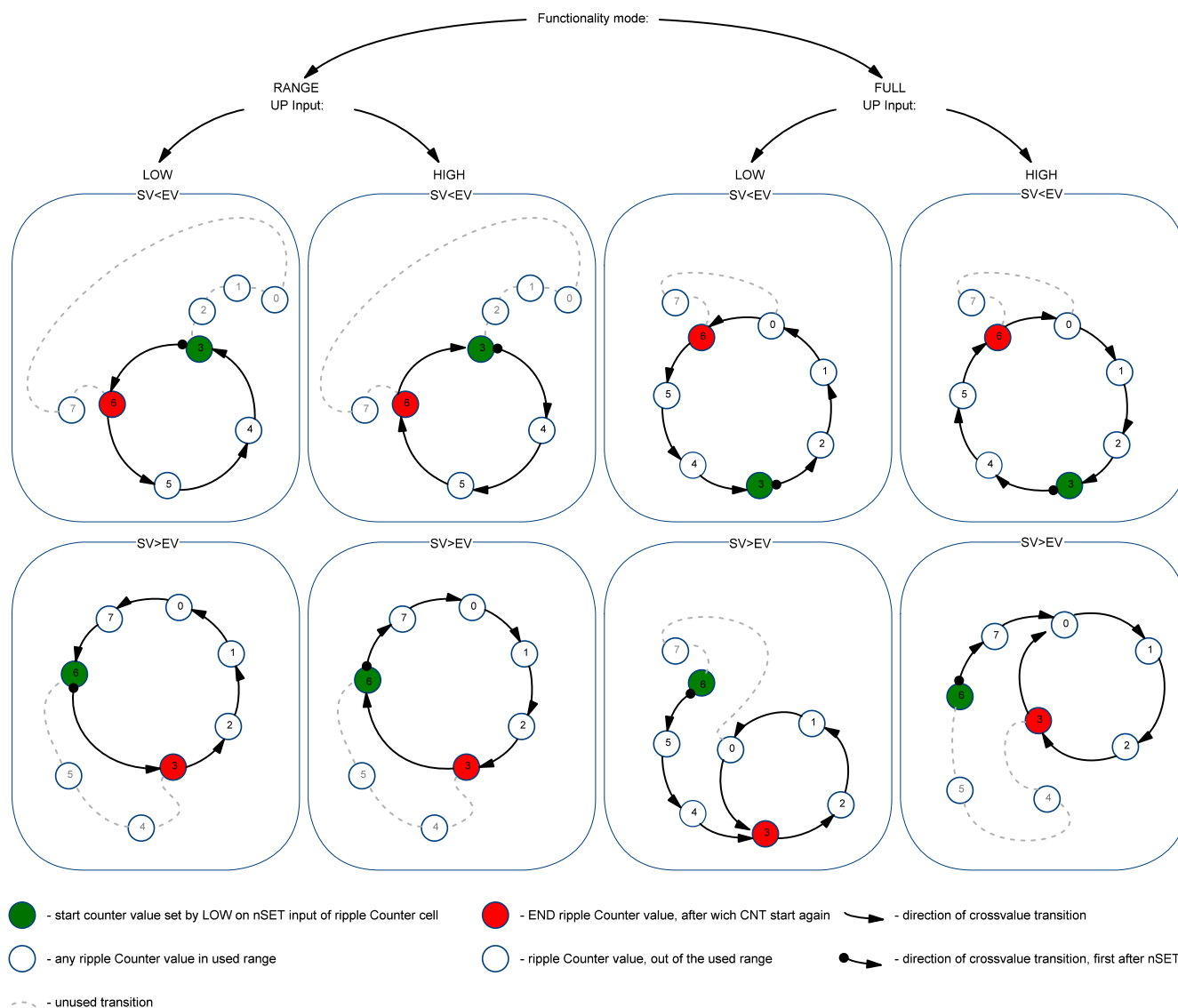


Figure 36: Example: Ripple Counter Functionality

7.4.1 3-Bit LUT or Pipe Delay Macrocells Used as 3-Bit LUT

Table 39: 3-bit LUT6 Truth Table

IN2	IN1	IN0	OUT
0	0	0	register [544]
0	0	1	register [545]
0	1	0	register [546]
0	1	1	register [547]
1	0	0	register [548]
1	0	1	register [549]
1	1	0	register [550]
1	1	1	register [551]

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Each Macrocell, when programmed for a LUT function, uses a 8-bit register to define their output function:

3-Bit LUT8 is defined by registers [551:544]

7.5 3-BIT LUT OR 8-BIT COUNTER/DELAY MACROCELLS

There are four macrocells that can serve as either 3-bit LUTs or as Counter/Delays. When used to implement LUT function, the 3-bit LUT takes in three input signals from the connection matrix and produces a single output, which goes back into the connection matrix. When used to implement 8-Bit Counter/Delay function, two of the three input signals from the connection matrix go to the external clock (ext_CLK) and reset (DLY_in/CNT_Reset) inputs for the counter/delay, with the output going back to the connection matrix.

Counter/Delay macrocell has an initial value, which define its initial value after GPAK is powered up. It is possible to select initial Low or initial High, as well as initial value defined by a Delay In signal.

For example, in case initial LOW option is used, the rising edge delay will start operation.

These macrocells can also operate in a frequency detection mode.

Delay time and Output Period can be calculated using the following formulas:

- Delay time: $[(\text{Counter data} + 2) / \text{CLK input frequency} - \text{Offset (Note)}]$
- Output Period: $[(\text{Counter data} + 1) / \text{CLK input frequency} - \text{Offset (Note)}]$

One Shot pulse width can be calculated using formula:

- Pulse width = $[(\text{Counter Data} + 2) / \text{CLK input frequency} - \text{Offset (Note)}]$

Note: Offset is the asynchronous time offset between the input signal and the first clock pulse.

Three of the four macrocells can have their active count value read via I²C (CNT0, CNT2 and CNT4). See Section 19.4.6.3 for further details.

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7.5.1 3-Bit LUT or 8-Bit CNT/DLY Block Diagrams

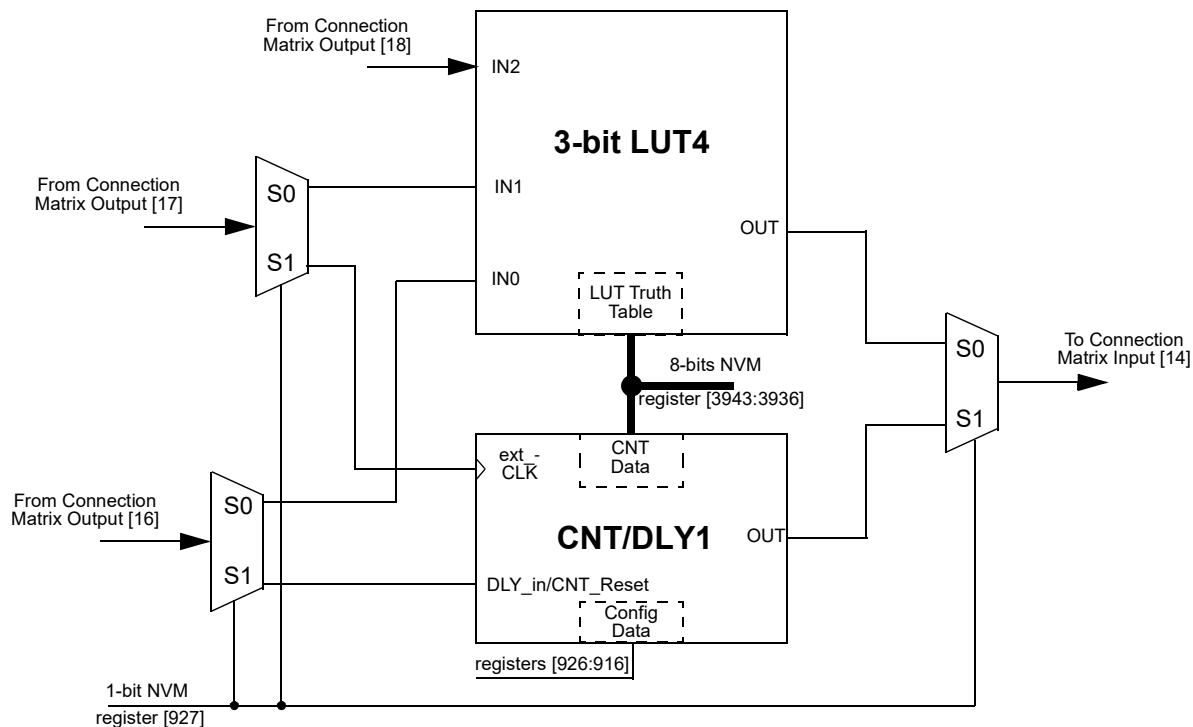


Figure 37: 3-bit LUT4 or CNT/DLY1

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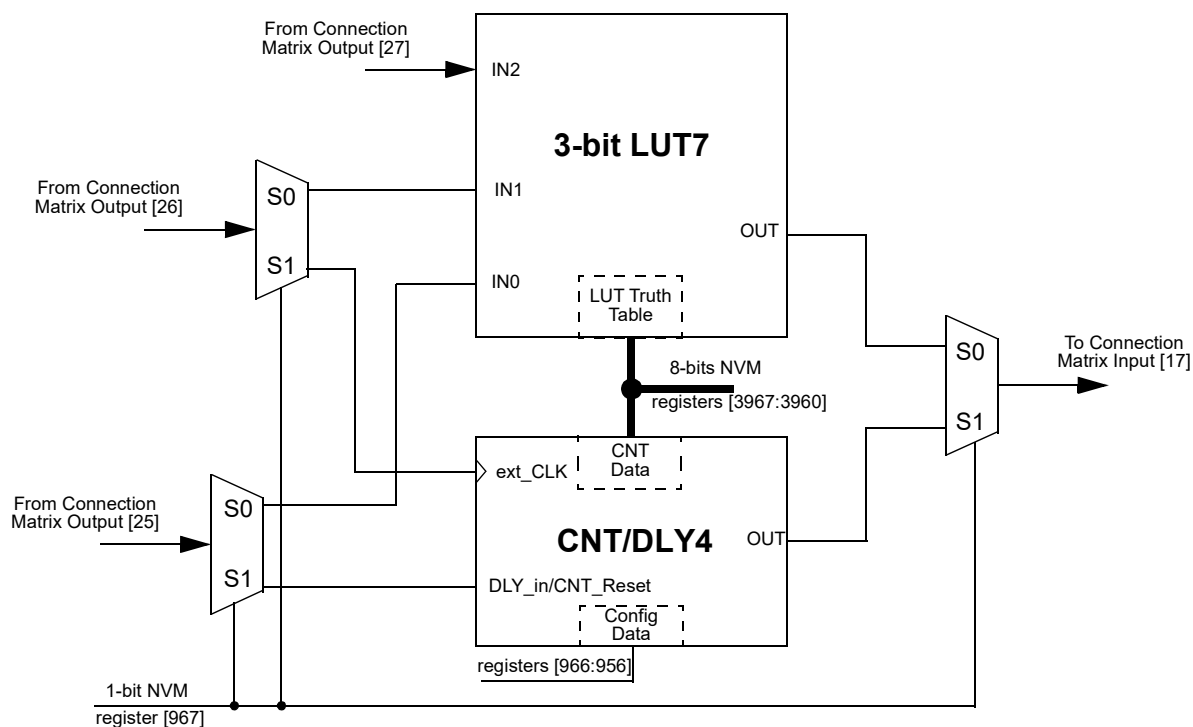


Figure 40: 3-bit LUT7 or CNT/DLY4

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7.5.2 3-Bit LUT or CNT/DLYs Used as 3-Bit LUTs

Table 40: 3-bit LUT4 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [3936]	LSB
0	0	1	register [3937]	
0	1	0	register [3938]	
0	1	1	register [3939]	
1	0	0	register [3940]	
1	0	1	register [3941]	
1	1	0	register [3942]	
1	1	1	register [3943]	MSB

Table 41: 3-bit LUT5 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [3944]	LSB
0	0	1	register [3945]	
0	1	0	register [3946]	
0	1	1	register [3947]	
1	0	0	register [3948]	
1	0	1	register [3949]	
1	1	0	register [3950]	
1	1	1	register [3951]	MSB

Table 42: 3-bit LUT6 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [3952]	LSB
0	0	1	register [3953]	
0	1	0	register [3954]	
0	1	1	register [3955]	
1	0	0	register [3956]	
1	0	1	register [3957]	
1	1	0	register [3958]	
1	1	1	register [3959]	MSB

Table 43: 3-bit LUT7 Truth Table

IN2	IN1	IN0	OUT	
0	0	0	register [3960]	LSB
0	0	1	register [3961]	
0	1	0	register [3962]	
0	1	1	register [3963]	
1	0	0	register [3964]	
1	0	1	register [3965]	
1	1	0	register [3966]	
1	1	1	register [3967]	MSB

Each Macrocell, when programmed for a LUT function, uses a 8-bit register to define their output function:

3-Bit LUT4 is defined by registers [3943:3936]

3-Bit LUT5 is defined by registers [3951:3944]

3-Bit LUT6 is defined by registers [3959:3952]

3-Bit LUT7 is defined by registers [3967:3960]

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7.6 CNT/DLY/FSM TIMING DIAGRAMS

7.6.1 Delay mode (Edge Select: Both, Counter Data: 3) CNT/DLY2...CNT/DLY6

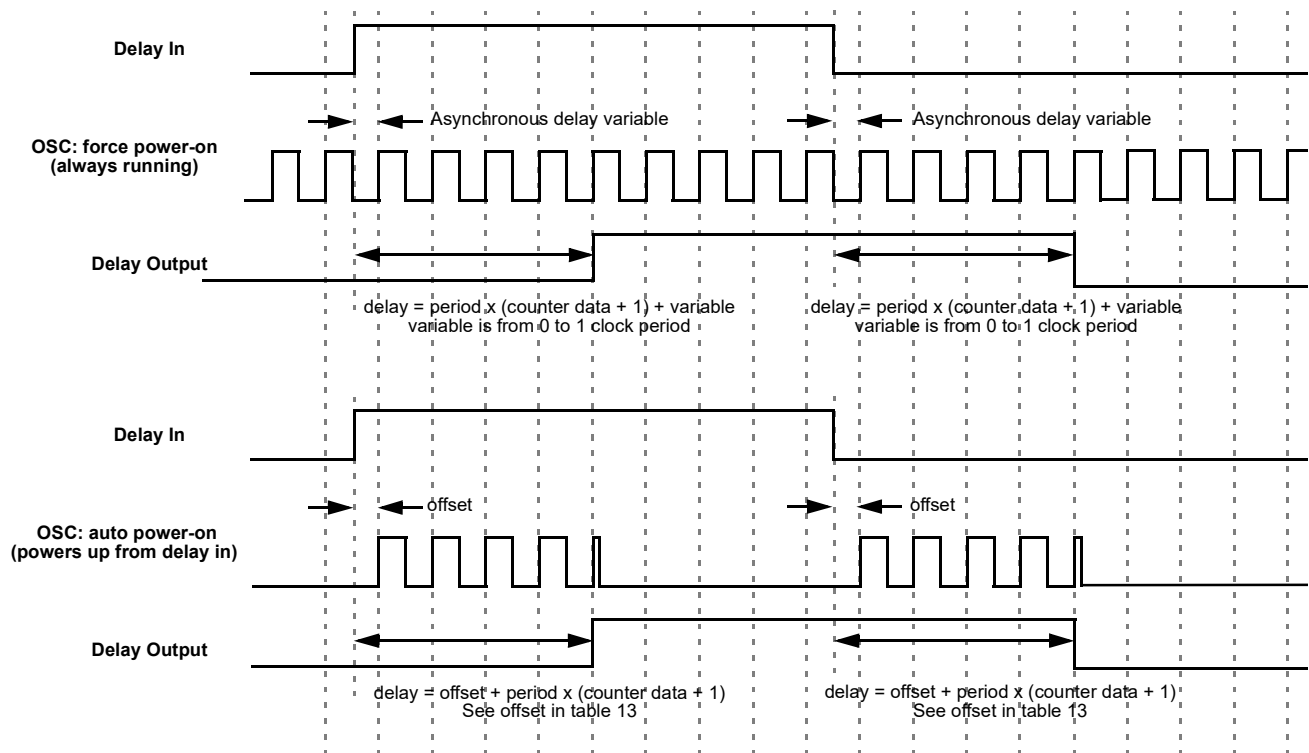


Figure 41: Delay Mode Timing Diagram

7.6.2 Count mode (Count Data: 3), Counter Reset (Rising Edge Detect) CNT/DLY2...CNT/DLY6

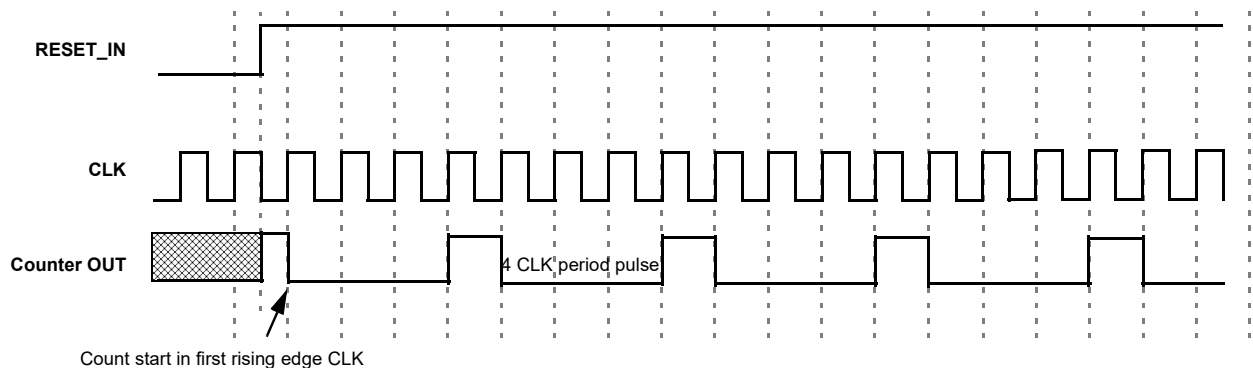


Figure 42: Counter Mode Timing Diagram without two DFFs Synced up

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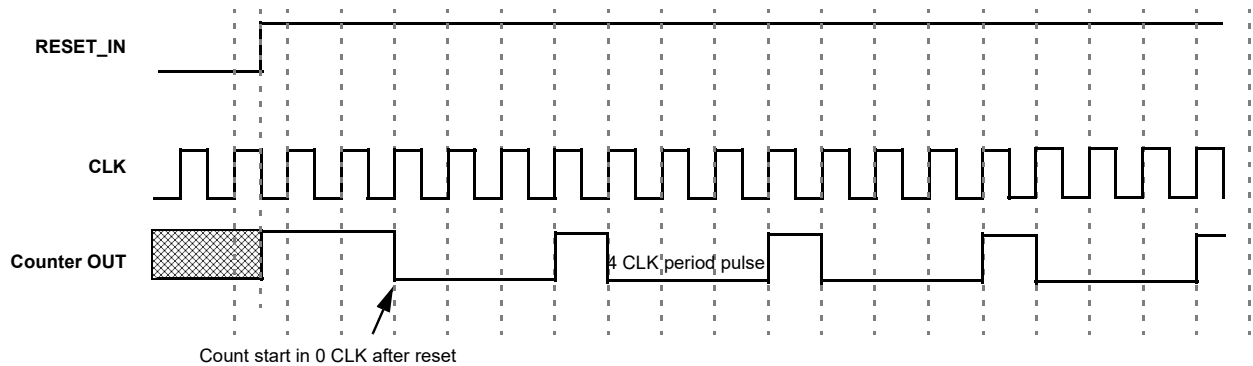


Figure 43: Counter Mode Timing Diagram with two DFFs Synced up

7.6.3 One-Shot Mode CNT/DLY0 to CNT/DLY6

This macrocell will generate a pulse whenever a selected edge is detected on its input. Register bits set the edge selection. The pulse width determines by counter data and clock selection properties. The output pulse polarity (non-inverted or inverted) is selected by register bit. Any incoming edges will be ignored during the pulse width generation. The following diagram shows one-shot function for non-inverted output.

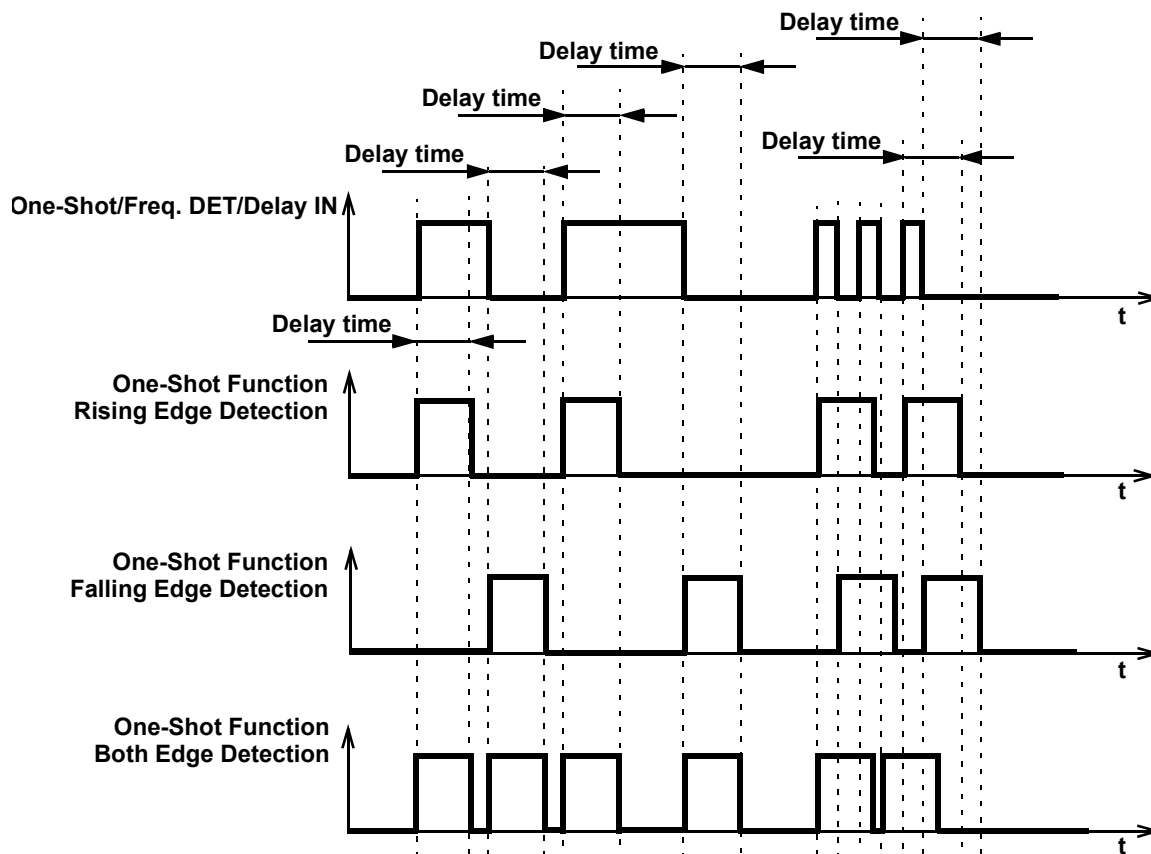


Figure 44: One-Shot Function Timing Diagram

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This macrocell generates a high level pulse with a set width (defined by counter data) when detecting the respective edge. It does not restart while pulse is high.

7.6.4 Frequency Detection Mode CNT/DLY0...CNT/DLY6

Rising Edge: The output goes high if the time between two successive edges is less than the delay. The output goes low if the second rising edge has not come after the last rising edge in specified time.

Falling Edge: The output goes high if the time between two falling edges is less than the set time. The output goes low if the second falling edge has not come after the last falling edge in specified time.

Both Edge: The output goes high if the time between the rising and falling edges is less than the set time, which is equivalent to the length of the pulse. The output goes low if after the last rising/falling edge and specified time, the second edge has not come.

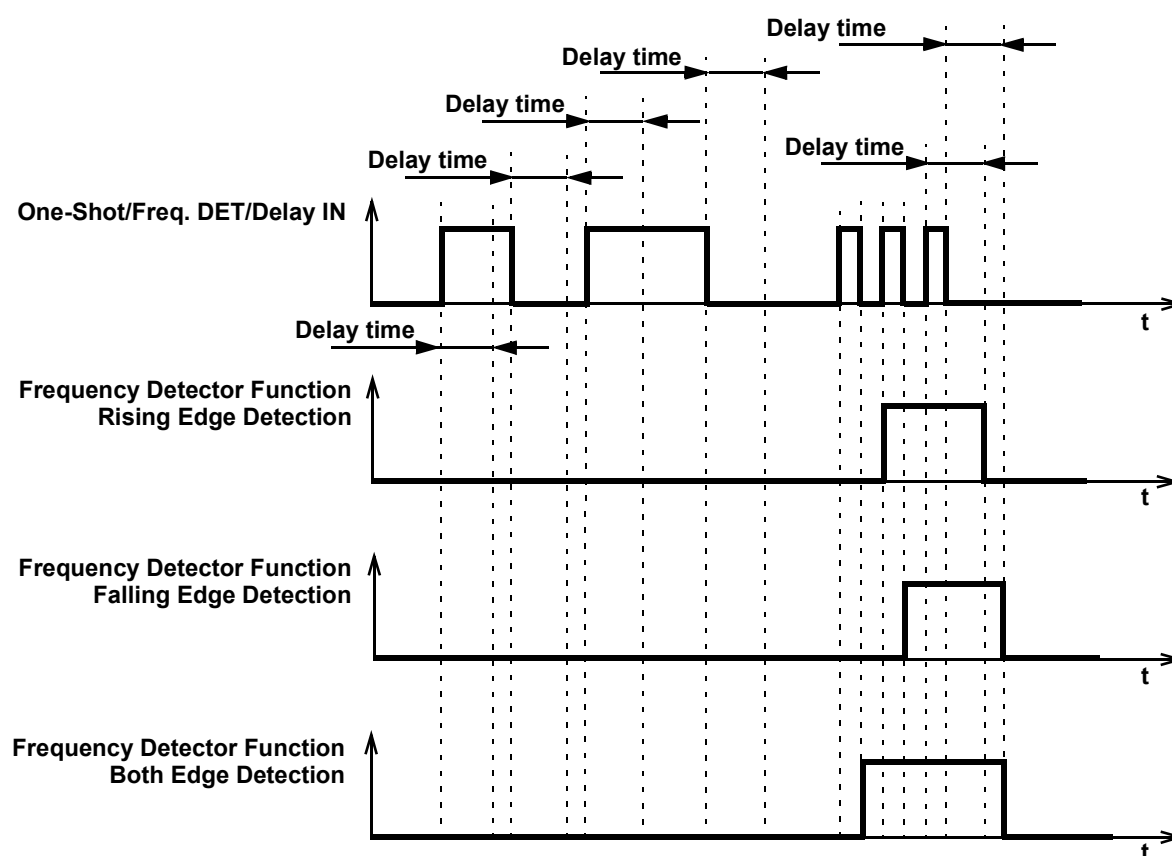


Figure 45: Frequency Detection Mode Timing Diagram

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7.6.5 Edge Detection Mode CNT/DLY2...CNT/DLY6

The macrocell generates high level short pulse when detecting the respective edge. See [Table 12](#).

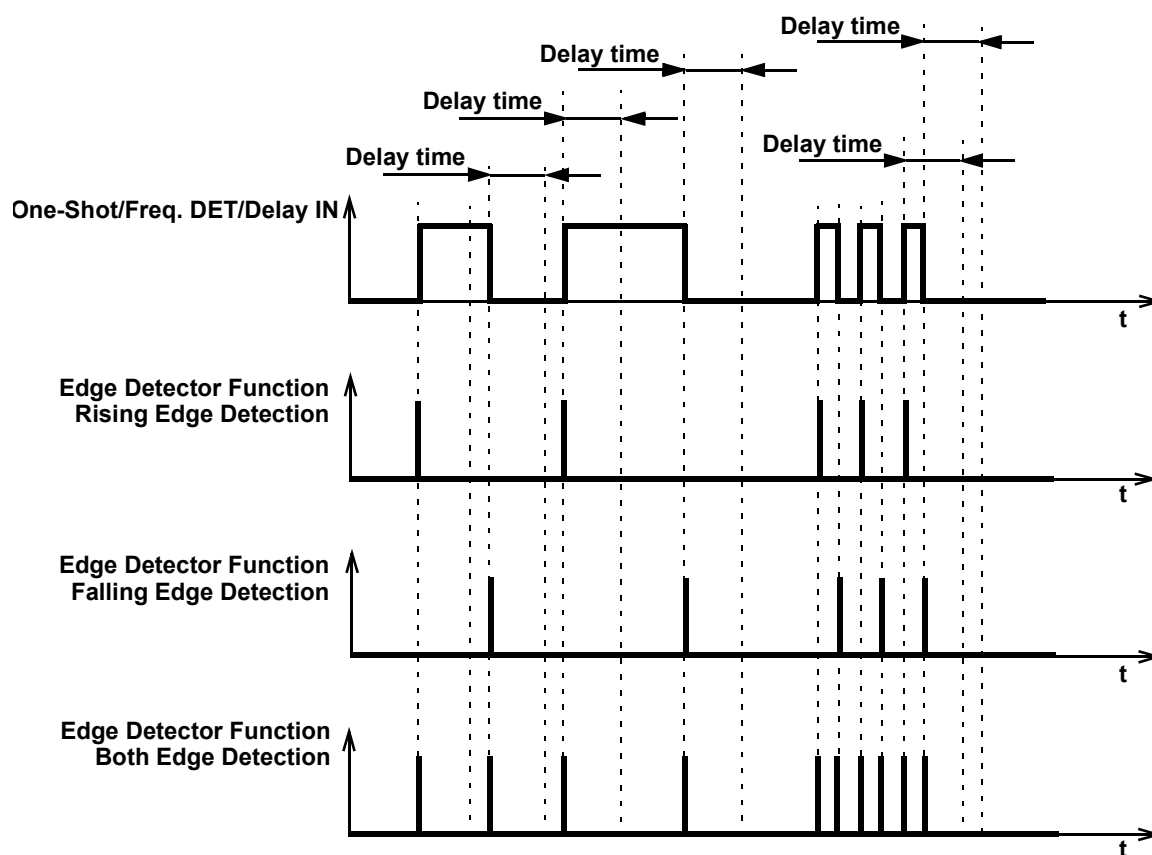


Figure 46: Edge Detection Mode Timing Diagram

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7.6.5.1 Delayed Edge Detection Mode

In Delayed Edge Detection Mode, High level short pulses are generated on the macrocell output after the configured delay time if the corresponding edge was detected on the input.

If the input signal is changed during the set delay time, the pulse will not be generated. See [Figure 47](#)

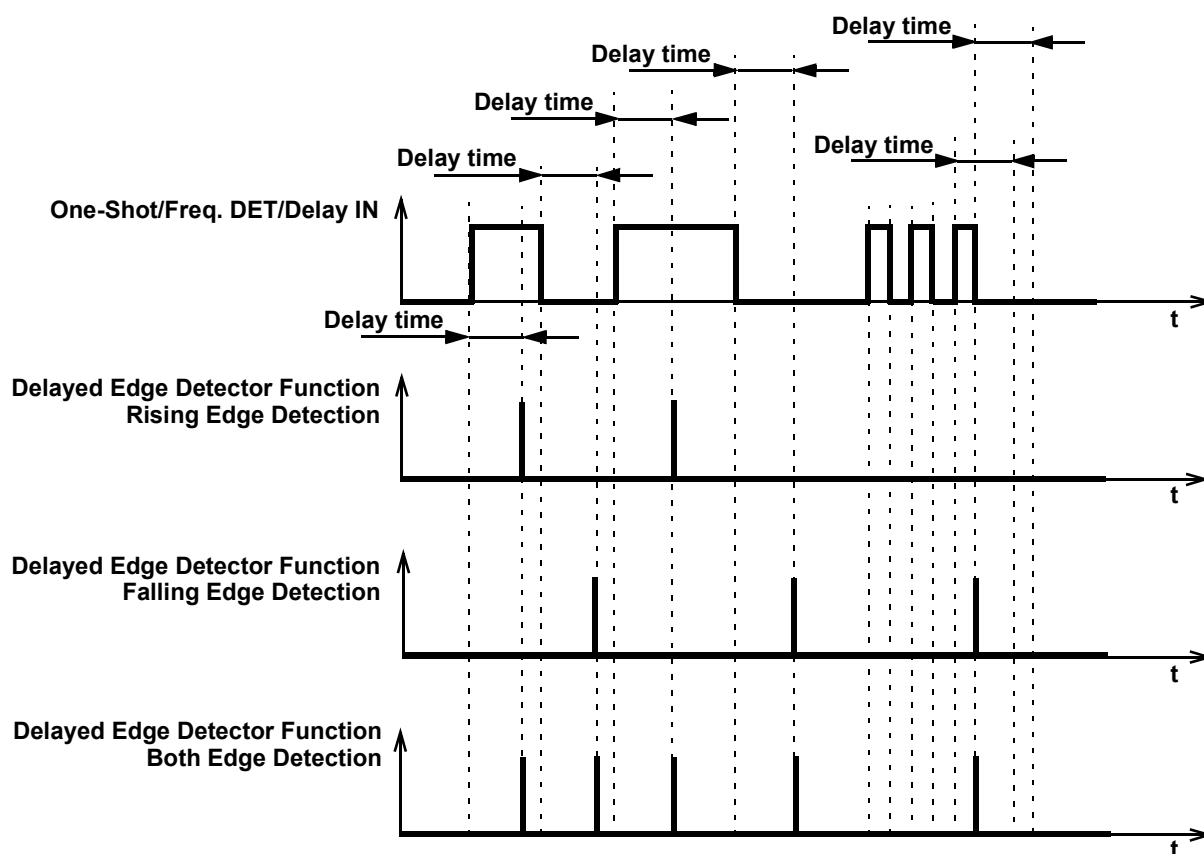


Figure 47: Delayed Edge Detection Mode

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7.6.6 Delay Mode CNT/DLY0...CNT/DLY6

The macrocell shifts the respective edge to a set time and restarts by appropriate edge. It works as a filter if the input signal is shorter than the delay time.

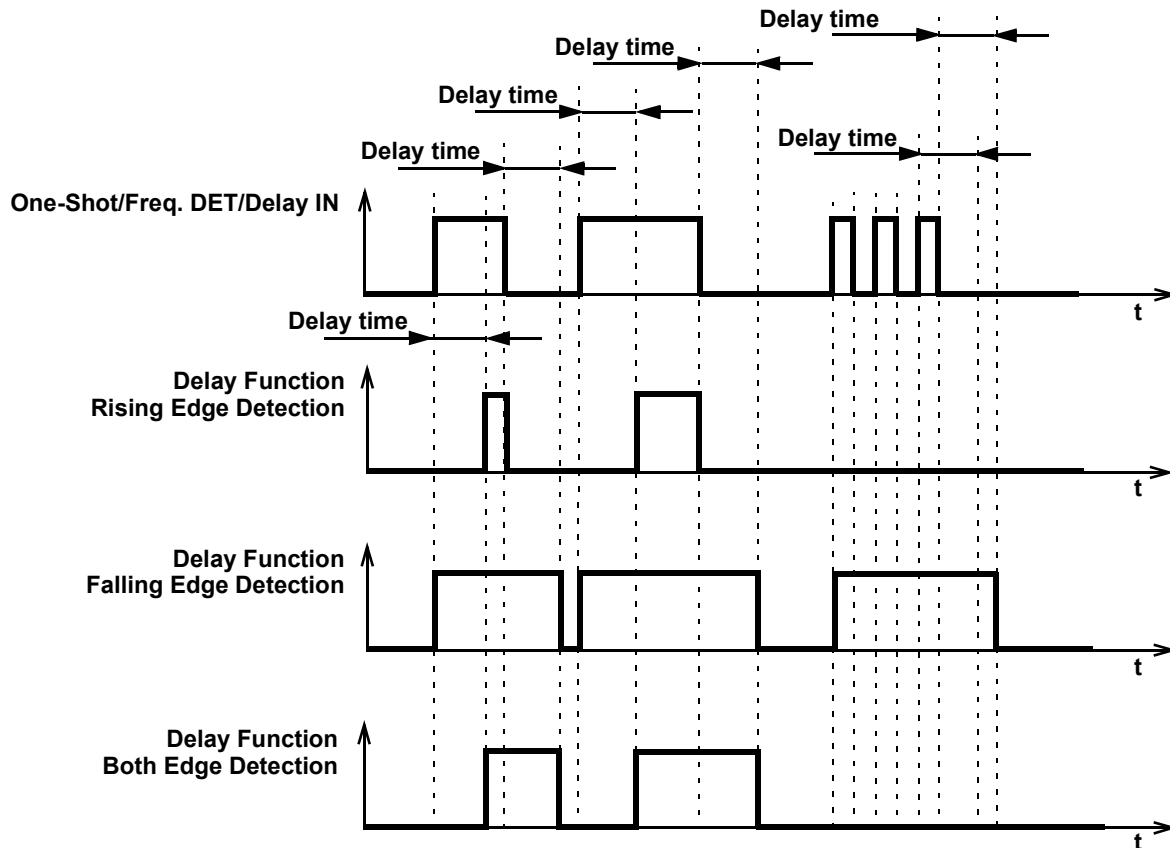


Figure 48: Delay Mode Timing Diagram

7.6.7 CNT/FSM Mode CNT/DLY0, CNT/DLY1

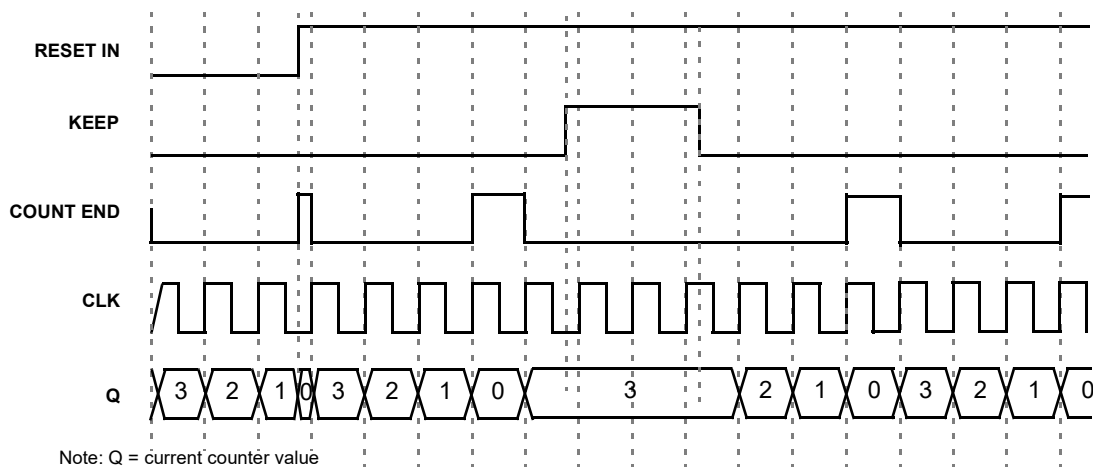


Figure 49: CNT/FSM Timing Diagram (Reset Rising Edge Mode, Oscillator is Forced On, UP=0) for Counter Data = 3

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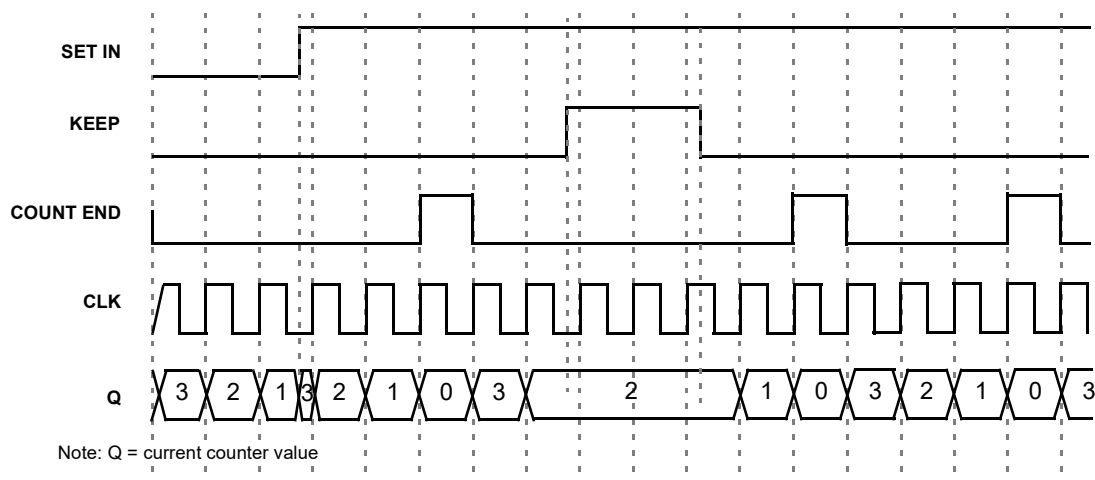


Figure 50: CNT/FSM Timing Diagram (Set Rising Edge Mode, Oscillator is Forced On, UP=0) for Counter Data = 3

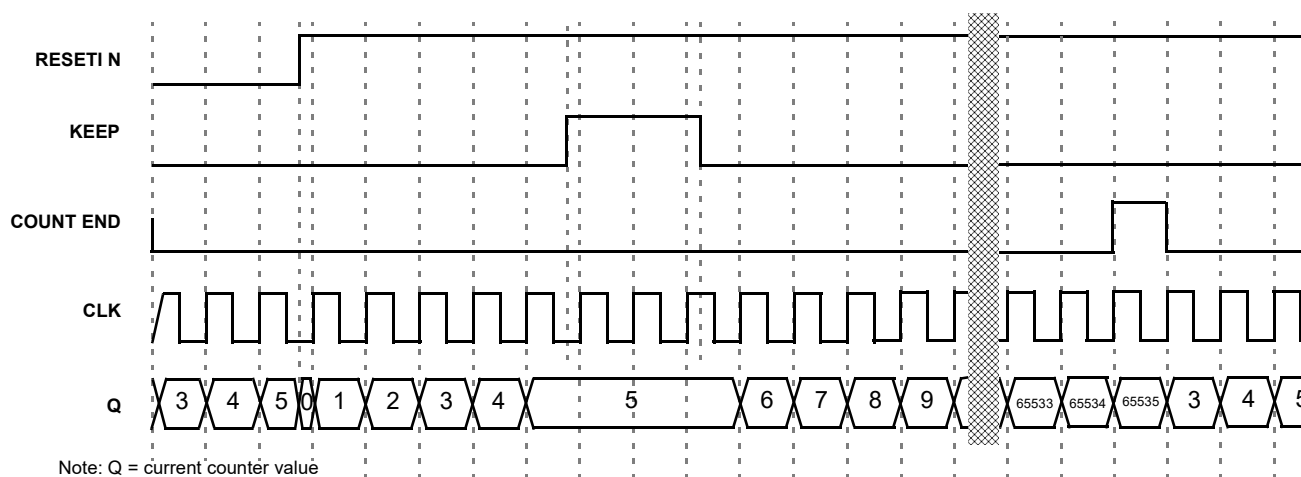


Figure 51: CNT/FSM Timing Diagram (Reset Rising Edge Mode, Oscillator is Forced On, UP=1) for Counter Data = 3

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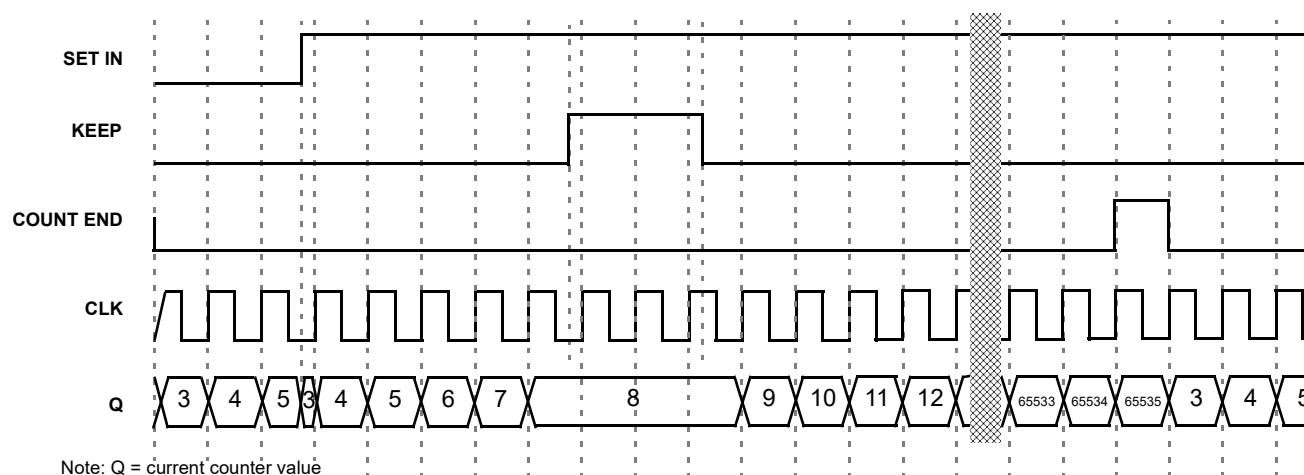


Figure 52: CNT/FSM Timing Diagram (Set Rising Edge Mode, Oscillator is Forced On, UP=1) for Counter Data = 3

7.6.8 Difference in Counter Value for Counter, Delay, One-Shot and Frequency Detect Modes

There is a difference in counter value for Counter and Delay/One-Shot/Frequency Detect modes. The counter value is shifted for two rising edges of the clock signal in Delay/One-Shot/Frequency Detect modes compared to Counter mode. See [Figure 53](#)

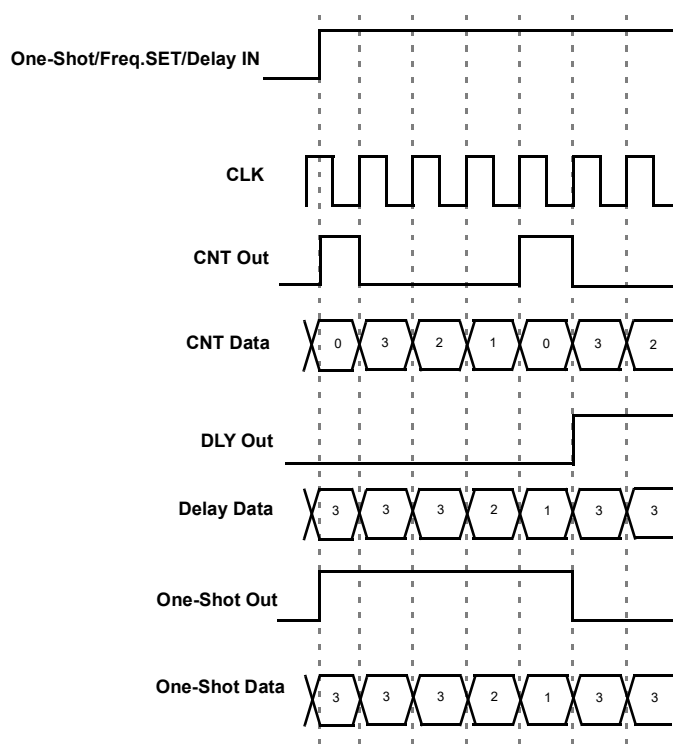


Figure 53: Counter Value, Counter Data = 3

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7.7 4-BIT LUT OR 16-BIT COUNTER/DELAY MACROCELL

There is one macrocell that can serve as either 4-bit LUT or as 16-bit Counter/Delay. When used to implement LUT function, the 4-bit LUT takes in four input signals from the Connection Matrix and produces a single output, which goes back into the Connection Matrix. When used to implement 16-Bit Counter/Delay function, two of the four input signals from the connection matrix go to the external clock (ext_CLK) and reset (DLY_in/CNT_Reset) for the counter/delay, with the output going back to the connection matrix.

This macrocell has an optional Finite State Machine (FSM) function. There are two additional matrix inputs for Up and Keep to support FSM functionality.

This macrocell can also operate in a one-shot mode, which will generate an output pulse of user-defined width.

This macrocell can also operate in a frequency detection or edge detection mode.

This macrocell can have its active count value read via I²C. See Section 19.4.6.3 for further details.

7.7.1 4-Bit LUT or 16-Bit CNT/DLY Block Diagram

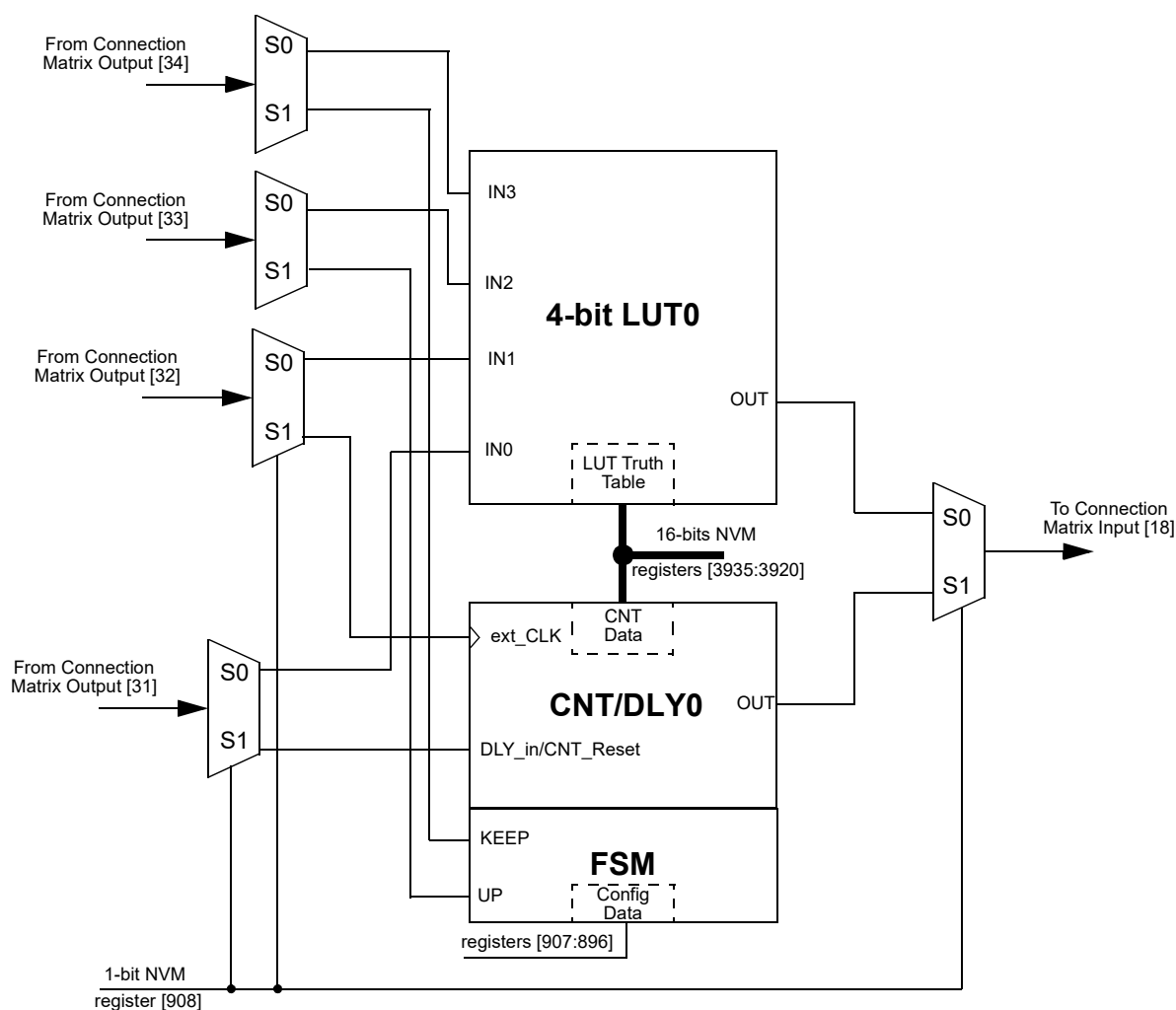


Figure 54: 4-bit LUT0 or CNT/DLY0

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7.7.2 4-Bit LUT or 16-Bit Counter/Delay Macrocells Used as 4-Bit LUTs

Table 44: 4-bit LUT0 Truth Table

IN3	IN2	IN1	IN0	OUT	
0	0	0	0	register [3920]	LSB
0	0	0	1	register [3921]	
0	0	1	0	register [3922]	
0	0	1	1	register [3923]	
0	1	0	0	register [3924]	
0	1	0	1	register [3925]	
0	1	1	0	register [3926]	
0	1	1	1	register [3927]	
1	0	0	0	register [3928]	
1	0	0	1	register [3929]	
1	0	1	0	register [3930]	
1	0	1	1	register [3931]	
1	1	0	0	register [3932]	
1	1	0	1	register [3933]	
1	1	1	0	register [3934]	
1	1	1	1	register [3935]	MSB

This Macrocell, when programmed for a LUT function, uses a 16-bit register to define their output function:

4-Bit LUT0 is defined by registers [3935:3920]

Table 45: 4-bit LUT Standard Digital Functions

Function	MSB															LSB
AND-4	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
NAND-4	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
OR-4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
NOR-4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
XOR-4	0	1	1	0	1	0	0	1	1	0	0	1	0	1	1	0
XNOR-4	1	0	0	1	0	1	1	0	0	1	1	0	1	0	0	1

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7.8 WAKE AND SLEEP CONTROLLER

The SLG46880/81 has a Wake and Sleep (WS) function for ACMP0H and ACMP1H. The microcell CNT/DLY0 can be reconfigured for this purpose registers [897:896]=11 and register [910]=1. The WS serves for power saving, it allows to switch on and off selected ACMPs on selected bit of 16-bit counter.

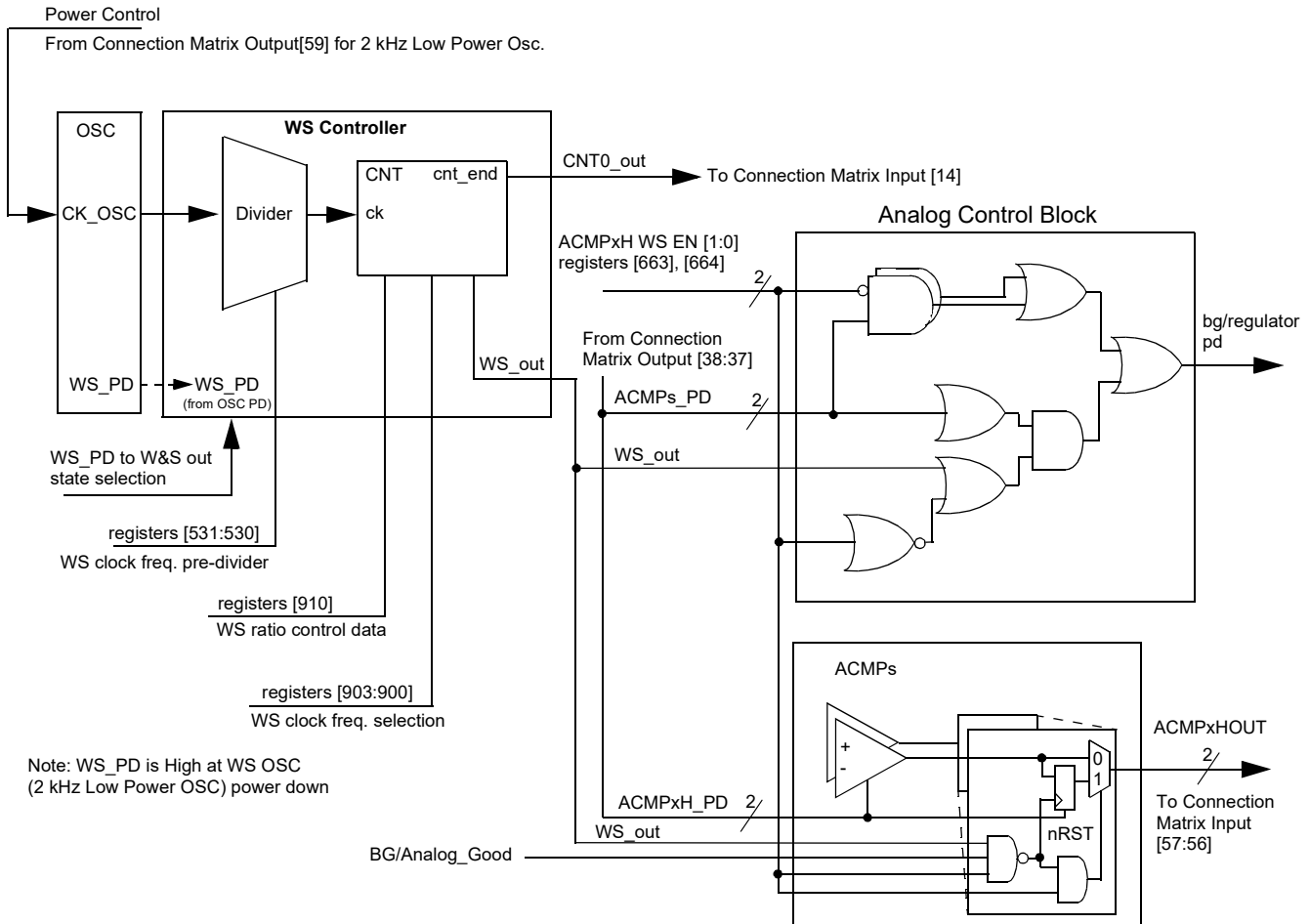


Figure 55: WS Controller

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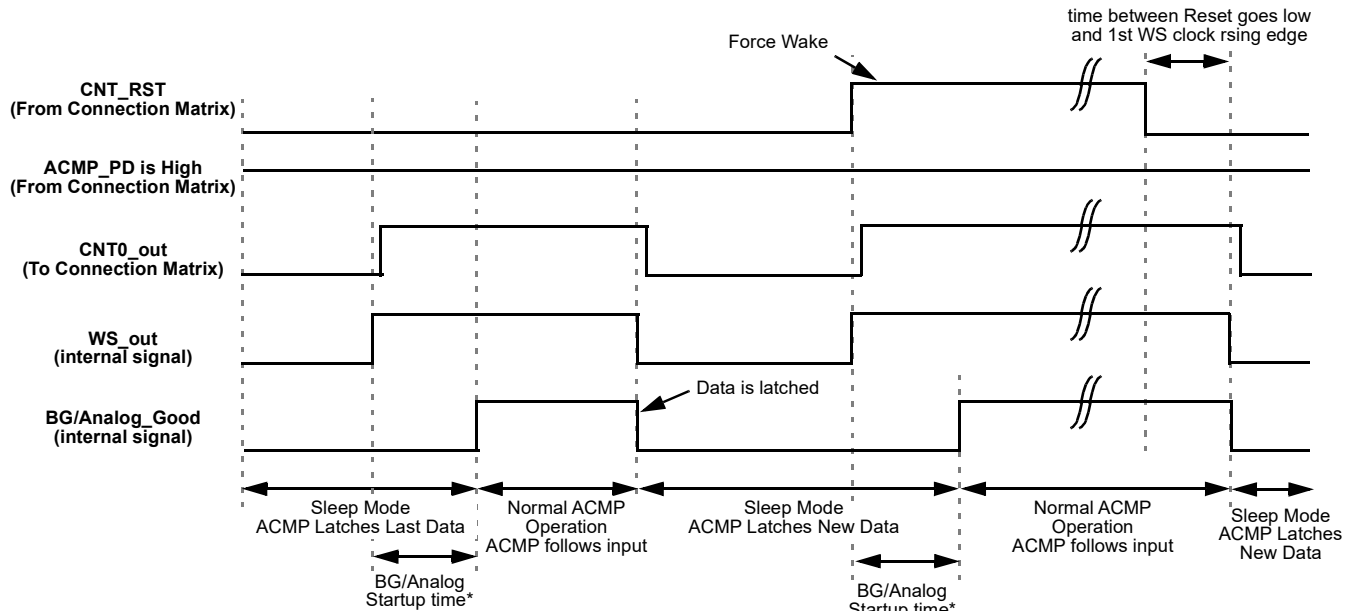


Figure 56: Wake/Sleep Timing Diagram, Normal Wake Mode, Counter Reset is Used

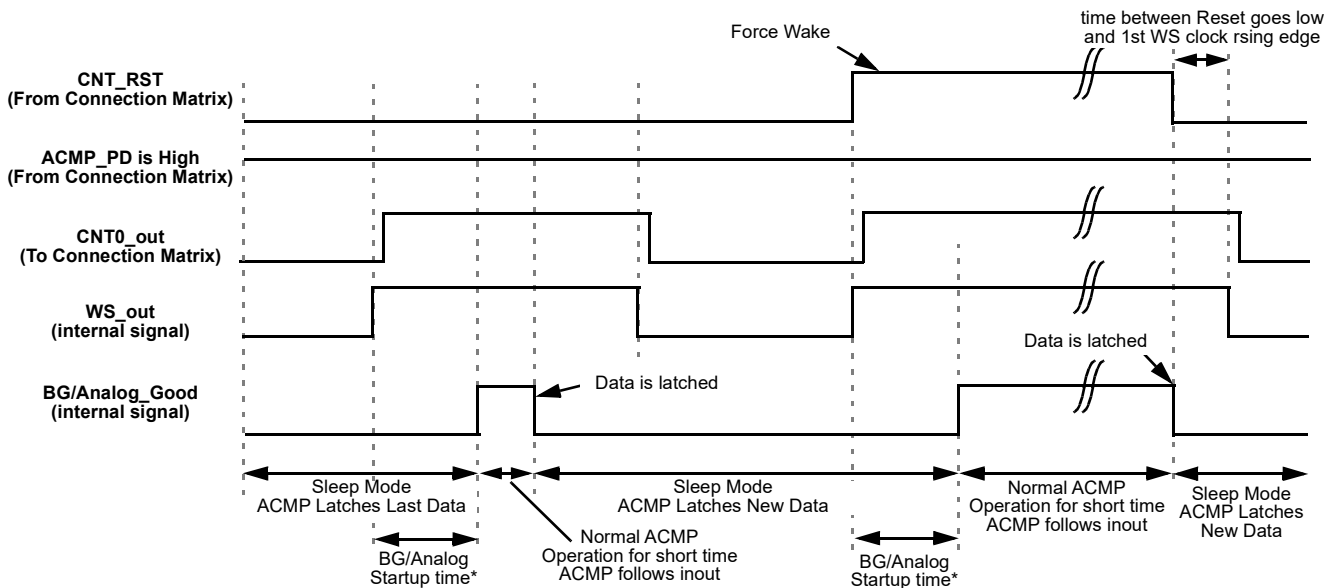
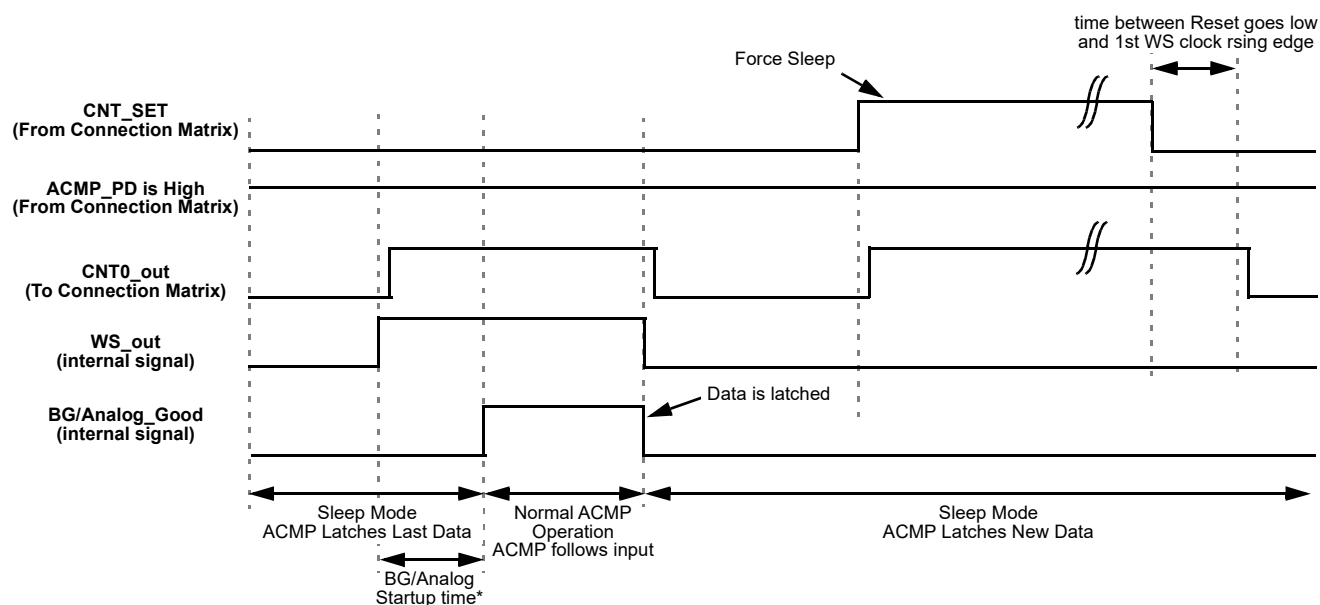


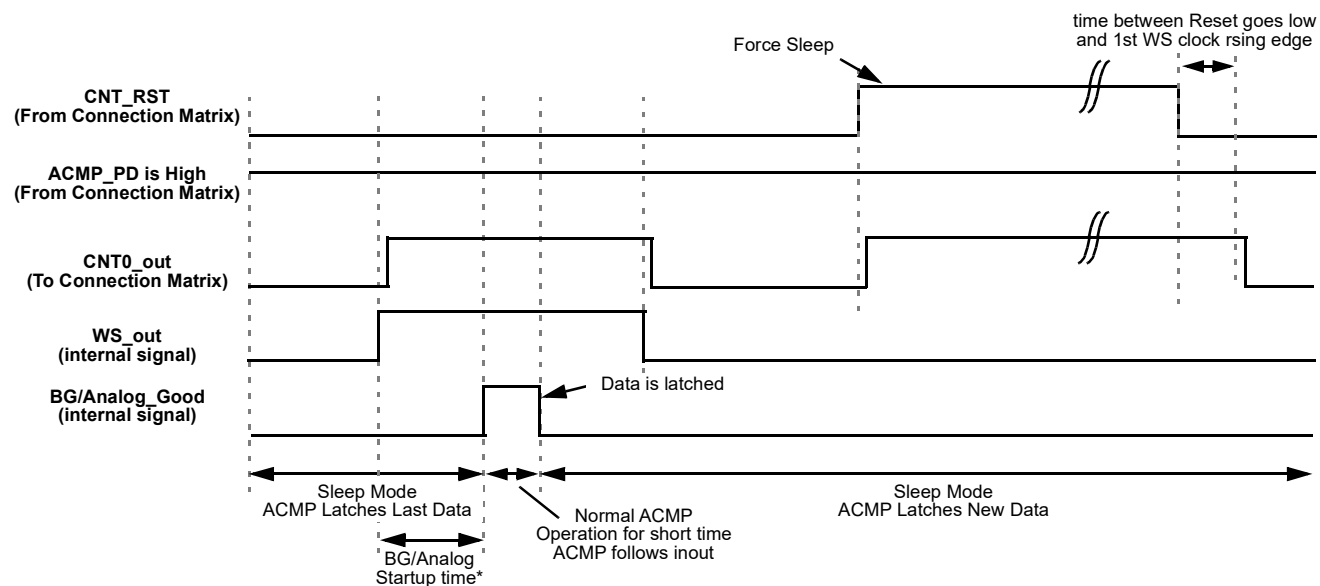
Figure 57: Wake/Sleep Timing Diagram, Short Wake Mode, Counter Reset is Used

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Note: CNT0_out is a delayed WS_out signal for 1us to make sure the data is correct during latch.

