Agilent HSMZ-C430-xxxxx High Performance Surface Mount LEDs

Data Sheet

Description

This evolutionary package design allows the optical designer flexibility to minimize the quantity of LEDs required without trading off the ultimate optical performance. This slim package can be easily coupled with secondary optics to efficiently distribute light, providing a total low-profile structure.

These LEDs have a very low package thermal resistance that efficiently dissipates heat out of the LED package to its surrounding, e.g., a circuit board.

High-efficiency LED dice are used in these LED components. AlInGaP (Aluminium Indium Gallium Phosphide) for Red, Red Orange, and Amber, is capable of producing high light output.

These solid-state surface mount LEDs are designed with a reflector cup and dome, which provide directional lighting. The reflector cup focuses the light more efficiently to provide a higher intensity compared to a nonreflector cup equivalent part.

All packages are compatible with IR soldering processes and are shipped in tape and reel with 2000 units per reel.

Features

- **Very low thermal impedance**
- **Smooth, consistent spatial radiation pattern**
- **Viewing angle: 30°**
- **3.2 x 2.8 mm footprint**
- **High luminous output**
- **Compatible with IR solder reflow**
- **Colors available: red, amber, and red orange**
- **Available in 8 mm tape on 7" (178 mm) diameter reels**
- **Tinted, nondiffused epoxy**

Applications

- **Variable message sign**
- **Traffic/rail signal**
- **Emergency/warning signs**
- **Decorative devices**
- **Backlighting**
- **Automotive**

Benefits

- **High package thermal dissipation capability**
- **Lens design capability to efficiently distribute light into desirable angle**
- **Small footprint to overcome space count**
- **High flux output in surface mount package**

