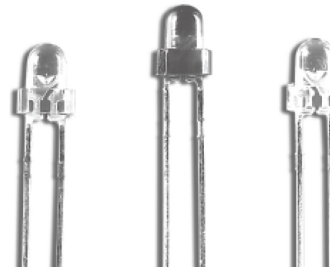


# HLMP-Nxxx

## T-1 (3 mm) Auto Insertable LED Lamps



### Data Sheet



**HLMP-N305, HLMP-N405, HLMP-NG0x,  
HLMP-NL06, HLMP-NH04**

#### Description

This family of 3 mm LED Lamps is capable of withstanding automatic insertion and wave soldering processes.

Designed with a thick epoxy flange and soft leadframe material, it is ideal for clinch and cut operations.

#### Applications

- General purpose
- High volume manufacturing

#### Features

- T-1 (3 mm) auto insertable package
- AllnGaP SunPower intensity
- High light output
- Tinted diffused and tinted non-diffused lens options
- Wide viewing angle
- Variety of colors
- Available with straight or formed lead tape and reel options

#### Device Selection Guides

High Brightness Lamps		Package		Luminous Intensity,	Viewing Angle,	Package
Color	Part Number	Tinted	Diffused	Min. Iv @ 20 mA	2θ <sup>1/2</sup>	Outline
Red	HLMP-NG05	μ		90.2	45	A
	HLMP-NG07	μ		90.2	60	B
Amber	HLMP-NL06	μ		96.2	60	B
Red Orange	HLMP-NH04			90.2	60	B

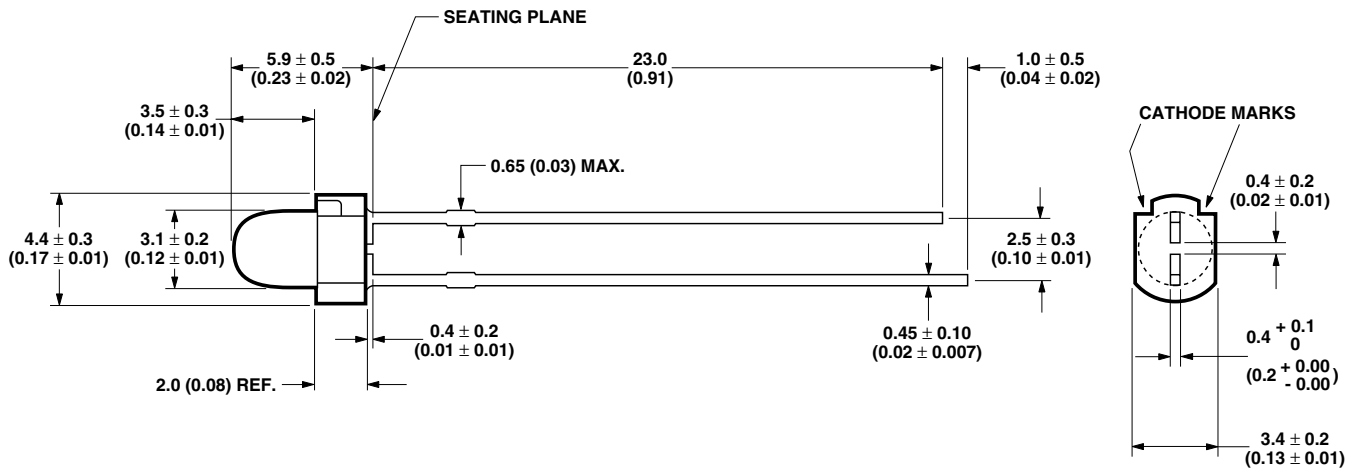
High Efficiency Lamps		Package		Luminous Intensity,	Viewing Angle,	Package
Color	Part Number	Tinted	Diffused	Min. Iv @ 10 mA	2θ <sup>1/2</sup>	Outline
GaP Yellow	HLMP-N305	X		14.7	45	A
GaP Orange	HLMP-N405	X		13.8	45	A

