

T-1 (3 mm) Diffused **LED Lamps**

Technical Data

HLMP-130X Series

HLMP-1385

HLMP-140X Series

HLMP-1485

HLMP-1503

HLMP-1523

HLMP-1585

HLMP-K40X Series

HLMP-K600

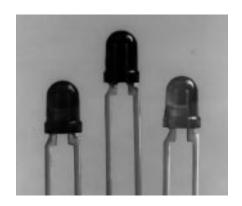
Features

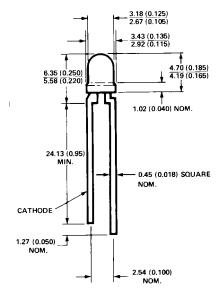
- High Intensity
- Choice of 4 Bright Colors High Efficiency Red Orange Yellow High Performance Green
- Popular T-1 Diameter **Package**
- Selected Minimum **Intensities**
- Wide Viewing Angle
- General Purpose Leads

- · Reliable and Rugged
- Available on Tape and Reel

Description

This family of T-1 lamps is widely used in general purpose indicator applications. Diffusants, tints, and optical design are balanced to yield superior light output and wide viewing angles. Several intensity choices are available in each color for increased design flexibility.





NOTES:

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

Part Number HLMP-	Application	Minimum Intensity (mcd) at 10 mA	Color (Material)
1300	General Purpose	1.3	High Efficiency
1301	General Purpose	2.1	Red (CoAcP.or
1302	High Ambient	3.4	(GaAsP on GaP)
1385	Premium Lamp	8.6	
K400	General Purpose	1.3	Orange
K401	High Ambient	2.1	(GaAsP on GaP)
K402	Premium Lamp	3.4	Gar
1400	General Purpose	1.4	Yellow
1401	General Purpose	2.2	(GaAsP on
1402	High Ambient	3.6	GaP)
1485	Premium Lamp	5.7	
1503	General Purpose	1.0	Green
1523	High Ambient	2.6	(GaP)
1585	Premium Lamp	4.2	
K600 ^[1]	General Purpose	1.0	Emerald Green (GaP)

Note:

 $1.\ Please\ refer\ to\ Application\ Note\ 1061\ for\ information\ comparing\ standard\ green\ and$ emerald green light output degradation.

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Absolute Maximum Ratings at $T_A = 25$ °C

Parameter	HER/Orange	Yellow	Green	Units	
Peak Forward Current	90	60	90	mA	
Average Forward Current ^[1]	25	20	25	mA	
DC Current ^[2]	30	20	30	mA	
Reverse Voltage ($I_R = 100 \mu A$)	5	5	5	V	
Transient Forward Current ^[4] (10 µsec Pulse)	500	500	500	mA	
LED Junction Temperature	110	110	110	$^{\circ}\!\mathrm{C}$	
Operating Temperature Range	-55 to +100	-55 to +100	-20 to +100	$^{\circ}\!\mathrm{C}$	
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 (HER/Orange), 10 (Yellow), or 15 (Green/Emerald Green) to establish pulsed operating conditions.
- 2. For Red, Orange, and Green series derate linearly from 50°C at 0.5 mA/°C. For Yellow series derate linearly from 50°C at 0.2 mA/°C.
- 3. For Red, Orange, and Green series derate power linearly from 25° C at 1.8 mW/°C. For Yellow series derate power linearly from 50° C at 1.6 mW/°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 $T_A = 25$ °C

		A				1	T
Symbol	Description	Device HLMP-	Min.	Тур.	Max.	Units	Test Conditions
$I_{ m V}$	Luminous Intensity	High Efficiency Red 1300 1301 1302 1385	1.3 2.1 3.4 8.6	5.0 5.5 7.0 11.0		mcd	$I_{\mathrm{F}} = 10 \; \mathrm{mA}$
		Orange K400 K401 K402	1.3 2.1 3.4	5.0 5.5 7.0			
		Yellow 1400 1401 1402 1485	1.4 2.2 3.6 5.7	5.0 6.0 7.0 10.0			
		Green 1503 1523 1585	1.0 2.6 4.2	5.0 7.0 8.5			
		Emerald Green K600	1.0	4.5			

Electrical Characteristics at $T_A = 25$ °C (cont.)

Symbol	Description	Device HLMP-	Min.	Тур.	Max.	Units	Test Conditions
2θ1/2	Included Angle Between Half Luminous Intensity Points	All		60		Deg.	$I_F = 10 \text{ mA}$ See Note 1
$\lambda_{ ext{PEAK}}$	Peak Wavelength	High Efficiency Red Orange Yellow Green Emerald Green		635 600 583 565 558		nm	Measurement at Peak
$\lambda_{ m d}$	Dominant Wavelength	High Efficiency Red Orange Yellow Green Emerald Green		626 602 585 569 560		nm	See Note 2
$\Delta\lambda_{1/2}$	Spectral Line Halfwidth	High Efficiency Red Yellow Green Emerald Green		40 36 28 24		nm	
$ au_{ m s}$	Speed of Response	High Efficiency Red Orange Yellow Green Emerald Green		90 280 90 500 3100		ns	
C	Capacitance	High Efficiency Red Orange Yellow Green Emerald Green		11 4 15 18 35		pF	$V_F = 0;$ f = 1 MHz
$\mathrm{R} heta_{ ext{J-PIN}}$	Thermal Resistance	All		290		°C/W	Junction to Cathode Lead
$ m V_{F}$	Forward Voltage	HER/Orange Yellow Green Emerald Green	1.5 1.5 1.5	1.9 2.0 2.1 2.1	2.4 2.4 2.7 2.7	V	$I_{\rm F} = 10 \text{ mA}$
V_{R}	Reverse Breakdown Voltage	All	5.0			V	$I_R = 100 \mu A$
$\eta_{ m V}$	Luminous Efficacy	High Efficiency Red Orange Yellow Green Emerald Green		145 380 500 595 655		lumens Watt	See Note 3

