HEWLETT PACKARD

Right Angle Surface Mount Flip Chip and Chip LEDs

Technical Data

HSMx-R661 Series
HSMx-R761 Series
HSMx-C660 Series

Features

- **Right Angle Mounting**
- **Compatible with SMT Reflow and Through-the-Wave Soldering Processes**
- **Available in a Wide Variety of Colors**
- **Available in 8 mm Tape on 178 mm (7") or 330 mm (13") Diameter Reels**

Applications

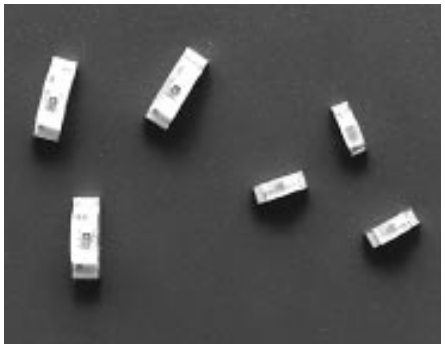
- **LCD Backlighting**
- **Keypad Side/Backlighting**
- **Light Piping**
- **Right Angle Indicator**

Description

The HSMx-C660 and HSMx-Rx61 series of chip-type LEDs are designed to illuminate at a right angle to the direction of mounting. When mounted on a PC board, these devices will emit light in a direction parallel to the board.

The small 3.0 x 2.0 mm footprint of the HSMx-C660 is designed for applications where space is limited. These devices are available in five colors and use untinted, non-diffused optics.

The HSMx-Rx61 is a low profile, right angle surface mount flip chip LED. The small 2.1 x 1.3 mm footprint and low profile 0.7 mm height make this part ideal for illuminating thin light guides for LCD backlighting, as well as for sidelighting applications where space is at a premium. The HSMx-Rx61 is available in four colors.

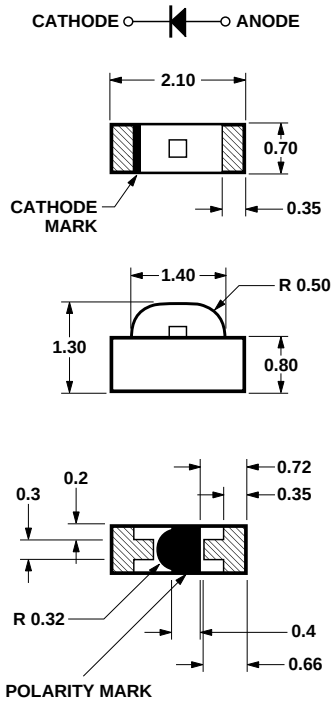


The HSMx-Rx61 use an internal flip chip construction that eliminates the need for a wire bond between the LED chip and the substrate. Consequently, product reliability is significantly improved.

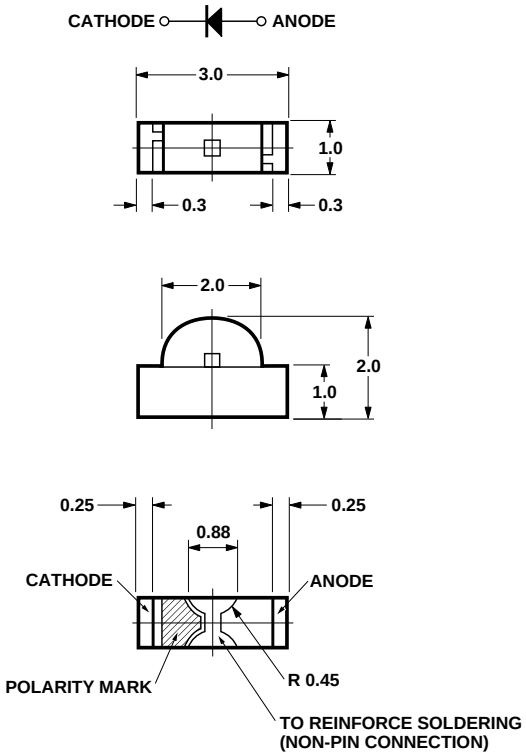
Both the HSMx-C660 and HSMx-Rx61 series of parts are compatible with IR / convective reflow and through the wave soldering processes.