Figure 58: Wake/Sleep Timing Diagram, Normal Wake Mode, Counter Set is Used



Note: CNT0_out is a delayed WS_out signal for 1us to make sure the data is correct during latch.

Figure 59: Wake/Sleep Timing Diagram, Short Wake Mode, Counter Set is Used

Note: If low power BG is powered on/off by w/s, the wake time should be longer than 2.1 ms. The BG/analog start up time will take maximal 2 ms. If low power BG is always on, LFOSC period is longer than required wake time. The short wake mode can be used to reduce the current consumption.

To use any ACMPxH under WS controller the following settings must be done:

- ACMPxH Power Up Input from matrix = 1 (for each ACMPxH separately).

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- CNT/DLY0 must be set to Wake and Sleep Controller function (for all ACMPxH).
- Register WS → enable (for each ACMPxH separately).
- CNT/DLY0 set/reset input = 0 (for all ACMPxH).

As the OSC any oscillator with any pre-divider can be used. The user can select a period of time while the ACMPxH is sleeping in a range of 1 to 65535 clock cycles. Before they are sent to sleep their outputs are latched so the ACMPs remain their state (High or Low) while sleeping.

WS controller has the following settings:

- Wake and Sleep Output State (High/Low)
 - If OSC is powered off (Power Down option is selected; power down input = 1) and Wake and Sleep Output State = High, the ACMPxH is continuously on.
 - If OSC is powered off (Power Down option is selected; power down input = 1) and Wake and Sleep Output State = Low, the ACMPxH is continuously off.
 - Both cases WS function is turned off.
- Counter Data (Range: 1 to 65535)
 - User can select wake and sleep ratio of the ACMP; counter data = sleep time, one clock = wake time.
- Q mode - defines the state of WS counter data when Set/Reset signal appears
 - Reset - when active signal appears, the WS counter will reset to zero and High level signal on its output will turn on the ACMPs. When Reset signal goes out, the WS counter will go Low and turn off the ACMPxH until the counter counts up to the end.
 - Set - when active signal appears, the WS counter will stop and Low level signal on its output will turn off the ACMPxH. When Set signal goes out, the WS counter will go on counting and High level signal will turn on the ACMPxH while counter is counting up to the end.

Note: The LFOSC matrix power down to control ACMP W/S is not supported for short wait time option.

- Edge Select defines the edge for Q mode
 - High level Set/Reset - switches mode Set/Reset when level is High

Note: Q mode operates only in case of "High Level Set/Reset".

- Wake time selection - time required for wake signal to turn the ACMPxH on

Normal Wake Time - when WS signal is High, it takes BG/analog start up time to turn the ACMPs on. They will stay on until WS signal is Low again. Wake time is one clock period. It should be longer than BG turn on time and minimal required comparing time of the ACMP.

Short Wake Time - when WS signal is High, it takes BG/analog start up time to turn the ACMPs on. They will stay on for 1 μ s and turn off regardless of WS signal. The WS signal width does not matter.

- Keep - pauses counting while Keep = 1
- Up - reverses counting
 - If Up = 1, CNT is counting up from user selected value to 65535.
 - If Up = 0, CNT is counting down from user selected value to 0.

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7.8.1 WS Register Settings

Table 46: WS Register Settings

Signal Function	Register Bit Address	Register Definition
Counter/delay0 Clock Source Select	registers [903:900]	0000: OSC2 0001: OSC2 /4 0010: OSC1 0011: OSC1 /8 0100: OSC1 /64 0101: OSC1 /512 0110: OSC0 0111: OSC0 /8 1000: OSC0 /64 1001: OSC0 /512 1010: OSC0 /4096 1011: OSC0 /32768 1100: OSC0 /262144 1101: CNT4 Overflow 1110: External 1111: Reserved
ACMP0H Wake & Sleep function Enable	register [663]	0: Disable 1: Enable
ACMP1H Wake & Sleep function Enable	register [664]	0: Disable 1: Enable
Wake Sleep Output State When WS Oscillator is Power Down if DLY/CNT0 Mode Selection is "11"	register [909]	0: Low 1: High
DLY/CNT0 (16bits, [15:0] = [3935:3920]) Control Data	registers [3935:3920]	1 - 65535

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8 Analog Comparators

There are four General Purpose Rail-to-Rail Analog Comparator (ACMP) macrocells in the SLG46880/81. In order for the ACMP cells to be used in a GreenPAK design, the power up signals (ACMP0H PWR UP, ACMP1H PWR UP, ACMP2L PWR UP and ACMP3L PWR UP) need to be active. By connecting to signals coming from the Connection Matrix, it is possible to have each ACMP be on continuously, off continuously, or switched on periodically based on a digital signal coming from the Connection Matrix. When ACMP is powered down, output is low.

Two of the four General Purpose Rail-to-Rail Analog Comparators are optimized for high speed operation (ACMP0H and ACMP1H), and two of the four are optimized for low power operation (ACMP2L and ACMP3L).

Each of the ACMP cells has a positive input signal that can be provided by a variety of external sources, and can also have a selectable gain stage before connection to the analog comparator. Each of the ACMP cells has a negative input signal that is either created from an internal Vref or provided by way of the external sources.

PWR UP = 1 → ACMP is powered up.

PWR UP = 0 → ACMP is powered down.

During power-up, the ACMP output will remain LOW, and then become valid 51.4 μs (max) after power up signal goes high for ACMP0H and ACMP1H, and become valid 326.6 μs (max) after power up signal goes high for ACMP2L and ACMP3L. Input bias current < 1 nA (typ). The Gain divider is unbuffered and consists of 2 MΩ resistors.

Each High Speed ACMP (ACMP0H and ACMP1H) has an optional Rail-to-Rail Input Buffer, which can be used along with the Gain divider to increase ACMP input resistance. However Input buffer will increase an input offset voltage.

Each cell also has a hysteresis selection, to offer hysteresis of (0, 32, 64, 192) mV. The hysteresis option is available when using an internal Vref only.

ACMP0H IN+ options are GPIO10, buffered GPIO10, V_{DD}

ACMP1H IN+ options are GPIO11, buffered GPIO11, ACMP0H IN+ MUX output

ACMP2L IN+ options are GPO5, ACMP0H IN+ MUX output, ACMP1H IN+ MUX output

ACMP3L IN+ options are GPO6, ACMP2L IN+ MUX output, Temp Sensor OUT

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8.1 ACMP0H BLOCK DIAGRAM

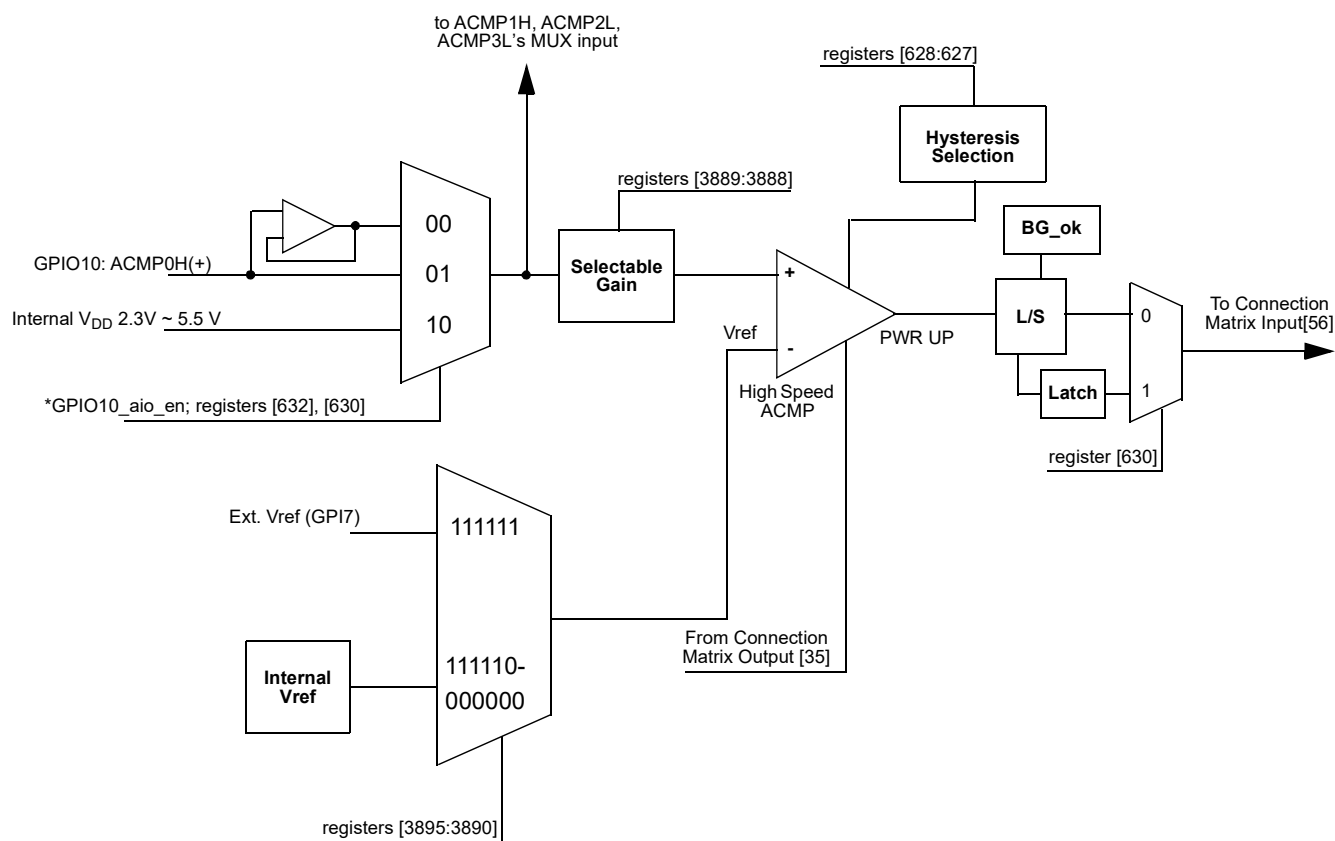


Figure 60: ACMP0H Block Diagram

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8.2 ACMP1H BLOCK DIAGRAM

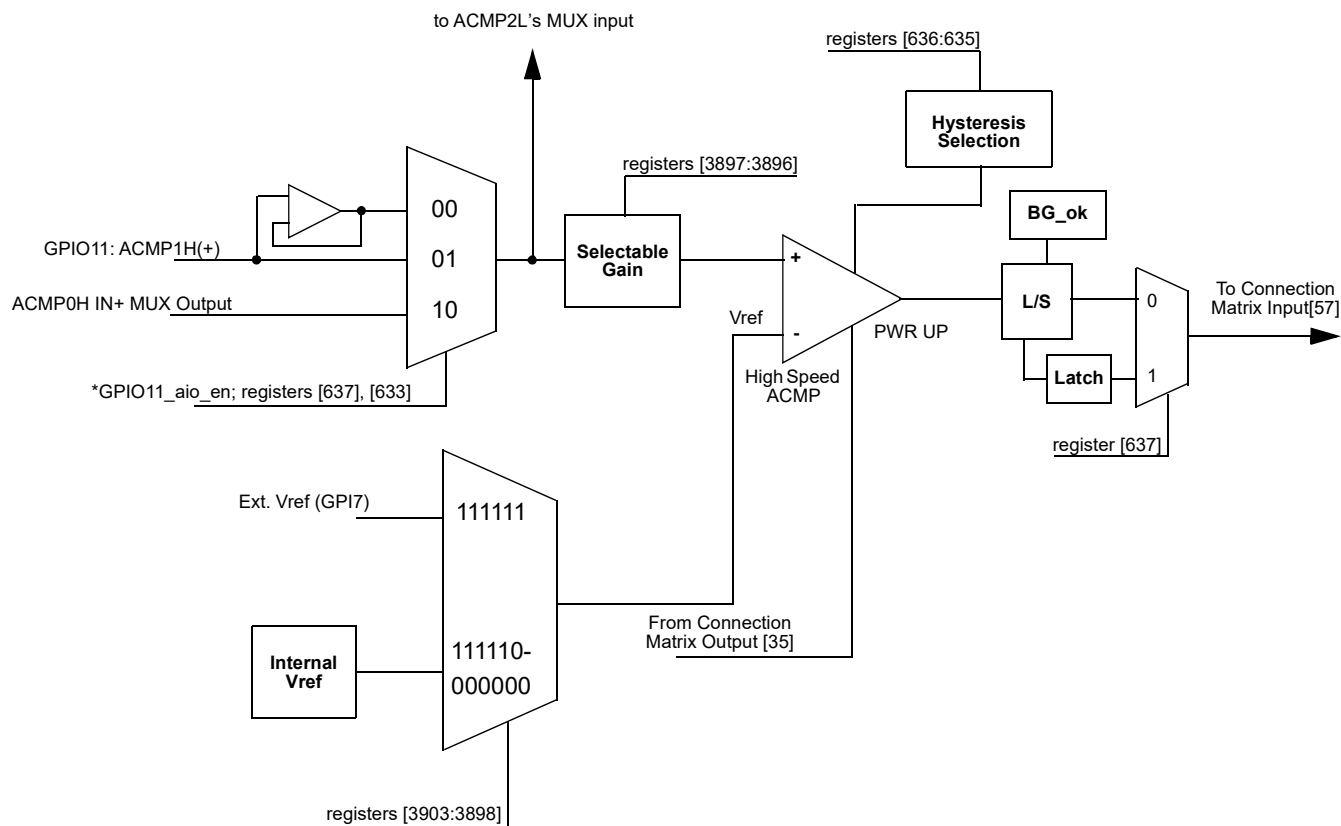


Figure 61: ACMP1H Block Diagram

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8.3 ACMP2L BLOCK DIAGRAM

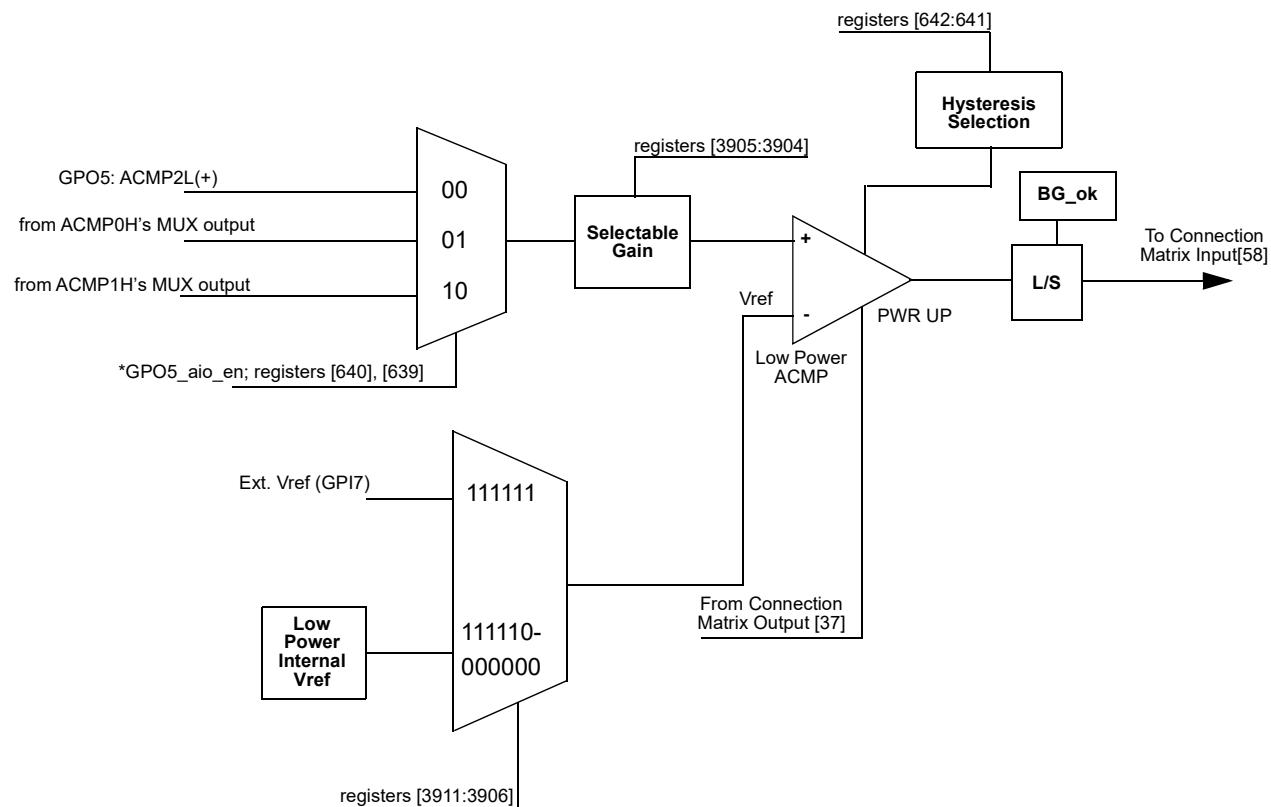


Figure 62: ACMP2L Block Diagram

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8.4 ACMP3L BLOCK DIAGRAM

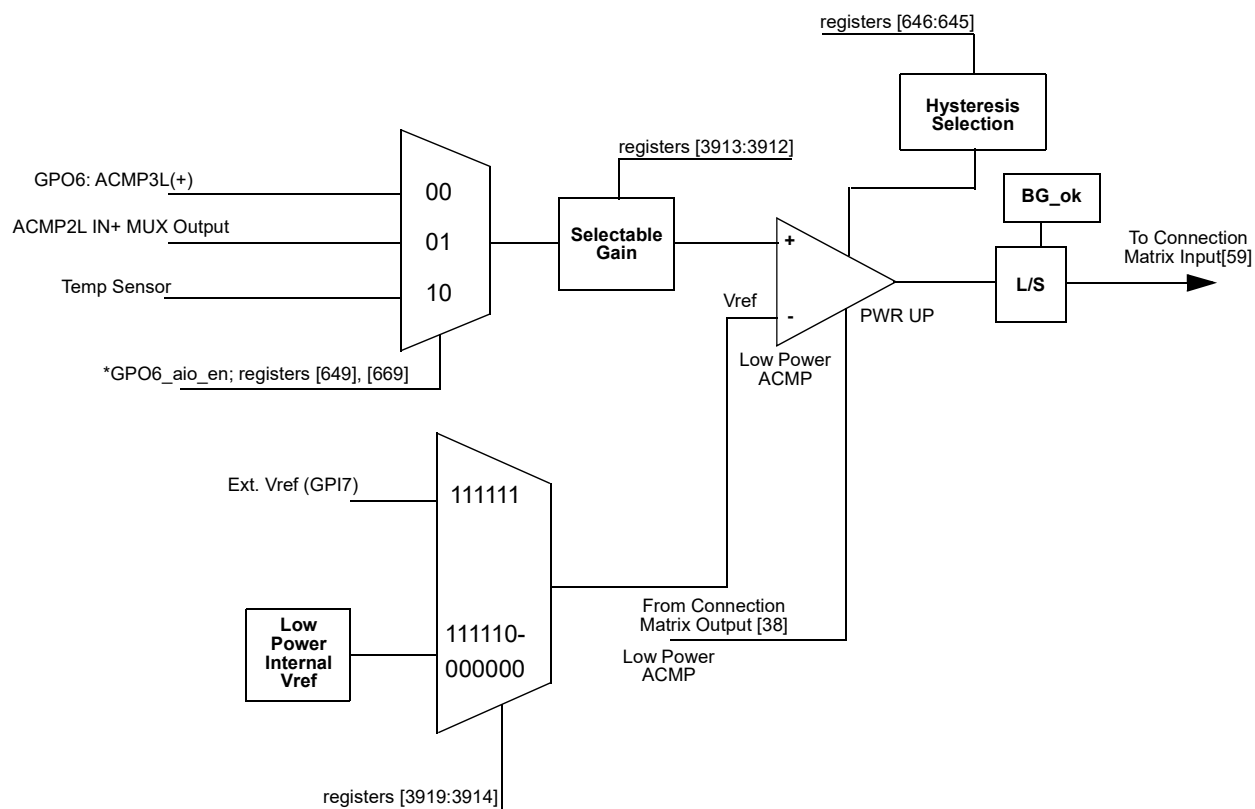


Figure 63: ACMP3L Block Diagram

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8.5 ACMP TYPICAL PERFORMANCE

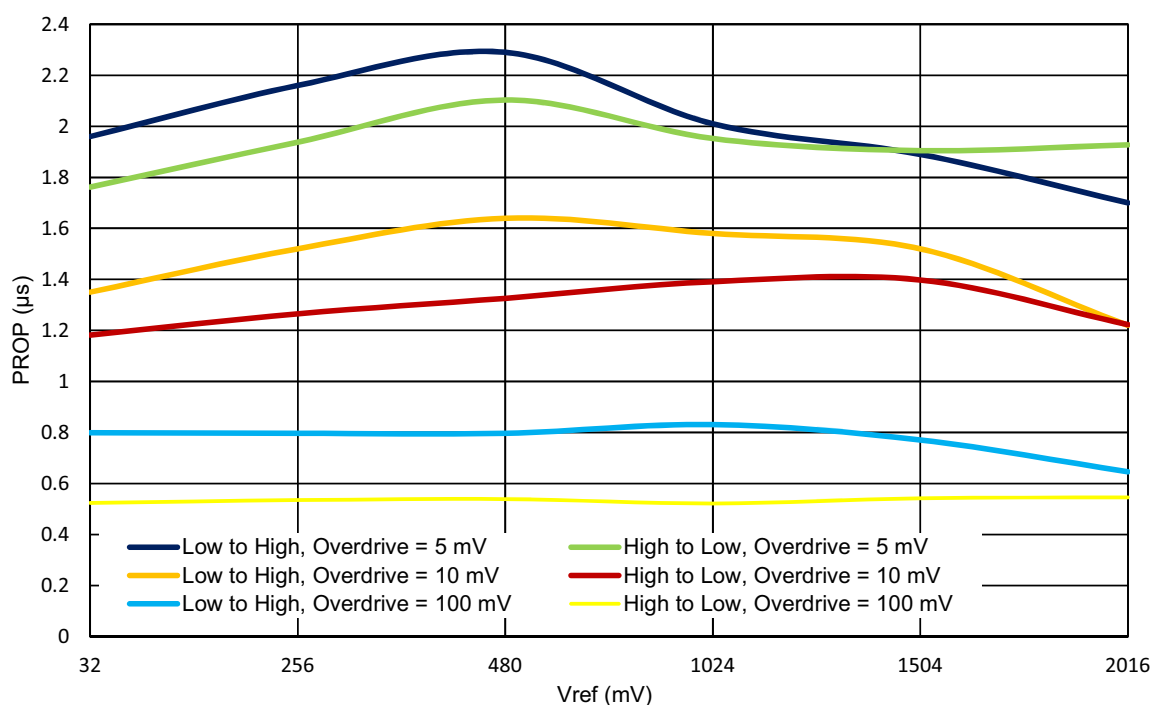


Figure 64: Typical Propagation Delay vs. Vref for ACMPxH at T = 25°C, Gain = 1, Buffer - Disabled, Hysteresis = 0

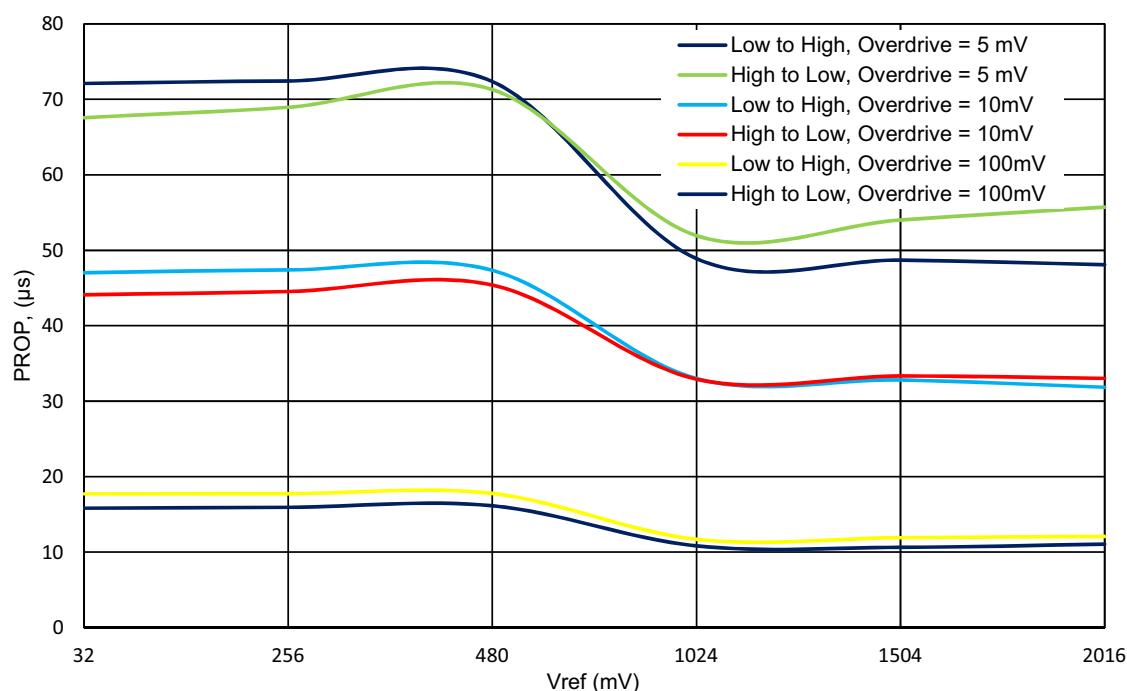


Figure 65: Typical Propagation Delay vs. Vref for ACMPxL at T = 25°C, Gain = 1, Buffer - Disabled, Hysteresis = 0

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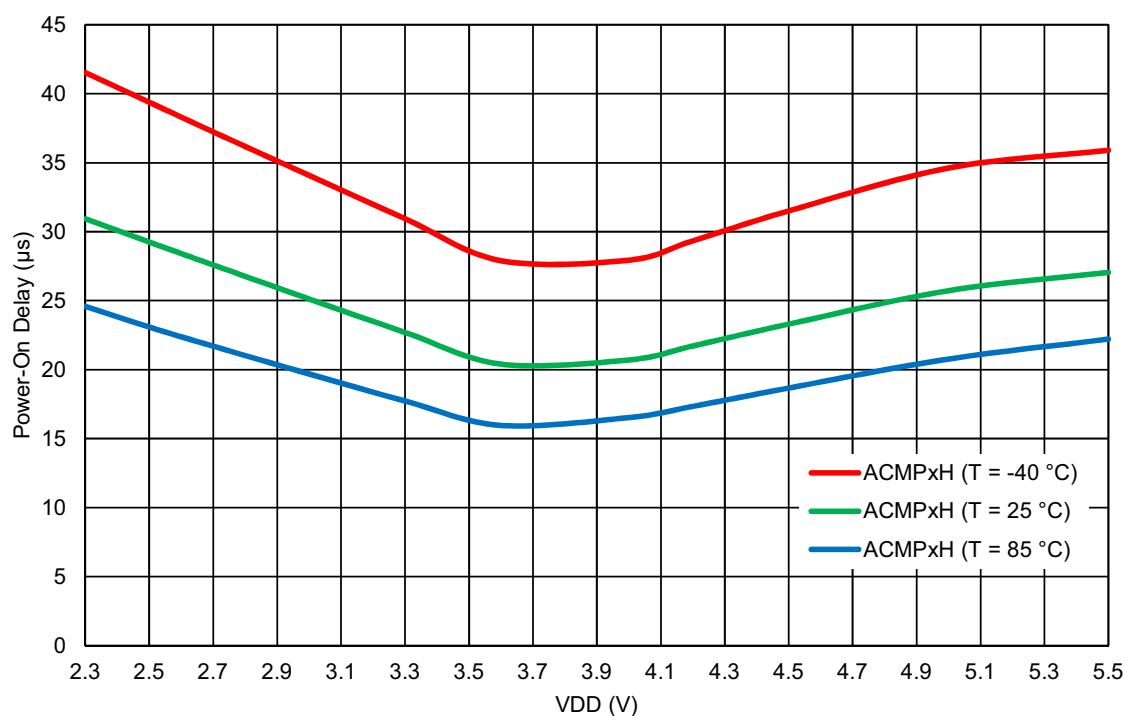


Figure 66: ACMPxH Power on Delay vs. V_{DD}

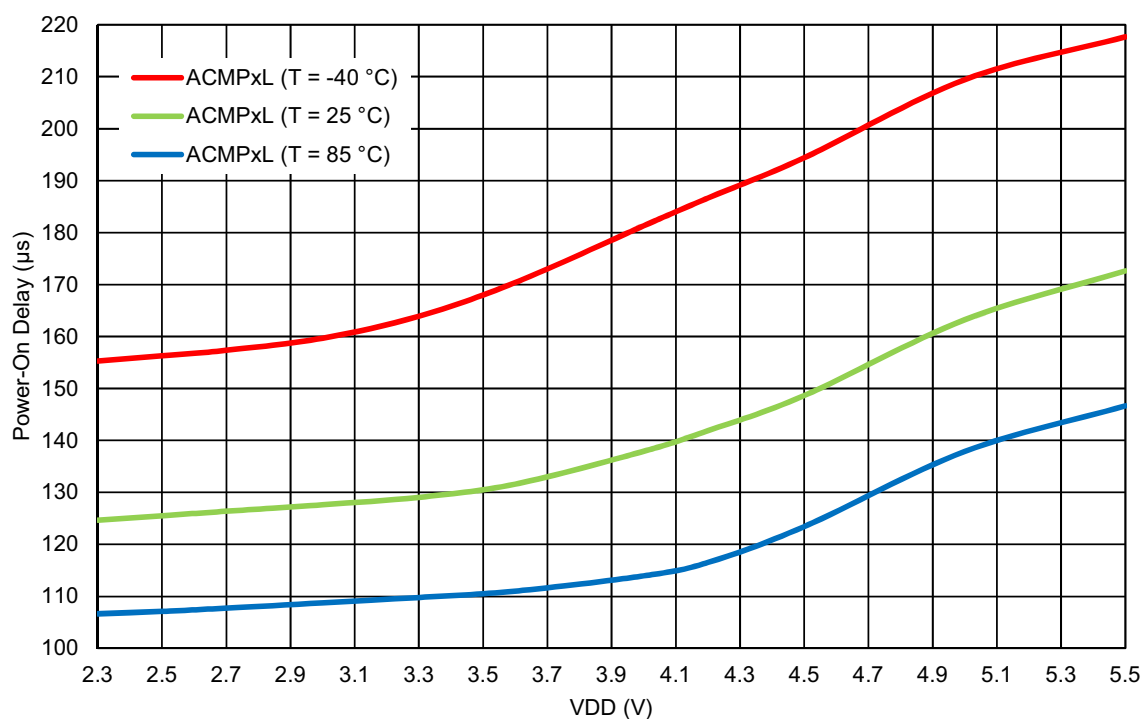


Figure 67: ACMPxL Power on Delay vs. V_{DD}

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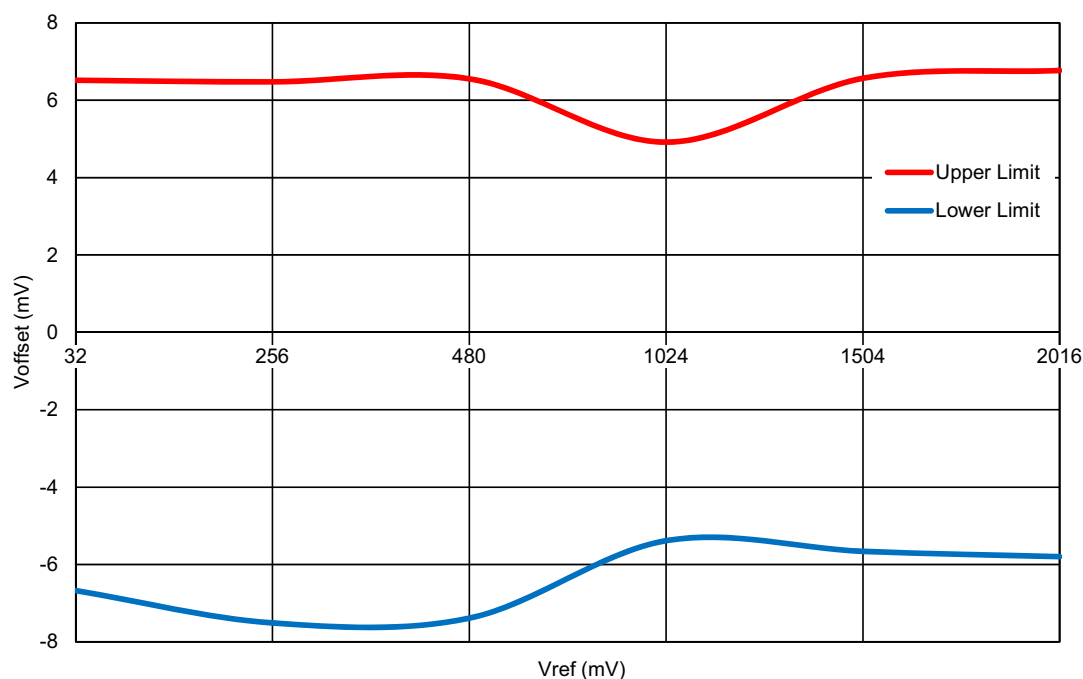


Figure 68: ACMPxH Input Offset Voltage vs. Vref at T = -40 °C to 85 °C, Input Buffer Disabled

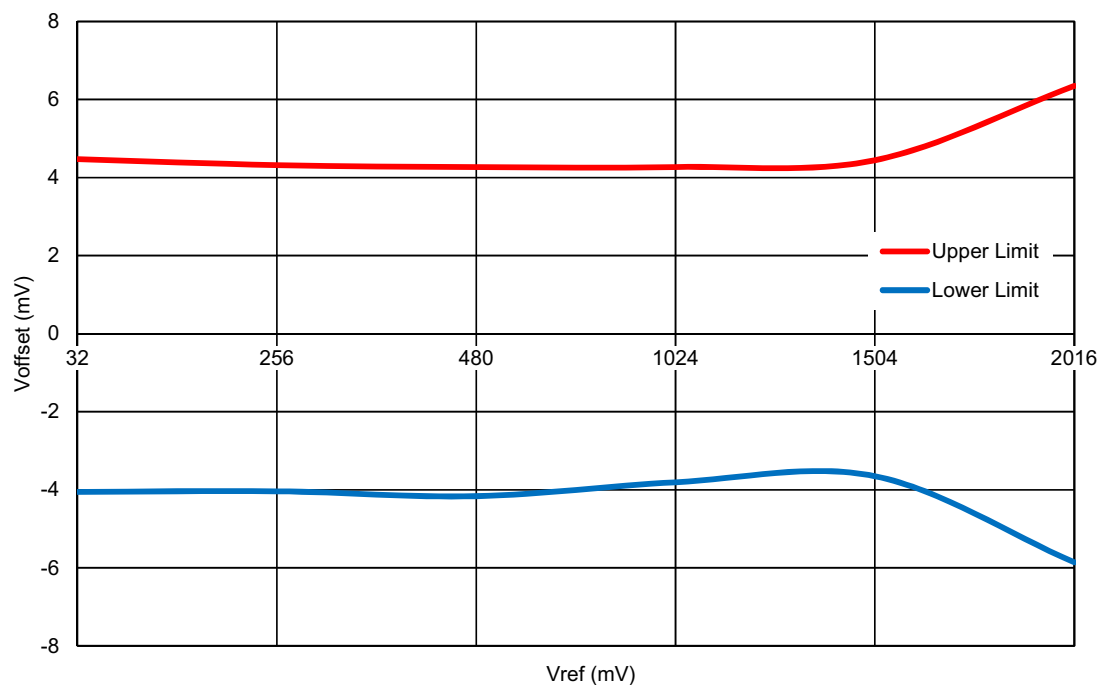


Figure 69: ACMPxL Input Offset Voltage vs. Vref at T = -40 °C to 85 °C, Input Buffer Disabled

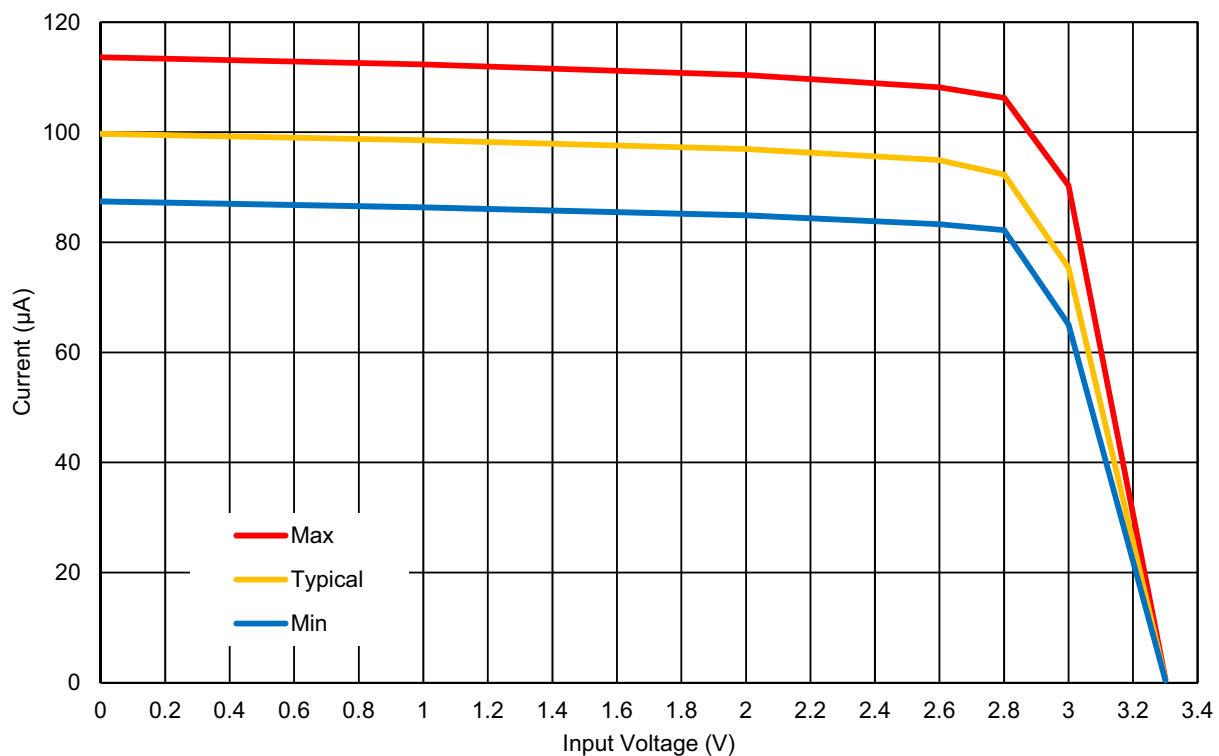
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Figure 70: ACMP Input Current Source vs. Input Voltage at T = -40 °C to 85 °C, V_{DD} = 3.3 V

9 Programmable Delay/Edge Detector

The SLG46880/81 has a programmable time delay logic cell available that can generate a delay that is selectable from one of four timings (time1) configured in the GreenPAK Designer. The programmable time delay cell can generate one of four different delay patterns, rising edge detection, falling edge detection, both edge detection and both edge delay. These four patterns can be further modified with the addition of delayed edge detection, which adds an extra unit of delay as well as glitch rejection during the delay period. See [Figure 72](#) for further information.

Note: The input signal must be longer than the delay, otherwise it will be filtered out.

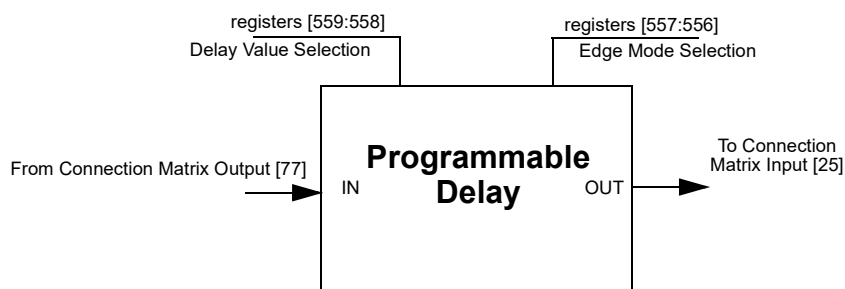


Figure 71: Programmable Delay

9.1 PROGRAMMABLE DELAY TIMING DIAGRAM - EDGE DETECTOR OUTPUT

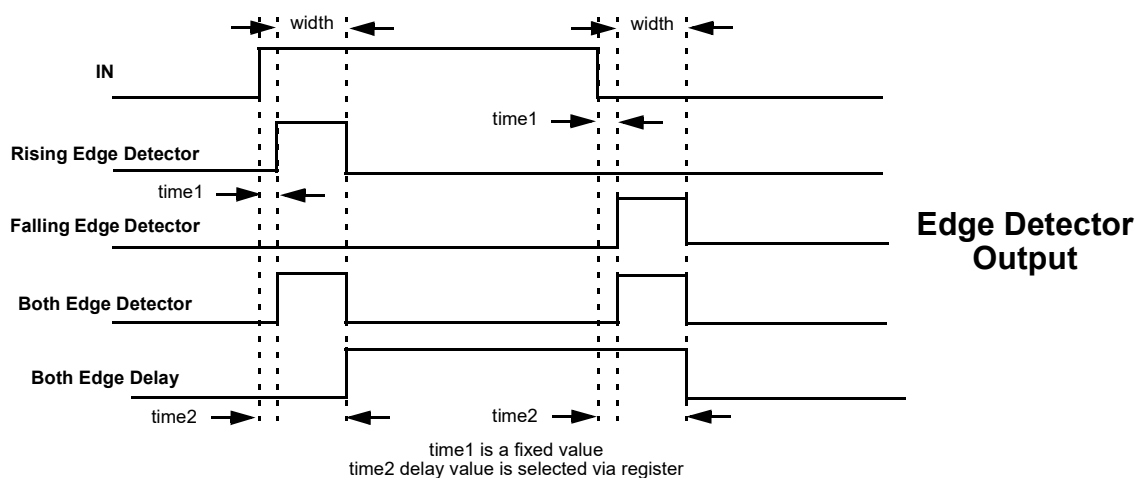


Figure 72: Edge Detector Output

Please refer to [Table 12](#).

10 Additional Logic Function

The SLG46880/81 has one additional logic function that is connected directly to the Connection Matrix inputs and outputs. There is one deglitch filter, with edge detector function.

10.1 DEGLITCH FILTER/EDGE DETECTOR

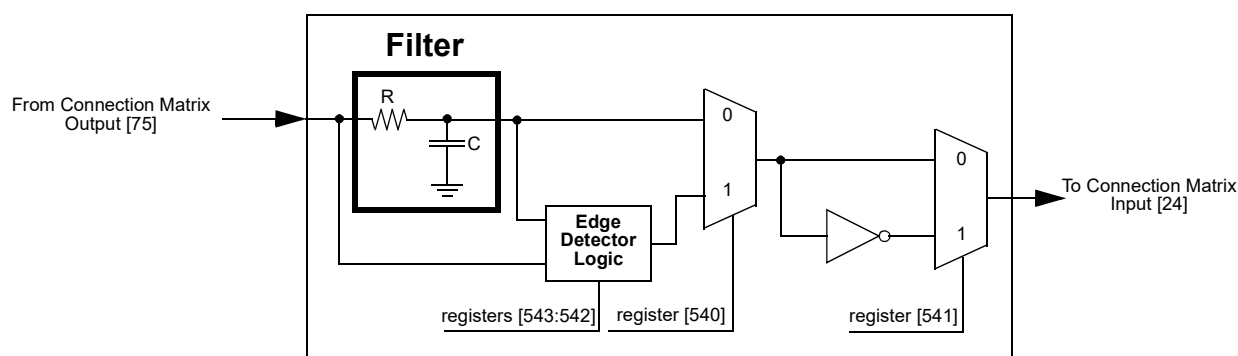


Figure 73: Deglitch Filter/Edge Detector

11 Voltage Reference

11.1 VOLTAGE REFERENCE OVERVIEW

The SLG46880/81 has a Voltage Reference (Vref) Macrocell to provide references to the four analog comparators. This macrocell can supply a user selection of fixed voltage references, or temperature sensor output. The macrocell also has the option to output reference voltages on GPIO2 and GPIO9. See [Table 47](#) for the available selections for each analog comparator. Also see [Figure 74](#), which shows the reference output structure.

11.2 VREF SELECTION TABLE

Table 47: Vref Selection Table

SEL[5:0]	Vref	SEL[5:0]	Vref
0	0.032	32	1.056
1	0.064	33	1.088
2	0.096	34	1.12
3	0.128	35	1.152
4	0.16	36	1.184
5	0.192	37	1.216
6	0.224	38	1.248
7	0.256	39	1.28
8	0.288	40	1.312
9	0.32	41	1.344
10	0.352	42	1.376
11	0.384	43	1.408
12	0.416	44	1.44
13	0.448	45	1.472
14	0.48	46	1.504
15	0.512	47	1.536
16	0.544	48	1.568
17	0.576	49	1.6
18	0.608	50	1.632
19	0.64	51	1.664
20	0.672	52	1.696
21	0.704	53	1.728
22	0.736	54	1.76
23	0.768	55	1.792
24	0.8	56	1.824
25	0.832	57	1.856
26	0.864	58	1.888
27	0.896	59	1.92
28	0.928	60	1.952
29	0.96	61	1.984
30	0.992	62	2.016
31	1.024	63	External

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11.3 TRUTH TABLE FOR VREF0 BUFFER AND OUTPUT SWITCH CONTROL

Table 48: VrefO0 Truth Table

Function Enable	VrefO0 Source Selection	VrefO0 Buffer Selection	VrefO0 Buffer Enable	Matrix out78	TS PD Selection	TS PD Register Control	GPI09 Analog Mode Enable	Buffer state	Output switch	Note
	register [655:654]	register [623]	register [653]		register [651]	register [650]	register [856:855]= 11, means enable			
None	00	0	0	0	0	0	Disable	Off	Off	VrefO0 is all off
ACMP0H_Vref	01	0	0	0	0	0	Disable	Off	Off	VrefO0 select ACMP0H; output has no buffer; pd comes from register [653]
	01	0	0	0	0	0	Enable	Off	On	
	01	0	1	0	0	0	Disable	On	Off	VrefO0 select ACMP0H; output has buffer; pd comes from register [653]
	01	0	1	0	0	0	Enable	On	On	
	01	1	0	0	0	0	Disable	Off	Off	VrefO0 select ACMP0H; output has no buffer; pd comes from matrix78
	01	1	0	0	0	0	Enable	Off	On	
	01	1	0	1	0	0	Disable	On	Off	VrefO0 select ACMP0H; output has buffer; pd comes from matrix78
	01	1	0	1	0	0	Enable	On	On	
ACMP1H_Vref	10	0	0	0	0	0	Disable	Off	Off	VrefO0 select ACMP1H; output has no buffer; pd comes from register [653]
	10	0	0	0	0	0	Enable	Off	On	
	10	0	1	0	0	0	Disable	On	Off	VrefO0 select ACMP1H; output has buffer; pd comes from register [653]
	10	0	1	0	0	0	Enable	On	On	
	10	1	0	0	0	0	Disable	Off	Off	VrefO0 select ACMP1H; output has no buffer; pd comes from matrix78
	10	1	0	0	0	0	Enable	Off	On	
	10	1	0	1	0	0	Disable	On	Off	VrefO0 select ACMP1H; output has buffer; pd comes from matrix78
	10	1	0	1	0	0	Enable	On	On	
TS function	11	0	0	0	0	0	Disable	Off	Off	TS enable comes from register [650]
	11	0	0	0	0	0	Enable	Off	Off	
	11	0	0	0	0	1	Disable	On	Off	
	11	0	0	0	0	1	Enable	On	On	
	11	0	0	0	0	0	Disable	Off	Off	TS enable comes from Matrix78
	11	0	0	0	0	0	Enable	Off	Off	
	11	0	0	1	0	0	Disable	On	Off	
	11	0	0	1	0	0	Enable	On	On	

11.4 TRUTH TABLE FOR VREF1 BUFFER AND OUTPUT SWITCH CONTROL

Table 49: VrefO1 Truth Table

Function Enable	VrefO1 Source Selection	VrefO1 Buffer Selection	GPI02 Analog Mode Enable	Buffer state	Output switch	Note
	registers [658:657]	register [656]	registers [708:707]= 11, means enable			
None	00	0	Disable	Off	Off	VrefO1 is all off
ACMP2L_Vref	01	0	Disable	Off	Off	VrefO1 select ACMP2L; output has no buffer; pd come from register [656]
	01	0	Enable	Off	On	
	01	1	Disable	On	Off	VrefO1 select ACMP2L; output has buffer; pd come from register [656]
	01	1	Enable	On	On	

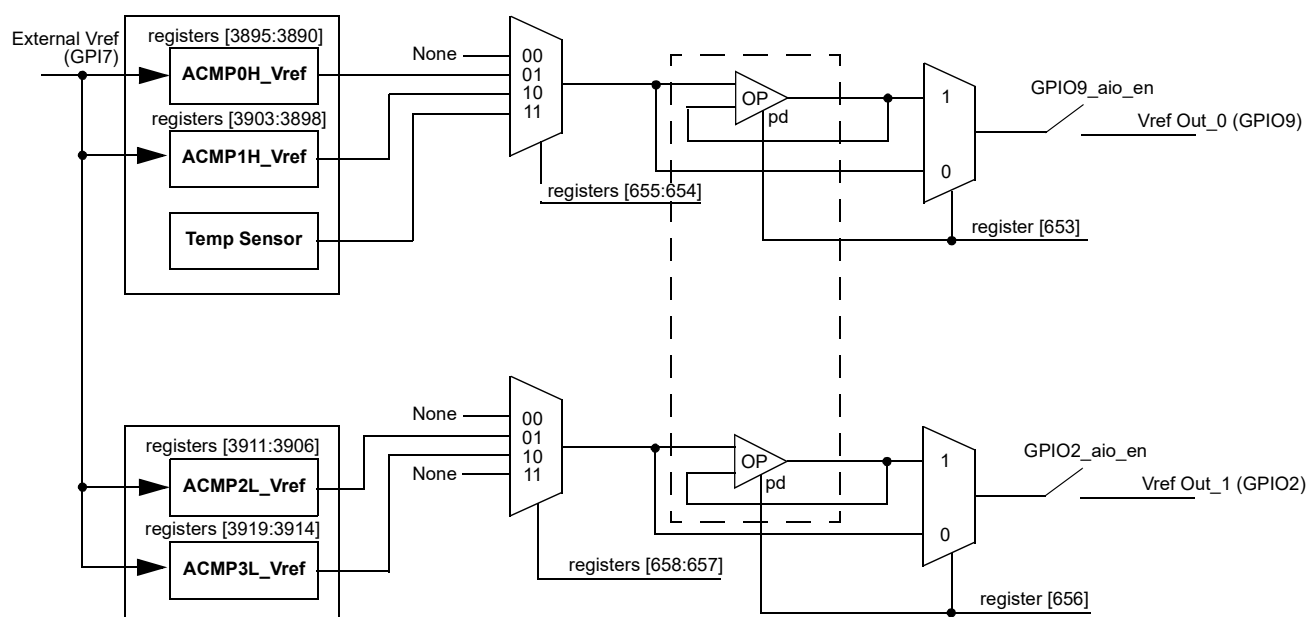
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Table 49: VrefO1 Truth Table(Continued)

Function Enable	VrefO1 Source Selection	VrefO1 Buffer Selection	GPIO2 Analog Mode Enable	Buffer state	Output switch	Note
	registers [658:657]	register [656]	registers [708:707]= 11, means enable			
ACMP3L_Vref	10	0	Disable	Off	Off	VrefO1 select ACMP2L; output has no buffer; pd come from register [656]
	10	0	Enable	Off	On	
	10	1	Disable	On	Off	VrefO1 select ACMP2L; output has buffer; pd come from register [656]
	10	1	Enable	On	On	

	valid output mode

11.5 VREF BLOCK DIAGRAM


Figure 74: Voltage Reference Block Diagram

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11.6 VREF LOAD REGULATION

Note 1 It is not recommended to use Vref connected to external pin without buffer.

Note 2 Vref buffer performance is not guaranteed at $V_{DD} < 2.7$ V.

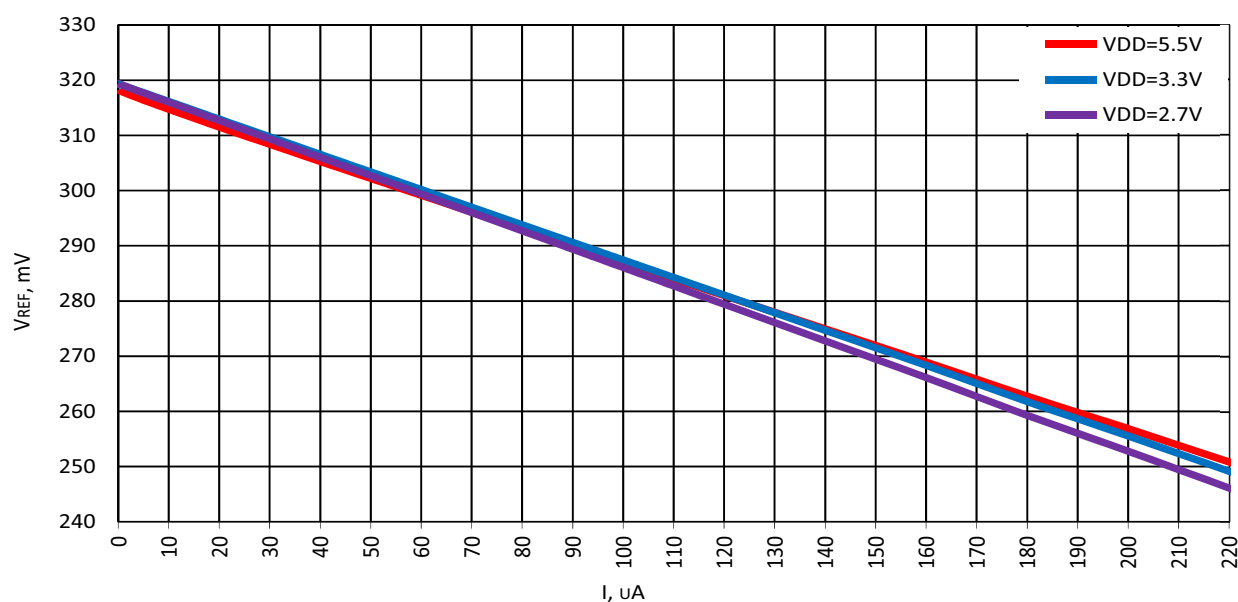


Figure 75: Typical Load Regulation, Vref = 320 mV, T = -40 °C to +85 °C, Buffer - Enable

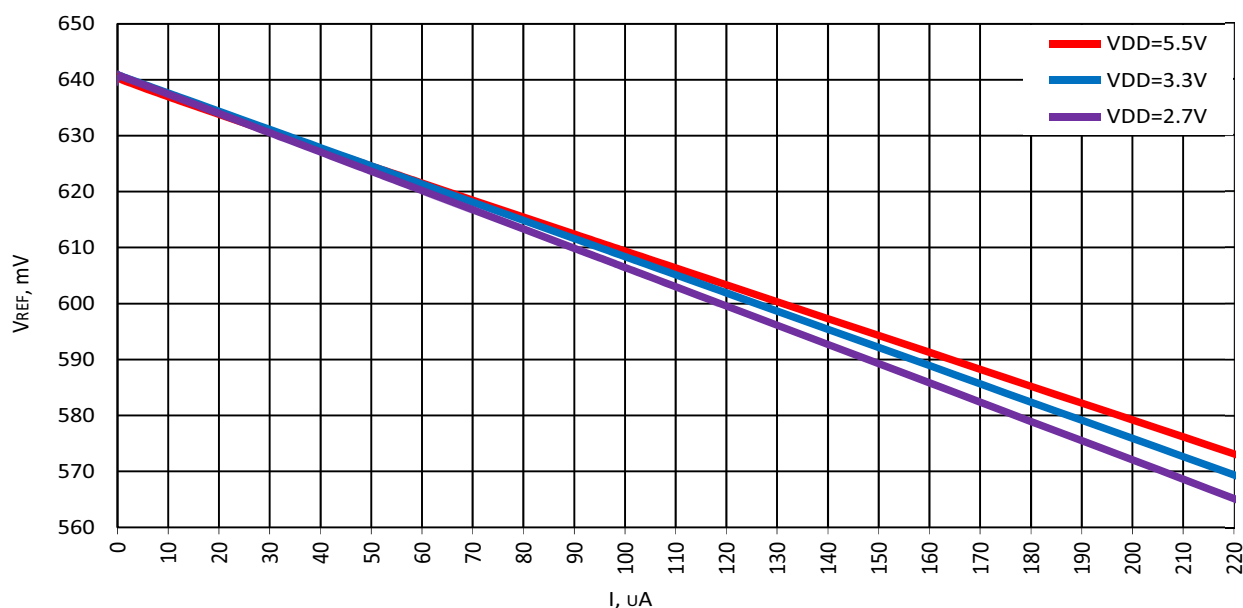


Figure 76: Typical Load Regulation, Vref = 640 mV, T = -40 °C to +85 °C, Buffer - Enable

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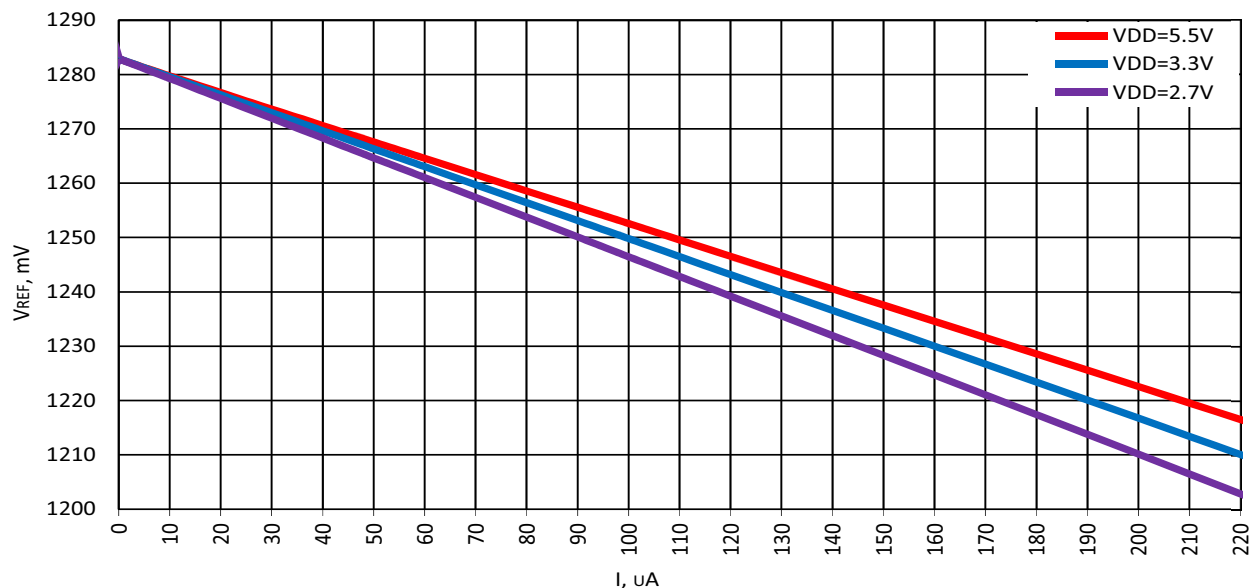


Figure 77: Typical Load Regulation, Vref = 1280 mV, T = -40 °C to +85 °C, Buffer - Enable

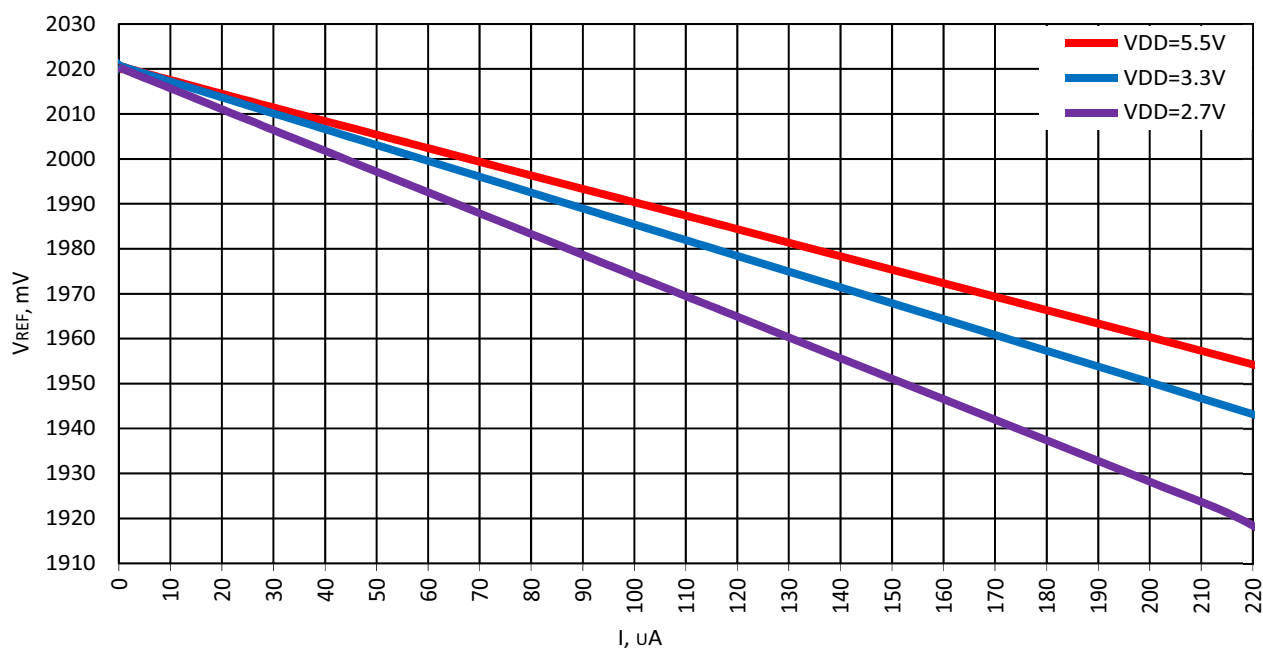


Figure 78: Typical Load Regulation, Vref = 2016 mV, T = -40 °C to +85 °C, Buffer - Enable

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12 Clocking

12.1 GENERAL DESCRIPTION

The SLG46880/81 has three internal oscillators to support a variety of applications:

- Oscillator0 (2.048 kHz)
- Oscillator1 (2.048 MHz)
- Oscillator2 (25 MHz)

There are two divider stages for each oscillator that gives the user flexibility for introducing clock signals to connection matrix, as well as various other Macrocells. The pre-divider (first stage) for Oscillator allows the selection of /1, /2, /4 or /8 to divide down frequency from the fundamental. The second stage divider has an input of frequency from the pre-divider, and outputs one of eight different frequencies divided by /1, /2, /3, /4, /8, /12, /24 or /64 on Connection Matrix Input lines [27], [28] and [29]. Please see [Figure 82](#), for more details on the SLG46880/81 clock scheme.

