

# Surface Mount Lensed Chip LEDs

## Technical Data

**HSMG-L640**  
**HSMH-L640**  
**HSMS-L640**

### Features

- **Compatible with IR Solder Process**
- **Narrow Viewing Angle**
- **Small 3.0 x 1.5 mm Package**
- **Available in 8 mm Tape on 7" (180 mm) Diameter Reels**

### Applications

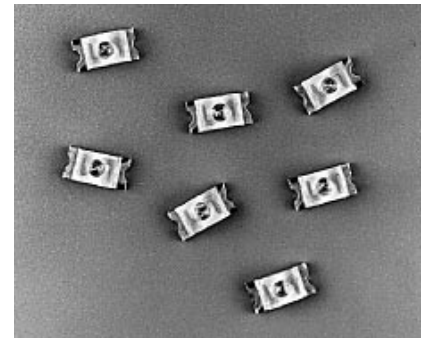
- **Keypad Backlighting**
- **Light Piping**
- **LCD Backlighting**
- **Front Panel Indicator**

### Description

The HSMx-L640 is a Chip LED with an integrated lens. The lens concentrates the emitted light into a narrow viewing angle, which has the effect of doubling the on-axis intensity. These LEDs are optimum for light piping, backlighting buttons and switches and applications, where as much flux as possible is required on axis.

The available colors are 571 nm Green, 626 nm Red, and 639 nm Deep Red.

The 3.0 x 1.5 mm package closely matches industry standard sizes for chip capacitors which



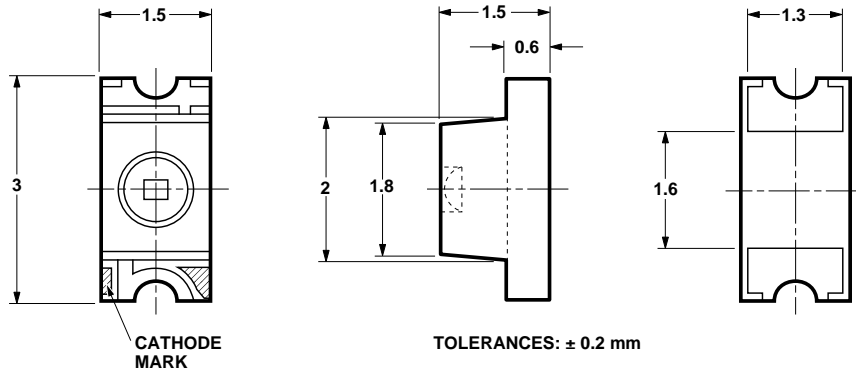
makes it compatible with automated pick and place equipment.

This package is compatible with IR and convective reflow soldering processes.

### Device Selection Guide

<b>AlGaAs Red 639 nm</b>	<b>High Efficiency Red 626 nm</b>	<b>GaP Green 571 nm</b>
HSMH-L640	HSMS-L640	HSMG-L640

## Package Dimensions



### Note:

1. Dimensions are in millimeters.

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

Parameter	Value	Units
DC Forward Current <sup>[3][4][5]</sup>	25	mA
Power Dissipation	65	mW
Reverse Current $V_R = 5\text{ V}$	100	$\mu\text{A}$
Operating Temperature Range	-30V to +85	$^\circ\text{C}$
Storage Temperature Range <sup>[6]</sup>	-40 to +100	$^\circ\text{C}$

### Notes:

3. Derate linearly as shown in Figure 4.
4. Drive currents between 1 mA and 25 mA are recommended for best long term performance.
5. Operating at currents below 1 mA is not recommended. Please contact your Agilent representative for further information.
6. Maximum temperature for tape and reel packaging is  $60^\circ\text{C}$ .

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

Part Number	Color	Luminous Intensity $I_V$ (mcd) @ $I_F 20\text{ mA}$ <sup>[7]</sup>		Peak Wavelength $\lambda_{\text{peak}}$ (nm) Typ.	Color, Dominant Wavelength $\lambda_d$ <sup>[8]</sup> (nm) Typ.	Viewing Angle $2\theta^{1/2}$ Degrees <sup>[9]</sup> Typ.
		Min.	Typ.			
HSMH-L640	DH AlGaAs Red	10	32	650	639	70
HSMS-L640	High Efficiency Red	2.5	10	639	626	70
HSMG-L640	Green	10	18	570	572	70

### Notes:

7. The luminous intensity,  $I_V$ , is measured at the peak of the spatial radiation pattern.
8. The dominant wavelength,  $\lambda_d$ , is derived from the CIE Chromaticity diagram, and represents the perceived color of the device.
9.  $\theta^{1/2}$  is the off-axis angle where the luminous intensity is  $1/2$  the peak intensity.

