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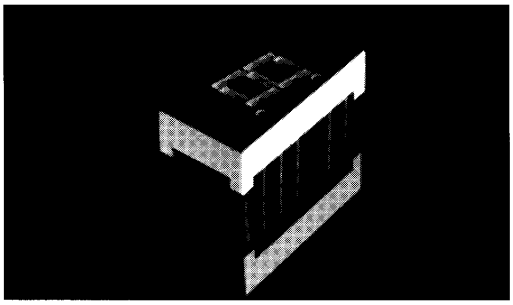
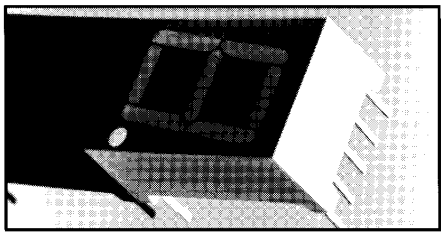
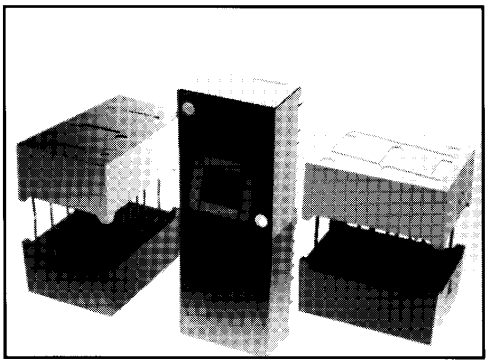
# DOUBLE HETEROJUNCTION AlGaAs RED LOW CURRENT DISPLAYS

## 7.6mm (0.3in) MAN30X0A
## 14.2mm (0.56in) MAN60X0
## 20.0mm (0.8in) MAN80X0







## DESCRIPTION

This line of solid state LED displays uses newly developed Double Heterojunction (HD) AlGaAs/GaAs material to emit deep red light at 650 nm. This material has outstanding efficiency at low drive currents and can be either DC or pulse driven. Viewability at up to 10 meters (MAN8000 Series) is available for applications such as instruments weighing scales, meters and point-of-sale terminals.

## FEATURES

- Low Power Consumption
  Typical power consumption is 1.6mA/seg. at 1mA drive
  ideal for battery operated applications
- Typical intensity of 650$\mu$cd/seg at 1mA drive
- Excellent for multiplexing long digit strings
- Compatible with monolithic LED display drivers
- Three Character Sizes
  7.6mm (0.3in), 14.2mm (0.56in), 20.0mm (0.8in)
- Common anode or common cathode
- Excellent character appearance
  Wide viewing angle
  Grey body for optimum contrast
- Categorized for luminous intensity. Use of like categorizes yields a uniform display

## MODEL NUMBERS

| PART NO. | CHARACTER SIZE | DESCRIPTION | PACKAGE DRAWING |
|---|---|---|---|
| MAN3010A | 0.3″ (7.6mm) | Common anode; right hand decimal | A |
| MAN3040A | | Common cathode; right hand decimal | B |
| MAN3020A | | Common anode; left hand decimal | C |
| MAN6060 | 0.56″ (14.2mm) | Common anode; right hand decimal | D |
| MAN6080 | | Common cathode; right hand decimal | E |
| MAN8010 | 0.8″ (20mm) | Common anode; right hand decimal | F |
| MAN8040 | | Common cathode; right hand decimal | G |

