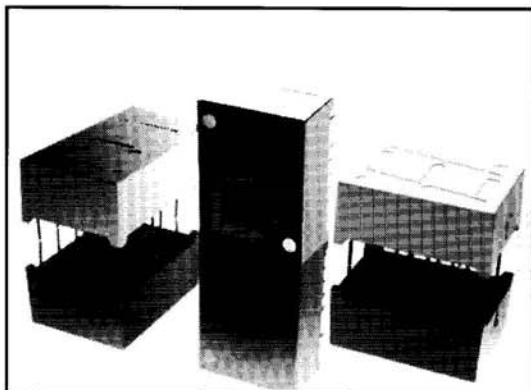




## 0.800-INCH SEVEN SEGMENT DISPLAYS

### HIGH EFFICIENCY RED (ORANGE) MAN8600 SERIES



#### DESCRIPTION

The MAN8600 Series is a family of large digits 0.8-inches in height. This series combines high brightness, large size, good aesthetics and is designed to be used where accurate readable displays need to be viewed over a distance. All models use right hand decimal points. Units are constructed with Grey face and neutral segment color.

#### FEATURES

- High performance nitrogen-doped GaAsP on GaP
- Large, easy to read, digits
- Common anode or common cathode models
- Fast switching — excellent for multiplexing
- Low power consumption
- Bold solid segments that are highly legible
- Solid state reliability — long operation life
- Rugged plastic construction
- Directly compatible with integrated circuits
- High brightness with high contrast
- Categorized for Luminous Intensity (See Note 6)
- Wide angle viewing...150°
- Low forward voltage
- Grey face for use in high ambient light conditions

#### APPLICATIONS

For industrial and consumer applications such as:

- Digital readout displays
- Instrument panels
- Point of sale equipment
- Digital clocks
- TV and radios

#### MODEL NUMBERS

| PART NUMBER | COLOR                        | DESCRIPTION                        | PACKAGE DRAWING |
|-------------|------------------------------|------------------------------------|-----------------|
| MAN8610     | High Efficiency Red (Orange) | Common Anode; Right Hand Decimal   | 1               |
| MAN8640     | High Efficiency Red (Orange) | Common Cathode; Right Hand Decimal | 1               |

#### RECOMMENDED FILTERS

For optimum ON and OFF contrast, one of the following filters or equivalents should be used over the display:

Panelgraphic Scarlet 65  
Homalite 100-1670

In situations of high ambient light, contrast with the Grey face can be enhanced by using a neutral density filter. The following or an equivalent can be used:

Panelgraphic Grey 10



## 0.800-INCH SEVEN SEGMENT DISPLAYS

### ELECTRO-OPTICAL CHARACTERISTICS

(25°C Free Air Temperature Unless Otherwise Specified)

|                                                        | MIN. | TYP. | MAX. | UNITS          | TEST CONDITIONS      |
|--------------------------------------------------------|------|------|------|----------------|----------------------|
| Luminous Intensity, digit average<br>(See Note 1)      | 600  | 2200 |      | $\mu\text{cd}$ | $I_F = 10\text{ mA}$ |
| Peak emission wavelength                               |      | 630  |      | nm             |                      |
| Spectral line half width                               |      | 40   |      | nm             |                      |
| Forward voltage                                        |      |      |      |                |                      |
| Segment                                                |      |      | 2.5  | V              | $I_F = 20\text{ mA}$ |
| Decimal point                                          |      |      | 2.5  | V              | $I_F = 20\text{ mA}$ |
| Dynamic resistance                                     |      |      |      |                |                      |
| Segment                                                |      | 26   |      | $\Omega$       | $I_F = 20\text{ mA}$ |
| Decimal point                                          |      | 26   |      | $\Omega$       | $I_F = 20\text{ mA}$ |
| Capacitance                                            |      |      |      |                |                      |
| Segment                                                |      | 35   |      | pF             | $V = 0$              |
| Decimal point                                          |      | 35   |      | pF             | $V = 0$              |
| Reverse current                                        |      |      |      |                |                      |
| Segment                                                |      |      | 100  | $\mu\text{A}$  | $V_R = 3.0\text{ V}$ |
| Decimal point                                          |      |      | 100  | $\mu\text{A}$  | $V_R = 3.0\text{ V}$ |
| Luminous Intensity Ratio $I_L$<br>(segment-to-segment) |      |      | 2:1  | —              | $I_F = 10\text{ mA}$ |

### ABSOLUTE MAXIMUM RATINGS

|                                                                      |                |
|----------------------------------------------------------------------|----------------|
| Power dissipation at 25°C ambient                                    | 600 mW         |
| Derate linearly from 50°C                                            | -8.6 mW/°C     |
| Storage and operating temperature                                    | -40°C to +85°C |
| Continuous forward current                                           |                |
| Total                                                                | 240 mA         |
| Per segment                                                          | 30 mA          |
| Decimal point                                                        | 30 mA          |
| Reverse voltage                                                      |                |
| Per segment                                                          | 6.0 V          |
| Decimal point                                                        | 6.0 V          |
| Soldering time at 260°C (See Note 4)                                 | 5 sec.         |
| Peak forward current per segment ( $I_{\text{max}}$ ) (See Figure 4) | —              |