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

Part Number	Color	Forward Voltage $V_F$ (Volts) @ $I_F = 20\text{ mA}$		Reverse Breakdown $V_R$ (Volts) @ $I_R = 100\ \mu\text{A}$ Min.	Capacitance $C$ (pF) $V_F = 0$ $f = 1\text{ MHz}$ Typ.	Thermal Resistance $R_{\theta J-PIN}$ ( $^\circ\text{C}/\text{W}$ )
		Typ.	Max.			
HSMH-L640	DH AlGaAs Red	1.8	2.2	5	4.5	475
HSMS-L640	High Efficiency Red	1.9	2.6	5	4.0	475
HSMG-L640	Green	2.2	2.6	5	8.0	475

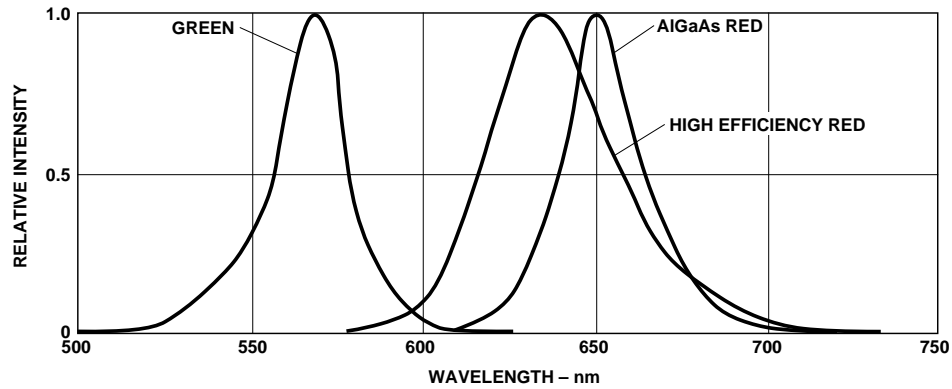


Figure 1. Relative Intensity vs. Wavelength.

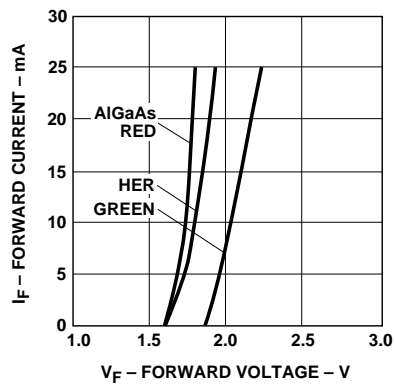


Figure 2. Forward Current vs. Forward Voltage.

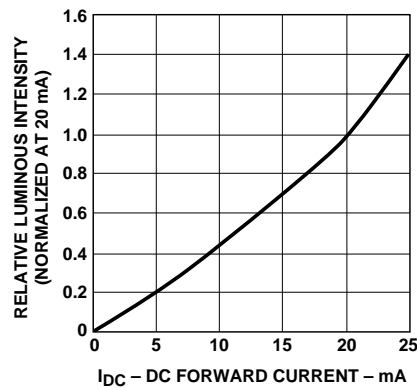


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

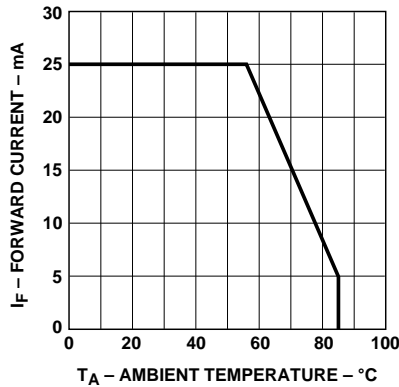


Figure 4. Maximum DC Current vs. Ambient Temperature.

