Agilent Technologies
Innovating the HP Way

T-1 (3 mm) High Intensity LED Lamps

Technical Data

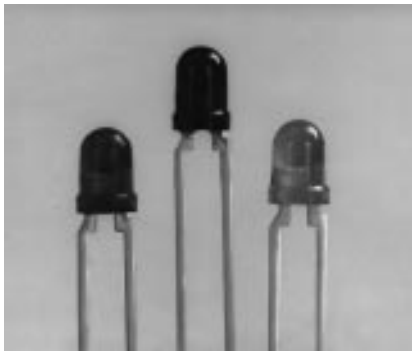
HLMP-1340-G0000
HLMP-1321
HLMP-142x Series
HLMP-152x Series

Features

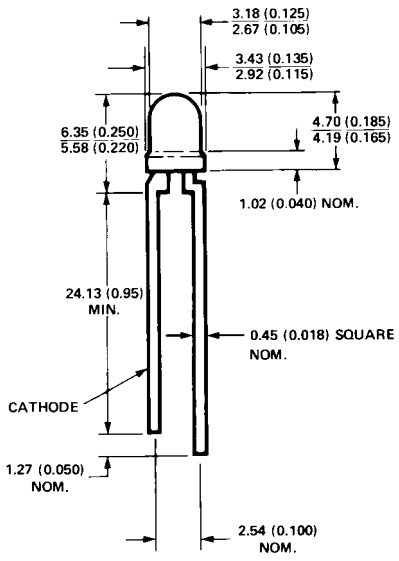
- **High Intensity**
- **Choice of 3 Bright Colors**
  High Efficiency Red
  Yellow
  High Performance Green
- **Popular T-1 Diameter Package**
- **Selected Minimum Intensities**
- **Narrow Viewing Angle**
- **General Purpose Leads**
- **Reliable and Rugged**
- **Available on Tape and Reel**

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)
1340-G0000	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°C

Parameter	Red	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
Power Dissipation[3]	135	85	135	mW
Reverse Voltage (I_R = 100 µA)	5	5	5	V
Transient Forward Current[4] (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°C at 0.5 mA/°C. For Yellow series derate linearly from 50°C at 0.2 mA/°C.
3. For Red 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

Symbol	Description	Device HLMP-	Min.	Typ.	Max.	Units	Test Conditions
I_V	Luminous Intensity	1340-G0000 1321	8.6 8.6	30 30		mcd	I_F = 10 mA (Figure 3)
		1420 1421	9.2 9.2	15 15		mcd	I_F = 10 mA (Figure 8)
		1520 1521	6.7 6.7	22 22		mcd	I_F = 10 mA (Figure 3)
$2\theta^1/_2$	Including Angle Between Half Luminous Intensity Points	All		45		Deg.	I_F = 10 mA See Note 1 (Figures 6, 11, 16, 21)
λ_{PEAK}	Peak Wavelength	1340-G0000 1321-G0000		635		nm	Measurement at Peak (Figure 1)
		142X 152X		583 565			
$\Delta\lambda_{1/2}$	Spectral Line Halfwidth	1340-G0000 1321-G0000		40		nm	
		142X 152X		36 28			
λ_d	Dominant Wavelength	1340-G0000 1321-G0000		626		nm	See Note 2 (Figure 1)
		142X 152X		585 569			
τ_s	Speed of Response	1340-G0000 1321-G0000		90		ns	
		142X 152X		90 500			
C	Capacitance	1340-G0000 1321-G0000		11		pF	V_F = 0; f = 1 MHz
		142X 152X		15 18			
$R\theta_{J\text{-}PIN}$	Thermal Resistance	All		290		°C/W	Junction to Cathode Lead
V_F	Forward Voltage	1340-G0000 1321-G0000		1.9	2.4	V	I_F = 10 mA
		142X 152X		2.0 2.1	2.4 2.7		
V_R	Reverse Breakdown Voltage	All	5.0			V	I_R = 100 µA
η_V	Luminous Efficacy	1340-G0000 1321-G0000		145		lumens	See Note 3
		142X 152X		500 595		Watt	

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 $I_e = l_v/\eta_v$, where l_v is the luminous intensity in candelas and η_v is the luminous efficacy in lumens/watt.