### TYPICAL THERMAL CHARACTERISTICS

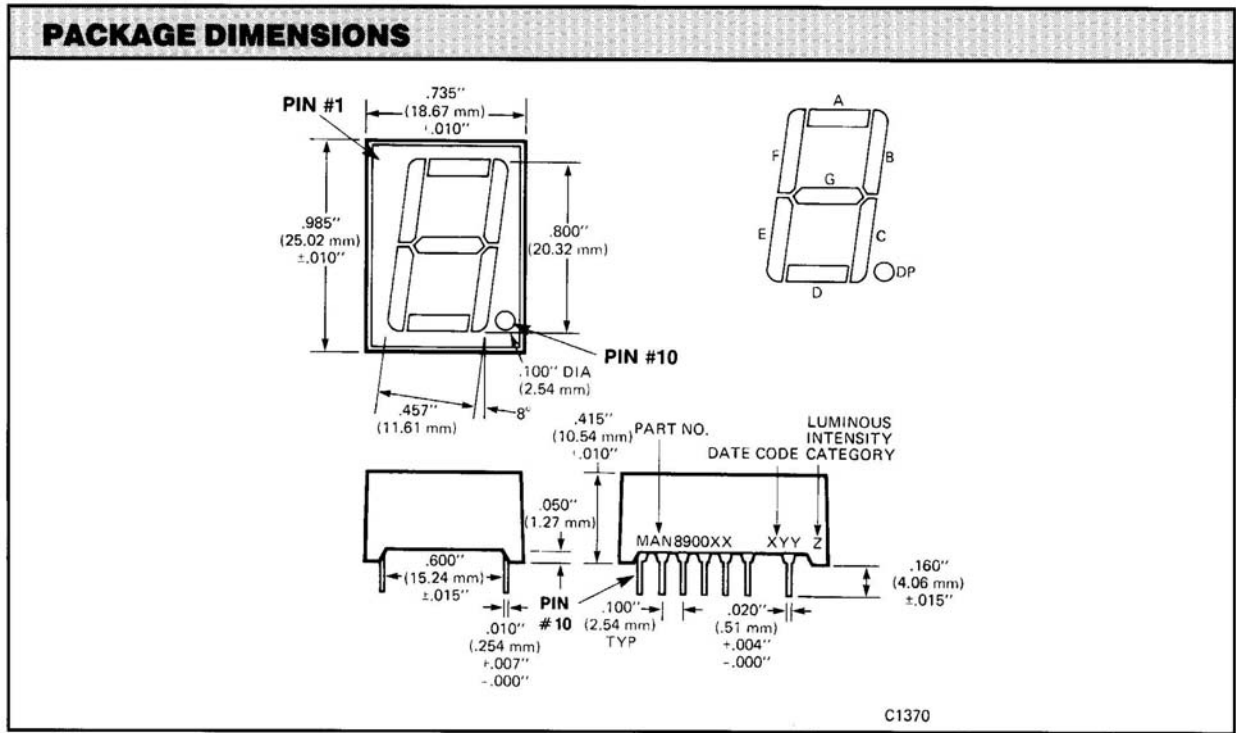
|                                                       |            |
|-------------------------------------------------------|------------|
| Thermal resistance junction to free air $\Phi_{JA}$   | 160°C/W    |
| Wavelength temperature coefficient (case temperature) | 1.0Å/°C    |
| Forward voltage temperature coefficient               | -2.0 mV/°C |

### NOTES

1. The digit average Luminous Intensity is obtained by summing the Luminous Intensity of each segment and dividing by the total number of segments. Intensity will not vary more than  $\pm 33.3\%$  between all segments within a digit.
2. The curve in Figure 3 is normalized to the brightness at 25°C to indicate the relative efficiency over the operating temperature range.
3. Leads of the device immersed to 1/16 inch from the body. Maximum device surface temperature is 140°C.
4. For flux removal, Freon TF, Freon TE, Isopropanol or water may be used up to their boiling points.
5. All displays are categorized for Luminous Intensity. The Intensity category is marked on each part as a suffix letter to the part number.



