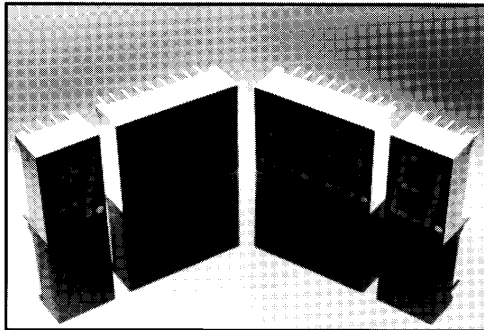


**ORANGE MAN6600 SERIES**



**DESCRIPTION**

The MAN6600 Series is a family of large digits which includes double and single digits. The series features the sculptured font which minimizes "gappiness" at the segment intersections. Available models include two-digit, one and one-half digits with polarity sign, single digits, and single polarity/overflow digits. All models have right hand decimal points and are available in common anode or common cathode configuration. Units are constructed with Orange face and 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 viewing angle... 150°
- Low forward voltage
- Two-digit package simplifies alignment and assembly

**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 | PIN OUT SPECIFICATION |
|-------------|--------|---------------------------------------------------------------|-----------------|-----------------------|
| MAN6610     | Orange | 2 Digit; Common Anode; Rt. Hand Decimal                       | A               | A                     |
| MAN6630     | Orange | 1 ½ Digit; Common Anode; Overflow ±1.8; Rt. Hand Decimal      | B               | B                     |
| MAN6640     | Orange | 2 Digit; Common Cathode; Rt. Hand Decimal                     | A               | C                     |
| MAN6650     | Orange | 1 ½ Digit; Common Cathode; Overflow ±1.8; Rt. Hand Decimal    | B               | D                     |
| MAN6660     | Orange | Single Digit; Common Anode; Rt. Hand Decimal                  | C               | E                     |
| MAN6675     | Orange | Single Digit; Common Anode; Overflow ±1.0; Rt. Hand Decimal   | D               | G                     |
| MAN6680     | Orange | Single Digit; Common Cathode; Rt. Hand Decimal                | C               | F                     |
| MAN6695     | Orange | Single Digit; Common Cathode; Overflow ±1.0; Rt. Hand Decimal | D               | H                     |

**RECOMMENDED OPTICAL FILTERS**

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

| DEVICE TYPE    | FILTER                                       |
|----------------|----------------------------------------------|
| MAN6600 Series | Panelgraphic Scarlet 65<br>Homalite 100-1670 |