Footprint (mm)	Parts per Reel	DH AS AlGaAs	High Efficiency Red	Orange	Yellow	Green
2.1 x 1.3 x 0.7	4000		HSMS-R661	HSMD-R661	HSMY-R661	HSMG-R661
2.1 x 1.3 x 0.7	18000		HSMS-R761	HSMD-R761	HSMY-R761	HSMG-R761
3.0 x 2.0 x 1.0	3000	HSMH-C660	HSMS-C660	HSMD-C660	HSMY-C660	HSMG-C660

Package Dimensions



HSMx-Rx61



HSMx-C660

Absolute Maximum Ratings at T_A = 25°C

Parameter	HSMx-Rx61	HSMx-C660	Units
DC Forward Current[1]	20	25	mA
Power Dissipation	50	65	mW
Reverse Voltage (I_R = 100 µA)	5	5	V
Operating Temperature Range	-40 to +85	-30 to +85	°C
Storage Temperature Range[2]	-40 to +85	-40 to +100	°C

Notes:
1. Derate linearly as shown on Figure 4.
2. Maximum temperature for the tape and reel packaging is 60°C.

Optical Characteristics at T_A = 25°C

Part No.	Color	Luminous Intensity I_v (mcd) @ I_F = 20 mA Min.	Luminous Intensity I_v (mcd) @ I_F = 20 mA Typ.	Peak Wavelength λ_{peak} (nm) Typ.	Color Dominant Wavelength λ_d[1] (nm) Typ.	Viewing Angle $2\theta_{1/2}$ (degrees)[2] Typ.	Luminous Efficacy η_v (lm/W)
HSMH-C660	DH AlGaAs Red	6.3	16.0	650	639	155	80
HSMS-R661	High Efficiency Red					165	
HSMS-R761		1.6	5.0	639	626	165	145
HSMS-C660						155	
HSMD-R661	Orange	1.6	4.0			165	
HSMD-R761		1.6	4.0	606	604	165	380
HSMD-C660		1.6	5.0			155	
HSMY-R661	Yellow					165	
HSMY-R761		1.6	5.0	589	586	165	500
HSMY-C660						155	
HSMG-R661	Green					165	
HSMG-R761		4.0	9.0	566	571	165	595
HSMG-C660						155	

Notes:
1. The dominant wavelength, λ_d, is derived from the CIE Chromaticity Diagram and represents the perceived color of the device.
2. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is $^1/_2$ the peak intensity.

Electrical Characteristics at T_A = 25°C

Part No.	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-C660	DH AlGaAs Red	1.8	2.2	5	4.5	300
HSMS-R661 HSMS-R761 HSMS-C660	High Efficiency Red	1.9	2.6	5	4.0	300
HSMD-R661 HSMD-R761 HSMD-C660	Orange	2.0	2.6	5	4.0	300
HSMY-R661 HSMY-R761 HSMY-C660	Yellow	2.1	2.6	5	3.0	300
HSMG-R661 HSMG-R761 HSMG-C660	Green	2.2	2.6	5	8.0	300

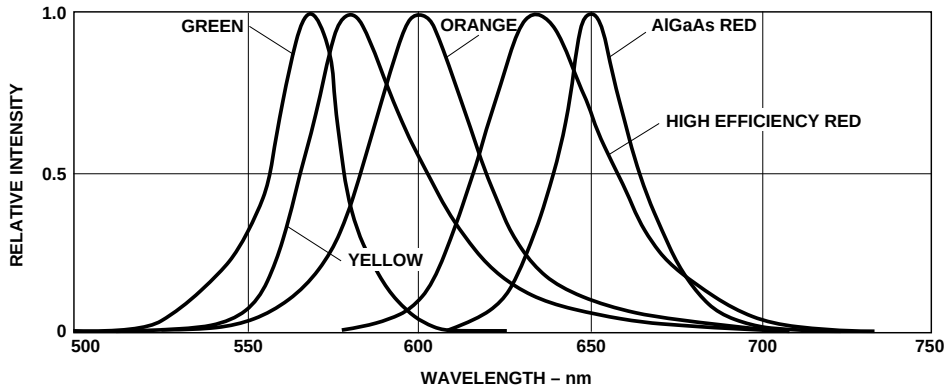


Figure 1. Relative Intensity vs. Wavelength.