### Luminous Intensity Bin Limits<sup>[10]</sup>

Bin ID	Minimum (mcd)	Maximum (mcd)
A	0.11	0.18
B	0.18	0.29
C	0.29	0.45
D	0.45	0.72
E	0.72	1.10
F	1.10	1.80
G	1.80	2.80
H	2.80	4.50
J	4.50	7.20
K	7.20	11.20
L	11.20	18.00
M	18.00	28.50
N	28.50	45.00
P	45.00	71.50
Q	71.50	112.50
R	112.50	180.00
S	180.00	285.00
T	285.00	450.00
U	450.00	715.00
V	715.00	1125.00
W	1125.00	1800.00
X	1800.00	2850.00
Y	2850.00	4500.00

Tolerance:  $\pm 15\%$

**Note:**

10. Bin categories are established for classification of products. Products may not be available in all bin categories. Please contact your Agilent representative for information of currently available bins.

### Green Color Bins<sup>[11]</sup>

Bin ID	Minimum (nm)	Maximum (nm)
A	561.5	564.5
B	564.5	567.5
C	567.5	570.5
D	570.5	573.5
E	573.5	576.5

Tolerance:  $\pm 0.5$  nm

**Note:**

11. Bin categories are established for classification of products. Products may not be available in all bin categories. Please contact your Agilent representative for information of currently available bins.

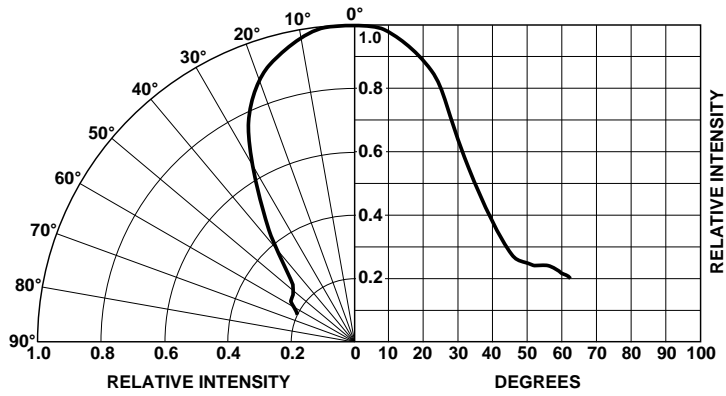


Figure 5. Intensity vs. Angle.

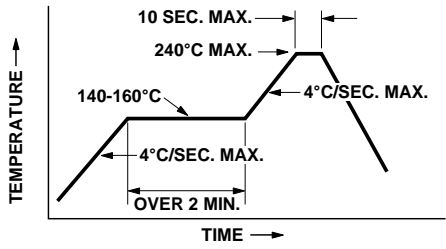


Figure 6. Recommended SMT Reflow Soldering Profile.

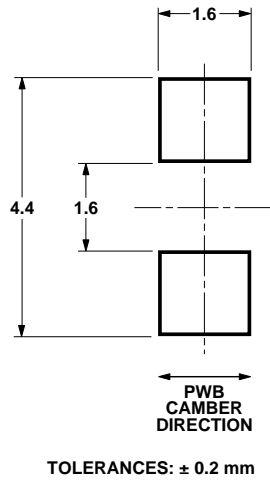


Figure 7. Recommended Solder Patterns.

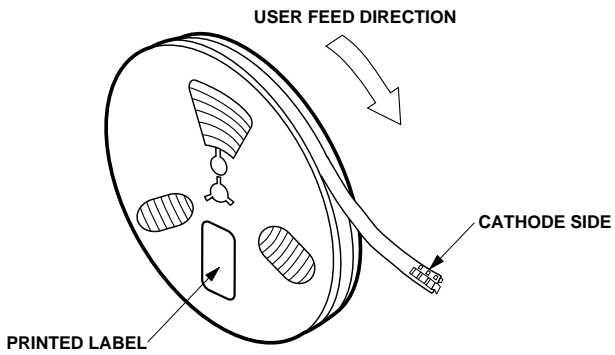


Figure 8. Reeling Orientation.