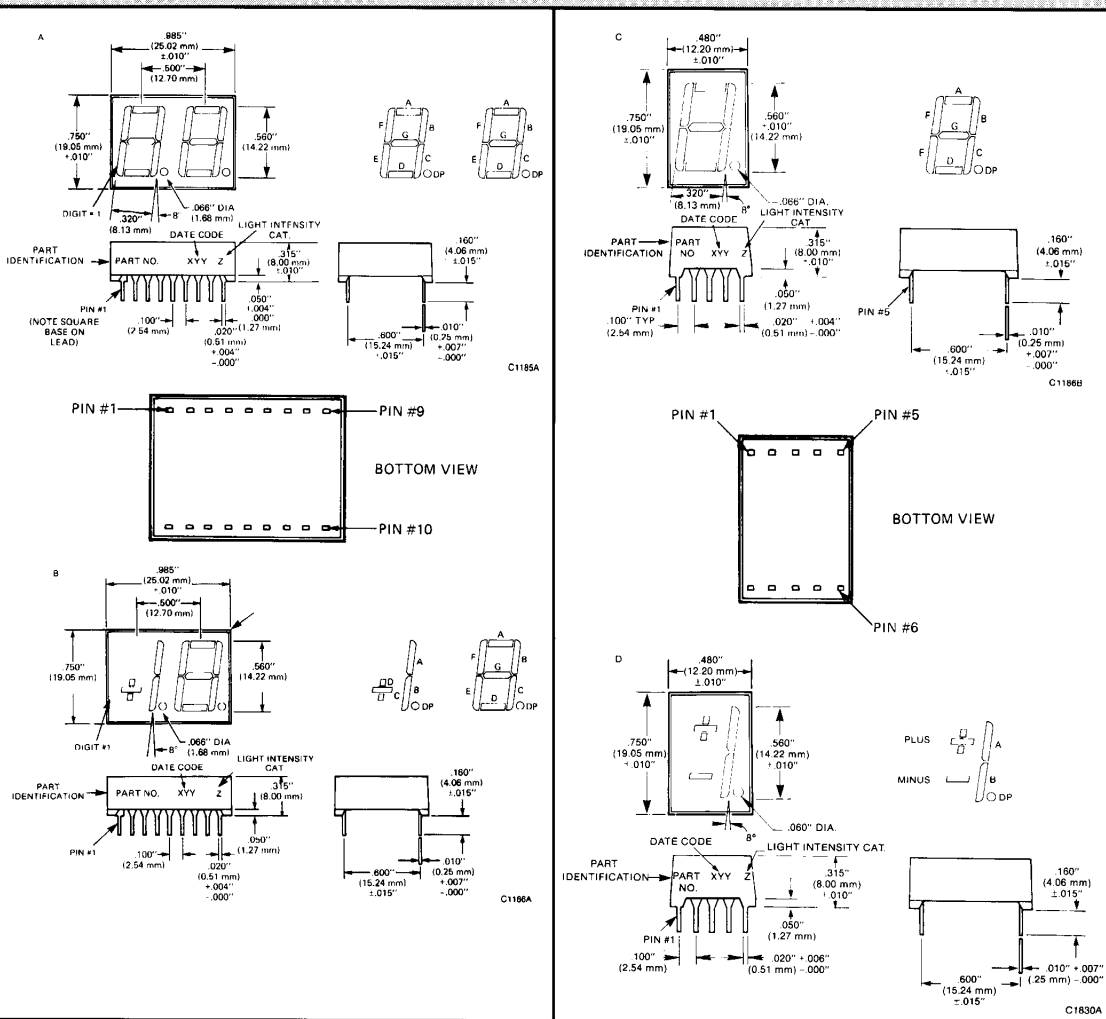
| <b>ELECTRO-OPTICAL CHARACTERISTICS</b><br>(Per Diode at 25°C Free Air Temperature Unless Otherwise Specified) |      |      |      |       |                        |
|---------------------------------------------------------------------------------------------------------------|------|------|------|-------|------------------------|
|                                                                                                               | MIN. | TYP. | MAX. | UNITS | TEST CONDITIONS        |
| Luminous Intensity, digit average<br>(See Note 1)                                                             | 510  | 2200 |      | μcd   | I <sub>F</sub> = 10 mA |
| Peak emission wavelength                                                                                      |      | 630  |      | nm    |                        |
| Spectral line half width                                                                                      |      | 40   |      | nm    |                        |
| Forward voltage                                                                                               |      |      |      |       |                        |
| Segment                                                                                                       |      |      | 2.5  | V     | I <sub>F</sub> = 20 mA |
| Decimal point                                                                                                 |      |      | 2.5  | V     | I <sub>F</sub> = 20 mA |
| Dynamic resistance                                                                                            |      |      |      |       |                        |
| Segment                                                                                                       |      | 26   |      | Ω     | I <sub>F</sub> = 20 mA |
| Decimal point                                                                                                 |      | 26   |      | Ω     | I <sub>F</sub> = 20 mA |
| Capacitance                                                                                                   |      |      |      |       |                        |
| Segment                                                                                                       |      | 35   |      | pF    | V = 0                  |
| Decimal point                                                                                                 |      | 35   |      | pF    | V = 0                  |
| Reverse current                                                                                               |      |      |      |       |                        |
| Segment                                                                                                       |      |      | 100  | μA    | V <sub>R</sub> = 3.0 V |
| Decimal point                                                                                                 |      |      | 100  | μA    | V <sub>R</sub> = 3.0 V |
| Ratio I <sub>L</sub>                                                                                          |      |      | 2:1  | —     | I <sub>F</sub> = 10 mA |

