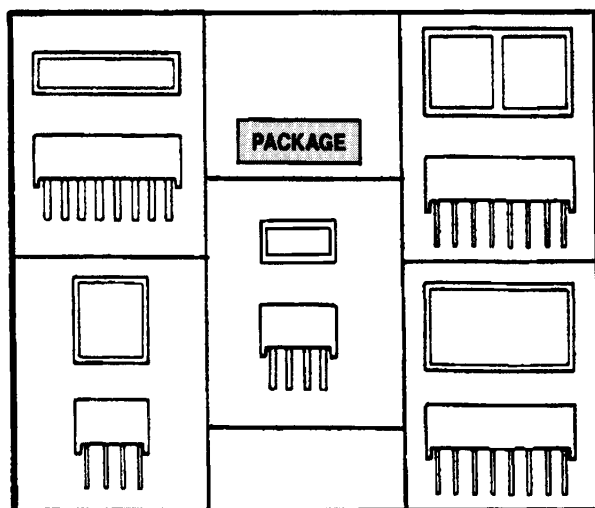


**HIGH EFFICIENCY RED HLMP-2300/2600 SERIES**  
**YELLOW HLMP-2400/2700 SERIES**  
**HIGH EFFICIENCY GREEN HLMP-2500/2800 SERIES**



**DESCRIPTION**

These LED Light Bar series are bright, large emitting area, rectangular devices that are designed for backlighting legend/message annunciators.

These devices are offered in single-in-line and dual-in-line packages that contain single or segmented light-emitting area. Each package style is offered in High Efficiency Red, Yellow, or Green emission color.

**FEATURES**

- Large area, uniform, bright light-emitting surfaces
- Select from six package styles
- Choice of three colors
- Categorized for intensity and color
- X-Y stackable
- Easily driven with I.C.s
- Alternate source for popular backlighting components

**MODEL NUMBERS**

| PART NO.  | COLOR                 | DESCRIPTION                                            |  | PACKAGE | PIN OUT |
|-----------|-----------------------|--------------------------------------------------------|--|---------|---------|
| HLMP-2300 | High Efficiency Red   | 2 LED Single-in-line<br>0.35 in. × 0.15 in. Area       |  | A       | A       |
| HLMP-2400 | Yellow                |                                                        |  |         |         |
| HLMP-2500 | High Efficiency Green |                                                        |  |         |         |
| HLMP-2350 | High Efficiency Red   | 4 LED Single-in-line<br>0.75 in. × 0.15 in. Area       |  | B       | B       |
| HLMP-2450 | Yellow                |                                                        |  |         |         |
| HLMP-2550 | High Efficiency Green |                                                        |  |         |         |
| HLMP-2655 | High Efficiency Red   | 4 LED Dual-in-line<br>0.35 in. × 0.35 in. Area         |  | C       | C       |
| HLMP-2755 | Yellow                |                                                        |  |         |         |
| HLMP-2855 | High Efficiency Green |                                                        |  |         |         |
| HLMP-2670 | High Efficiency Red   | Dual 0.35 in. × 0.35 in. Area<br>Dual-in-line package  |  | D       | D       |
| HLMP-2770 | Yellow                |                                                        |  |         |         |
| HLMP-2870 | High Efficiency Green |                                                        |  |         |         |
| HLMP-2685 | High Efficiency Red   | 8 LED 0.35 in. × 0.75 in. Area<br>Dual-in-line package |  | E       | D       |
| HLMP-2785 | Yellow                |                                                        |  |         |         |
| HLMP-2885 | High Efficiency Green |                                                        |  |         |         |