Oscillator2 (25 MHz) has an additional function of 100 ns delayed startup, which can be enabled/disabled by register [525]. This function is recommended to use when analog blocks are used along with the Oscillator.

The Matrix Power Down/Force On function allows switching off or force on the oscillator using an external pin. The Matrix Power Down/Force On (Connection Matrix Output [72], [73], [74]) signal has the highest priority. The OSC operates according to the [Table 50](#).

Table 50: Oscillator Operation Mode Configuration Settings

POR	External Clock Selection	Signal From Connection Matrix	Register: Power Down or Force On by Matrix Input	Register: Auto Power-On or Force On	OSC Enable Signal from CNT/DLY Macrocells	OSC Operation Mode
0	X	X	X	X	X	OFF
1	1	X	X	X	X	Internal OSC is OFF, logic is ON
1	0	1	0	X	X	OFF
1	0	1	1	X	X	ON
1	0	0	X	1	X	ON
1	0	0	X	0	CNT/DLY requires OSC	ON
1	0	0	X	0	CNT/DLY does not require OSC	OFF

Note: The OSC will run only when any macrocell that uses OSC is powered on.

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12.2 OSCILLATOR0 (2.048 kHz)

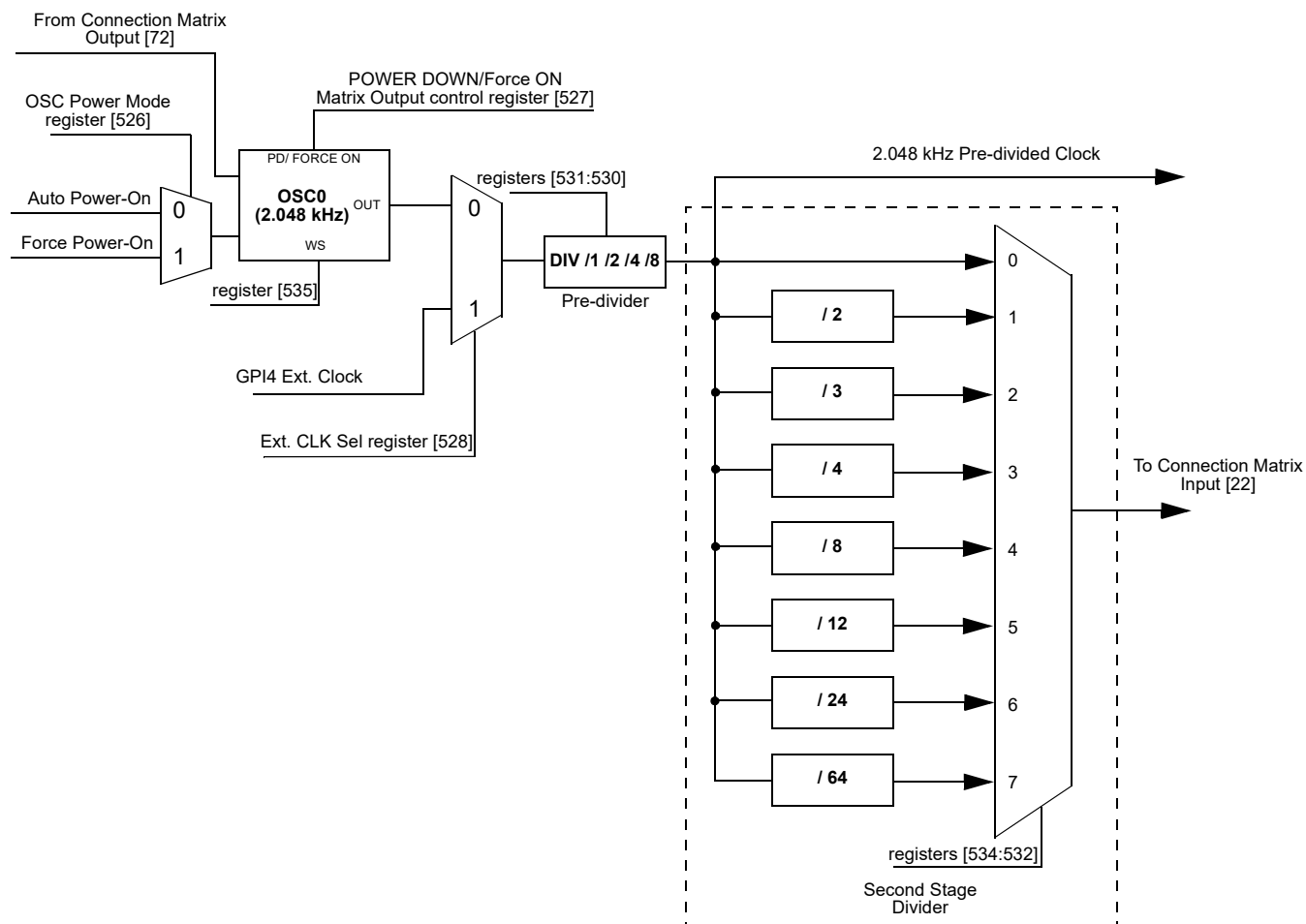


Figure 79: Oscillator0 Block Diagram

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12.3 OSCILLATOR1 (2.048 MHZ)

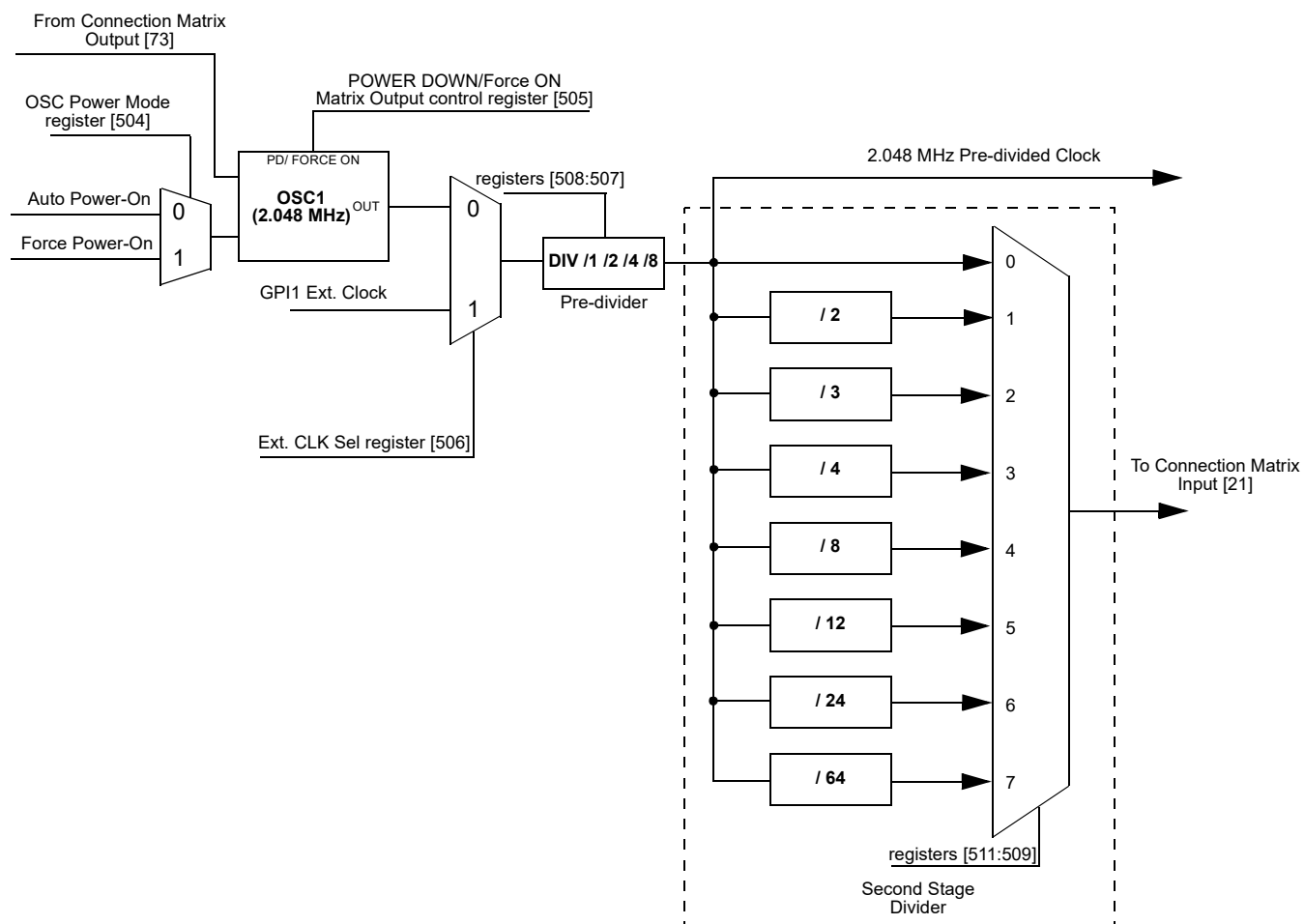


Figure 80: Oscillator1 Block Diagram

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12.4 OSCILLATOR2 (25 MHz)

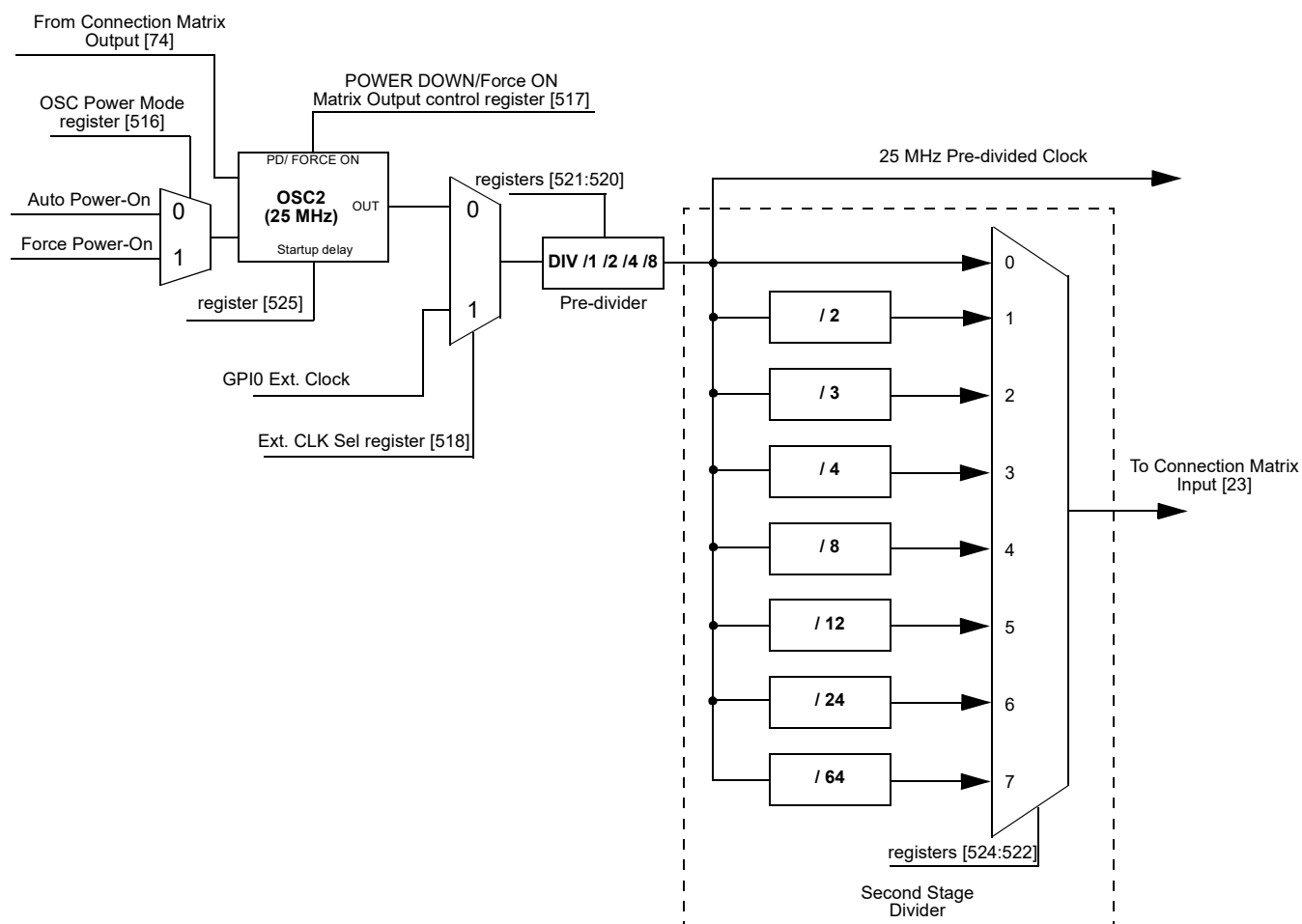


Figure 81: Oscillator2 Block Diagram

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12.5 CLOCK SCHEME

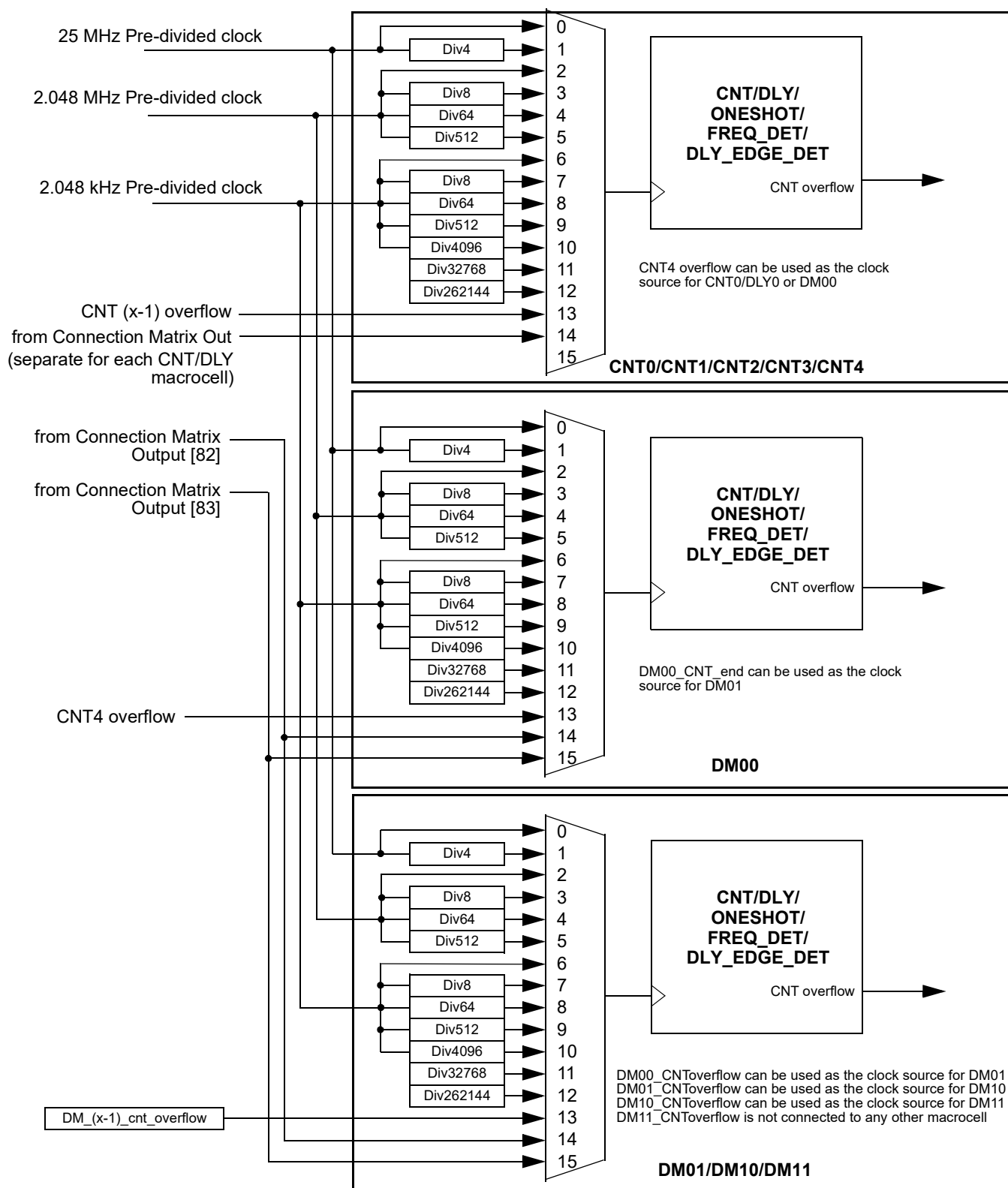


Figure 82: Clock Scheme

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12.6 CRYSTAL OSCILLATOR

The Crystal OSC provides high precision and stability of the output frequency. GPI5 and GPI4 are input and output, respectively, of an inverting amplifier which is configured for use as an On-chip Oscillator, as shown in [Figure 84](#). Either a quartz crystal or a ceramic resonator may be used. C1 and C2 should always be equal for both crystals and resonators. The optimal value of the capacitors depends on the crystal or resonator in use, the amount of stray capacitance, and the electromagnetic noise of the environment. Refer to [Table 51](#). For the ceramic resonators, the capacitor values given by the manufacturer should be used. It is possible to use an external clock source, it must be connected to GPI4. In this case no external components are required.

The Power Down Mode is paired with temperature sensor, [Section 20](#). If it is enabled for Crystal OSC, it is not available for Temp Sensor and vice versa. However, it is possible to enable Power Down Mode for Crystal OSC and Temp Sensor simultaneously.

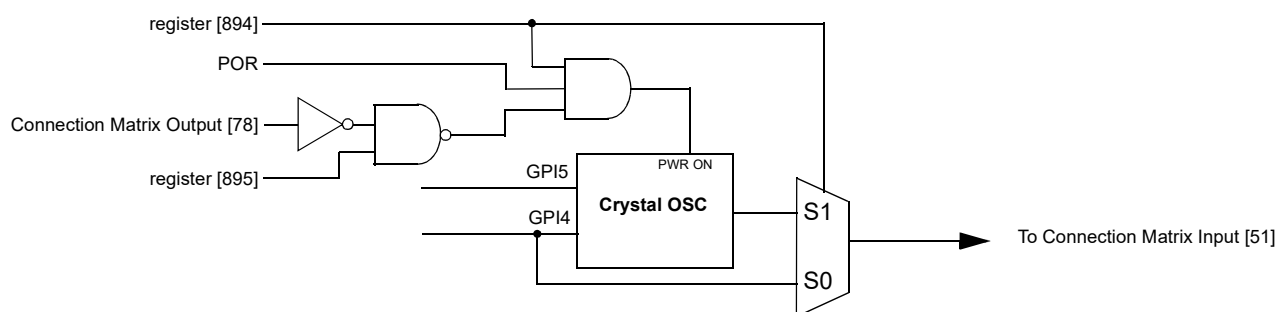


Figure 83: Crystal OSC Block Diagram

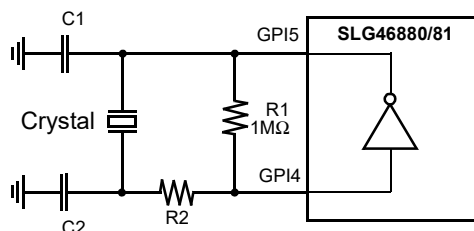


Figure 84: External Crystal Connection

Table 51: External Components Selection Table

f (MHz)	C1, C2	R2
5	33 pF	5 kΩ
10	22 pF	1 kΩ
15	15 pF	500 Ω
20	10 pF	270 Ω

12.7 EXTERNAL CLOCKING

The SLG46880/81 supports several ways to use an external, higher accuracy clock as a reference source for internal operations.

12.7.1 Crystal OSC Mode

When register [1136] is set to 1, an external crystal can be connected to GPI5 and GPI4 for supplying an accurate clock source. See [Section 12.6](#). An external clocking signal on GPI4 can be used in place of the crystal. The high and low limits for crystal frequency that can be selected are 40 MHz and 32.75 kHz.

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12.7.2 GPI4 Source for Oscillator0 (2.048 kHz)

When register [528] is set to 1, an external clocking signal on GPI4 will be routed in place of the internal oscillator derived 2.048 kHz clock source. See [Figure 79](#) The high and low limits for external frequency are 0 MHz and 20 MHz.

12.7.3 GPI1 Source for Oscillator1 (2.048 kHz)

When register [506] is set to 1, an external clocking signal on GPI1 will be routed in place of the internal oscillator derived 2.048 MHz clock source. See [Figure 80](#) The high and low limits for external frequency are 0 MHz and 70 MHz.

12.7.4 GPI0 Source for Oscillator2 (25 MHz)

When register [518] is set to 1, an external clocking signal on GPI0 will be routed in place of the internal oscillator derived 25 MHz clock source. See [Figure 81](#) The high and low limits for external frequency are 0 MHz and 80 MHz.

12.8 OSCILLATORS POWER-ON DELAY

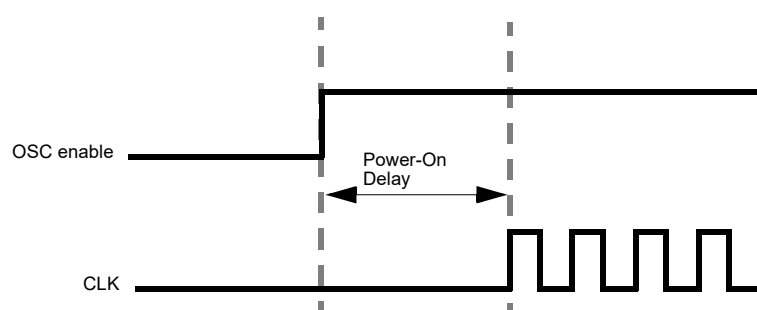


Figure 85: Oscillator Startup Diagram

Note 1 OSC power mode: “Auto Power-On”.

Note 2 “OSC enable” signal appears when any macrocell that uses OSC is powered on.

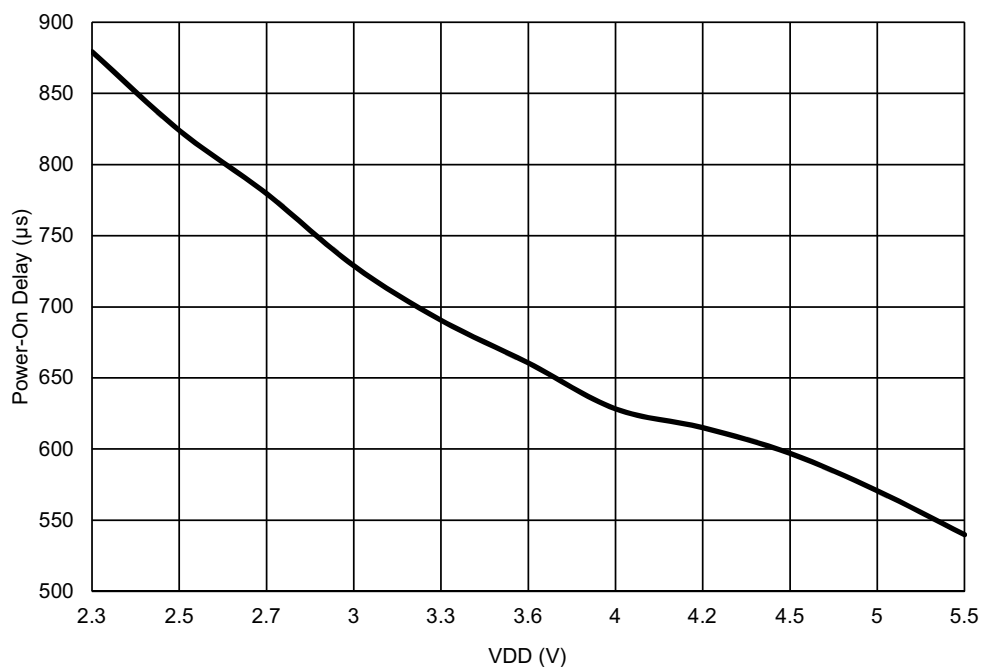
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Figure 86: Oscillator0 Maximum Power-On Delay vs. V_{DD} at Room Temperature, OSC0 = 2.048 kHz

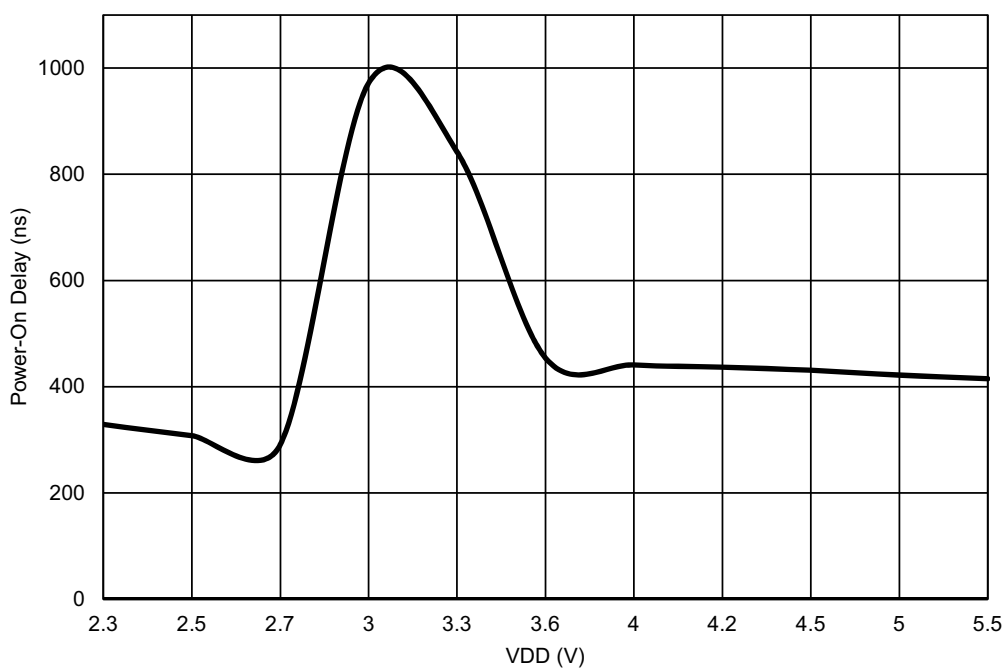


Figure 87: Oscillator1 Maximum Power-On Delay vs. V_{DD} at Room Temperature, OSC1 = 2.048 MHz

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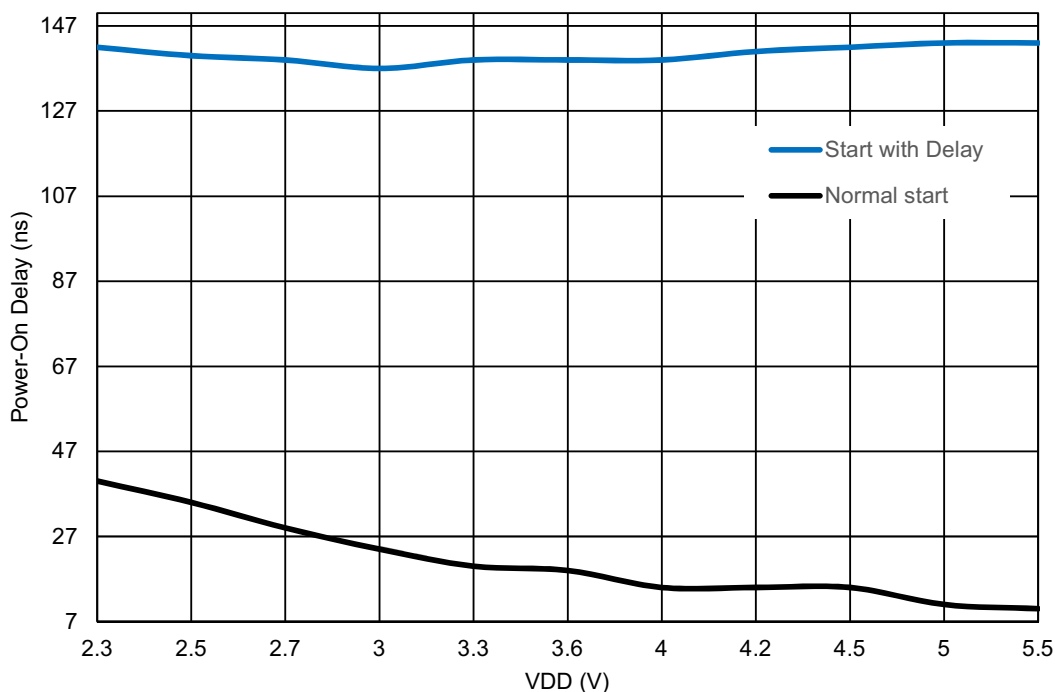


Figure 88: Oscillator2 Maximum Power-On Delay vs. V_{DD} at Room Temperature, OSC2 = 25 MHz

12.9 OSCILLATORS ACCURACY

Note: OSC power setting: Force Power-On; Clock to matrix input - enable; Bandgap: turn on by register - enable.

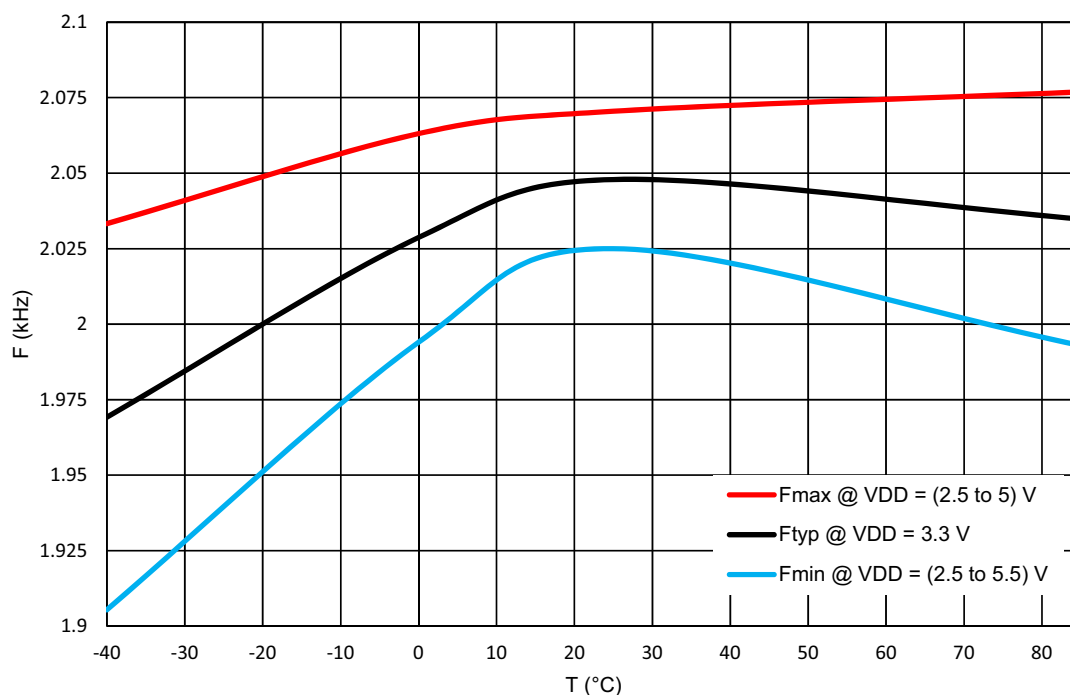


Figure 89: Oscillator0 Frequency vs. Temperature, OSC0 = 2.048 kHz

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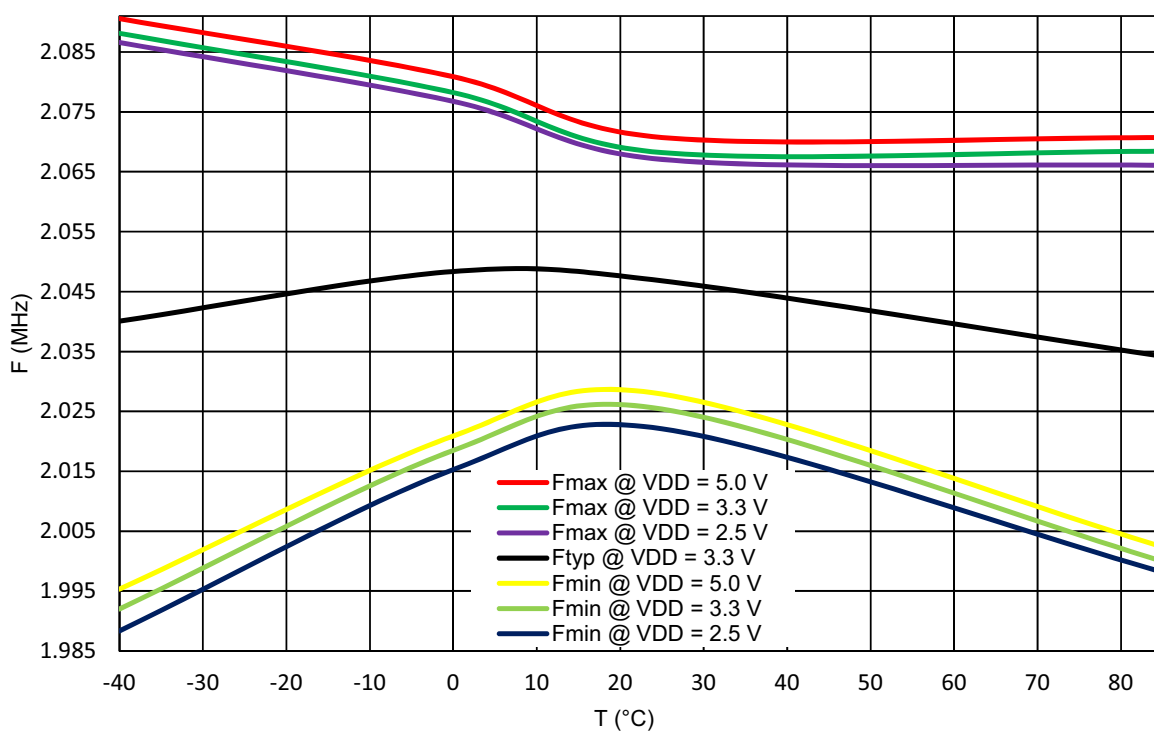


Figure 90: Oscillator1 Frequency vs. Temperature, OSC1 = 2.048 MHz

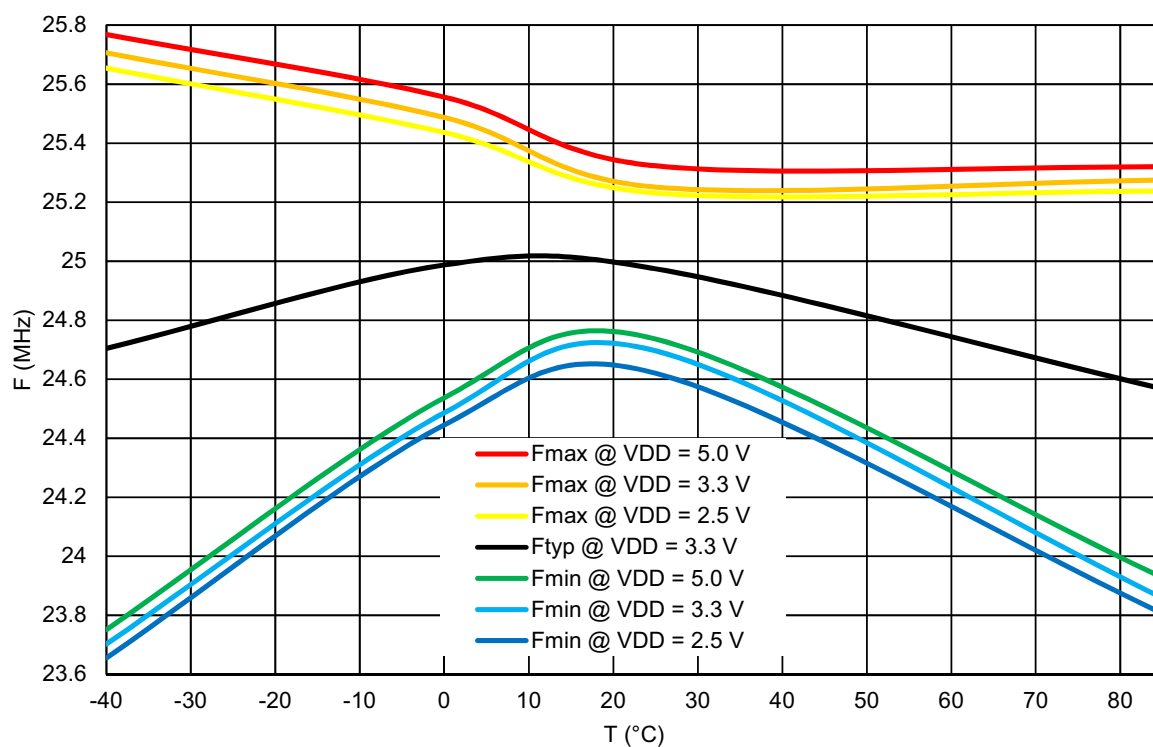


Figure 91: Oscillator2 Frequency vs. Temperature, OSC2 = 25 MHz

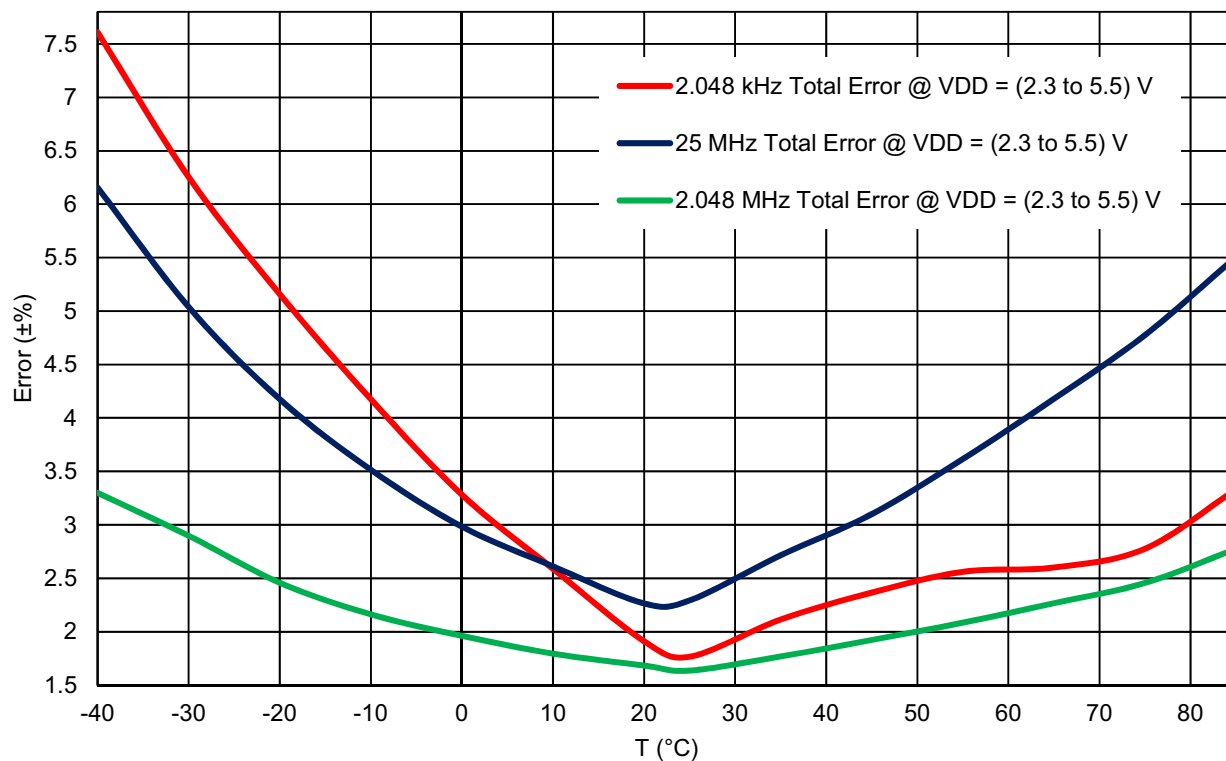
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Figure 92: Oscillators Total Error vs. Temperature

Note: For more information see Section [3.5](#).

13 Power-On Reset

The SLG46880/81 has a power-on reset (POR) macrocell to ensure correct device initialization and operation of all macrocells in the device. The purpose of the POR circuit is to have consistent behavior and predictable results when the V_{DD} power is first ramping to the device, and also while the V_{DD} is falling during power-down. To accomplish this goal, the POR drives a defined sequence of internal events that trigger changes to the states of different macrocells inside the device, and finally to the state of the IO pins.

13.1 GENERAL OPERATION

The SLG46880/81 is guaranteed to be powered down and non-operational when the V_{DD} voltage (voltage on V_{DD}) is less than Power Off Threshold (see in [Table 3.3](#) and [Table 5](#)), but not less than -0.6 V. Another essential condition for the chip to be powered down is that no voltage higher (Note) than the V_{DD} voltage is applied to any other PIN. For example, if V_{DD} voltage is 0.3 V, applying a voltage higher than 0.3 V to any other PIN is incorrect, and can lead to incorrect or unexpected device behavior.

Note: There is a 0.6 V margin due to forward drop voltage of the ESD protection diodes.

To start the POR sequence in the SLG46880/81, the voltage applied on the V_{DD} should be higher than the Power-ON threshold (Note). The full operational V_{DD} range for the SLG46880/81 is 2.3 V to 5.5 V. This means that the V_{DD} voltage must ramp up to the operational voltage value, but the POR sequence will start earlier, as soon as the V_{DD} voltage rises to the Power-ON threshold. After the POR sequence has started, the SLG46880/81 will have a typical Startup Time (see in [Table 4](#) and [Table 5](#)) to go through all the steps in the sequence, and will be ready and completely operational after the POR sequence is complete.

Note: The Power-ON threshold is defined in [Table 3.3](#) and [Table 5](#).

To power down the chip the, V_{DD} voltage should be lower than the operational and to guarantee that chip is powered down, it should be less than Power Off Threshold.

All PINs are in high impedance state when the chip is powered down and while the POR sequence is taking place. The last step in the POR sequence releases the IO structures from the high impedance state, at which time the device is operational. The pin configuration at this point in time is defined by the design programmed into the chip. Also as it was mentioned before, the voltage on PINs can't be bigger than the V_{DD} , this rule also applies to the case when the chip is powered on.

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13.2 POR SEQUENCE

The POR system generates a sequence of signals that enable certain macrocells. The sequence is shown in [Figure 93](#).

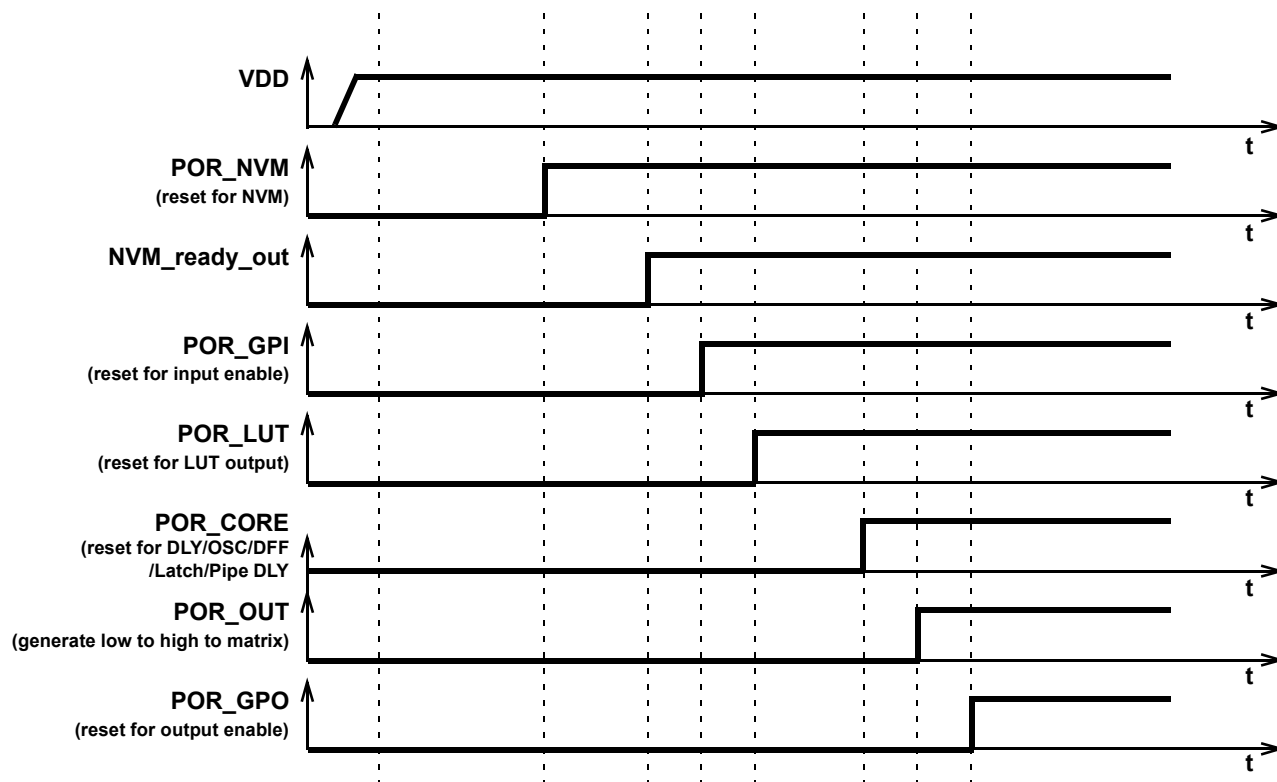


Figure 93: POR Sequence

As can be seen from [Figure 93](#) after the V_{DD} has started ramping up and crossed the Power-ON threshold, first, the on-chip NVM memory is reset. Next the chip reads the data from NVM, and transfers this information to a CMOS Latch that serves to configure each macrocell, and the Connection Matrix which routes signals between macrocells. The third stage causes the reset of the input pins, and then to enable them. After that, the LUTs are reset and become active. After LUTs, the Delay cells, OSCs, DFFs, Latches and Pipe Delay are initialized. Only after all macrocells are initialized, internal POR signal (POR macrocell output) goes from LOW to HIGH (POR_OUT in [Figure 93](#)). The last portion of the device to be initialized is the output pins, which transition from high impedance to active at this point.

The typical time that takes to complete the POR sequence varies by device type in the GreenPAK family. It also depends on many environmental factors, such as: slew rate, V_{DD} value, temperature and even will vary from chip to chip (process influence).

13.3 MACROCELLS OUTPUT STATES DURING POR SEQUENCE

To have a full picture of SLG46880/81 operation during powering and POR sequence, refer to [Figure 94](#) which describes the macrocell output states during the POR sequence.

First, before the NVM has been reset, all macrocells have their output set to logic LOW (except the output pins which are in high impedance state). On the next step, some of the macrocells start initialization: input pins output state becomes LOW; LUTs also output LOW. After that input pins are enabled. Next, only LUTs are configured. Then, all other macrocells are initialized. After

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macrocells are initialized, internal POR matrix signal switches from LOW to HIGH. The last are output pins that become active and determined by the input signals.

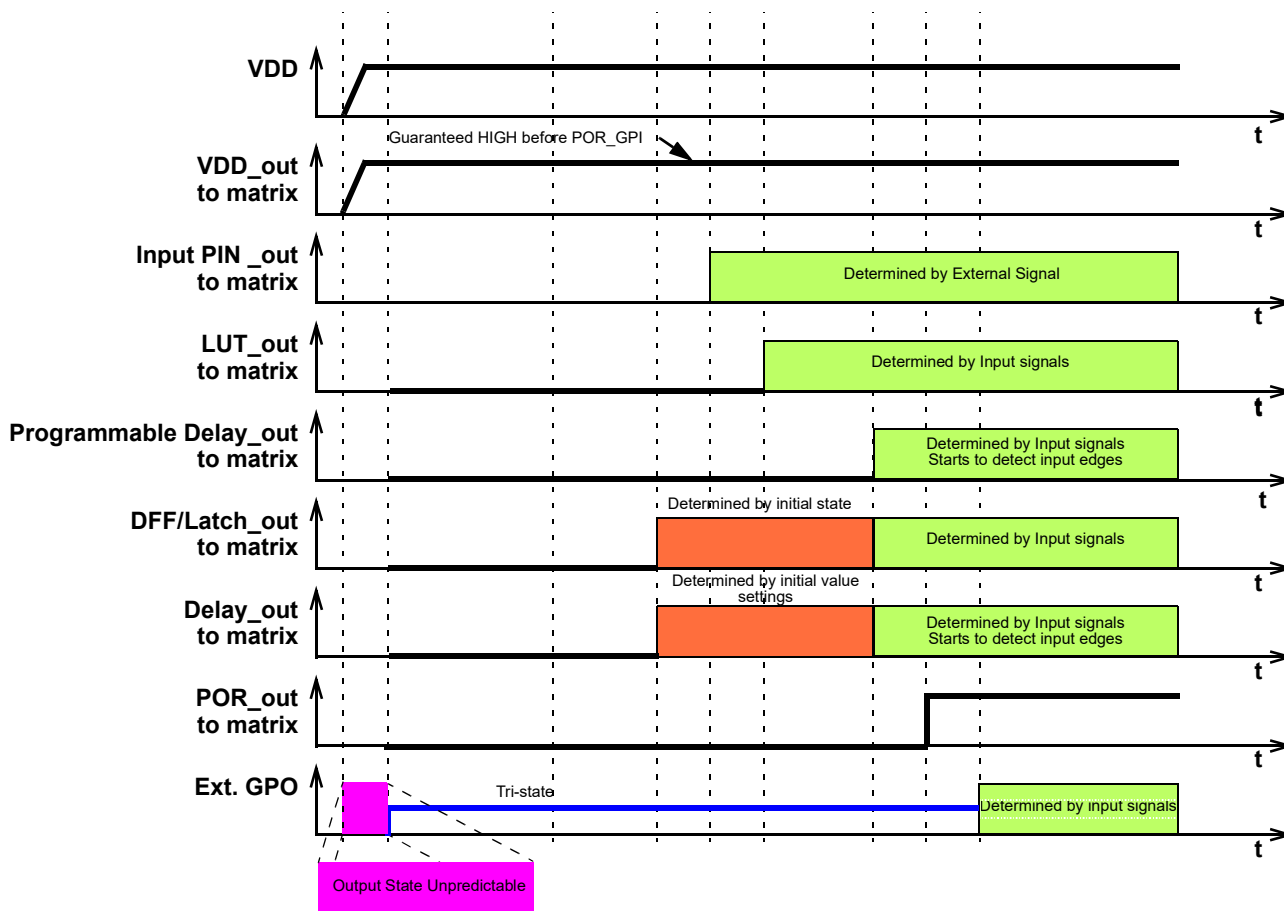


Figure 94: Internal Macrocell States during POR Sequence

13.3.1 Initialization

All internal macrocells by default have initial low level. Starting from indicated power-up time of 1.64 V to 2.11 V, macrocells in SLG46880/81 are powered on while forced to the reset state. All outputs are in Hi-Z and chip starts loading data from NVM. Then the reset signal is released for internal macrocells and they start to initialize according to the following sequence:

1. Input pins, pull up/down.
2. LUTs.
3. DFFs, Delays/Counters, Pipe Delay, OSCs, ACMPs.
4. POR output to matrix.
5. Output pin corresponds to the internal logic.

The Vref output pin driving signal can precede POR output signal going high by 3 μ s to 5 μ s. The POR signal going high indicates the mentioned power-up sequence is complete.

Note: The maximum voltage applied to any pin should not be higher than the V_{DD} level. There are ESD Diodes between pin $\rightarrow$ V_{DD} and pin $\rightarrow$ GND on each pin. Exceeding V_{DD} results in leakage current on the input pin, and V_{DD} will be pulled up, following the voltage on the input pin.

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13.3.2 Power Down

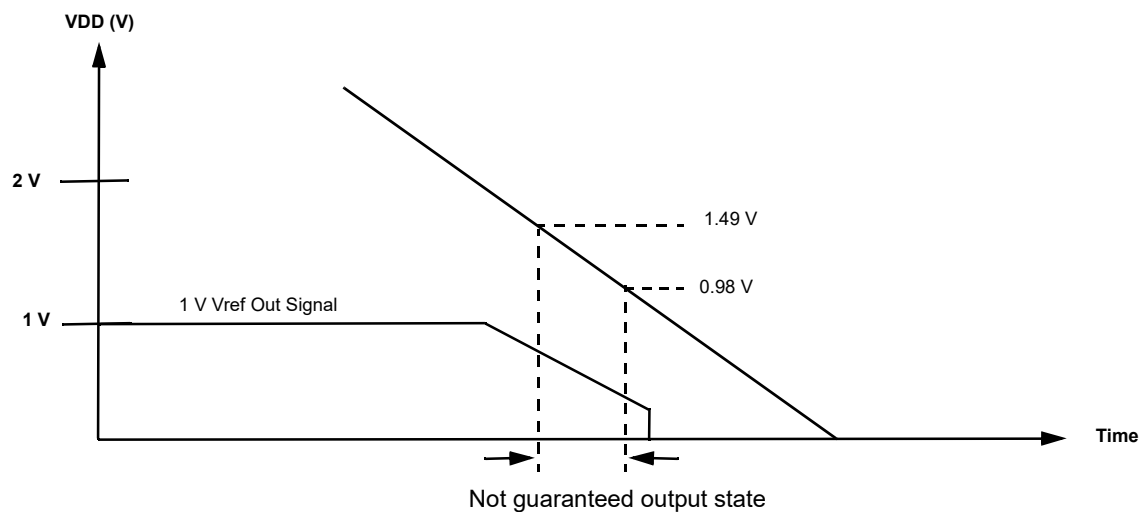


Figure 95: Power Down

During powerdown, macrocells in SLG46880/81 are powered off after V_{DD} falling down below Power Off Threshold. Please note that during a slow rampdown, outputs can possibly switch state.

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14 Asynchronous State Machine Subsystem

14.1 ASM SUBSYSTEM OVERVIEW

The Asynchronous State Machine (ASM) Subsystem is designed to allow the user to create state machines with between 2 to 12 states. The user has flexibility to define the available states, the available state transitions, and the input signals (a, b, c ...) that will cause transitions from one state to another state, as shown in [Figure 96](#).

The ASM Subsystem can persist in 1 of 12 states at any given time and the ASM Current State can be read via I²C. See [Section 19.4.6.4](#) for details.

The ASM Subsystem includes several discrete macrocells, including the ASM macrocell, four Dynamic Memory (DMx_x) macrocells, three Matrix Interface (MIx) macrocells, and one f(1) Computation Macrocell. These macrocells are designed to work as a system for building user defined state machines. More information on each of these various macrocells can be found in the following chapters:

- ASM Macrocell – [Section 15](#).
- Dynamic Memory (DM) Macrocells – [Section 16](#).
- f(1) Computation Macrocell – [Section 17](#).
- Matrix Interface (MI) Macrocells [Section 18](#).

The ASM Subsystem has a total of 25 digital input signal lines, as shown in [Figure 97](#), which all come from the Connection Matrix outputs. Of these 25 digital input signals, 3 are user selectable inputs going directly from the Connection Matrix to the three Matrix Interface (MI) macrocells. There are a total of 16 input signals that go to the DMx_x macrocell, four per macrocell. There is 1 ASM_nReset input that is for driving a state transition in both the ASM macrocell and the f(1) Computation Macrocell to an Initial/Reset state. It is possible to use one macrocell only (MI or DM) for state to state transitions. There are 4 digital input signals coming from the Connection Matrix to the f(1) Computation Macrocell. There is also 1 dedicated Interrupt input signal to the f(1) Computation Macrocell that will halt any active operations and transfer control back to the ASM macrocell.

There are a total of 8 analog inputs coming from various pins which can be muxed into the positive input for the f(1) Analog Comparator inside the f(1) Computation Macrocell. The f(1) Analog Comparator can be re-programmed for analog input source and negative input reference settings. The user selections for both positive input signal and negative reference are included as part of the information stored in the f(1) Command Register Table. This allows the user to make different analog measurements that are state dependent in their analog sources and reference settings.

The ASM Subsystem has a total of 21 digital output signal lines, as shown in [Figure 97](#), There are a total of 4 output signals which go to the Connections Matrix inputs, and from there can be routed to other internal macrocells or pins. The 4 outputs are user defined for each of the possible 12 states. There are a total of 8 output signals which go directly to the 8 GPOs. The 8 outputs are user defined for each of the possible 12 states. Each of the three macrocells, DM0_0, DM0_1 and f(1) have three output signals that go to the Connection Matrix.

In using this macrocell, the user must take into consideration the critical timing required on all input and output signals. The timing waveforms and timing specifications for this macrocell are all measured relative to the input signals (which come into the macrocell on the Connection Matrix outputs) and on the outputs from the macrocell (which are direct connections to Connection Matrix inputs). The user must consider any delays from other logic and internal chip connections, including IO delays, to insure that signals are properly processed, and state transitions are deterministic.

It is also important to note that the timing for the ASM Subsystem will change based on changes in temperature and system voltage. The user design that implements a state machine function must take into consideration, and be tolerant of, this variation

The GPAK Designer development tools support user designs for the ASM Subsystem at both the physical level and logic level. [Figure 96](#) is a representation of the user design at the logical level, and [Figure 97](#) shows the physical resources inside the various macrocells in the ASM Subsystem. To best utilize this subsystem, the user must develop a logical representation of their desired state machine, as well as a physical mapping of the input and outputs required for the desired functionality.

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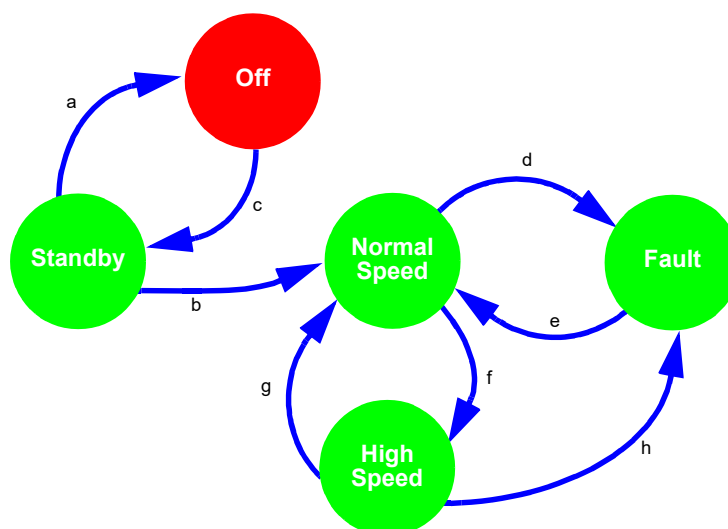


Figure 96: Asynchronous State Machine State Transitions

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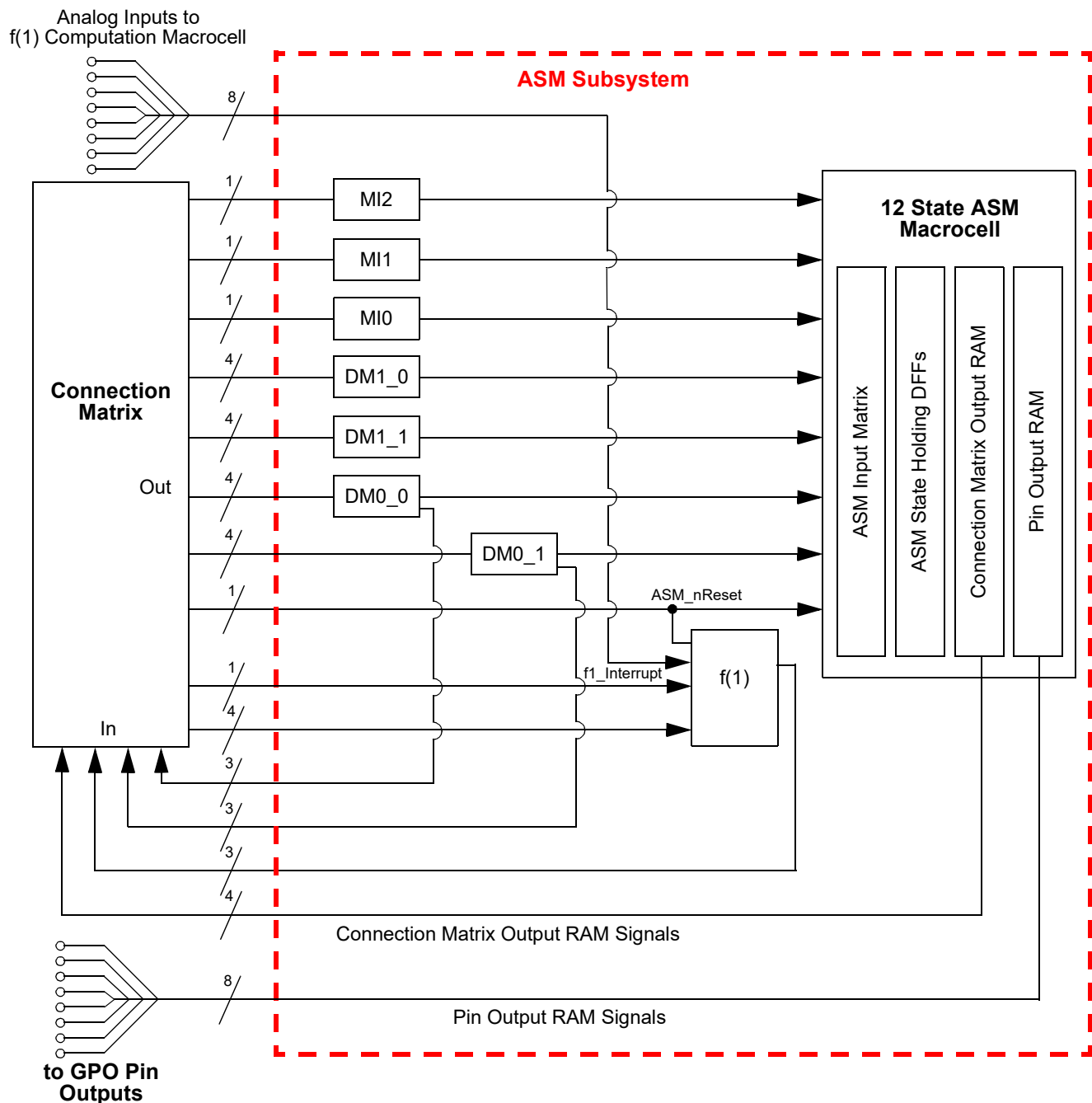


Figure 97: Connection Matrix to ASM Subsystem

14.2 ASM SUBSYSTEM INPUT SIGNALS

The ASM Subsystem has a total of 25 digital input signal lines, as shown in Figure 98, which all come from the Connection Matrix outputs. Of these 25 input signals, 3 are user selectable inputs going directly from the Connection Matrix to the three Matrix Interface (MI) macrocells. There are a total of 16 input signals that go to the DM_x_x macrocell, four per macrocell. There is 1 ASM_nReset input that is for driving a state transition in both the ASM macrocell and the f(1) Computation Macrocell to an Initial/Reset state. There are 4 digital input signals coming from the Connection Matrix to the f(1) Computation Macrocell. There is also 1 dedicated Interrupt input to the f(1) Computation Macrocell that will halt any active operations and transfer control back to the ASM macrocell. Each of the 25 input signals are level sensitive.

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There are a total of 16 digital input signals to the ASM Subsystem which are inputs directly to the DM macrocells. These 16 signals are shown in [Figure 98](#), highlighted in blue. While there are 4 input signals coming from the Connection Matrix and going to each DMx_x macrocell, there is only 1 output signal from each of these macrocells, which goes directly to the ASM macrocell. There are also 3 signal lines that come directly from the Connection Matrix and go to the three Matrix Interface (MI) macrocells which can drive state transitions. These signals are shown in [Figure 98](#), highlighted in green. This sets an upper bound on the number of transitions that the user can select going **out of** a particular state to be 7, shown in [Figure 99](#). There is no limitation on the number of unique transitions that can be supported going into a particular state, the user can select to have transitions going from a state to all other states, shown in [Figure 100](#). Each of these input signals to the ASM macrocell is level sensitive, and active high. A high level input will trigger a state transition.

There are a total of 8 analog inputs coming from various pins which can be muxed into the positive input for the f(1) Analog Comparator inside the f(1) Computation Macrocell. These 8 signals are shown in [Figure 98](#), highlighted in pink. The f(1) Analog Comparator can be re-programmed for analog input source and negative input reference settings. The user selections for both positive input signal and negative reference are included as part of the information stored in the f(1) Command Register Table. This allows the user to make different analog measurements that are state dependent in their analog sources and reference settings.

Also there are 4 digital inputs that can be connected with any Connection Matrix output by the f(1) Computational Macrocell commands. These 4 signals are shown in [Figure 98](#), highlighted in light blue.