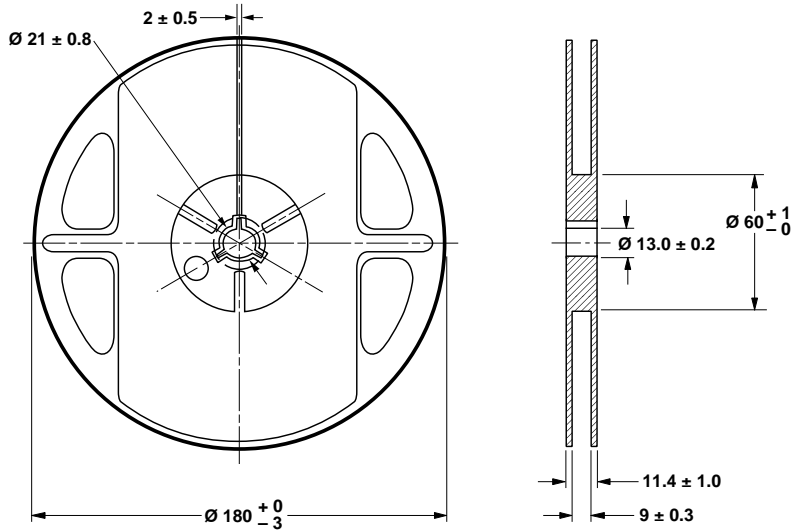


Figure 9. Reel Dimensions.

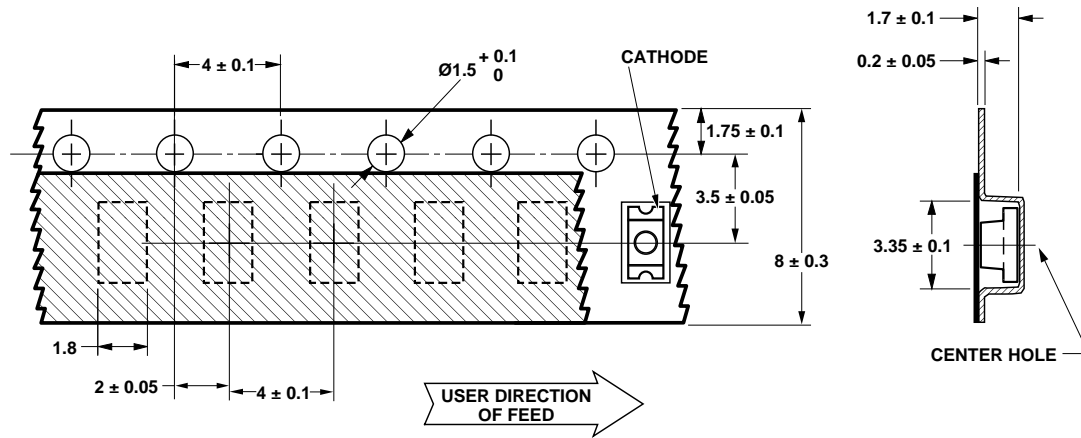


Figure 10. Tape Dimensions.

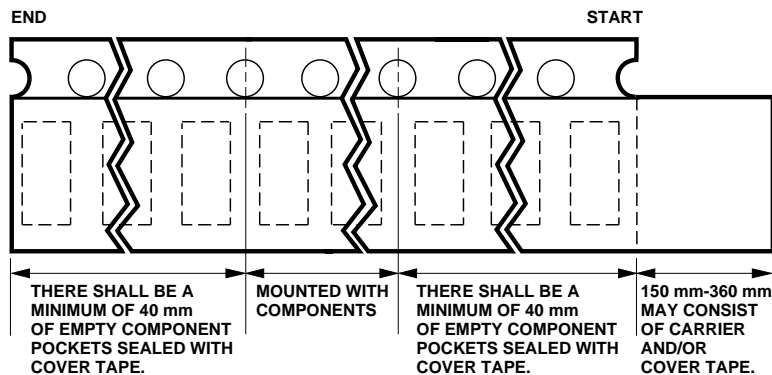


Figure 11. Tape Leader and Trailer Dimensions.

Storage Condition: 5 to 30° C @ 60% RH max.

Baking is required under the condition:

- a) the blue silica gel indicator becoming white/transparent color
- b) the pack has been opened for more than 1 week

Baking recommended condition: 60 +/- 5° C for 20 hours.

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