

# T-1 (3 mm) High Intensity LED Lamps

## Technical Data

**HLMP-132X Series**  
**HLMP-142X Series**  
**HLMP-152X Series**

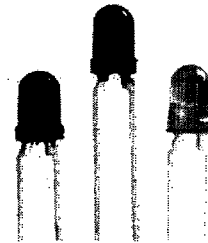
### Features

- **High Intensity**
- **Choice of 3 Bright Colors**  
High Efficiency Red  
Yellow  
High Performance Green
- **Popular T-1 Diameter Package**
- **Selected Minimum Intensities**
- **Narrow Viewing Angle**

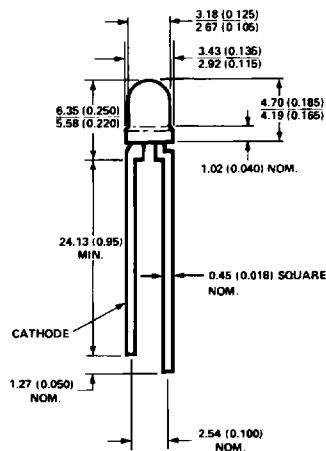
- **General Purpose Leads**
- **Reliable and Rugged**
- **Available on Tape and Reel**

### Description

This family of T-1 lamps is specially designed for applications requiring higher on-axis intensity than is achievable with a standard lamp. The light generated is focused to a narrow beam to achieve this effect.



### Package Dimensions



NOTES:  
1. ALL DIMENSIONS ARE IN MILLIMETRES (INCHES).  
2. AN EPOXY MENISCUS MAY EXTEND ABOUT 1mm (0.040") DOWN THE LEADS.

### Selection Guide

Part Number HLMP-	Description	Minimum Intensity (mcd) at 10 mA	Color (Material)
1320	Untinted Nondiffused	8.6	High Efficiency Red (GaAsP on GaP)
1321	Tinted Nondiffused	8.6	
1420	Untinted Nondiffused	9.2	Yellow (GaAsP on GaP)
1421	Tinted Nondiffused	9.2	
1520	Untinted Nondiffused	6.7	Green (GaP)
1521	Tinted Nondiffused	6.7	

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

Parameter	Red	Yellow	Green	Units
Peak Forward Current	90	60	90	mA
Average Forward Current <sup>[1]</sup>	25	20	25	mA
DC Current <sup>[2]</sup>	30	20	30	mA
Power Dissipation <sup>[3]</sup>	135	85	135	mW
Reverse Voltage (I <sub>R</sub> = 100 μA)	5	5	5	V
Transient Forward Current <sup>[4]</sup> (10 μsec Pulse)	500	500	500	mA
LED Junction Temperature	110	110	110	°C
Operating Temperature Range	-55 to +100	-55 to +100	-20 to +100	°C
Storage Temperature Range			-55 to +100	
Lead Soldering Temperature [1.6 mm (0.063 in.) from body]	260°C for 5 seconds			

**Notes:**

1. See Figure 5 (Red), 10 (Yellow), or 15 (Green) to establish pulsed operating conditions.
2. For Red and Green series derate linearly from 50 $^\circ\text{C}$  at 0.5 mA/ $^\circ\text{C}$ . For Yellow series derate linearly from 50 $^\circ\text{C}$  at 0.2 mA/ $^\circ\text{C}$ .
3. For Red and Green series derate power linearly from 25 $^\circ\text{C}$  at 1.8 mW/ $^\circ\text{C}$ . For Yellow series derate power linearly from 50 $^\circ\text{C}$  at 1.6 mW/ $^\circ\text{C}$ .
4. The transient peak current is the maximum non-recurring peak current that can be applied to the device without damaging the LED die and wirebond. It is not recommended that the device be operated at peak currents beyond the peak forward current listed in the Absolute Maximum Ratings.

