Agilent T-1 3/4 (5 mm) AlInGaP Lamps
Data Sheet

HLMP-Cx08 Series, HLMP-Cx25 Series
HLMP-Cx27 Series, HLMP-C610

Features

- **High intensity**
- **General purpose leads**
- **Popular 5 mm diameter**
- **Available in bulk, tape and reel, or ammopack**
- **8° or 25° viewing angles**
- **Choice of colors: Amber or Red**

Description

The HLMP-Cx08, HLMP-Cx25, HLMP-Cx27, and HLMP-C610 series are 5 mm lamps specially designed for applications requiring very high on-axis intensity that is not achievable with a standard lamp. These devices are capable of producing light output over a wide range of drive currents.

Built using AlInGaP technology, they are well suited for typical 5 mm TS-AlGaAs lamp applications, and have significantly SUPERIOR RELIABILITY than most TS-AlGaAs lamps in wet/hot environments. These lamps come with clear non-diffused lens and are optically designed to yield superior light output.

Applications

- **Indoor / outdoor applications**
- **Small store-front signs**
- **Message panels**
- **Road construction barrier lights**
- **Center high mount stop lights**
- **Spoiler, car decorative lighting**
- **Motorcycle / bicycle warning lights**

Device Selection

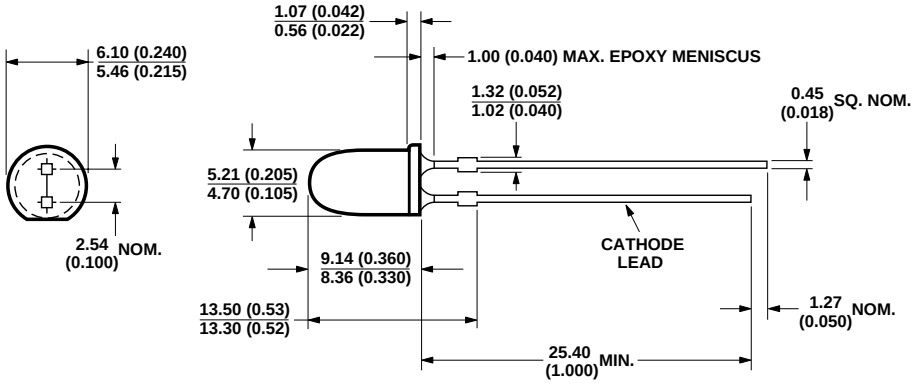
Part Number	Standoff	Typical Viewing Angle[1] (degrees), $2\Theta^1/_2$	Luminous Intensity, Iv (mcd) @ 20 mA Min.	Typ.	Color	Dominant Wavelength[2]
HLMP-C008-U00xx	No	8	2900.0	6000.0	Red	626
HLMP-C208-S00xx		8	2600.0	3000.0	Amber	590
HLMP-C608-R00xx		8	1000.0	2000.0	Red	635
HLMP-C610-R00xx	Yes	8	1000.0	2000.0	Red	635
HLMP-C025-P00xx	No	25	500.0	1000.0	Red	626
HLMP-C225-O00xx		25	450.0	800.0	Amber	590
HLMP-C625-P00xx		25	500.0	700.0	Red	635
HLMP-C027-P00xx	Yes	25	500.0	1000.0	Red	626
HLMP-C627-P00xx		25	500.0	700.0	Red	635

Notes:

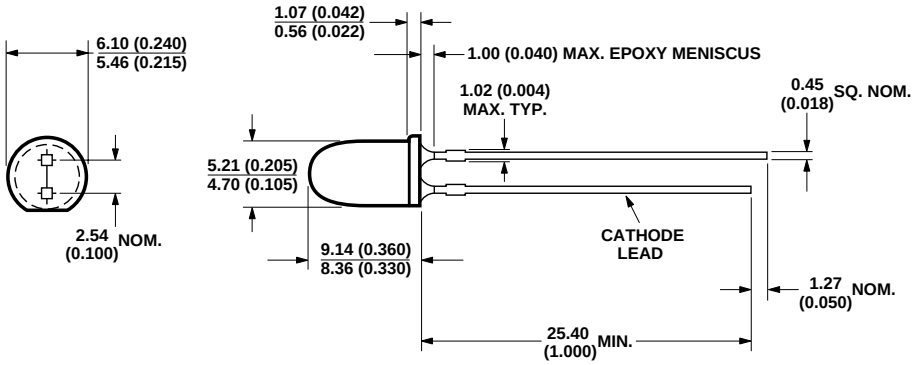
1. $\theta^1/_2$ is the off-axis angle at which the luminous intensity is half of the axial luminous intensity.
2. The dominant wavelength, λ_d, is derived from the CIE chromaticity diagram and represents the single wavelength which defines the color of the device.