Note:

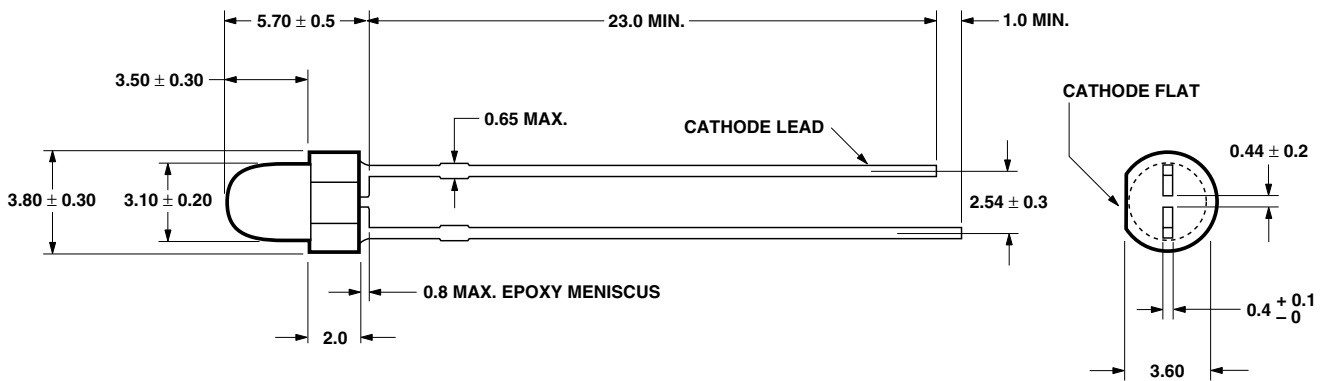
1. 2θ<sup>1/2</sup> is the off axis angle where the luminous intensity is 1/2 the on axis intensity.

## Package Dimensions

### Package Outline "A"



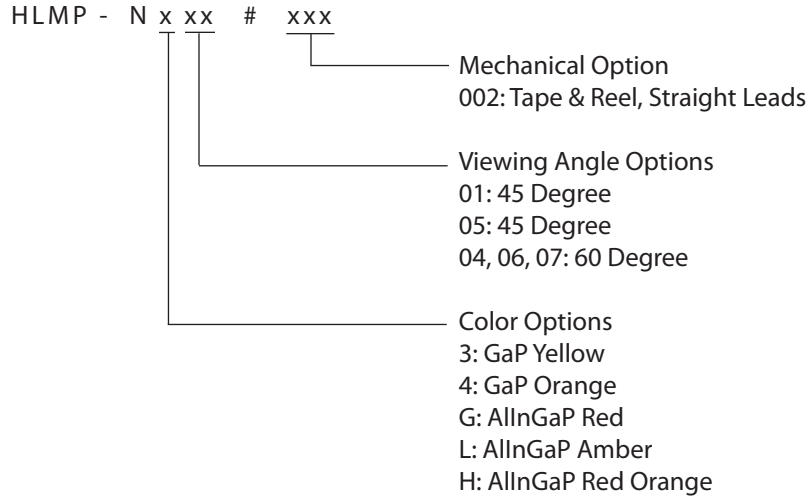
### Package Outline "B"



#### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. LEADS ARE MILD STEEL. SOLDER COATED.
3. EPOXY MENISCUS OF 0.8 mm (0.03 in.) MAXIMUM MAY EXTEND TO THE LEADS.

## Part Numbering System



## Absolute Maximum Ratings at $T_A = 25\text{ }^\circ\text{C}$

Parameter	Orange	Yellow	AllnGaP Red Orange, Amber & Red	Units
DC Forward Current <sup>[1]</sup>	30	20	30 <sup>[2,3]</sup>	mA
Reverse Voltage ( $I_r = 100\text{ }\mu\text{A}$ )		5		V
Junction Temperature, $T_{j\text{max}}$		110		$^\circ\text{C}$
Storage Temperature Range		-40 to +85		$^\circ\text{C}$
Operating Temperature Range		-20 to +85	-40 to +85	$^\circ\text{C}$

### Notes:

1. See Figure 4 for maximum current derating vs. ambient temperature.
2. Suggested minimum DC current: 10 mA.
3. Maximum Peak Pulsed Forward Current: 50 mA, 30 mA average.