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

Symbol	Description	Device HLMP-	Min.	Typ.	Max.	Units	Test Conditions
$I_V$	Luminous Intensity	1320	8.6	30		mcd	$I_F = 10\text{ mA}$ (Figure 3)
		1321	8.6	30			
		1420	9.2	15		mcd	$I_F = 10\text{ mA}$ (Figure 8)
		1421	9.2	15			
		1520	6.7	22		mcd	$I_F = 10\text{ mA}$ (Figure 3)
		1521	6.7	22			
$2\theta^{1/2}$	Including Angle Between Half Luminous Intensity Points	All		45		Deg.	$I_F = 10\text{ mA}$ See Note 1 (Figures 6, 11, 16, 21)
$\lambda_{\text{PEAK}}$	Peak Wavelength	132X 142X 152X		635 583 565		nm	Measurement at Peak (Figure 1)
$\Delta\lambda_{1/2}$	Spectral Line Halfwidth	132X 142X 152X		40 36 28		nm	
$\lambda_d$	Dominant Wavelength	132X 142X 152X		626 585 569		nm	See Note 2 (Figure 1)
$\tau_s$	Speed of Response	132X 142X 152X		90 90 500		ns	
C	Capacitance	132X 142X 152X		11 15 18		pF	$V_F = 0$ ; $f = 1\text{ MHz}$
$R\theta_{J-PIN}$	Thermal Resistance	All		290		$^\circ\text{C/W}$	Junction to Cathode Lead
$V_F$	Forward Voltage	132X 142X 152X		1.9 2.0 2.1	2.4 2.4 2.7	V	$I_F = 10\text{ mA}$
$V_R$	Reverse Breakdown Voltage	All	5.0			V	$I_R = 100\text{ }\mu\text{A}$
$\eta_V$	Luminous Efficacy	132X 142X 152X		145 500 595		$\frac{\text{lumens}}{\text{Watt}}$	See Note 3

## **Notes:**

- $\theta^{1/2}$  is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
- The dominant wavelength,  $\lambda_d$ , is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.
- Radiant intensity,  $I_e$ , in watts/steradian, may be found from the equation  $I_e = I_v/\eta_v$ , where  $I_v$  is the luminous intensity in candelas and  $\eta_v$  is the luminous efficacy in lumens/watt.

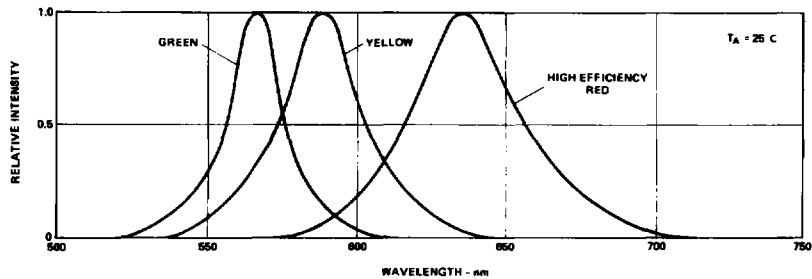


Figure 1. Relative Intensity vs. Wavelength.

### T-1 High Efficiency Red Non-Diffused

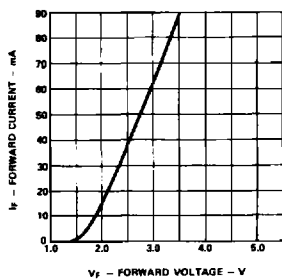


Figure 2. Forward Current vs. Forward Voltage Characteristics.

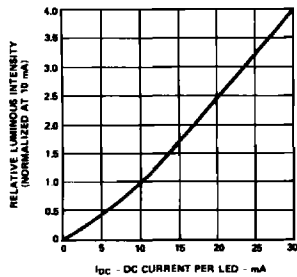


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

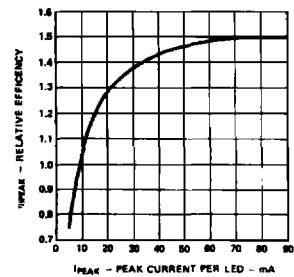


Figure 4. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

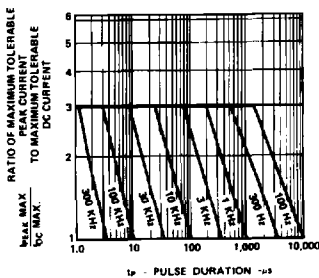


Figure 5. Maximum Tolerable Peak Current vs. Pulse Duration. ( $I_{DC}$  MAX as per MAX Ratings).

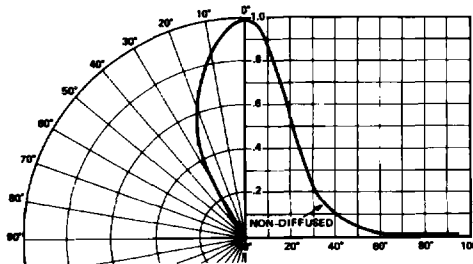


Figure 6. Relative Luminous Intensity vs. Angular Displacement.