Package Dimensions

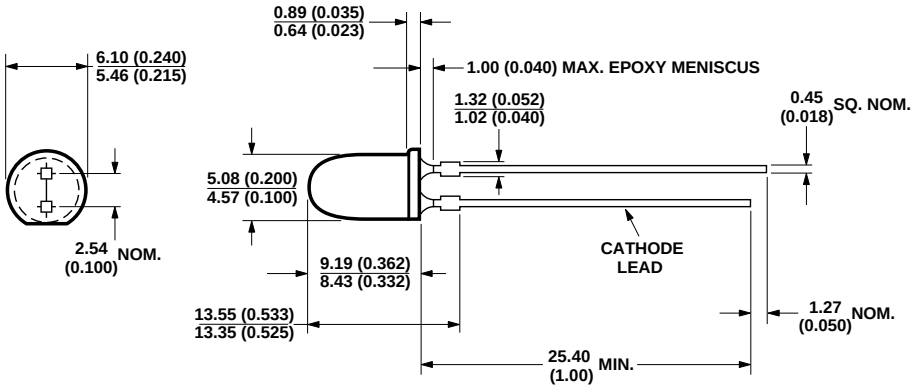
HLMP-Cx27



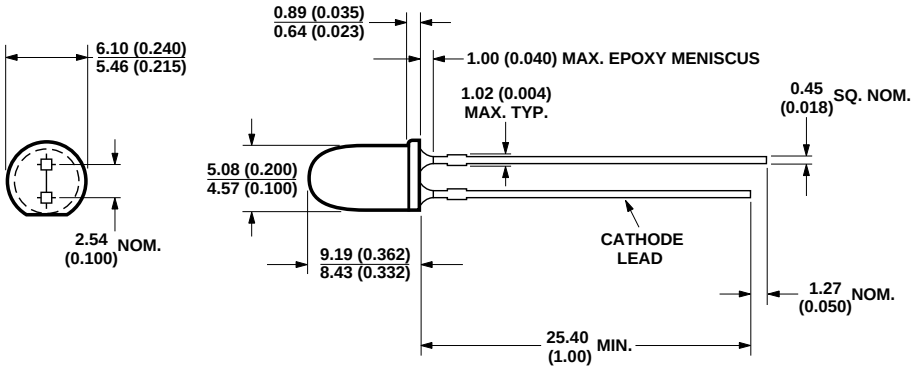
HLMP-Cx25



HLMP-C610



HLMP-Cx08



Part Numbering System

HLMP - C x xx - x x x xx

Mechanical Option
00: Bulk
02: Tape & Reel, Straight Leads
DD: Ammo Pack

Color Bin Options
0: Full Color Bin Distribution

Maximum Iv Bin Options
0: Open (no max. limit)

Minimum Iv Bin Options
Please refer to the Iv Bin Table

Viewing Angle & Standoff Option
08: 8 degrees, without standoff
10: 8 degrees, with standoff
25: 25 degrees, without standoff
27: 25 degrees, with standoff

Color Options
0: AlInGaP Red 626 nm
2: AlInGaP Amber 590 nm
6: AlInGaP Red 635 nm

Absolute Maximum Ratings at T_A=25°C

Parameter	Absolute Maximum	Units
Peak Forward Current	70	mA
Average Forward Current[1]	30	mA
DC Current[2]	50	mA
Reverse Voltage (I_R = 100 μA)	5	V
LED Junction Temperature	110	°C
Operating Temperature	-40 to +100	°C
Storage Temperature	-40 to +120	

Notes:
1. See Figure 2 to establish pulsed operating conditions.
2. Derate linearly from 50°C at 0.5 mA/°C.
3. 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 this device be operated at peak currents above the Absolute Maximum Peak Forward Current.