## Electrical Characteristics at $T_A = 25^\circ\text{C}$

Part Number	Forward Voltage $V_f$ (Volts)			Capacitance C (pF), $V_f = 0, f = 1 \text{ MHz}$	Thermal Resistance $R_{\theta J-PIN}$ ( $^\circ\text{C/W}$ )	Speed of Response $\tau_s$ (ns) Time Constant $e^{-t/\tau_s}$
	Typ.	Max.	$I_f$ (mA)	Typ.		Typ.
HLMP-N30x	2.00	2.6	10	15	290	90
HLMP-N40x	1.90	2.6	10	4	290	280
HLMP-NL06 <sup>[1]</sup>	2.02	2.4	20	40	240	20
HLMP-NG0x <sup>[1]</sup>	1.90	2.4	20	40	240	20
HLMP-NH04	1.94	2.4	20	40	250	20

Note:

1. Please contact your Avago Sales Representative about operating currents below 10 mA.

## Optical Characteristics at $T_A = 25^\circ\text{C}$

Part Number	Luminous Intensity		Typ. Peak Wavelength (nm)	Typ. Dominant Wavelength (nm)	Typ. Spectral Half Width	Luminous Efficacy Width (lm/W)
	Min.	$I_f$ (mA)				
HLMP-NG05	90.2	20	635	626	17	150
HLMP-NG07	90.2	20	635	626	17	150
HLMP-NL06	96.2	20	592	590	17	480
HLMP-N305	14.7	10	583	585	36	500
HLMP-N405	13.8	10	600	602	37	380
HLMP-NH04	90.2	20	621	615	17	235

Notes:

1. The luminous intensity,  $I_v$ , is measured at the mechanical axis of the lamp package. The actual peak of the spatial radiation pattern may not be aligned with this axis.
2. The dominant wavelength,  $\lambda_d$ , is derived from the CIE Chromaticity Diagram and represents the color of the device.
3. The radiant intensity,  $I_e$ , in watts per steradian, may be found from the equation  $I_e = I_v/\eta_v$ , where  $I_v$  is the luminous intensity in candelas and  $\eta_v$  is the luminous efficacy in lumens/watt.

### Intensity Bin Limits

Color	Bin	Intensity Range (mcd)	
		Min.	Max.
	H	13.8	27.6
	I	22.0	44.0
	J	35.2	70.4
	K	56.4	112.8
	L	90.2	180.4
	M	138.0	276.0
	N	200.0	400.0
	O	290.0	580.0
Red/Orange	P	500.0	1000.0
/Red-Orange	Q	700.0	1400.0
	R	1000.0	2000.0
	S	1400.0	2800.0
	T	2000.0	4000.0
	U	2900.0	5800.0
	V	4200.0	8400.0
	W	6000.0	12000.0
	X	8700.0	17400.0
	Y	12600.0	25200.0
	Z	18200.0	36400.0
	G	14.7	29.4
	H	23.5	47.0
	I	37.6	75.2
	J	60.1	120.2
	K	96.2	192.4
	L	147.0	294.0
	M	212.0	424.0
Yellow/Amber	N	300.0	600.0
	O	450.0	900.0
	P	700.0	1400.0
	Q	1000.0	2000.0
	R	1600.0	3200.0
	S	2600.0	5200.0
	T	4000.0	8000.0
	U	6500.0	13000.0
	V	10000.0	20000.0
	W	16000.0	30000.0

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

### Amber Color Bin Limits

(nm at 20 mA)

Bin Name	Min.	Max.
1	584.5	587.0
2	587.0	589.5
4	589.5	592.0
6	592.0	594.5

Tolerance for each bin limit is  $\pm 0.5$  nm.

