HEWLETT PACKARD

T-1¾ (5 mm) High Intensity Solid State Lamps

Technical Data

HLMP-331X Series
HLMP-341X Series
HLMP-351X Series

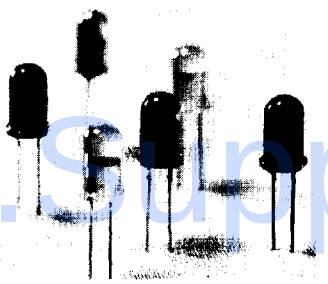
SOLID STATE LAMPS

Features

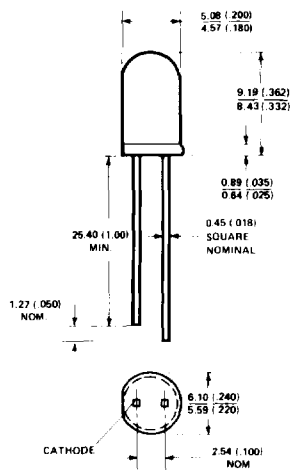
- **High Intensity**
- **Choice of 3 Bright Colors**
  High Efficiency Red
  Yellow
  High Performance Green
- **Popular T-1¾ Diameter Package**
- **Selected Minimum Intensities**
- **Narrow Viewing Angle**
- **General Purpose Leads**
- **Reliable and Rugged**
- **Available on Tape and Reel**

Description

This family of T-1¾ 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 (.040") DOWN THE LEADS.

Selection Guide

Part Number HLMP-	Description	Minimum Intensity (mcd) at 10 mA	Color (Material)
3315	Illuminator/ Point Source	12	High Efficiency Red (GaAsP on GaP)
3316	Illuminator/ High Brightness	20	
3415	Illuminator/ Point Source	10	Yellow (GaAsP on GaP)
3416	Illuminator/ High Brightness	20	
3517	Illuminator/ Point Source	6.7	Green (GaP)
3519	Illuminator/ High Brightness	10.6	

Electrical Characteristics at $T_A = 25°C$

Symbol	Description	Device HLMP-	Min.	Typ.	Max.	Units	Test Conditions
I_V	Luminous Intensity	3315 3316	12.0 20.0	40.0 60.0		mcd	I_F = 10 mA (Figure 3)
		3415 3416	10.0 20.0	40.0 50.0		mcd	I_F = 10 mA (Figure 8)
		3517 3519	6.7 10.6	50.0 70.0		mcd	I_F = 10 mA (Figure 13)
$2\theta_{1/2}$	Including Angle Between Half Luminous Intensity Points	3315 3316		35 35		Deg.	I_F = 10 mA See Note 1 (Figure 6)
		3415 3416		35 35		Deg.	I_F = 10 mA See Note 1 (Figure 11)
		3517 3519		24 24		Deg.	I_F = 10 mA See Note 1 (Figure 16)
λ_{PEAK}	Peak Wavelength	331X 341X 351X		635 583 565		nm	Measurement at Peak (Figure 1)
$\Delta\lambda_{1/2}$	Spectral Line Halfwidth	331X 341X 351X		40 36 28		nm	
λ_d	Dominant Wavelength	331X 341X 351X		626 585 569		nm	See Note 2 (Figure 1)
τ_s	Speed of Response	331X 341X 351X		90 90 500		ns	
C	Capacitance	331X 341X 351X		11 15 18		pF	V_F = 0; f = 1 MHz
$R\theta_{J\text{-}PIN}$	Thermal Resistance	331X 341X 351X		260		°C/W	Junction to Cathode Lead
V_F	Forward Voltage	331X 341X 351X		1.9 2.0 2.1	2.4 2.4 2.7	V	I_F = 10 mA (Figure 2) I_F = 10 mA (Figure 7) I_F = 10 mA (Figure 12)
V_R	Reverse Breakdown Volt.	All	5.0			V	I_R = 100 μA
η_V	Luminous Efficacy	331X 341X 351X		145 500 595		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.

Absolute Maximum Ratings at T_A = 25°C

Parameter	331X Series	341X Series	351X Series	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.

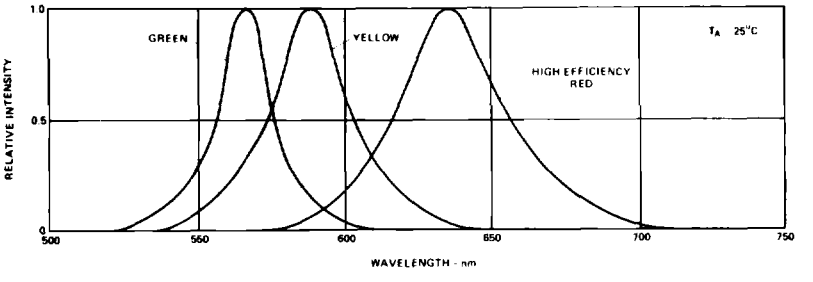


Figure 1. Relative Intensity vs. Wavelength.

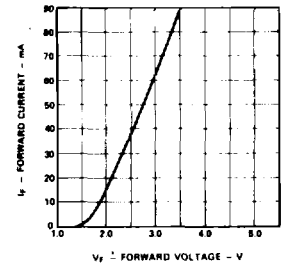


Figure 2. Forward Current vs. Forward Voltage Characteristics.

