Agilent Technologies

Surface Mount Chip LEDs

Technical Data

HSMx-C650
HSMx-C670

Features

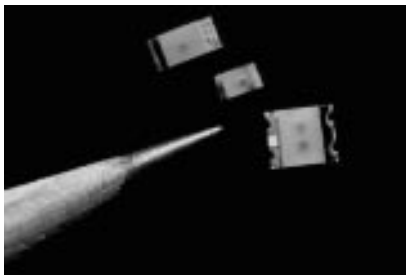
- **Small Size**
- **Industry Standard Footprint**
- **Low Profile**
- **Tinted, Diffused Optics**
- **Compatible with IR Solder Process**
- **Five Colors Available**
- **Available in 8 mm Tape on 7" (178 mm) Diameter Reels**

Applications

- **Push-Button Backlighting**
- **LCD Backlighting**
- **Symbol Backlighting**
- **Front Panel Indicator**

Description

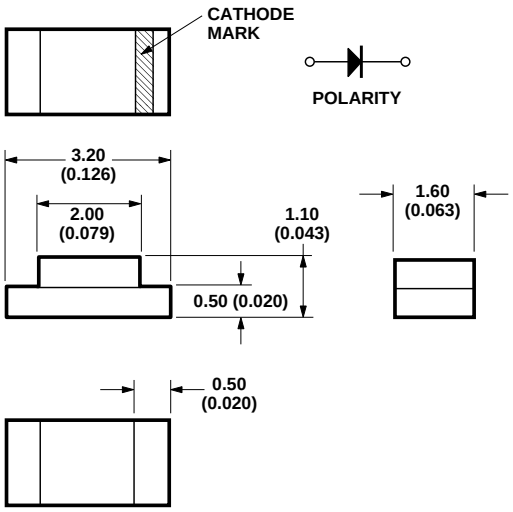
These LEDs are designed in an industry standard package for ease of handling and use. Five different LED colors are available in two compact, low profile packages. The 3.2 x 1.6 mm is an excellent all around package, and the small 2.0 x 1.25 mm package is designed for applications where space is limited. The LEDs have tinted diffused optics.



The small size, low 1.1 mm profile and wide viewing angle make these LEDs excellent for backlighting applications and front panel illumination. They are compatible with IR reflow soldering processes.

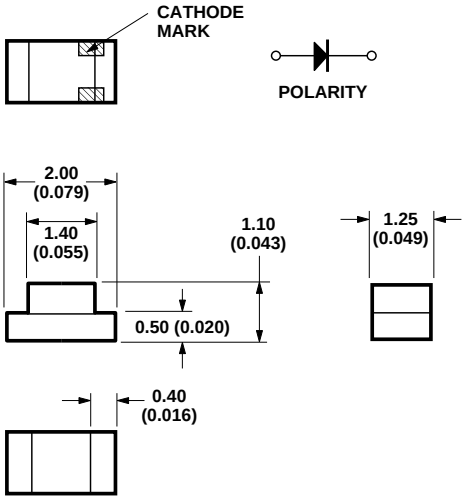
Device Selection Guide

Footprint (mm)	DH AlGaAs Red	High Efficiency Red	Orange	Yellow	Green
3.20 x 1.60	HSMH-C650	HSMS-C650	HSMD-C650	HSMY-C650	HSMG-C650
2.00 x 1.25	HSMH-C670	HSMS-C670	HSMD-C670	HSMY-C670	HSMG-C670



HSMX-C650 Series

[1206]



HSMX-C670 Series

[805]

Absolute Maximum Ratings at T_A = 25°C

Parameter	HSMX-C650	HSMX-C670	Units
DC Forward Current[1]	25	20	mA
Power Dissipation	65	50	mW
Reverse Voltage (I_R = 100 μA)	5	5	V
LED Junction Temperature	95	95	°C
Operating Temperature Range	-25 to +80	-25 to +80	°C
Storage Temperature Range	-30 to +85	-30 to +85	°C
Soldering Temperature	See SMT reflow soldering profile, Figure 6		

Notes:
1. Derate linearly as shown in Figure 4 for temperatures above 25°C.