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## ELECTRICAL/OPTICAL CHARACTERISTICS AT $T_A$=25°C

| DESCRIPTION | SYMBOL | DEVICE | TEST CONDITIONS | MIN. | TYP. | MAX. | UNITS |
|---|---|---|---|---|---|---|---|
| Luminous intensity/segment [1.2] (digit average) | $I_v$ | MAN3000A Series | 1 mA DC | 315 | 600 | | |
| | | | 5 mA DC | | 3600 | | |
| | | | 20 mA Pk: 1 of 4 Duty Factor | | 3300 | | µcd |
| | | MAN6000 Series | 1 mA DC | 400 | 700 | | |
| | | | 5 mA DC | | 4200 | | |
| | | | 20 mA Pk: 1 of 4 Duty Factor | | 3900 | | µcd |
| | | MAN8000 Series | 1 mA DC | 270 | 500 | | |
| | | | 5 mA DC | | 3500 | | |
| | | | 20 mA Pk: 1 of 4 Duty Factor | | 3300 | | µcd |
| Peak wavelength | λ Peak | All Devices | | | 650 | | nm |
| Dominant wavelength [3] | λd | All Devices | | | 642 | | nm |
| Forward voltage/segment or DP | $V_F$ | All Devices | $I_F$=1 mA<br>$I_F$=5 mA<br>$I_F$=20 mA Pk | | 1.6<br>1.7<br>1.8 | 2.0<br>2.1<br>2.2 | V |
| Reverse voltage/segment or DP | $V_R$ | All Devices | $I_R$=100 µA | 3.0 | 15 | | V |
| Temp. coefficient of $V_F$/seg. or DP | $\Delta V_F$/°C | | | | −2mV | | MV/°C |
| Thermal resistance LED junction—to—pin | RθJ-PIN | MAN3000<br>MAN6000<br>MAN8000 | | | 255<br>400<br>430 | | °C/W/Seg. |

## NOTES

1. *Case temperature of the device immediately prior to the intensity measurement is 25°C.*
2. *The digits are categorized for luminous intensity with the intensity category designated by a letter on the side of the package.*
3. *The dominant wavelength, $\lambda_d$, is derived from the CIE chromaticity diagram and is that single wavelength which defines the color of the device.*

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## ABSOLUTE MAXIMUM RATINGS (All Products)

| | |
|---|---|
| Average power per segment or DP ($T_A$=25°C) | 37 mW |
| Peak forward current per segment or DP ($T_A$=25°C)[1] | 45 mA |
| Average or DC forward current per segment or DP ($T_A$=25°C) | 15 mA |
| Operating temperature range | −20°C to +85°C |
| Storage temperature range | −40°C to +85°C |
| Reverse voltage per segment or DP | 3.0 V |
| Lead solder temperature (1.59 mm [1/16″] below seating plane) | 260°C for 3 sec. |