## Color Categories

Color	Category #	Lambda (nm)	
		Min.	Max.
Yellow	1	582.0	584.5
	3	584.5	587.0
	2	587.0	589.5
	4	589.5	592.0
	5	592.0	593.0
Orange	1	597.0	599.5
	2	599.5	602.0
	3	602.0	604.5
	4	604.5	607.5
	5	607.5	610.5
	6	610.5	613.5
	7	613.5	616.5
	8	616.5	619.5

Tolerance for each bin limit is  $\pm 0.5$  nm.

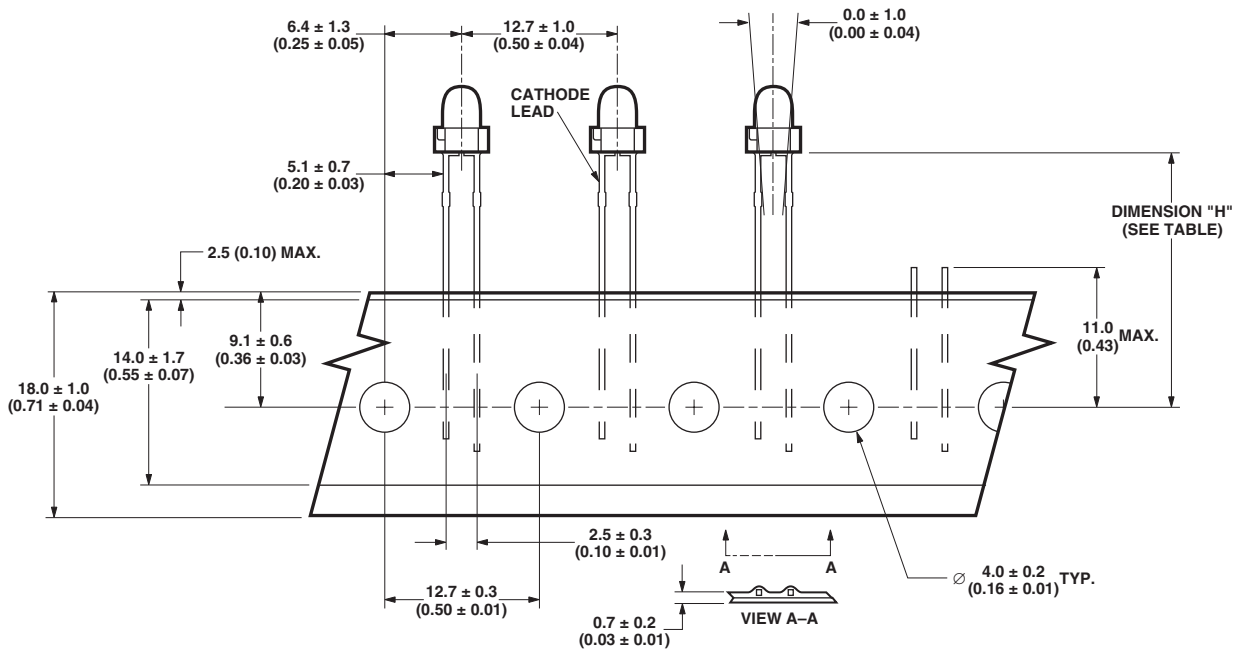
## Taping Options

Option	Straight Lead		
	#002	#2CA	#2CD
Dimension "B"	–	–	–
Dimension "H"	20.5 $\pm$ 1.0 (0.81 $\pm$ 0.04)	18.0 $\pm$ 1.0 (0.71 $\pm$ 0.04)	20.5 $\pm$ 1.0 (0.81 $\pm$ 0.04)