The ASM macrocell also has a ASM_nReset input. This input to the ASM macrocell is level sensitive and active low. This signal is shown in [Figure 98](#), highlighted in yellow. An active signal on this input will drive an immediate state transition to the user-defined Initial/Reset state. The user can choose which state within the ASM Editor inside GPAK Designer will be the reset state.

There is also 1 dedicated f1_Interrupt input to the f(1) Computation Macrocell that will halt any active operations and transfer control back to the ASM macrocell. This signal is shown in [Figure 98](#) also highlighted in yellow.

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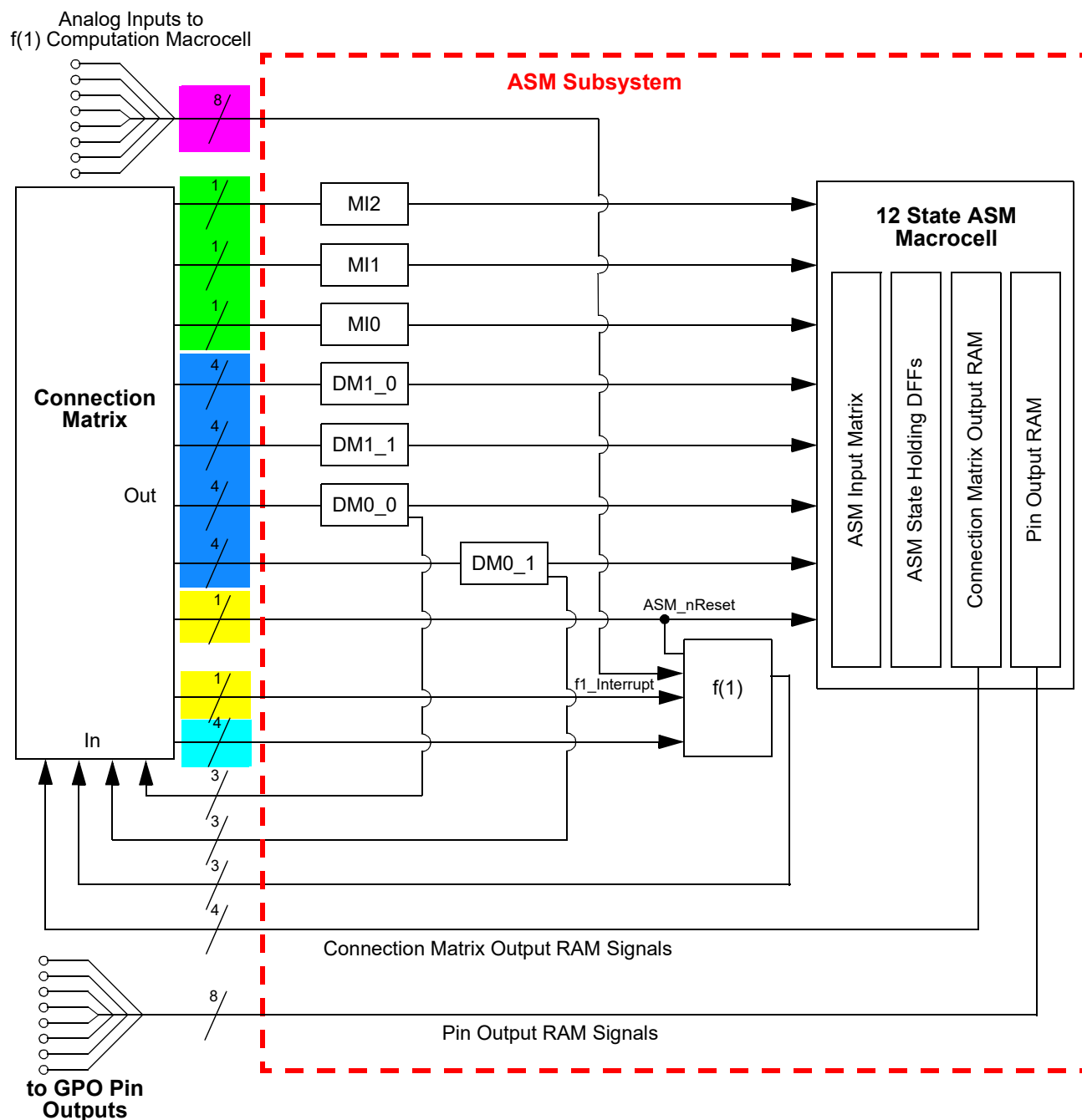


Figure 98: ASM Subsystem Input Signals

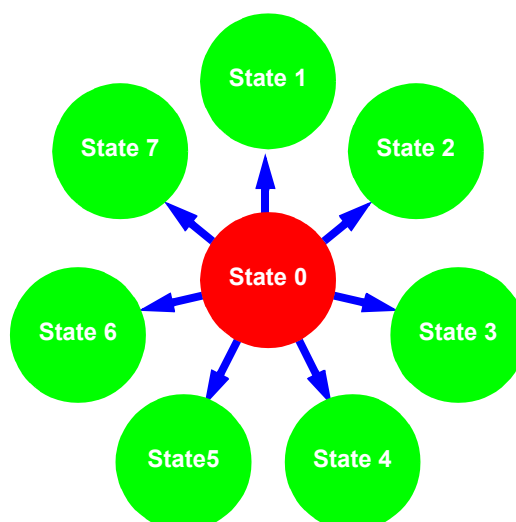


Figure 99: Maximum 7 State Transitions out of a Given State

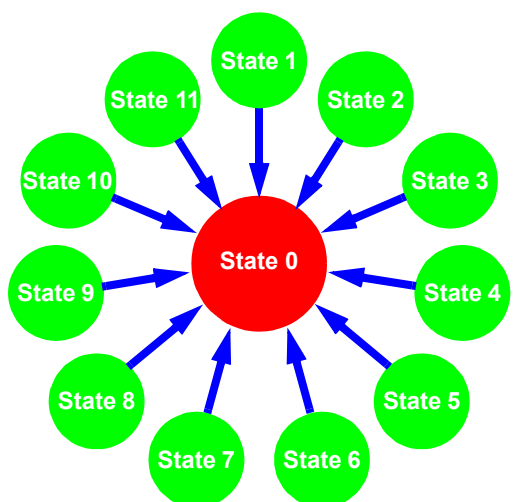


Figure 100: Maximum 11 State Transitions into Given State

14.3 ASM SUBSYSTEM OUTPUT SIGNALS

The ASM subsystem has a total of 21 output signal lines, as shown in [Figure 101](#).

There are a total of 4 output signals from the ASM macrocell which go to the Connections Matrix inputs and from there can be routed to other internal macrocells or pins. These signals are shown in [Figure 101](#), highlighted in green. The 4 outputs are user defined for each of the possible 12 states. The user selection for the output states is held in the Connection Matrix Output RAM.

There are a total of 8 output signals from the ASM macrocell which go directly to the 8 GPOs. These signals are shown in [Figure 101](#), highlighted in blue. The 8 outputs are user defined for each of the possible 12 states. The user selection for the output states is held in the Pin Output RAM. Each of these GPOs has a single selection bit which defines the GPO input source as either the ASM Output RAM signal or the Connection Matrix signal.

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Two of the Dynamic Memory macrocells, DM0_0 and DM0_1, can be used as either a resource for generating input signals for driving state transitions in the ASM macrocell, or to generate signals for use in other parts of the user design. When used to generate signals for purposes other than ASM state transitions, each of these macrocells has three output signals that go to the Connection Matrix, and from there can be routed to other internal macrocells or pins. Each of these macrocells has a total of 3 output signals of this type. These signals are shown in Figure 101, highlighted in yellow.

The f(1) Computation Macrocell has 3 output signals that go to the Connection Matrix, and from there can be routed to other internal macrocells or pins. These signals are shown in Figure 101, highlighted in pink.

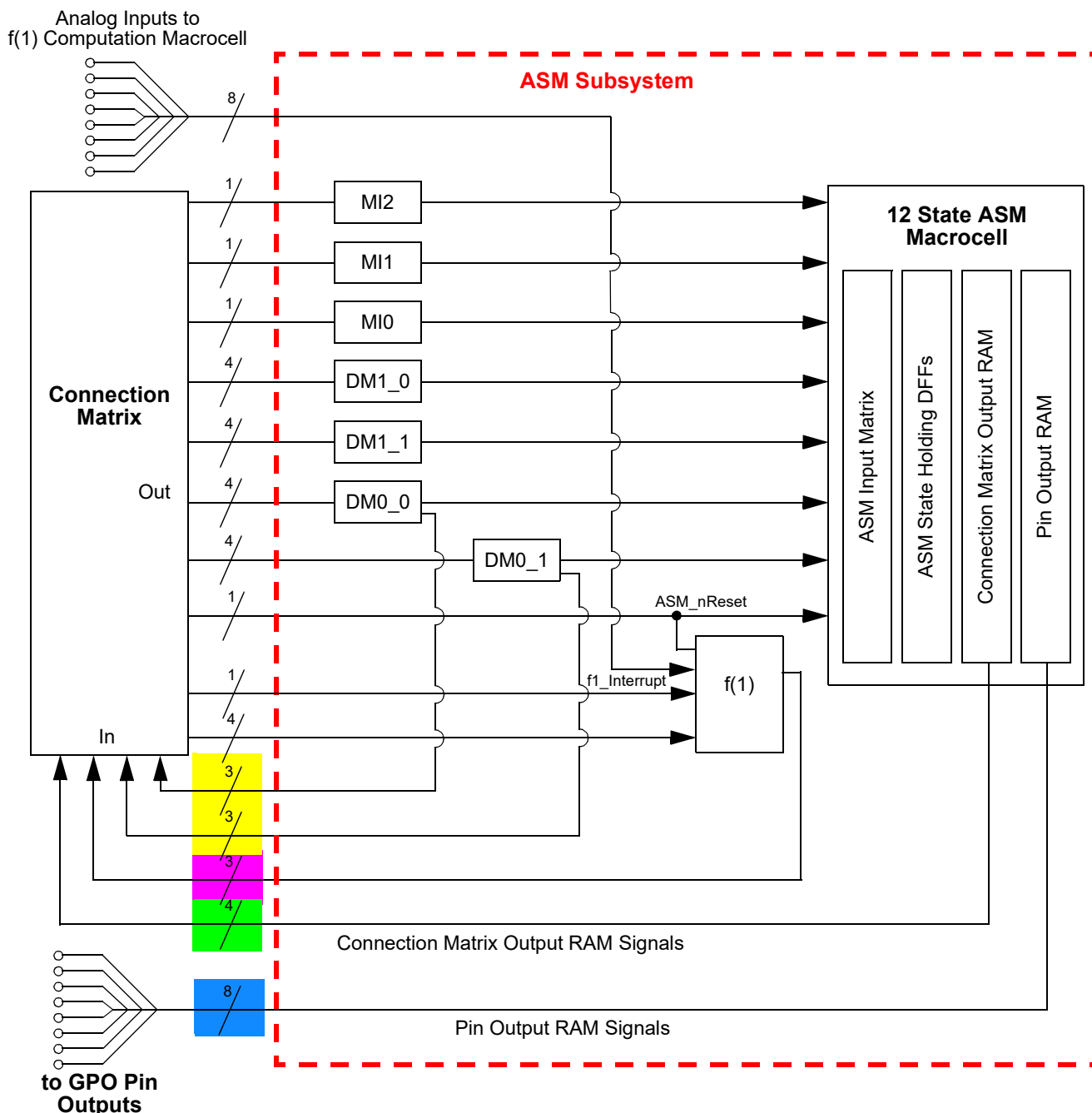


Figure 101: ASM Subsystem Input Signals

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14.4 BASIC ASM_SUBSYSTEM TIMING

The basic state transition timing from input on one of 19 state transition input lines (4 going into each DMx_x and 3 from Connection Matrix going directly to the ASM macrocell) to the time when the 4 Connection Matrix Output RAM signals and 8 Pin Output RAM signals change is shown in [Figure 102](#) and [Figure 103](#). The time from a valid input signal to the time that there is a valid change of state, and valid signals on the 4 Connection Matrix Output RAM signals and 8 Pin Output RAM signals is State Machine Output Delay Time (Tst_out_delay).

At the point in time that the Connection Matrix Output RAM signals and Pin Output RAM signals are changing, the f(1) Computation Macrocell is prepared for executing commands coded for the new state, if the user has coded commands to execute. Based on the chosen commands, the f(1) Computation Macrocell outputs can change a number of times before the f(1) finishes for the new state. The ASM Subsystem will not be ready for the next state transition until the f(1) Computation Macrocell has completed the commands for the new state, or until it is reset by asserting the f1_Interrupt input from the Connection Matrix. The period of time between the input on one of the 7 inputs to the ASM macrocell and the ASM subsystem being ready for the next state transition input is State Machine Sequential Delay Time (Tst_sequential_delay).

From the input on one of 19 state transition input lines, there is a delay before the outputs are latched from the DM0_0 and DM0_1 macrocells, noted as DM Connection Matrix Output Delay Time (Tst_dmlatch_delay).

During state transitions, there will be no change in output levels on other states than the one state going active→inactive and the other state going inactive→active

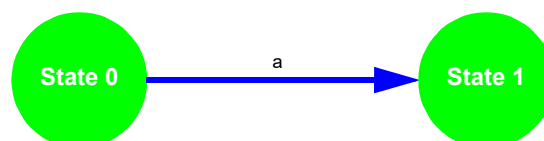


Figure 102: State Transition

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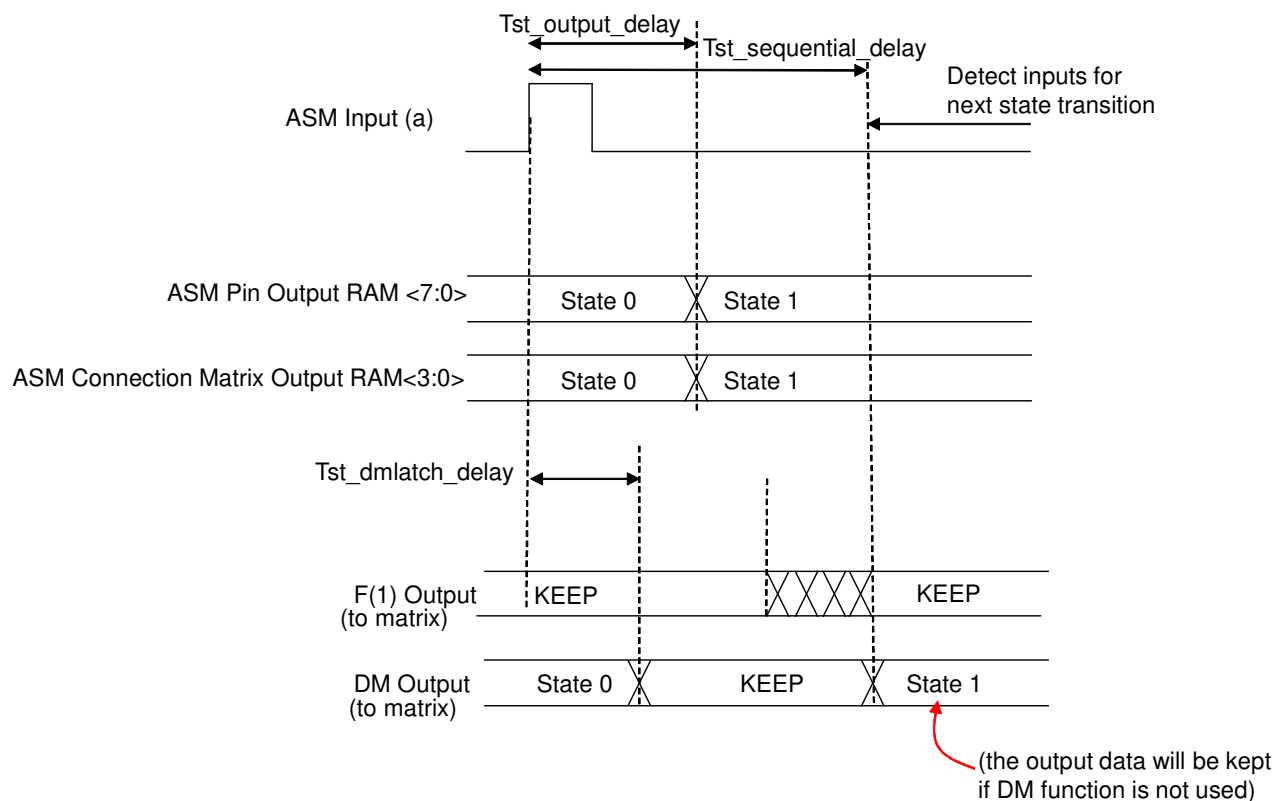


Figure 103: State Transition Timing

14.5 ASM POWER CONSIDERATIONS

A benefit of the asynchronous nature of this macrocell is that it will consume power only during state transitions. shown in [Figure 104](#) and [Figure 105](#), the current consumption of the macrocell will be a fraction of a μA between state transitions, and will rise only during state transitions. This is assuming that the DLY/CNT inside each DMx_x macrocells are also in-active. See [table Table 8](#) to find average current during state transitions.

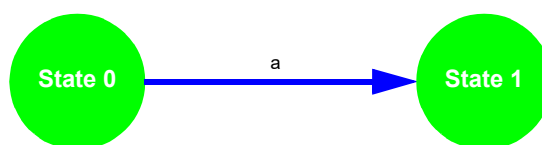


Figure 104: State Transition

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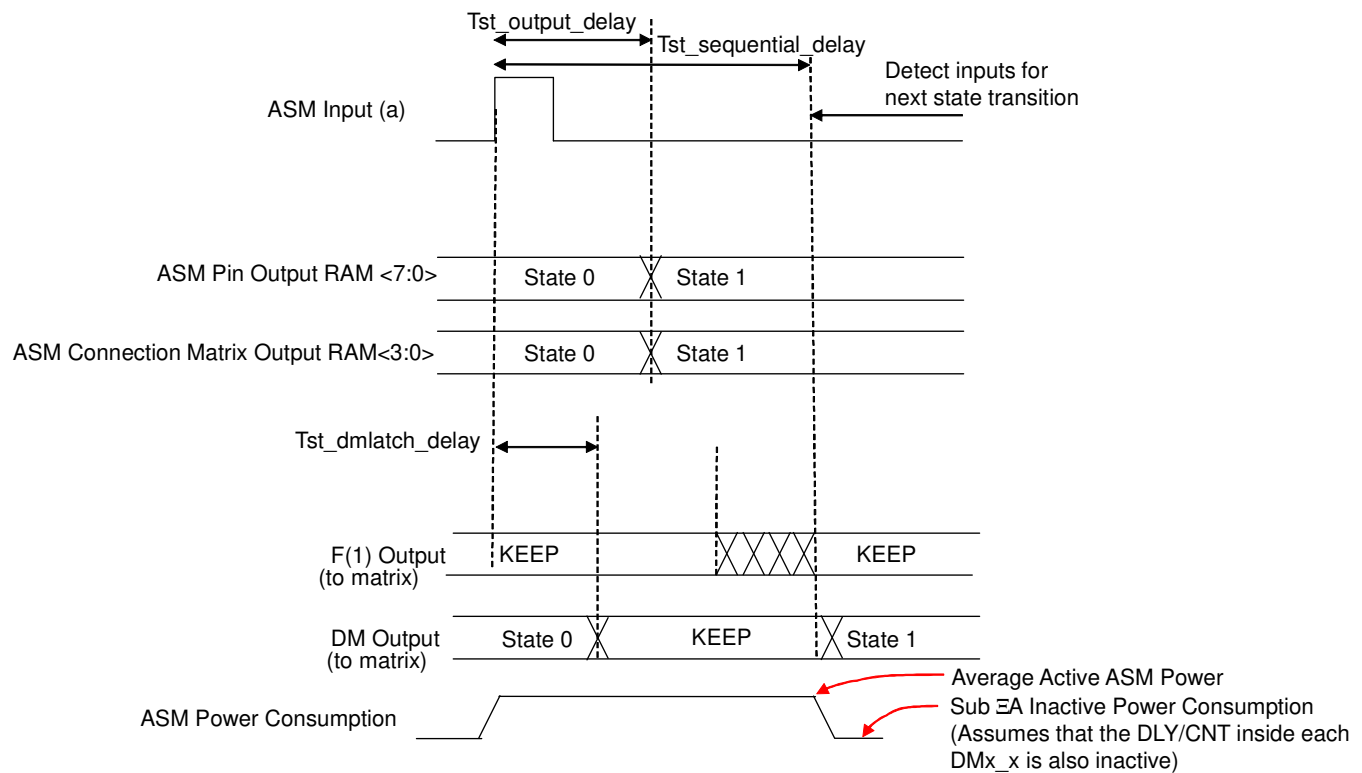


Figure 105: State Transition Timing and Power Consumption

14.6 ASYNCHRONOUS STATE MACHINES VS. SYNCHRONOUS STATE MACHINES

It is important to note that this macrocell is designed for asynchronous operation, which means the following:

1. No clock source is needed, it reacts only to input signals.
2. The input signals do not have to be synchronized to each other, the macrocell will react to the earliest valid signal for state transition.
3. This macrocell does not have traditional set-up and hold time specifications which are related to incoming clock, as this macrocell has no clock source.
4. The macrocell only consumes power while in state transition.

14.7 ASM SPECIAL CASE TIMING CONSIDERATIONS

14.7.1 State Transition Pulse Input Timing

All inputs to the ASM macrocell are level sensitive. If the input to the state machine macrocell for a state transition is a pulse, there is a minimum pulse width on the input to the state machine macrocell (as measured at the matrix input to the macrocell) which is guaranteed to result in a state transition shown in Figure 106 and Figure 107. This pulse width is defined by the State Machine Input Pulse Acceptance Time (T_{st_pulse}). If a pulse width that is shorter than T_{st_pulse} is input to the state machine macrocell, it is indeterminate whether the state transition will happen or not. If a pulse that is rejected (invalid due to the pulse

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width being narrower than the guaranteed minimum of T_{st_pulse}), this will not stop a valid pulse on another state transition input that does meet minimum pulse width.

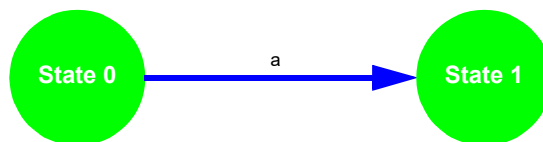


Figure 106: State Transition

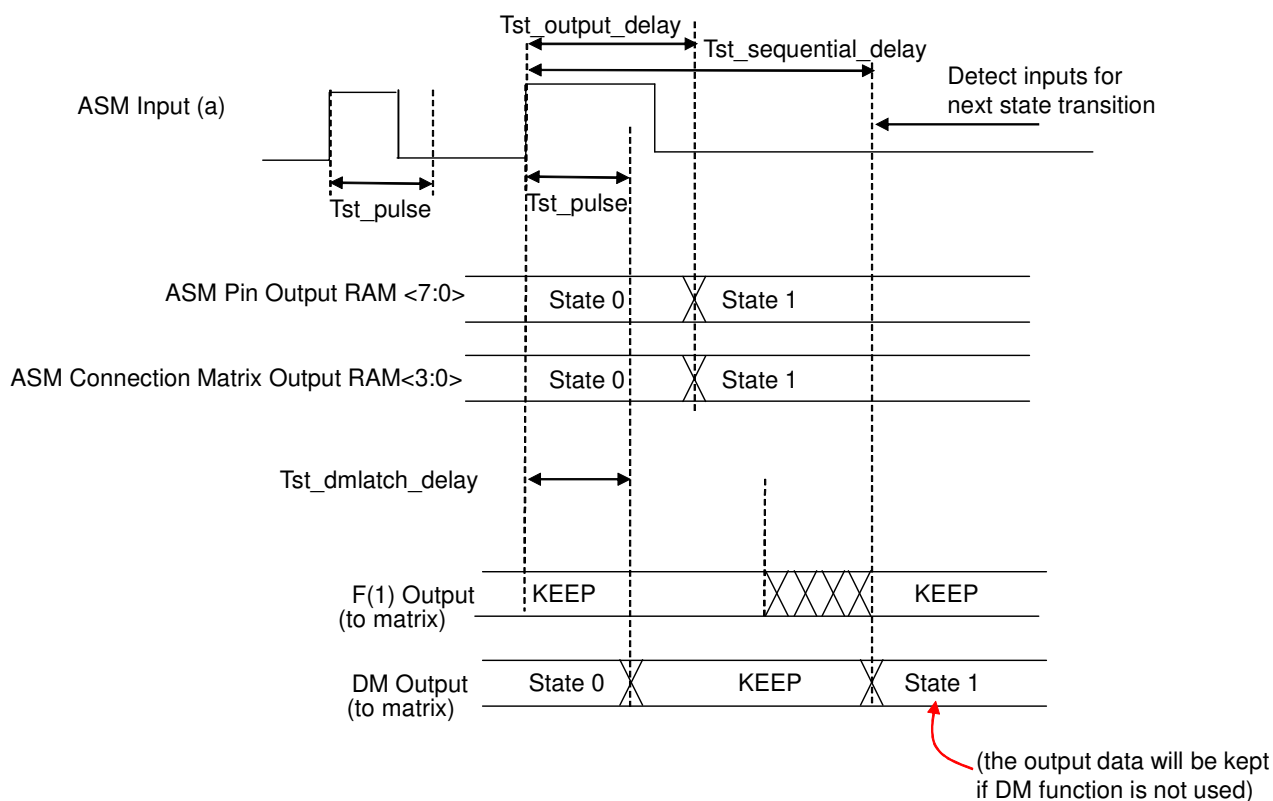


Figure 107: State Transition Pulse Input Timing

14.7.2 State Transition Competing Input Timing

There will be situations where two input signals can be valid inputs that will drive two different state transitions from a given state. In that sense, the two signals are "competing" (signals a and b in Figure 108), and the signal that arrives sooner should drive the state transition that will "win", or drive the state transition. If one signal arrives T_{st_comp} before the other one, it is guaranteed to win, and the state transition that it codes for will be taken, as shown in Figure 109. If the two signals arrive within T_{st_comp} of

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each other, it will be indeterminate which state transition will win, but one of the transitions will take place as long as the winning signal satisfies the pulse width criteria described in the paragraph above, as shown in Figure 110.

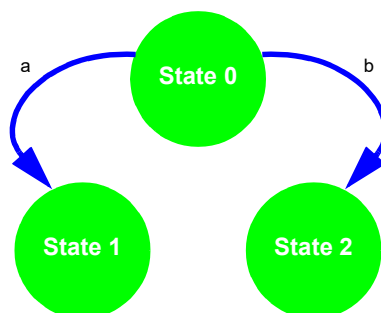


Figure 108: State Transition - Competing Inputs

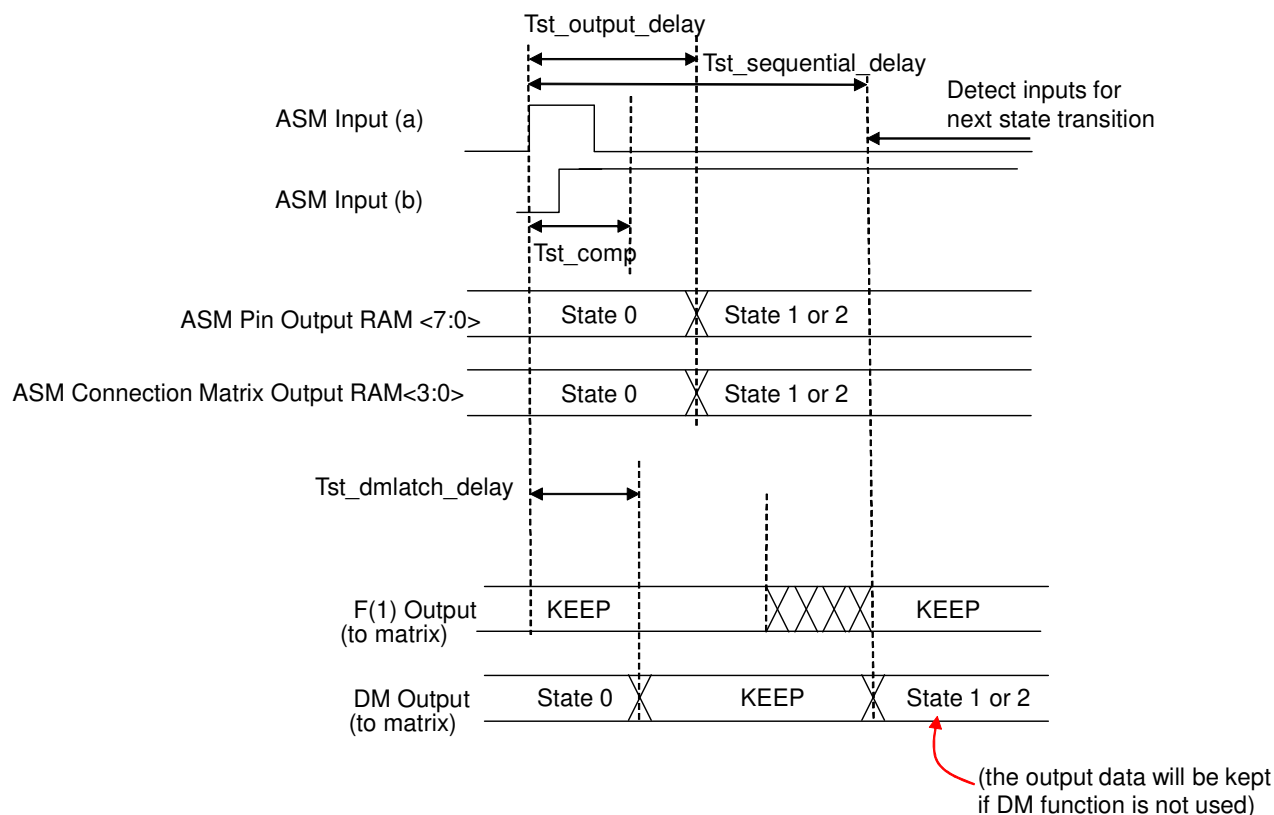


Figure 109: State Transition Timing - Competing Inputs Indeterminate

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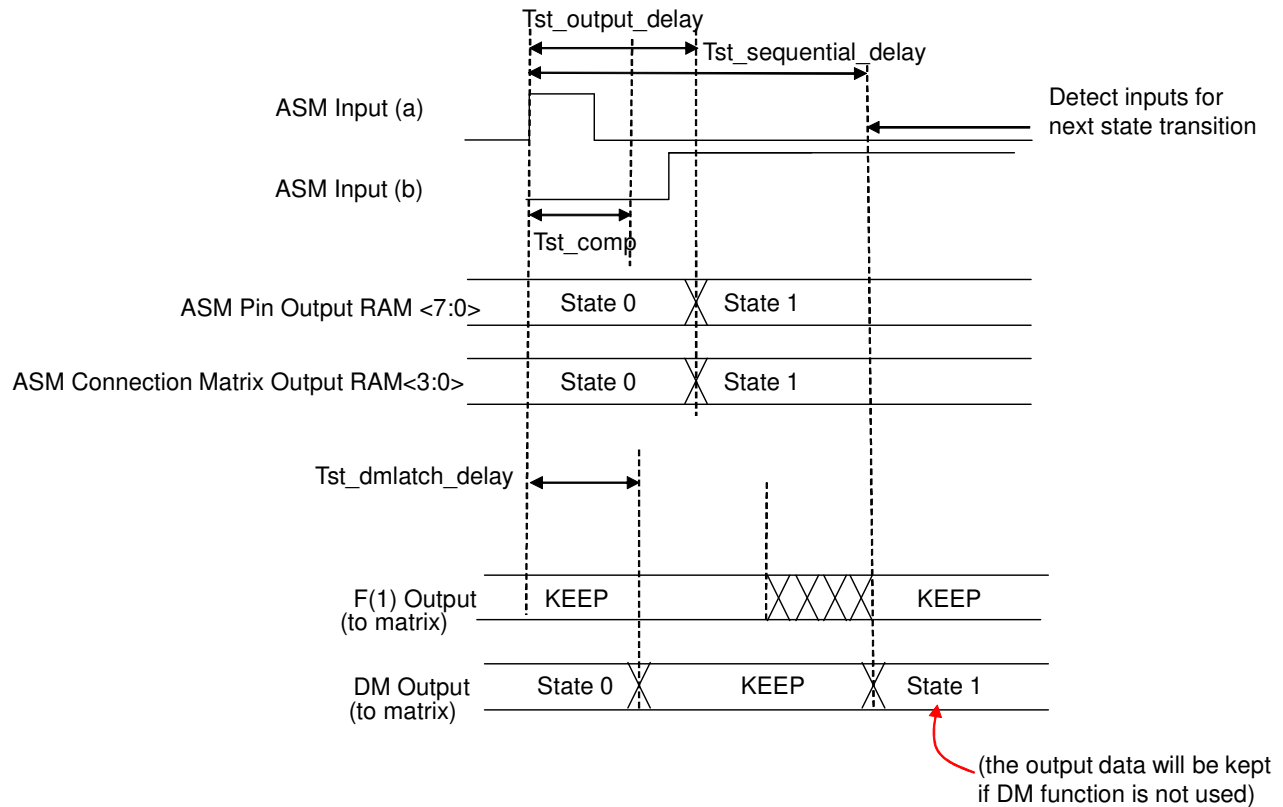


Figure 110: State Transition Timing - Competing Inputs Determinable

14.7.3 ASM State Transition Sequential Timing

It is possible to have a valid input signal for a transition out from a particular state be active before the state is active. If this is the case, the macrocell will only stay in that particular state for Tst_sequential_delay time before making the transition to the next state. An example of this sequential behavior is shown in Figure 111 and the associated timing is shown in Figure 112.

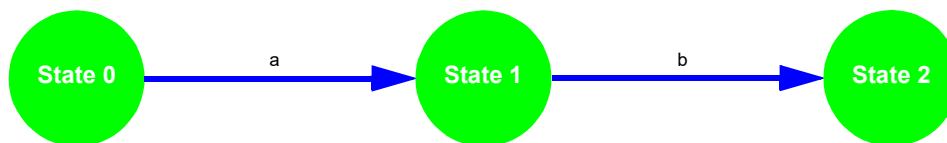


Figure 111: State Transition - Sequential

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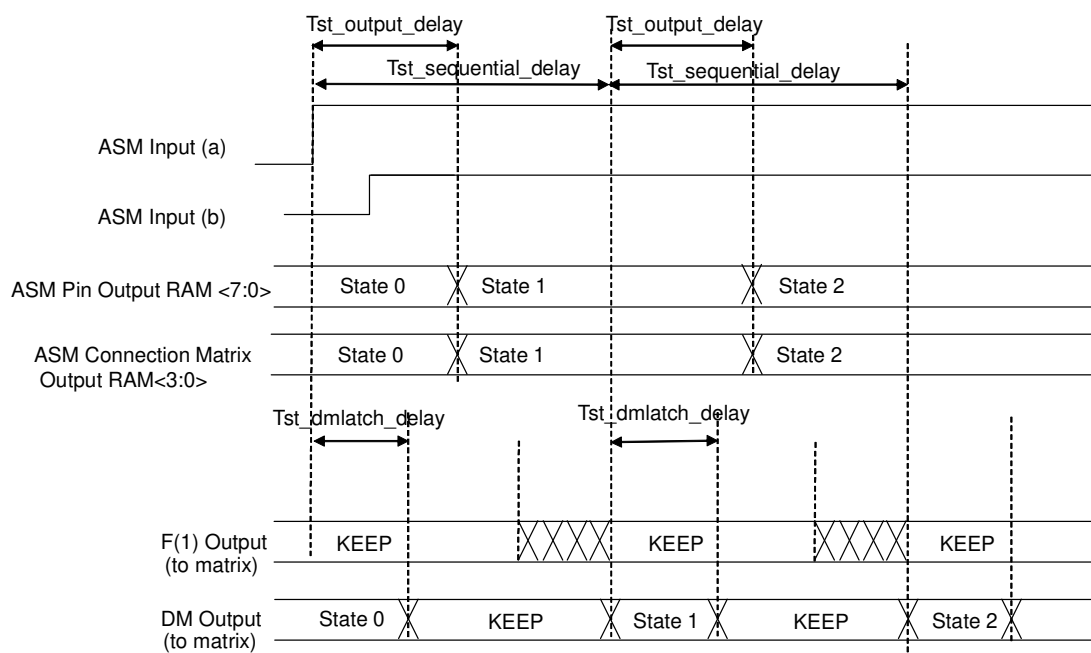


Figure 112: State Transition - Sequential Timing

14.7.4 State Transition Closed Cycling

It is possible to have a closed cycle of state transitions that will run continuously if there are valid inputs that are active at the same time. The rate at which the state transitions will take place is determined by *Tst_sequential_delay*, which determines the timing from one state transition signal that is accepted (and causes a state transition) to the ASM Subsystem being ready for the next input signal. The example shown in [Figure 113](#) involves cycling between two states, but any number of two – twelve states can be included in state transition closed cycling of this nature. [Figure 114](#) shows the associated timing for closed cycling.

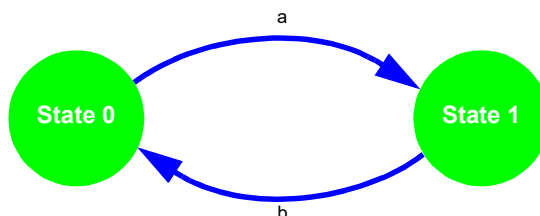


Figure 113: State Transition - Closed Cycling

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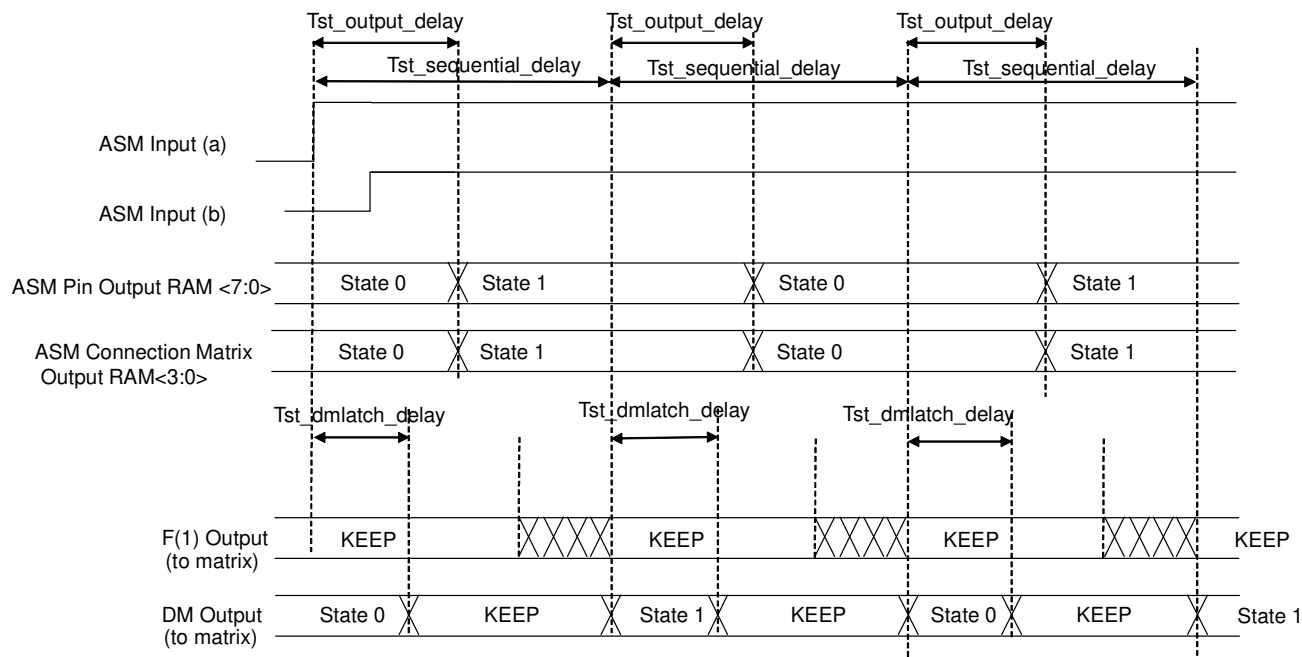


Figure 114: State Transition - Closed Cycling Timing

15 Asynchronous State Machine Macrocell

15.1 ASYNCHRONOUS STATE MACHINE OVERVIEW

The Asynchronous State Machine macrocell is one of several macrocells in the Asynchronous State Machine Subsystem, and its specific role is to hold one active state at a time, and to facilitate user defined state transitions in a fast and power efficient manner. This macrocell is designed to allow the user to create state machines with between 2 to 12 states. When combined with the other macrocells in the ASM subsystem [four Dynamic Memory (DMx_x) macrocells, three Matrix Interface (MIx) macrocells, and one f(1) Computation Macrocell], the user has flexibility to define the available states, the available state transitions, and the input signals (a, b, c ...) that will cause transitions from one state to another state, as shown in the example in Figure 115.

The ASM macrocell has a total of 8 input signal lines, as shown in Figure 116, which come from a combination of three Matrix Interface (MI) macrocell outputs and DM macrocell outputs. Of these 8 inputs, 3 are user selectable inputs coming from the three Matrix Interface (MI) macrocells (one per macrocell) to the ASM macrocell. There are also 4 inputs that come from the DMx_x macrocells (one per macrocell). There is 1 ASM_nReset input that is for driving a state transition in the ASM macrocell to a user defined Initial/Reset state.

The ASM macrocell has a total of 12 output signal lines, as shown in Figure 117, There are a total of 4 output signals which go to the Connections Matrix inputs, and from there can be routed to other internal macrocells or pins. The 4 output signals are user defined for each of the possible 12 states. There are a total of 8 output signals which go directly to the 8 GPOs. The 8 outputs are user defined for each of the possible 12 states.

In using this macrocell, the user must take into consideration the critical timing required on all input and output signals. The timing waveforms and timing specifications for this macrocell are all measured relative to the input signals (which come into the macrocell on the Connection Matrix outputs) and on the outputs from the macrocell (which are direct connections to Connection Matrix inputs). The user must consider any delays from other logic and internal chip connections, including IO delays, to insure that signals are properly processed, and state transitions are deterministic.

It is also important to note that the timing for the ASM Subsystem will change based on changes in temperature and system voltage. The user design that implements a state machine function must take into consideration, and be tolerant of this variation

The GPAK Designer development tools support user designs for the ASM macrocell at both the physical level and logic level. Figure 116 is a representation of the user design at the logical level, and Figure 116 shows the physical resources inside the various macrocells in the ASM Subsystem. To best utilize this subsystem, the user must develop a logical representation of their desired state machine, as well as a physical mapping of the input and outputs required for the desired functionality.

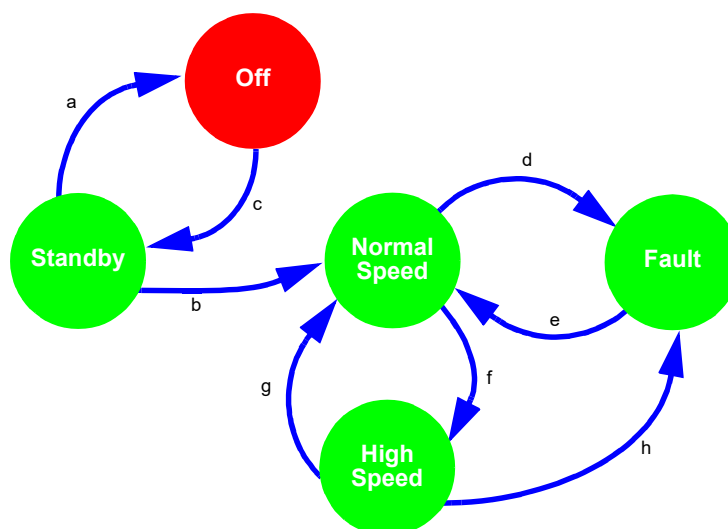


Figure 115: Asynchronous State Machine State Transitions

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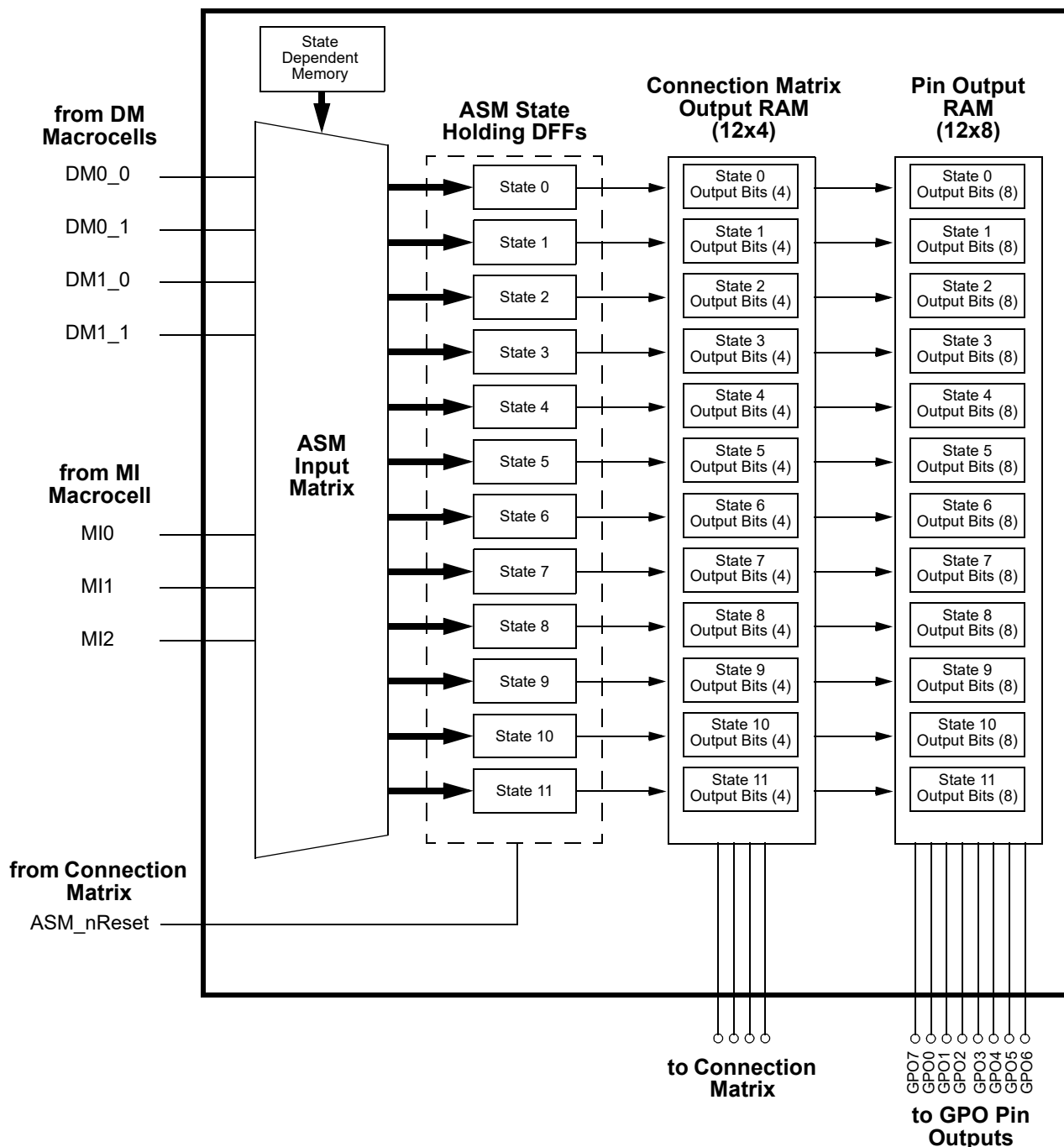


Figure 116: 12 State ASM Macrocell

15.2 ASM MACROCELL INPUT SIGNALS

The ASM macrocell has a total of 8 input signal lines, as shown in Figure 116, which come from a combination of Connection Matrix outputs and DM macrocell outputs.

There are 3 user selectable input signals that come from the MIx macrocells (one per macrocell) to the ASM macrocell. These signals are shown in Figure 118, highlighted in green. Each of these input signals are level sensitive and active high. A high level signal on any of these inputs can be enabled to drive a state transition, depending on the coding in the ASM Input Matrix.

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There are 4 input signals that come from the DM_x_x macrocells (one per macrocell). These signals are shown in Figure 118, highlighted in blue. Each of these input signals are level sensitive and active high. A high level signal on any of these inputs can be enabled to drive a state transition, depending on the coding in the ASM Input Matrix.

There is 1 ASM_nReset input that is for driving a state transition in the ASM macrocell to an user defined Initial/Reset state. This signal is shown in Figure 118, highlighted in yellow. This input signal is level sensitive and active low.

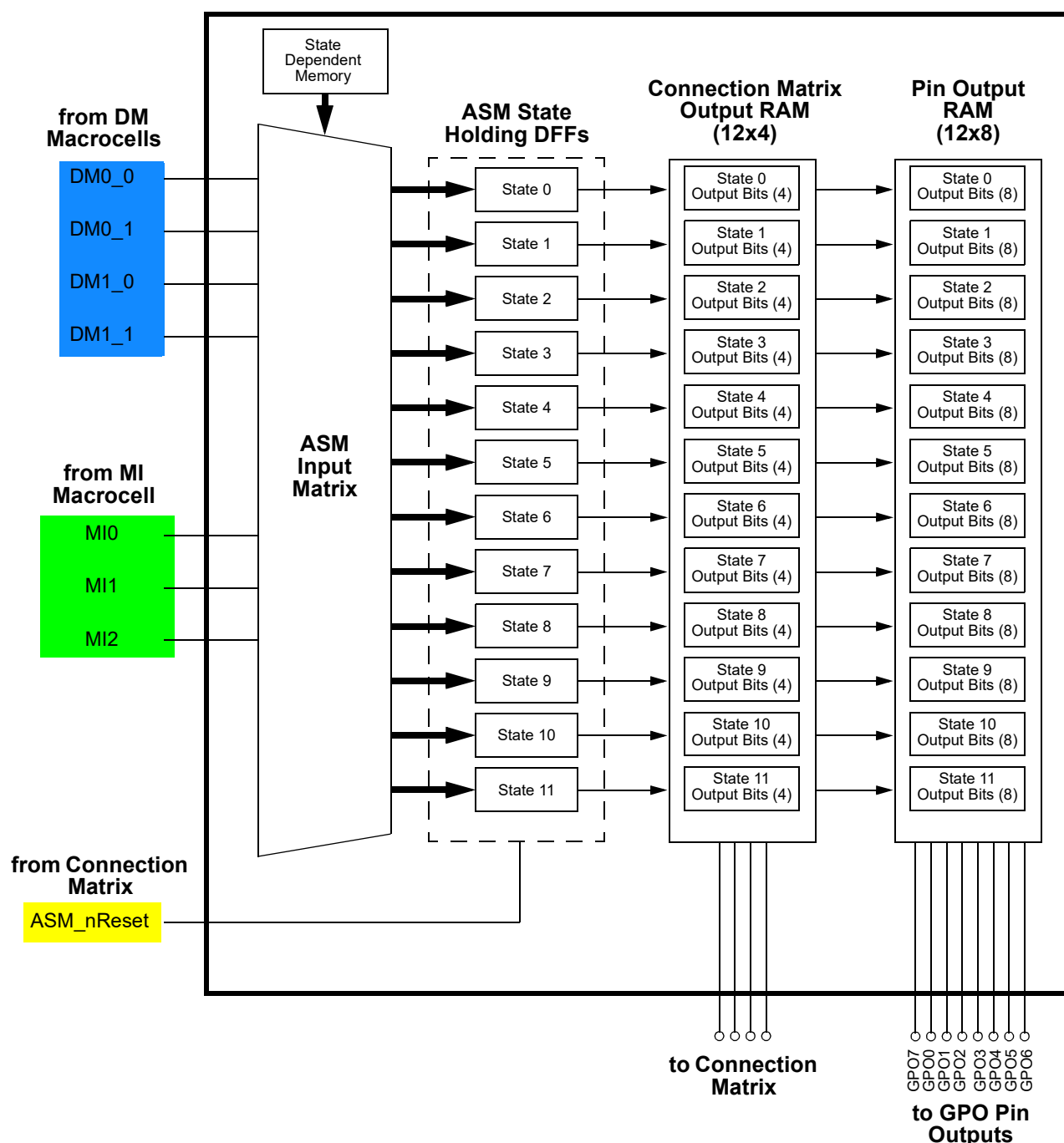


Figure 117: ASM Macrocell Input Signals

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15.2.1 ASM Macrocell Output Signals

The ASM macrocell has a total of 12 output signal lines, as shown in [Figure 118](#).

There are a total of 4 output signals which go to the Connections Matrix inputs, and from there can be routed to other internal macrocells or pins. These signals are shown in [Figure 118](#), highlighted in green. The 4 outputs are user defined for each of the possible 12 states. The user defined values for these outputs is stored in the Connection Matrix Output RAM which is 12 x 4 in size (12 states x 4 outputs), for a total of 48 bits.

There are a total of 8 output signals which go directly to the 8 GPOs. These signals are shown in [Figure 118](#), highlighted in blue. The 8 outputs are user defined for each of the possible 12 states. The user defined values for these outputs is stored in the Connection Matrix Output RAM which is 12 x 8 in size (12 states x 8 outputs), for a total of 96 bits. Each of the 8 GPOs has an internal mux that will either accept a signal from the outputs defined here, or directly from a Connection Matrix output. This mux in each GPO is under control of a register bit.

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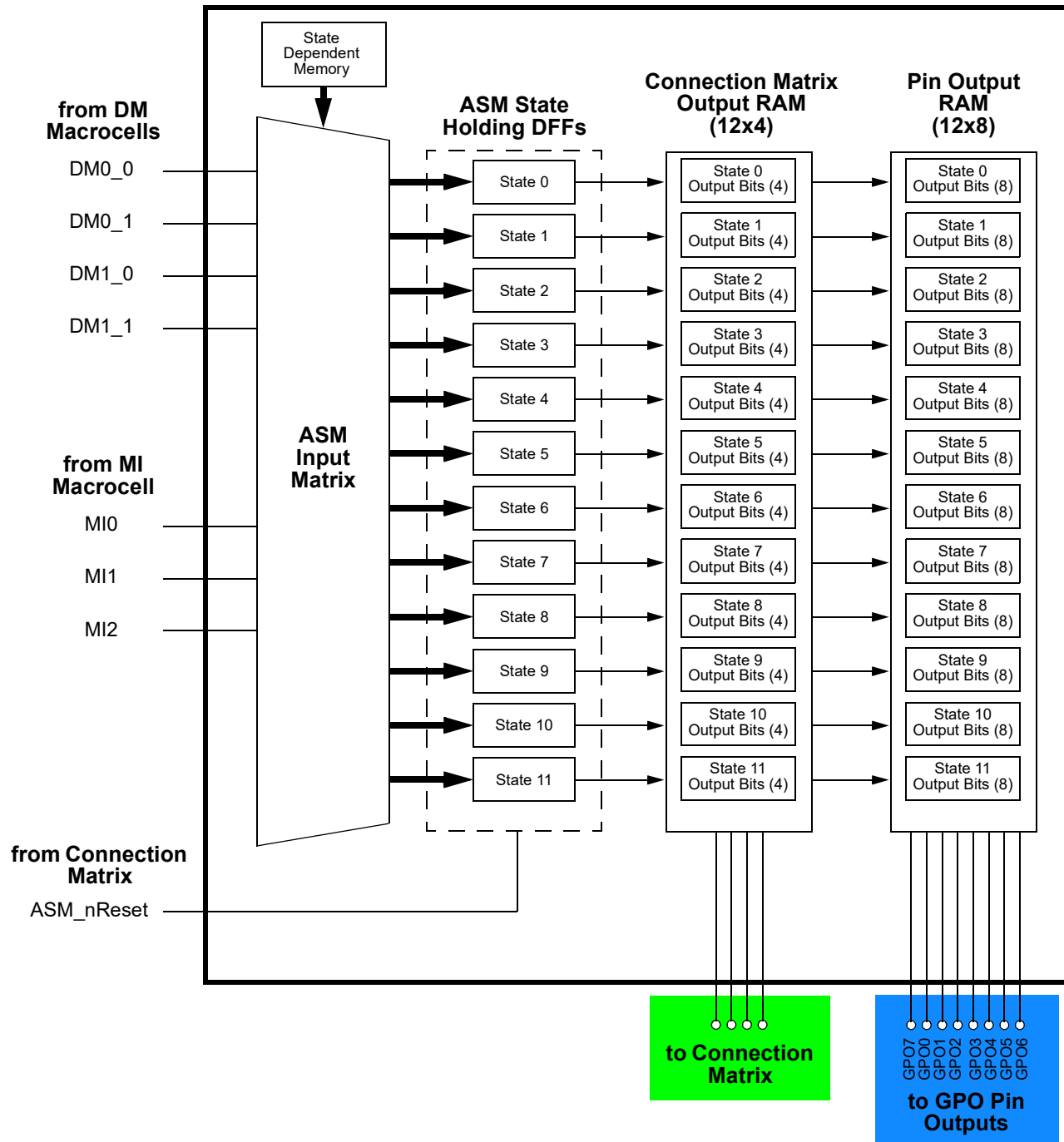


Figure 118: ASM Macrocell Output Signals

15.3 ASM LOGICAL VS. PHYSICAL DESIGN

A successful design with the ASM macrocell must include both the logic level design as well as the physical level design. The GPAK Designer development software support user designs for the ASM macrocell at both the logic level and physical level. The logic level design of the user defined state machine takes place inside the ASM Editor. In the ASM Editor, the user can select and name states, define and name allowed state transitions, define the Initial/Reset state and define the output values for

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the 8 outputs in the Pin Output RAM and 4 outputs in the Connection Matrix Output RAM. The physical level design takes place in the general GPAK Designer window, and here the user makes connections for the sources for ASM input signals, as well as making connections for destinations for ASM output signals.

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16 Dynamic Memory Macrocell

16.1 DYNAMIC MEMORY MACROCELL OVERVIEW

The ASM Sub-System includes several discrete macrocells, including the ASM macrocell, four Dynamic Memory (DM_x_x) macrocells, and one f(1) Computation Macrocell. These macrocells are designed to work as a system for building user defined state machines.

The Dynamic Memory (DM) macrocells have the characteristic that they can change internal configuration characteristics and their connections to the Connection Matrix based on the current state of the State Machine (SM) macrocell. This is accomplished by making different memory register bit settings contained within the macrocell active, based on the current active state of the SM. This allows the user to “repurpose” the resources inside these macrocells to match the circuit needs in various states.

There are two different types of DM macrocells, which vary slightly in the resources available inside the DM macrocell, as well as the connectivity to the Connection Matrix. The SLG46880/81 has a total of four DM macrocells. DM0_0 and DM0_1 have the same structure and resources as each other, and DM1_0 and DM1_1 also have the same structure and resources as each other. The DM0_x macrocells include all the functionality of the DM1_x macrocells, but they also have an output control capability, which is optimized for using the output of this macrocell to drive IO pin output states through the Connection Matrix. The DM CNT included in the DM0_x macrocells has more operating modes than the equivalent structure in the DM1_x macrocells.

Each DM macrocell has a DM_x_x Configuration Register Table, which is a bank of 6 DM_x_x Configuration Registers. The bits in these registers hold user selections which define all functional aspects of the behavior for the DM macrocell, including input connections from the Connection Matrix, DM LUT settings, DM CNT settings and settings of muxing internal to the DM macrocell. The fact that there are 6 Configuration Registers means that there can only be a total of six unique configurations for each DM_x_x macrocell. There are a total of twelve states, which means that the user can either re-use the configuration coded in a particular DM_x_x Operating Mode Register in more than one state, or not use some DM_x_x macrocells in some states.

Each DM macrocell has a DM_x_x Configuration Selection Table, which is a bank of 12 Configuration Selection Registers, one for each state of the State Machine macrocell. The bits in these registers hold the user's selection of DM functional behavior, by mapping to a particular selection in the Configuration Register Table, based on the current state of the State Machine macrocell.

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16.2 DM0_0 AND DM0_1 MACROCELL ARCHITECTURE

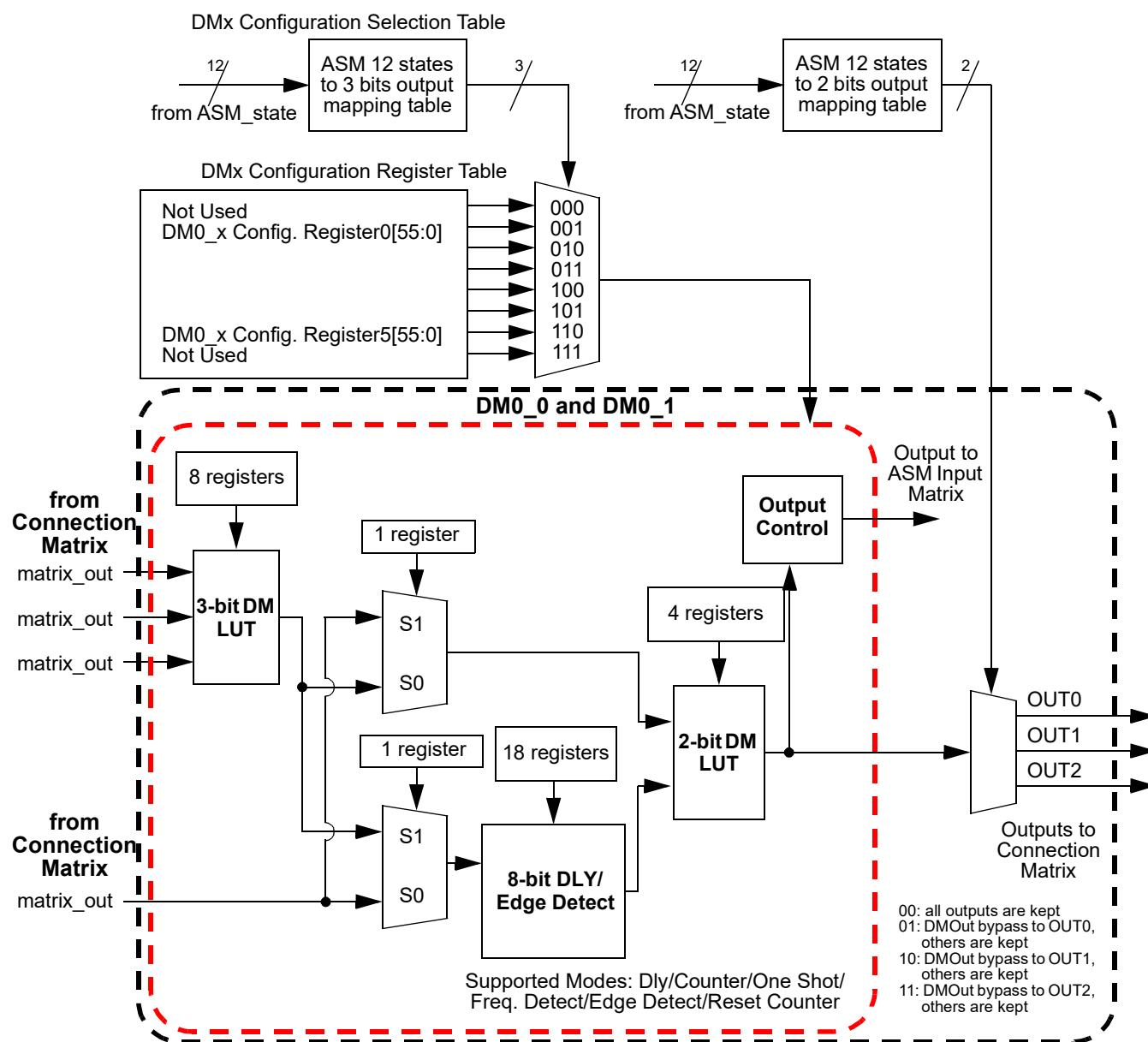


Figure 119: DM0_0/DM0_1

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16.3 DM1_0 AND DM1_1 MACROCELL ARCHITECTURE

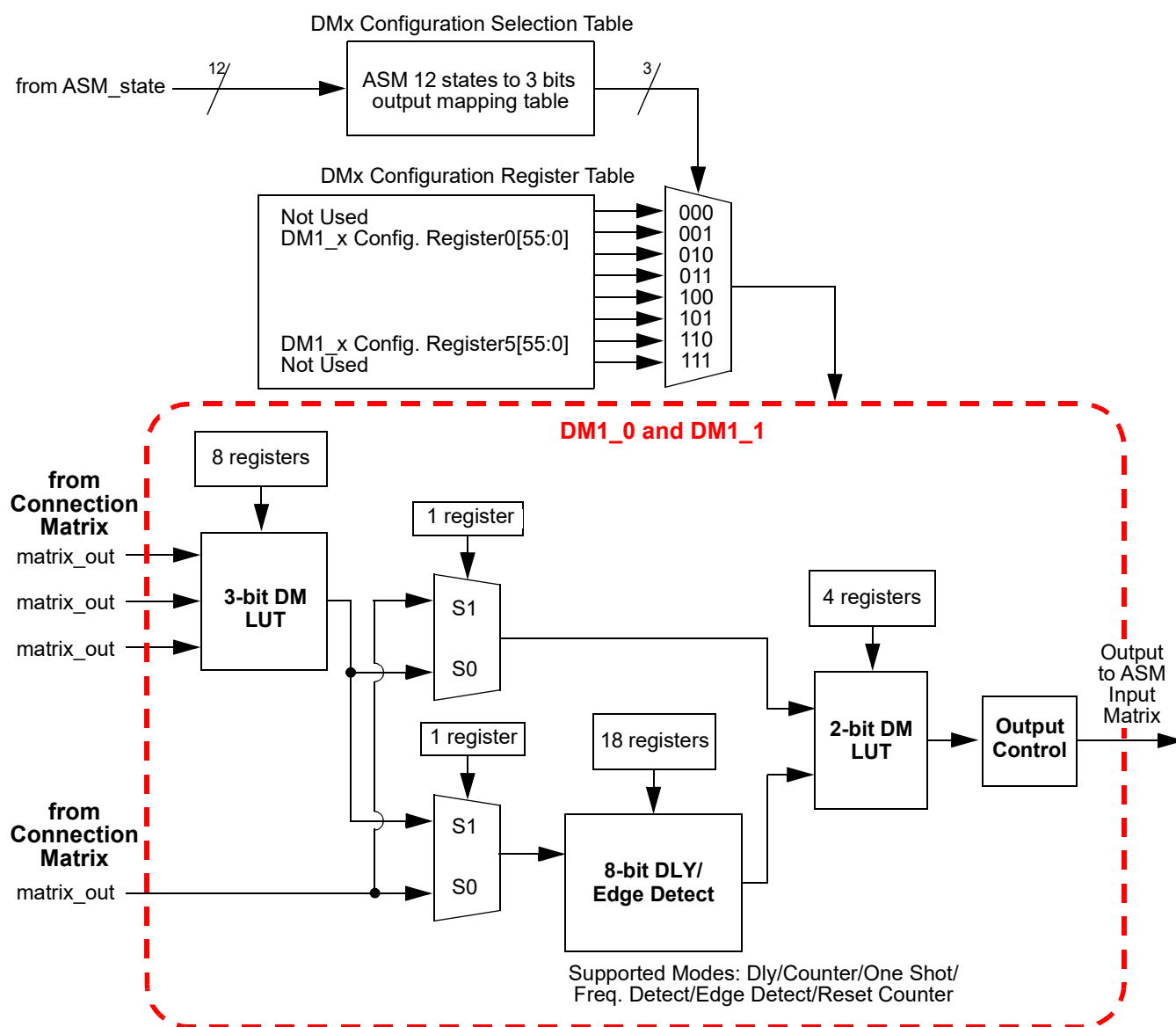


Figure 120: DM1_0/DM1_1

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16.4 DMX_X MACROCELL INPUT SIGNALS

Each DMx_x macrocell has 4 digital input signals coming from the Connection Matrix and from there can be routed to other internal macrocells or pins. These 4 signals are shown in [Figure 121](#) and [Figure 122](#), highlighted in blue.

