

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

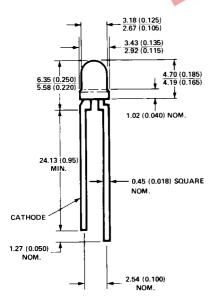
- General Purpose Leads
- Reliable and Rugged
- Available on Tape and Reel
- For more information, please refer to Tape and Reel Option Data Sheet



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

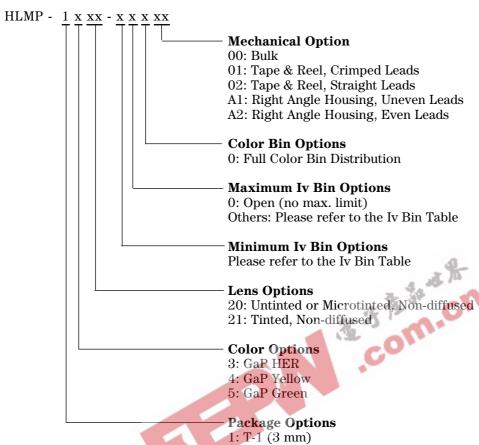


NOTES: 1. ALL DIMENSIONS ARE IN MILLIMETRES (INCHES). 2. AN EPOXY MENISCUS MAY EXTEND ABOUT 1mm (0.040") DOWN THE LEADS.

Selection Guide

Part	Package		Luminous Intensit Iv (mcd) @ 10 m		
Number	Description	Color	Min.	Max.	
HLMP-1320-G00xx	Untinted,	High	8.6	_	
HLMP-1320 GH0xx	Nondiffused		8.6	27.6	
HLMP-1321	m: 4 1	Efficiency	8.6	_	
HLMP-1321-G00xx	Tinted, Nondiffused	Red	8.6	_	
HLMP-1321-HI0xx	Nonumuseu		13.8	44.0	
HLMP-1420	Microtinted,		9.2	_	
HLMP-1420-F00xx	Nondiffused		9.2	-	
HLMP-1421	m	Yellow	9.2	_	
HLMP-1421-F00xx	Tinted, Nondiffused		9.2	-	
HLMP-1421-FG0xx	Nonumuseu		9.2	29.4	
HLMP-1520	Microtinted,		6.7	-	
HLMP-1520-E00xx	Nondiffused		6.7	_	
HLMP-1521	/D:41	Green	6.7	_	
HLMP-1521-E00xx	Tinted, Nondiffused		6.7	_	
HLMP-1521-EF0xx	riorianiuscu		6.7	21.2	

Part Numbering System



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 ($I_R = 100 \mu A$)	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.	Тур.	Max.	Units	Test Conditions
I_{V}	Luminous Intensity	1320 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	$I_F = 10 \text{ mA}$ (Figure 3)
$2\theta^{1/2}$	Including Angle Between Half Luminous Intensity Points	All		45		Deg.	$\begin{split} I_F &= 10 \text{ mA} \\ \text{See Note 1} \\ \text{(Figures 6, 11, 16, 21)} \end{split}$
λ_{PEAK}	Peak Wavelength	132x		635		nm	Measurement at Peak (Figure 1)
		142X 152X		583 565	400	A .	
$\Delta\lambda_{1/2}$	Spectral Line Halfwidth	132x		40	9.	nm	
		142X 152X		36 28	W.		
$\lambda_{ m d}$	Dominant Wavelength	132 x		626		nm	See Note 2 (Figure 1)
		142X 152X		585 569			
$ au_{ m s}$	Speed of Response	132x		90		ns	
		142X 152X		90 500			
\mathbf{C}	Capacitance	132x		11		pF	$V_F = 0$; $f = 1 MHz$
		142X 152X		15 18			
$R\theta_{\text{J-PIN}}$	Thermal Resistance	All		290		°C/W	Junction to Cathode Lead
$V_{\rm F}$	Forward Voltage	132x		1.9	2.4	V	$I_F = 10 \text{ mA}$
		142X 152X		2.0 2.1	2.4 2.7		
V_{R}	Reverse Breakdown Voltage	All	5.0			V	$I_R = 100 \mu\text{A}$
η_{V}	Luminous Efficacy	132x		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
- 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.

