

# T-1<sup>3</sup>/<sub>4</sub> Super Ultra-Bright LED Lamps

## Technical Data

<b>HLMP-C116</b>	<b>HLMP-C124</b>
<b>HLMP-C115</b>	<b>HLMP-C123</b>
<b>HLMP-C215</b>	<b>HLMP-C223</b>
<b>HLMP-C315</b>	<b>HLMP-C323</b>
<b>HLMP-C415</b>	<b>HLMP-C423</b>
<b>HLMP-C515</b>	<b>HLMP-C523</b>
<b>HLMP-C615</b>	<b>HLMP-C623</b>

### Features

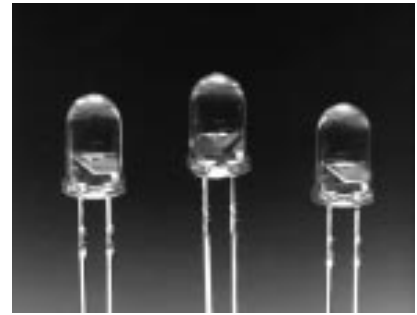
- **Very High Intensity**
- **Exceptional Uniformity**
- **Microtint Lens for Color Identification**
- **Consistent Viewability All Colors:**
  - AlGaAs Red
  - High Efficiency Red
  - Yellow
  - Orange
  - Green
  - Emerald Green
- **15° and 25° Family**
- **Tape and Reel Options Available**
- **Binned for Color and Intensity**

### Applications

- **Ideal for Backlighting Front Panels\***
- **Used for Lighting Switches**
- **Adapted for Indoor and Outdoor Signs**

### Description

These non-diffused lamps are designed to produce a bright light source and smooth radiation pattern. A slight tint is added to the lens for easy color identification. This lamp has been designed with a 20 mil lead frame, enhanced



flange, and tight meniscus controls, making it compatible with radial lead automated insertion equipment.

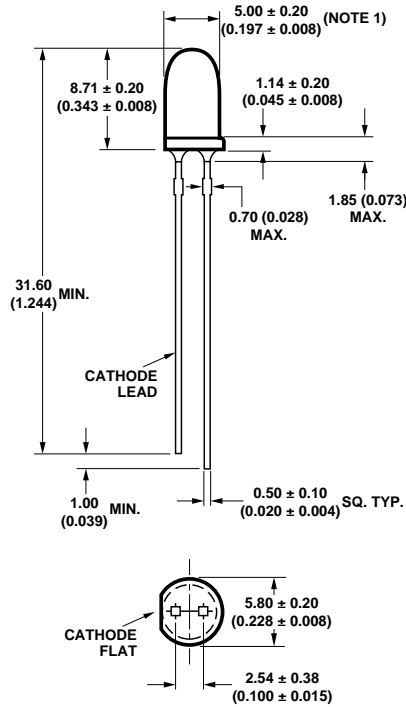
### Device Selection Guide

LED Color	Part Number	Typical Luminous Intensity (mcd @ 20 mA)	Viewing Angle Family <sup>[1]</sup>
TS AlGaAs	HLMP-C116	2000	15°
	HLMP-C124	1000	25°
DH AS AlGaAs	HLMP-C115	600	15°
	HLMP-C123	200	25°
High Efficiency Red	HLMP-C215	300	15°
	HLMP-C223	170	25°
Yellow	HLMP-C315	300	15°
	HLMP-C323	170	25°
Orange	HLMP-C415	300	15°
	HLMP-C423	170	25°
High Performance Green	HLMP-C515	300	15°
	HLMP-C523	170	25°
Emerald Green	HLMP-C615	45	15°
	HLMP-C623	27	25°

**Note:**

1. Refer to page 3 for typical values.

## Package Dimensions



### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. LEADS ARE MILD STEEL, SOLDER DIPPED.
3. AN EPOXY MENISCUS MAY EXTEND ABOUT 0.5 mm (0.020 in.) DOWN THE LEADS.