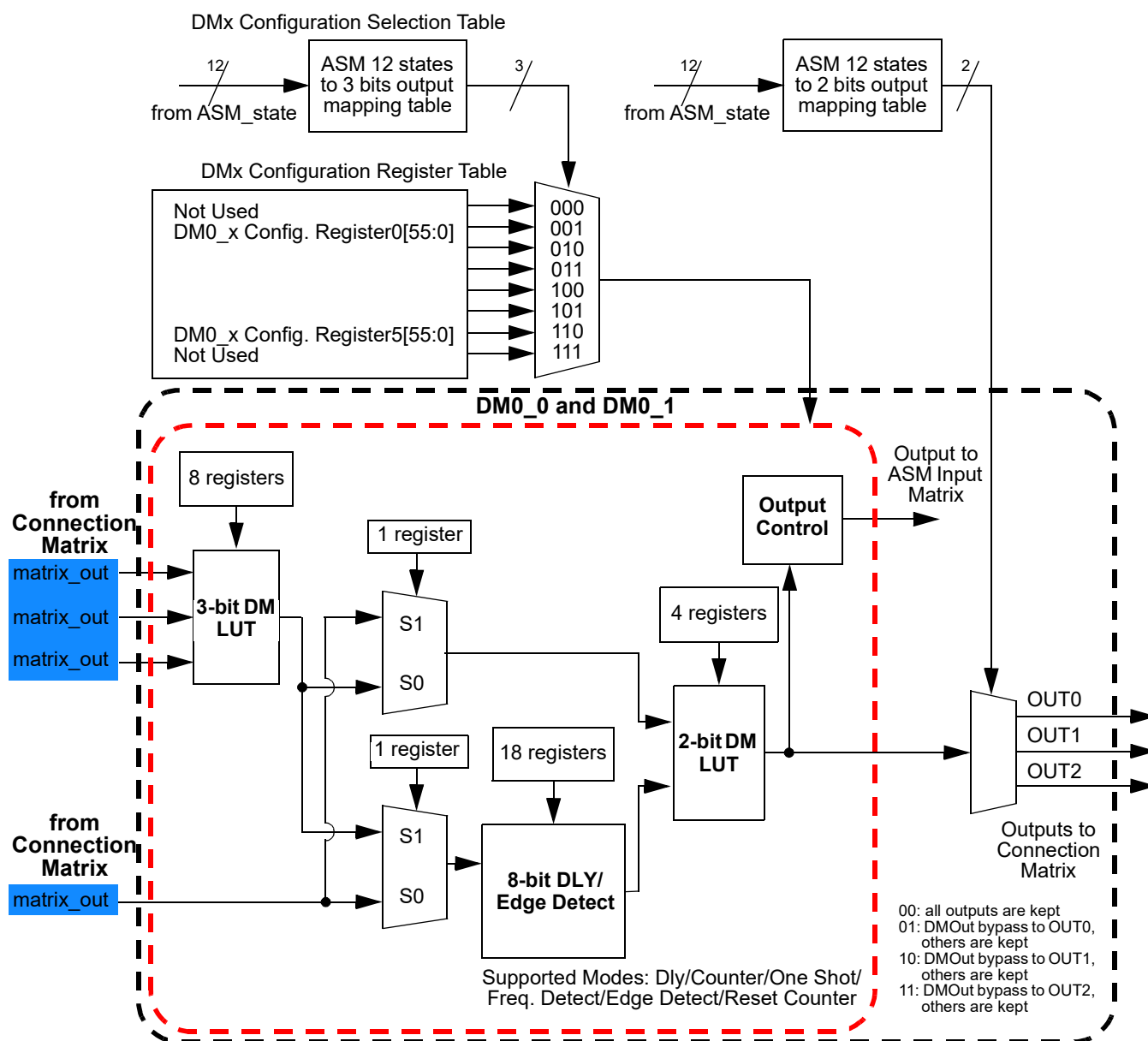


Figure 121: DM0_0/DM0_1 Inputs

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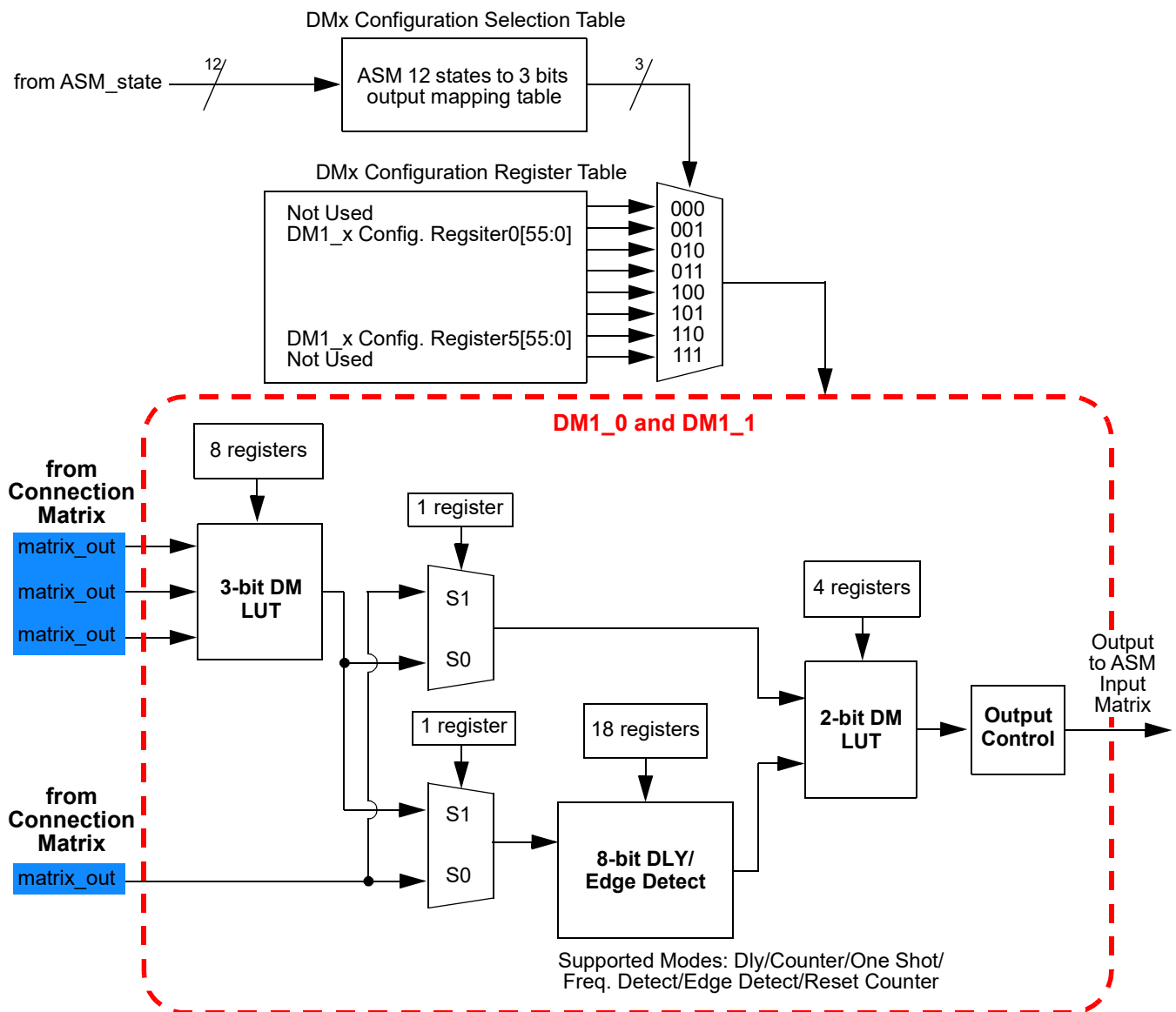


Figure 122: DM1_0/DM1_1 Inputs

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16.5 DMX_X MACROCELL OUTPUT SIGNALS

Each DMx_x macrocell has 1 digital output signal, which goes directly to the ASM Input Matrix inside the ASM Macrocell. This signal is shown in Figure 123 and Figure 124, highlighted in blue.

Additionally, the DM0_0 and DM0_1 Macrocells each have 3 digital output signals which go to the Connection Matrix and from there can be routed to other internal macrocells or pins. These 3 signals are shown in Figure 123, highlighted in green.

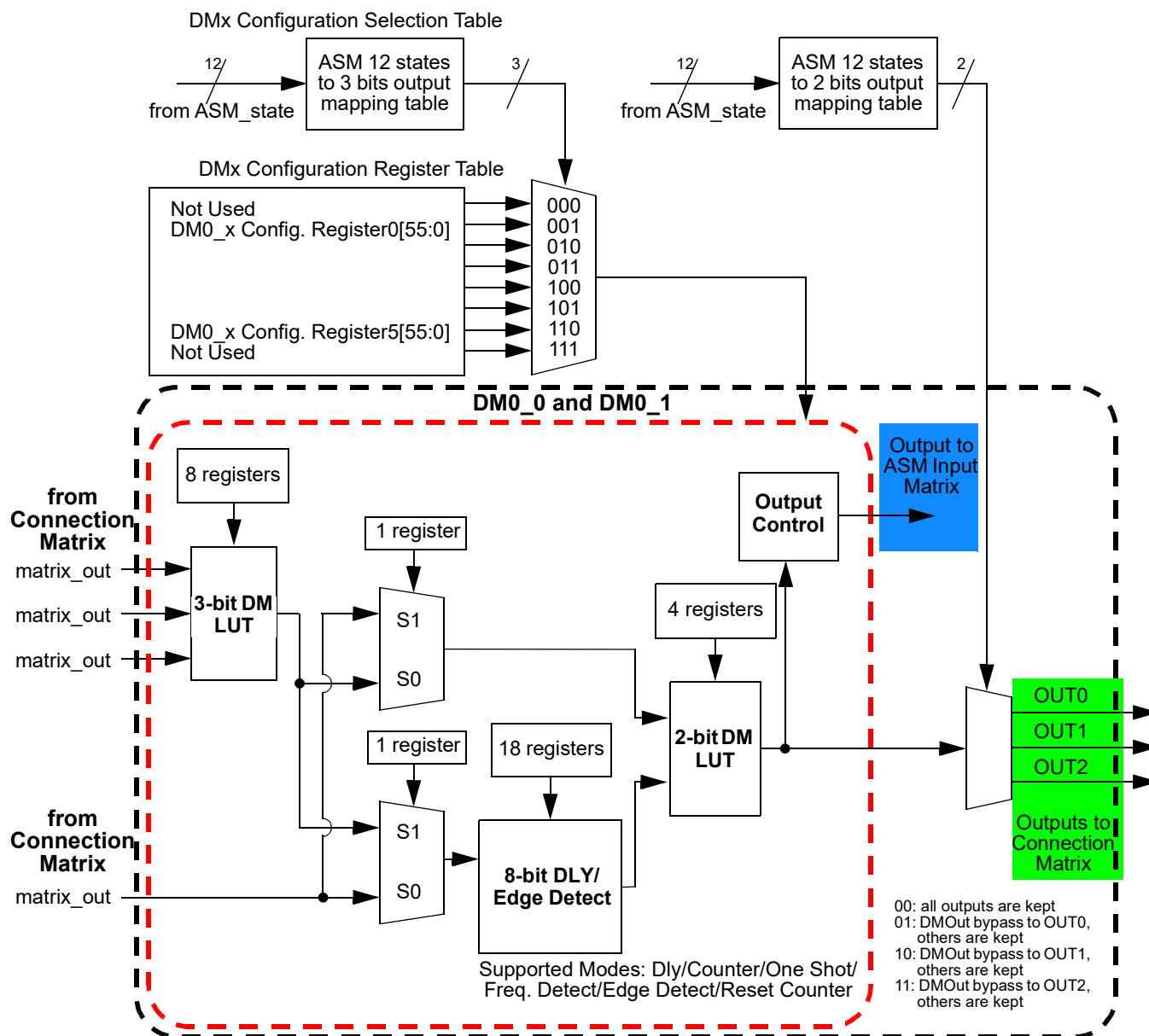


Figure 123: DM0_0/DM0_1 Outputs

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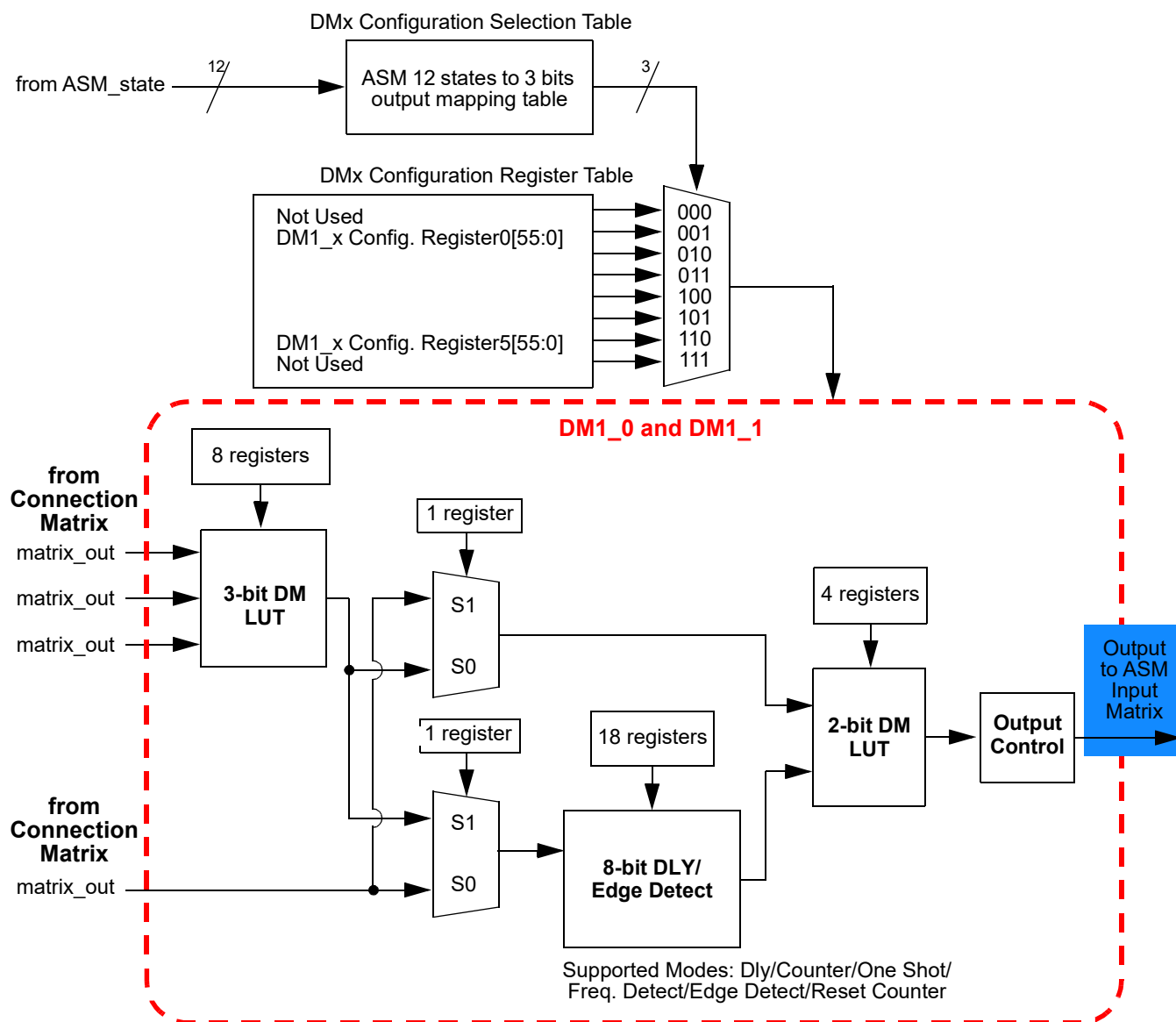


Figure 124: DM1_0/DM1_1 Outputs

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17 f(1) Computation Macrocell

17.1 F(1) COMPUTATION MACROCELL OVERVIEW

The f(1) Computation Macrocell consists of a specialized state machine which is optimized for simple data manipulation activities on single data bit values. The operation of this macrocell can be initiated whenever the ASM Macrocell enters a new state, and can execute a string of up to 12 commands for loading and storing 1 bit data, as well as doing simple logical functions such as ANDs, ORs and XORs.

The only time the f(1) Computation Macrocell will begin to execute instructions is when the ASM Macrocell first enters a new state. At that point in time, the f(1) Computation Macrocell will execute the user selected commands, if any, that are associated with that particular ASM state. When the f(1) Computation Macrocell completes the commands, it will then relinquish control back to the ASM Macrocell. During the time that the f(1) Computation Macrocell is active, there can be no activity in the ASM macrocell (i.e., the ASM Macrocell is prevented from any state transition during the time when the f(1) Macrocell is active).

The f(1) Computation Macrocell has two digital inputs, ASM_nReset and f1_Interrupt. An active signal on either of these inputs will immediately halt any command execution for the f(1) Computation Macrocell, and will immediately relinquish control back to the ASM macrocell.

The f(1) Command Register Table has 4 registers, each of which holds a string of up to 12 commands to run when the f(1) Computation Macrocell is initiated. These 4 registers allow for 4 different command strings that the user can choose from. The f(1) Command Selection Table has 12 entries (one per ASM state), which allow the user to select which of the f(1) Command Registers will be used upon entry into each state. The user can also select that no commands are used in a particular state (one of the selection options for each entry in the f(1) Command Selection Table), in which case the f(1) Computation Macrocell is completely bypassed upon entry to that particular state.

There are a total of 8 analog inputs coming from various pins which can be muxed into the positive input for the f(1) Analog Comparator inside the f(1) Computation Macrocell. The f(1) Analog Comparator can be re-programmed for analog input source and negative input reference settings. The user selections for both positive input signal and negative reference are included as part of the information stored in the f(1) Command Register Table. This allows the user to make different analog measurements that are state dependent in their analog sources and reference settings.

This macrocell also includes a f(1) Memory Stack, which is 1 bit wide by 16 deep memory which is organized as a stack, and can serve as a data source or data destination for the commands running on the macrocell. LOADx commands will push data down into the stack. OUTx commands will pop data off the stack, and send to the contents of the Top-Of-Stack to one of three outputs of the f(1) macrocell to the Connection Matrix. The contents of this memory are not changed during ASM state transitions, and are only changed by the commands running inside the f(1) Computation Macrocell itself. The initial memory stack values are loaded from registers [3279:3264].

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17.2 F(1) COMPUTATION MACROCELL ARCHITECTURE

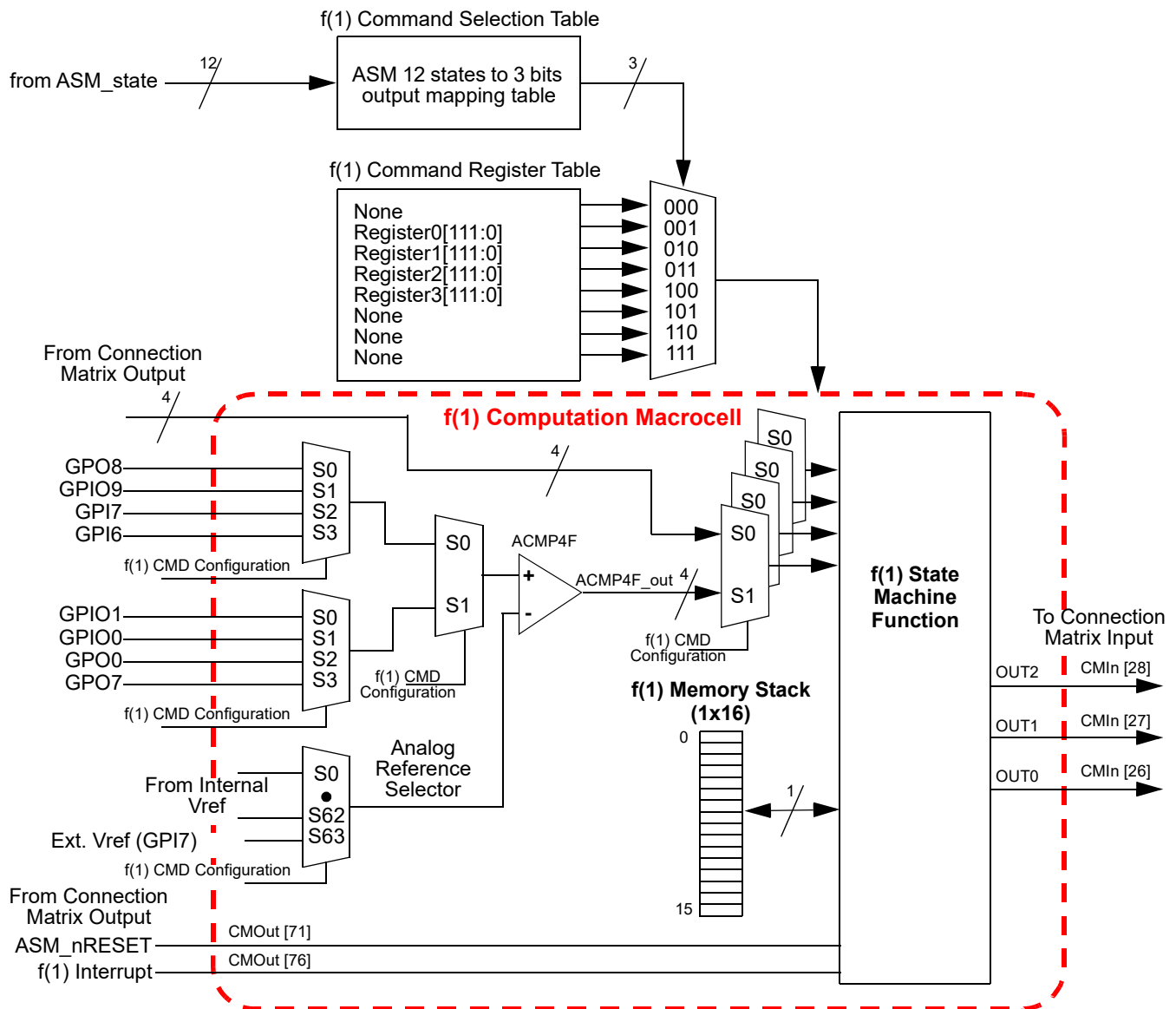


Figure 125: f(1) Computation Macrocell Architecture

17.3 F(1) COMPUTATION MACROCELL INPUT SIGNALS

The f(1) Computation Macrocell has 6 digital input signals, ASM_nReset, f1_Interrupt, and four inputs from Connection Matrix outputs. An active signal on either of the first 2 inputs will immediately halt any command execution for the f(1) Computation Macrocell, and will immediately relinquish control back to the ASM macrocell. The ASM_nReset is a level sensitive signal, and active low. The f1_Interrupt is a level sensitive signal, and active high. These signals are shown in Figure 126, highlighted in blue. Also there are 4 digital inputs from the Connection Matrix, which can be routed to any Connection Matrix outputs from the f(1) Commands. These signals are shown on Figure 126 highlighted in yellow.

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There are a total of 8 analog inputs coming from various pins which can be muxed into the positive input for the f(1) Analog Comparator inside the f(1) Computation Macrocell. These signals are shown in [Figure 102](#), highlighted in green. The f(1) Analog Comparator can be re-programmed for analog input source and negative input reference settings with settings inside the LOADx command. The user selections for both positive input signal and negative reference are included as part of the information stored in the f(1) Command Register Table. This allows the user to make different analog measurements that are state dependent in their analog sources and reference settings.

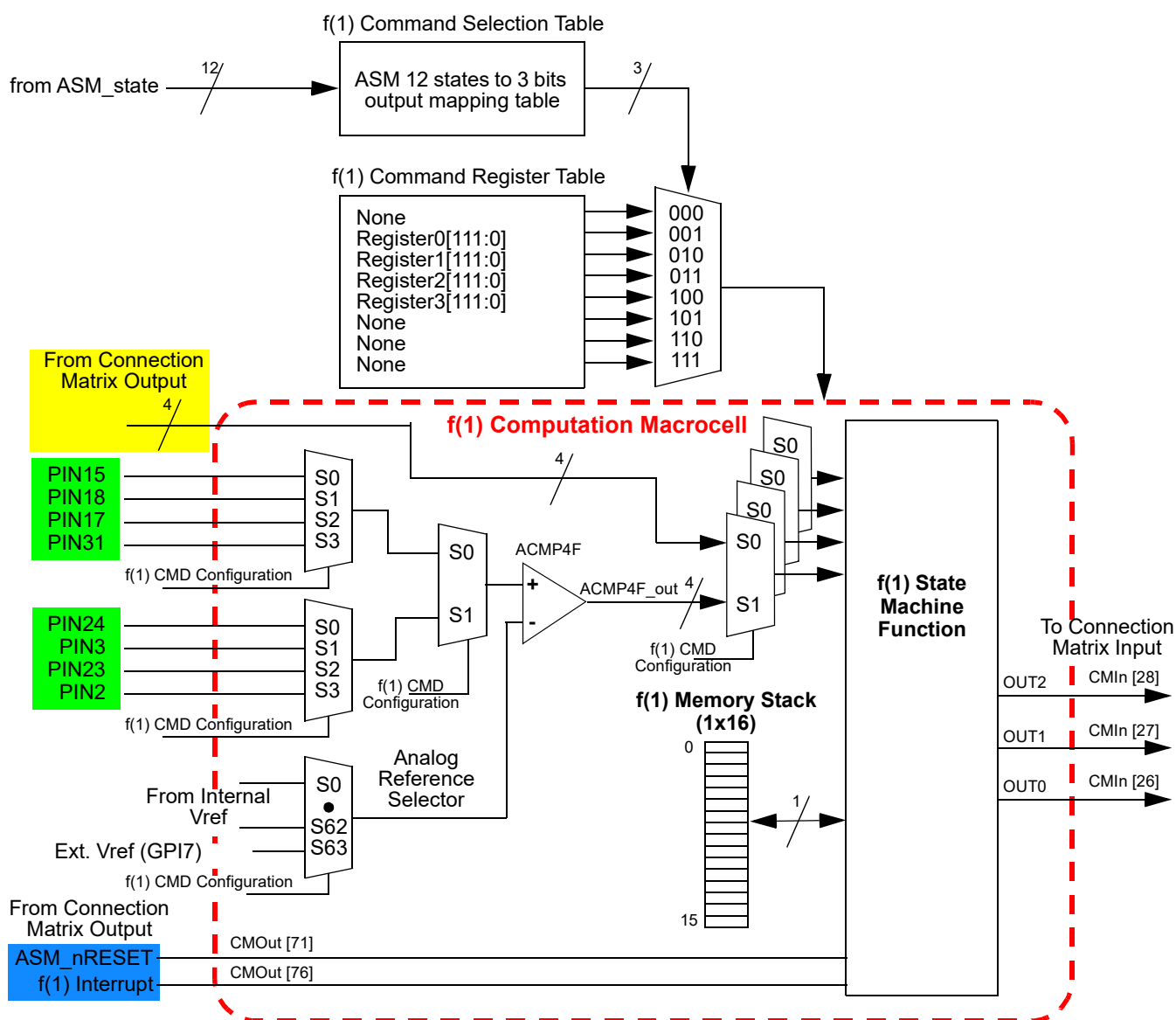


Figure 126: f(1) Computation Macrocell Input Signals

The f(1) interrupt signal comes from Connection Matrix Output. The high level f(1) interrupt signal forces the f(1) computation macrocell to immediately finish command execution and return control to the ASM similar to the END command. It is possible to load initial memory stack with the f(1) interrupt signal when register [3766] is high.

The ASM_nRESET low level signal forces the ASM macrocell and the f(1) computation macrocell to an initial state and an initial memory stack value.

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17.4 f(1) COMPUTATION MACROCELL OUTPUT SIGNALS

The f(1) Computation Macrocell has 3 digital output signals that go to the Connection Matrix, and from there can be routed to other internal macrocells or pins. These signals are shown in Figure 127, highlighted in blue. The state of these output signals are under user control, and are changed based on the Output commands.

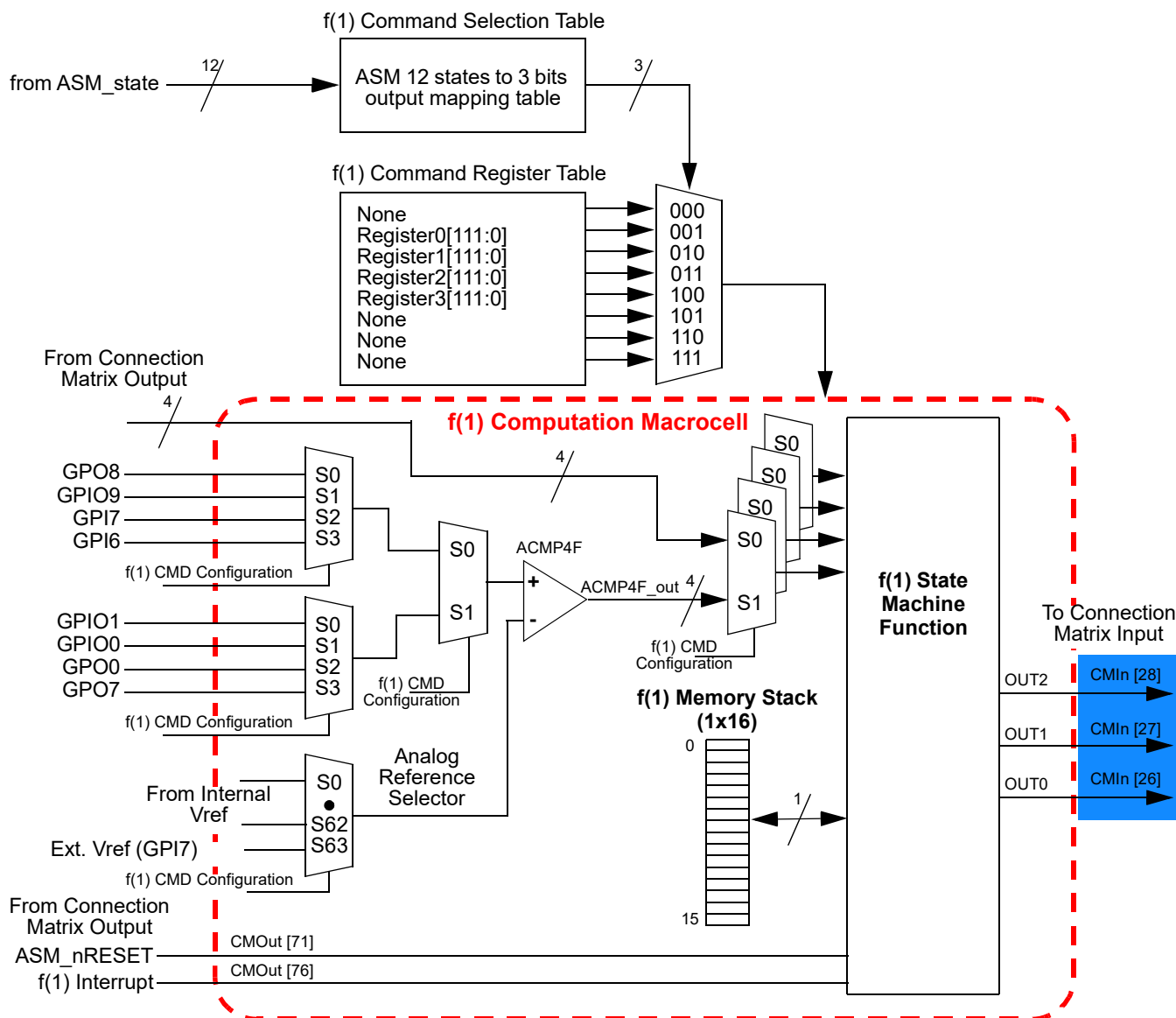


Figure 127: f(1) Computation Macrocell Output Signals

17.5 f(1) COMMAND REGISTERS

The f(1) Computation Macrocell consists of a specialized state machine which is optimized for simple data manipulation activities on single data bit values. The f(1) Computation Macrocell must be used for accessing the 8:1 analog multiplexer and associated analog comparator. The f(1) is also useful for storing state independent values, looping operations such as periodic signal checks, and for performing simple repetitive logic functions.

The operation of this macrocell can be initiated whenever the ASM Macrocell enters a new state, and can execute a string of up to 12 commands for loading and storing 1 bit data, as well as doing simple logical functions such as ANDs, ORs and XORs.

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The f(1) Command Register Table has 4 registers, therefore 4 independent f(1) functions can be defined. Each state of the ASM can access one of the four f(1) configurable instances of the f(1).

Each of the four f(1) configurations may contain up to 12 commands which run when the f(1) Computation Macrocell is initiated. The list of available commands is as follows:

Command	Command Name	Command Description
0000	LOAD1	Loads a one bit value to the top of the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in location 15 is lost. The data loaded by Load 1 command is defined in the Load 1 register, which defines where the value is to be loaded from such as a pin, the f(1) comparator, etc.
0001	LOAD2	Loads a one bit value to the top of the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in location 15 is lost. The data loaded by Load 2 command is defined in the Load 2 register, which defines where the value is to be loaded from such as a pin, the f(1) comparator, etc.
0010	LOAD3	Loads a one bit value to the top of the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in location 15 is lost. The data loaded by Load 3 command is defined in the Load 3 register, which defines where the value is to be loaded from such as a pin, the f(1) comparator, etc.
0011	LOAD4	Loads a one bit value to the top of the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in location 15 is lost. The data loaded by Load 4 command is defined in the Load 4 register, which defines where the value is to be loaded from such as a pin, the f(1) comparator, etc.
0100	AND	Performs a logical AND to the top two locations in the memory stack (location 0 and location 1). During execution of this command, the two values in the top two stack locations are deleted, and the logical AND result is pushed on the top of stack (location 0). In the process, all other values in the stack are shifted up 1 location, and a 0 is loaded in location 15.
0101	OR	Performs a logical OR to the top two locations in the memory stack (location 0 and location 1). During execution of this command, the two values in the top two stack locations are deleted, and the logical OR result is pushed on the top of stack (location 0). In the process, all other values in the stack are shifted up 1 location, and a 0 is loaded in location 15.
0110	XOR	Performs a logical XOR to the top two locations in the memory stack (location 0 and location 1). During execution of this command, the two values in the top two stack locations are deleted, and the logical XOR result is pushed on the top of stack (location 0). In the process, all other values in the stack are shifted up 1 location, and a 0 is loaded in location 15.
0111	INV	Performs a logical Invert (INV) to the top location in the memory stack (location 0). During execution of this command, the value in the top stack location is deleted, and the logical INV result is pushed on the top of stack. There is no effect on all other values in the stack.
1000	PUSH0	Pushes a 0 into the top location in the memory stack (location 0). During the execution of this command, all other values are shifted down 1 location, and the value in the location 15 is lost.
1001	POP	During execution of this command, values in the stack are shifted up 1 location, and a 0 is loaded in location 15.
1010	DELAY	The execution of commands by the f(1) Computation microcell is delayed by a period of time defined in the configuration of the delay function. Once this time period is completed, the next f(1) instruction will execute.
1011	LOOP with DELAY	If the top location in the memory stack (location 0) is equal to 0, the command execution in the f(1) Macrocell is delayed by a period of time defined in the configuration of the delay function and then executes the f(1) sequence at the specified jump location. If the top location in the memory stack (location 0) is equal to 1, the f(1) Macrocell proceeds with execution of the next command in sequence.
1100	OUT1	Outputs the top location in the memory stack (location 0) on matrix input OUT1
1101	OUT2	Outputs the top location in the memory stack (location 0) on matrix input OUT2
1110	OUT3	Outputs the top location in the memory stack (location 0) on matrix input OUT3
1111	END	Immediately ends execution of commands by f(1) Macrocell, and control is returned to ASM Macrocell

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These commands form a machine level language that may be configured within GPAK Designer software using a simple GUI, as opposed to using a typical text editor. See application examples below:

Example #1: Sensor Application showing the command sequence for a potential use case of the f(1) Macrocell.

f(1) Command Sequence	Command	Description
1	INV	Change Top Memory location from 0 → 1
2	OUT1	Output a 1 to a pin defined by OUT1 register. This can be used to turn on or bias an external sensor
3	DELAY	Wait for a time defined by DELAY register. This can be used to allow sensor to settle.
4	LOAD1	Capture the output of f(1) ACMP from an analog pin connected to the sensor as defined by the LOAD1 register.
5	LOAD2	Capture the output of a pin as defined by the LOAD2 register. This can be used to check a power good signal
6	AND	Logically AND the top two values of the 1x16 memory that were just loaded with LOAD1 and LOAD2
7	OUT2	Output the result of sensor output AND power good signal for a control decision for the ASM
8	END	ASM can now act on OUT2 signal

Example #2: Power Good Application showing the command sequence for a potential use case of the f(1) Macrocell.

f(1) Command Sequence	Command	Description
1	LOAD1	Capture the output of f(1) ACMP from an analog pin connected to power rail 1 as defined by the LOAD1 register. A "1" means that power is good on power rail 1.
2	LOAD2	Capture the output of f(1) ACMP from an analog pin connected to power rail 2 as defined by the LOAD2 register. A "1" means that power is good on power rail 2.
3	LOAD3	Capture the output of f(1) ACMP from an analog pin connected to power rail 3 as defined by the LOAD3 register. A "1" means that power is good on power rail 3.
4	LOAD4	Capture the output of f(1) ACMP from an analog pin connected to power rail 4 as defined by the LOAD4 register. A "1" means that power is good on power rail 4.
5	AND	LOAD4 result ANDs with LOAD3 result (LOAD4 & LOAD3). This combines two of the Power Good signals.
6	AND	(LOAD4 & LOAD3) & LOAD2. This combines three of the Power Good signals.
7	AND	((LOAD4 & LOAD3) & LOAD2) & LOAD1. This combines four of the Power Good signals
8	OUT1	Output the Master Power Good signal to a location defined by the OUT1 register

The LOADx, OUTx, and DELAY/DELAY LOOP commands are required to be defined before using them.

17.5.1 Delay Command Configuration Bits

The Delay Command is defined by 12 bits. Each of the 4 instances of the f(1) command can configure a new value for the delays. However, the DELAY and DELAY LOOP use the same configuration data so these two delays must be identical.

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Delay Configuration Bits

Configuration Bits	Description	
8 Bits	Delay Count (0 .. 255)	
3 Bits	Delay Clock	
	000	OSC2
	001	OSC2/4
	010	OSC1
	011	OSC1/8
	100	OSC1/64
	101	OSC0
	110	OSC0/8
	111	OSC0/64
1 Bit	ACMP Shutdown during Delay	ACMP is shutdown after data Load

17.5.2 LOADx Command Configuration Bits

There are two types of load configuration schemes. One method defines loading from one of eight analog pins via the f(1) ACMP. The other method defines loading from any of the matrix outputs connected to digital input pins, logic macrocells, ASM outputs, oscillators, etc. LOAD1 and LOAD2 can only be configured for 4 analog input pins. LOAD3 and LOAD 4 can be configured for the remaining 4 analog input pins.

LOAD1, 2, 3, 4 Command from f(1) ACMP or Matrix connection. A single bit determines if LOADx takes its value from the f(1) analog comparator or from a matrix output.

Configuration Bit	Description	
1 Bit	LOAD1 Connection	0: Matrix, 1: f(1) ACMP
1 Bit	LOAD2 Connection	0: Matrix, 1: f(1) ACMP
1 Bit	LOAD3 Connection	0: Matrix, 1: f(1) ACMP
1 Bit	LOAD4 Connection	0: Matrix, 1: f(1) ACMP

LOAD1 and LOAD2 Configuration Bits f(1) ACMP input

Configuration Bits	Description	
6 Bits	ACMP Voltage Reference value	000000 is 32 mV, 111111 is 2.048 V
2 Bits	One of four analog input pins	
	00	Analog pin 1
	01	Analog pin 2
	10	Analog pin 3
	11	Analog pin 4
1 Bit	Reserved	

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LOAD3 and LOAD4 Configuration Bits f(1) ACMP input

Configuration Bits	Description	
6 Bits	ACMP Voltage Reference value	000000 is 32 mV, 111111 is 2.048 V
2 Bits	One of four analog input pins	
	00	Analog pin 5
	01	Analog pin 6
	10	Analog pin 7
	11	Analog pin 8
1 Bit	Reserved	

17.5.3 OUTx Command Configuration Bits

Each f(1) instance can be configured to output to up to three matrix inputs using the OUTx command. OUT1, 2, & 3's initial condition is two bit selectable. Each time the ASM changes state, the initial condition of the f(1) is re-loaded.

Configuration Bits	Description	
00	OUTx equals previous OUTx	
01	OUTx is 0	
10	OUTx is 1	
11	none (high Z)	

The only time the f(1) Computation Macrocell will run is when ASM macrocell first enters a new state. At that point in time, the f(1) Computation Macrocell will execute the user selected commands (based on user selection), and then relinquish control back to the ASM macrocell. During the time that the f(1) Computation Macrocell is active, there can be no activity in the ASM macrocell (i.e. no ASM macrocell state change).

The f(1) Computation Macrocell has two digital inputs, ASM_nReset and f1_Interrupt. An active signal on either of these inputs will immediately halt any command execution for the f(1) Computation Macrocell, and will immediately relinquish control back to the ASM macrocell.

17.5.4 LOOP WITH DELAY Configuration Bits

There is one conditional command LOOP WITH DELAY in f(1) computation macrocell. The order of the f(1) command execution depends on the LOOP WITH DELAY usage and its configuration. If top value in 1 x 16 memory stack is 0, then the f(1) is delayed according to the configuration of the f(1) delay function and the f(1) command sequence starting from the location defined by 4-bit register is executed, otherwise f(1) continues to execute commands one by one.

Configuration Bits	Description	
4 bits	Next command location after LOOP WITH DELAY command	0000 is the first command in the f(1) sequence, 1011 is the twelfth last command in the f(1) sequence

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Example #3: Rising Edge Deglitch Application showing the command sequence for a potential use case of the f(1) Macrocell.

f(1) Command Sequence	Command	Description
1	LOAD1	Capture the output of a pin or any macrocell output defined by the LOAD1 register.
2	DELAY	Delay for the time defined by configuration register.
3	LOAD1	Capture the output of a pin or any macrocell output defined by the LOAD1 register.
4	DELAY	Delay for time defined by configuration register.
5	LOAD1	Capture the output of a pin or any macrocell output defined by the LOAD1 register.
6	AND	Logically AND the top two values of the 1x16 memory stack, that was loaded before. (LOAD1 & LOAD1 after Delay).
7	AND	(LOAD1 & LOAD1 after Delay) & LOAD1 after double Delay.
8	LOOP WITH DELAY	If the calculated value is 0, then start to execute first command once again, which is defined by the configuration bits. Otherwise f(1) continues to execute next command (command 9).
9	OUT1	Output the result value, which is a high level.
10	END	ASM can act on any other signals.

The following flowchart shows the f(1) rising edge deglitch based on three samples application.

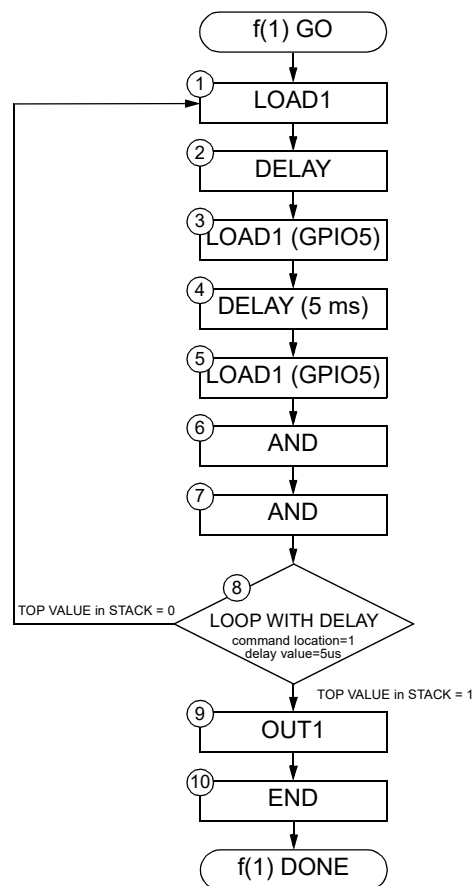


Figure 128: f(1) Flowchart for Rising Edge Deglitch

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Example #4: Average Function for Captured Data, showing the command sequence for a potential use case of the f(1) Macrocell. This function requires two f(1) Macrocell command sequences to implement

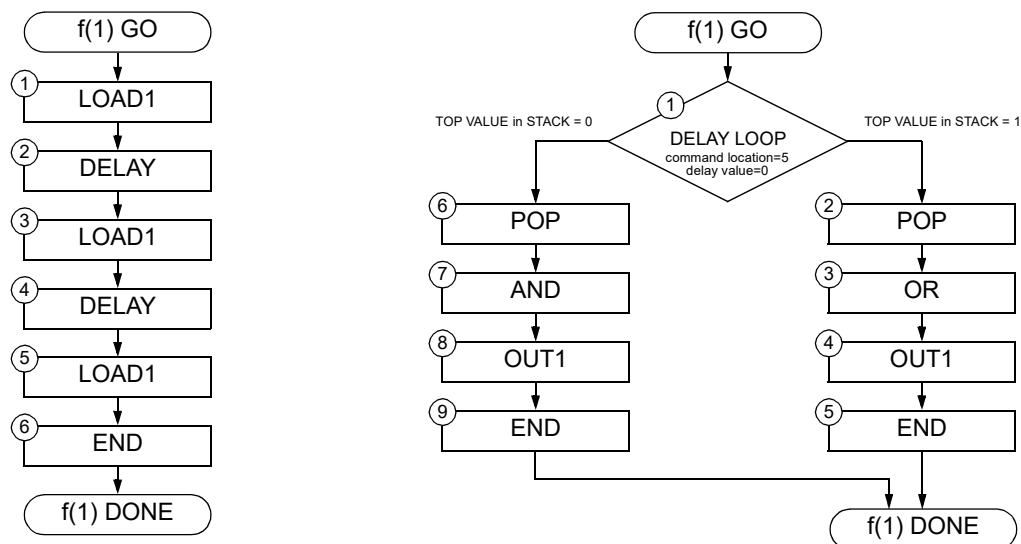


Figure 129: f(1) Flowchart for Average Function for Captured Data

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17.6 F(1) TYPICAL PERFORMANCE

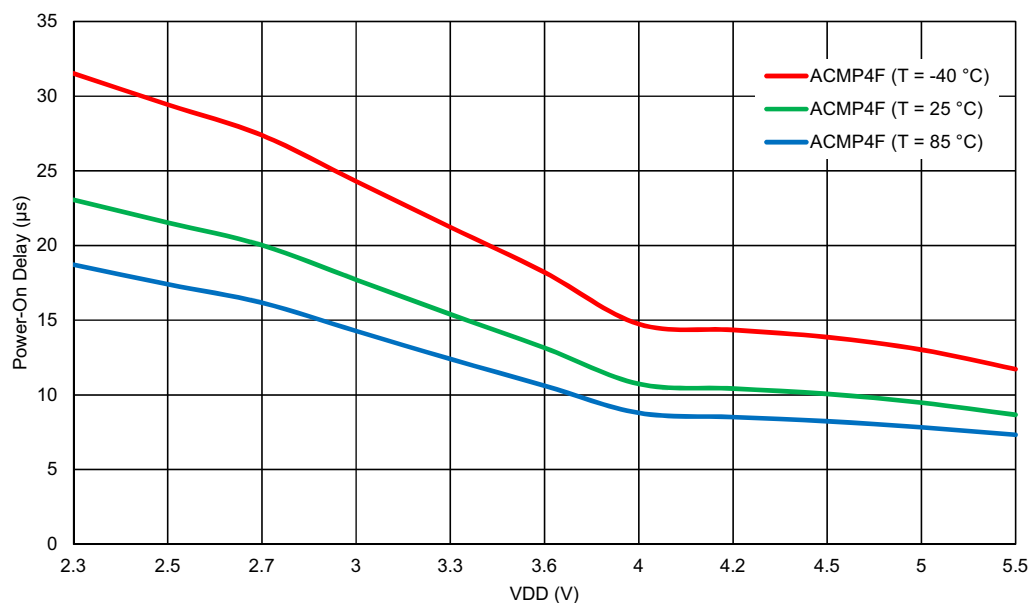


Figure 130: ACMP4F Power on Delay vs. V_{DD}

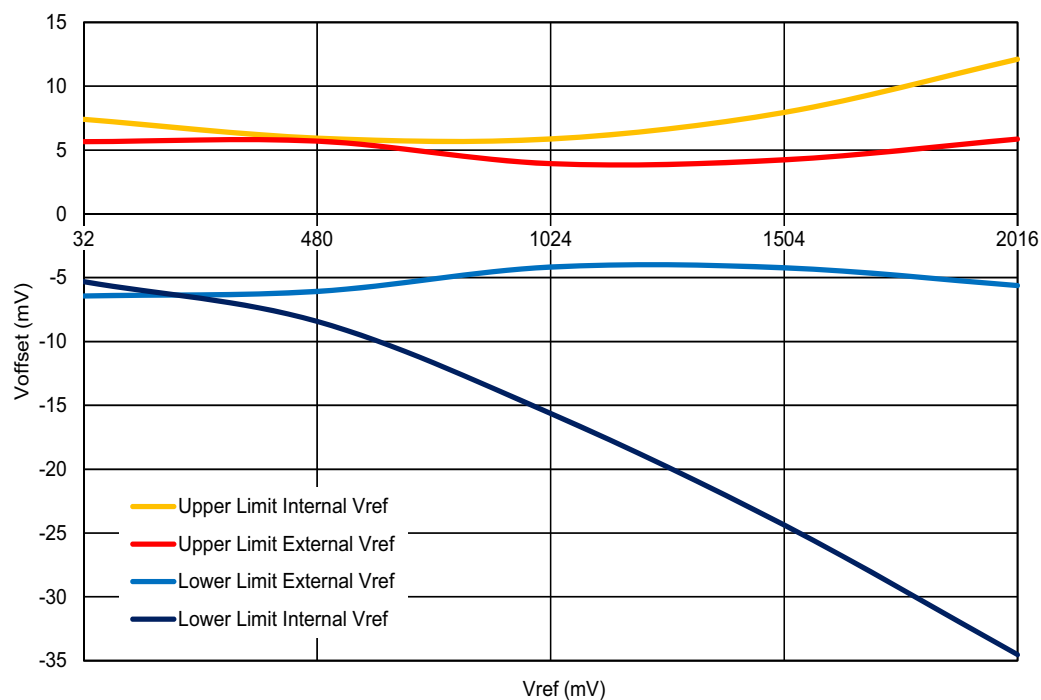


Figure 131: ACMP4F Input Offset Voltage vs. V_{ref} at $T = -40\text{ °C}$ to 85 °C , Input Buffer Disabled

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18 Matrix Interface Macrocells

The ASM Sub-System includes several discrete macrocells, including the ASM macrocell, four Dynamic Memory (DMx_x) macrocells, three Matrix Interface (MI) Macrocells, and one f(1) Computation Macrocell. These macrocells are designed to work as a system for building user defined state machines.

The Matrix Interface macrocells have the characteristic that they can change internal configuration characteristics and their connections to the Connection Matrix based on the current state of the State Machine (SM) macrocell. This is accomplished by making different memory register bit settings contained within the macrocell active, based on the current active state of the SM. This allows the user to “repurpose” the resources inside these macrocells to match the circuit needs in various states.

The SLG46880/81 has a total of three MI macrocells, MI0, MI1 and MI2.

Each MI macrocell has a Mlx Configuration Register Table, which is a bank of 4 Mlx Configuration Registers. The bits in these registers hold user selections which define the input connections from the Connection Matrix. The fact that there are 4 Configuration Registers means that there can only be a total of four unique configurations for each Mlx macrocell. There are a total of twelve states, which means that the user can either re-use the configuration coded in a particular Mlx Operating Mode Register in more than one state, or not use some Mlx macrocells in some states.

Each MI macrocell has a Mlx Operating Mode Selection Table, which is a bank of 12 Configuration Selection Registers, one for each state of the State Machine macrocell. The bits in these registers hold the user’s selection of MI functional behavior (input selection from Connection Matrix), by mapping to a particular selection in the Configuration Register Table, based on the current state of the State Machine macrocell.

18.1 MI0, MI1, AND MI2 MACROCELL ARCHITECTURE

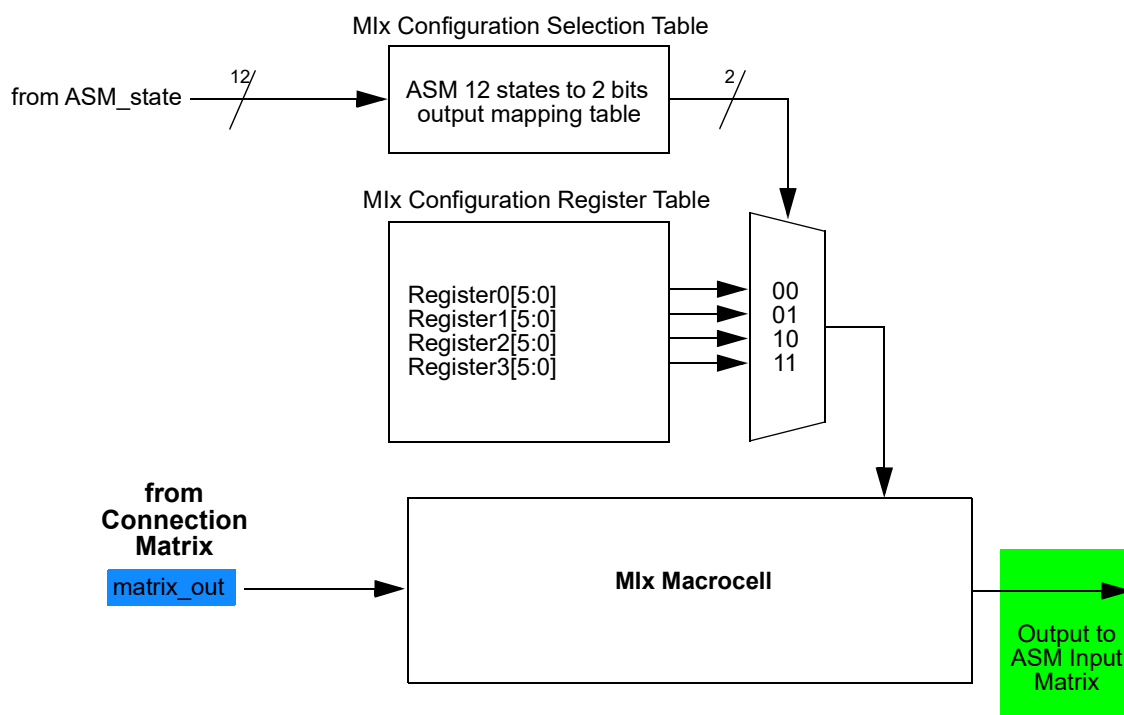


Figure 132: Mlx Macrocell Architecture

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18.2 MIX MACROCELL INPUT SIGNALS

Each Mlx macrocell has a single digital input signal coming from the Connection Matrix and from there can be routed to other internal macrocells or pins. This signal is shown in [Figure 132](#) highlighted in blue.

18.3 MIX MACROCELL OUTPUT SIGNALS

Each Mlx macrocell has a single digital output signal, which goes directly to the ASM Input Matrix inside the ASM Macrocell. This signal is shown in [Figure 132](#), highlighted in green.

19 I²C Serial Communications Macrocell

19.1 I²C SERIAL COMMUNICATIONS MACROCELL OVERVIEW

In the standard use case for the GreenPAK devices, the configuration choices made by the user are stored as bit settings in the Non-Volatile Memory (NVM), and this information is transferred at startup time to volatile RAM registers that enable the configuration of the macrocells. Other RAM registers in the device are responsible for setting the connections in the Connection Matrix to route signals in the manner most appropriate for the user's application.

The I²C Serial Communications Macrocell in this device allows an I²C bus Master to read and write this information via a serial channel directly to the RAM registers, allowing the remote re-configuration of macrocells, and remote changes to signal chains within the device.

An I²C bus Master is also able read and write other register bits that are not associated with NVM memory. As an example, the input lines to the Connection Matrix can be read as digital register bits. These are the signal outputs of each of the macrocells in the device, giving an I²C bus Master the capability to remotely read the current value of any macrocell.

The user has the flexibility to control read access and write access via registers bits registers [4071:4069]. See Section 19.4.6.1 for more details on I²C read/write memory protection.

19.2 I²C SERIAL COMMUNICATIONS DEVICE ADDRESSING

Each command to the I²C Serial Communications macrocell begins with a Control Byte. The bits inside this Control Byte are shown in Figure 133. After the Start bit, the first four bits are a control code, which can be set by the user in registers [4083:4080] or value defined externally by GPIs 4, 5, 6, and 7. The LSB of the control code is defined by the value of GPI4, while the MSB is defined by the value of GPI7. The address source is selected by register [4087]. This gives the user flexibility on the chip level addressing of this device and other devices on the same I²C bus. The Block Address is the next three bits (A10, A9, A8), which will define the most significant bits in the addressing of the data to be read or written by the command. The last bit in the Control Byte is the R/W bit, which selects whether a read command or write command is requested, with a "1" selecting for a Read command, and a "0" selecting for a Write command. This Control Byte will be followed by an Acknowledge bit (ACK), which is sent by this device to indicate successful communication of the Control Byte data.

In the read and write command address structure, there are a total of 11 bits of addressing, each pointing to a unique byte of information, resulting in a total address space of 2K bytes. Of this 2K byte address space, the valid addresses accessible to the I²C Macrocell on the SLG46880/81 are in the range from 0 (00H) to 511 (1FFH). The upper two address bits (A10 and A9) will be "0" for all commands to the SLG46880/81. The value of Address bit A8 will depend on whether the Bus Master is addressing the upper or lower half of the 4K bit address space.

With the exception of the Current Address Read command, all commands will have the Control Byte followed by the Word Address.

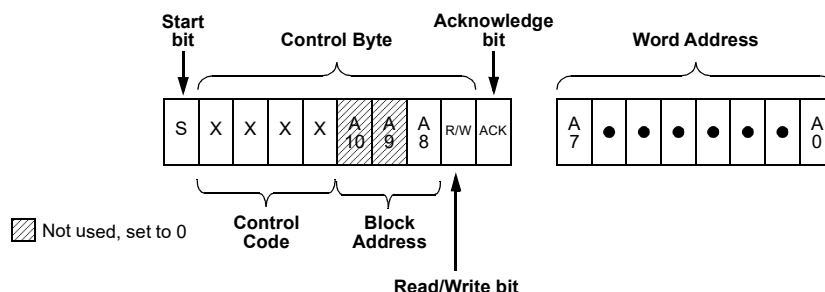


Figure 133: Basic Command Structure

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19.3 I²C SERIAL GENERAL TIMING

General timing characteristics for the I²C Serial Communications macrocell are shown in Figure 134. Timing specifications can be found in the AC Characteristics section.

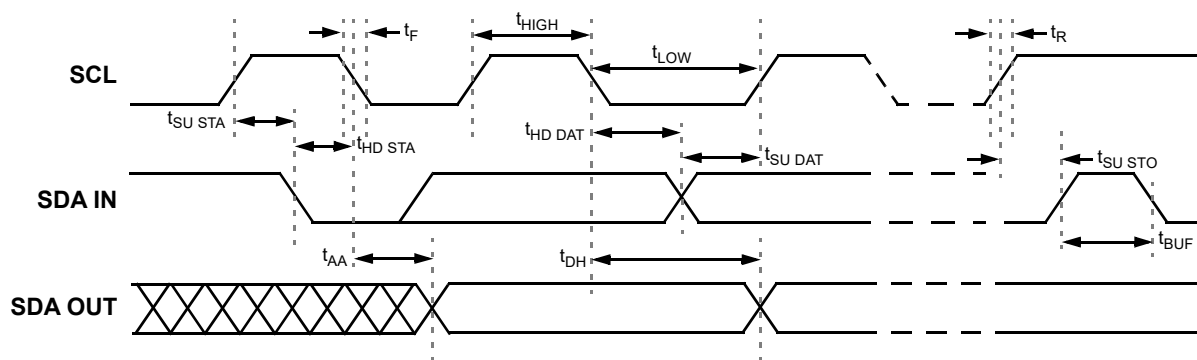


Figure 134: I²C General Timing Characteristics

19.4 I²C SERIAL COMMUNICATIONS COMMANDS

19.4.1 Byte Write Command

Following the Start condition from the Master, the Control Code [4 bits], the Block Address [3 bits] and the R/W bit (set to "0"), are placed onto the I²C bus by the Master. After the SLG46880/81 sends an Acknowledge bit (ACK), the next byte transmitted by the Master is the Word Address. The Block Address (A10, A9, A8), combined with the Word Address (A7 through A0), together set the internal address pointer in the SLG46880/81 where the data byte is to be written. After the SLG46880/81 sends another Acknowledge bit, the Master will transmit the data byte to be written into the addressed memory location. The SLG46880/81 again provides an Acknowledge bit and then the Master generates a Stop condition. The internal write cycle for the data will take place at the time that the SLG46880/81 generates the Acknowledge bit.

It is possible to latch all IOs during I²C write command, register [4065]=1 - Enable. It means that IOs will remain their state until the write command is done.

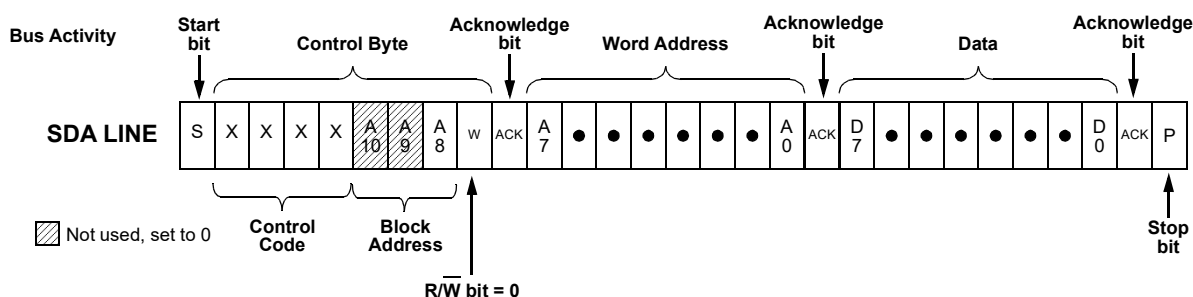


Figure 135: Byte Write Command, $R/\bar{W} = 0$

19.4.2 Sequential Write Command

The write Control Byte, Word Address and the first data byte are transmitted to the SLG46880/81 in the same way as in a Byte Write command. However, instead of generating a Stop condition, the Bus Master continues to transmit data bytes to the SLG46880/81. Each subsequent data byte will increment the internal address counter, and will be written into the next higher byte

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in the command addressing. As in the case of the Byte Write command, the internal write cycle will take place at the time that the SLG46880/81 generates the Acknowledge bit.