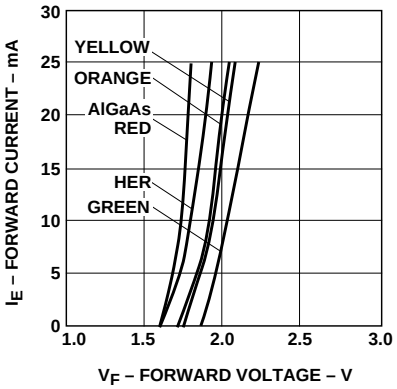


Figure 2. Forward Current vs. Forward Voltage.

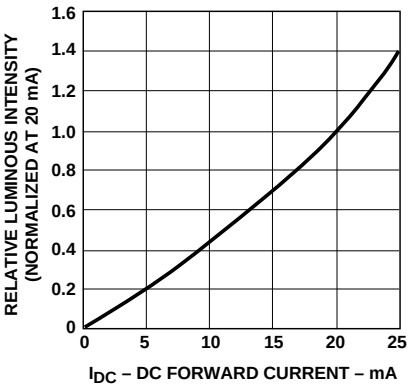


Figure 3. Relative Luminous Intensity vs. DC Forward Current.

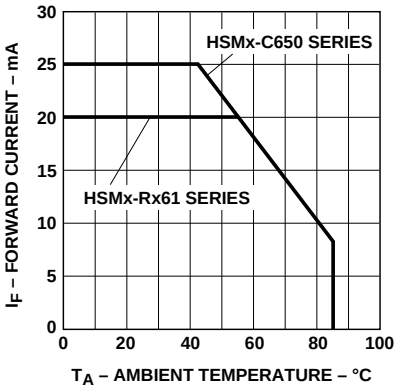


Figure 4. Maximum DC Current vs. Ambient Temperature.

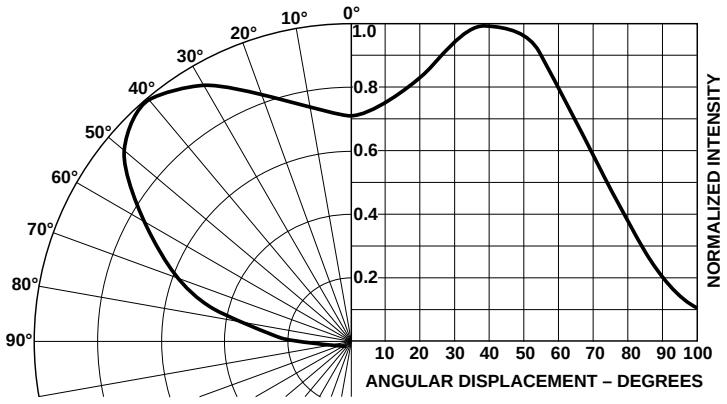


Figure 5. HSMx-C660 Intensity vs. Angle, Vertical Axis.

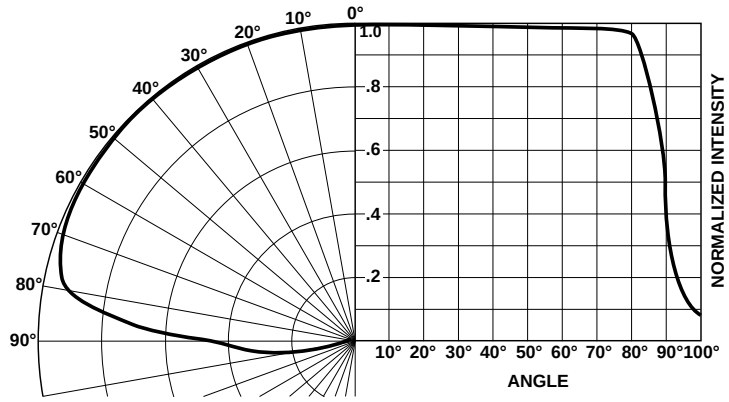


Figure 6. HSMx-Rx61 Intensity vs. Angle, Horizontal Axis.