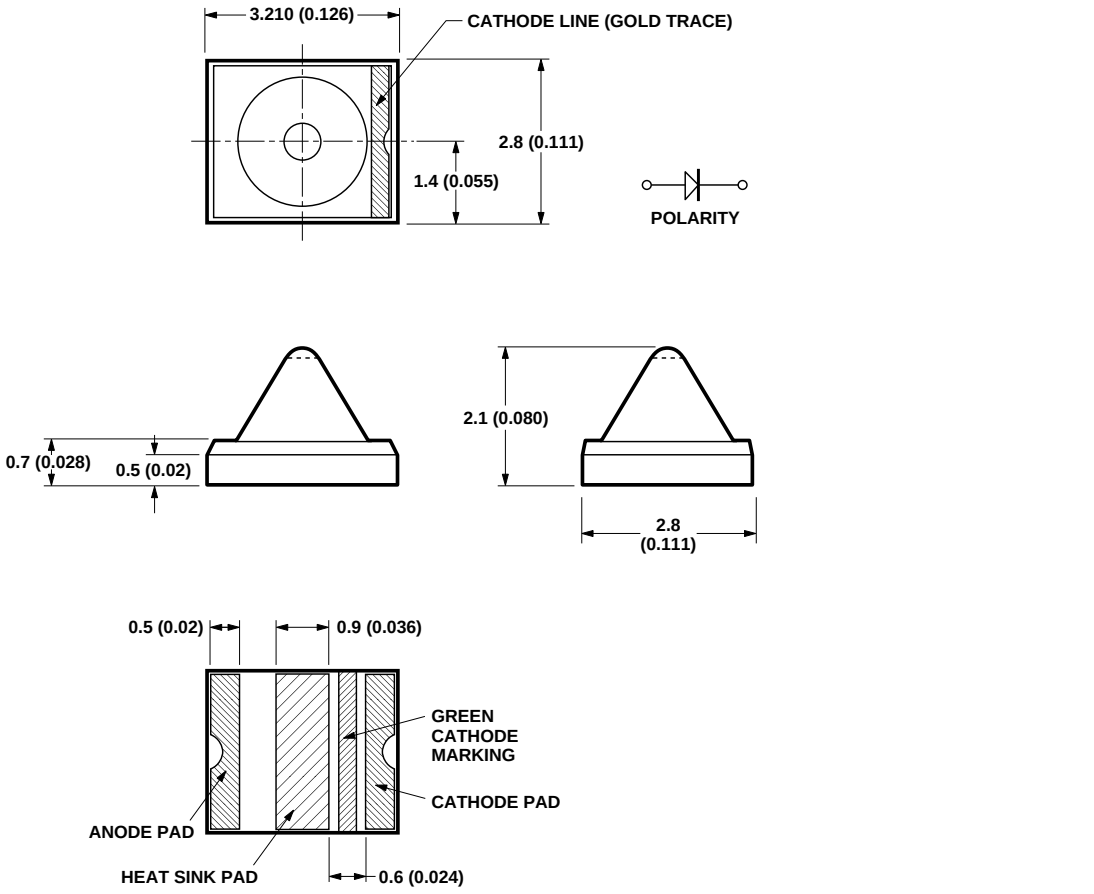
Device Selection Guide

	Total Flux ϕ_v (mlm)[1] @ 70 mA				
Part Number	**Min.**	**Typ.**	**Max.**	**Color**	**Parts per Reel**
HSMZ-C430-TW001	2100	3800	8300	TS AlInGaP Red	2000
HSMV-C430-UX001	2700	4500	10700	TS AlInGaP Red Orange	2000
HSMU-C430-SV001	1600	3100	6300	TS AlInGaP Amber	2000

Note:

1. ϕ_v is the total luminous flux output as measured with an integrating sphere after the device has stabilized.

Package Dimensions



NOTES:
1. ALL DIMENSIONS IN MILLIMETERS (INCHES).
2. TOLERANCE IS ± 0.1 mm (± 0.004 IN.) UNLESS OTHERWISE SPECIFIED.
3. HEAT SINK PAD IS CONNECTED TO CATHODE PAD BY PRODUCT DESIGN.
4. DO NOT USE HEAT SINK PAD AS CATHODE.
5. HEAT SINK PAD NEEDS TO BE INDEPENDENT FOR EACH UNIT (IF ARRANGED IN-LINE OR IN MATRIX FORM).
6. DO NOT CONNECT ALL THE HEAT SINKS TOGETHER AS THIS WILL LEAD TO SHORT CIRCUIT.
7. ILLUSTRATION ON HEAT SINK DESIGN FOR MATRIX AND IN-LINE ARRANGEMENT DESIGN SHOWN IN APPLICATION NOTES.

HSM x - C4 xx - x x x xx

Packaging Option
01: Tape and Reel on 8 mm Tape, 7 inch Reel

Color Bin Selection
0: Full Color Distribution

Max. Flux Bin (Refer to Flux Bin Table)

Min. Flux Bin (Refer to Flux Bin Table)

Viewing Angle

Dice Color
U: TS AlInGaP Amber
V: TS AlInGaP Red Orange
Z: TS AlInGaP Red

Absolute Maximum Ratings at T_A = 25°C

Parameter	AlInGaP	Units
DC Forward Current[1]	70	mA
Peak Pulsing Current[2]	200	mA
Power Dissipation	230	mW
Reverse Voltage	5	V
LED Junction Temperature	110	°C
Operating Temperature Range	–40 to +100	°C
Storage Temperature Range	–55 to +100	°C
Soldering Temperature	See IR reflow profile (Figure 7)	

Notes:
1. Derate linearly as shown in Figure 4.
2. Pulse condition of 1/100 duty factor and 1 msec width.

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

Device	Forward Voltage V_F (Volts) @ $I_F = 70$ mA Typ.	Max.	Reverse Voltage V_R (Volts) @ $I_R = 100\ \mu A$ Min.	Capacitance C (pF), $V_F = 0$, f = 1 MHz Typ.	Thermal Resistance $R\theta_{J\text{-}PIN}$ (°C/W) Typ.
HSMZ-C430	2.7	3.2	5	30	90
HSMV-C430	2.6	3.2	5	30	90
HSMU-C430	2.7	3.2	5	30	90

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

Part Number	Luminous Intensity/Total Flux I_v (mcd) / Φ_V (mlm)[2] Typ.	Peak Wavelength λ_{peak} (nm) Typ.	Color, Dominant Wavelength λ_d (nm)[3] Typ.	Viewing Angle 2 $\theta_{1/2}$ Degrees[4] Typ.	Luminous Efficacy η_v (lm/W) Typ.	Luminous Efficiency (lm/W) Typ.
HSMZ-C430	1.2	642	629	30	150	20
HSMV-C430	1.2	634	621	30	210	25
HSMU-C430	1.2	597	593	30	500	16

Notes:

2. ϕ_V is the total luminous flux output as measured with an integrating sphere after the device has stabilized.
3. The dominant wavelength is derived from the CIE Chromatically Diagram and represents the perceived color of the device.
4. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.