Optical Characteristics at T_A = 25°C

Part Number	Color	Luminous Intensity I_V (mcd) @ I_F 20 mA[1] Min.	Typ.	Peak Wavelength λ_{peak} (nm) Typ.	Color, Dominant Wavelength λ_d[2] (nm) Typ.	Viewing Angle 2 $\theta_{1/2}$ Degrees[3] Typ.
HSMH-C650 HSMH-C670	DH AlGaAs Red	6.3	16.0	650	639	155
HSMS-C650 HSMS-C670	High Efficiency Red	1.6	5.0	639	626	155
HSMD-C650 HSMD-C670	Orange	1.6	4.0	606	604	155
HSMY-C650 HSMY-C670	Yellow	1.6	5.0	584	586	155
HSMG-C650 HSMG-C670	Green	4.0	9.0	570	572	155

Notes:
1. The luminous intensity, I_V, is measured at the peak of the spatial radiation pattern which may not be aligned with the the lamp package.
2. The dominant wavelength, λ_d, is derived from the CIE Chromaticity Diagram and represents the perceived color of the device.
3. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.
4. Chip LEDs are supplied in 8 mm embossed tape on 178 mm (7 in.) diameter reels, with 3000 devices per reel. Minimum order quantity and order incremenets are in quantity of reels only.

Electrical Characteristics at $T_A = 25°C$

Part Number	Color	Forward Voltage V_F (Volts) @ $I_F = 20$ mA Typ.	Forward Voltage V_F (Volts) @ $I_F = 20$ mA Max.	Reverse Breakdown V_R (Volts) @ $I_R = 100$ μA Min.	Capacitance C (pF) $V_F = 0$, f = 1 MHz Typ.	Thermal Resistance $R\theta_{J\text{-}PIN}$ (°C/W)
HSMH-C650 HSMH-C670	DH AlGaAs Red	1.8	2.2	5	46	460 300
HSMS-C650 HSMS-C670	High Efficiency Red	1.9	2.6	5	4.0	400 250
HSMD-C650 HSMD-C670	Orange	2.1	2.6	5	4.0	400 250
HSMY-C650 HSMY-C670	Yellow	2.1	2.6	5	3.0	400 250
HSMG-C650 HSMG-C670	Green	2.2	2.6	5	8.0	400 250

	Green Color Bins[1]	
	Dom. Wavelength (nm)	
Bin ID	Min.	Max.
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.

	Orange Color Bins[1]	
	Dom. Wavelength (nm)	
Bin ID	Min.	Max.
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.

	Yellow/Amber Color Bins[1]	
	Dom. Wavelength (nm)	
Bin ID	Min.	Max.
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.

Note:

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

Light Intensity (Iv) Bin Limits[1]

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

Tolerance: ±15%.

Note:

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

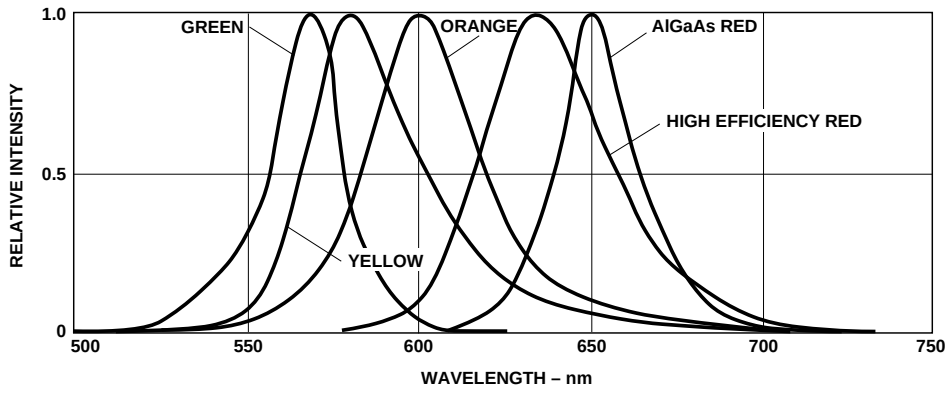


Figure 1. Relative Intensity vs. Wavelength.

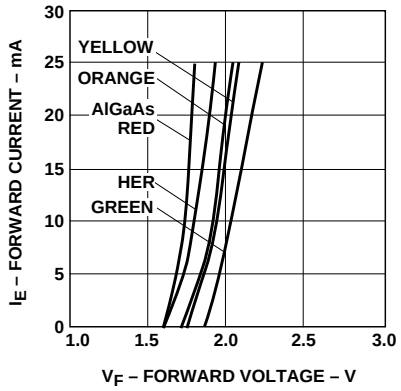


Figure 2. Forward Current vs. Forward Voltage.