Optical / Electrical Characteristics at T_A=25°C

Symbol	Parameter	Device	Min.	Typ.[3]	Max.	Units	Test Conditions
$2\theta^1/_2$	Included Angle Between Half Luminous Intensity Points[1]	HLMP-C008		8		Deg.	I_F = 20 mA
		HLMP-C208		8			See Note 1
		HLMP-C608		8			
		HLMP-C025		25			
		HLMP-C225		25			
		HLMP-C625		25			
		HLMP-C610		8			
		HLMP-C027		25			
		HLMP-C627		25			
λ_d	Dominant Wavelength[2]	HLMP-C008		626		nm	See Note 2
		HLMP-C208		590			
		HLMP-C608		635			
		HLMP-C025		626			
		HLMP-C225		590			
		HLMP-C625		635			
		HLMP-C610		635			
		HLMP-C027		626			
		HLMP-C627		635			
λ_{PEAK}	Peak Wavelength	HLMP-C008		635		nm	Measurement at Peak
		HLMP-C208		594			
		HLMP-C608		650			
		HLMP-C025		635			
		HLMP-C225		594			
		HLMP-C625		650			
		HLMP-C610		650			
		HLMP-C027		635			
		HLMP-C627		650			
$\Delta\lambda^1/_2$	Spectral Line Halfwidth			17		nm	
τ_s	Speed of Response			20		ns	
C	Capacitance			40		pF	V_F = 0; f = 1 MHz
$R\theta_{J\text{-}PIN}$	Thermal Resistance			260		°C/W	Junction to Cathode Lead
V_F	Forward Voltage	HLMP-C008		1.9	2.4	V	I_F = 20 mA
		HLMP-C208		1.9	2.6		
		HLMP-C608		1.9	2.2		
		HLMP-C025		1.9	2.4		
		HLMP-C225		1.9	2.6		
		HLMP-C625		1.9	2.2		
		HLMP-C610		1.9	2.2		
		HLMP-C027		1.9	2.4		
		HLMP-C627		1.9	2.2		
V_R	Reverse Breakdown Voltage		5.0			V	I_R = 100 µA

Notes:

1. $\theta^1/_2$ is the off-axis angle at which the luminous intensity is half of 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. Typical specification for reference only. Do not exceed absolute maximum ratings.

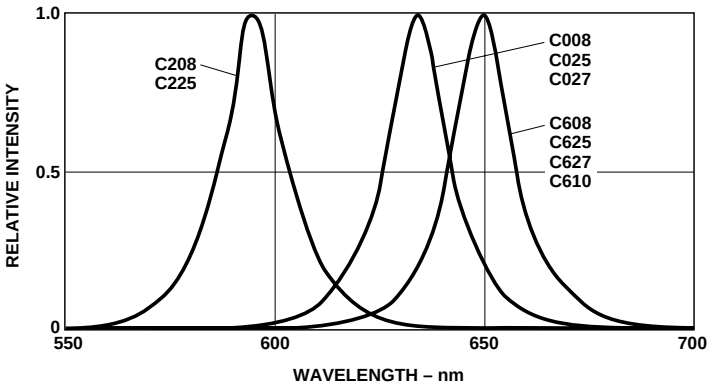


Figure 1. Relative intensity vs. wavelength.

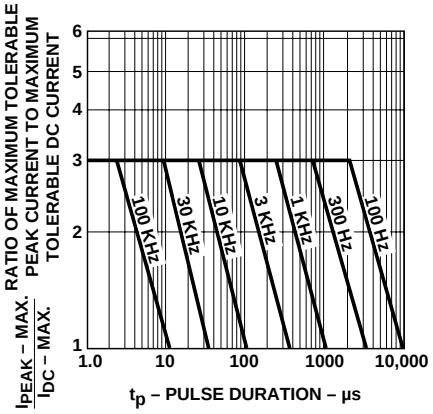


Figure 2. Maximum tolerable peak current vs. pulse duration.