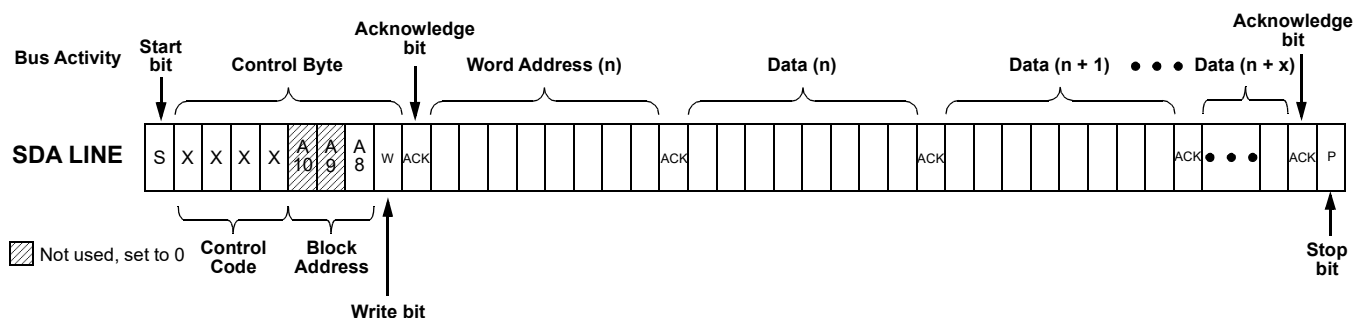


Figure 136: Sequential Write Command

19.4.3 Current Address Read Command

The Current Address Read Command reads from the current pointer address location. The address pointer is incremented at the first STOP bit following any write control byte. For example, if a Sequential Read command (which contains a write control byte) reads data up to address n , the address pointer would get incremented to $n+1$ upon the STOP of that command. Subsequently, a Current Address Read that follows would start reading data at $n+1$. The Current Address Read Command contains the Control Byte sent by the Master, with the $R/\bar{W}$ bit = "1". The SLG46880/81 will issue an Acknowledge bit, and then transmit eight data bits for the requested byte. The Master will not issue an Acknowledge bit, and follow immediately with a Stop condition.

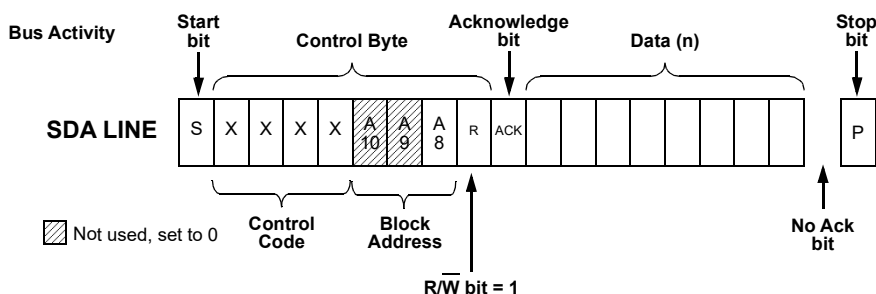


Figure 137: Current Address Read Command, $R/\bar{W} = 1$

19.4.4 Random Read Command

The Random Read command starts with a Control Byte (with $R/\bar{W}$ bit set to "0", indicating a write command) and Word Address to set the internal byte address, followed by a Start bit, and then the Control Byte for the read (exactly the same as the Byte Write command). The Start bit in the middle of the command will halt the decoding of a Write command, but will set the internal address

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counter in preparation for the second half of the command. After the Start bit, the Bus Master issues a second control byte with the R/W bit set to “1”, after which the SLG46880/81 issues an Acknowledge bit, followed by the requested eight data bits.

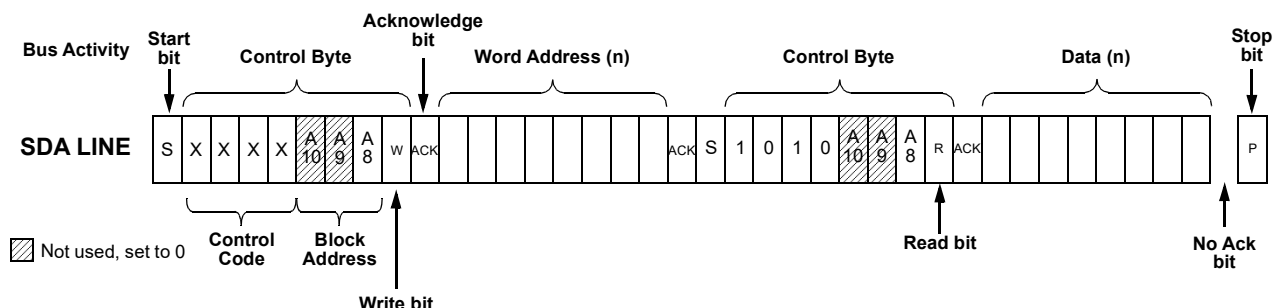


Figure 138: Random Read Command

19.4.5 Sequential Read Command

The Sequential Read command is initiated in the same way as a Random Read command, except that once the SLG46880/81 transmits the first data byte, the Bus Master issues an Acknowledge bit as opposed to a Stop condition in a random read. The Bus Master can continue reading sequential bytes of data, and will terminate the command with a Stop condition.

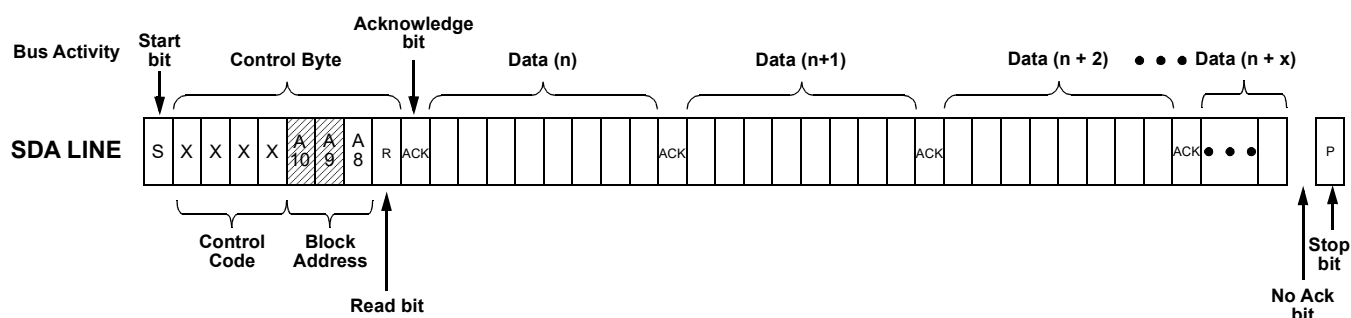


Figure 139: Sequential Read Command

19.4.6 I²C SERIAL COMMAND REGISTER MAP

19.4.6.1 Register Read/Write Protection

There are seven read/write protect modes for the design sequence from being corrupted or copied. See [Table 52](#) for details.

Table 52: Read/Write Protection Options

Configurations	Protection Modes Configuration							Data Output From	Register Address
	Unlocked	Partly Lock Read1	Partly Lock Read2	Partly Lock Read2/ Write	Lock Read	Lock Write	Lock Read/ Write		
	(Mode 0)	(Mode 1)	(Mode 2)	(Mode 3)	(Mode 4)	(Mode 5)	(Mode 6)		
I2C Byte Write Bit Masking (section 19.4.7)	R/W	R/W	R/W	R/W	W	R	-	Memory	1FD

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Table 52: Read/Write Protection Options(Continued)

Configurations	Protection Modes Configuration							Data Output From	Register Address
	Unlocked	Partly Lock Read1	Partly Lock Read2	Partly Lock Read2/ Write	Lock Read	Lock Write	Lock Read/ Write		
	(Mode 0)	(Mode 1)	(Mode 2)	(Mode 3)	(Mode 4)	(Mode 5)	(Mode 6)		
I2C Serial Reset Command (section 19.4.6.2)	R/W	R/W	R/W	R/W	W	R	-	Memory	1FC,b'0
Outputs Latching During I ² C Write	R/W	R/W	R/W	R/W	W	R	-	Memory	1FC,b'1
f(1) Computation Macrocell Stack	R/W	R/W	R/W	R/W	W	R	-	Macrocell	198~199
Connection Matrix Virtual Inputs (section 6.3)	R/W	R/W	R/W	R/W	W	R	-	Macrocell	1DB
Configuration Bits for All Macrocells (IO Pins, ACMPs, Combination Function Macrocells, ASM, etc.)	R/W	R/W	W	-	W	R	-	Memory	
Macrocells Inputs Configuration (Connection Matrix Outputs, section 6.2)	R/W	W	W	-	W	R	-	Memory	0~3E
Protection Mode Selection	R/W	R	R	R	R	R	R	Memory	1FC,b'7,6,5
Macrocells Output Values (Connection Matrix Inputs, section 6.1)	R	R	R	R	-	R	-	Macrocell	1D7~1DA; 1DC~1DE
Counter Current Value	R	R	R	R	-	R	-	Macrocell	1DF,1E0,1E1,1E2
ASM Current State	R	R	R	R	-	R	-	Macrocell	1E3,1E4
I ² C Control Code (section 19.4)	R	R	R	R	R	R	R	Memory	1FE,b'3~0
I ² C Disable/Enable	R	R	R	R	R	R	R	Memory	1FE,b'4

R/W	Allow Read and Write Data
W	Allow Write Data Only
R	Allow Read Data Only
-	The Data is protected for Read and Write

It is possible to read some data from macrocells, such as counter current value, ASM current state, connection matrix, f(1) computation macrocell stack and connection matrix virtual inputs. The I²C write will do not have any impact on data in case data comes from macrocell output, except f(1) Computation Macrocell Stack and Connection Matrix Virtual Inputs. The silicon identification service bits allows identifying silicon family, its revision, etc.

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See Section 21 for detailed information on all registers.

19.4.6.2 I²C SERIAL RESET COMMAND

If I²C serial communication is established with the device, it is possible to reset the device to initial power up conditions, including configuration of all macrocells, and all connections provided by the Connection Matrix. This is implemented by setting register [4064] I²C reset bit to “1”, which causes the device to re-enable the Power-On Reset (POR) sequence, including the reload of all register data from NVM. During the POR sequence, the outputs of the device will be in tri-state. After the reset has taken place, the contents of register [4064] will be set to “0” automatically. The timing diagram shown below illustrates the sequence of events for this reset function.

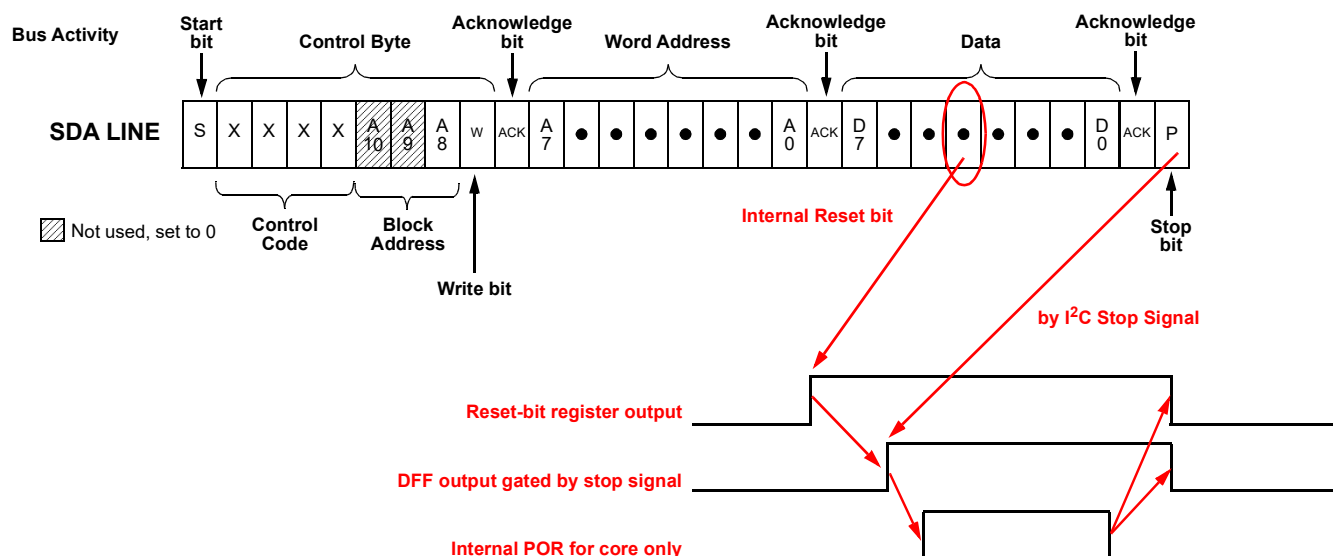


Figure 140: Reset Command Timing

19.4.6.3 Reading Counter Data via I²C

The current count value in four counters in the device can be read via I²C. The counters that have this additional functionality are 16-bit CNT0, and 8-bit counters CNT2 and CNT4.

19.4.6.4 Reading ASM Current State via I²C

The Current State of the ASM can be read via I²C. There are 12 memory bits located at registers [3875:3864]. Configuration for

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each Current State can be found in [Table 53](#).

Table 53: ASM Current State Bits Configuration

I ² C Address	Register Bit #	ASM State #	ASM Current State Bits Configuration											
			State 0	State 1	State 2	State 3	State 4	State 5	State 6	State 7	State 8	State 9	State 10	State 11
1E3	3864	State 0	1	0	0	0	0	0	0	0	0	0	0	0
	3865	State 1	0	1	0	0	0	0	0	0	0	0	0	0
	3866	State 2	0	0	1	0	0	0	0	0	0	0	0	0
	3867	State 3	0	0	0	1	0	0	0	0	0	0	0	0
	3868	State 4	0	0	0	0	1	0	0	0	0	0	0	0
	3869	State 5	0	0	0	0	0	1	0	0	0	0	0	0
	3870	State 6	0	0	0	0	0	0	1	0	0	0	0	0
1E4	3871	State 7	0	0	0	0	0	0	0	1	0	0	0	0
	3872	State 8	0	0	0	0	0	0	0	0	1	0	0	0
	3873	State 9	0	0	0	0	0	0	0	0	0	1	0	0
	3874	State 10	0	0	0	0	0	0	0	0	0	0	1	0
	3875	State 11	0	0	0	0	0	0	0	0	0	0	0	1

19.4.6.5 I²C Expander

In addition to the eight Connection Matrix Virtual Inputs, the SLG46880/81 chip has four pins which can be used as an I²C Expander. These four pins are GPIO4, GPIO5, GPIO6, and GPIO7.

Each of these pins can be used as an I²C Expander output or used as a normal pin. Also each of these four expander outputs have initial state settings which are specified in registers [3880:3870].

19.4.7 I²C Byte Write Bit Masking

The I²C macrocell inside SLG46880/81 supports masking of individual bits within a byte that is written to the RAM memory space. This function is supported across the entire RAM memory space. To implement this function, the user performs a Byte Write Command (see Section 19.4.1 for details) on the I²C Byte Write Mask Register (address 0xxH) with the desired bit mask pattern. This sets a bit mask pattern for the target memory location that will take effect on the next Byte Write Command to this register byte. Any bit in the mask that is set to "1" in the I²C Byte Write Mask Register will mask the effect of changing that particular bit in the target register, during the next Byte Write Command. The contents of the I²C Byte Write Mask Register are reset (set to 00h) after the Byte Write Command. If the next command received by the device is not a Byte Write Command, the effect of the

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bit masking function will be aborted, and the I²C Byte Write Mask Register will be reset with no effect. Figure 141 shows an example of this function.

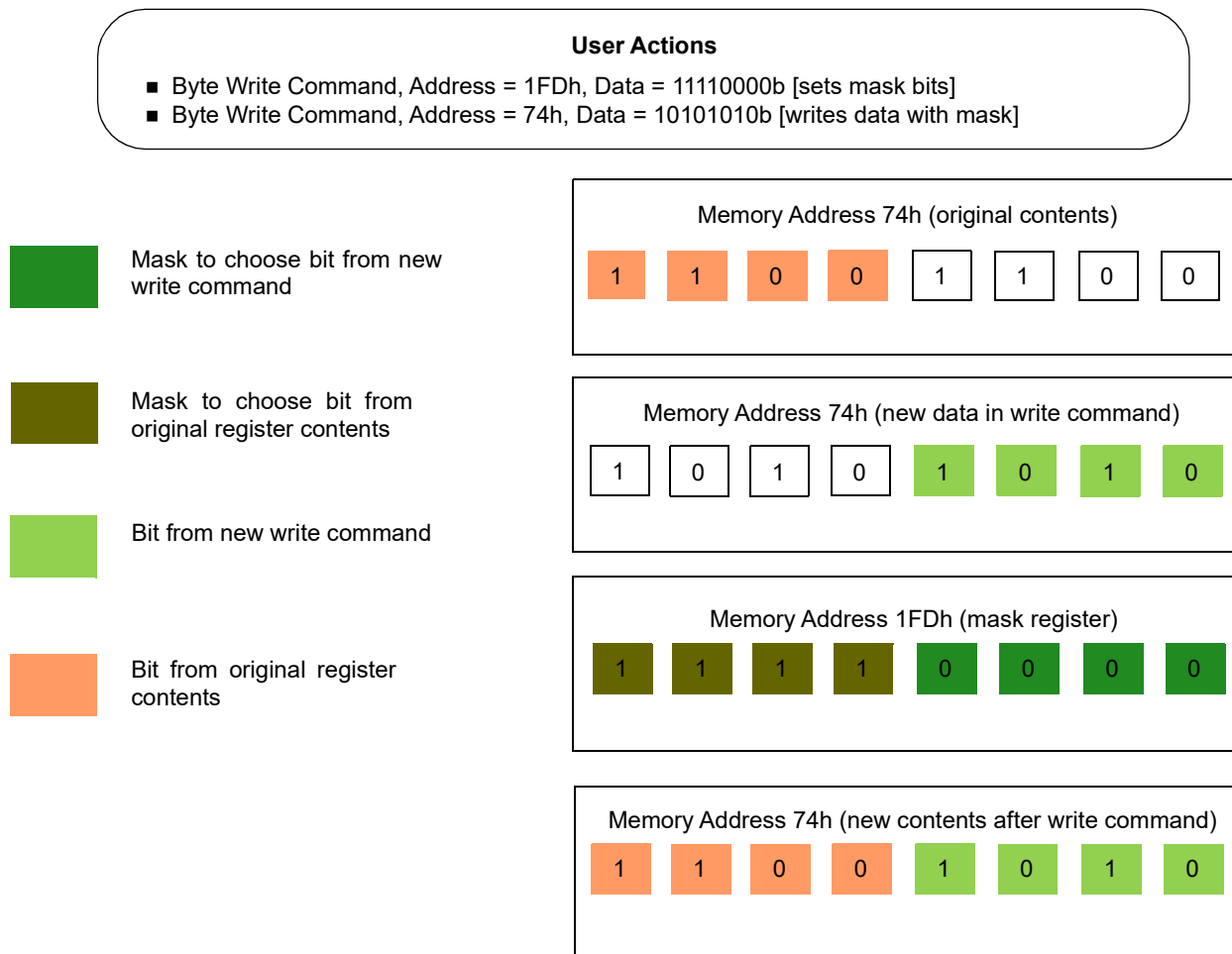


Figure 141: Example of I²C Byte Write Bit Masking

20 Analog Temperature Sensor

The SLG46880 has an Analog Temperature sensor (TS) with an output voltage linearly-proportional to the Centigrade temperature. The TS cell shares buffer with Vref0, so it is impossible to use both cells simultaneously, its output can be connected directly to the GPIO9 or to the ACPM3_L positive input. Using buffer causes low-output impedance, linear output and makes interfacing to readout or control circuitry especially easy. The TS is rated to operate over a -40°C to 85°C temperature range. The error in the whole temperature range does not exceed $\pm 3.6\%$. TS output voltage variation over V_{DD} at constant temperature is less than $\pm 1\%$. For more detail refer to Section 3.

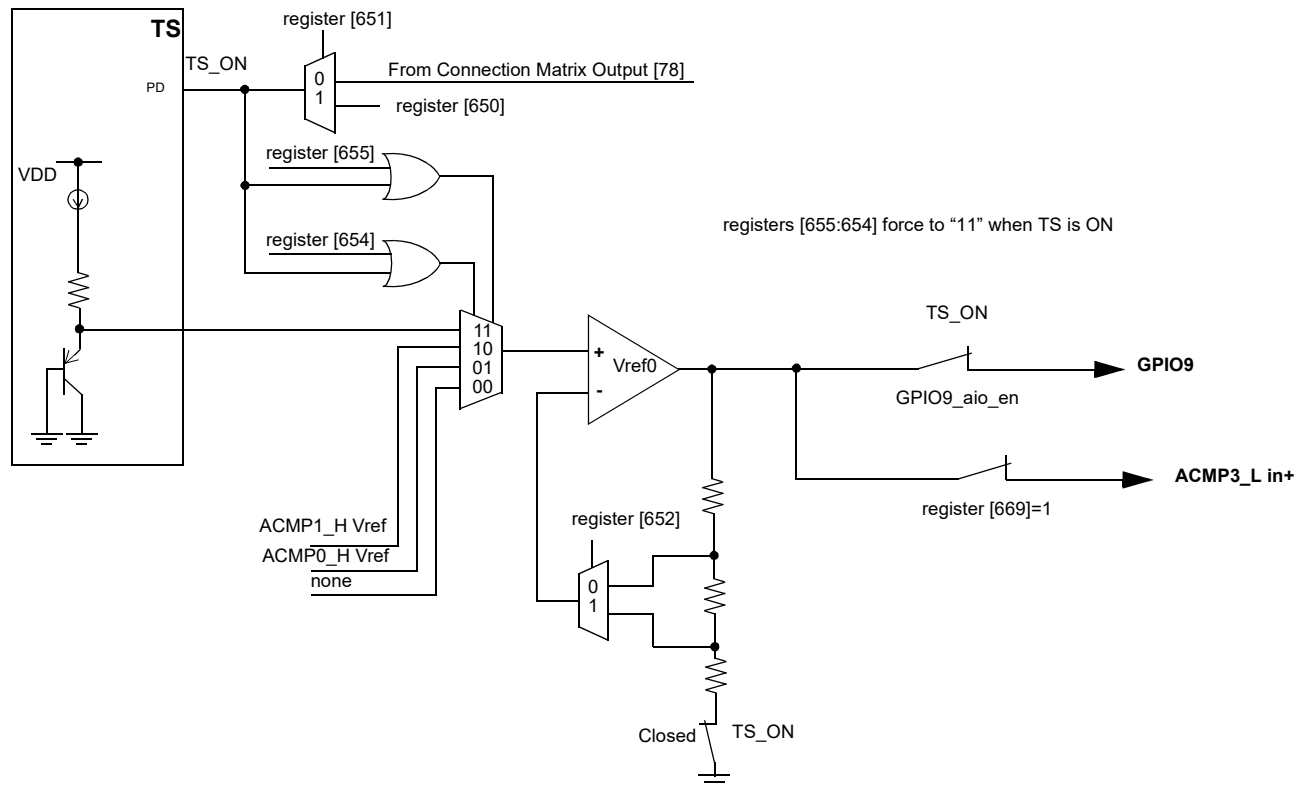
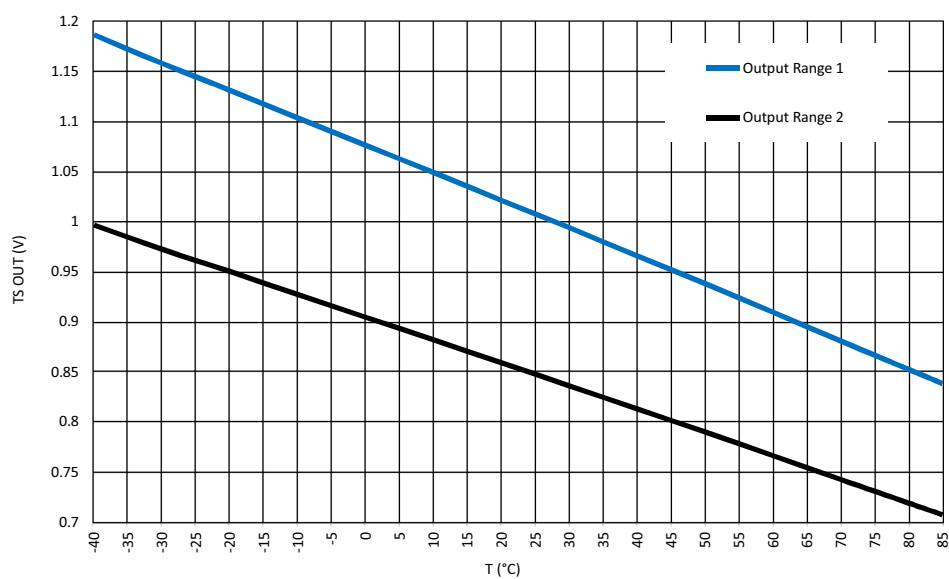


Figure 142: Analog Temperature Sensor Structure Diagram

Note that the Power-Down Mode is paired with Crystal OSC, see Section 12.6. If it is enabled for Temp Sensor, it is not available for Crystal OSC and vice versa. However, it is possible to enable Power-Down Mode for Crystal OSC and Temp Sensor simultaneously.

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous
State Machine and Dual SupplyFigure 143: TS Output vs. Temperature, $V_{DD} = 2.3 \text{ V to } 5.5 \text{ V}$

21 Register Definitions

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
0	0	OUT0: IN0 of LUT2_0 or Clock Input of DFF0	
	1		
	2		
	3		
	4		
	5		
	6		
1	7	OUT1: IN1 of LUT2_0 or Data Input of DFF0	
	8		
	9		
	10		
	11		
	12		
	13		
2	14	OUT2: IN0 of LUT2_1 or Clock Input of PGEN	
	15		
	16		
	17		
	18		
	19		
	20		
3	21	OUT3: IN1 of LUT2_1 or nRST of PGEN	
	22		
	23		
	24		
	25		
	26		
	27		
4	28	OUT4: IN0 of LUT3_0 or Clock Input of DFF1	
	29		
	30		
	31		
	32		
	33		
	34		
4	35	OUT5: IN1 of LUT3_0 or Data Input of DFF1	

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Address		Signal Function	Register Bit Definition
Byte	Register Bit		
4	36	OUT6: IN2 of LUT3_0 or nRST (nSET) of DFF1	
	37		
	38		
	39		
5	40	OUT7: IN0 of LUT3_1 or Clock Input of DFF2	
	41		
	42		
	43		
	44		
	45		
	46		
	47		
6	48	OUT8: IN1 of LUT3_1 or Data Input of DFF2	
	49		
	50		
	51		
	52		
	53		
	54		
	55		
7	56	OUT9: IN2 of LUT3_1 or nRST (nSET) of DFF2	
	57		
	58		
	59		
	60	OUT10: IN0 of LUT3_2 or Clock Input of DFF3	
	61		
	62		
	63		
8	64	OUT11: IN1 of LUT3_2 or Data Input of DFF3	
	65		
	66		
	67		
	68		
	69		
	70		
	71		
9	72	OUT12: IN2 of LUT3_2 or nRST (nSET) of DFF3	
	73		
	74		
	75		
	76		
	77		

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Address		Signal Function	Register Bit Definition
Byte	Register Bit		
9	78	OUT13:IN0 of LUT3_3 or Clock Input of DFF4	
	79		
A	80		
	81		
	82		
	83		
	84	OUT14:IN1 of LUT3_3 or Data Input of DFF4	
	85		
	86		
	87		
B	88		
	89		
	90		
	91		
	92	OUT15:IN2 of LUT3_3 or nRST (nSET) of DFF4	
	93		
	94		
	95		
C	96		
	97		
	98		
	99		
	100	OUT16:IN0 of LUT3_4 or Delay1 Input (or Counter1 nRST Input)	
	101		
	102		
	103		
D	104	OUT17:IN1 of LUT3_4 or External Clock1 Input of Delay1 (or Counter1)	
	105		
	106		
	107		
	108	OUT18:IN2 of LUT3_4	
	109		
	110		
	111		
E	112		
	113		
	114		
	115		
	116	OUT19:IN0 of LUT3_5 or Delay2 Input (or Counter2 nRST Input)	
	117		
	118		
	119		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
F	120	OUT20:IN1 of LUT3_5 or External Clock1 Input of Delay2 (or Counter2)	
	121		
	122		
	123		
	124		
	125		
	126		
	127		
10	128	OUT21:IN2 of LUT3_5	
	129		
	130		
	131		
	132	OUT22:IN0 of LUT3_6 or Delay3 Input (or Counter3 nRST Input)	
	133		
	134		
	135		
11	136		
	137		
	138		
	139		
	140	OUT23:IN1 of LUT3_6 or External Clock1 Input of Delay3 (or Counter3)	
	141		
	142		
	143		
12	144	OUT24:IN2 of LUT3_6	
	145		
	146		
	147		
	148		
	149		
	150		
	151		
13	152	OUT25:IN0 of LUT3_7 or Delay4 Input (or Counter4 nRST Input)	
	153		
	154		
	155		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
13	156	OUT26:IN1 of LUT3_7 or External Clock1 Input of Delay4 (or Counter4)	
	157		
	158		
	159		
14	160	OUT27:IN2 of LUT3_7	
	161		
	162		
	163		
	164		
	165		
	166		
	167		
15	168	OUT28:IN0 of LUT3_8 or Input of Pipe Delay or UP signal of Ripple CNT	
	169		
	170		
	171		
	172		
	173		
	174		
	175		
16	176	OUT29:IN1 of LUT3_8 or nRST of Pipe Delay or STB of Ripple CNT	
	177		
	178		
	179		
	180	OUT30:IN2 of LUT3_8 or Clock of Pipe Delay_Ripple CNT	
	181		
	182		
	183		
17	184	OUT31:IN0 of LUT4_0 or Delay0 Input (or Counter0 nRST Input)	
	185		
	186		
	187		
	188		
	189		
	190		
	191		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
18	192	OUT32:IN1 of LUT4_0 or External Clock Input of Delay0 (or Counter0)	
	193		
	194		
	195		
	196		
	197		
	198		
	199		
19	200	OUT33:IN2 of LUT4_0 or UP Input of FSM0	
	201		
	202		
	203		
	204	OUT34:IN3 of LUT4_0 or KEEP Input of FSM0	
	205		
	206		
	207		
1A	208		
	209		
	210		
	211		
	212	OUT35:PWR UP of ACMP0_H	
	213		
	214		
	215		
1B	216		
	217		
	218		
	219		
	220	OUT36:PWR UP of ACMP1_H	
	221		
	222		
	223		
1C	224	OUT37:PWR UP of ACMP2_L	
	225		
	226		
	227		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1C	228	OUT38: PWR UP of ACMP3_L	
	229		
	230		
	231		
1D	232	OUT39: GPO7 DOUT	
	233		
	234		
	235		
	236		
	237		
	238		
	239		
1E	240	OUT40: GPO0 DOUT	
	241		
	242		
	243		
	244		
	245		
	246		
	247		
1F	248	OUT41: GPIO0 DOUT	
	249		
	250		
	251		
	252	OUT42: GPIO0 DOUT OE	
	253		
	254		
	255		
20	256	OUT43: GPIO1 DOUT	
	257		
	258		
	259		
	260		
	261		
	262		
	263		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
21	264	OUT44:GPIO1 DOUT OE	
	265		
	266		
	267		
	268		
	269		
	270		
	271		
22	272	OUT45: GPIO2 DOUT	
	273		
	274		
	275		
	276	OUT46: GPIO2 DOUT OE	
	277		
	278		
	279		
23	280	OUT47: GPIO3 DOUT	
	281		
	282		
	283		
	284		
	285		
	286		
	287		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
24	288	OUT48: GPIO3 DOUT OE	
	289		
	290		
	291		
	292		
	293		
	294		
	295		
25	296	OUT49: GPIO4 DOUT	
	297		
	298		
	299		
	300	OUT50: GPIO4 DOUT OE	
	301		
	302		
	303		
26	304	OUT51: GPIO5 DOUT	
	305		
	306		
	307		
	308		
	309		
	310		
	311		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
27	312	OUT52: GPIO5 DOUT OE	
	313		
	314		
	315		
	316		
	317		
	318		
	319		
28	320	OUT53: GPO1 DOUT	
	321		
	322		
	323		
	324	OUT54: GPO2 DOUT	
	325		
	326		
	327		
29	328	OUT55: GPO3 DOUT	
	329		
	330		
	331		
	332		
	333		
	334		
	335		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
2A	336	OUT56: GPO4 DOUT	
	337		
	338		
	339		
	340		
	341		
	342		
	343		
2B	344	OUT57: GPIO6 DOUT OE	
	345		
	346		
	347		
	348	OUT58: GPIO6 DOUT	
	349		
	350		
	351		
2C	352	OUT59: GPIO7 DOUT	
	353		
	354		
	355		
	356		
	357		
	358		
	359		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
2D	360	OUT60: GPIO7 DOUT OE	
	361		
	362		
	363		
	364		
	365		
	366		
	367		
2E	368	OUT61: GPIO8 DOUT OE	
	369		
	370		
	371		
	372	OUT62: GPIO8 DOUT	
	373		
	374		
	375		
2F	376	OUT63: GPIO9 DOUT OE	
	377		
	378		
	379		
	380		
	381		
	382		
	383		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
30	384	OUT64: GPIO9 DOUT	
	385		
	386		
	387		
	388		
	389		
	390		
	391		
31	392	OUT65: GPIO10 DOUT OE	
	393		
	394		
	395		
	396	OUT66: GPIO10 DOUT	
	397		
	398		
	399		
32	400	OUT67: GPIO11 DOUT OE	
	401		
	402		
	403		
	404		
	405		
	406		
	407		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
33	408	OUT68: GPIO11 DOUT	
	409		
	410		
	411		
	412		
	413		
	414		
	415		
34	416	OUT69: GPO5 DOUT	
	417		
	418		
	419		
	420	OUT70: GPO5 DOUT	
	421		
	422		
	423		
35	424	OUT71: ASM REnSET	
	425		
	426		
	427		
	428		
	429		
	430		
	431		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
36	432	OUT72: OSC0 ENABLE	
	433		
	434		
	435		
	436		
	437		
	438		
	439		
37	440	OUT73: OSC1 ENABLE	
	441		
	442		
	443		
	444	OUT74: OSC2 ENABLE	
	445		
	446		
	447		
38	448	OUT75: Filter/Edge detect input	
	449		
	450		
	451		
	452		
	453		
	454		
	455		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
39	456	OUT76: F1 interrupt	
	457		
	458		
	459		
	460		
	461		
	462		
	463		
3A	464	OUT77: Programmable delay/edge detect input	
	465		
	466		
	467		
	468	OUT78: Temp sensor/Crystal PD	
	469		
	470		
	471		
3B	472	OUT79: GPI Latch enable	
	473		
	474		
	475		
	476		
	477		
	478		
	479		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
3C	480	OUT80: GPIO Latch enable	
	481		
	482		
	483		
	484		
	485		
	486		
	487		
3D	488	OUT81: BG power-down	
	489		
	490		
	491		
	492	OUT82: DM EXT CLK0	
	493		
	494		
	495		
3E	496	OUT83: DM EXT CLK1	
	497		
	498		
	499		
	500	OUT83: DM EXT CLK1	
	501		
	502		
	503		
3F	504	OSC1 turn on by register	when matrix output enable/pd control signal=0: 0: auto on by delay cells 1: always on
	505	OSC1 matrix power down or on select	0: matrix down, and register [504] should set to 1 1: matrix on, and register [504] should set to 0
	506	external clock source enable	0: internal OSC1 1: external clock from GPI1
	507	post divider ratio control	00: div 1 01: div 2 10: div 4 11: div 8
	508		
	509	matrix divider ratio control	000: /1 001: /2 010: /4 011: /3 100: /8 101: /12 110: /24 111: /64
	510		
	511		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
40	512	matrix out enable	0: disable 1: enable
	513	Reserved	
	514	Reserved	
	515	Reserved	
	516	OSC2 turn on by register	when matrix output enable/pd control signal=0: 0: auto on by delay cells 1: always on
	517	matrix power down or on select	0: matrix down 1: matrix on
	518	external clock source enable	0: internal OSC2 1: external clock from GPIO
	519	matrix out enable	0: disable 1: enable
41	520	post divider ratio control	00: div 1 01: div 2 10: div 4 11: div 8
	521		
	522	matrix divider ratio control	000: /1 001: /2 010: /4 011: /3 100: /8 101: /12 110: /24 111: /64
	523		
	524		
	525	100 ns Startup Delay	0: enable 1: disable
	526	OSC0 turn on by register	when matrix output enable/pd control signal=0: 0: auto on by delay cells 1: always on
	527	matrix power down or on select	0: matrix down 1: matrix on

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
42	528	external clock source enable	0: internal OSC0 1: external clock from PIN30
	529	matrix out enable	0: disable 1: enable
	530	post divider ratio control	00: div 1 01: div 2 10: div 4 11: div 8
	531		
	532	matrix divider ratio control	000: /1 001: /2 010: /4 011: /3 100: /8 101: /12 110: /24 111: /64
	533		
	534		
	535	enable OSC0 output gating by wake_sleep signal (note: the wake_sleep clock is separated path, so it is not gated)	0: no gating 1: enable
43	536	GPI0 Digital Input 100 ns debounce enable	0: disable 1: enable
	537	GPI1 Digital Input 100 ns debounce enable	0: disable 1: enable
	538	GPI5 Digital Input 100 ns debounce enable	0: disable 1: enable
	539	GPI6 Digital Input 100 ns debounce enable	0: disable 1: enable
	540	Filter or Edge Detector selection	Filter or Edge Detector Select 0: filter 1: edge det
	541	Output Polarity Select	0: Filter/edge detect output 1: Filter/edge detect output inverted
	542	Select the edge mode	00: Rising Edges Det 01: Falling Edge Det 10: Both Edge Det 11: Both Edge dly
	543		
44	544	LUT value or pipe delay out sel or Nset/END value	[7:4]: LUT3_8 [7:4]/REG_S1[3:0] pipe delay out1 sel [3:0]: LUT3_8 [3:0]/REG_S0[3:0] pipe delay out0 sel at Ripple CNT mode: bit[546:544] is the nSET value. bit[549:547] is the END value bit [550] is the range control: 0: full cycle, 1: ranged cycle bit [551] Not used
	545		
	546		
	547		
	548		
	549		
	550		
	551		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
45	552	Pipe Delay OUT1 Polarity Select	0: Non-inverted 1: Inverted
	553	LUT3_8 or Pipe Delay Select	0: LUT3_8 1: Pipe Delay or Ripple CNT
	554	PIPE_Ripple_CNT_S	0: Pipe delay mode selection 1: Ripple Counter mode selection
	555	Reserved	
	556	Select the Edge Mode of Programmable Delay & Edge Detector	00: Rising Edge Detector 01: Falling Edge Detector 10: Both Edge Detector 11: Both Edge Delay
	557		
	558	Delay Value Select for Programmable Delay & Edge Detector	00: 125ns 01: 250ns 10: 375ns 11: 500ns
	559		
46	560	LUT2_0/DFF0 setting	[3]:LUT2_0 [3]/DFF0 or Latch Select 0: DFF function 1: Latch function [2]:LUT2_0 [2]/DFF0 Output Select 0: Q output 1: QB output [1]:LUT2_0 [1]/DFF0 Initial Polarity Select 0: Low 1: High [0]:LUT2_0 [0]
	561		
	562		
	563		
	564	LUT2_1_VAL or PGEN_data	LUT2_1[3:0] or PGEN 4bit counter data[3:0]
	565		
	566		
	567		
47	568	PGEN data	PGEN Data[15:0]
	569		
	570		
	571		
	572		
	573		
	574		
	575		
48	576		
	577		
	578		
	579		
	580		
	581		
	582		
	583		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
49	584	LUT3_0_DFF1 setting	[7]:LUT3_0 [7]/DFF1 or Latch Select
	585		0: DFF function
	586		1: Latch function
	587		[6]:LUT3_0 [6]/DFF1 Output Select
	588		0: Q output
	589		1: QB output
	590		[5]:LUT3_0 [5] /DFF1
	591		0: nRST from Matrix Output
4A	592	LUT3_1_DFF2 setting	1: nSET from Matrix Output
	593		[4]:LUT3_0 [4]/DFF1 Initial Polarity Select
	594		0: Low,
	595		1: High
	596		[3:0]: LUT3_0 [3:0]
	597		[7]:LUT3_1 [7]/DFF2 or Latch Select
	598		0: DFF function
	599		1: Latch function
4B	600	LUT3_2_DFF3 setting	[6]:LUT3_1 [6]/DFF2 Output Select
	601		0: Q output
	602		1: QB output
	603		[5]:LUT3_1 [5] /DFF2
	604		0: nRST from Matrix Output
	605		1: nSET from Matrix Output
	606		[4]:LUT3_1 [4]/DFF2 Initial Polarity Select
	607		0: Low
4C	608	LUT3_3_DFF4 setting	1: High [
	609		3:0]: LUT3_2 [3:0]
	610		[7]:LUT3_2 [7]/DFF3 or Latch Select
	611		0: DFF function,
	612		1: Latch function
	613		[6]:LUT3_2 [6]/DFF3 Output Select
	614		0: Q output
	615		1: QB output

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
4D	616	LUT2_0 or DFF0 Select	0: LUT2_0 1: DFF0
	617	LUT2_1 or PGEN Select	0: LUT2_1 1: PGEN
	618	LUT3_0 or DFF1 Select	0: LUT3_0 1: DFF1
	619	DFF1_SECONDQ_Sel	0: Q of first DFF 1: Q of second DFF
	620	LUT3_1 or DFF2 Select	0: LUT3_1 1: DFF2
	621	LUT3_2 or DFF3 Select	0: LUT3_2 1: DFF3
	622	LUT3_3 or DFF4 Select	0: LUT3_3 1: DFF4
	623	Reserved	
4E	624	BG CHOP OFF	0: CHOP enable 1: chopper off
	625	BG Chopper clock test enable	1: enable
	626	Bandgap internal voltage output to Pin enable	1: enable
	627	ACMP0_H hysteresis	00: 0mV 01: 32mV 10: 64mV 11: 196mV
	628		
	629	Reserved	
	630	ACMP0_H input buffer enable	1: enable
	631	Reserved	
4F	632	ACMP0_H input tie to V _{DD} enable	1: enable
	633	ACMP1_H positive input come from ACMP0_H's input mux output enable	1: enable
	634	Reserved	
	635	ACMP1_H hysteresis	00: 0mV 01: 32mV 10: 64mV 11: 196mV
	636		
	637	ACMP1_H input buffer enable	0: disable 1: enable
	638	Reserved	
	639	ACMP2_L positive input come from ACMP0_H's input mux output enable	1: enable

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
50	640	ACMP2_L positive input come from AC-MP1_H's input mux output enable	1: enable
	641	ACMP2_L hysteresis	00: 0 mV 01: 32 mV 10: 64 mv 11: 196 mV
	642		
	643	Reserved	
	644	Reserved	
	645	ACMP3_L hysteresis	00: 0mV 01: 32mV 10: 64mv 11: 196mV
	646		
51	647	Reserved	
	648	Reserved	
	649	ACMP3_L positive input come from AC-MP2_L's input mux output enable	1: enable
	650	Temp sensor register pd control	0: power-down 1: power-on
	651	Temp sensor register pd select	0: come from register 1: come matrix
	652	Temp sensor range select	0: 0.62V ~ 0.99V (TYP) 1: 0.75V ~ 1.2V (TYP)
	653	Vref0 output OP	0: disable 1: enable
	654	Vref0 input selection	00: None 01: ACMP0_H Vref 10: ACMP1_H Vref 11: temp sensor
52	655		
	656	Vref1 output OP	0: disable 1: enable
	657	Vref1 input selection	00: None 01: ACMP2_L Vref 10: ACMP3_L Vref
	658		
	659	Reserved	
	660		
	661		
	662		
	663	ACMP0_H Wake/sleep enable	1: enable

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
53	664	ACMP1_H Wake/sleep enable	1: enable
	665	ACMP wake/sleep time selection,	0: short time 1: normal w/s
	666	ACMP0_H 100uA current source enable	1: enable
	667	Reserved for ACMP	
	668	BG Trimming source select	0: VBG 1: Vref normal 2.048 output
	669	ACMP3_L input come from Temp sensor output enable	1: enable
	670	IO fast pull up/down enable	0: disable 1: enable
	671	8 GPO outputs skew enable	0: disable 1: enable

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
54	672	GPO7output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	673		
	674	GPO7pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	675		
	676	GPO7pull up/down selection	0: pull down 1: pull up
	677	GPO7digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[0])
	678	GPO7output enable	0: disable 1: enable.
	679	GPO0output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
55	680		
	681		00: floating 01: 10K 10: 100K 11: 1M
	682		
	683		0: pull down 1: pull up
	684		0: from matrix 1: from ASM (ASM output to GPO bit[1])
	685		0: disable 1: enable
	686		0: disable 1: enable
56	687		00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	688	GPIO0input mode configuration	
	689		
	690	GPIO0output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	691		
	692	GPIO0pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	693		0: pull down 1: pull up
	694	Reserved	
	695	GPIO1 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
57	696	GPIO1input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	697		
	698	GPIO1output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	699		
	700	GPIO1pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	701		
	702	GPIO1pull up/down selection	0: pull down 1: pull up
	703	Reserved	
58	704	GPIO2 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
	705	GPIO2digital input latch configuration	00: without latch 01: normal latch 10: input data 0 latch (when latch_en is high) 11: input data 1 latch (when latch_en is high)
	706		
	707	GPIO2input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	708		
	709	GPIO2output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	710		
	711	GPIO2pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
59	712	GPIO2pull up/down selection	0: pull down 1: pull up
	713	GPIO0digital input latch configuration	00: without latch 01: normal latch 10: input data 0 latch (when latch_en is high) 11: input data 1 latch (when latch_en is high)
	714		
	715	GPIO0input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	716		
	717	GPIO0pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	718		
	719		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
5A	720	GPI0pull up/down selection	0: pull down 1: pull up
	721	GPI1 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
	722	GPI1digital input latch configuration	00: without latch 01: normal latch
	723		10: input data 0 latch (when latch_en is high) 11: input data 1 latch (when latch_en is high)
	724	GPI1input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger
	725		10: low voltage digital in 11: analog IO
	726	GPI1pull up/down resistance selection	00: floating 01: 10K
	727		10: 100K 11: 1M
5B	728	GPI1pull up/down selection	0: pull down 1: pull up
	729	GPI2 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
	730	GPI2/SDA input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger
	731		10: low voltage digital in 11: analog IO
	732	GPI2/SDA pull up/down resistance selection	00: floating 01: 10K
	733		10: 100K 11: 1M
	734	GPI2/SDApull up/down selection	0: pull down 1: pull up
	735	GPI3 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
5C	736	GPI3/SCL input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger
	737		10: low voltage digital in 11: analog IO
	738	GPI3/SCLpull up/down resistance selection	00: floating 01: 10K
	739		10: 100K 11: 1M
	740	GPI3/SCLpull up/down selection	0: pull down 1: pull up
	741	GPI03 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
	742	GPI03digital input latch configuration	00: without latch 01: normal latch
	743		10: input data 0 latch (when latch_en is high) 11: input data 1 latch (when latch_en is high)

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
5D	744	GPIO3input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO.
	745		
	746	GPIO3output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	747		
	748	GPIO3pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	749		
	750	GPIO3pull up/down selection	0: pull down 1: pull up
	751	Reserved	
5E	752	Reserved	
	753	GPIO4input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	754		
	755	GPIO4output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	756		
	757	GPIO4pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	758		
	759	GPIO4pull up/down selection	0: pull down 1: pull up
5F	760	Reserved	
	761	GPIO5input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	762		
	763	GPIO5output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	764		
	765	GPIO5pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	766		
	767	GPIO5pull up/down selection	0: pull down 1: pull up

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
60	768	GPO1output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	769		
	770	GPO1pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	771		
	772	GPO1pull up/down selection	0: pull down 1: pull up
	773	GPO1digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[2])
	774	GPO1output enable	0: disable 1: enable.
	775	GPO2output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
61	776		
	777	GPO2pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	778		
	779	GPO2pull up/down selection	0: pull down 1: pull up
	780	GPO2digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[3]).
	781	GPO2output enable	0: disable 1: enable.
	782	GPO3output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	783		
62	784	GPO3pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	785		
	786	GPO3pull up/down selection	0: pull down 1: pull up
	787	GPO3digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[4]).
	788	GPO3output enable	0: disable 1: enable.
	789	GPO4output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	790		
	791	GPO4pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
63	792		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition	
Byte	Register Bit			
63	793	GPO4pull up/down selection	0: pull down 1: pull up	
	794	GPO4digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[5]).	
	795	GPO4output enable	0: disable 1: enable.	
	796	Reserved		
	797	GPIO6digital input latch configuration	00: without latch 01: normal latch	
	798		10: input data 0 latch (when latch_en is high) 11: input data 1 latch (when latch_en is high)	
	799	GPIO6input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO.	
64	800		GPIO6output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	801			
	802		GPIO6pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M.
	803			
	804		GPIO6pull up/down selection	0: pull down 1: pull up
	805			Reserved
	806	Reserved		
65	807	GPIO7digital input latch configuration	00: without latch 01: normal latch 10: input data 0 latch (when latch_en is high) 11: input data 1 latch (when latch_en is high)	
	808			
	809	GPIO7input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO	
	810			
	811	GPIO7output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain	
	812			
	813	GPIO7pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M	
	814			
815				

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
66	816	GPI07pull up/down selection	0: pull down 1: pull up
	817	Reserved	
	818	GPI08 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
	819	GPI08input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	820		
	821	GPI08output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	822		
	823	GPI08pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
67	824		
	825		0: pull down 1: pull up
	826		0: disable 1: enable
	827		00: without latch 01: normal latch 10: input data 0 latch (when latch_en is high) 11: input data 1 latch (when latch_en is high)
	828		
	829		00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	830		
	831		00: floating 01: 10K 10: 100K 11: 1M
68	832	GPI4pull up/down resistance selection	
	833	GPI4pull up/down selection	0: pull down 1: pull up
	834	GPI5 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
	835	GPI5digital input latch configuration	00: without latch 01: normal latch 10: input data 0 latch (when latch_en is high) 11: input data 1 latch (when latch_en is high)
	836		
	837	GPI5input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	838		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
68	839	GPI5pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
69	840		
	841		0: pull down 1: pull up
	842	GPI6 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
69	843	GPI6input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	844		
	845	GPI6pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	846		
	847		0: pull down 1: pull up

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
6A	848	GPI7 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
	849	GPI7input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
	850		
	851	GPI7pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	852		
	853	GPI7pull up/down selection	0: pull down 1: pull up
	854	GPI09 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable
	855	GPI09input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
6B	856		
	857		00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	858		
	859		00: floating 01: 10K 10: 100K 11: 1M
	860		
	861		0: pull down 1: pull up
	862		0: disable 1: enable
	863		00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
6C	864	GPI010input mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	865	GPI010output mode configuration	
	866		
	867	GPI010pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M.
	868		
	869	GPI010pull up/down selection	0: pull down 1: pull up
	870	GPI011 ultra-low power digital in enable (only used in SLG46881)	0: disable 1: enable

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
6C	871	GPIO11input mode configuration	00: digital without schmitt trigger 01: digital with schmitt trigger 10: low voltage digital in 11: analog IO
6D	872		
	873	GPIO11output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	874		
	875	GPIO11pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	876		
	877	GPIO11pull up/down selection	0: pull down 1: pull up
	878	Reserved	
	879		
6E	880	GPO5output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	881	GPO5pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	882		
	883	GPO5pull up/down selection	0: pull down 1: pull up
	884	GPO5digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[6])
	885	GPO5output enable	0: disable 1: enable
	886	GPO6output mode configuration	00: 1x push-pull 01: 2x push-pull 10: 1x open-drain 11: 2x open-drain
	887		
6F	888	GPO6pull up/down resistance selection	00: floating 01: 10K 10: 100K 11: 1M
	889		
	890	GPO6pull up/down selection	0: pull down 1: pull up
	891	GPO6digital output source selection	0: from matrix 1: from ASM (ASM output to GPO bit[7]).
	892	GPO6output enable	0: disable 1: enable
	893	I ² C mode selection.	0: I ² C fast mode + 1: I ² C standard/fast mode
	894	XTAL enable and matrix in51 source mux select	1: xtal enable is controlled by matrix out78 and matrix in51 source is from Xtal OSC 0: xtal is powered down and matrix in51 source is from GPI4

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
6F	895	XTAL matrix enable signal gating	0: matrix enable signal (matrix out78) is gated and xtal is controlled by register [894] 1: matrix enable signal is effective if register [894] = 1 (matrix out78 = 0 -] off, matrix out78 = 1 -] on)
70	896	DLY/CNT0 Mode Selection	00:DLY 01: one shot 10: frequency det 11: cnt register [913]=0
	897		
	898	DLY/CNT0 edge Mode Selection	00:both edge 01: falling edge 10: rising edge 11: High Level Reset (only in CNT mode)
	899		
	900	DLY/CNT0 Clock Source Select	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT4_END; 1110: External; 1111: No-used
	901		
	902		
	903		
71	904	FSM0 SET/RST Selection	0: Reset to 0 1: Set to data
	905	CNT0 output pol selection	0: Default Output 1: Inverted Output
	906	CNT0 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	907		
	908	lut4_0 or DLY/CNT0 selection	0: LUT4_0 1: DLY/CNT0(16bits)
	909	Wake sleep power down state selection	0: (low) 1: (high)
	910	wake sleep mode selection	0: Default Mode 1: Wake Sleep Mode (registers [897:896]=11)
	911	Keep signal sync selection	0: bypass 1: after two DFFs
72	912	UP signal sync selection	0: bypass 1: after two DFFs
	913	CNT0 DLY EDET FUNCTION Selection	0: normal 1: DLY function edge detection (registers [897:896]=00)
	914	CNT0 CNT mode SYNC selection	0: bypass 1: after two DFFs
	915	CNT1 CNT mode SYNC selection	0: bypass 1: after two DFFs

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
72	916	DLY/CNT1 Clock Source Select	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT0_END; 1110: External; 1111: No-used
	917		
	918		
	919		
73	920	CNT1 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	921		
	922	CNT1 function and edge mode selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	923		
	924		
	925		
	926	CNT1 output pol selection	0: Default Output 1: Inverted Output
	927	LUT3_4 or CNT_1 selection	0: LUT3_4 1: DLY/CNT1(8bits)
74	928	CNT2 CNT mode SYNC selection	0: bypass; 1: after two DFFs

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
74	929	DLY/CNT2 Clock Source Select	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT1_END; 1110: External; 1111: No-used
	930		
	931		
	932		
	933	CNT2 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	934		
	935	CNT2 function and edge mode selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT register [941]=0
75	936		
	937		
	938		
	939	CNT2 output pol selection	0: Default Output 1: Inverted Output
	940	LUT3_5 or CNT_2 selection	0: LUT3_5 1: DLY/CNT2(8bits)
	941	CNT2 DLY EDET FUNCTION Selection	0: normal 1: DLY function edge detection (registers [938:935]=0000/0001/0010)
	942	CNT3 CNT mode SYNC selection	0: bypass 1: after two DFFs

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
75	943	DLY/CNT3 Clock Source Select	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT2_END; 1110: External; 1111: No-used
	944		
	945		
	946		
	947	CNT3 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	948		
	949	CNT3 function and edge mode selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	950		
	951		
77	952		
	953	CNT3 output pol selection	0: Default Output 1: Inverted Output
	954	LUT3_6 or CNT_3 selection	0: LUT3_6 1: DLY/CNT3(8bits)
	955	CNT4 CNT mode SYNC selection	0: bypass 1: after two DFFs

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
77	956	DLY/CNT4 Clock Source Select	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT3_END; 1110: External; 1111: No-used
	957		
	958		
	959		
78	960	CNT3 initial value selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	961		
	962	CNT4 function and edge mode selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	963		
	964		
	965		
	966	CNT4 output pol selection	0: Default Output 1: Inverted Output
	967	LUT3_7 or CNT_4 selection	0: LUT3_7 1: DLY/CNT4(8bits)
79	968	REG_TEST_EN	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
79	969	TOP test path select	Digital test mux selection: 0000: GPO6 normal output, 0001: CNT_GOOD 0010: BG_CHOP_CK 0011: Data compare result 0100: ASM error flag 0101: F1_GO 0110: F1_GOOD 0111: DM_DONE 1000: BG_OK no delay 1001: BGOK_DLY 1010: 100ns delay test 1011: 1uS delay test 1100: sig_F1ACMP_OUT 1101: normal speed ACMP VrefOK 1110: low speed ACMP VrefOK 1111: ACMP_H0_OK signal
	970		
	971		
	972		
	973	Control DFT Test enable	0: matrix work at normal function 1: test matrix by DFT
	974	Signal of DFT selection (AOUT[83])	Select DFT test matrix or test DFT itself function 0: bypass mode (normal DFT test) 1: tied high or low (test DFT itself function)
	975	Signal of DFT tied low or high	Set input signal high or low to test DFT itself function 0: tied low 1: tied high
7A	976	ASM State 0 Output Memory for 8 GPOs	Memory for GPO 0
	977		Memory for GPO 1
	978		Memory for GPO 2
	979		Memory for GPO 3
	980		Memory for GPO 4
	981		Memory for GPO 5
	982		Memory for GPO 6
	983		Memory for GPO 7
7B	984	ASM State 1 Output Memory for 8 GPOs	Memory for GPO 0
	985		Memory for GPO 1
	986		Memory for GPO 2
	987		Memory for GPO 3
	988		Memory for GPO 4
	989		Memory for GPO 5
	990		Memory for GPO 6
	991		Memory for GPO 7

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
7C	992	ASM State 2 Output Memory for 8 GPOs	Memory for GPO 0
	993		Memory for GPO 1
	994		Memory for GPO 2
	995		Memory for GPO 3
	996		Memory for GPO 4
	997		Memory for GPO 5
	998		Memory for GPO 6
	999		Memory for GPO 7
7D	1000	ASM State 3 Output Memory for 8 GPOs	Memory for GPO 0
	1001		Memory for GPO 1
	1002		Memory for GPO 2
	1003		Memory for GPO 3
	1004		Memory for GPO 4
	1005		Memory for GPO 5
	1006		Memory for GPO 6
	1007		Memory for GPO 7
7E	1008	ASM State 4 Output Memory for 8 GPOs	Memory for GPO 0
	1009		Memory for GPO 1
	1010		Memory for GPO 2
	1011		Memory for GPO 3
	1012		Memory for GPO 4
	1013		Memory for GPO 5
	1014		Memory for GPO 6
	1015		Memory for GPO 7
7F	1016	ASM State 5 Output Memory for 8 GPOs	Memory for GPO 0
	1017		Memory for GPO 1
	1018		Memory for GPO 2
	1019		Memory for GPO 3
	1020		Memory for GPO 4
	1021		Memory for GPO 5
	1022		Memory for GPO 6
	1023		Memory for GPO 7
80	1024	ASM State 6 Output Memory for 8 GPOs	Memory for GPO 0
	1025		Memory for GPO 1
	1026		Memory for GPO 2
	1027		Memory for GPO 3
	1028		Memory for GPO 4
	1029		Memory for GPO 5
	1030		Memory for GPO 6
	1031		Memory for GPO 7

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
81	1032	ASM State 7 Output Memory for 8 GPOs	Memory for GPO 0
	1033		Memory for GPO 1
	1034		Memory for GPO 2
	1035		Memory for GPO 3
	1036		Memory for GPO 4
	1037		Memory for GPO 5
	1038		Memory for GPO 6
	1039		Memory for GPO 7
82	1040	ASM State 8 Output Memory for 8 GPOs	Memory for GPO 0
	1041		Memory for GPO 1
	1042		Memory for GPO 2
	1043		Memory for GPO 3
	1044		Memory for GPO 4
	1045		Memory for GPO 5
	1046		Memory for GPO 6
	1047		Memory for GPO 7
83	1048	ASM State 9 Output Memory for 8 GPOs	Memory for GPO 0
	1049		Memory for GPO 1
	1050		Memory for GPO 2
	1051		Memory for GPO 3
	1052		Memory for GPO 4
	1053		Memory for GPO 5
	1054		Memory for GPO 6
	1055		Memory for GPO 7
84	1056	ASM State 10 Output Memory for 8 GPOs	Memory for GPO 0
	1057		Memory for GPO 1
	1058		Memory for GPO 2
	1059		Memory for GPO 3
	1060		Memory for GPO 4
	1061		Memory for GPO 5
	1062		Memory for GPO 6
	1063		Memory for GPO 7
85	1064	ASM State 11 Output Memory for 8 GPOs	Memory for GPO 0
	1065		Memory for GPO 1
	1066		Memory for GPO 2
	1067		Memory for GPO 3
	1068		Memory for GPO 4
	1069		Memory for GPO 5
	1070		Memory for GPO 6
	1071		Memory for GPO 7