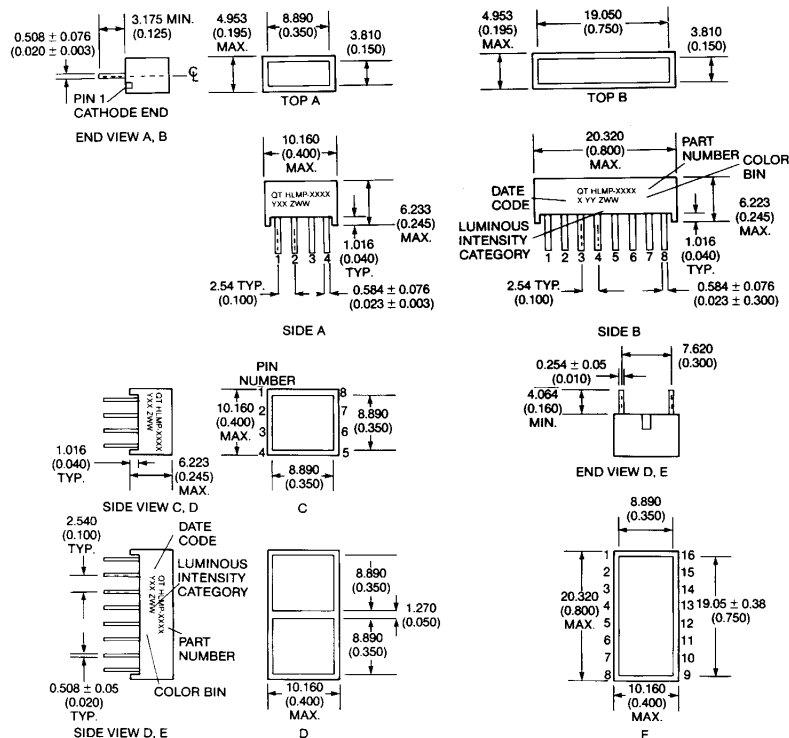
### ABSOLUTE MAXIMUM RATINGS $T_A=25^\circ\text{C}$ (Unless Otherwise Stated)

|                                                                                                          | HIGH EFFICIENCY RED<br>HIGH EFFICIENCY GREEN<br>HLMP-2300/-2500<br>-2600/-2800 SERIES | YELLOW<br>HLMP-2400/<br>-2700 SERIES       |
|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------|
| Power dissipation per LED chip (See Note 1)                                                              | 135 mW                                                                                | 85 mW                                      |
| Peak forward current per LED chip,<br>$T_A=50^\circ\text{C}$ (max. pulse width=2 ms) (See Notes 1 and 2) | 90 mA                                                                                 | 60 mA                                      |
| Average forward per LED chip pulsed conditions,<br>$T_A=50^\circ\text{C}$ (See Note 2)                   | 25 mA                                                                                 | 20 mA                                      |
| DC forward current per LED chip,<br>$T_A=50^\circ\text{C}$ (See Note 3)                                  | 30 mA                                                                                 | 25 mA                                      |
| Reverse voltage per LED chip                                                                             | 6V                                                                                    | 6V                                         |
| Storage and operating temperature                                                                        | $-40^\circ\text{C}$ to $+85^\circ\text{C}$                                            | $-40^\circ\text{C}$ to $+85^\circ\text{C}$ |
| Soldering time at $260^\circ\text{C}$ (See Note 4)                                                       | 260°C for 3 sec.                                                                      | 260°C for 3 sec.                           |

### NOTES

- For HLMP-2300/-2500/-2600/-2800 Series, derate above  $T_A=25^\circ\text{C}$  at  $1.8\text{ mW}/^\circ\text{C}$  per LED chip. For HLMP-2400/-2700 Series, derate above  $T_A=50^\circ\text{C}$  at  $1.8\text{ mW}/^\circ\text{C}$  per LED chip.
- See Figure 1/2 to establish pulse operating conditions.
- For HLMP-2300/-2500/-2600/-2800 Series, derate above  $T_A=50^\circ\text{C}$  at  $0.5\text{ mA}/^\circ\text{C}$  per LED chip. For HLMP-2400/-2700 Series derate above  $T_A=60^\circ\text{C}$  at  $9.5\text{ mA}/^\circ\text{C}$  per LED chip.
- Lead immersed to 1/16 in. from body of the device. Maximum unit surface temperature is  $140^\circ\text{C}$ .

### PACKAGE DIMENSIONS



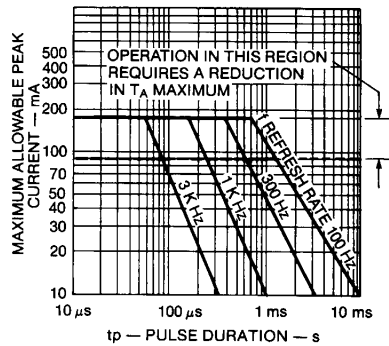
NOTE: DIMENSIONS IN MILLIMETERS (INCHES). TOLERANCES  $\pm 0.25$  ( $\pm 0.010$ ) UNLESS OTHERWISE INDICATED