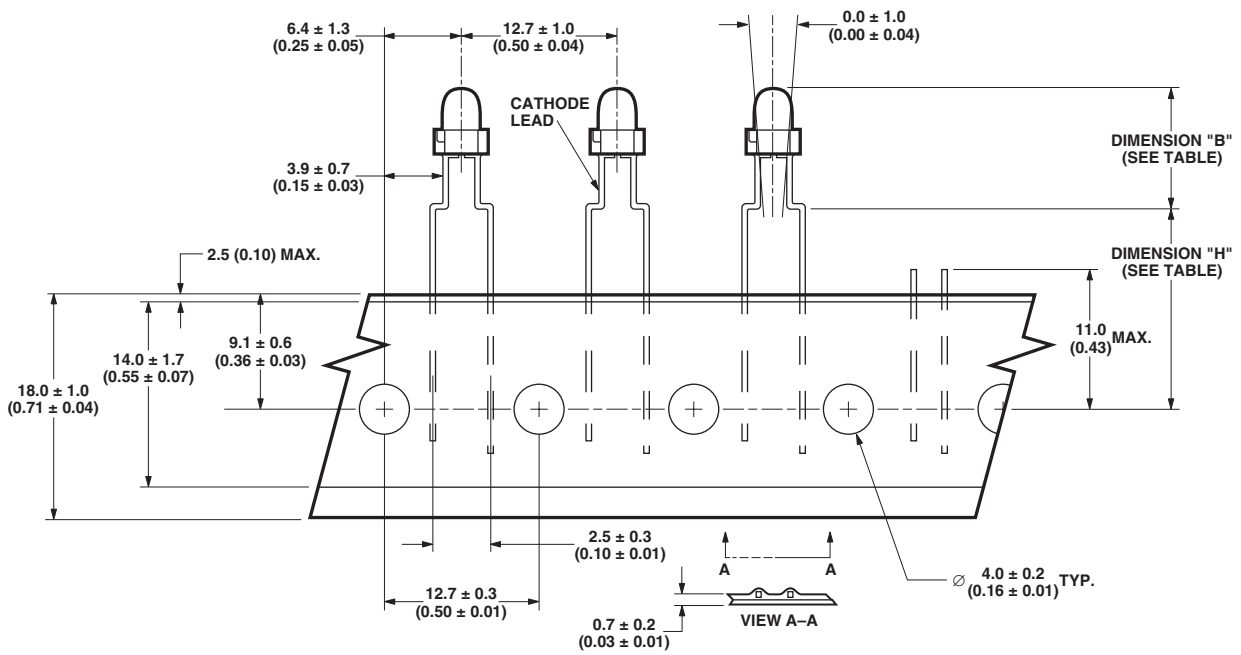
Option	Formed Lead						
	#2UK	#2UL	#2UM	#2UN	#2UP	#2UQ	#2UR
Dimension "B"	12.0 $\pm$ 1.0 (0.47 $\pm$ 0.04)	9.0 $\pm$ 1.0 (0.35 $\pm$ 0.04)	10.0 $\pm$ 1.0 (0.39 $\pm$ 0.04)	11.0 $\pm$ 1.0 (0.43 $\pm$ 0.04)	13.0 $\pm$ 1.0 (0.51 $\pm$ 0.04)	14.0 $\pm$ 1.0 (0.55 $\pm$ 0.04)	15.0 $\pm$ 1.0 (0.59 $\pm$ 0.04)
Dimension "H"				16.0 $\pm$ 1.0 (0.63 $\pm$ 0.04)			

Units: mm (inches)