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
86	1072	ASM State 0 Output Memory for Matrix Input	Memory for Matrix input 0
	1073		Memory for Matrix input 1
	1074		Memory for Matrix input 2
	1075		Memory for Matrix input 3
	1076	ASM State 1 Output Memory for Matrix Input	Memory for Matrix input 0
	1077		Memory for Matrix input 1
	1078		Memory for Matrix input 2
	1079		Memory for Matrix input 3
87	1080	ASM State 2 Output Memory for Matrix Input	Memory for Matrix input 0
	1081		Memory for Matrix input 1
	1082		Memory for Matrix input 2
	1083		Memory for Matrix input 3
	1084	ASM State 3 Output Memory for Matrix Input	Memory for Matrix input 0
	1085		Memory for Matrix input 1
	1086		Memory for Matrix input 2
	1087		Memory for Matrix input 3
88	1088	ASM State 4 Output Memory for Matrix Input	Memory for Matrix input 0
	1089		Memory for Matrix input 1
	1090		Memory for Matrix input 2
	1091		Memory for Matrix input 3
	1092	ASM State 5 Output Memory for Matrix Input	Memory for Matrix input 0
	1093		Memory for Matrix input 1
	1094		Memory for Matrix input 2
	1095		Memory for Matrix input 3
89	1096	ASM State 6 Output Memory for Matrix Input	Memory for Matrix input 0
	1097		Memory for Matrix input 1
	1098		Memory for Matrix input 2
	1099		Memory for Matrix input 3
	1100	ASM State 7 Output Memory for Matrix Input	Memory for Matrix input 0
	1101		Memory for Matrix input 1
	1102		Memory for Matrix input 2
	1103		Memory for Matrix input 3
8A	1104	ASM State 8 Output Memory for Matrix Input	Memory for Matrix input 0
	1105		Memory for Matrix input 1
	1106		Memory for Matrix input 2
	1107		Memory for Matrix input 3
	1108	ASM State 9 Output Memory for Matrix Input	Memory for Matrix input 0
	1109		Memory for Matrix input 1
	1110		Memory for Matrix input 2
	1111		Memory for Matrix input 3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
8B	1112	ASM State 10 Output Memory for Matrix Input	Memory for Matrix input 0
	1113		Memory for Matrix input 1
	1114		Memory for Matrix input 2
	1115		Memory for Matrix input 3
	1116	ASM State 11 Output Memory for Matrix Input	Memory for Matrix input 0
	1117		Memory for Matrix input 1
	1118		Memory for Matrix input 2
	1119		Memory for Matrix input 3
8C	1120	ASM Initial State Selection	0000 --] 1011: State 0 --] State 11
	1121		
	1122		
	1123		
	1124	Reserved registers for ASM	
	1125		
	1126		
8D	1127		
	1128	6Bit MATRIX_IN_Setting0	OUT0_Setting0: REG_MATRIX_IN_SEL[5:0]
	1129		
	1130		
	1131		
	1132		
	1133		
8E	1134	6Bit MATRIX_IN_Setting1	OUT0_Setting0: REG_MATRIX_IN_SEL[11:6]
	1135		
	1136		
	1137		
	1138		
	1139		
8F	1140	6Bit MATRIX_IN_Setting2	OUT0_Setting0: REG_MATRIX_IN_SEL[17:12]
	1141		
	1142		
	1143		
	1144	6Bit MATRIX_IN_Setting3	OUT0_Setting0: REG_MATRIX_IN_SEL[23:18]
	1145		
	1146		
	1147		
	1148		
	1149		
	1150		
	1151		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
90	1152	6Bit MATRIX_IN_Setting0	OUT1_Setting0: REG_MATRIX_IN_SEL[5:0]
	1153		
	1154		
	1155		
	1156		
	1157		
	1158		
	1159		
91	1160	6Bit MATRIX_IN_Setting1	OUT1_Setting0: REG_MATRIX_IN_SEL[11:6]
	1161		
	1162		
	1163		
	1164	6Bit MATRIX_IN_Setting2	OUT1_Setting0: REG_MATRIX_IN_SEL[17:12]
	1165		
	1166		
	1167		
92	1168	6Bit MATRIX_IN_Setting3	OUT1_Setting0: REG_MATRIX_IN_SEL[23:18]
	1169		
	1170		
	1171		
	1172	6Bit MATRIX_IN_Setting0	OUT2_Setting0: REG_MATRIX_IN_SEL[5:0]
	1173		
	1174		
	1175		
93	1176	6Bit MATRIX_IN_Setting1	OUT2_Setting0: REG_MATRIX_IN_SEL[11:6]
	1177		
	1178		
	1179		
	1180	6Bit MATRIX_IN_Setting2	OUT2_Setting0: REG_MATRIX_IN_SEL[17:12]
	1181		
	1182		
	1183		
94	1184	6Bit MATRIX_IN_Setting1	OUT2_Setting0: REG_MATRIX_IN_SEL[11:6]
	1185		
	1186		
	1187		
	1188	6Bit MATRIX_IN_Setting2	OUT2_Setting0: REG_MATRIX_IN_SEL[17:12]
	1189		
	1190		
	1191		
95	1192	6Bit MATRIX_IN_Setting3	OUT2_Setting0: REG_MATRIX_IN_SEL[23:18]
	1193		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
95	1194	6Bit MATRIX_IN_Setting3	OUT2_Setting0: REG_MATRIX_IN_SEL[23:18]
	1195		
	1196		
	1197		
	1198		
	1199		
96	1200	State0_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1201		
	1202	State0_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1203		
	1204	State0_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1205		
	1206	State1_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1207		
97	1208	State1_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1209		
	1210	State1_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1211		
	1212	State2_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1213		
	1214	State2_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1215		
98	1216	State2_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1217		
	1218	State3_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1219		
	1220	State3_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1221		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
98	1222	State3_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1223		
99	1224	State4_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1225		
	1226	State4_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1227		
	1228	State4_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1229		
	1230	State5_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1231		
9A	1232	State5_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1233		
	1234	State5_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1235		
	1236	State6_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1237		
	1238	State6_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1239		
9B	1240	State6_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1241		
	1242	State7_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1243		
	1244	State7_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1245		
	1246	State7_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1247		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
9C	1248	State8_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1249		
	1250	State8_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1251		
	1252	State8_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1253		
	1254	State9_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1255		
9D	1256	State9_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1257		
	1258	State9_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1259		
	1260	State10_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1261		
	1262	State10_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1263		
9E	1264	State10_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1265		
	1266	State11_6BitMatrix_OUT0 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1267		
	1268	State11_6BitMatrix_OUT1 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1269		
	1270	State11_6BitMatrix_OUT2 4 Settings selection	00: Settings 0 01: Settings 1 10: Settings 2 11: Settings 3
	1271		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
9F	1272	ASM Input Matrix (Signal Source for State 0 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1273		
	1274		
	1275		
	1276	ASM Input Matrix (Signal Source for State 0 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1277		
	1278		
	1279		
A0	1280	ASM Input Matrix (Signal Source for State 0 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1281	ASM Input Matrix (Signal Source for State 0 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1282		
	1283		
	1284		
	1285	ASM Input Matrix (Signal Source for State 0 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1286		
	1287		
A1	1288	ASM Input Matrix (Signal Source for State 0 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1289		
	1290		
	1291		
	1292	ASM Input Matrix (Signal Source for State 0 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
A1	1293	ASM Input Matrix (Signal Source for State 0 → State 7 Transition)	000: VSS;
	1294		001: 6Bit_Matrix_OUT0;
	1295		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
A2	1296	ASM Input Matrix (Signal Source for State 0 → State 8 Transition)	000: VSS;
	1297		001: 6Bit_Matrix_OUT0;
	1298		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1299	ASM Input Matrix (Signal Source for State 0 → State 9 Transition)	000: VSS;
	1300		001: 6Bit_Matrix_OUT0;
	1301		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1302		000: VSS;
	1303		001: 6Bit_Matrix_OUT0;
A3	1304	ASM Input Matrix (Signal Source for State 0 → State 10 Transition)	010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1305	ASM Input Matrix (Signal Source for State 0 → State 11 Transition)	000: VSS;
	1306		001: 6Bit_Matrix_OUT0;
	1307		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1308	ASM Input Matrix (Signal Source for State 1 → State 10 Transition), bit [2] Note: This bit, along with registers [1343:1342], select the signal source for State 1 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1309	ASM Input Matrix (Signal Source for State 1 → State 11 Transition)	000: VSS;
	1310		001: 6Bit_Matrix_OUT0;
	1311		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
A4	1312	ASM Input Matrix (Signal Source for State 1 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1313		
	1314		
	1315	ASM Input Matrix (Signal Source for State 1 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1316		
	1317		
	1318		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1319		
A5	1320	ASM Input Matrix (Signal Source for State 1 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1321	ASM Input Matrix (Signal Source for State 1 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1322		
	1323		
	1324	ASM Input Matrix (Signal Source for State 1 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1325		
	1326		
	1327		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1328		
A6	1329	ASM Input Matrix (Signal Source for State 1 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1330	ASM Input Matrix (Signal Source for State 1 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1331		
	1332		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
A6	1333	ASM Input Matrix (Signal Source for State 1 → State 7 Transition)	000: VSS;
	1334		001: 6Bit_Matrix_OUT0;
	1335		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
A7	1336	ASM Input Matrix (Signal Source for State 1 → State 8 Transition)	000: VSS;
	1337		001: 6Bit_Matrix_OUT0;
	1338		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1339	ASM Input Matrix (Signal Source for State 1 → State 9 Transition)	000: VSS;
	1340		001: 6Bit_Matrix_OUT0;
	1341		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1342	ASM Input Matrix (Signal Source for State 1 → State 10 Transition), bits [1:0] Note: These bits, along with register [1308], select the signal source for State 1 to State 10 Transition	000: VSS;
	1343		001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
A8	1344	ASM Input Matrix (Signal Source for State 2 → State 0 Transition)	000: VSS;
	1345		001: 6Bit_Matrix_OUT0;
	1346		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1347	ASM Input Matrix (Signal Source for State 2 → State 1 Transition)	000: VSS;
	1348		001: 6Bit_Matrix_OUT0;
	1349		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1350	ASM Input Matrix (Signal Source for State 2 → State 2 Transition)	000: VSS;
	1351		001: 6Bit_Matrix_OUT0;
A9	1352	ASM Input Matrix (Signal Source for State 2 → State 2 Transition)	010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
A9	1353	ASM Input Matrix (Signal Source for State 2 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1354		
	1355		
	1356	ASM Input Matrix (Signal Source for State 2 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1357		
	1358		
AA	1359	ASM Input Matrix (Signal Source for State 2 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1360		
	1361		
	1362	ASM Input Matrix (Signal Source for State 2 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1363		
	1364		
	1365	ASM Input Matrix (Signal Source for State 2 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1366		
	1367		
AB	1368	ASM Input Matrix (Signal Source for State 2 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1369		
	1370		
	1371	ASM Input Matrix (Signal Source for State 2 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1372		
	1373		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
AB	1374		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1375		
AC	1376	ASM Input Matrix (Signal Source for State 2 → State 10 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1377	ASM Input Matrix (Signal Source for State 2 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1378		
	1379		
	1380	ASM Input Matrix (Signal Source for State 3 → State 10 Transition), bit [2] Note: This bit, along with registers [1415:1414], select the signal source for State 3 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1381	ASM Input Matrix (Signal Source for State 3 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1382		
	1383		
AD	1384	ASM Input Matrix (Signal Source for State 3 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1385		
	1386		
	1387	ASM Input Matrix (Signal Source for State 3 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1388		
	1389		
	1390	ASM Input Matrix (Signal Source for State 3 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1391		
AE	1392		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
AE	1393	ASM Input Matrix (Signal Source for State 3 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1394		
	1395		
	1396	ASM Input Matrix (Signal Source for State 3 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1397		
	1398		
AF	1399	ASM Input Matrix (Signal Source for State 3 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1400		
	1401		
	1402	ASM Input Matrix (Signal Source for State 3 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1403		
	1404		
	1405	ASM Input Matrix (Signal Source for State 3 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1406		
	1407		
BO	1408	ASM Input Matrix (Signal Source for State 3 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1409		
	1410		
	1411	ASM Input Matrix (Signal Source for State 3 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1412		
	1413		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
BO	1414	ASM Input Matrix (Signal Source for State 3 →State 10 Transition), bits [1:0] Note: These bits, along with registers [1380], select the signal source for State 3 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1415		
B1	1416	ASM Input Matrix (Signal Source for State 4 →State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1417		
	1418		
	1419	ASM Input Matrix (Signal Source for State 4 →State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1420		
	1421		
	1422	ASM Input Matrix (Signal Source for State 4 →State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1423		
B2	1424	ASM Input Matrix (Signal Source for State 4 →State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1425		
	1426		
	1427	ASM Input Matrix (Signal Source for State 4 →State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1428		
	1429		
	1430	ASM Input Matrix (Signal Source for State 4 →State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1431		
B3	1432		
	1433		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
B3	1434	ASM Input Matrix (Signal Source for State 4 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1435		
	1436		
	1437	ASM Input Matrix (Signal Source for State 4 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1438		
	1439		
B4	1440	ASM Input Matrix (Signal Source for State 4 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1441		
	1442		
	1443	ASM Input Matrix (Signal Source for State 4 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1444		
	1445		
	1446	ASM Input Matrix (Signal Source for State 4 → State 10 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1447		
B5	1448	ASM Input Matrix (Signal Source for State 4 → State 10 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1449	ASM Input Matrix (Signal Source for State 4 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1450		
	1451		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
B5	1452	ASM Input Matrix (Signal Source for State 5 → State 10 Transition), bit [2] Note: This bit, along with registers [1487:1486], select the signal source for State 5 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1453	ASM Input Matrix (Signal Source for State 5 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1454		
	1455		
B6	1456	ASM Input Matrix (Signal Source for State 5 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1457		
	1458		
	1459	ASM Input Matrix (Signal Source for State 5 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1460		
	1461		
	1462	ASM Input Matrix (Signal Source for State 5 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1463		
B7	1464	ASM Input Matrix (Signal Source for State 5 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1465	ASM Input Matrix (Signal Source for State 5 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1466		
	1467	ASM Input Matrix (Signal Source for State 5 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
B7	1468	ASM Input Matrix (Signal Source for State 5 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1469		
	1470		
	1471		
B8	1472	ASM Input Matrix (Signal Source for State 5 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1473		
	1474		
	1475		
	1476	ASM Input Matrix (Signal Source for State 5 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1477		
	1478		
	1479		
B9	1480	ASM Input Matrix (Signal Source for State 5 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1481		
	1482		
	1483		
	1484	ASM Input Matrix (Signal Source for State 5 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1485		
	1486		
	1487		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
BA	1488	ASM Input Matrix (Signal Source for State 6 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1489		
	1490		
	1491	ASM Input Matrix (Signal Source for State 6 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1492		
	1493		
	1494	ASM Input Matrix (Signal Source for State 6 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1495		
BB	1496		
	1497	ASM Input Matrix (Signal Source for State 6 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1498		
	1499		
	1500	ASM Input Matrix (Signal Source for State 6 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1501		
	1502		
	1503	ASM Input Matrix (Signal Source for State 6 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
BC	1504		
	1505		
	1506	ASM Input Matrix (Signal Source for State 6 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1507		
	1508		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
BC	1509	ASM Input Matrix (Signal Source for State 6 → State 7 Transition)	000: VSS;
	1510		001: 6Bit_Matrix_OUT0;
	1511		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
BD	1512	ASM Input Matrix (Signal Source for State 6 → State 8 Transition)	000: VSS;
	1513		001: 6Bit_Matrix_OUT0;
	1514		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1515	ASM Input Matrix (Signal Source for State 6 → State 9 Transition)	000: VSS;
	1516		001: 6Bit_Matrix_OUT0;
	1517		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1518	ASM Input Matrix (Signal Source for State 6 → State 10 Transition)	000: VSS;
	1519		001: 6Bit_Matrix_OUT0;
BE	1520		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1521	ASM Input Matrix (Signal Source for State 6 → State 11 Transition)	000: VSS;
	1522		001: 6Bit_Matrix_OUT0;
	1523		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1524	ASM Input Matrix (Signal Source for State 7 → State 10 Transition), bit [2] Note: This bit, along with registers [1559:1558], select the signal source for State 7 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1525	ASM Input Matrix (Signal Source for State 7 → State 11 Transition)	000: VSS;
	1526		001: 6Bit_Matrix_OUT0;
	1527		010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
BF	1528	ASM Input Matrix (Signal Source for State 7 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1529		
	1530		
	1531		
	1532	ASM Input Matrix (Signal Source for State 7 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1533		
	1534		
	1535		
CO	1536	ASM Input Matrix (Signal Source for State 7 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1537	ASM Input Matrix (Signal Source for State 7 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1538		
	1539		
	1540		
	1541	ASM Input Matrix (Signal Source for State 7 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1542		
	1543		
C1	1544	ASM Input Matrix (Signal Source for State 7 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1545		
	1546		
	1547		
	1548	ASM Input Matrix (Signal Source for State 7 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
C1	1549	ASM Input Matrix (Signal Source for State 7 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1550		
	1551		
C2	1552	ASM Input Matrix (Signal Source for State 7 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1553		
	1554		
	1555	ASM Input Matrix (Signal Source for State 7 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1556		
	1557		
	1558	ASM Input Matrix (Signal Source for State 7 → State 10 Transition), bits [1:0] Note: These bits, along with register [1524], select the signal source for State 7 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1559		
C3	1560	ASM Input Matrix (Signal Source for State 8 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1561		
	1562		
	1563	ASM Input Matrix (Signal Source for State 8 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1564		
	1565		
	1566	ASM Input Matrix (Signal Source for State 8 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1567		
C4	1568	ASM Input Matrix (Signal Source for State 8 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
C4	1569	ASM Input Matrix (Signal Source for State 8 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1570		
	1571		
	1572	ASM Input Matrix (Signal Source for State 8 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1573		
	1574		
C5	1575	ASM Input Matrix (Signal Source for State 8 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1576		
	1577		
	1578	ASM Input Matrix (Signal Source for State 8 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1579		
	1580		
	1581	ASM Input Matrix (Signal Source for State 8 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1582		
	1583		
C6	1584	ASM Input Matrix (Signal Source for State 8 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1585		
	1586		
	1587	ASM Input Matrix (Signal Source for State 8 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1588		
	1589		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
C6	1590		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1591		
C7	1592	ASM Input Matrix (Signal Source for State 8 → State 10 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1593		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1594		
	1595	ASM Input Matrix (Signal Source for State 8 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1596	ASM Input Matrix (Signal Source for State 9 → State 10 Transition), bit [2] Note: This bit, along with registers [1631:1630], select the signal source for State 9 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1597		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1598		
	1599	ASM Input Matrix (Signal Source for State 9 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
C8	1600		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1601		
	1602	ASM Input Matrix (Signal Source for State 9 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1603		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1604		
	1605	ASM Input Matrix (Signal Source for State 9 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1606		000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1607		
C9	1608	ASM Input Matrix (Signal Source for State 9 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
C9	1609	ASM Input Matrix (Signal Source for State 9 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1610		
	1611		
	1612	ASM Input Matrix (Signal Source for State 9 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1613		
	1614		
CA	1615	ASM Input Matrix (Signal Source for State 9 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1616		
	1617		
	1618	ASM Input Matrix (Signal Source for State 9 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1619		
	1620		
	1621	ASM Input Matrix (Signal Source for State 9 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1622		
	1623		
CB	1624	ASM Input Matrix (Signal Source for State 9 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1625		
	1626		
	1627	ASM Input Matrix (Signal Source for State 9 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1628		
	1629		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
CB	1630	ASM Input Matrix (Signal Source for State 9 → State 10 Transition), bits [1:0] Note: These bits, along with register [1596], select the signal source for State 9 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1631		
CC	1632	ASM Input Matrix (Signal Source for State 10 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1633		
	1634	ASM Input Matrix (Signal Source for State 10 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1635		
	1636	ASM Input Matrix (Signal Source for State 10 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1637		
	1638	ASM Input Matrix (Signal Source for State 10 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1639		
CD	1640	ASM Input Matrix (Signal Source for State 10 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1641		
	1642	ASM Input Matrix (Signal Source for State 10 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1643		
	1644	ASM Input Matrix (Signal Source for State 10 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1645		
	1646	ASM Input Matrix (Signal Source for State 10 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1647		
CE	1648	ASM Input Matrix (Signal Source for State 10 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1649		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
CE	1650	ASM Input Matrix (Signal Source for State 10 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1651		
	1652		
	1653	ASM Input Matrix (Signal Source for State 10 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1654		
	1655		
CF	1656	ASM Input Matrix (Signal Source for State 10 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1657		
	1658		
	1659	ASM Input Matrix (Signal Source for State 10 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1660		
	1661		
D0	1662	ASM Input Matrix (Signal Source for State 10 → State 10 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1663		
	1664		
	1665	ASM Input Matrix (Signal Source for State 10 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1666		
	1667	ASM Input Matrix (Signal Source for State 10 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1668	ASM Input Matrix (Signal Source for State 11 → State 10 Transition), bit [2] Note: This bit, along with registers [1703:1702], select the signal source for State 11 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
D0	1669	ASM Input Matrix (Signal Source for State 11 → State 11 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1670		
	1671		
D1	1672	ASM Input Matrix (Signal Source for State 11 → State 0 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1673		
	1674		
	1675	ASM Input Matrix (Signal Source for State 11 → State 1 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1676		
	1677		
	1678	ASM Input Matrix (Signal Source for State 11 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1679		
D2	1680	ASM Input Matrix (Signal Source for State 11 → State 2 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1681	ASM Input Matrix (Signal Source for State 11 → State 3 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1682		
	1683		
	1684	ASM Input Matrix (Signal Source for State 11 → State 4 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1685		
	1686		
D3	1687	ASM Input Matrix (Signal Source for State 11 → State 5 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1688		
	1689		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
D3	1690	ASM Input Matrix (Signal Source for State 11 → State 6 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1691		
	1692		
	1693	ASM Input Matrix (Signal Source for State 11 → State 7 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1694		
	1695		
D4	1696	ASM Input Matrix (Signal Source for State 11 → State 8 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1697		
	1698		
	1699	ASM Input Matrix (Signal Source for State 11 → State 9 Transition)	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1700		
	1701		
	1702	ASM Input Matrix (Signal Source for State 11 → State 10 Transition), bits [1:0] Note: These bits, along with register [1668], select the signal source for State 11 to State 10 Transition	000: VSS; 001: 6Bit_Matrix_OUT0; 010: 6Bit_Matrix_OUT1; 011: 6Bit_Matrix_OUT2; 100: DM0_0; 101: DM0_1; 110: DM1_0; 111: DM1_1
	1703		
D5	1704	DM0_0 Configuration Register 0 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1705		
	1706		
	1707		
	1708		
	1709		
	1710		
	1711		
D6	1712	DM0_0 Configuration Register 0 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1713		
	1714		
	1715		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
D6	1716	DM0_0 Configuration Register 0 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1717		
	1718		
	1719		
D7	1720	DM0_0 Configuration Register 0 DLY input from matrix	DM Delay input
	1721		
	1722		
	1723		
	1724		
	1725		
	1726		
D8	1727	DM0_0 Configuration Register 0 Data of LUT3	REG_VAL_LUT3[0] REG_VAL_LUT3[1] REG_VAL_LUT3[2] REG_VAL_LUT3[3] REG_VAL_LUT3[4] REG_VAL_LUT3[5] REG_VAL_LUT3[6] REG_VAL_LUT3[7]
	1728		
	1729		
	1730		
	1731		
	1732		
	1733		
	1734		
D9	1735	DM0_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[0] REG_VAL_LUT2[1] REG_VAL_LUT2[2] REG_VAL_LUT2[3]
	1736		
	1737		
	1738		
	1739	DM0_0 Configuration Register 0 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	1740		
	1741		
	1742		
	1743		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
DA	1744	DM0_0 Configuration Register 0 Data of Delay	Data[7:0]
	1745		
	1746		
	1747		
	1748		
	1749		
	1750		
	1751		
DB	1752	DM0_0 Configuration Register 0 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1753		
	1754	DM0_0 Configuration Register 0 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	1755		
	1756		
	1757		
	1758	DM0_0 Configuration Register 0 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	1759	DM0_0 Configuration Register 0 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3
DC	1760	DM0_0 Configuration Register 1 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1761		
	1762		
	1763		
	1764		
	1765		
	1766		
	1767		
DD	1768	DM0_0 Configuration Register 1 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1769		
	1770		
	1771		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
DD	1772	DM0_0 Configuration Register 1 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1773		
	1774		
	1775		
DE	1776	DM0_0 Configuration Register 1 DLY input from matrix	DM Delay input
	1777		
	1778		
	1779		
	1780		
	1781		
	1782		
DF	1783	DM0_0 Configuration Register 1 Data of LUT3	REG_VAL_LUT3[0]
	1784		
	1785		
	1786		
	1787		
	1788		
	1789		
	1790		
E0	1791	DM0_0 Configuration Register 1 Clock source selection	REG_VAL_LUT3[7]
	1792		REG_VAL_LUT2[0]
	1793		REG_VAL_LUT2[1]
	1794		REG_VAL_LUT2[2]
	1795		REG_VAL_LUT2[3]
	1796		Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	1797		
	1798		
	1799		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
E1	1800	DM0_0 Configuration Register 1 Data of Delay	Data[7:0]
	1801		
	1802		
	1803		
	1804		
	1805		
	1806		
	1807		
E2	1808	DM0_0 Configuration Register 1 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1809		
	1810	DM0_0 Configuration Register 1 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	1811		
	1812		
	1813		
	1814	DM0_0 Configuration Register 1 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	1815	DM0_0 Configuration Register 1 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3
E3	1816	DM0_0 Configuration Register 2 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1817		
	1818		
	1819		
	1820		
	1821		
	1822		
	1823		
E4	1824	DM0_0 Configuration Register 2 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1825		
	1826		
	1827		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition	
Byte	Register Bit			
E4	1828	DM0_0 Configuration Register 2 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]	
	1829			
	1830			
	1831			
E5	1832	DM0_0 Configuration Register 2 DLY input from matrix	DM Delay input	
	1833			
	1834			
	1835			
	1836			
	1837			
	1838			
E6	1839	DM0_0 Configuration Register 2 Data of LUT3	REG_VAL_LUT3[0]	
	1840			REG_VAL_LUT3[1]
	1841			REG_VAL_LUT3[2]
	1842			REG_VAL_LUT3[3]
	1843			REG_VAL_LUT3[4]
	1844			REG_VAL_LUT3[5]
	1845			REG_VAL_LUT3[6]
	1846			REG_VAL_LUT3[7]
E7	1847	DM0_0 Configuration Register 2 Clock source selection	REG_VAL_LUT3[7]	
	1848		REG_VAL_LUT2[0]	
	1849		REG_VAL_LUT2[1]	
	1850		REG_VAL_LUT2[2]	
	1851		REG_VAL_LUT2[3]	
	1852		Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External	
	1853			
	1854			
	1855			

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
E8	1856	DM0_0 Configuration Register 2 Data of Delay	Data[7:0]
	1857		
	1858		
	1859		
	1860		
	1861		
	1862		
	1863		
E9	1864	DM0_0 Configuration Register 2 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1865		
	1866	DM0_0 Configuration Register 2 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	1867		
	1868		
	1869		
	1870	DM0_0 Configuration Register 2 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	1871	DM0_0 Configuration Register 2 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3
EA	1872	DM0_0 Configuration Register 3 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1873		
	1874		
	1875		
	1876		
	1877		
	1878		
	1879		
EB	1880	DM0_0 Configuration Register 3 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1881		
	1882		
	1883		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
EB	1884	DM0_0 Configuration Register 3 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1885		
	1886		
	1887		
EC	1888	DM0_0 Configuration Register 3 DLY input from matrix	DM Delay input
	1889		
	1890		
	1891		
	1892		
	1893		
	1894		
ED	1895	DM0_0 Configuration Register 3 Data of LUT3	REG_VAL_LUT3[0]
	1896		
	1897		
	1898		
	1899		
	1900		
	1901		
	1902		
EE	1903	DM0_0 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[7]
	1904		REG_VAL_LUT2[0]
	1905		REG_VAL_LUT2[1]
	1906		REG_VAL_LUT2[2]
	1907		REG_VAL_LUT2[3]
	1908		Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	1909		
	1910		
	1911		
	1911		
	1911		
	1911		
	1911		
	1911		
	1911		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
EF	1912	DM0_0 Configuration Register 3 Data of Delay	Data[7:0]
	1913		
	1914		
	1915		
	1916		
	1917		
	1918		
	1919		
F0	1920	DM0_0 Configuration Register 3 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	1921		
	1922	DM0_0 Configuration Register 3 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	1923		
	1924		
	1925		
	1926	DM0_0 Configuration Register 3 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	1927	DM0_0 Configuration Register 3 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3
F1	1928	DM0_0 Configuration Register 4 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1929		
	1930		
	1931		
	1932		
	1933		
	1934		
	1935		
F2	1936	DM0_0 Configuration Register 4 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1937		
	1938		
	1939		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
F2	1940	DM0_0 Configuration Register 4 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1941		
	1942		
	1943		
F3	1944	DM0_0 Configuration Register 4 DLY input from matrix	DM Delay input
	1945		
	1946		
	1947		
	1948		
	1949		
F4	1950	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[0]
	1951		
	1952		
	1953		
	1954		
	1955		
F5	1956	DM0_0 Configuration Register 4 Clock source selection	REG_VAL_LUT3[1]
	1957		
	1958		
	1959		
	1960		
	1961		
F6	1962	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	1963		
	1964		
	1965		
	1966		
	1967		
F7	1968	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	1969		
	1970		
	1971		
	1972		
	1973		
F8	1974	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	1975		
	1976		
	1977		
	1978		
	1979		
F9	1980	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	1981		
	1982		
	1983		
	1984		
	1985		
FA	1986	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	1987		
	1988		
	1989		
	1990		
	1991		
FB	1992	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	1993		
	1994		
	1995		
	1996		
	1997		
FC	1998	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	1999		
	2000		
	2001		
	2002		
	2003		
FD	2004	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2005		
	2006		
	2007		
	2008		
	2009		
FE	2010	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2011		
	2012		
	2013		
	2014		
	2015		
FF	2016	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2017		
	2018		
	2019		
	2020		
	2021		
100	2022	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2023		
	2024		
	2025		
	2026		
	2027		
101	2028	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2029		
	2030		
	2031		
	2032		
	2033		
102	2034	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2035		
	2036		
	2037		
	2038		
	2039		
103	2040	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2041		
	2042		
	2043		
	2044		
	2045		
104	2046	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2047		
	2048		
	2049		
	2050		
	2051		
105	2052	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2053		
	2054		
	2055		
	2056		
	2057		
106	2058	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2059		
	2060		
	2061		
	2062		
	2063		
107	2064	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2065		
	2066		
	2067		
	2068		
	2069		
108	2070	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2071		
	2072		
	2073		
	2074		
	2075		
109	2076	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2077		
	2078		
	2079		
	2080		
	2081		
10A	2082	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2083		
	2084		
	2085		
	2086		
	2087		
10B	2088	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2089		
	2090		
	2091		
	2092		
	2093		
10C	2094	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2095		
	2096		
	2097		
	2098		
	2099		
10D	2100	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2101		
	2102		
	2103		
	2104		
	2105		
10E	2106	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2107		
	2108		
	2109		
	2110		
	2111		
10F	2112	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2113		
	2114		
	2115		
	2116		
	2117		
110	2118	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2119		
	2120		
	2121		
	2122		
	2123		
111	2124	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2125		
	2126		
	2127		
	2128		
	2129		
112	2130	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2131		
	2132		
	2133		
	2134		
	2135		
113	2136	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2137		
	2138		
	2139		
	2140		
	2141		
114	2142	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2143		
	2144		
	2145		
	2146		
	2147		
115	2148	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2149		
	2150		
	2151		
	2152		
	2153		
116	2154	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2155		
	2156		
	2157		
	2158		
	2159		
117	2160	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2161		
	2162		
	2163		
	2164		
	2165		
118	2166	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2167		
	2168		
	2169		
	2170		
	2171		
119	2172	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2173		
	2174		
	2175		
	2176		
	2177		
11A	2178	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2179		
	2180		
	2181		
	2182		
	2183		
11B	2184	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2185		
	2186		
	2187		
	2188		
	2189		
11C	2190	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2191		
	2192		
	2193		
	2194		
	2195		
11D	2196	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2197		
	2198		
	2199		
	2200		
	2201		
11E	2202	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2203		
	2204		
	2205		
	2206		
	2207		
11F	2208	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2209		
	2210		
	2211		
	2212		
	2213		
120	2214	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2215		
	2216		
	2217		
	2218		
	2219		
121	2220	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2221		
	2222		
	2223		
	2224		
	2225		
122	2226	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2227		
	2228		
	2229		
	2230		
	2231		
123	2232	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2233		
	2234		
	2235		
	2236		
	2237		
124	2238	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2239		
	2240		
	2241		
	2242		
	2243		
125	2244	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2245		
	2246		
	2247		
	2248		
	2249		
126	2250	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2251		
	2252		
	2253		
	2254		
	2255		
127	2256	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2257		
	2258		
	2259		
	2260		
	2261		
128	2262	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2263		
	2264		
	2265		
	2266		
	2267		
129	2268	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2269		
	2270		
	2271		
	2272		
	2273		
12A	2274	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2275		
	2276		
	2277		
	2278		
	2279		
12B	2280	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2281		
	2282		
	2283		
	2284		
	2285		
12C	2286	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2287		
	2288		
	2289		
	2290		
	2291		
12D	2292	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2293		
	2294		
	2295		
	2296		
	2297		
12E	2298	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2299		
	2300		
	2301		
	2302		
	2303		
12F	2304	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2305		
	2306		
	2307		
	2308		
	2309		
130	2310	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2311		
	2312		
	2313		
	2314		
	2315		
131	2316	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2317		
	2318		
	2319		
	2320		
	2321		
132	2322	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2323		
	2324		
	2325		
	2326		
	2327		
133	2328	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2329		
	2330		
	2331		
	2332		
	2333		
134	2334	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2335		
	2336		
	2337		
	2338		
	2339		
135	2340	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2341		
	2342		
	2343		
	2344		
	2345		
136	2346	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2347		
	2348		
	2349		
	2350		
	2351		
137	2352	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2353		
	2354		
	2355		
	2356		
	2357		
138	2358	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2359		
	2360		
	2361		
	2362		
	2363		
139	2364	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2365		
	2366		
	2367		
	2368		
	2369		
13A	2370	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2371		
	2372		
	2373		
	2374		
	2375		
13B	2376	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2377		
	2378		
	2379		
	2380		
	2381		
13C	2382	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2383		
	2384		
	2385		
	2386		
	2387		
13D	2388	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2389		
	2390		
	2391		
	2392		
	2393		
13E	2394	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2395		
	2396		
	2397		
	2398		
	2399		
13F	2400	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2401		
	2402		
	2403		
	2404		
	2405		
140	2406	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2407		
	2408		
	2409		
	2410		
	2411		
141	2412	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2413		
	2414		
	2415		
	2416		
	2417		
142	2418	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2419		
	2420		
	2421		
	2422		
	2423		
143	2424	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2425		
	2426		
	2427		
	2428		
	2429		
144	2430	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2431		
	2432		
	2433		
	2434		
	2435		
145	2436	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2437		
	2438		
	2439		
	2440		
	2441		
146	2442	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2443		
	2444		
	2445		
	2446		
	2447		
147	2448	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2449		
	2450		
	2451		
	2452		
	2453		
148	2454	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2455		
	2456		
	2457		
	2458		
	2459		
149	2460	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2461		
	2462		
	2463		
	2464		
	2465		
14A	2466	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2467		
	2468		
	2469		
	2470		
	2471		
14B	2472	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]
	2473		
	2474		
	2475		
	2476		
	2477		
14C	2478	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[0]
	2479		
	2480		
	2481		
	2482		
	2483		
14D	2484	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[1]
	2485		
	2486		
	2487		
	2488		
	2489		
14E	2490	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
	2491		
	2492		
	2493		
	2494		
	2495		
14F	2496	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[3]
	2497		
	2498		
	2499		
	2500		
	2501		
150	2502	DM0_0 Configuration Register 4 Data of LUT0	REG_VAL_LUT3[4]
	2503		
	2504		
	2505		
	2506		
	2507		
151	2508	DM0_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[5]
	2509		
	2510		
	2511		
	2512		
	2513		
152	2514	DM0_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
	2515		
	2516		
	2517		
	2518		
	2519		
153	2520	DM0_0 Configuration Register 4 Data of LUT1	REG_VAL_LUT3[7]</

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
F6	1968	DM0_0 Configuration Register 4 Data of Delay	Data[7:0]
	1969		
	1970		
	1971		
	1972		
	1973		
	1974		
	1975		
F7	1976	DM0_0 Configuration Register 4 DLY input initial selection	00: bypass the initial
	1977		01: initial 0 10: initial 1 11: initial 1
	1978	DM0_0 Configuration Register 4 DLY/CNT Function selection	0000: Both Edge Delay
	1979		0001: Falling Edge Delay
	1980		0010: Rising Edge Delay
			0011: Both Edge One Shot
			0100: Falling Edge One Shot
			0101: Rising Edge One Shot
	1981	0110: Both Edge Freq Detect	
0111: Falling Edge Freq Detect			
1000: Rising Edge Freq Detect			
1001: Both Edge Detect			
1010: Falling Edge Detect			
1011: Rising Edge Detect			
1982	DM0_0 Configuration Register 4 MUX1 selection for LUT2	1100: Both Edge Reset CNT	
		1101: Falling Edge Reset CNT	
		1110: Rising Edge Reset CNT	
1983	DM0_0 Configuration Register 4 MUX2 selection for DLY input	1111: High Level Reset CNT	
F8	1984	DM0_0 Configuration Register 5 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	1985		
	1986		
	1987		
	1988		
	1989		
	1990		
	1991		
F9	1992	DM0_0 Configuration Register 5 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	1993		
	1994		
	1995		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
F9	1996	DM0_0 Configuration Register 5 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	1997		
	1998		
	1999		
FA	2000	DM0_0 Configuration Register 5 DLY input from matrix	DM Delay input
	2001		
	2002		
	2003		
	2004		
	2005		
	2006		
FB	2007	DM0_0 Configuration Register 5 Data of LUT3	REG_VAL_LUT3[0]
	2008		
	2009		
	2010		
	2011		
	2012		
	2013		
	2014		
FC	2015	DM0_0 Configuration Register 5 Clock source selection	REG_VAL_LUT3[7]
	2016		
	2017		
	2018		
	2019		
	2020		
	2021		
	2022		
2023			REG_VAL_LUT2[0]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
FD	2024	DM0_0 Configuration Register 5 Data of Delay	Data[7:0]
	2025		
	2026		
	2027		
	2028		
	2029		
	2030		
	2031		
FE	2032	DM0_0 Configuration Register 5 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2033		
	2034	DM0_0 Configuration Register 5 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2035		
	2036		
	2037		
	2038	DM0_0 Configuration Register 5 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2039	DM0_0 Configuration Register 5 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3
FF	2040	power sequency byte 5A	5A fixed
	2041		
	2042		
	2043		
	2044		
	2045		
	2046		
	2047		
100	2048	DM0_1 Configuration Register 0 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2049		
	2050		
	2051		
	2052		
	2053		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
100	2054	DM0_1 Configuration Register 0 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2055		
101	2056		
	2057		
	2058		
	2059		
	2060	DM0_1 Configuration Register 0 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
102	2061		
	2062		
	2063		
	2064		
103	2065	DM0_1 Configuration Register 0 DLY input from matrix	DM Delay input
	2066		
	2067		
	2068		
	2069		
104	2070	DM0_1 Configuration Register 0 Data of LUT3	REG_VAL_LUT3[0]
	2071		
	2072		
	2073		
	2074		
105	2075	DM0_1 Configuration Register 0 Data of LUT3	REG_VAL_LUT3[1]
	2076		
	2077		
	2078		
	2079		
106	2080	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT3[2]
	2081		
	2082		
	2083		
	2084		
107	2085	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT3[3]
	2086		
	2087		
	2088		
	2089		
108	2090	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT3[4]
	2091		
	2092		
	2093		
	2094		
109	2095	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT3[5]
	2096		
	2097		
	2098		
	2099		
110	2100	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT3[6]
	2101		
	2102		
	2103		
	2104		
111	2105	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT3[7]
	2106		
	2107		
	2108		
	2109		
112	2110	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[0]
	2111		
	2112		
	2113		
	2114		
113	2115	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[1]
	2116		
	2117		
	2118		
	2119		
114	2120	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[2]
	2121		
	2122		
	2123		
	2124		
115	2125	DM0_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[3]
	2126		
	2127		
	2128		
	2129		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
104	2084	DM0_1 Configuration Register 0 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2085		
	2086		
	2087		
105	2088	DM0_1 Configuration Register 0 Data of Delay	Data[7:0]
	2089		
	2090		
	2091		
	2092		
	2093		
	2094		
	2095		
106	2096	DM0_1 Configuration Register 0 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2097		
	2098	DM0_1 Configuration Register 0 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2099		
	2100		
	2101		
	2102	DM0_1 Configuration Register 0 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2103	DM0_1 Configuration Register 0 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition		
Byte	Register Bit				
107	2104	DM0_1 Configuration Register 1 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]		
	2105				
	2106				
	2107				
	2108				
	2109				
	2110				
108	2111	DM0_1 Configuration Register 1 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]		
	2112				
	2113				
	2114				
	2115				
	2116			DM0_1 Configuration Register 1 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2117				
2118					
2119					
109	2120				
	2121				
	2122	DM0_1 Configuration Register 1 DLY input from matrix	DM Delay input		
	2123				
	2124				
	2125				
	2126				
2127					
10A	2128	DM0_1 Configuration Register 1 Data of LUT3	REG_VAL_LUT3[0]		
	2129		REG_VAL_LUT3[1]		
	2130		REG_VAL_LUT3[2]		
	2131		REG_VAL_LUT3[3]		
	2132		REG_VAL_LUT3[4]		
	2133		REG_VAL_LUT3[5]		
	2134		REG_VAL_LUT3[6]		
	2135		REG_VAL_LUT3[7]		
10B	2136	DM0_1 Configuration Register 1 Data of LUT2	REG_VAL_LUT2[0]		
	2137		REG_VAL_LUT2[1]		
	2138		REG_VAL_LUT2[2]		
	2139		REG_VAL_LUT2[3]		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
10B	2140	DM0_1 Configuration Register 1 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2141		
	2142		
	2143		
10C	2144	DM0_1 Configuration Register 1 Data of Delay	Data[7:0]
	2145		
	2146		
	2147		
	2148		
	2149		
	2150		
	2151		
10D	2152	DM0_1 Configuration Register 1 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2153		
	2154	DM0_1 Configuration Register 1 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2155		
	2156		
	2157		
	2158	DM0_1 Configuration Register 1 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2159	DM0_1 Configuration Register 1 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
10E	2160	DM0_1 Configuration Register 2 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2161		
	2162		
	2163		
	2164		
	2165		
	2166		
	2167		
10F	2168	DM0_1 Configuration Register 2 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2169		
	2170		
	2171		
	2172	DM0_1 Configuration Register 2 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2173		
	2174		
	2175		
110	2176		
	2177		
	2178		
	2179		
	2180	DM0_1 Configuration Register 2 DLY input from matrix	DM Delay input
	2181		
	2182		
	2183		
111	2184	DM0_1 Configuration Register 2 Data of LUT3	REG_VAL_LUT3[0]
	2185		REG_VAL_LUT3[1]
	2186		REG_VAL_LUT3[2]
	2187		REG_VAL_LUT3[3]
	2188		REG_VAL_LUT3[4]
	2189		REG_VAL_LUT3[5]
	2190		REG_VAL_LUT3[6]
	2191		REG_VAL_LUT3[7]
112	2192	DM0_1 Configuration Register 2 Data of LUT2	REG_VAL_LUT2[0]
	2193		REG_VAL_LUT2[1]
	2194		REG_VAL_LUT2[2]
	2195		REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
112	2196	DM0_1 Configuration Register 2 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2197		
	2198		
	2199		
113	2200	DM0_1 Configuration Register 2 Data of Delay	Data[7:0]
	2201		
	2202		
	2203		
	2204		
	2205		
	2206		
	2207		
114	2208	DM0_1 Configuration Register 2 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2209		
	2210	DM0_1 Configuration Register 2 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2211		
	2212		
	2213		
	2214	DM0_1 Configuration Register 2 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2215	DM0_1 Configuration Register 2 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
115	2216	DM0_1 Configuration Register 3 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2217		
	2218		
	2219		
	2220		
	2221		
	2222		
116	2223	DM0_1 Configuration Register 3 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2224		
	2225		
	2226		
	2227		
	2228		
	2229		
117	2230	DM0_1 Configuration Register 3 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2231		
	2232		
	2233		
	2234		
	2235		
	2236		
118	2237	DM0_1 Configuration Register 3 DLY input from matrix	DM Delay input
	2238		
	2239		
	2240		
	2241		
	2242		
	2243		
119	2244	DM0_1 Configuration Register 3 Data of LUT3	REG_VAL_LUT3[0]
	2245		
	2246		
	2247		
	2248		
	2249		
	2250		
119	2251	DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[1]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[2]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[3]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[4]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[5]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[6]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[7]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT2[0]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT2[1]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT2[2]
119		DM0_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
119	2252	DM0_1 Configuration Register 3 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2253		
	2254		
	2255		
11A	2256	DM0_1 Configuration Register 3 Data of Delay	Data[7:0]
	2257		
	2258		
	2259		
	2260		
	2261		
	2262		
	2263		
11B	2264	DM0_1 Configuration Register 3 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2265		
	2266	DM0_1 Configuration Register 3 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2267		
	2268		
	2269		
	2270	DM0_1 Configuration Register 3 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2271	DM0_1 Configuration Register 3 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
11C	2272	DM0_1 Configuration Register 4 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2273		
	2274		
	2275		
	2276		
	2277		
	2278		
11D	2279	DM0_1 Configuration Register 4 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2280		
	2281		
	2282		
	2283		
	2284		
	2285		
11E	2286	DM0_1 Configuration Register 4 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2287		
	2288		
	2289		
	2290		
	2291		
	2292		
11F	2293	DM0_1 Configuration Register 4 DLY input from matrix	DM Delay input
	2294		
	2295		
	2296		
	2297		
	2298		
	2299		
120	2300	DM0_1 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[0]
	2301		REG_VAL_LUT3[1]
	2302		REG_VAL_LUT3[2]
	2303		REG_VAL_LUT3[3]
	2304		REG_VAL_LUT3[4]
	2305		REG_VAL_LUT3[5]
	2306		REG_VAL_LUT3[6]
120	2307	DM0_1 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[7]
	2308		REG_VAL_LUT2[0]
	2309		REG_VAL_LUT2[1]
	2310		REG_VAL_LUT2[2]
120	2311	DM0_1 Configuration Register 4 Data of LUT2	REG_VAL_LUT2[3]
	2312		REG_VAL_LUT2[4]
	2313		REG_VAL_LUT2[5]
	2314		REG_VAL_LUT2[6]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
120	2308	DM0_1 Configuration Register 4 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2309		
	2310		
	2311		
121	2312	DM0_1 Configuration Register 4 Data of Delay	Data[7:0]
	2313		
	2314		
	2315		
	2316		
	2317		
	2318		
	2319		
122	2320	DM0_1 Configuration Register 4 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2321		
	2322	DM0_1 Configuration Register 4 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2323		
	2324		
	2325		
	2326	DM0_1 Configuration Register 4 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2327	DM0_1 Configuration Register 4 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
123	2328	DM0_1 Configuration Register 5 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2329		
	2330		
	2331		
	2332		
	2333		
	2334		
124	2335	DM0_1 Configuration Register 5 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2336		
124	2337	DM0_1 Configuration Register 5 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2338		
	2339		
	2340		
	2341		
	2342		
	2343		
125	2344	DM0_1 Configuration Register 5 DLY input from matrix	DM Delay input
	2345		
	2346		
	2347		
	2348		
	2349		
	2350		
126	2351	DM0_1 Configuration Register 5 Data of LUT3	REG_VAL_LUT3[0]
	2352		REG_VAL_LUT3[1]
	2353		REG_VAL_LUT3[2]
	2354		REG_VAL_LUT3[3]
	2355		REG_VAL_LUT3[4]
	2356		REG_VAL_LUT3[5]
	2357		REG_VAL_LUT3[6]
	2358		REG_VAL_LUT3[7]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
127	2360	DM0_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[0]
	2361		REG_VAL_LUT2[1]
	2362		REG_VAL_LUT2[2]
	2363		REG_VAL_LUT2[3]
	2364	DM0_1 Configuration Register 5 Clock source selection	Clock source sel[3:0]
	2365		0000: 25M;
	2366		0001: 25M/4;
	2367		0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
128	2368	DM0_1 Configuration Register 5 Data of Delay	Data[7:0]
	2369		
	2370		
	2371		
	2372		
	2373		
	2374		
	2375		
129	2376	DM0_1 Configuration Register 5 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2377		
	2378	DM0_1 Configuration Register 5 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2379		
	2380		
	2381		
	2382	DM0_1 Configuration Register 5 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
129	2383	DM0_1 Configuration Register 5 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3
12A	2384	DM1_0 Configuration Register 0 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2385		
	2386		
	2387		
	2388		
	2389		
	2390		
12B	2391	DM1_0 Configuration Register 0 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2392		
	2393		
	2394		
	2395		
	2396		
	2397		
12C	2398	DM1_0 Configuration Register 0 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2399		
	2400		
	2401		
	2402		
	2403		
	2404		
12D	2405	DM1_0 Configuration Register 0 DLY input from matrix	DM Delay input
	2406		
	2407		
	2408		
	2409		
	2410		
	2411		
12E	2412	DM1_0 Configuration Register 0 Data of LUT3	REG_VAL_LUT3[0]
	2413		REG_VAL_LUT3[1]
	2414		REG_VAL_LUT3[2]
	2415		REG_VAL_LUT3[3]
	2416		REG_VAL_LUT3[4]
	2417		REG_VAL_LUT3[5]
	2418		REG_VAL_LUT3[6]
12F	2419	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT3[7]
	2420		REG_VAL_LUT2[0]
	2421		REG_VAL_LUT2[1]
	2422		REG_VAL_LUT2[2]
12G	2423	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[3]
	2424		REG_VAL_LUT2[4]
	2425		REG_VAL_LUT2[5]
	2426		REG_VAL_LUT2[6]
12H	2427	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[7]
	2428		REG_VAL_LUT2[8]
	2429		REG_VAL_LUT2[9]
	2430		REG_VAL_LUT2[10]
12I	2431	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[11]
	2432		REG_VAL_LUT2[12]
	2433		REG_VAL_LUT2[13]
	2434		REG_VAL_LUT2[14]
12J	2435	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[15]
	2436		REG_VAL_LUT2[16]
	2437		REG_VAL_LUT2[17]
	2438		REG_VAL_LUT2[18]
12K	2439	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[19]
	2440		REG_VAL_LUT2[20]
	2441		REG_VAL_LUT2[21]
	2442		REG_VAL_LUT2[22]
12L	2443	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[23]
	2444		REG_VAL_LUT2[24]
	2445		REG_VAL_LUT2[25]
	2446		REG_VAL_LUT2[26]
12M	2447	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[27]
	2448		REG_VAL_LUT2[28]
	2449		REG_VAL_LUT2[29]
	2450		REG_VAL_LUT2[30]
12N	2451	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[31]
	2452		REG_VAL_LUT2[32]
	2453		REG_VAL_LUT2[33]
	2454		REG_VAL_LUT2[34]
12O	2455	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[35]
	2456		REG_VAL_LUT2[36]
	2457		REG_VAL_LUT2[37]
	2458		REG_VAL_LUT2[38]
12P	2459	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[39]
	2460		REG_VAL_LUT2[40]
	2461		REG_VAL_LUT2[41]
	2462		REG_VAL_LUT2[42]
12Q	2463	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[43]
	2464		REG_VAL_LUT2[44]
	2465		REG_VAL_LUT2[45]
	2466		REG_VAL_LUT2[46]
12R	2467	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[47]
	2468		REG_VAL_LUT2[48]
	2469		REG_VAL_LUT2[49]
	2470		REG_VAL_LUT2[50]
12S	2471	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[51]
	2472		REG_VAL_LUT2[52]
	2473		REG_VAL_LUT2[53]
	2474		REG_VAL_LUT2[54]
12T	2475	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[55]
	2476		REG_VAL_LUT2[56]
	2477		REG_VAL_LUT2[57]
	2478		REG_VAL_LUT2[58]
12U	2479	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[59]
	2480		REG_VAL_LUT2[60]
	2481		REG_VAL_LUT2[61]
	2482		REG_VAL_LUT2[62]
12V	2483	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[63]
	2484		REG_VAL_LUT2[64]
	2485		REG_VAL_LUT2[65]
	2486		REG_VAL_LUT2[66]
12W	2487	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[67]
	2488		REG_VAL_LUT2[68]
	2489		REG_VAL_LUT2[69]
	2490		REG_VAL_LUT2[70]
12X	2491	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[71]
	2492		REG_VAL_LUT2[72]
	2493		REG_VAL_LUT2[73]
	2494		REG_VAL_LUT2[74]
12Y	2495	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[75]
	2496		REG_VAL_LUT2[76]
	2497		REG_VAL_LUT2[77]
	2498		REG_VAL_LUT2[78]
12Z	2499	DM1_0 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[79]
	2500		REG_VAL_LUT2[80]
	2501		REG_VAL_LUT2[81]
	2502		REG_VAL_LUT2[82]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
12E	2420	DM1_0 Configuration Register 0 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2421		
	2422		
	2423		
12F	2424	DM1_0 Configuration Register 0 Data of Delay	Data[7:0]
	2425		
	2426		
	2427		
	2428		
	2429		
	2430		
	2431		
130	2432	DM1_0 Configuration Register 0 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2433		
	2434	DM1_0 Configuration Register 0 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2435		
	2436		
	2437		
	2438	DM1_0 Configuration Register 0 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2439	DM1_0 Configuration Register 0 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
131	2440	DM1_0 Configuration Register 1 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2441		
	2442		
	2443		
	2444		
	2445		
	2446		
132	2447	DM1_0 Configuration Register 1 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2448		
	2449		
	2450		
	2451		
	2452		
	2453		
133	2454	DM1_0 Configuration Register 1 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2455		
	2456		
	2457		
	2458		
	2459		
	2460		
134	2461	DM1_0 Configuration Register 1 DLY input from matrix	DM Delay input
	2462		
	2463		
	2464		
	2465		
	2466		
	2467		
135	2468	DM1_0 Configuration Register 1 Data of LUT3	REG_VAL_LUT3[0]
	2469		
	2470		
	2471		
	2472		
	2473		
	2474		
135	2475	DM1_0 Configuration Register 1 Data of LUT2	REG_VAL_LUT3[1]
135			REG_VAL_LUT3[2]
135			REG_VAL_LUT3[3]
135			REG_VAL_LUT3[4]
135			REG_VAL_LUT3[5]
135			REG_VAL_LUT3[6]
135			REG_VAL_LUT3[7]
135			REG_VAL_LUT2[0]
135			REG_VAL_LUT2[1]
135			REG_VAL_LUT2[2]
135			REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
135	2476	DM1_0 Configuration Register 1 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2477		
	2478		
	2479		
136	2480	DM1_0 Configuration Register 1 Data of Delay	Data[7:0]
	2481		
	2482		
	2483		
	2484		
	2485		
	2486		
	2487		
137	2488	DM1_0 Configuration Register 1 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2489		
	2490	DM1_0 Configuration Register 1 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2491		
	2492		
	2493		
	2494	DM1_0 Configuration Register 1 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2495	DM1_0 Configuration Register 1 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
138	2496	DM1_0 Configuration Register 2 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2497		
	2498		
	2499		
	2500		
	2501		
	2502		
	2503		
139	2504	DM1_0 Configuration Register 2 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2505		
	2506		
	2507		
	2508	DM1_0 Configuration Register 2 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2509		
	2510		
	2511		
13A	2512	DM1_0 Configuration Register 2 DLY input from matrix	DM Delay input
	2513		
	2514		
	2515		
	2516		
	2517		
	2518		
	2519		
13B	2520	DM1_0 Configuration Register 2 Data of LUT3	REG_VAL_LUT3[0]
	2521		REG_VAL_LUT3[1]
	2522		REG_VAL_LUT3[2]
	2523		REG_VAL_LUT3[3]
	2524		REG_VAL_LUT3[4]
	2525		REG_VAL_LUT3[5]
	2526		REG_VAL_LUT3[6]
	2527		REG_VAL_LUT3[7]
13C	2528	DM1_0 Configuration Register 2 Data of LUT2	REG_VAL_LUT2[0]
	2529		REG_VAL_LUT2[1]
	2530		REG_VAL_LUT2[2]
	2531		REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
13C	2532	DM1_0 Configuration Register 2 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2533		
	2534		
	2535		
13D	2536	DM1_0 Configuration Register 2 Data of Delay	Data[7:0]
	2537		
	2538		
	2539		
	2540		
	2541		
	2542		
	2543		
13E	2544	DM1_0 Configuration Register 2 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2545		
	2546	DM1_0 Configuration Register 2 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2547		
	2548		
	2549		
	2550	DM1_0 Configuration Register 2 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2551	DM1_0 Configuration Register 2 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
13F	2552	DM1_0 Configuration Register 3 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2553		
	2554		
	2555		
	2556		
	2557		
	2558		
140	2559	DM1_0 Configuration Register 3 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2560		
	2561		
	2562		
	2563		
	2564		
	2565		
141	2566	DM1_0 Configuration Register 3 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2567		
	2568		
	2569		
	2570		
	2571		
	2572		
142	2573	DM1_0 Configuration Register 3 DLY input from matrix	DM Delay input
	2574		
	2575		
	2576		
	2577		
	2578		
	2579		
143	2580	DM1_0 Configuration Register 3 Data of LUT3	REG_VAL_LUT3[0]
	2581		REG_VAL_LUT3[1]
	2582		REG_VAL_LUT3[2]
	2583		REG_VAL_LUT3[3]
	2584		REG_VAL_LUT3[4]
	2585		REG_VAL_LUT3[5]
	2586		REG_VAL_LUT3[6]
143	2587	DM1_0 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[7]
	2584		REG_VAL_LUT2[0]
	2585		REG_VAL_LUT2[1]
	2586		REG_VAL_LUT2[2]
143	2587		REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
143	2588	DM1_0 Configuration Register 3 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2589		
	2590		
	2591		
144	2592	DM1_0 Configuration Register 3 Data of Delay	Data[7:0]
	2593		
	2594		
	2595		
	2596		
	2597		
	2598		
	2599		
145	2600	DM1_0 Configuration Register 3 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2601		
	2602	DM1_0 Configuration Register 3 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2603		
	2604		
	2605		
	2606	DM1_0 Configuration Register 3 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2607	DM1_0 Configuration Register 3 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
146	2608	DM1_0 Configuration Register 4 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2609		
	2610		
	2611		
	2612		
	2613		
	2614		
147	2615	DM1_0 Configuration Register 4 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2616		
	2617		
	2618		
	2619		
	2620		
	2621		
148	2622	DM1_0 Configuration Register 4 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2623		
	2624		
	2625		
	2626		
	2627		
	2628		
149	2629	DM1_0 Configuration Register 4 DLY input from matrix	DM Delay input
	2630		
	2631		
	2632		
	2633		
	2634		
	2635		
14A	2636	DM1_0 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[0]
	2637		
	2638		
	2639		
	2640		
	2641		
	2642		
14A	2643	DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[1]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[2]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[3]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[4]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[5]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[6]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT3[7]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT2[0]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT2[1]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT2[2]
14A		DM1_0 Configuration Register 4 Data of LUT2	REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
14A	2644	DM1_0 Configuration Register 4 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2645		
	2646		
	2647		
14B	2648	DM1_0 Configuration Register 4 Data of Delay	Data[7:0]
	2649		
	2650		
	2651		
	2652		
	2653		
	2654		
	2655		
14C	2656	DM1_0 Configuration Register 4 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2657		
	2658	DM1_0 Configuration Register 4 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2659		
	2660		
	2661		
	2662	DM1_0 Configuration Register 4 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2663	DM1_0 Configuration Register 4 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
14D	2664	DM1_0 Configuration Register 5 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2665		
	2666		
	2667		
	2668		
	2669		
	2670		
14E	2671	DM1_0 Configuration Register 5 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2672		
	2673		
	2674		
	2675		
	2676		
	2677		
14F	2678	DM1_0 Configuration Register 5 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2679		
	2680		
	2681		
	2682		
	2683		
	2684		
150	2685	DM1_0 Configuration Register 5 DLY input from matrix	DM Delay input
	2686		
	2687		
	2688		
	2689		
	2690		
	2691		
151	2692	DM1_0 Configuration Register 5 Data of LUT3	REG_VAL_LUT3[0]
	2693		
	2694		
	2695		
	2696		
	2697		
	2698		
151	2699	DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[1]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[2]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[3]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[4]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[5]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[6]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[7]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[0]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[1]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[2]
151		DM1_0 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
151	2700	DM1_0 Configuration Register 5 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2701		
	2702		
	2703		
152	2704	DM1_0 Configuration Register 5 Data of Delay	Data[7:0]
	2705		
	2706		
	2707		
	2708		
	2709		
	2710		
	2711		
153	2712	DM1_0 Configuration Register 5 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2713		
	2714	DM1_0 Configuration Register 5 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2715		
	2716		
	2717		
	2718	DM1_0 Configuration Register 5 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2719	DM1_0 Configuration Register 5 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
154	2720	DM1_1 Configuration Register 0 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2721		
	2722		
	2723		
	2724		
	2725		
	2726		
155	2727	DM1_1 Configuration Register 0 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2728		
	2729		
	2730	DM1_1 Configuration Register 0 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2731		
	2732		
	2733		
156	2734	DM1_1 Configuration Register 0 DLY input from matrix	DM Delay input
	2735		
	2736		
	2737		
	2738	DM1_1 Configuration Register 0 Data of LUT3	REG_VAL_LUT3[0]
	2739		
	2740		
157	2741	DM1_1 Configuration Register 0 Data of LUT3	REG_VAL_LUT3[1]
	2742		REG_VAL_LUT3[2]
	2743		REG_VAL_LUT3[3]
	2744		REG_VAL_LUT3[4]
	2745		REG_VAL_LUT3[5]
	2746		REG_VAL_LUT3[6]
	2747		REG_VAL_LUT3[7]
158	2748	DM1_1 Configuration Register 0 Data of LUT2	REG_VAL_LUT2[0]
	2749		REG_VAL_LUT2[1]
	2750		REG_VAL_LUT2[2]
	2751		REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
158	2756	DM1_1 Configuration Register 0 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2757		
	2758		
	2759		
159	2760	DM1_1 Configuration Register 0 Data of Delay	Data[7:0]
	2761		
	2762		
	2763		
	2764		
	2765		
	2766		
	2767		
15A	2768	DM1_1 Configuration Register 0 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2769		
	2770	DM1_1 Configuration Register 0 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2771		
	2772		
	2773		
	2774	DM1_1 Configuration Register 0 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2775	DM1_1 Configuration Register 0 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
15B	2776	DM1_1 Configuration Register 1 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2777		
	2778		
	2779		
	2780		
	2781		
	2782		
	2783		
15C	2784	DM1_1 Configuration Register 1 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2785		
	2786		
	2787		
	2788	DM1_1 Configuration Register 1 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2789		
	2790		
	2791		
15D	2792	DM1_1 Configuration Register 1 DLY input from matrix	DM Delay input
	2793		
	2794		
	2795		
	2796		
	2797		
	2798		
	2799		
15E	2800	DM1_1 Configuration Register 1 Data of LUT3	REG_VAL_LUT3[0]
	2801		REG_VAL_LUT3[1]
	2802		REG_VAL_LUT3[2]
	2803		REG_VAL_LUT3[3]
	2804		REG_VAL_LUT3[4]
	2805		REG_VAL_LUT3[5]
	2806		REG_VAL_LUT3[6]
	2807		REG_VAL_LUT3[7]
15F	2808	DM1_1 Configuration Register 1 Data of LUT2	REG_VAL_LUT2[0]
	2809		REG_VAL_LUT2[1]
	2810		REG_VAL_LUT2[2]
	2811		REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
15F	2812	DM1_1 Configuration Register 1 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2813		
	2814		
	2815		
160	2816	DM1_1 Configuration Register 1 Data of Delay	Data[7:0]
	2817		
	2818		
	2819		
	2820		
	2821		
	2822		
	2823		
161	2824	DM1_1 Configuration Register 1 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2825		
	2826	DM1_1 Configuration Register 1 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2827		
	2828		
	2829		
	2830	DM1_1 Configuration Register 1 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2831	DM1_1 Configuration Register 1 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
162	2832	DM1_1 Configuration Register 2 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2833		
	2834		
	2835		
	2836		
	2837		
	2838		
163	2839	DM1_1 Configuration Register 2 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2840		
	2841		
	2842		
	2843		
	2844		
	2845		
164	2846	DM1_1 Configuration Register 2 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2847		
	2848		
	2849		
	2850		
	2851		
	2852		
165	2853	DM1_1 Configuration Register 2 DLY input from matrix	DM Delay input
	2854		
	2855		
	2856		
	2857		
	2858		
	2859		
166	2860	DM1_1 Configuration Register 2 Data of LUT3	REG_VAL_LUT3[0]
	2861		REG_VAL_LUT3[1]
	2862		REG_VAL_LUT3[2]
	2863		REG_VAL_LUT3[3]
	2864		REG_VAL_LUT3[4]
	2865		REG_VAL_LUT3[5]
	2866		REG_VAL_LUT3[6]
167	2867	DM1_1 Configuration Register 2 Data of LUT2	REG_VAL_LUT3[7]
	2868		REG_VAL_LUT2[0]
	2869		REG_VAL_LUT2[1]
	2870		REG_VAL_LUT2[2]
168	2871	DM1_1 Configuration Register 2 Data of LUT2	REG_VAL_LUT2[3]
	2872		REG_VAL_LUT2[4]
	2873		REG_VAL_LUT2[5]
	2874		REG_VAL_LUT2[6]
169	2875	DM1_1 Configuration Register 2 Data of LUT2	REG_VAL_LUT2[7]
	2876		REG_VAL_LUT2[8]
	2877		REG_VAL_LUT2[9]
	2878		REG_VAL_LUT2[10]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
166	2868	DM1_1 Configuration Register 2 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2869		
	2870		
	2871		
167	2872	DM1_1 Configuration Register 2 Data of Delay	Data[7:0]
	2873		
	2874		
	2875		
	2876		
	2877		
	2878		
	2879		
168	2880	DM1_1 Configuration Register 2 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2881		
	2882	DM1_1 Configuration Register 2 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2883		
	2884		
	2885		
	2886	DM1_1 Configuration Register 2 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2887	DM1_1 Configuration Register 2 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
169	2888	DM1_1 Configuration Register 3 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2889		
	2890		
	2891		
	2892		
	2893		
	2894		
16A	2895	DM1_1 Configuration Register 3 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2896		
	2897		
	2898		
	2899		
	2900		
	2901		
16B	2902	DM1_1 Configuration Register 3 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2903		
	2904		
	2905		
	2906		
	2907		
	2908		
16C	2909	DM1_1 Configuration Register 3 DLY input from matrix	DM Delay input
	2910		
	2911		
	2912		
	2913		
	2914		
	2915		
16D	2916	DM1_1 Configuration Register 3 Data of LUT3	REG_VAL_LUT3[0]
	2917		
	2918		
	2919		
	2920		
	2921		
	2922		
16D	2923	DM1_1 Configuration Register 3 Data of LUT2	REG_VAL_LUT3[1]
16D			REG_VAL_LUT3[2]
16D			REG_VAL_LUT3[3]
16D			REG_VAL_LUT3[4]
16D			REG_VAL_LUT3[5]
16D			REG_VAL_LUT3[6]
16D			REG_VAL_LUT3[7]
16D			REG_VAL_LUT2[0]
16D			REG_VAL_LUT2[1]
16D			REG_VAL_LUT2[2]
16D			REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
16D	2924	DM1_1 Configuration Register 3 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2925		
	2926		
	2927		
16E	2928	DM1_1 Configuration Register 3 Data of Delay	Data[7:0]
	2929		
	2930		
	2931		
	2932		
	2933		
	2934		
	2935		
16F	2936	DM1_1 Configuration Register 3 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2937		
	2938	DM1_1 Configuration Register 3 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2939		
	2940		
	2941		
	2942	DM1_1 Configuration Register 3 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2943	DM1_1 Configuration Register 3 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
170	2944	DM1_1 Configuration Register 4 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	2945		
	2946		
	2947		
	2948		
	2949		
	2950		
	2951		
171	2952	DM1_1 Configuration Register 4 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	2953		
	2954		
	2955		
	2956	DM1_1 Configuration Register 4 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	2957		
	2958		
	2959		
172	2960	DM1_1 Configuration Register 4 DLY input from matrix	DM Delay input
	2961		
	2962		
	2963		
	2964		
	2965		
	2966		
	2967		
173	2968	DM1_1 Configuration Register 4 Data of LUT3	REG_VAL_LUT3[0]
	2969		REG_VAL_LUT3[1]
	2970		REG_VAL_LUT3[2]
	2971		REG_VAL_LUT3[3]
	2972		REG_VAL_LUT3[4]
	2973		REG_VAL_LUT3[5]
	2974		REG_VAL_LUT3[6]
	2975		REG_VAL_LUT3[7]
174	2976	DM1_1 Configuration Register 4 Data of LUT2	REG_VAL_LUT2[0]
	2977		REG_VAL_LUT2[1]
	2978		REG_VAL_LUT2[2]
	2979		REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
174	2980	DM1_1 Configuration Register 4 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	2981		
	2982		
	2983		
175	2984	DM1_1 Configuration Register 4 Data of Delay	Data[7:0]
	2985		
	2986		
	2987		
	2988		
	2989		
	2990		
	2991		
176	2992	DM1_1 Configuration Register 4 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	2993		
	2994	DM1_1 Configuration Register 4 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	2995		
	2996		
	2997		
	2998	DM1_1 Configuration Register 4 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	2999	DM1_1 Configuration Register 4 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
177	3000	DM1_1 Configuration Register 5 IN0 of LUT3	REG_MATRIX_LUT3_IN0_SEL[5:0]
	3001		
	3002		
	3003		
	3004		
	3005		
	3006		
178	3007	DM1_1 Configuration Register 5 IN1 of LUT3	REG_MATRIX_LUT3_IN1_SEL[5:0]
	3008		
	3009		
	3010		
	3011		
	3012		
	3013		
179	3014	DM1_1 Configuration Register 5 IN2 of LUT3	REG_MATRIX_LUT3_IN2_SEL[5:0]
	3015		
	3016		
	3017		
	3018		
	3019		
	3020		
17A	3021	DM1_1 Configuration Register 5 DLY input from matrix	DM Delay input
	3022		
	3023		
	3024		
	3025		
	3026		
	3027		
17B	3028	DM1_1 Configuration Register 5 Data of LUT3	REG_VAL_LUT3[0]
	3029		
	3030		
	3031		
	3032		
	3033		
	3034		
17B	3035	DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[1]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[2]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[3]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[4]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[5]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[6]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT3[7]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[0]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[1]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[2]
17B		DM1_1 Configuration Register 5 Data of LUT2	REG_VAL_LUT2[3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
17B	3036	DM1_1 Configuration Register 5 Clock source selection	Clock source sel[3:0] 0000: 25M; 0001: 25M/4; 0010: 2.048M 0011: 2.048M/8; 0100: 2.048M/64; 0101: 2.048M/512; 0110: 2.048K; 0111: 2.048K/8; 1000: 2.048K/64; 1001: 2.048K/512; 1010: 2.048K/4096 1011: 2.048K/32768; 1100: 2.048K/262144; 1101: CNT_END; 1110: External; 1111: External
	3037		
	3038		
	3039		
17C	3040	DM1_1 Configuration Register 5 Data of Delay	Data[7:0]
	3041		
	3042		
	3043		
	3044		
	3045		
	3046		
	3047		
17D	3048	DM1_1 Configuration Register 5 DLY input initial selection	00: bypass the initial 01: initial 0 10: initial 1 11: initial 1
	3049		
	3050	DM1_1 Configuration Register 5 DLY/CNT Function selection	0000: Both Edge Delay 0001: Falling Edge Delay 0010: Rising Edge Delay 0011: Both Edge One Shot 0100: Falling Edge One Shot 0101: Rising Edge One Shot 0110: Both Edge Freq Detect 0111: Falling Edge Freq Detect 1000: Rising Edge Freq Detect 1001: Both Edge Detect 1010: Falling Edge Detect 1011: Rising Edge Detect 1100: Both Edge Reset CNT 1101: Falling Edge Reset CNT 1110: Rising Edge Reset CNT 1111: High Level Reset CNT
	3051		
	3052		
	3053		
	3054	DM1_1 Configuration Register 5 MUX1 selection for LUT2	0: from LUT3 1: from matrix (DLY IN)
	3055	DM1_1 Configuration Register 5 MUX2 selection for DLY input	0: from matrix (DLY IN) 1: from LUT3