| <b>ELECTRO-OPTICAL CHARACTERISTICS</b> ( $T_A=25^{\circ}\text{C}$ )<br><b>HIGH EFFICIENCY RED</b> |                    |       |       |       |       |       |                               |                                 |
|---------------------------------------------------------------------------------------------------|--------------------|-------|-------|-------|-------|-------|-------------------------------|---------------------------------|
| PARAMETER                                                                                         | SYMBOL             | HLMP  |       |       |       |       | UNIT                          | TEST CONDITIONS                 |
|                                                                                                   |                    | -2300 | -2350 | -2655 | -2670 | -2685 |                               |                                 |
| Luminous Intensity                                                                                | min. $I_v$         | 6.0   | 13    | 13    | 13    | 22    | mcd                           | $I_F=20\text{ mA}$              |
|                                                                                                   | typ.               | 23    | 45    | 43    | 45    | 80    | mcd                           | $I_F=20\text{ mA}$              |
|                                                                                                   | typ.               | 30    | 50    | 50    | 50    | 100   | mcd                           | $I_F=60\text{ mA pK, 1:3 D.F.}$ |
| Forward voltage                                                                                   | max. $V_F$         | 2.6   | 2.6   | 2.6   | 2.6   | 2.6   | V                             | $I_F=20\text{ mA}$              |
|                                                                                                   | typ.               | 2.0   | 2.0   | 2.0   | 2.0   | 2.0   | V                             |                                 |
| Peak wavelength                                                                                   | typ. $\lambda_p$   | 630   | 630   | 630   | 630   | 630   | nm                            |                                 |
| Dominant wavelength                                                                               | typ. $\lambda_d$   | 626   | 626   | 626   | 626   | 626   | nm                            |                                 |
| Capacitance                                                                                       | typ. $C$           | 45    | 45    | 45    | 45    | 45    | pF                            | $V_F=0, f=1\text{ MHz}$         |
| Reverse voltage                                                                                   | min. $V_R$         | 6     | 6     | 6     | 6     | 6     | V                             | $I_R=100\text{ }\mu\text{A}$    |
| Thermal resistance                                                                                | typ. $\theta_{JA}$ | 150   | 150   | 150   | 150   | 150   | $^{\circ}\text{C/W/LED chip}$ |                                 |

| <b>ELECTRO-OPTICAL CHARACTERISTICS</b> ( $T_A=25^{\circ}\text{C}$ )<br><b>YELLOW</b> |                    |       |       |       |       |       |                               |                                 |
|--------------------------------------------------------------------------------------|--------------------|-------|-------|-------|-------|-------|-------------------------------|---------------------------------|
| PARAMETER                                                                            | SYMBOL             | HLMP  |       |       |       |       | UNIT                          | TEST CONDITIONS                 |
|                                                                                      |                    | -2400 | -2450 | -2755 | -2770 | -2785 |                               |                                 |
| Luminous Intensity                                                                   | min. $I_v$         | 6     | 13    | 13    | 13    | 26    | mcd                           | $I_F=20\text{ mA}$              |
|                                                                                      | typ.               | 20    | 38    | 35    | 35    | 70    | mcd                           | $I_F=20\text{ mA}$              |
|                                                                                      | typ.               | 33    | 60    | 60    | 60    | 115   | mcd                           | $I_F=60\text{ mA pK, 1:3 D.F.}$ |
| Forward voltage                                                                      | max. $V_F$         | 2.6   | 2.6   | 2.6   | 2.6   | 2.6   | V                             | $I_F=20\text{ mA}$              |
|                                                                                      | typ.               | 2.1   | 2.1   | 2.1   | 2.1   | 2.1   | V                             |                                 |
| Peak wavelength                                                                      | typ. $\lambda_p$   | 585   | 585   | 585   | 585   | 585   | nm                            |                                 |
| Dominant wavelength                                                                  | typ. $\lambda_d$   | 588   | 588   | 588   | 588   | 588   | nm                            |                                 |
| Capacitance                                                                          | typ. $C$           | 35    | 35    | 35    | 35    | 35    | pF                            | $V_F=0, f=1\text{ MHz}$         |
| Reverse voltage                                                                      | min. $V_R$         | 6     | 6     | 6     | 6     | 6     | V                             | $I_R=100\text{ }\mu\text{A}$    |
| Thermal resistance                                                                   | typ. $\theta_{JA}$ | 150   | 150   | 150   | 150   | 150   | $^{\circ}\text{C/W/LED chip}$ |                                 |