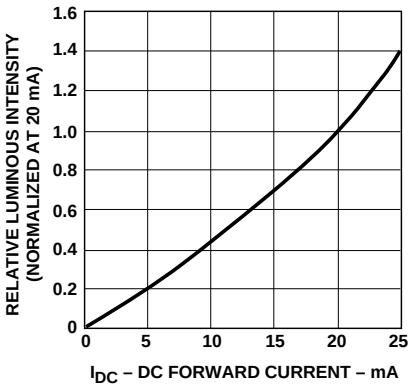


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

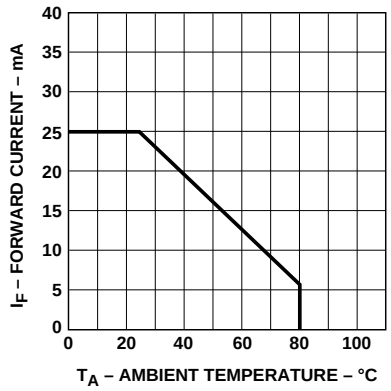


Figure 4. Maximum DC Current vs. Ambient Temperature.

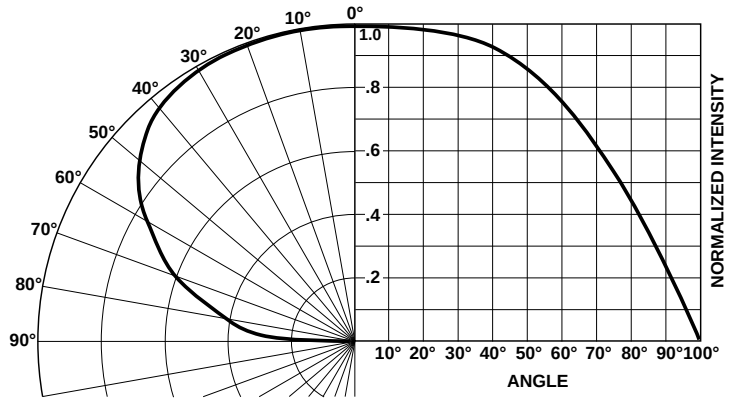


Figure 5. Intensity vs. Angle.

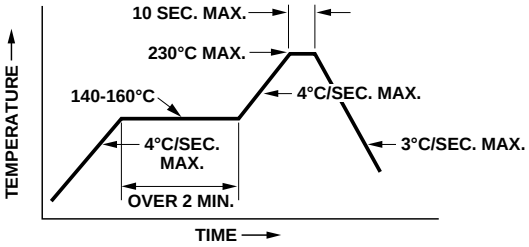
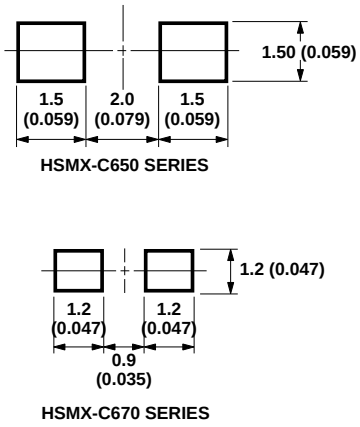


Figure 6. Recommended SMT Reflow Soldering Profile.



NOTE:
ALL DIMENSIONS IN MILLIMETERS (INCHES).

Figure 7. Recommended Solder Patterns.

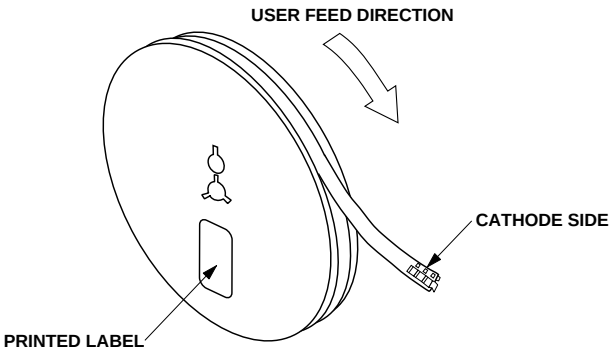


Figure 8. Reeling Orientation.

