

Surface Mount Lensed Chip LEDs

Technical Data

HSMD-L640
HSMG-L640
HSMH-L640
HSMS-L640
HSMY-L640

Features

- **Five Colors Available**
- **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**

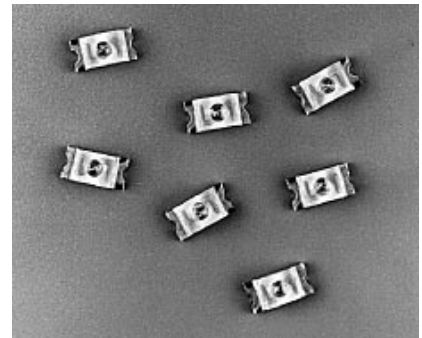
Applications

- **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, 586 nm Yellow, 604 nm Orange, 626 nm Red, and 639 nm Deep Red.



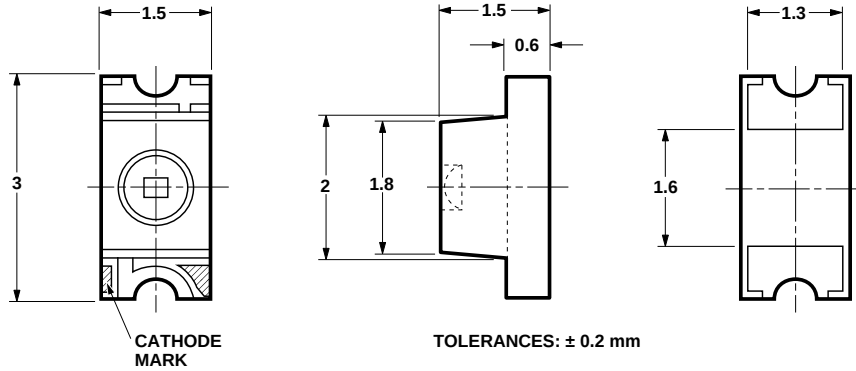
The 3.0 x 1.5 mm package closely matches industry standard sizes for chip capacitors which makes it compatible with automated pick and place equipment.

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

Device Selection Guide

AlGaAs Red 639 nm	High Efficiency Red 626 nm	GaP Orange 604 nm	GaP Yellow 586 nm	GaP Green 571 nm
HSMH-L640	HSMS-L640	HSMD-L640	HSMY-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 ^{[3][4][5]}	25	mA
Power Dissipation	65	mW
Reverse Current $V_R = 5$ V	100	μA
Operating Temperature Range	-30V to +85	$^\circ\text{C}$
Storage Temperature Range ^[6]	-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°C .

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

Part Number	Color	Luminous Intensity I_V (mcd) @ I_F 20 mA ^[7]		Peak Wavelength λ_{peak} (nm) Typ.	Color, Dominant Wavelength λ_d ^[8] (nm) Typ.	Viewing Angle $2\theta^{1/2}$ Degrees ^[9] Typ.
		Min.	Typ.			
HSMH-L640	DH AlGaAs Red	10	32	650	639	70
HSMS-L640	High Efficiency Red	2.5	10	639	626	70
HSMD-L640	Orange	2.5	10	606	604	70
HSMY-L640	Yellow	2.5	10	589	586	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, λ_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) @ $I_R = 100\text{ }\mu\text{A}$ Min.	Capacitance C (pF) $V_F = 0$ $f = 1\text{ MHz}$ Typ.	Thermal Resistance $R_{\theta J-PIN}$ ($^\circ\text{C/W}$)
		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
HSMD-L640	Orange	2.1	2.6	5	4.0	475
HSMY-L640	Yellow	2.1	2.6	5	3.0	475
HSMG-L640	Green	2.2	2.6	5	8.0	475

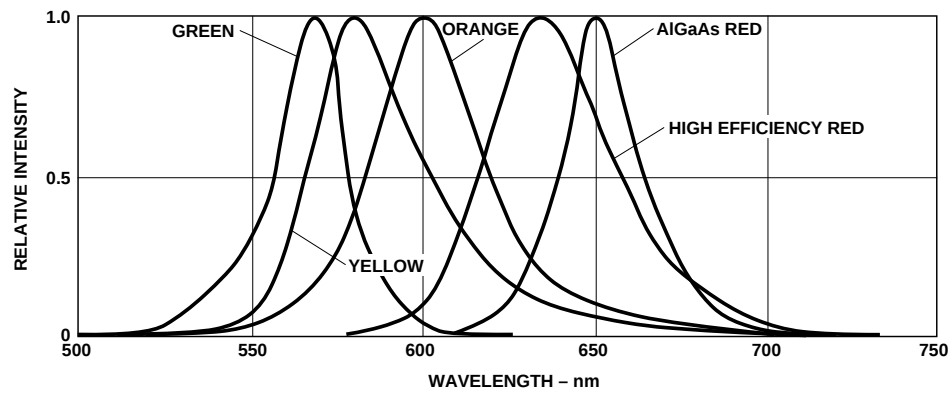


Figure 1. Relative Intensity vs. Wavelength.