Notes:

^{1.} $\theta^{1}/2$ is the off-axis angle at which the luminous intensity is half the axial luminous intensity.

^{2.} The dominant wavelength, λ_d , is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

^{3.} 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 η_v is the luminous efficacy in lumens/watt.

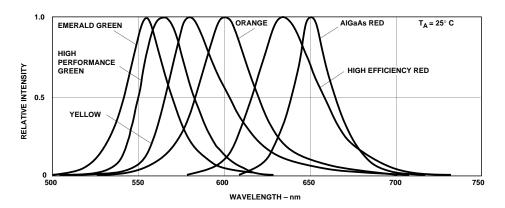


Figure 1. Relative Intensity vs. Wavelength.

T-1 High Efficiency Red, Orange Diffused Lamps

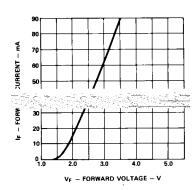


Figure 2. Forward Current vs. Forward Voltage Characteristics.

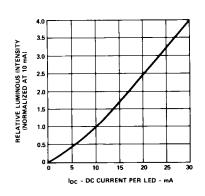


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

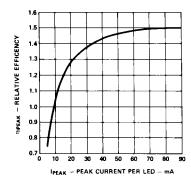


Figure 4. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

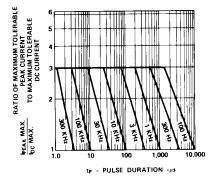


Figure 5. Maximum Tolerable Peak Current vs. Pulse Duration. (I_{DC} MAX as per MAX Ratings).

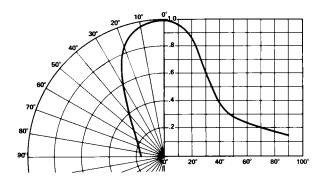


Figure 6. Relative Luminous Intensity vs. Angular Displacement.

T-1 Yellow Diffused Lamps

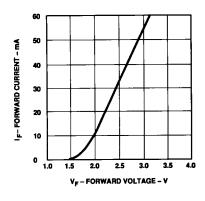


Figure 7. Forward Current vs. Forward Voltage Characteristics.

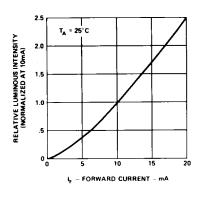


Figure 8. Relative Luminous Intensity vs. Forward Current.

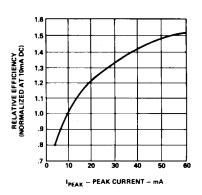


Figure 9. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak Current.

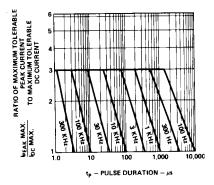


Figure 10. Maximum Tolerable Peak Current vs. Pulse Duration. (I_{DC} MAX as per MAX Ratings).

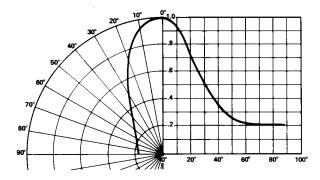


Figure 11. Relative Luminous Intensity vs. Angular Displacement.

T-1 Green/Emerald Green Diffused Lamps

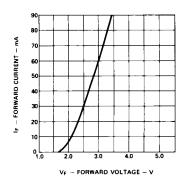


Figure 12. Forward Current vs. Forward Voltage Characteristics.

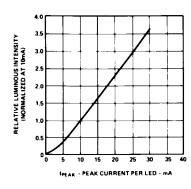


Figure 13. Relative Luminous Intensity vs. Forward Current.

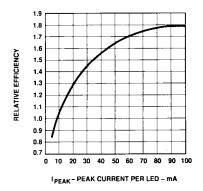


Figure 14. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

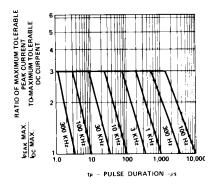


Figure 15. Maximum Tolerable Peak Current vs. Pulse Duration. ($I_{\rm DC}$ MAX as per MAX Ratings).

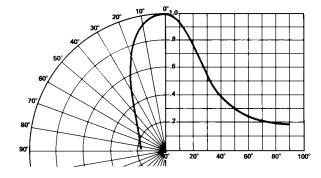


Figure 16. Relative Luminous Intensity vs. Angular Displacement.