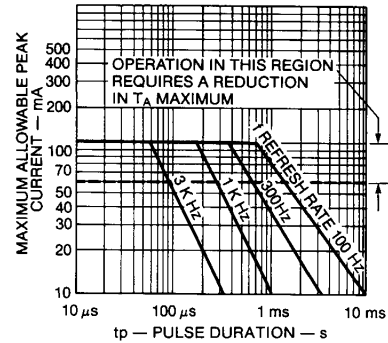
| <b>ELECTRO-OPTICAL CHARACTERISTICS</b> ( $T_A=25^{\circ}\text{C}$ )<br><b>HIGH EFFICIENCY GREEN</b> |                    |       |       |       |       |       |                               |                                 |
|-----------------------------------------------------------------------------------------------------|--------------------|-------|-------|-------|-------|-------|-------------------------------|---------------------------------|
| PARAMETER                                                                                           | SYMBOL             | HLMP  |       |       |       |       | UNIT                          | TEST CONDITIONS                 |
|                                                                                                     |                    | -2500 | -2550 | -2855 | -2870 | -2885 |                               |                                 |
| Luminous Intensity                                                                                  | min. $I_v$         | 5     | 11    | 11    | 11    | 22    | mcd                           | $I_F=20\text{ mA}$              |
|                                                                                                     | typ.               | 25    | 50    | 50    | 50    | 100   | mcd                           | $I_F=20\text{ mA}$              |
|                                                                                                     | typ.               | 38    | 75    | 75    | 75    | 150   | mcd                           | $I_F=60\text{ mA pK, 1:3 D.F.}$ |
| Forward voltage                                                                                     | max. $V_F$         | 2.6   | 2.6   | 2.6   | 2.6   | 2.6   | V                             | $I_F=20\text{ mA}$              |
|                                                                                                     | typ.               | 2.2   | 2.2   | 2.2   | 2.2   | 2.2   | V                             |                                 |
| Peak wavelength                                                                                     | typ. $\lambda_p$   | 565   | 565   | 565   | 565   | 565   | nm                            |                                 |
| Dominant wavelength                                                                                 | typ. $\lambda_d$   | 567   | 567   | 567   | 567   | 567   | nm                            |                                 |
| Capacitance                                                                                         | typ. $C$           | 40    | 40    | 40    | 40    | 40    | pF                            | $V_F=0, f=1\text{ MHz}$         |
| Reverse voltage                                                                                     | min. $V_R$         | 6     | 6     | 6     | 6     | 6     | V                             | $I_R=100\text{ }\mu\text{A}$    |
| Thermal resistance                                                                                  | typ. $\theta_{JA}$ | 150   | 150   | 150   | 150   | 150   | $^{\circ}\text{C/W/LED chip}$ |                                 |

**TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES**  
(25°C Free Air Temperature Unless Otherwise Specified)



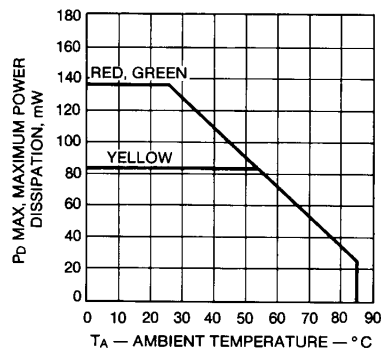
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Fig. 1. Maximum Tolerable Peak Current per LED Chip vs. Pulse Duration for HLMP-23X0/-26XX/-25X0/-28XX



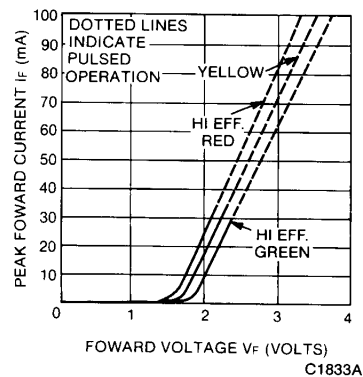
C2014

Fig. 2. Maximum Tolerable Peak Current per LED Chip vs. Pulse Duration for HLMP-24X0/-27XX Devices