## Absolute Maximum Ratings at $T_A = 25^\circ\text{C}$

Parameter	TS AlGaAs Red	DH AS AlGaAs Red	High Efficiency Red and Orange	Yellow	High Performance Green and Emerald Green	Units
DC Forward Current <sup>[1]</sup>	50	30	30	20	30	mA
Transient Forward Current <sup>[2]</sup> (10 $\mu$ sec Pulse)	500	500	500	500	500	mA
Reverse Voltage ( $I_r = 100 \mu\text{A}$ )	5	5	5	5	5	V
LED Junction Temperature	110	110	110	110	110	$^\circ\text{C}$
Operating Temperature Range	-55 to +100	-20 to +100	-55 to +100		-20 to +100	$^\circ\text{C}$
Storage Temperature Range	-55 to +100					$^\circ\text{C}$
Lead Soldering Temperature [1.6 mm (0.063 in.) from body]	260 $^\circ\text{C}$ for 5 seconds					

### Notes:

1. See Figure 5 for maximum current derating vs. ambient temperature.
2. The transient current is the maximum nonrecurring peak current the device can withstand without damaging the LED die and wire bond.

### Electrical Characteristics at $T_A = 25^\circ\text{C}$

Part Number	Forward Voltage Vf (Volts) @ If = 20 mA		Reverse Breakdown Vr (Volts) @ Ir = 100 $\mu\text{A}$ Min.	Capacitance C (pF) Vf = 0 f = 1 MHz Typ.	Thermal Resistance R $\theta_{\text{J-PIN}}$ ( $^\circ\text{C}/\text{W}$ )	Speed of Response $\tau_s$ (ns) Time Constant $e^{-t/\tau_s}$ Typ.
	Typ.	Max.				
HLMP-C116 HLMP-C124	1.9	2.4	5	20	210	45
HLMP-C115 HLMP-C123	1.8	2.2	5	30	210	30
HLMP-C215 HLMP-C223	1.9	2.6	5	11	210	90
HLMP-C315 HLMP-C323	2.1	2.6	5	15	210	90
HLMP-C415 HLMP-C423	1.9	2.6	5	4	210	280
HLMP-C515 HLMP-C523	2.2	3.0	5	18	210	260
HLMP-C615 HLMP-C623	2.2	3.0	5	18	210	260

### Optical Characteristics at $T_A = 25^\circ\text{C}$

Part Number	Luminous Intensity Iv (mcd) @ 20 mA <sup>[1]</sup>		Peak Wavelength $\lambda_{\text{peak}}$ (nm) Typ.	Color, Dominant Wavelength $\lambda_d$ <sup>[2]</sup> (nm) Typ.	Viewing Angle $2\theta_{1/2}$ (Degrees) <sup>[3]</sup> Typ.	Luminous Efficacy $\eta_v$ (lm/w)
	Min.	Typ.				
HLMP-C116 HLMP-C124	500	2000	654	644	14	85
	290	1000			20	
HLMP-C115 HLMP-C123	290	600	645	637	11	80
	90	200			26	
HLMP-C215 HLMP-C223	138	300	635	626	17	145
	90	170			23	
HLMP-C315 HLMP-C323	146	300	583	585	17	500
	96	170			25	
HLMP-C415 HLMP-C423	138	300	600	602	17	380
	90	170			23	
HLMP-C515 HLMP-C523	170	300	568	570	20	595
	69	170			28	
HLMP-C615 HLMP-C623	17	45	558	560	20	656
	6	27			28	

#### Notes:

1. The luminous intensity,  $I_v$ , is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.
2. The dominant wavelength,  $\lambda_d$ , is derived from the CIE Chromaticity Diagram and represents the color of the device.
3.  $2\theta_{1/2}$  is the off-axis angle where the luminous intensity is 1/2 the on-axis intensity.

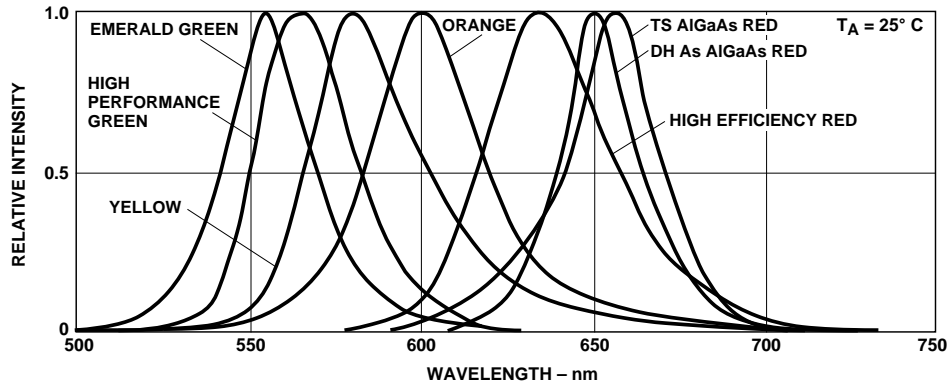


Figure 1. Relative Intensity vs. Wavelength.