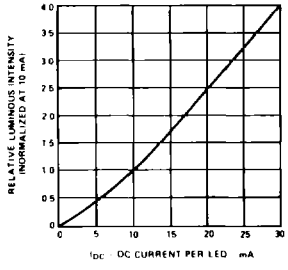


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

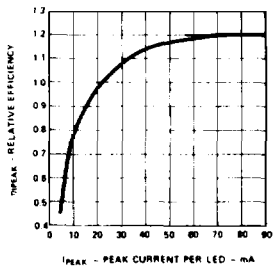


Figure 4. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

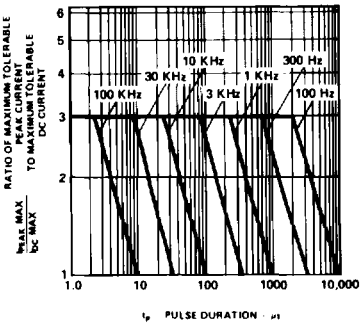


Figure 5. Maximum Tolerable Peak Current vs. Pulse Duration (I_{DC} MAX as per MAX Ratings).

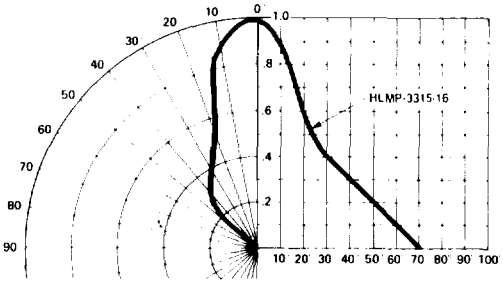


Figure 6. Relative Luminous Intensity vs. Angular Displacement.

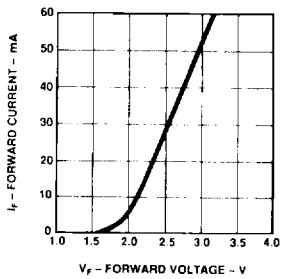


Figure 7. Forward Current vs. Forward Voltage Characteristics.

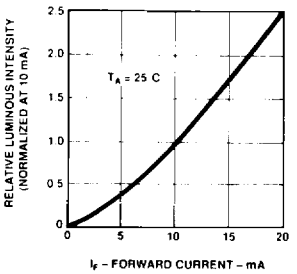


Figure 8. Relative Luminous Intensity vs. DC Forward Current.

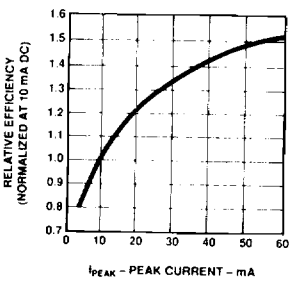


Figure 9. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak Current.

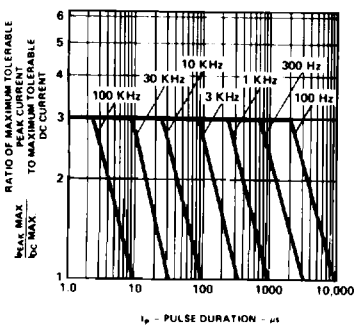


Figure 10. Maximum Tolerable Peak Current vs. Pulse Duration (I_{DC} MAX as per MAX Ratings).

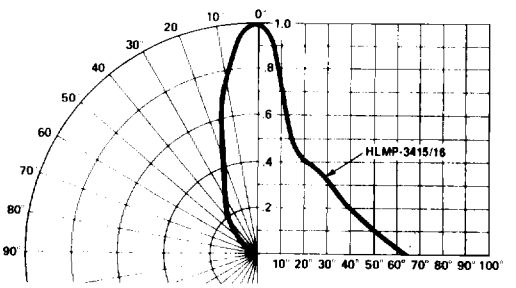


Figure 11. Relative Luminous Intensity vs. Angular Displacement.

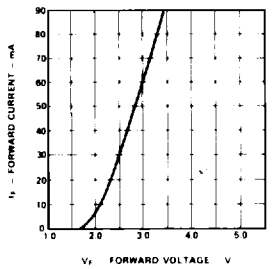


Figure 12. Forward Current vs. Forward Voltage Characteristics.

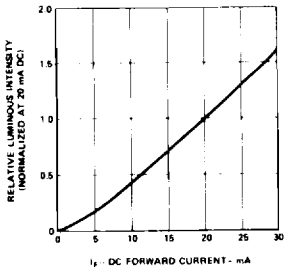


Figure 13. Relative Luminous Intensity vs. DC Forward Current.

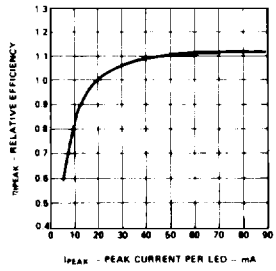


Figure 14. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

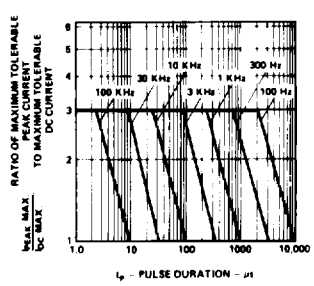


Figure 15. Maximum Tolerable Peak Current vs. Pulse Duration (I_{DC} MAX as per MAX Ratings).

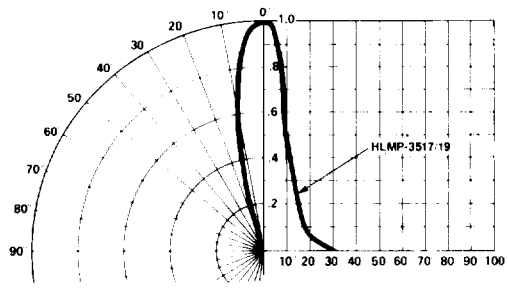


Figure 16. Relative Luminous Intensity vs. Angular Displacement. T-1¾ Lamp.