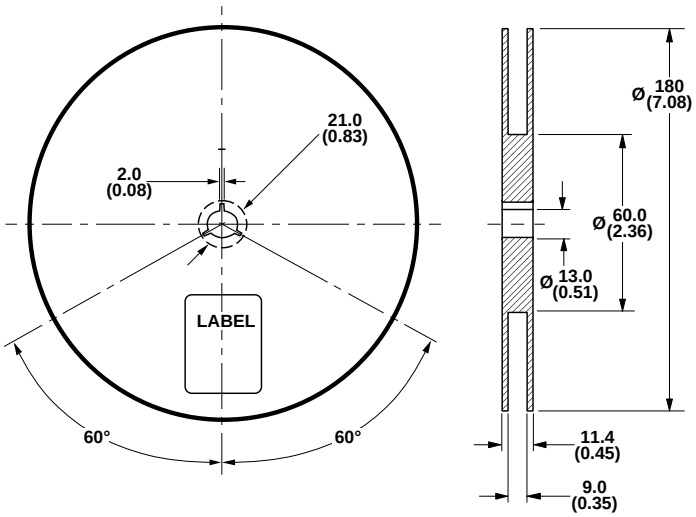


Figure 9. Reel Dimensions.

NOTE:
ALL DIMENSIONS IN MILLIMETERS (INCHES).

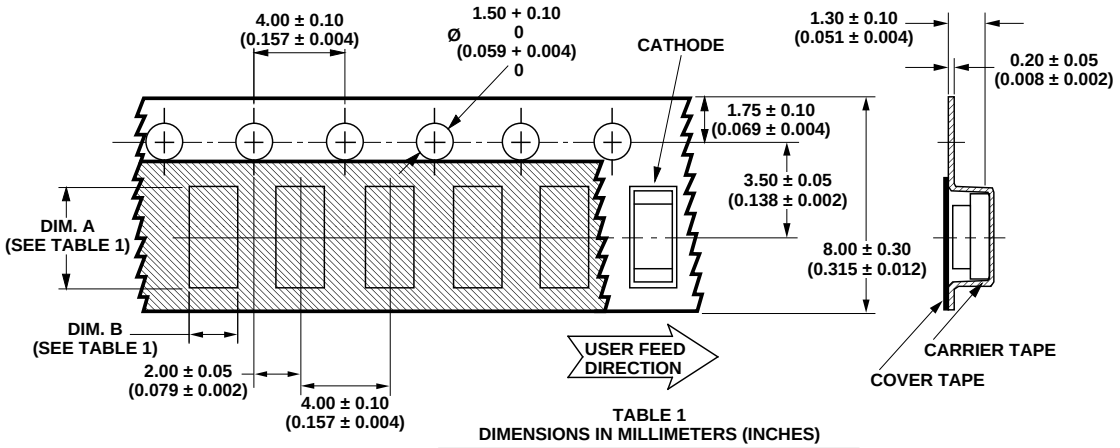


TABLE 1
DIMENSIONS IN MILLIMETERS (INCHES)

PART NUMBER	DIM. A ± 0.10 (0.004)	DIM. B ± 0.10 (0.004)
HSMx-C650 SERIES	3.75 (0.148)	2.10 (0.083)
HSMx-C670 SERIES	2.40 (0.094)	1.60 (0.064)

Figure 10. Tape Dimensions.

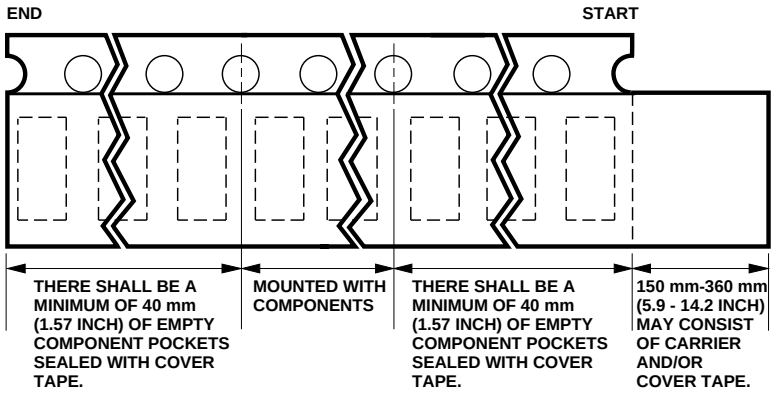


Figure 11. Tape Leader and Trailer Dimensions.

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.

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 5988-2709EN
July 10, 2002
5988-7312EN