T-1 Yellow Non-Diffused

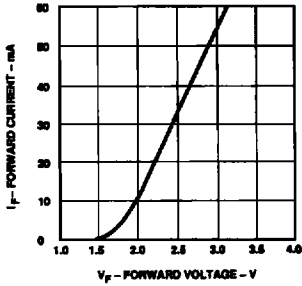


Figure 7. Forward Current vs. Forward Voltage Characteristics.

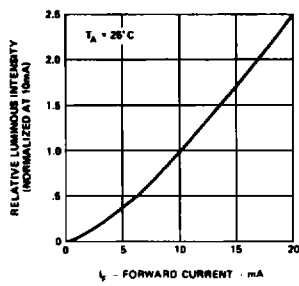


Figure 8. Relative Luminous Intensity vs. Forward Current.

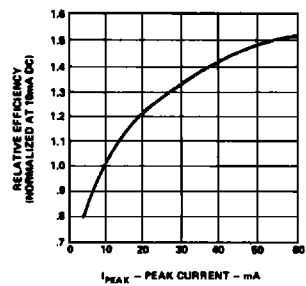


Figure 9. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak Current.

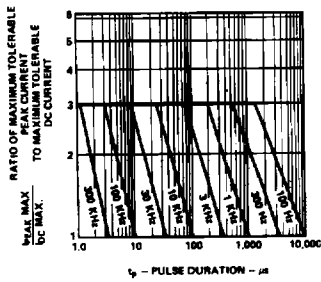


Figure 10. Maximum Tolerable Peak Current vs. Pulse Duration. ( $I_{\text{DCMAX}}$  as per MAX Ratings).

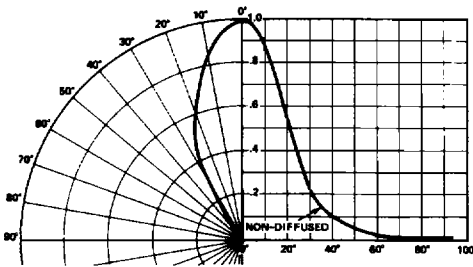


Figure 11. Relative Luminous Intensity vs. Angular Displacement.

## T-1 Green Non-Diffused

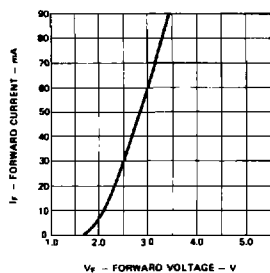


Figure 12. Forward Current vs. Forward Voltage Characteristics.

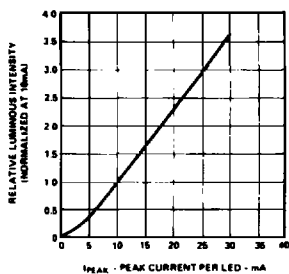


Figure 13. Relative Luminous Intensity vs. Forward Current.

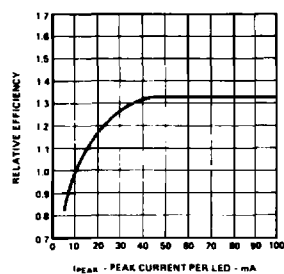


Figure 14. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

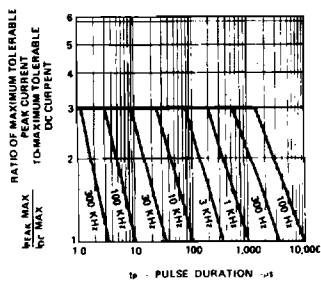


Figure 15. Maximum Tolerable Peak Current vs. Pulse Duration. ( $I_{DCMAX}$  as per MAX Ratings).

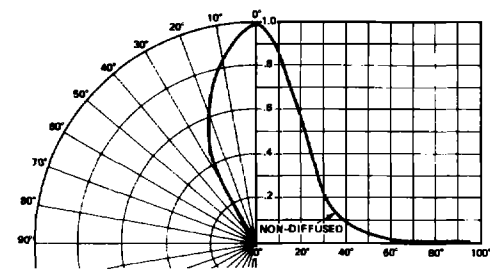


Figure 16. Relative Luminous Intensity vs. Angular Displacement.