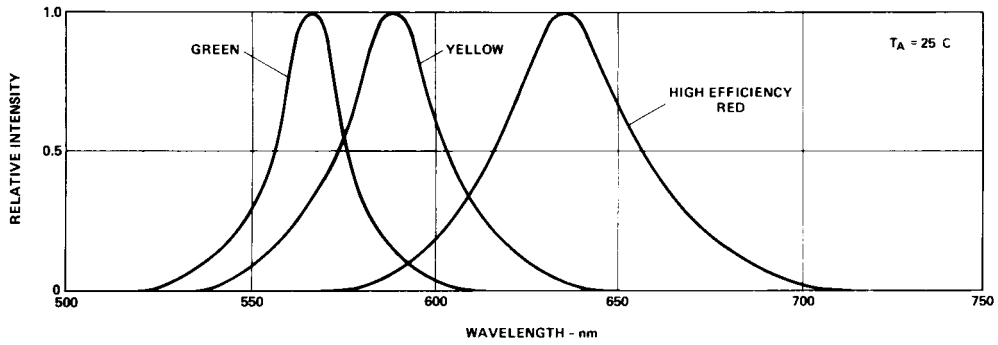


Figure 1. Relative Intensity vs. Wavelength.

T-1 High Efficiency Red Non-Diffused

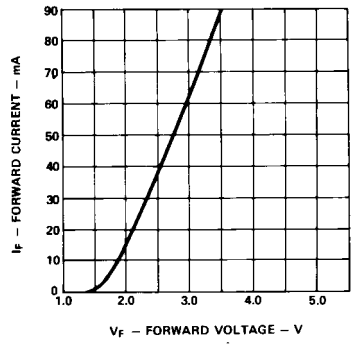


Figure 2. Forward Current vs. Forward Voltage Characteristics.

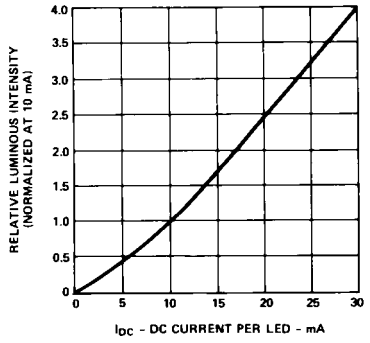


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

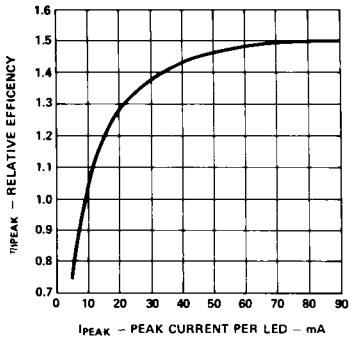


Figure 4. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

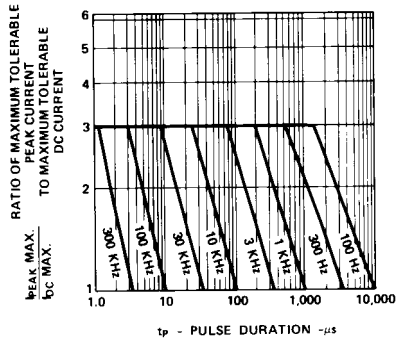


Figure 5. Maximum Tolerable Peak Current vs. Pulse Duration. (I_{DC} MAX as per MAX Ratings).

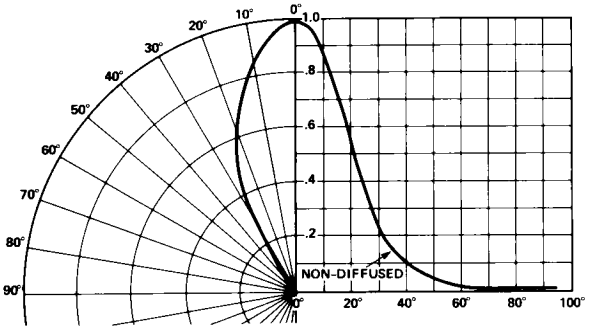


Figure 6. Relative Luminous Intensity vs. Angular Displacement.

T-1 Yellow Non-Diffused

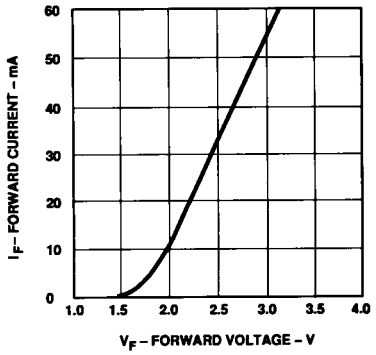


Figure 7. Forward Current vs. Forward Voltage Characteristics.

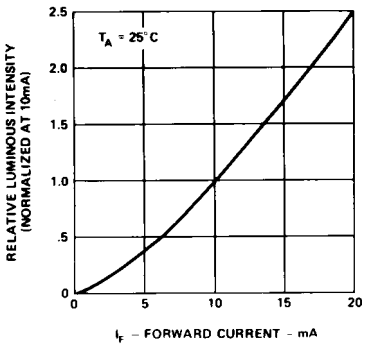


Figure 8. Relative Luminous Intensity vs. Forward Current.