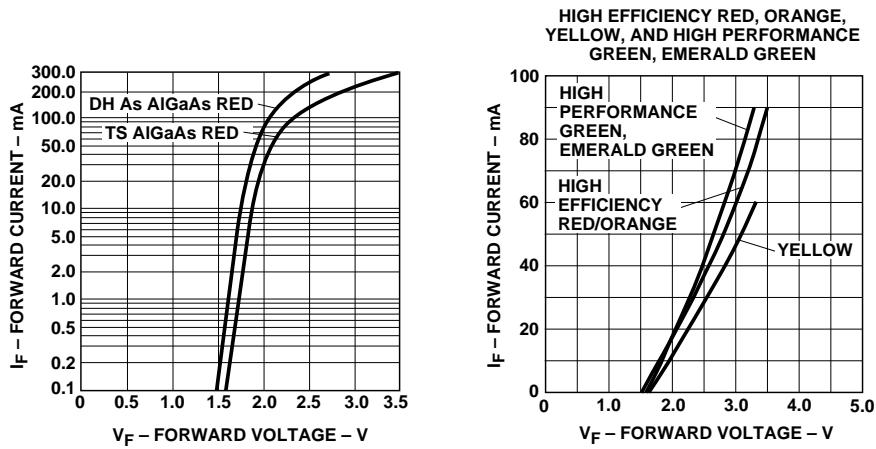


Figure 2. Forward Current vs. Forward Voltage (Non-resistor Lamp).

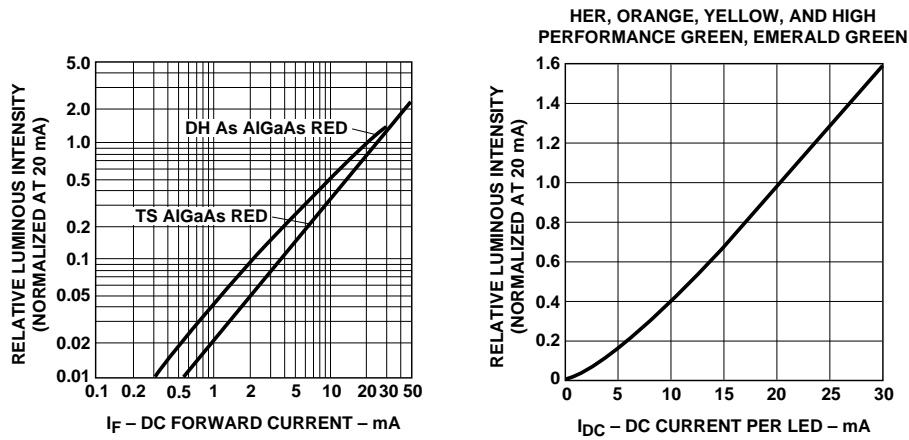


Figure 3. Relative Luminous Intensity vs. Forward Current.

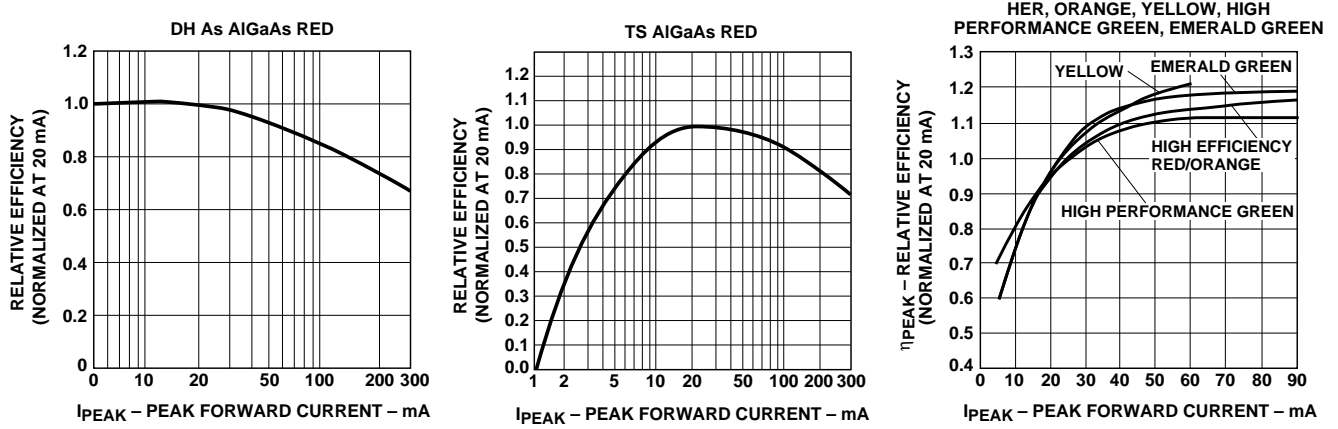


Figure 4. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak Current.