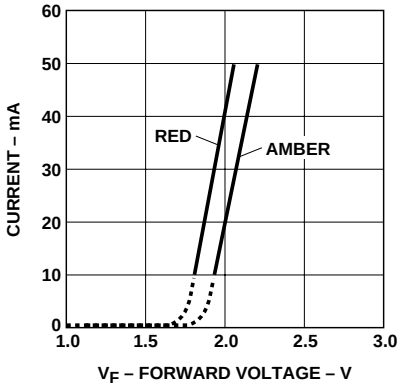


Figure 3. Forward current vs. forward voltage.

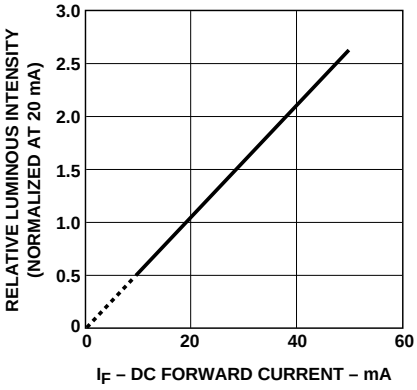


Figure 4. Relative luminous intensity vs. forward current.

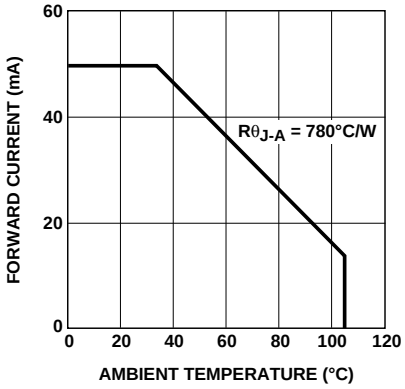


Figure 5. Maximum forward DC current vs. ambient temperature.

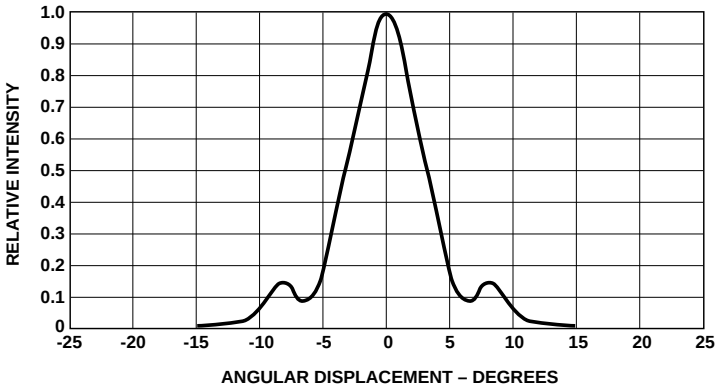


Figure 6. Relative luminous intensity vs. angular displacement for HLMP-Cx08 and HLMP-Cx10.

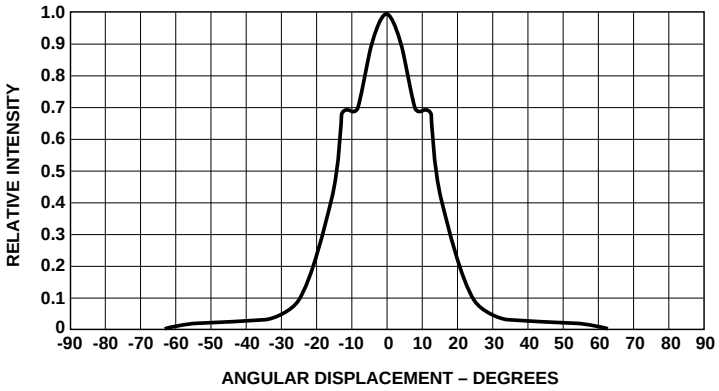


Figure 7. Relative luminous intensity vs. angular displacement for HLMP-Cx25 and HLMP-Cx27.

Soldering / Cleaning

Cleaning agents from the ketone family (acetone, methyl ethyl ketone, etc.) and from the chlorinated hydrocarbon family (methylene chloride, trichloro-ethylene, carbon tetrachloride, etc.) are not recommended for cleaning LED parts. All of these various solvents attack or dissolve the encapsulating epoxies used to form the package of plastic LED parts.