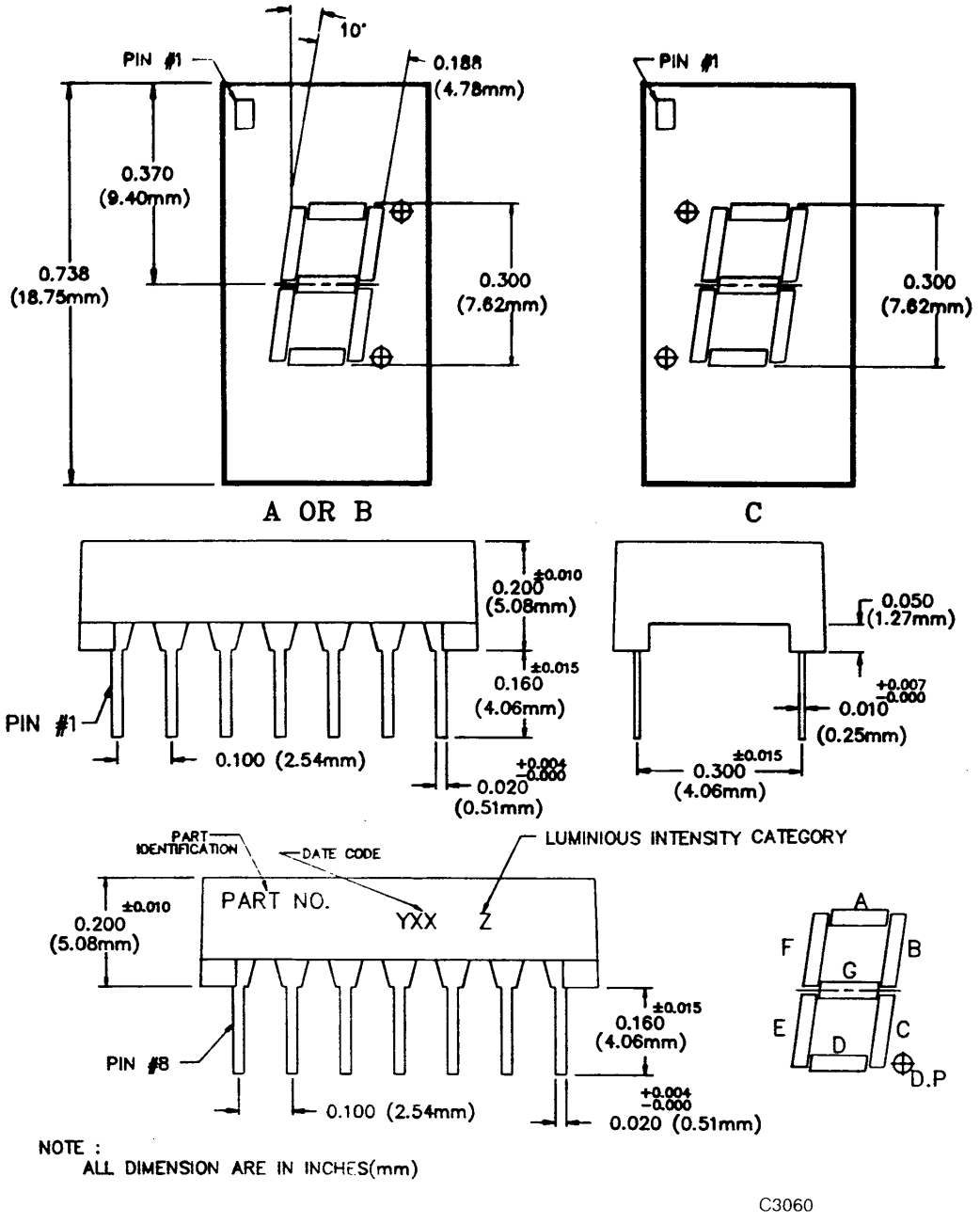
**NOTES:** *1. Do not exceed maximum average current per segment.*

## 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 ±33.3% between all segment within a digit.*
2. *Leads of the device immersed to 1/16″ from the body. Maximum device surface temperature is 140°C.*
3. *For flux removal, Freon TF, Freon TE, Isoproponal or water may be used up to their boiling points.*
4. *All displays are categorized for Luminous Intensity. The intensity category is marked on each part as a suffix letter to the part numbers.*

## PACKAGE DIMENSIONS

**MAN3000A SERIES**




NOTE :
ALL DIMENSION ARE IN INCHES(mm)

C3060

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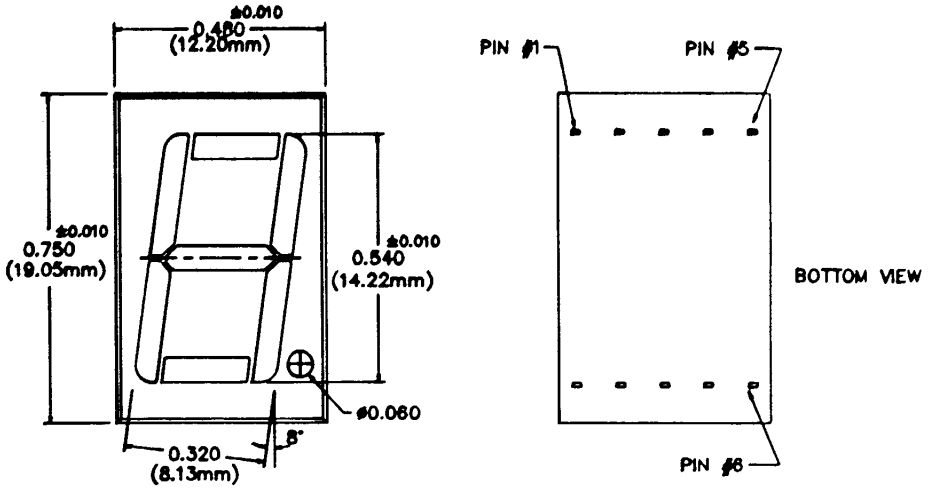
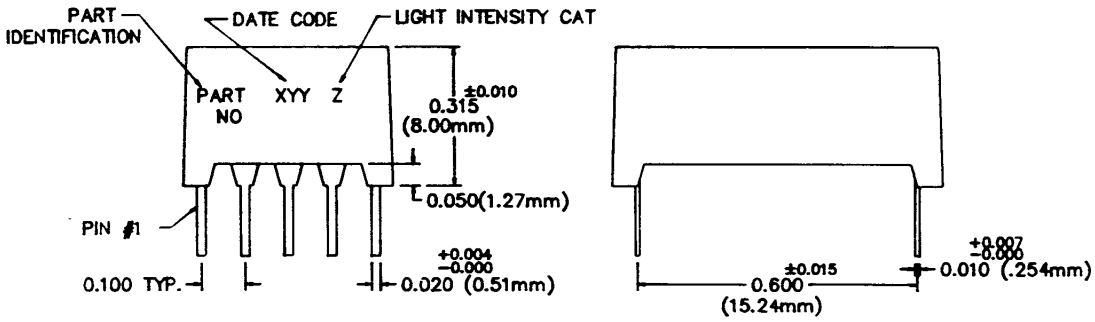
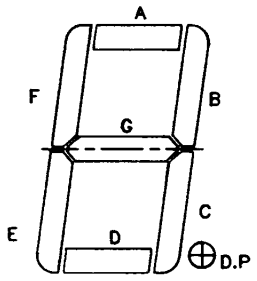
## PACKAGE DIMENSIONS