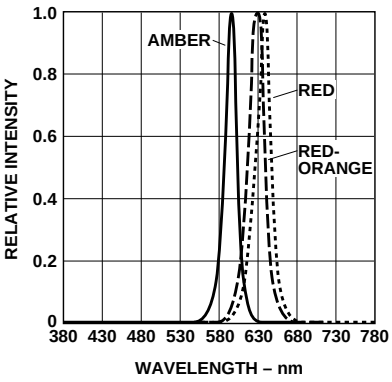


Figure 1. Relative intensity vs. wavelength.

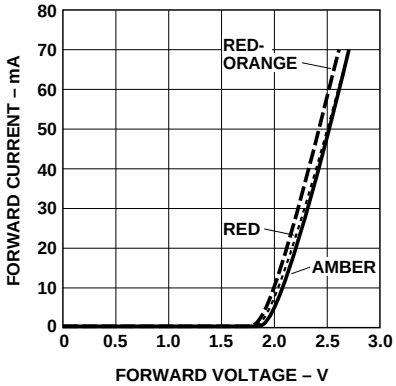


Figure 2. Forward current vs. forward voltage.

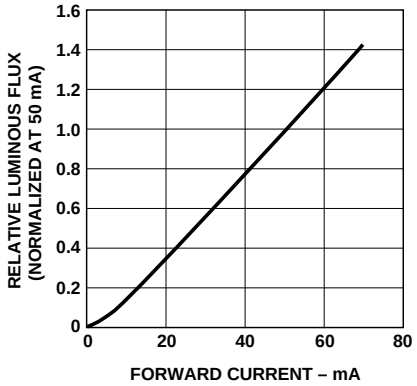


Figure 3. Relative luminous flux vs. forward current.

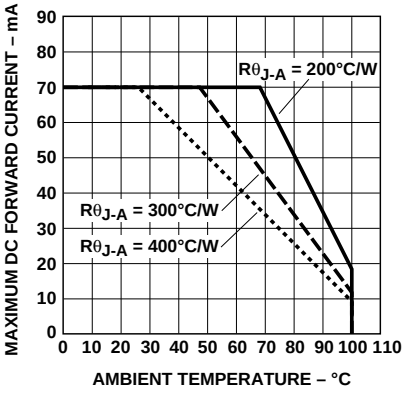


Figure 4. Maximum DC forward current vs. ambient temperature.

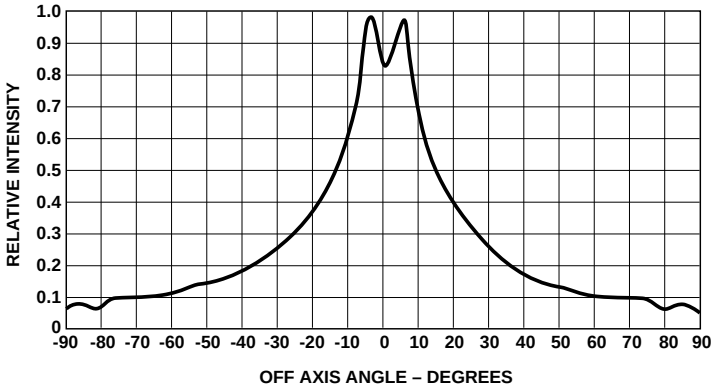


Figure 5. Radiation pattern.

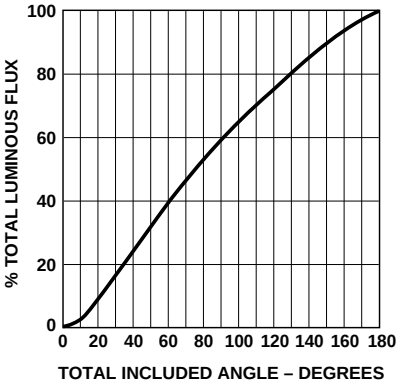


Figure 6. Percent total luminous flux vs. total included angle.

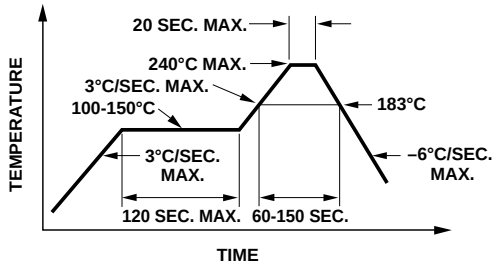


Figure 7. Recommended reflow soldering profile (JEDEC J-STD-020-A).