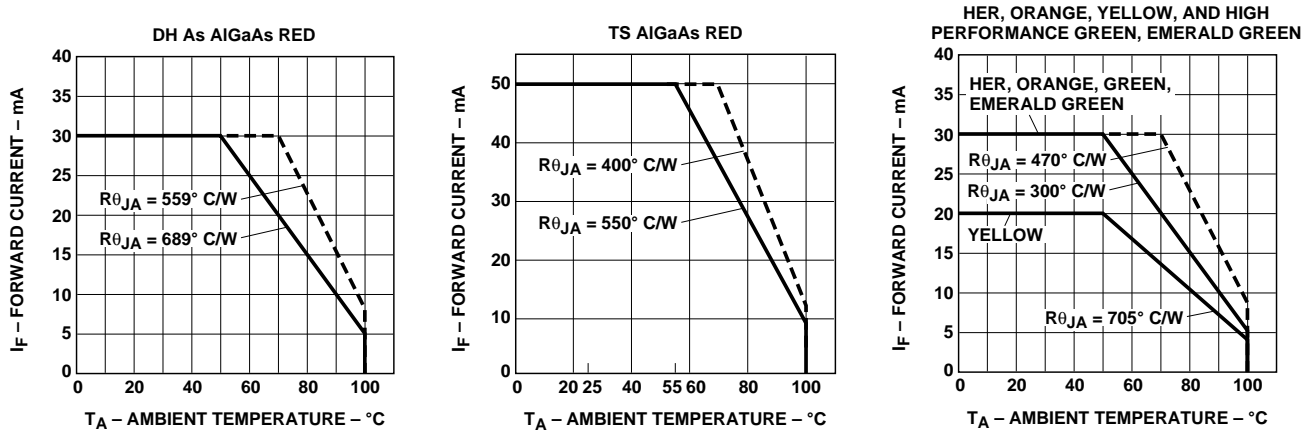


Figure 5. Maximum Forward dc Current vs. Ambient Temperature. Derating Based on  $T_{jMAX} = 110^\circ \text{C}$

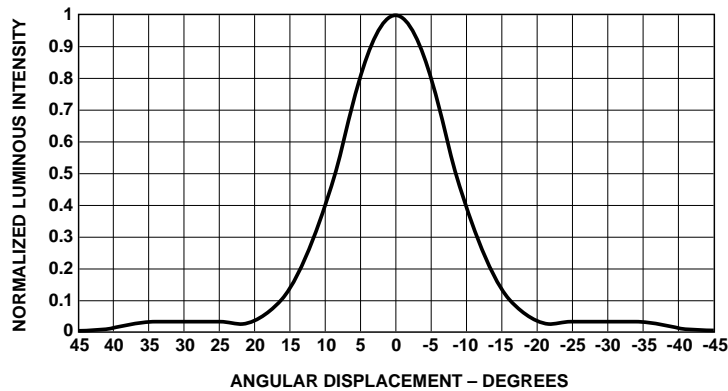
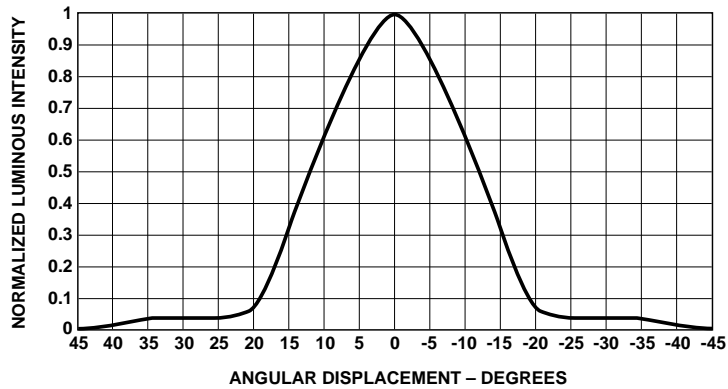


Figure 6. Relative Luminous Intensity vs. Angular Displacement. 15 Degree Family.



**Figure 7. Relative Luminous Intensity vs. Angular Displacement. 25 Degree Family.**

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