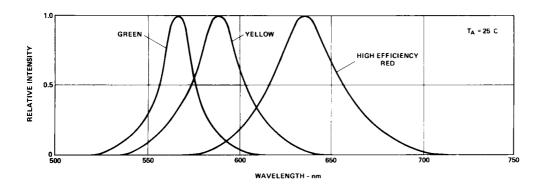


Figure 1. Relative Intensity vs. Wavelength.

T-1 High Efficiency Red Non-Diffused

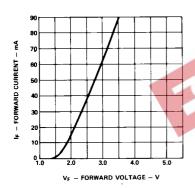


Figure 2. Forward Current vs. Forward Voltage Characteristics.

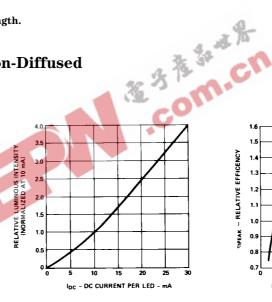


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

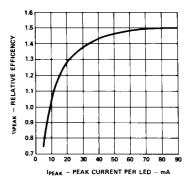


Figure 4. Relative Efficiency (Luminous Intensity per Unit Current) vs. Peak LED Current.

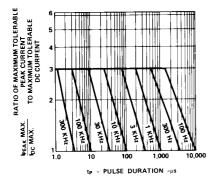
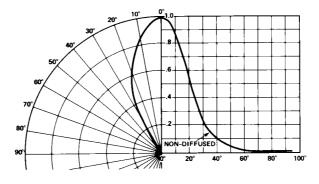
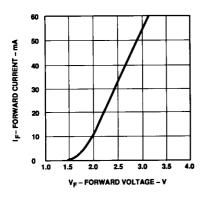


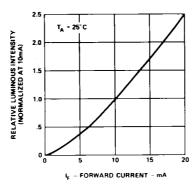
Figure 5. Maximum Tolerable Peak Current vs. Pulse Duration. (I_{DC} MAX as per MAX Ratings).



 ${\bf Figure~6.~Relative~Luminous~Intensity~vs.~Angular~Displacement.}$

T-1 Yellow Non-Diffused





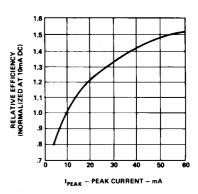
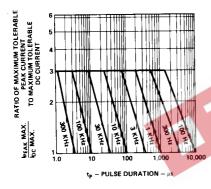


Figure 7. Forward Current vs. Forward Voltage Characteristics.

Figure 8. Relative Luminous Intensity vs. Forward Current.

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



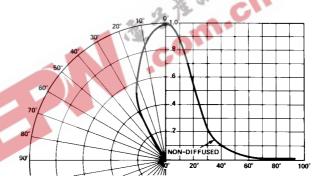
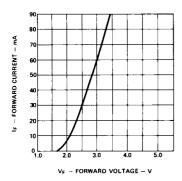


Figure 10. Maximum Tolerable Peak Current vs. Pulse Duration. ($I_{DC}MAX$ as per MAX Ratings).

Figure 11. Relative Luminous Intensity vs. Angular Displacement.

T-1 Green Non-Diffused



3.5 3.0 3.0 1.5 20 25 30 35 44

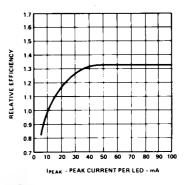
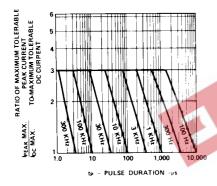


Figure 12. Forward Current vs. Forward Voltage Characteristics.

Figure 13. Relative Luminous Intensity vs. Forward Current.