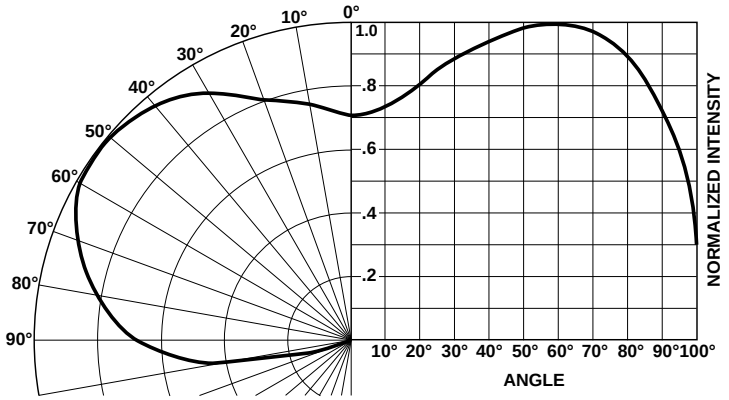


Figure 7. HSMx-Rx61 Intensity vs. Angle, Vertical Axis.

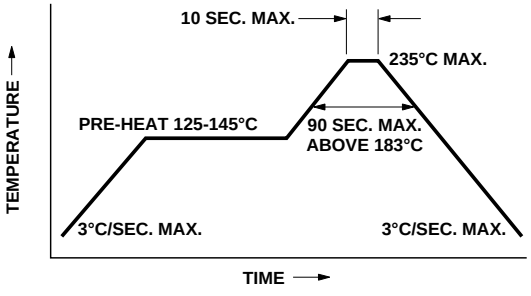


Figure 8. Recommended Reflow Soldering Profile.

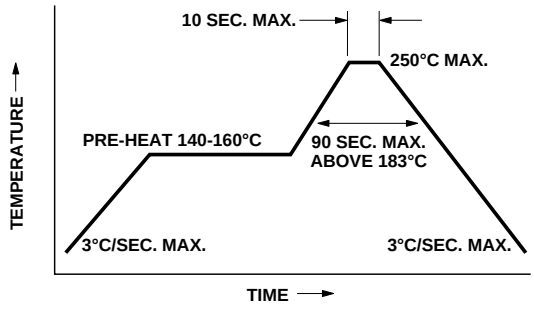
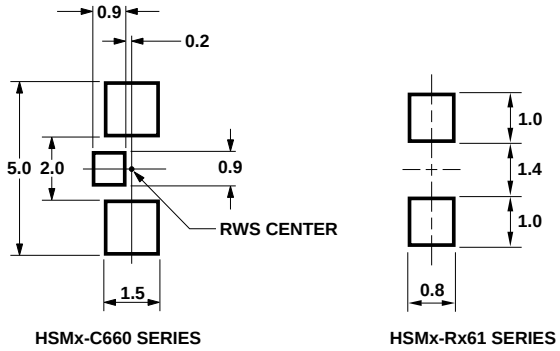


Figure 9. Recommended Wave Solder Profile.



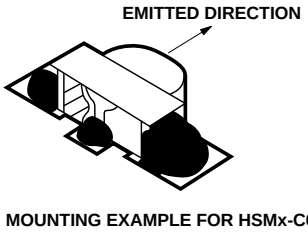


Figure 10. Recommended Solder Patterns.

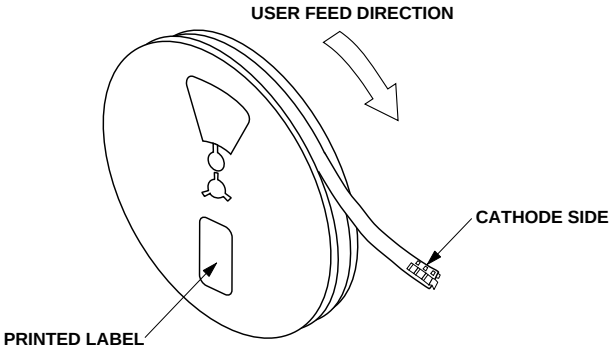


Figure 11. Reeling Orientation for the HSMx-C660. For the HSMx-Rx61, the printed label is on the opposite side of the reel.