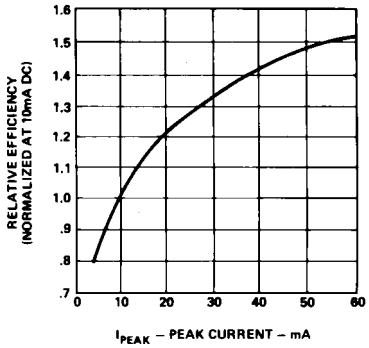


Figure 9. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak Current.

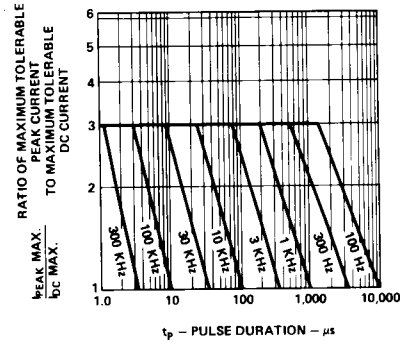


Figure 10. Maximum Tolerable Peak Current vs. Pulse Duration. (I_{DC}MAX as per MAX Ratings).

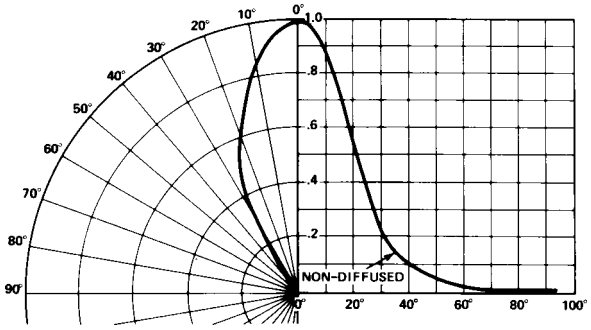


Figure 11. Relative Luminous Intensity vs. Angular Displacement.

T-1 Green Non-Diffused

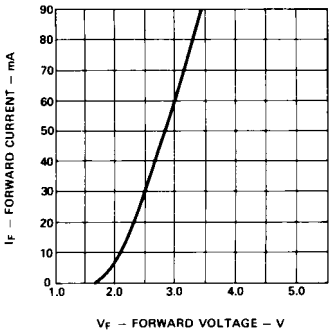


Figure 12. Forward Current vs. Forward Voltage Characteristics.

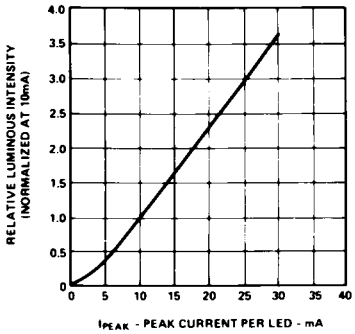


Figure 13. Relative Luminous Intensity vs. Forward Current.

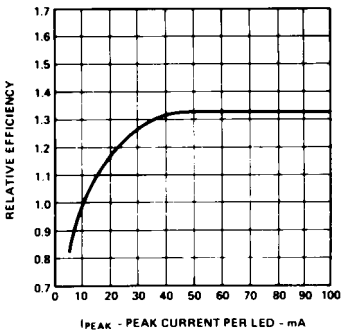


Figure 14. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

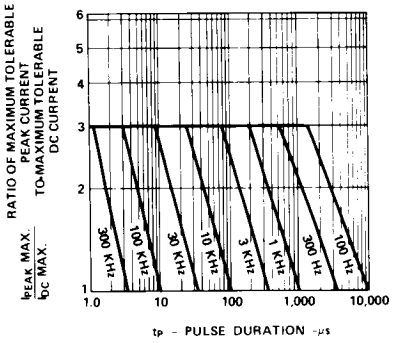


Figure 15. Maximum Tolerable Peak Current vs. Pulse Duration. (I_{DCMAX} as per MAX Ratings).

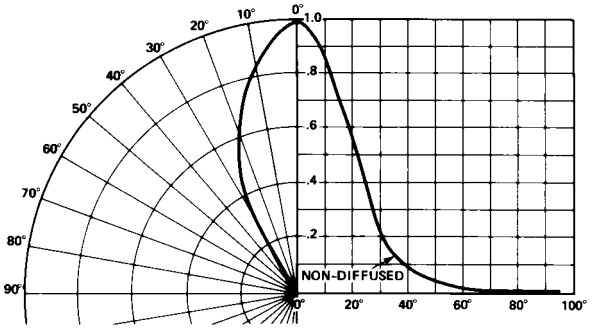


Figure 16. Relative Luminous Intensity vs. Angular Displacement.

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Obsoletes 5964-9373E (4/96)
5968-4163E (11/99)