**MAN6000 SERIES**




D OR E

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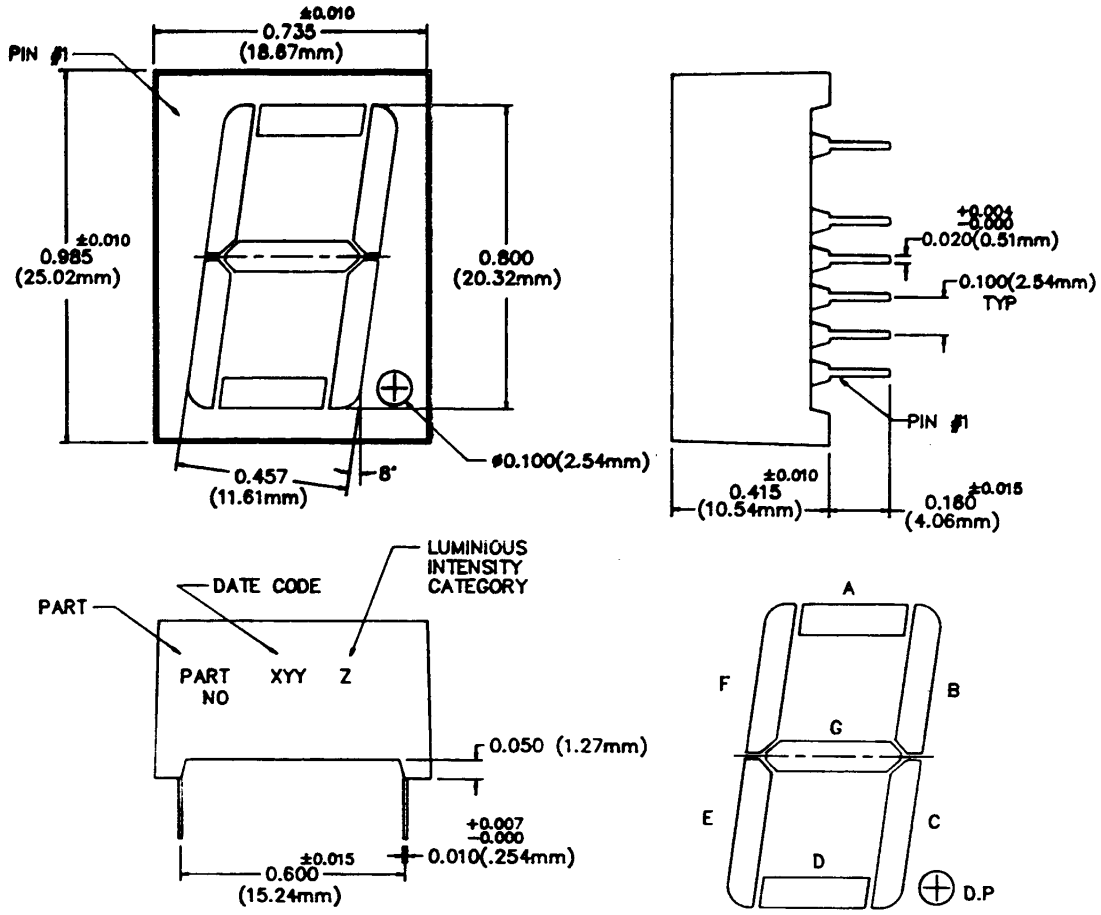
## PACKAGE DIMENSIONS