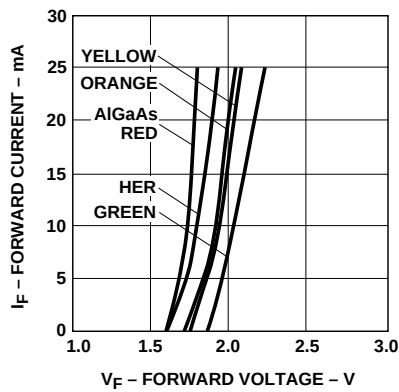


Figure 2. Forward Current vs. Forward Voltage.

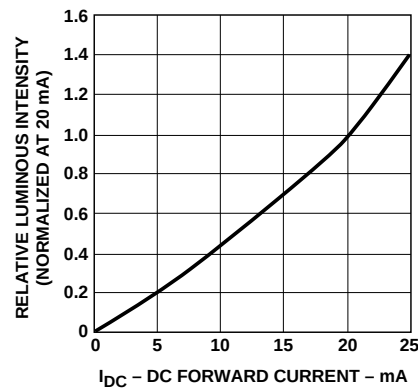


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

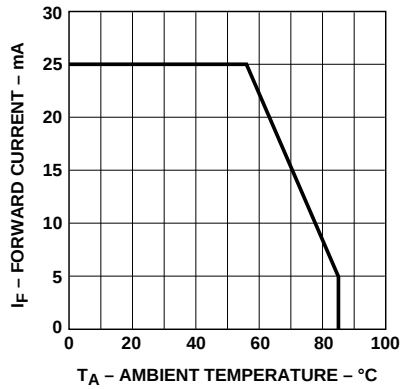


Figure 4. Maximum DC Current vs. Ambient Temperature.

Luminous Intensity Bin Limits^[10]

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^[11]

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: ± 0.5 nm

Yellow Color Bins^[11]

Bin ID	Minimum (nm)	Maximum (nm)
A	582.0	584.5
B	584.5	587.0
C	587.0	589.5
D	589.5	592.0
E	592.0	594.5
F	594.5	597.0

Tolerance: ± 0.5 nm

Orange Color Bins^[11]

Bin ID	Minimum (nm)	Maximum (nm)
A	597.0	600.0
B	600.0	603.0
C	603.0	606.0
D	606.0	609.0
E	609.0	612.0
F	612.0	615.0

Tolerance: ± 1 nm

Notes:

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.

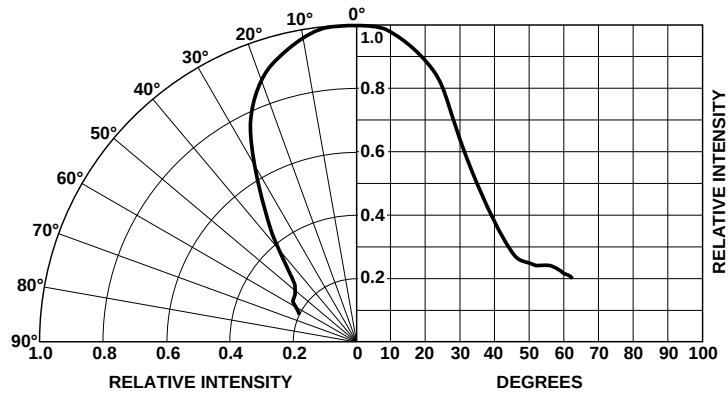


Figure 5. Intensity vs. Angle.

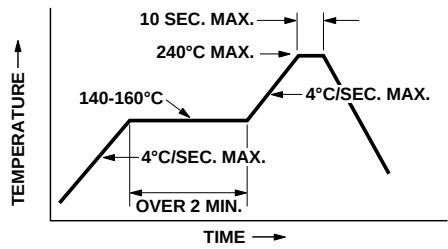


Figure 6. Recommended SMT Reflow Soldering Profile.

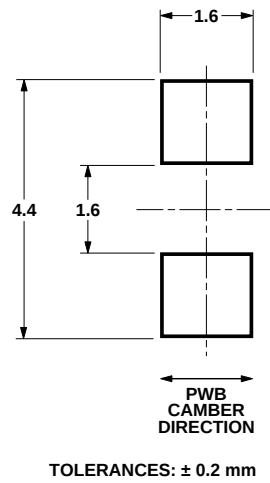


Figure 7. Recommended Solder Patterns.

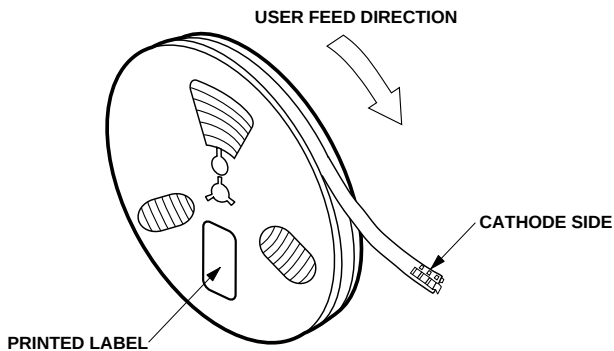


Figure 8. Reeling Orientation.