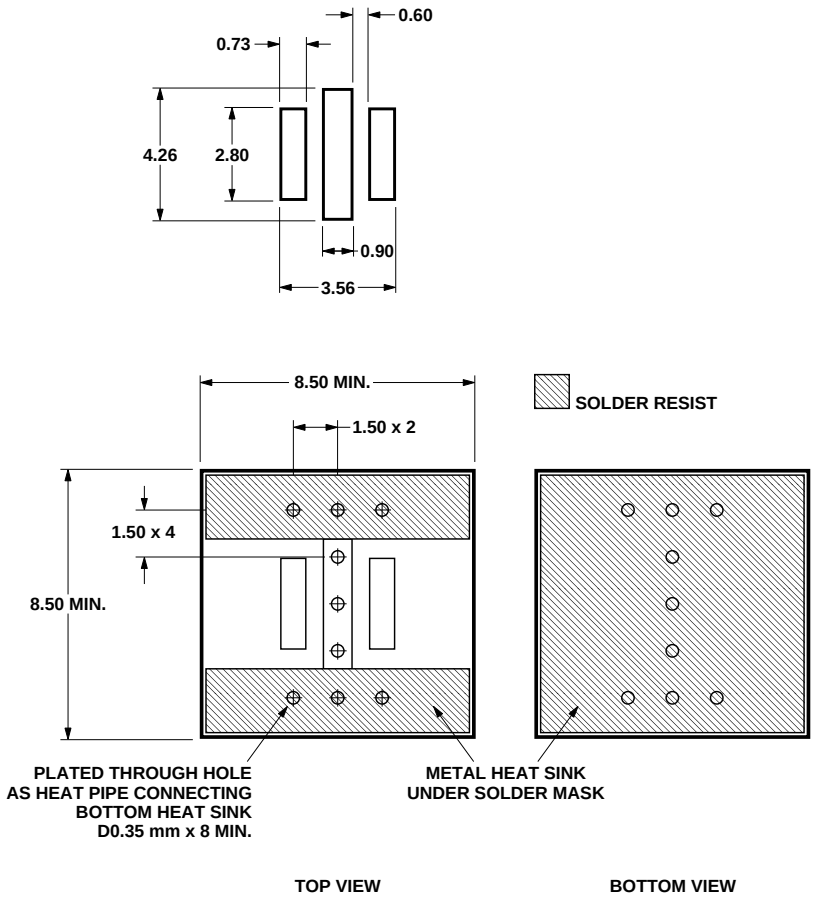


Figure 8. Recommended soldering pad pattern.

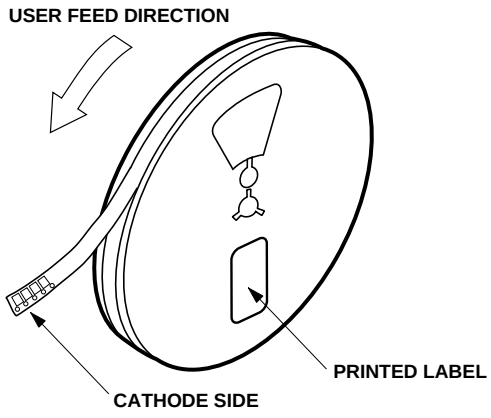


Figure 9. Reel Orientation.

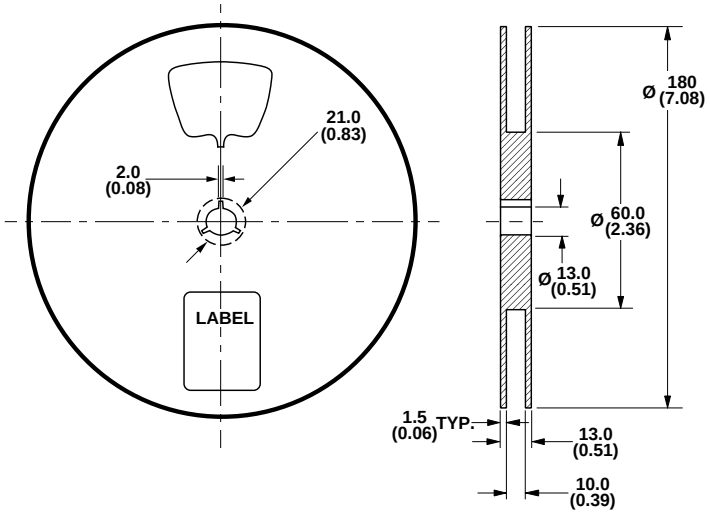


Figure 10. Reel dimensions.