### MAN8000 SERIES

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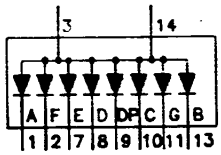
## ELECTRICAL CONNECTIONS

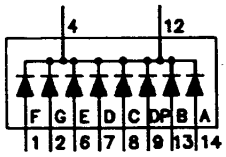
| PIN NO. | A MAN3010A | B MAN3040A | C MAN3020A | D MAN6060 | E MAN6080 | F MAN8010 | G MAN8040 |
|---|---|---|---|---|---|---|---|
| 1 | Cathode A | Anode F | Cathode A | Cathode E | Anode E | No Connection | No Connection |
| 2 | Cathode F | Anode G | Cathode F | Cathode D | Anode D | A Cathode | A Anode |
| 3 | Common Anode | No Pin | Common Anode | Common Anode | Common Cathode | F Cathode | F Anode |
| 4 | No Pin | Common Cathode | No Pin | Cathode C | Anode C | Common Anode | Common Cathode |
| 5 | No Pin | No Pin | No Pin | Cathode D.P | Anode D.P | E Cathode | E Anode |
| 6 | No Connection | Anode E | Cathode D.P | Cathode B | Anode B | — | — |
| 7 | Cathode E | Anode D | Cathode E | Cathode A | Anode A | E Cathode | E Anode |
| 8 | Cathode D | Anode C | Cathode D | Common Anode | Common Cathode | — | — |
| 9 | Cathode D.P | Anode D.P | No Connection | Cathode F | Anode F | D Cathode | Common Cathode |
| 10 | Cathode C | No Pin | Cathode C | Cathode G | Anode G | D.P Cathode | D.P Anode |
| 11 | Cathode G | No Pin | Cathode G | | | D Cathode | D Anode |
| 12 | No Pin | Common Cathode | No Pin | | | Common Anode | Common Cathode |
| 13 | Cathode B | Anode B | Cathode B | | | C Cathode | C Anode |
| 14 | Common Anode | Anode A | Common Anode | | | G Cathode | G Anode |
| 15 | | | | | | B Cathode | B Anode |
| 16 | | | | | | — | — |
| 17 | | | | | | Common Anode | Common Cathode |
| 18 | | | | | | — | — |

## ELECTRICAL SCHEMATIC



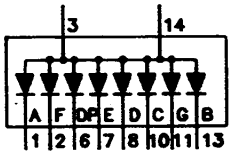

MAN3010
(A)

C3070



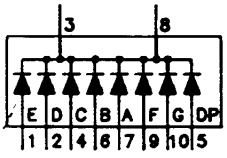

MAN3040
(B)

C3071



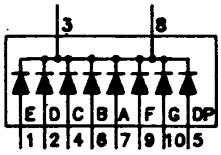

MAN3020
(C)

C3072



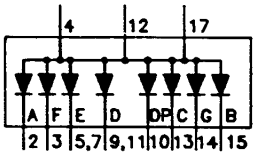

MAN6060
(D)

C3073



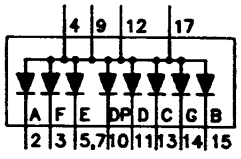

MAN6080
(E)

C3074




MAN8010
(F)

C3075




MAN8040
(G)

C3076

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