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



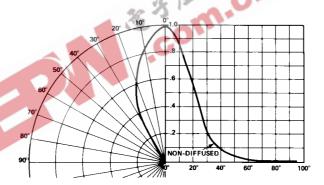


Figure 15. Maximum Tolerable Peak Current vs. Pulse Duration. (I_{DCMAX} as per MAX Ratings).

Figure 16. Relative Luminous Intensity vs. Angular Displacement.

Intensity Bin Limits

	Intensity Range (mcd			
Color	Bin	Min.	Max.	
	G	9.7	15.5	
	Н	15.5	24.8	
	I	24.8	39.6	
	J	39.6	63.4	
	K	63.4	101.5	
	L	101.5	162.4	
	M	162.4	234.6	
	N	234.6	340.0	
	0	340.0	540.0	
Red	P	540.0	850.0	
	Q	850.0	1200.0	
	R	1200.0	1700.0	
	S	1700.0	2400.0	
	T	2400.0	3400.0	
	U	3400.0	4900.0	
	V	4900.0	7100.0	
	W	7100.0	10200.0	
	X	10200.0	14800.0	
	Y	14800.0	21400.0	
	Z	21400.0	30900.0	
	F	10.3	16.6	
	G	16.6	26.5	
	Н	26.5	42.3	
	I	42.3	67.7	
	J	67.7	108.2	
	K	108.2	173.2	
	L	173.2	250.0	
Yellow	M	250.0	360.0	
	N	360.0	510.0	
	О	510.0	800.0	
	P	800.0	1250.0	
	Q	1250.0	1800.0	
	R	1800.0	2900.0	
	S	2900.0	4700.0	
	T	4700.0	7200.0	
	U	7200.0	11700.0	
	V	11700.0	18000.0	
	W	18000.0	27000.0	

Intensity Bin Limits, continued

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		Intensity Range (mcd)			
Color	Bin	Min.	Max.		
	Е	7.6	12.0		
	F	12.0	19.1		
	G	19.1	30.7		
	Н	30.7	49.1		
	I	49.1	78.5		
	J	78.5	125.7		
	K	125.7	201.1		
	L	201.1	289.0		
Green	M	289.0	417.0		
	N	417.0	680.0		
	0	680.0	1100.0		
_ 4,	P	1100.0	1800.0		
2. 75 3	Q	1800.0	2700.0		
6 3	R	2700.0	4300.0		
-01	S	4300.0	6800.0		
0	Т	6800.0	10800.0		
	U	10800.0	16000.0		
	V	16000.0	25000.0		
	W	25000.0	40000.0		

Maximum tolerance for each bin limit is \pm 18%.



Color Categories

		Lambda (nm)		
Color	Category #	Min.	Max.	
	6	561.5	564.5	
	5	564.5	567.5	
Green	4	567.5	570.5	
	3	570.5	573.5	
	2	573.5	576.5	
	1	582.0	584.5	
	3	584.5	587.0	
Yellow	2	587.0	589.5	
	4	589.5	592.0	
	5	592.0	593.0	

Mechanical Option Matrix

	4	989.9	594.0				
	5		593.0				
Maximum tolerance for	Maximum tolerance for each bin limit is ±0.5 nm.						
	Maximum tolerance for each bin limit is ± 0.5 nm.						
Mechanical Op	tion Matrix	X	132				
Mechanical Opti	on Code		Definitio	n			
00	В	ulk Packaging, minim	um increment 500	0 pcs/bag			
01	Т	Tape & Reel, crimped leads, minimum increment 1800 pcs/bag					
02	T	Tape & Reel, straight leads, minimum increment 1800 pcs/bag					
A1	R	Right Angle Housing, uneven leads, minimum increment 500 pcs/bag					
A2	R	Right Angle Housing, even leads, minimum increment 500 pcs/bag					

Note:

All categories are established for classification of products. Products may not be available in all categories. Please contact your local Agilent representative for further clarification/information.