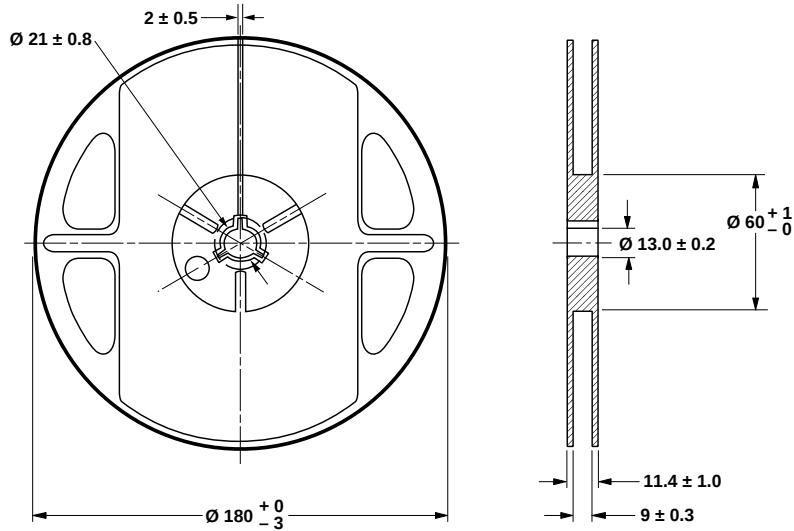


Figure 9. Reel Dimensions.

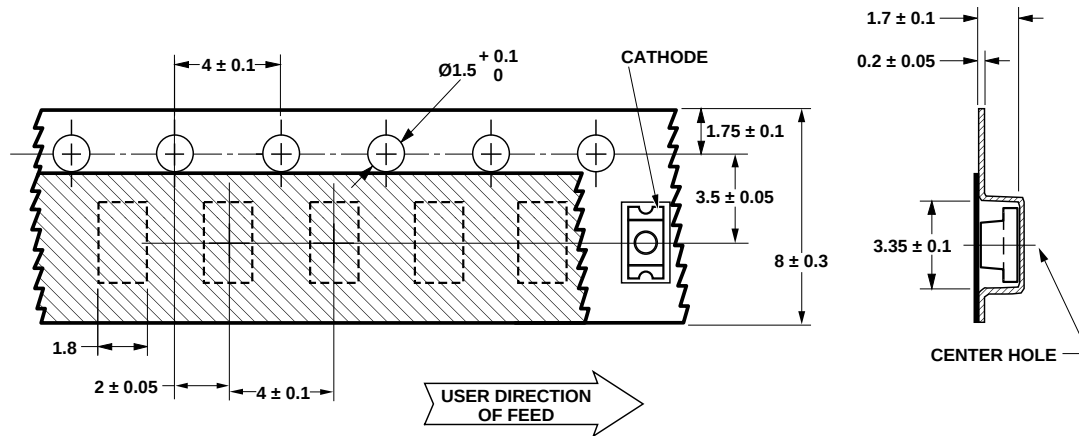


Figure 10. Tape Dimensions.

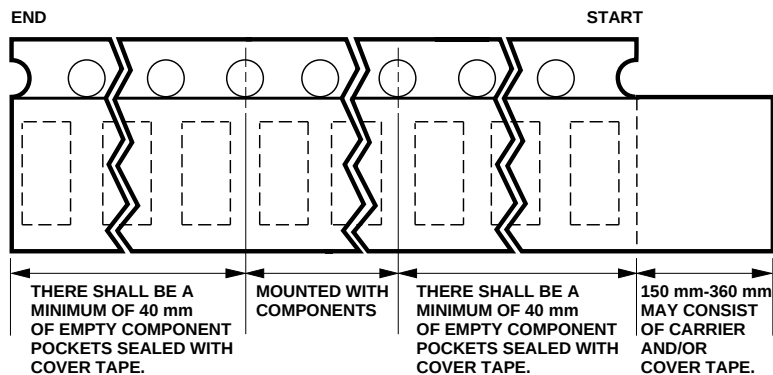


Figure 11. Tape Leader and Trailer Dimensions.

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

Baking is required under the
condition:

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

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

www.agilent.com/semiconductors

For product information and a complete list of distributors, please go to our web site.

For technical assistance call:

Americas/Canada: +1 (800) 235-0312 or
(408) 654-8675

Europe: +49 (0) 6441 92460

China: 10800 650 0017

Hong Kong: (+65) 6271 2451

India, Australia, New Zealand: (+65) 6271 2394

Japan: (+81 3) 3335-8152(Domestic/International), or 0120-61-1280(Domestic Only)

Korea: (+65) 6271 2194

Malaysia, Singapore: (+65) 6271 2054

Taiwan: (+65) 6271 2654

Data subject to change.

Copyright © 2002 Agilent Technologies, Inc.

Obsoletes 5988-4448EN

May 3, 2002

5988-6273EN