0.800-INCH  
SEVEN SEGMENT DISPLAYS



| ELECTRICAL CONNECTIONS |                    |                    |
|------------------------|--------------------|--------------------|
| ELECTRICAL CONNECTIONS |                    |                    |
|                        | MAN8610            | MAN8640            |
|                        | Digit              | Digit              |
| PIN #                  | Common Anode       | Common Cathode     |
|                        | Package Dimensions | Package Dimensions |
| 1                      | No Connection      | No Connection      |
| 2                      | A Cathode          | A Anode            |
| 3                      | F Cathode          | F Anode            |
| 4                      | Common Anode       | Common Cathode     |
| 5                      | E Cathode          | E Anode            |
| 6                      | —                  | —                  |
| 7                      | E Cathode          | E Anode            |
| 8                      | —                  | —                  |
| 9                      | D Cathode          | Common Cathode     |
| 10                     | DP Cathode         | DP Anode           |
| 11                     | D Cathode          | D Anode            |
| 12                     | Common Anode       | Common Cathode     |
| 13                     | C Cathode          | C Anode            |
| 14                     | G Cathode          | G Anode            |
| 15                     | B Cathode          | B Anode            |
| 16                     | —                  | —                  |
| 17                     | Common Anode       | Common Cathode     |
| 18                     | —                  | —                  |



## 0.800-INCH SEVEN SEGMENT DISPLAYS

### TYPICAL CHARACTERISTIC CURVES

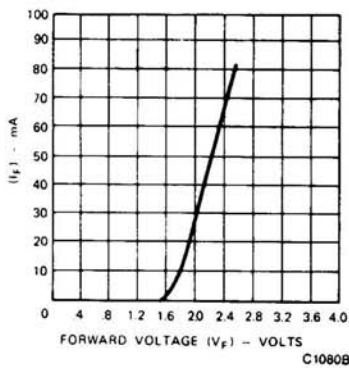


Fig. 1. Forward Current vs. Forward Voltage

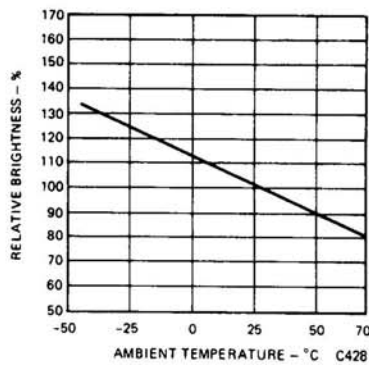


Fig. 2. Luminous Intensity vs. Temperature (See Note 2)

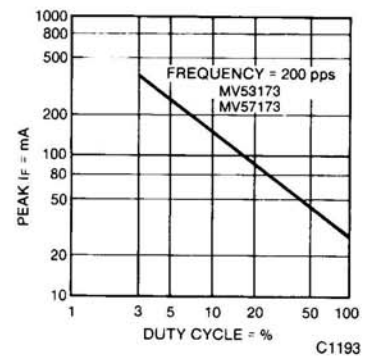


Fig. 3. Max Peak Current vs. Duty Cycle

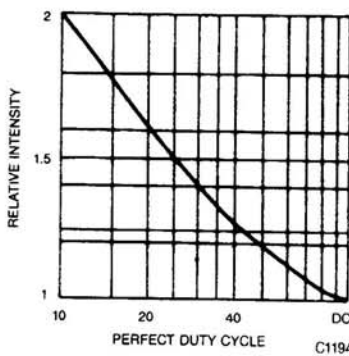


Fig. 4. Luminous Intensity vs. Duty Cycle

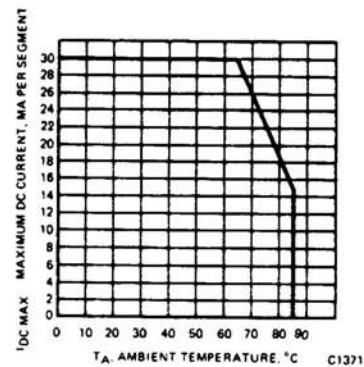


Fig. 5. Maximum DC Current vs. Temperature

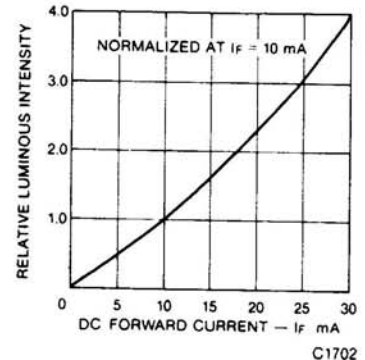
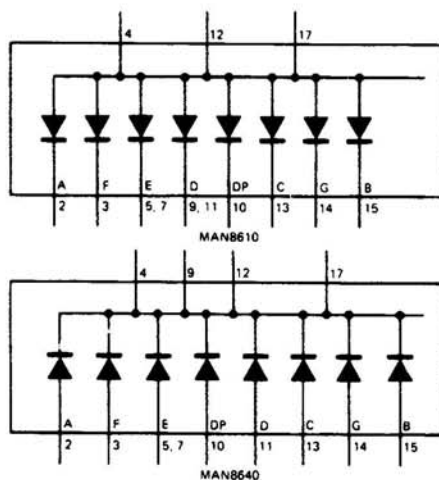


Fig. 6. Relative Luminous Intensity vs. Forward Current

### INTERNAL CONNECTIONS





## 0.800-INCH SEVEN SEGMENT DISPLAYS

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.