For information on soldering LEDs, please refer to Application Note 1027.

Intensity Bin Limits

Color	Bin	Intensity Range (mcd) Min.	Max.
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
Yellow	O	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

Maximum tolerance for each bin limit is ±18%.

Color Categories

Color	Category #	Lambda (nm) Min.	Max.
Amber	3	584.5	587.0
	2	587.0	589.5
	4	589.5	592.0
	6	592.0	594.5
	7	594.5	597.0

Tolerance for each bin limit is ±0.5 nm.

Mechanical Option Matrix

Mechanical Option Code	Definition
00	Bulk Packaging, minimum increment 500 pcs/bag
02	Tape & Reel, straight leads, minimum increment 1300 pcs/bag
DD	Ammo Pack, straight leads with minimum increment 2K/pack

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.

Precautions

Lead Forming

- The leads of an LED lamp may be preformed or cut to length prior to insertion and soldering into PC board.
- If lead forming is required before soldering, care must be taken to avoid any excessive mechanical stress induced to LED package. Otherwise, cut the leads of LED to length after soldering process at room temperature. The solder joint formed will absorb the mechanical stress of the lead cutting from traveling to the LED chip die attach and wirebond.
- It is recommended that tooling made to precisely form and cut the leads to length rather than rely upon hand operation.

Soldering Conditions

- Care must be taken during PCB assembly and soldering process to prevent damage to LED component.
- The closest LED is allowed to solder on board is 1.59 mm below the body (encapsulant epoxy) for those parts without standoff.
- Recommended soldering conditions:

	Wave Soldering	Manual Solder Dipping
Pre-heat Temperature	105 °C Max.	–
Pre-heat Time	30 sec Max.	–
Peak Temperature	250 °C Max.	260 °C Max.
Dwell Time	3 sec Max.	5 sec Max.

- Wave soldering parameter must be set and maintained according to recommended temperature and dwell time in the solder wave. Customer is advised to periodically check on the soldering profile to ensure the soldering profile used is always conforming to recommended soldering condition.
- If necessary, use fixture to hold the LED component in proper orientation with respect to the PCB during soldering process.
- Proper handling is imperative to avoid excessive thermal stresses to LED components when heated. Therefore, the soldered PCB must be allowed to cool to room temperature, 25° C, before handling.
- Special attention must be given to board fabrication, solder masking, surface plating and lead holes size and component orientation to assure solderability.
- Recommended PC board plated through hole sizes for LED component leads:

LED Component Lead Size	Diagonal	Plated Through Hole Diameter
0.457 x 0.457 mm (0.018 x 0.018 inch)	0.646 mm (0.025 inch)	0.976 to 1.078 mm (0.038 to 0.042 inch)
0.508 x 0.508 mm (0.020 x 0.020 inch)	0.718 mm (0.028 inch)	1.049 to 1.150 mm (0.041 to 0.045 inch)

Note: Refer to application note AN1027 for more information on soldering LED components.

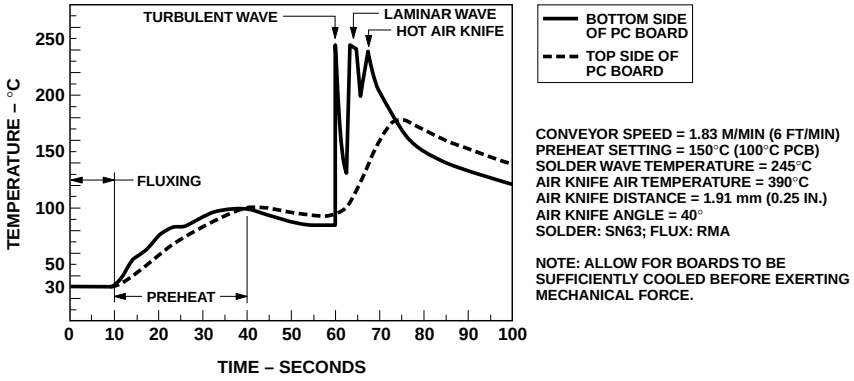


Figure 8. Recommended wave soldering profile.

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Data subject to change.

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