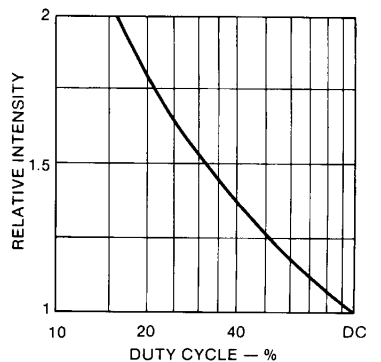
C2025

Fig. 3. Maximum Power Dissipation per LED vs. Ambient Temperature



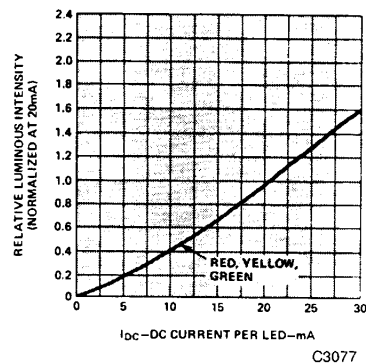
C1833A

Fig. 4. Forward Current vs. Forward Voltage



C1194C

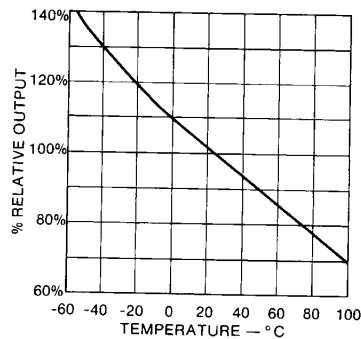
Fig. 5. Luminous Intensity vs. Duty Cycle



C3077

Fig. 6. Luminous Intensity vs. Forward Current

**TYPICAL ELECTRO-OPTICAL CHARACTERISTIC CURVES**  
(25°C Free Air Temperature Unless Otherwise Specified) (Cont'd)



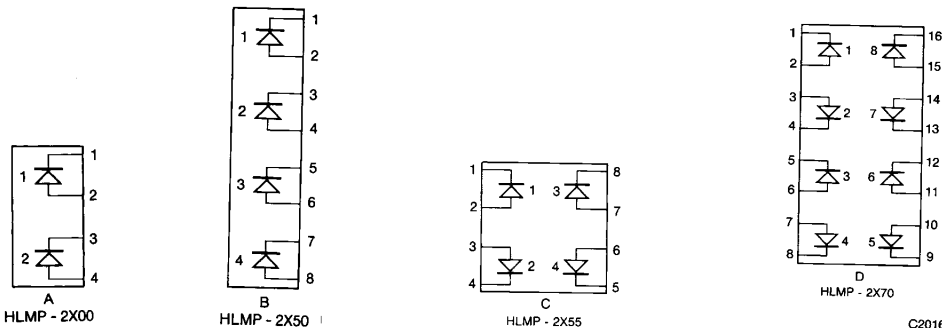
C654B

Fig. 7. Output vs. Temperature

**PIN CONNECTIONS TO ELECTRICAL SCHEMATIC**

| PIN | ELECTRICAL CONNECTION |           |           |                 |
|-----|-----------------------|-----------|-----------|-----------------|
|     | HLMP-2X00             | HLMP-2X50 | HLMP-2X55 | HLMP-2X70/-2X85 |
| 1   | 1 Cathode             | 1 Cathode | 1 Cathode | 1 Cathode       |
| 2   | 1 Anode               | 1 Anode   | 1 Anode   | 1 Anode         |
| 3   | 2 Cathode             | 2 Cathode | 2 Cathode | 2 Cathode       |
| 4   | 2 Anode               | 2 Anode   | 2 Cathode | 3 Cathode       |
| 5   |                       | 3 Cathode | 3 Cathode | 3 Cathode       |
| 6   |                       | 3 Anode   | 3 Anode   | 3 Anode         |
| 7   |                       | 4 Cathode | 4 Anode   | 4 Anode         |
| 8   |                       | 4 Anode   | 4 Cathode | 4 Cathode       |
| 9   |                       |           |           | 5 Cathode       |
| 10  |                       |           |           | 5 Anode         |
| 11  |                       |           |           | 6 Anode         |
| 12  |                       |           |           | 6 Cathode       |
| 13  |                       |           |           | 7 Cathode       |
| 14  |                       |           |           | 7 Anode         |
| 15  |                       |           |           | 8 Anode         |
| 16  |                       |           |           | 8 Cathode       |

**ELECTRICAL SCHEMATIC**



C2016

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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.