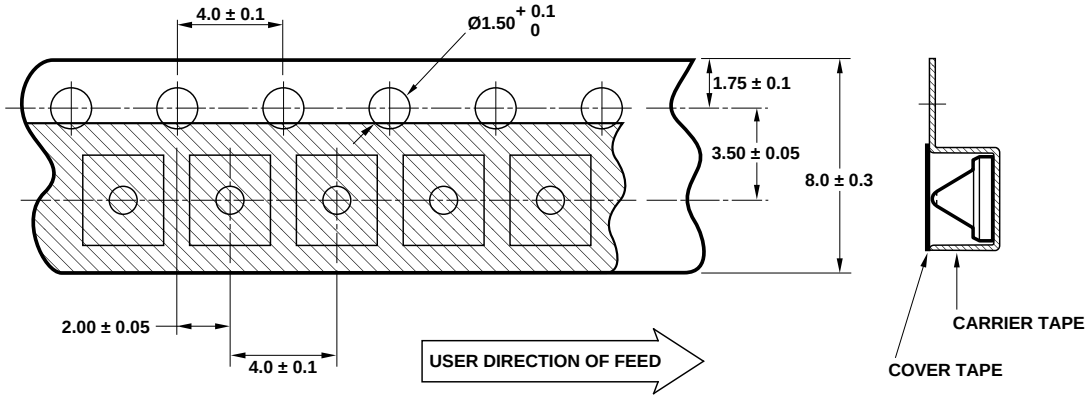


Figure 11. Tape dimensions.

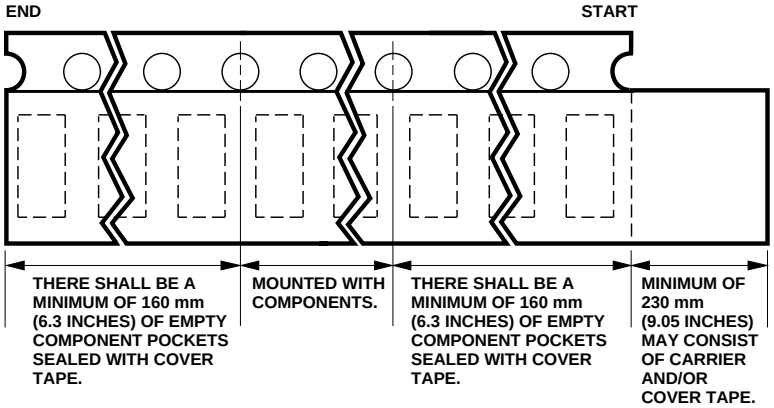


Figure 12. Tape leader and trailer dimensions.

Convective IR Reflow Soldering

For more information on IR reflow soldering, refer to Application Note 1060, *Surface Mounting SMT LED Indicator Components*.

For more information on using HSMx-C4xx series SMT LEDs, refer to Application Note 1266.

Flux Bin Category

Bin ID	Min.	Max.
Q	1150	1500
R	1500	1900
S	1900	2500
T	2500	3200
U	3200	4200
V	4200	5500
W	5500	7200
X	7200	9300

Tolerance = ± 15%

Storage Condition:

5 to 30˚C @ 60% RH max.

Baking is required under the condition:

a) The pack has been opened for more than 1 week.

Baking recommended condition: 60 ± 5˚C for 20 hours.

This product is qualified as Moisture Sensitive JEDEC Level 2A.

Color Bin Category

Amber

Bin ID	Min.	Max.
1	584.5	587.0
2	587.0	589.5
4	589.5	592.0
6	592.0	594.5
7	594.5	597.0

Tolerance = ± 0.5%

Red Orange

Bin ID	Min.	Max.
1	610.5	613.5
2	613.5	616.5
3	616.5	619.5
4	619.5	623.5
5	623.5	626.5

Tolerance = ± 0.5%

Red

Full Distribution
Tolerance = ± 0.5 nm

www.agilent.com/semiconductors

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

For technical assistance call:

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Hong Kong: (+65) 6271 2451

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

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