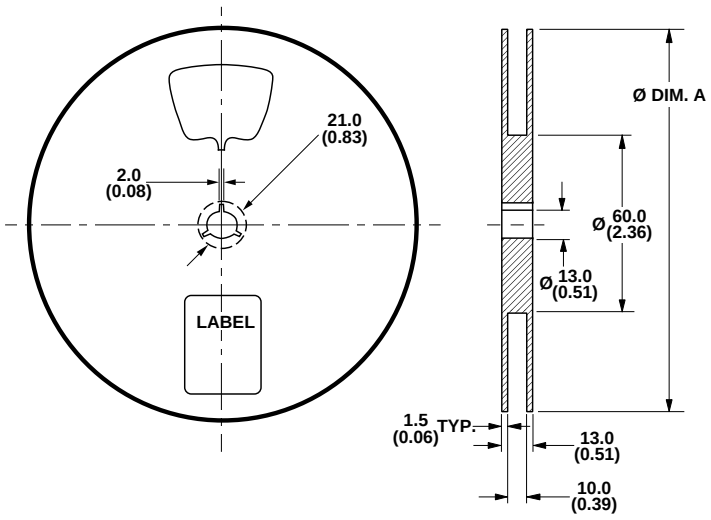
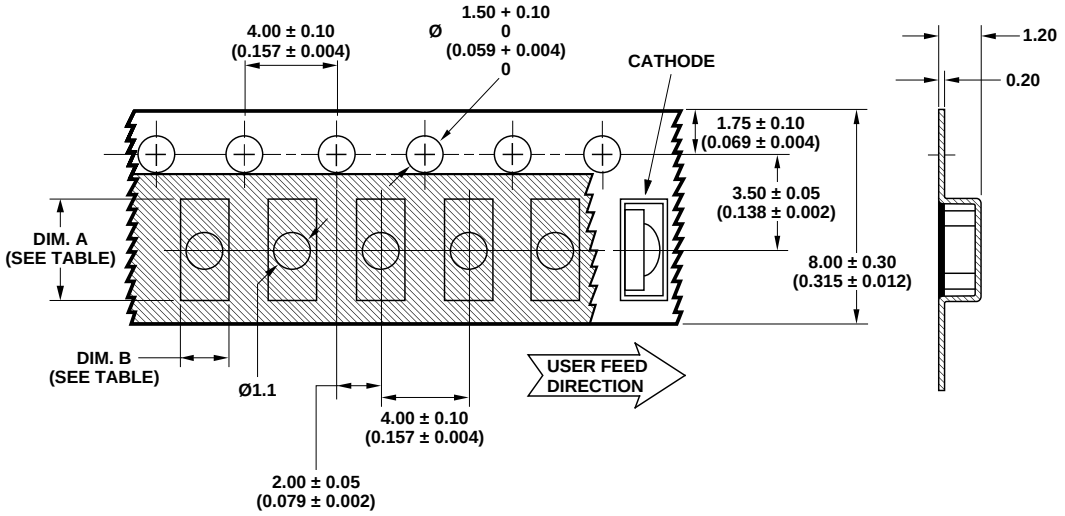


Figure 12. Reel Dimensions.

Package	DIM. A
HSMx-R761	330 mm (13")
HSMx-R661	178 mm (7")
HSMx-C660	178 mm (7")



Part Number	DIM. A ± 0.10 (0.004)	DIM. B ± 0.10 (0.004)
HSMx-RX61	2.26	1.47
HSMx-C660	3.35	2.30

Figure 13. Tape Dimensions.

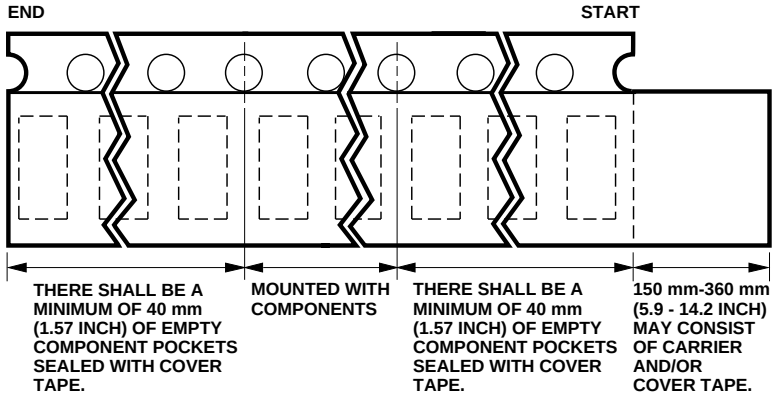


Figure 14. Tape Leader and Trailer Dimensions.

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Data subject to change.

Obsoletes 5968-1096E
5968-3198E (12/98)