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
17E	3056	DM0_0 Selection Register State 0, bit [0]	selection bit[2:0]: 000: Not Used 001: DM0_0 Configuration Register 0 010: DM0_0 Configuration Register 1 011: DM0_0 Configuration Register 2 100: DM0_0 Configuration Register 3 101: DM0_0 Configuration Register 4 110: DM0_0 Configuration Register 5 111: Not Used
	3057	DM0_0 Selection Register State 1, bit [0]	
	3058	DM0_0 Selection Register State 2, bit [0]	
	3059	DM0_0 Selection Register State 3, bit [0]	
	3060	DM0_0 Selection Register State 4, bit [0]	
	3061	DM0_0 Selection Register State 5, bit [0]	
	3062	DM0_0 Selection Register State 6, bit [0]	
	3063	DM0_0 Selection Register State 7, bit [0]	
17F	3064	DM0_0 Selection Register State 8, bit [0]	
	3065	DM0_0 Selection Register State 9, bit [0]	
	3066	DM0_0 Selection Register State 10, bit [0]	
	3067	DM0_0 Selection Register State 11, bit [0]	
	3068	DM0_0 Selection Register State 0, bit [1]	
	3069	DM0_0 Selection Register State 1, bit [1]	
	3070	DM0_0 Selection Register State 2, bit [1]	
	3071	DM0_0 Selection Register State 3, bit [1]	
180	3072	DM0_0 Selection Register State 4, bit [1]	
	3073	DM0_0 Selection Register State 5, bit [1]	
	3074	DM0_0 Selection Register State 6, bit [1]	
	3075	DM0_0 Selection Register State 7, bit [1]	
	3076	DM0_0 Selection Register State 8, bit [1]	
	3077	DM0_0 Selection Register State 9, bit [1]	
	3078	DM0_0 Selection Register State 10, bit [1]	
	3079	DM0_0 Selection Register State 11, bit [1]	
181	3080	DM0_0 Selection Register State 0, bit [2]	selection bit[2:0]: 000: Not Used 001: DM0_0 Configuration Register 0 010: DM0_0 Configuration Register 1 011: DM0_0 Configuration Register 2 100: DM0_0 Configuration Register 3 101: DM0_0 Configuration Register 4 110: DM0_0 Configuration Register 5 111: Not Used
	3081	DM0_0 Selection Register State 1, bit [2]	
	3082	DM0_0 Selection Register State 2, bit [2]	
	3083	DM0_0 Selection Register State 3, bit [2]	
	3084	DM0_0 Selection Register State 4, bit [2]	
	3085	DM0_0 Selection Register State 5, bit [2]	
	3086	DM0_0 Selection Register State 6, bit [2]	
	3087	DM0_0 Selection Register State 7, bit [2]	
182	3088	DM0_0 Selection Register State 8, bit [2]	
	3089	DM0_0 Selection Register State 9, bit [2]	
	3090	DM0_0 Selection Register State 10, bit [2]	
	3091	DM0_0 Selection Register State 11, bit [2]	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
182	3092	DM0_0 Output Configuration Selection Register State 0, bit [0]	control bit[1:0]: 00:DM out0/1/2 keep 01:DM out bypass to out0, out1/2 keep 10: DM out bypass to out1, out0/2 keep 11: DM out bypass to out2, out0/1 keep
	3093	DM0_0 Output Configuration Selection Register State 1, bit [0]	
	3094	DM0_0 Output Configuration Selection Register State 2, bit [0]	
	3095	DM0_0 Output Configuration Selection Register State 3, bit [0]	
183	3096	DM0_0 Output Configuration Selection Register State 4, bit [0]	
	3097	DM0_0 Output Configuration Selection Register State 5, bit [0]	
	3098	DM0_0 Output Configuration Selection Register State 6, bit [0]	
	3099	DM0_0 Output Configuration Selection Register State 7, bit [0]	
	3100	DM0_0 Output Configuration Selection Register State 8, bit [0]	
	3101	DM0_0 Output Configuration Selection Register State 9, bit [0]	
	3102	DM0_0 Output Configuration Selection Register State 10, bit [0]	
	3103	DM0_0 Output Configuration Selection Register State 11, bit [0]	
184	3104	DM0_0 Output Configuration Selection Register State 0, bit [1]	control bit[1:0]: 00:DM out0/1/2 keep 01:DM out bypass to out0, out1/2 keep 10: DM out bypass to out1, out0/2 keep 11: DM out bypass to out2, out0/1 keep
	3105	DM0_0 Output Configuration Selection Register State 1, bit [1]	
	3106	DM0_0 Output Configuration Selection Register State 2, bit [1]	
	3107	DM0_0 Output Configuration Selection Register State 3, bit [1]	
	3108	DM0_0 Output Configuration Selection Register State 4, bit [1]	
	3109	DM0_0 Output Configuration Selection Register State 5, bit [1]	
	3110	DM0_0 Output Configuration Selection Register State 6, bit [1]	
	3111	DM0_0 Output Configuration Selection Register State 7, bit [1]	
185	3112	DM0_0 Output Configuration Selection Register State 8, bit [1]	
	3113	DM0_0 Output Configuration Selection Register State 9, bit [1]	
	3114	DM0_0 Output Configuration Selection Register State 10, bit [1]	
	3115	DM0_0 Output Configuration Selection Register State 11, bit [1]	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
185	3116	DM1_0 Selection Register State 0, bit [0]	selection bit[2:0]: 000: Not Used
	3117	DM1_0 Selection Register State 1, bit [0]	
	3118	DM1_0 Selection Register State 2, bit [0]	
	3119	DM1_0 Selection Register State 3, bit [0]	
186	3120	DM1_0 Selection Register State 4, bit [0]	001: DM1_0 Configuration Register 0 010: DM1_0 Configuration Register 1 011: DM1_0 Configuration Register 2 100: DM1_0 Configuration Register 3 101: DM1_0 Configuration Register 4 110: DM1_0 Configuration Register 5 111: Not Used
	3121	DM1_0 Selection Register State 5, bit [0]	
	3122	DM1_0 Selection Register State 6, bit [0]	
	3123	DM1_0 Selection Register State 7, bit [0]	
	3124	DM1_0 Selection Register State 8, bit [0]	
	3125	DM1_0 Selection Register State 9, bit [0]	
	3126	DM1_0 Selection Register State 10, bit [0]	
	3127	DM1_0 Selection Register State 11, bit [0]	
187	3128	DM1_0 Selection Register State 0, bit [1]	selection bit[2:0]: 000: Not Used 001: DM1_0 Configuration Register 0 010: DM1_0 Configuration Register 1 011: DM1_0 Configuration Register 2 100: DM1_0 Configuration Register 3 101: DM1_0 Configuration Register 4 110: DM1_0 Configuration Register 5 111: Not Used
	3129	DM1_0 Selection Register State 1, bit [1]	
	3130	DM1_0 Selection Register State 2, bit [1]	
	3131	DM1_0 Selection Register State 3, bit [1]	
	3132	DM1_0 Selection Register State 4, bit [1]	
	3133	DM1_0 Selection Register State 5, bit [1]	
	3134	DM1_0 Selection Register State 6, bit [1]	
	3135	DM1_0 Selection Register State 7, bit [1]	
188	3136	DM1_0 Selection Register State 8, bit [1]	selection bit[2:0]: 000: Not Used 001: DM1_0 Configuration Register 0 010: DM1_0 Configuration Register 1 011: DM1_0 Configuration Register 2 100: DM1_0 Configuration Register 3 101: DM1_0 Configuration Register 4 110: DM1_0 Configuration Register 5 111: Not Used
	3137	DM1_0 Selection Register State 9, bit [1]	
	3138	DM1_0 Selection Register State 10, bit [1]	
	3139	DM1_0 Selection Register State 11, bit [1]	
	3140	DM1_0 Selection Register State 0, bit [2]	
	3141	DM1_0 Selection Register State 1, bit [2]	
	3142	DM1_0 Selection Register State 2, bit [2]	
	3143	DM1_0 Selection Register State 3, bit [2]	
189	3144	DM1_0 Selection Register State 4, bit [2]	selection bit[2:0]: 000: Not Used 001: DM1_0 Configuration Register 0 010: DM1_0 Configuration Register 1 011: DM1_0 Configuration Register 2 100: DM1_0 Configuration Register 3 101: DM1_0 Configuration Register 4 110: DM1_0 Configuration Register 5 111: Not Used
	3145	DM1_0 Selection Register State 5, bit [2]	
	3146	DM1_0 Selection Register State 6, bit [2]	
	3147	DM1_0 Selection Register State 7, bit [2]	
	3148	DM1_0 Selection Register State 8, bit [2]	
	3149	DM1_0 Selection Register State 9, bit [2]	
	3150	DM1_0 Selection Register State 10, bit [2]	
	3151	DM1_0 Selection Register State 11, bit [2]	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
18A	3152	DM0_1 Selection Register State 0, bit [0]	selection bit[2:0]: 000: Not Used 001: DM0_1 Configuration Register 0 010: DM0_1 Configuration Register 1 011: DM0_1 Configuration Register 2 100: DM0_1 Configuration Register 3 101: DM0_1 Configuration Register 4 110: DM0_1 Configuration Register 5 111: Not Used
	3153	DM0_1 Selection Register State 1, bit [0]	
	3154	DM0_1 Selection Register State 2, bit [0]	
	3155	DM0_1 Selection Register State 3, bit [0]	
	3156	DM0_1 Selection Register State 4, bit [0]	
	3157	DM0_1 Selection Register State 5, bit [0]	
	3158	DM0_1 Selection Register State 6, bit [0]	
	3159	DM0_1 Selection Register State 7, bit [0]	
18B	3160	DM0_1 Selection Register State 8, bit [0]	selection bit[2:0]: 000: Not Used 001: DM0_1 Configuration Register 0 010: DM0_1 Configuration Register 1 011: DM0_1 Configuration Register 2 100: DM0_1 Configuration Register 3 101: DM0_1 Configuration Register 4 110: DM0_1 Configuration Register 5 111: Not Used
	3161	DM0_1 Selection Register State 9, bit [0]	
	3162	DM0_1 Selection Register State 10, bit [0]	
	3163	DM0_1 Selection Register State 11, bit [0]	
	3164	DM0_1 Selection Register State 0, bit [1]	
	3165	DM0_1 Selection Register State 1, bit [1]	
	3166	DM0_1 Selection Register State 2, bit [1]	
	3167	DM0_1 Selection Register State 3, bit [1]	
18C	3168	DM0_1 Selection Register State 4, bit [1]	selection bit[2:0]: 000: Not Used 001: DM0_1 Configuration Register 0 010: DM0_1 Configuration Register 1 011: DM0_1 Configuration Register 2 100: DM0_1 Configuration Register 3 101: DM0_1 Configuration Register 4 110: DM0_1 Configuration Register 5 111: Not Used
	3169	DM0_1 Selection Register State 5, bit [1]	
	3170	DM0_1 Selection Register State 6, bit [1]	
	3171	DM0_1 Selection Register State 7, bit [1]	
	3172	DM0_1 Selection Register State 8, bit [1]	
	3173	DM0_1 Selection Register State 9, bit [1]	
	3174	DM0_1 Selection Register State 10, bit [1]	
	3175	DM0_1 Selection Register State 11, bit [1]	
18D	3176	DM0_1 Selection Register State 0, bit [2]	selection bit[2:0]: 000: Not Used 001: DM0_1 Configuration Register 0 010: DM0_1 Configuration Register 1 011: DM0_1 Configuration Register 2 100: DM0_1 Configuration Register 3 101: DM0_1 Configuration Register 4 110: DM0_1 Configuration Register 5 111: Not Used
	3177	DM0_1 Selection Register State 1, bit [2]	
	3178	DM0_1 Selection Register State 2, bit [2]	
	3179	DM0_1 Selection Register State 3, bit [2]	
	3180	DM0_1 Selection Register State 4, bit [2]	
	3181	DM0_1 Selection Register State 5, bit [2]	
	3182	DM0_1 Selection Register State 6, bit [2]	
	3183	DM0_1 Selection Register State 7, bit [2]	
18E	3184	DM0_1 Selection Register State 8, bit [2]	selection bit[2:0]: 000: Not Used 001: DM0_1 Configuration Register 0 010: DM0_1 Configuration Register 1 011: DM0_1 Configuration Register 2 100: DM0_1 Configuration Register 3 101: DM0_1 Configuration Register 4 110: DM0_1 Configuration Register 5 111: Not Used
	3185	DM0_1 Selection Register State 9, bit [2]	
	3186	DM0_1 Selection Register State 10, bit [2]	
	3187	DM0_1 Selection Register State 11, bit [2]	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
18E	3188	DM0_1 Output Configuration Selection Register State 0, bit [0]	control bit[1:0]: 00:DM out0/1/2 keep 01:DM out bypass to out0, out1/2 keep 10: DM out bypass to out1, out0/2 keep 11: DM out bypass to out2, out0/1 keep
	3189	DM0_1 Output Configuration Selection Register State 1, bit [0]	
	3190	DM0_1 Output Configuration Selection Register State 2, bit [0]	
	3191	DM0_1 Output Configuration Selection Register State 3, bit [0]	
18F	3192	DM0_1 Output Configuration Selection Register State 4, bit [0]	
	3193	DM0_1 Output Configuration Selection Register State 5, bit [0]	
	3194	DM0_1 Output Configuration Selection Register State 6, bit [0]	
	3195	DM0_1 Output Configuration Selection Register State 7, bit [0]	
	3196	DM0_1 Output Configuration Selection Register State 8, bit [0]	
	3197	DM0_1 Output Configuration Selection Register State 9, bit [0]	
	3198	DM0_1 Output Configuration Selection Register State 10, bit [0]	
	3199	DM0_1 Output Configuration Selection Register State 11, bit [0]	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
190	3200	DM0_1 Output Configuration Selection Register State 0, bit [1]	control bit[1:0]: 00:DM out0/1/2 keep 01:DM out bypass to out0, out1/2 keep 10: DM out bypass to out1, out0/2 keep 11: DM out bypass to out2, out0/1 keep
	3201	DM0_1 Output Configuration Selection Register State 1, bit [1]	
	3202	DM0_1 Output Configuration Selection Register State 2, bit [1]	
	3203	DM0_1 Output Configuration Selection Register State 3, bit [1]	
	3204	DM0_1 Output Configuration Selection Register State 4, bit [1]	
	3205	DM0_1 Output Configuration Selection Register State 5, bit [1]	
	3206	DM0_1 Output Configuration Selection Register State 6, bit [1]	
	3207	DM0_1 Output Configuration Selection Register State 7, bit [1]	
191	3208	DM0_1 Output Configuration Selection Register State 8, bit [1]	
	3209	DM0_1 Output Configuration Selection Register State 9, bit [1]	
	3210	DM0_1 Output Configuration Selection Register State 10, bit [1]	
	3211	DM0_1 Output Configuration Selection Register State 11, bit [1]	
	3212	DM1_1 Selection Register State 0, bit [0]	selection bit[2:0]: 000: Not Used 001: DM1_1 Configuration Register 0 010: DM1_1 Configuration Register 1 011: DM1_1 Configuration Register 2 100: DM1_1 Configuration Register 3 101: DM1_1 Configuration Register 4 110: DM1_1 Configuration Register 5 111: Not Used
192	3213	DM1_1 Selection Register State 1, bit [0]	
	3214	DM1_1 Selection Register State 2, bit [0]	
	3215	DM1_1 Selection Register State 3, bit [0]	
	3216	DM1_1 Selection Register State 4, bit [0]	
	3217	DM1_1 Selection Register State 5, bit [0]	
	3218	DM1_1 Selection Register State 6, bit [0]	
	3219	DM1_1 Selection Register State 7, bit [0]	
	3220	DM1_1 Selection Register State 8, bit [0]	
	3221	DM1_1 Selection Register State 9, bit [0]	
	3222	DM1_1 Selection Register State 10, bit [0]	
	3223	DM1_1 Selection Register State 11, bit [0]	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
193	3224	DM1_1 Selection Register State 0, bit [1]	selection bit[2:0]: 000: Not Used 001: DM1_1 Configuration Register 0 010: DM1_1 Configuration Register 1 011: DM1_1 Configuration Register 2 100: DM1_1 Configuration Register 3 101: DM1_1 Configuration Register 4 110: DM1_1 Configuration Register 5 111: Not Used
	3225	DM1_1 Selection Register State 1, bit [1]	
	3226	DM1_1 Selection Register State 2, bit [1]	
	3227	DM1_1 Selection Register State 3, bit [1]	
	3228	DM1_1 Selection Register State 4, bit [1]	
	3229	DM1_1 Selection Register State 5, bit [1]	
	3230	DM1_1 Selection Register State 6, bit [1]	
	3231	DM1_1 Selection Register State 7, bit [1]	
194	3232	DM1_1 Selection Register State 8, bit [1]	
	3233	DM1_1 Selection Register State 9, bit [1]	
	3234	DM1_1 Selection Register State 10, bit [1]	
	3235	DM1_1 Selection Register State 11, bit [1]	
	3236	DM1_1 Selection Register State 0, bit [2]	
	3237	DM1_1 Selection Register State 1, bit [2]	
	3238	DM1_1 Selection Register State 2, bit [2]	
195	3239	DM1_1 Selection Register State 3, bit [2]	
	3240	DM1_1 Selection Register State 4, bit [2]	
	3241	DM1_1 Selection Register State 5, bit [2]	
	3242	DM1_1 Selection Register State 6, bit [2]	
	3243	DM1_1 Selection Register State 7, bit [2]	
	3244	DM1_1 Selection Register State 8, bit [2]	
	3245	DM1_1 Selection Register State 9, bit [2]	
	3246	DM1_1 Selection Register State 10, bit [2]	
196	3247	DM1_1 Selection Register State 11, bit [2]	
	3248	DM0_0 function 4 outputs initial value	0: initial 0 1: initial 1
	3249	DM0_1 function 4 outputs initial value	0: initial 0 1: initial 1
	3250	Reserved	
	3251	Reserved	
	3252	Reserved	
	3253	Reserved	
	3254	Reserved	
197	3255	Reserved	
	3256	Reserved	
	3257	Reserved	
	3258	Reserved	
	3259	Reserved	
	3260	VrefO0 register PD control	Vrefo0 register power down signal 0: power-down, 1: power-on
	3261	VrefO0 PD control select	Vrefo0 pd selection 0: come from reg[3260], 1: come from matrix out78

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
197	3262	VrefO1 register PD control	Vrefo1 register power down signal 0: power-down, 1: power-on
	3263	VrefO1 PD control select	Vrefo1 pd selection 0: come from reg[3260], 1: come from matrix out78
198	3264	F1 stack memory, lower byte	Bit0 (top memory)
	3265		Bit1
	3266		Bit2
	3267		Bit3
	3268		Bit4
	3269		Bit5
	3270		Bit6
	3271		Bit7
199	3272	F1 stack memory, higher byte	Bit8
	3273		Bit9
	3274		Bit10
	3275		Bit11
	3276		Bit12
	3277		Bit13
	3278		Bit14
	3279		Bit15
19A	3280	aio0-3 input selection load 1	00: aio0 01: aio1 10: aio2 11: aio3
	3281		
	3282	ACMP4_F Vref selection load 1	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63
	3283		"F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3284		
	3285		
	3286		
	3287		
19B	3288	aio0-3 input selection load 2	00: aio0 01: aio1 10: aio2 11: aio3
	3289		
	3290	ACMP4_F Vref selection load 2	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63
	3291		"F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3292		
	3293		
	3294		
	3295		
19C	3296	aio4-7 input selection load 3	00: aio4 01: aio5 10: aio6 11: aio7
	3297		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
19C	3298	ACMP4_F Vref selection load 3	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3299		
	3300		
	3301		
	3302		
	3303		
19D	3304	aio4-7 input selection load 4	00: aio4 01: aio5 10: aio6 11: aio7
	3305		
	3306	ACMP4_F Vref selection load 4	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3307		
	3308		
	3309		
	3310		
	3311		
19E	3312	F1 input selection load 1	0: from matrix 1: from ACMP4_F
	3313	F1 input selection load 2	0: from matrix 1: from ACMP4_F
	3314	F1 input selection load 3	0: from matrix 1: from ACMP4_F
	3315	F1 input selection load 4	0: from matrix 1: from ACMP4_F
	3316	Reserved	
	3317	delay clock source selection	000: RING; 001: RING/4 010: RC 011: RC/8 100: RC/64 101: LF 110: LF/8 111: LF/64
	3318		
	3319		
19F	3320	F1 delay data	Data[7:0]
	3321		
	3322		
	3323		
	3324		
	3325		
	3326		
	3327		
1A0	3328	F1 CMD1 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3329		
	3330		
	3331		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1A0	3332	F1 CMD2 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3333		
	3334		
	3335		
1A1	3336	F1 CMD3 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3337		
	3338		
	3339		
	3340	F1 CMD4 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3341		
	3342		
	3343		
1A2	3344	F1 CMD5 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3345		
	3346		
	3347		
	3348	F1 CMD6 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3349		
	3350		
	3351		
1A3	3352	F1 CMD7 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3353		
	3354		
	3355		
	3356	F1 CMD8 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3357		
	3358		
	3359		
1A4	3360	F1 CMD9 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3361		
	3362		
	3363		
	3364	F1 CMD10 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3365		
	3366		
	3367		
1A5	3368	F1 CMD11 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3369		
	3370		
	3371		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1A5	3372	F1 CMD12 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3373		
	3374		
	3375		
1A6	3376	delay loop to location selection	0000:CMD1;0001:CMD2;0010:CMD3;0011:CMD4;0100:CMD5;0101:CMD6;or;0110:CMD7;0111:CMD8;1000:CMD9;1001:CMD10;1010:CMD11;1011:CMD12
	3377		
	3378		
	3379		
	3380	output mux1 initial state setting	00: keep 01: 0 10: 1 11: none
	3381		
	3382	output mux2 initial state setting	00: keep 01: 0 10: 1 11: none
	3383		
1A7	3384	output mux3 initial state setting	00: keep 01: 0 10: 1 11: none
	3385		
	3386	interrupt reset stack memory enable	0: no reset stack memory 1: reset stack memory
	3387	Reserved	
	3388	Reserved	
	3389	Reserved	
	3390	Reserved	
	3391	Reserved	
1A8	3392	aio0-3 input selection load 1	00: aio0 01: aio1 10: aio2 11: aio3
	3393		
	3394	ACMP4_F Vref selection load 1	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3395		
	3396		
	3397		
	3398		
	3399		
1A9	3400	aio0-3 input selection load 2	00: aio0 01: aio1 10: aio2 11: aio3
	3401		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1A9	3402	ACMP4_F Vref selection load 2	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3403		
	3404		
	3405		
	3406		
	3407		
1AA	3408	aio4-7 input selection load 3	00: aio4 01: aio5 10: aio6 11: aio7
	3409		
	3410	ACMP4_F Vref selection load 3	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3411		
	3412		
	3413		
	3414		
	3415		
1AB	3416	aio4-7 input selection load 4	00: aio4 01: aio5 10: aio6 11: aio7
	3417		
	3418	ACMP4_F Vref selection load 4	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3419		
	3420		
	3421		
	3422		
	3423		
1AC	3424	F1 input selection load 1	0: from matrix 1: from ACMP4_F
	3425	F1 input selection load 2	0: from matrix 1: from ACMP4_F
	3426	F1 input selection load 3	0: from matrix 1: from ACMP4_F
	3427	F1 input selection load 4	0: from matrix 1: from ACMP4_F
	3428	Reserved	
	3429	delay clock source selection	000: RING; 001: RING/4 010: RC 011: RC/8 100: RC/64 101: LF 110: LF/8 111: LF/64
	3430		
	3431		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1AD	3432	F1 delay data	Data[7:0]
	3433		
	3434		
	3435		
	3436		
	3437		
	3438		
	3439		
1AE	3440	F1 CMD1 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3441		
	3442		
	3443		
	3444	F1 CMD2 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3445		
	3446		
	3447		
1AF	3448	F1 CMD3 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3449		
	3450		
	3451		
	3452	F1 CMD4 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3453		
	3454		
	3455		
1B0	3456	F1 CMD5 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3457		
	3458		
	3459		
	3460	F1 CMD6 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3461		
	3462		
	3463		
1B1	3464	F1 CMD7 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3465		
	3466		
	3467		
	3468	F1 CMD8 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3469		
	3470		
	3471		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1B2	3472	F1 CMD9 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3473		
	3474		
	3475		
	3476	F1 CMD10 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3477		
	3478		
	3479		
1B3	3480	F1 CMD11 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3481		
	3482		
	3483		
	3484	F1 CMD12 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3485		
	3486		
	3487		
1B4	3488	delay loop to location selection	0000:CMD1;0001:CMD2;0010:CMD3;0011:CMD4;0100:CMD5;0101:CMD6;or;0110:CMD7;0111:CMD8;1000:CMD9;1001:CMD10;1010:CMD11;1011:CMD12
	3489		
	3490		
	3491		
	3492	output mux1 initial state setting	00: keep 01: 0 10: 1 11: none
	3493		
	3494	output mux2 initial state setting	00: keep 01: 0 10: 1 11: none
	3495		
1B5	3496	output mux3 initial state setting	00: keep 01: 0 10: 1 11: none
	3497		
	3498	interrupt reset stack memory enable	0: no reset stack memory 1: reset stack memory.
	3499	Reserved	
	3500	Reserved	
	3501	Reserved	
	3502	Reserved	
	3503	Reserved	
1B6	3504	aio0-3 input selection load 1	00: aio0 01: aio1 10: aio2 11: aio3
	3505		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1B6	3506	ACMP4_F Vref selection load 1	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3507		
	3508		
	3509		
	3510		
	3511		
1B7	3512	aio0-3 input selection load 2	00: aio0 01: aio1 10: aio2 11: aio3
	3513		
	3514	ACMP4_F Vref selection load 2	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3515		
	3516		
	3517		
	3518		
	3519		
1B8	3520	aio4-7 input selection load 3	00: aio4 01: aio5 10: aio6 11: aio7
	3521		
	3522	ACMP4_F Vref selection load 3	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3523		
	3524		
	3525		
	3526		
	3527		
1B9	3528	aio4-7 input selection load 4	00: aio4 01: aio5 10: aio6 11: aio7
	3529		
	3530	ACMP4_F Vref selection load 4	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63 "F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External VRE
	3531		
	3532		
	3533		
	3534		
	3535		
1BA	3536	F1 input selection load 1	0: from matrix 1: from ACMP4_F
	3537	F1 input selection load 2	0: from matrix 1: from ACMP4_F
	3538	F1 input selection load 3	0: from matrix 1: from ACMP4_F
	3539	F1 input selection load 4	0: from matrix 1: from ACMP4_F
	3540	Reserved	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1BA	3541	delay clock source selection	000: RING; 001: RING/4 010: RC 011: RC/8 100: RC/64 101: LF 110: LF/8 111: LF/64
	3542		
	3543		
1BB	3544	F1 delay data	Data[7:0]
	3545		
	3546		
	3547		
	3548		
	3549		
	3550		
	3551		
1BC	3552	F1 CMD1 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3553		
	3554		
	3555		
	3556	F1 CMD2 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3557		
	3558		
	3559		
1BD	3560	F1 CMD3 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3561		
	3562		
	3563		
	3564	F1 CMD4 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3565		
	3566		
	3567		
1BE	3568	F1 CMD5 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3569		
	3570		
	3571		
	3572	F1 CMD6 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3573		
	3574		
	3575		
1BF	3576	F1 CMD7 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3577		
	3578		
	3579		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1BF	3580	F1 CMD8 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3581		
	3582		
	3583		
1C0	3584	F1 CMD9 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3585		
	3586		
	3587		
	3588	F1 CMD10 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3589		
	3590		
	3591		
1C1	3592	F1 CMD11 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3593		
	3594		
	3595		
	3596	F1 CMD12 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3597		
	3598		
	3599		
1C2	3600	delay loop to location selection	0000:CMD1;0001:CMD2;0010:CMD3;0011:CMD4;0100:CMD5;0101:CMD6;or;0110:CMD7;0111:CMD8;1000:CMD9;1001:CMD10;1010:CMD11;1011:CMD12
	3601		
	3602		
	3603		
	3604	output mux1 initial state setting	00: keep 01: 0 10: 1 11: none
	3605		
	3606	output mux2 initial state setting	00: keep 01: 0 10: 1 11: none
	3607		
1C3	3608	output mux3 initial state setting	00: keep 01: 0 10: 1 11: none
	3609		
	3610	interrupt reset stack memory enable	0: no reset stack memory 1: reset stack memory
	3611	Reserved	
	3612	Reserved	
	3613	Reserved	
	3614	Reserved	
1C3	3615	Reserved	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1C4	3616	aio0-3 input selection load 1	00: aio0 01: aio1 10: aio2 11: aio3
	3617		
	3618	ACMP4_F Vref selection load 1	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63
	3619		"F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3620		
	3621		
	3622		
	3623		
1C5	3624	aio0-3 input selection load 2	00: aio0 01: aio1 10: aio2 11: aio3
	3625		
	3626	ACMP4_F Vref selection load 2	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63
	3627		"F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3628		
	3629		
	3630		
	3631		
1C6	3632	aio4-7 input selection load 3	00: aio4 01: aio5 10: aio6 11: aio7
	3633		
	3634	ACMP4_F Vref selection load 3	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63
	3635		"F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3636		
	3637		
	3638		
	3639		
1C7	3640	aio4-7 input selection load 4	00: aio4 01: aio5 10: aio6 11: aio7
	3641		
	3642	ACMP4_F Vref selection load 4	"F1 input selection load 1" bit=0: Matrix input select: 000000: Matrix in0; ~ 111111: Matrix in63
	3643		"F1 input selection load 1" bit=1: ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV; 111111: External Vref
	3644		
	3645		
	3646		
	3647		
1C8	3648	F1 input selection load 1	0: from matrix 1: from ACMP4_F
	3649	F1 input selection load 2	0: from matrix 1: from ACMP4_F

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1C8	3650	F1 input selection load 3	0: from matrix 1: from ACMP4_F
	3651	F1 input selection load 4	0: from matrix 1: from ACMP4_F
	3652	Reserved	
	3653	delay clock source selection	000: RING; 001: RING/4 010: RC 011: RC/8 100: RC/64 101: LF 110: LF/8 111: LF/64
	3654		
	3655		
1C9	3656	F1 delay data	Data[7:0]
	3657		
	3658		
	3659		
	3660		
	3661		
	3662		
	3663		
1CA	3664	F1 CMD1 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3665		
	3666		
	3667		
	3668	F1 CMD2 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3669		
	3670		
	3671		
1CB	3672	F1 CMD3 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3673		
	3674		
	3675		
	3676	F1 CMD4 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3677		
	3678		
	3679		
1CC	3680	F1 CMD5 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3681		
	3682		
	3683		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1CC	3684	F1 CMD6 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3685		
	3686		
	3687		
1CD	3688	F1 CMD7 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3689		
	3690		
	3691		
	3692	F1 CMD8 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3693		
	3694		
	3695		
1CE	3696	F1 CMD9 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3697		
	3698		
	3699		
	3700	F1 CMD10 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3701		
	3702		
	3703		
1CF	3704	F1 CMD11 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3705		
	3706		
	3707		
	3708	F1 CMD12 selection	0000:load1;0001:load2;0010:load3;0011:load4;0100:and;0101:or;0110:xor;0111:inv;1000:push0;1001:pop;1010:delay;1011:delay with loop;1100:out1;1101:out2;1110:out3; 1111:end.
	3709		
	3710		
	3711		
1D0	3712	delay loop to location selection	0000: CMD1; 0001: CMD2; 0010: CMD3; 0011: CMD4; 0100: CMD5; 0101: CMD6 or; 0110: CMD7; 0111: CMD8; 1000: CMD9; 1001: CMD10; 1010: CMD11; 1011: CMD12
	3713		
	3714		
	3715		
	3716	output mux1 initial state setting	00: keep 01: 0 10: 1 11: none
	3717		
	3718	output mux2 initial state setting	00: keep 01: 0 10: 1 11: none
	3719		
1D1	3720	output mux3 initial state setting	00: keep 01: 0 10: 1 11: none
	3721		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1D1	3722	interrupt reset stack memory enable	0: no reset stack memory 1: reset stack memory
	3723	Reserved	
	3724	Reserved	
	3725	Reserved	
	3726	Reserved	
	3727	Reserved	
1D2	3728	F1 state0 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3729		
	3730		
	3731	F1 state 1 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3732		
	3733		
1D3	3734	F1 state 2 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3735		
	3736		
	3737	F1 state 3 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3738		
	3739		
	3740	F1 state 4 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3741		
	3742		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1D3	3743	F1 state 5 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
1D4	3744		
	3745		
	3746		F1 state 6 setting selection
	3747		
	3748		
	3749	F1 state 7 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3750		
	3751		
1D5	3752	F1 state 8 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3753		
	3754		
	3755	F1 state 9 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3756		
	3757		
	3758	F1 state 10 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none
	3759		
1D6	3760	F1 state 11 setting selection	000: none 001: setting 0 010: setting 1 011: setting 2 100: setting 3 101: none 110: none 111: none.
	3761		
	3762		
	3763		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1D6	3764	F1 ACMP4_F input LPF enable	0: input no LPF 1: input with LPF
	3765	F1 ACMP4_F output LPF enable	0: output no LPF 1: output with LPF
	3766	register interrupt	1: interrupt active
	3767	Reserved	
1D7	3768	Matrix Input 0	
	3769	Matrix Input 1	
	3770	Matrix Input 2	
	3771	Matrix Input 3	
	3772	Matrix Input 4	
	3773	Matrix Input 5	
	3774	Matrix Input 6	
1D8	3775	Matrix Input 7	
	3776	Matrix Input 8	
	3777	Matrix Input 9	
	3778	Matrix Input 10	
	3779	Matrix Input 11	
	3780	Matrix Input 12	
	3781	Matrix Input 13	
1D9	3782	Matrix Input 14	
	3783	Matrix Input 15	
	3784	Matrix Input 16	
	3785	Matrix Input 17	
	3786	Matrix Input 18	
	3787	Matrix Input 19	
	3788	Matrix Input 20	
1DA	3789	Matrix Input 21	
	3790	Matrix Input 22	
	3791	Matrix Input 23	
	3792	Matrix Input 24	
	3793	Matrix Input 25	
	3794	Matrix Input 26	
	3795	Matrix Input 27	
1DB	3796	Matrix Input 28	
	3797	Matrix Input 29	
	3798	Matrix Input 30	
	3799	Matrix Input 31	
	3800	Matrix Input 32	Virtual Input [0]
	3801	Matrix Input 33	Virtual Input [1]
	3802	Matrix Input 34	Virtual Input [2]
	3803	Matrix Input 35	Virtual Input [3]

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1DB	3804	Matrix Input 36	Virtual Input [4]
	3805	Matrix Input 37	Virtual Input [5]
	3806	Matrix Input 38	Virtual Input [6]
	3807	Matrix Input 39	Virtual Input [7]
1DC	3808	Matrix Input 40	
	3809	Matrix Input 41	
	3810	Matrix Input 42	
	3811	Matrix Input 43	
	3812	Matrix Input 44	
	3813	Matrix Input 45	
	3814	Matrix Input 46	
1DD	3815	Matrix Input 47	
	3816	Matrix Input 48	
	3817	Matrix Input 49	
	3818	Matrix Input 50	
	3819	Matrix Input 51	
	3820	Matrix Input 52	
	3821	Matrix Input 53	
	3822	Matrix Input 54	
1DE	3823	Matrix Input 55	
	3824	Matrix Input 56	
	3825	Matrix Input 57	
	3826	Matrix Input 58	
	3827	Matrix Input 59	
	3828	Matrix Input 60	
	3829	Matrix Input 61	
	3830	Matrix Input 62	
	3831	Matrix Input 63	

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1DF	3832	CNT0 (16bits) Counted Value	
	3833		
	3834		
	3835		
	3836		
	3837		
	3838		
	3839		
1E0	3840		
	3841		
	3842		
	3843		
	3844		
	3845		
	3846		
	3847		
1E1	3848	CNT2 (8bits) Counted Value	
	3849		
	3850		
	3851		
	3852		
	3853		
	3854		
	3855		
1E2	3856	CNT4 (8bits) Counted Value	
	3857		
	3858		
	3859		
	3860		
	3861		
	3862		
	3863		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1E3	3864	ASM state read back	
	3865		
	3866		
	3867		
	3868		
	3869		
	3870		
	3871		
1E4	3872		
	3873		
	3874		
	3875		
	3876		
	3877		
	3878		
	3879		
1E5	3880	GPIO4 I ² C output expender data	
	3881	GPIO4 I ² C output expender select	0: GPIO4 output come from matrix 1: GPIO4 output is register
	3882	GPIO5 I ² C output expender data	
	3883	GPIO5 I ² C output expender select	0: GPIO5 output come from matrix 1: GPIO5 output is register
	3884	GPIO6 I ² C output expender data	
	3885	GPIO6 I ² C output expender select	0: GPIO6 output come from matrix 1: GPIO6 output is register
	3886	GPIO7 I ² C output expender data	
	3887	GPIO7 I ² C output expender select	0: GPIO7 output come from matrix 1: GPIO7 output is register
1E6	3888	ACMP0_H Gain divider	ACMP gain divider select: 00: 1X 01: 0.5X 10: 0.33X 11: Reserved
	3889		
	3890	ACMP0_H Vref	ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV 111111: External Vref
	3891		
	3892		
	3893		
	3894		
	3895		
1E7	3896	ACMP1_H Gain divider	ACMP gain divider select: 00: 1X 01: 0.5X 10: 0.33X 11: Reserved
	3897		

Address		Signal Function	Register Bit Definition		
Byte	Register Bit				
1E7	3898	ACMP1_H Vref	ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV 111111: External Vref		
	3899				
	3900				
	3901				
	3902				
	3903				
1E8	3904	ACMP2_L Gain divider	ACMP gain divider select: 00: 1X 01: 0.5X 10: 0.33X 11: Reserved		
	3905				
	3906	ACMP2_L Vref	ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV 111111: External Vref		
	3907				
	3908				
	3909				
	3910				
	3911				
1E9	3912	ACMP3_L Gain divider	ACMP gain divider select: 00: 1X 01: 0.5X 10: 0.33X 11: Reserved		
	3913				
	3914	ACMP3_L Vref	ACMP Vref select: 000000: 32mV ~ 111110: 2.016V/ step=32mV 111111: External Vref		
	3915				
	3916				
	3917				
	3918				
	3919				
1EA	3920	REG_LUT4_0_D0[15:0]	Data[15:0]		
	3921				
	3922				
	3923				
	3924				
	3925				
	3926				
	3927				
1EB	3928				
	3929				
	3930				
	3931				
	3932				
	3933				
	3934				
	3935				

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1EC	3936	REG_LUT3_4_D1[7:0]	Data[7:0]
	3937		
	3938		
	3939		
	3940		
	3941		
	3942		
	3943		
1ED	3944	REG_LUT3_5_D2[7:0]	Data[7:0]
	3945		
	3946		
	3947		
	3948		
	3949		
	3950		
	3951		
1EE	3952	REG_LUT3_6_D3[7:0]	Data[7:0]
	3953		
	3954		
	3955		
	3956		
	3957		
	3958		
	3959		
1EF	3960	REG_LUT3_7_D4[7:0]	Data[7:0]
	3961		
	3962		
	3963		
	3964		
	3965		
	3966		
	3967		
1F0	3968	band gap trim bit0	
	3969	band gap trim bit1	
	3970	band gap trim bit2	
	3971	band gap trim bit3	
	3972	band gap trim bit4	
	3973	band gap trim bit5	
	3974	band gap trim bits6	
	3975	band gap trim bits program protect; CK&CKB function enable	1: program protect; CK&CKB function disable

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1F1	3976	F1 Vref trim bit0	
	3977	F1 Vref trim bit1	
	3978	F1 Vref trim bit2	
	3979	F1 Vref trim bit3	
	3980	Reserved	
	3981	Reserved	
	3982	F1 ACMP test enable	1: enable
	3983	F1 Vref trim bits program protect	1: program protect
1F2	3984	Temperature sensor trim bit0	
	3985	Temperature sensor trim bit1	
	3986	Temperature sensor trim bit2	
	3987	Temperature sensor trim bit3	
	3988	Reserved	
	3989	Reserved	
	3990	Reserved	
	3991	Temperature sensor trim bits program protect	1: program protect
1F3	3992	LPVref trim bit0	
	3993	LPVref trim bit1	
	3994	LPVref trim bit2	
	3995	LPVref trim bit3	
	3996	LPVref trim bit4	
	3997	Reserved	
	3998	F1 ACMP test enable	1: enable
	3999	LPVref trim bits program protect	1: program protect
1F4	4000	OSC0 trim bit0	
	4001	OSC0 trim bit1	
	4002	OSC0 trim bit2	
	4003	OSC0 trim bit3	
	4004	OSC0 trim bit4	
	4005	OSC0 trim bit5	
	4006	Reserved	
	4007	OSC0 trim bits program protect	1: program protect
1F5	4008	OSC1 trim bit0	
	4009	OSC1 trim bit1	
	4010	OSC1 trim bit2	
	4011	OSC1 trim bit3	
	4012	OSC1 trim bit4	
	4013	OSC1 trim bit5	
	4014	Reserved	
	4015	OSC1 trim bits program protect	1: program protect

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Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1F6	4016	OSC2 trim bit0	
	4017	OSC2 trim bit1	
	4018	OSC2 trim bit2	
	4019	OSC2 trim bit3	
	4020	OSC2 trim bit4	
	4021	OSC2 trim bit5	
	4022	Reserved	
	4023	OSC2 trim bits program protect	1: program protect
1F7	4024	Reserved	
	4025		
	4026		
	4027		
	4028		
	4029		
	4030		
	4031		
1F8	4032	NVM blank check result (From check circuit): ID[24]	
	4033	NVM Power-Up Check Pattern Status (From Flag): ID[25] (Reg[2047:2040]=0xA5, Reg[2015:2008]=0x5A)	0: Incorrect 1: Correct
	4034	Reserved for ID (From Metal Hard Code): ID[27:26]	00: Reserved
	4035		
	4036	Product Family ID (From Metal Hard Code): ID[31:28]	0000: 46880 0001: 46881
	4037		
	4038		
	4039		
1F9	4040	8-bit Pattern ID Byte 0 (From NVM): ID[23:16]	
	4041		
	4042		
	4043		
	4044		
	4045		
	4046		
	4047		

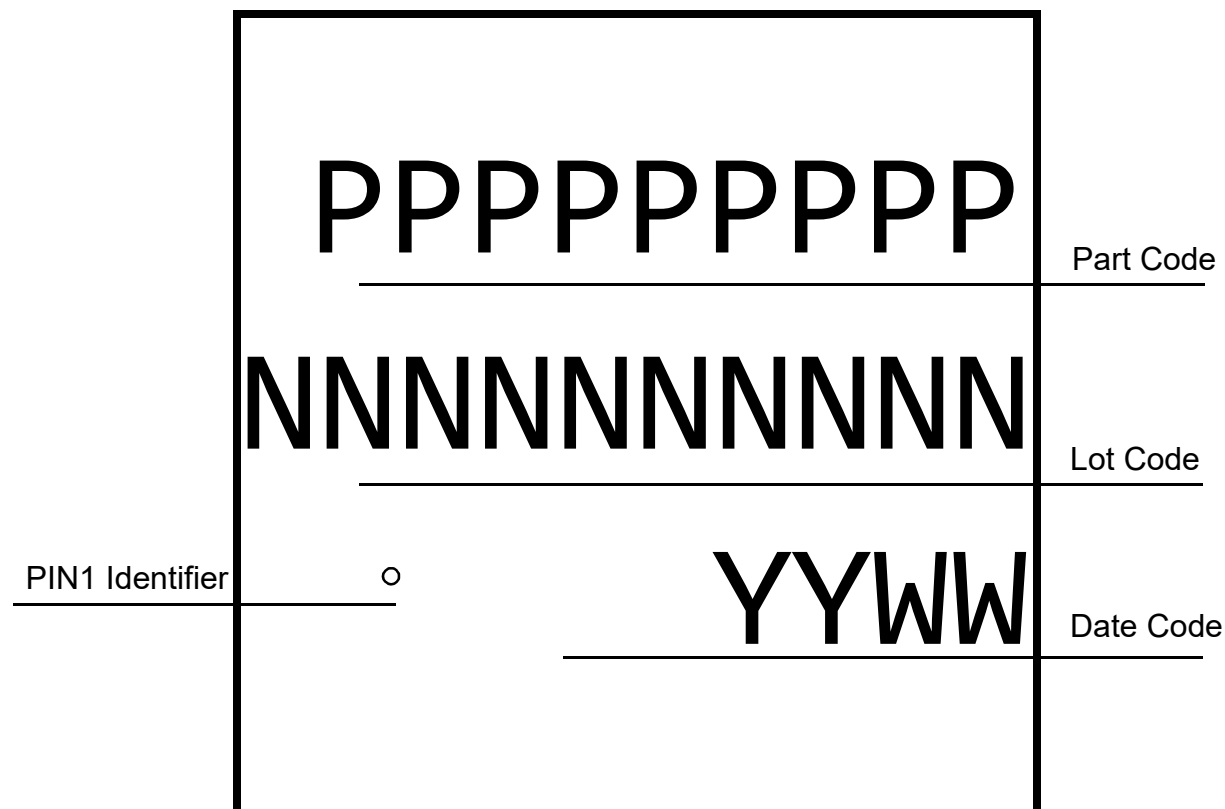
GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1FA	4048	Metal Revision ID (From Metal Hard Code): ID[15:8]	Hard Code 0x00
	4049		
	4050		
	4051		
	4052		
	4053		
	4054		
	4055		
1FB	4056	Base Die ID (From Metal Hard Code): ID[7:0]	Hard Code 0x58
	4057		
	4058		
	4059		
	4060		
	4061		
	4062		
	4063		
1FC	4064	I ² C reset bit with reloading NVM into Data register (soft reset)	0: Keep existing condition 1: Reset execution
	4065	IO Latching Enable During I ² C Write Interface	0: Disable 1: Enable
	4066	Reserved	
	4067	protect mode enable	0: Disable 1: Enable
	4068	trim enable	0: Disable 1: Enable
	4069	register protection mode bit 0	000: all open read/write (mode 0); 001: partly lock read (mode 1); 010: partly lock read2 (mode 2); 011: partly lock read2/write (mode 3); 100: all lock read (mode 4); 101: all lock write (mode 5); 110: all lock read/write (mode 6).
	4070	register protection mode bit 1	
	4071	register protection mode bit 2	
1FD	4072	I ² C write mask bits	1: mask 0: overwrite
	4073		
	4074		
	4075		
	4076		
	4077		
	4078		
	4079		

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

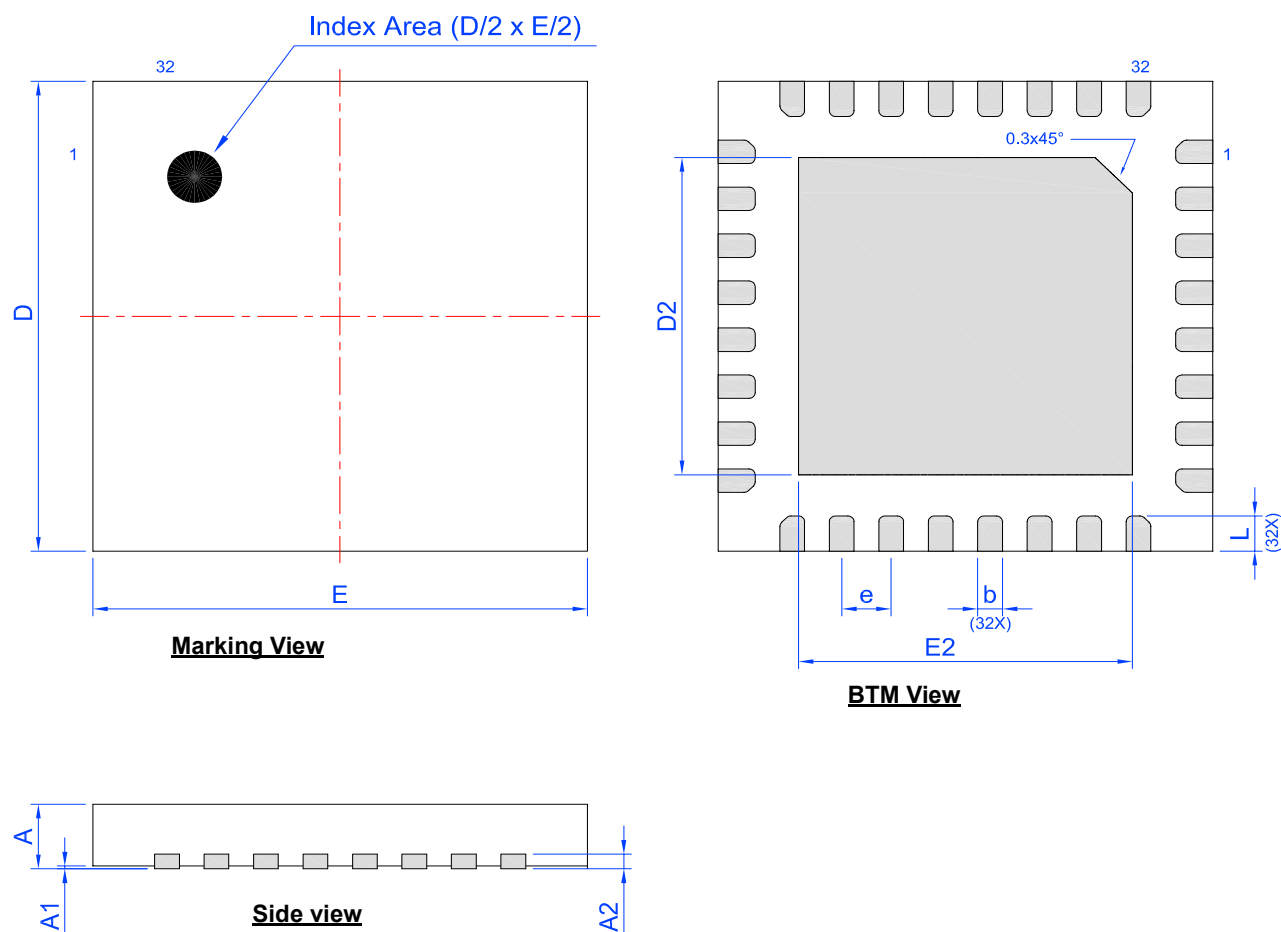
Address		Signal Function	Register Bit Definition
Byte	Register Bit		
1FE	4080	I ² C slave address	
	4081		
	4082		
	4083		
	4084	I ² C operation disable bit	0: I2C operation enable; matrix in 34(35) select I2C_virtual_0(1) Input 1: I2C operation disable; matrix in 34(35) select GPI2(3) digital input
	4085	NVM program disable	1: disable
	4086	code compare enable	1: enable
	4087	slave address selection	0: from Register 1: from Pin
1FF	4088	power sequency byte A5	A5 fixed
	4089		
	4090		
	4091		
	4092		
	4093		
	4094		
	4095		

22 Package Top Marking System Definition



23 Package Information

STQFN 32L 4 mm x 4 mm 0.4P Package JEDEC MO-220, Variation WECE



Unit: mm

Symbol	Min.	Nom.	Max.	Symbol	Min.	Nom.	Max.
A	0.500	0.550	0.600	D	3.950	4.000	4.050
A1	0.00	-	0.050	E	3.950	4.000	4.050
A2	0.150 REF			D2	2.650	2.700	2.750
b	0.150	0.200	0.250	E2	2.650	0.270	2.750
e	0.400 BSC			L	0.250	0.300	0.350

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

24 STQFN Handling

Be sure to handle STQFN package only in a clean, ESD-safe environment. Tweezers or vacuum pick-up tools are suitable for handling. Do not handle STQFN package with fingers as this can contaminate the package pins and interface with solder reflow.

25 Soldering Information

Please see IPC/JEDEC J-STD-020: latest revision for reflow profile based on package volume of 3.85 mm³ (nominal). More information can be found at www.jedec.org.

26 Ordering Information

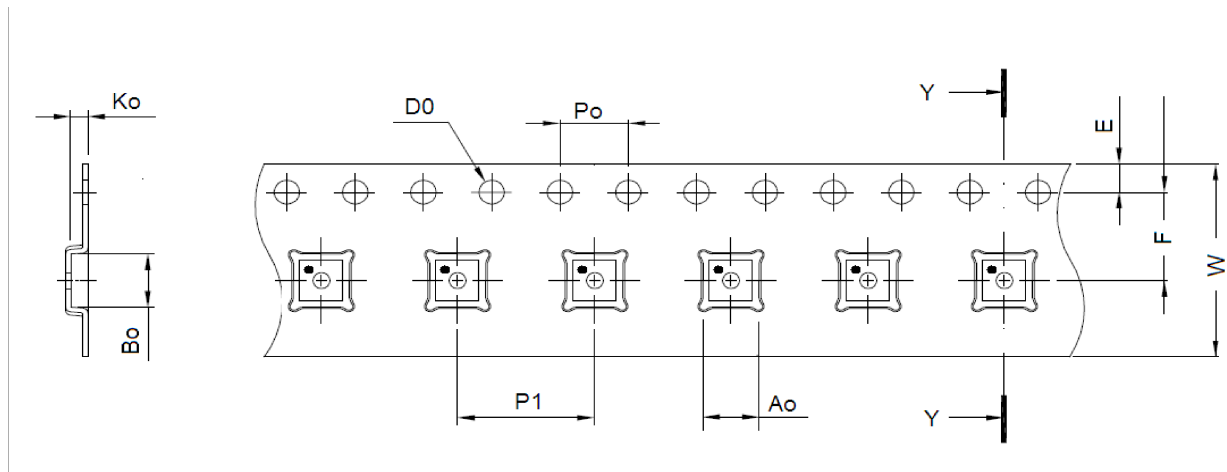
Part Number	Type
SLG46880V	32-Pin STQFN
SLG46880VTR	32-Pin STQFN - Tape and Reel (3k units)
SLG46881V	32-Pin STQFN
SLG46881VTR	32-Pin STQFN - Tape and Reel (3k units)

26.1 TAPE AND REEL SPECIFICATIONS

Package Type	# of Pins	Nominal Package Size (mm)	Max Units		Reel & Hub Size (mm)	Leader (min)		Trailer (min)		Tape Width (mm)	Part Pitch (mm)
			per Reel	per Box		Pockets	Length (mm)	Pockets	Length (mm)		
STQFN 32L 4 mm x 4 mm 0.4P Green	32	4 x 4 x 0.55	5,000	10,000	330/100	42	336	42	336	12	8

26.2 CARRIER TAPE DRAWING AND DIMENSIONS

Package Type	PocketBTM Length (mm)	PocketBTM Width (mm)	Pocket Depth (mm)	Index Hole Pitch (mm)	Pocket Pitch (mm)	Index Hole Diameter (mm)	Index Hole to Tape Edge (mm)	Index Hole to Pocket Center (mm)	Tape Width (mm)
	A0	B0	K0	P0	P1	D0	E	F	W
STQFN 32L 2 mm x 3 mm 0.4P Green	4.25	4.25	0.75	4	8	1.5	1.75	5.5	12

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous
State Machine and Dual Supply

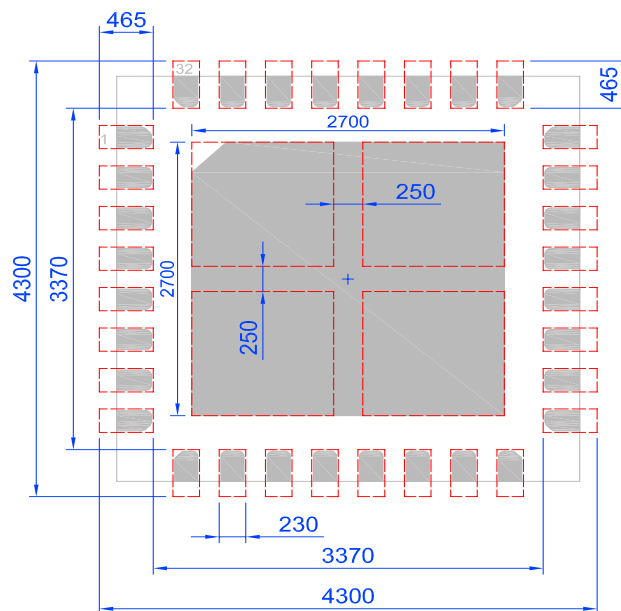
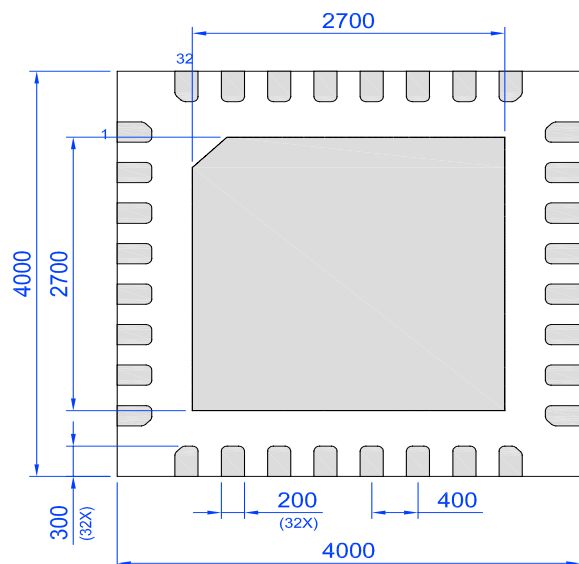
Refer to EIA-481 specification

27 Layout Guidelines

Units: μm

 Exposed Pad
(PKG face down)

 Recommended Land Pattern
(PKG face down)



GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Glossary

ACK	Acknowledge bit
ACMP	Analog Comparator
ACMPH	Analog Comparator High Speed
ACMPL	Analog Comparator Low Power
ASM	Asynchronous State Machine
BG	Bandgap
CLK	Clock
CMO	Connection matrix output
CNT	Counter
DFF	D Flip-Flop
DLY	Delay
DM	Dynamic Memory
EC	Electrical Characteristics
ERSE	Erase Enable
ERSR	Erase Register
ESD	Electrostatic discharge
EV	End Value
FSM	Finite State Machine
GPI	General Purpose Input
GPIO	General Purpose Input/Output
GPO	General Purpose Output
IN	Input
IO	Input/Output
LPF	Low Pass Filter
LSB	Least Significant Bit
LUT	Look-Up Table
LV	Low Voltage
MSB	Most Significant Bit
MTP	Multiple-Time-Programmable
MUX	Multiplexer
NPR	Non-Volatile Memory Read/Write/Erase Protection
nRST	Reset
NVM	Non-Volatile Memory
OD	Open Drain
OE	Output Enable
OSC	Oscillator
OUT	Output
PD	Power Down

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

PGEN	Pattern Generator
POR	Power-On Reset
PP	Push Pull
PRL	Protect Lock Bit
PWR	Power
P DLY	Programmable Delay
RPR	Register Read/Write Protection
RPRB	Register Read/Write Protection Bit
RPRL	Register Protection Read/Write/Erase Lock
R/W	Read/Write
SCL	I ² C Clock Input
SDA	I ² C Data Input/Output
SLA	Slave Address
SMT	With Schmitt Trigger
SV	nSET Value
TS	Temperature Sensor
Vref	Voltage Reference
WOSMT	Without Schmitt Trigger
WPB	Write Protect Bit
WPR	Write Protection Register
WPRE	Write Protect Enable
WS	Wake and Sleep Controller

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Revision History

Revision	Date	Description
3.6	4-Jan-2019	Added subsection f(1) Performance Added subsection IO Pins Performance Added ACMPs' hysteresis information Added additional information about V_{DD2} to IO Pins section Added table Typical Delay Estimated for F(1) Added graph for ACMP Input Current Source Updated Input Current Source Spec Added section ACMP Typical Performance Updated Analog Temperature Sensor Electrical Spec Added sections Oscillators Power-On Delay and Oscillators Accuracy Corrected Absolute Maximum Ratings Updated Typical Delay table Updated DM Block Diagrams Updated ACMP section Fixed typos
3.5	14-Sept-2018	Fixed typos Updated Analog Temperature Sensor Structure Diagram Updated Example of I ² C Byte Write Bit Masking
3.4	20-Aug-2018	Updated EC for SLG46881 Fixed typos
3.3	9-Aug-2018	Fixed typos
3.2	27-Jul-2018	Updated TS Structure Diagram Added STQFN Handling section Updated ACMP Electrical Spec Fixed formatting Updated R_{PULL} in Electrical Spec
3.1	30-Apr-2018	Updated TS Electrical Spec
3.0	18-Apr-2018	Final version

GreenPAK Programmable Mixed-Signal Matrix with Asynchronous State Machine and Dual Supply

Status Definitions

Version	Datasheet Status	Product Status	Definition
1.[n]	Target	Development	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
2.[n]	Preliminary	Qualification	This datasheet contains the specifications and preliminary characterization data for products in pre-production. Specifications may be changed at any time without notice in order to improve the design.
3.[n]	Final	Production	This datasheet contains the final specifications for products in volume production. The specifications may be changed at any time in order to improve the design, manufacturing and supply. Major specification changes are communicated via Customer Product Notifications. Datasheet changes are communicated via www.dialog-semiconductor.com .
4.[n]	Obsolete	Archived	This datasheet contains the specifications for discontinued products. The information is provided for reference only.

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