| <b>ABSOLUTE MAXIMUM RATINGS</b>                          |                    |                    |                    |                    |
|----------------------------------------------------------|--------------------|--------------------|--------------------|--------------------|
|                                                          | MAN6610<br>MAN6640 | MAN6630<br>MAN6650 | MAN6660<br>MAN6680 | MAN6675<br>MAN6695 |
| Power dissipation at 25°C ambient. . . . .               | 1200 mW            | 1050 mW            | 600 mW             | 375 mW             |
| Derate linearly from 50°C . . . . .                      | -17 mW/°C          | -15.0 mW/°C        | -8.6 mW/°C         | -5.4 mW/°C         |
| Storage and operating temperature. . . . .               | -40°C to +85°C     | -40°C to +85°C     | -40°C to +85°C     | -40°C to +85°C     |
| Continuous forward current                               |                    |                    |                    |                    |
| Total. . . . .                                           | 480 mA             | 420 mA             | 240 mA             | 150 mA             |
| Per segment. . . . .                                     | 30 mA              | 30 mA              | 30 mA              | 30 mA              |
| Decimal point. . . . .                                   | 30 mA              | 30 mA              | 30 mA              | 30 mA              |
| Reverse voltage                                          |                    |                    |                    |                    |
| Per segment. . . . .                                     | 6.0 V              | 6.0 V              | 6.0 V              | 6.0 V              |
| Decimal point. . . . .                                   | 6.0 V              | 6.0 V              | 6.0 V              | 6.0 V              |
| Soldering time at 260°C<br>(See Notes 3 and 4) . . . . . | 5 sec.             | 5 sec.             | 5 sec.             | 5 sec.             |

| <b>TYPICAL THERMAL CHARACTERISTICS</b>                         |            |
|----------------------------------------------------------------|------------|
| 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 |

| <b>NOTES</b>                                                                                                                                                                                                                      |  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| 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 ±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, Isoproponal 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.                                                                                      |  |

**PACKAGE DIMENSIONS**



# **ELECTRICAL CONNECTIONS**

| Pin No. | ELECTRICAL CONNECTIONS |               |                |                |              |              |              |              |
|---------|------------------------|---------------|----------------|----------------|--------------|--------------|--------------|--------------|
|         | A<br>MAN6610           | B<br>MAN6630  | C<br>MAN6640   | D<br>MAN6650   | E<br>MAN6660 | F<br>MAN6680 | G<br>MAN6675 | H<br>MAN6695 |
| 1       | E Cath. (#1)           | C Cath. (#1)  | E An. (#1)     | C An. (#1)     | E Cath.      | E An.        | Minus Cath.  | Minus An.    |
| 2       | D Cath. (#1)           | D Cath. (#1)  | D An. (#1)     | D An. (#1)     | D Cath.      | D An.        | Com. An. ±   | Com. Cath. ± |
| 3       | C Cath. (#1)           | B Cath. (#1)  | C An. (#1)     | B An. (#1)     | Com. An.     | Com. Cath.   | Seg. B Cath. | Seg. B An.   |
| 4       | DP Cath. (#1)          | DP Cath. (#1) | DP An. (#1)    | DP An. (#1)    | C Cath.      | C An.        | Com. An.     | Com. Cath.   |
| 5       | E Cath. (#2)           | E Cath. (#2)  | E An. (#2)     | E An. (#2)     | DP Cath.     | DP An.       | A, B, DP     | A, B, DP     |
| 6       | D Cath. (#2)           | D Cath. (#2)  | D An. (#2)     | D An. (#2)     | B Cath.      | B An.        | DP Cath.     | DP An.       |
| 7       | G Cath. (#2)           | G Cath. (#2)  | G An. (#2)     | G An. (#2)     | A Cath.      | A An.        | Seg. A Cath. | Seg. A An.   |
| 8       | C Cath. (#2)           | C Cath. (#2)  | C An. (#2)     | C An. (#2)     | Com. An.     | Com. Cath.   | Com. An.     | Com. Cath.   |
| 9       | DP Cath. (#2)          | DP Cath. (#2) | DP An. (#2)    | DP An. (#2)    | F Cath.      | F An.        | A, B, DP     | A, B, DP     |
| 10      | B Cath. (#2)           | B Cath. (#2)  | B An. (#2)     | B An. (#2)     | G Cath.      | G An.        | Com. An. ±   | Com. Cath. ± |
| 11      | A Cath. (#2)           | A Cath. (#2)  | A An. (#2)     | A An. (#2)     |              |              | Plus Cath.   | Plus An.     |
| 12      | F Cath. (#2)           | F Cath. (#2)  | F An. (#2)     | F An. (#2)     |              |              | N.C.         | N.C.         |
| 13      | Digit #2 An.           | Digit #2 An.  | Digit #2 Cath. | Digit #2 Cath. |              |              |              |              |
| 14      | Digit #1 An.           | Digit #1 An.  | Digit #1 Cath. | Digit #1 Cath. |              |              |              |              |
| 15      | B Cath. (#1)           | A Cath. (#1)  | B An. (#1)     | A An. (#1)     |              |              |              |              |
| 16      | A Cath. (#1)           | N.C.          | A An. (#1)     | N.C.           |              |              |              |              |
| 17      | G Cath. (#1)           | N.C.          | G An. (#1)     | N.C.           |              |              |              |              |
| 18      | F Cath. (#1)           | N.C.          | F An. (#1)     | N.C.           |              |              |              |              |