# Tape Outline Drawing



STRAIGHT LEAD

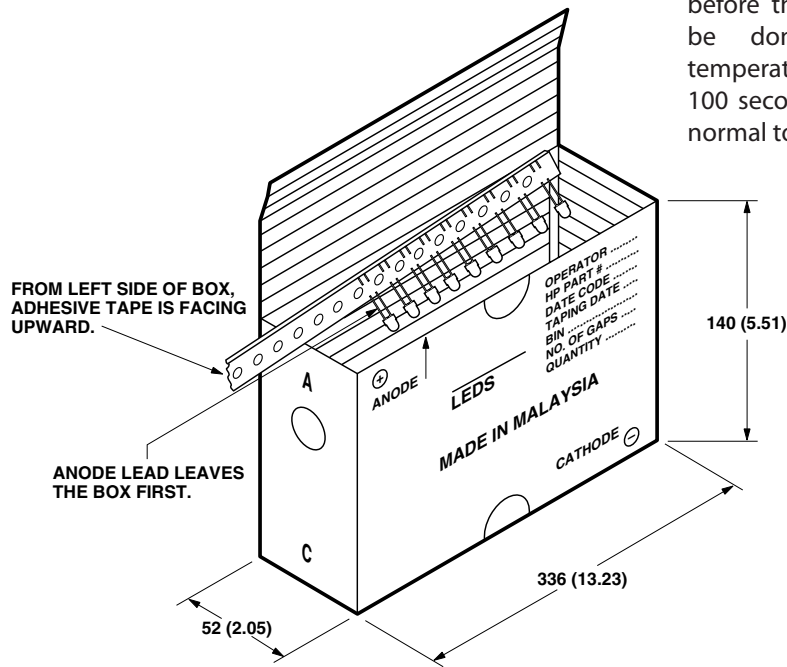


FORMED LEAD

## Package Options

Lead Option	Ammo Pack (1000 pcs.)	Tape & Reel (2000 pcs.)
Straight Lead	#2C —	#002
Formed Lead	#2U —	—

### AMMO PACK (for All options except #002)

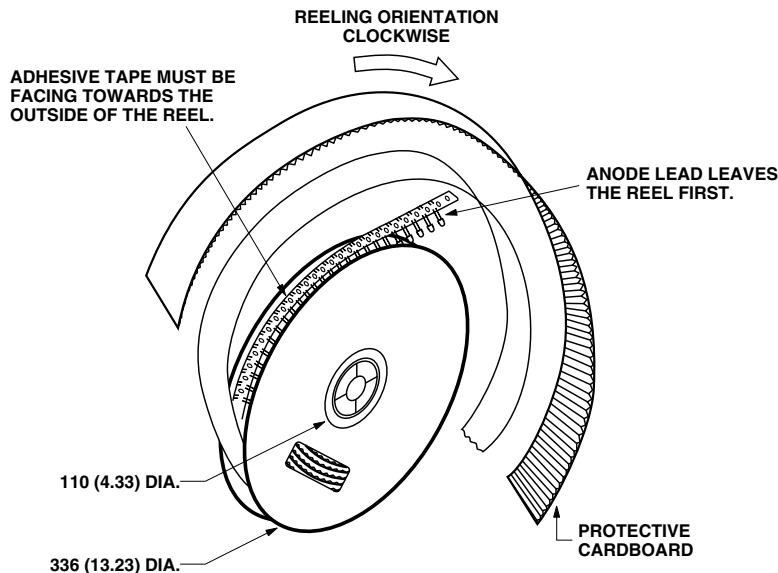


DIMENSIONS IN MILLIMETERS (INCHES).

## Recommended Assembly Condition

- A single-sided phenolic printed circuit board (PCB) is preferred. Double-sided PCB and other materials may cause greater lead stress. Recommended through-hole diameter is 0.93 to 1.03 mm. Leadlength below the PCB should be 1.5 to 2.0 mm, and the clinching angle (angle between the lead and PCB) should be  $30 \pm 10$  degrees.
- If SMT devices and an adhesive are used on the same pcb as these lamps, the adhesive should be cured before the lamps are auto-inserted. If curing must be done after lamp insertion, the cure temperature and time should not exceed  $140^{\circ}\text{C}$ , 100 seconds. This is the temperature of the surface normal to the IR source.

### TAPE & REEL (for option #002 only)



DIMENSIONS IN MILLIMETERS (INCHES).