# **TYPICAL CHARACTERISTIC CURVES**

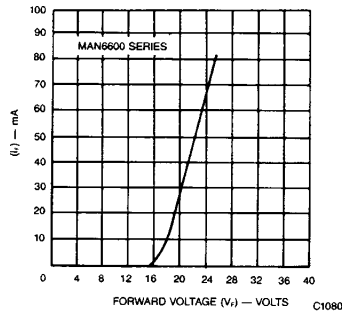


Fig. 1. Forward Current vs. Forward Voltage

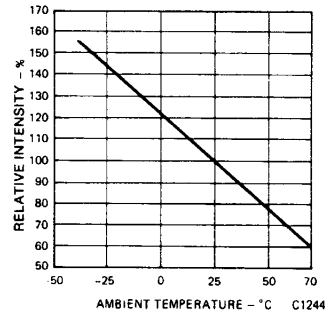


Fig. 2. Relative Luminous Intensity vs. Temperature (see Note 2)

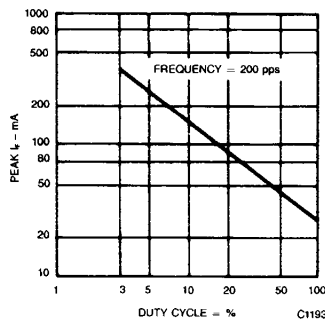


Fig. 3. Max Peak Current vs. Duty Cycle

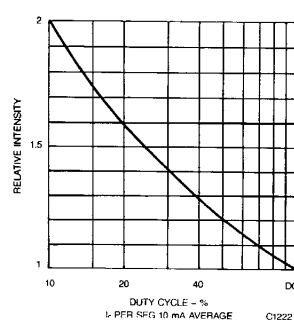


Fig. 4. Luminous Intensity vs. Duty Cycle

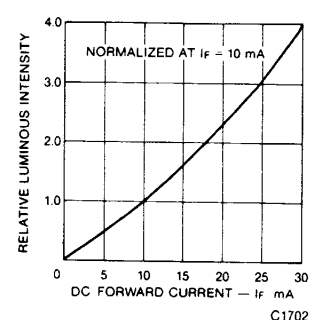
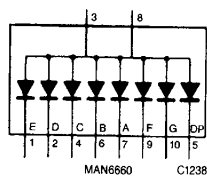
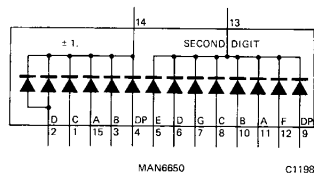
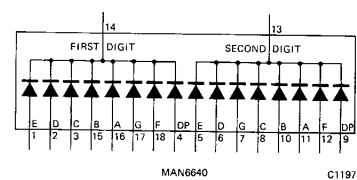
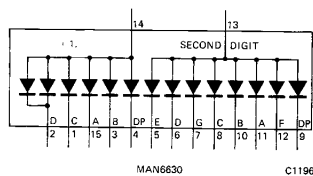
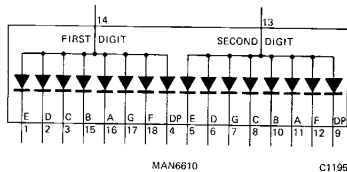


Fig. 5. Relative Luminous Intensity vs. Forward Current

**INTERNAL CONNECTIONS**





## 0.560-INCH SEVEN SEGMENT DISPLAYS

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