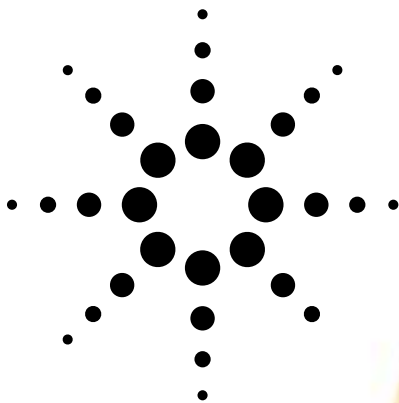


# Agilent HSMW-C191/190/170/150/110/265 White ChipLED Data Sheet



## Description

These white ChipLEDs come in unique shades of white and provide product differentiation for backlighting application. It is designed in industry standard package for ease of handling and use.

These chipLEDs come in either top emitting packages (HSMW-C191, 190, 170, 150, & 265) or in a side emitting package (HSMW-C110).

The packages all compatible with IR reflow soldering process and come in 8 mm tape on 7" diameter reel. They are compatible with automatic placement equipment.

In order to facilitate pick and place operation, these chipLEDs are shipped in tape and reel with 4000 units per reel for HSMW-C191, 190, and 170 packages, and 3000 units per reel for HSMW-C150, 110, and 265 packages.

## Features

- White color
- Small size
- Industry standard footprint
- Compatible with IR soldering
- Compatible with automatic placement equipment
- Operating temperature range  $-30^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Come in 8 mm tape on 7" diameter reels

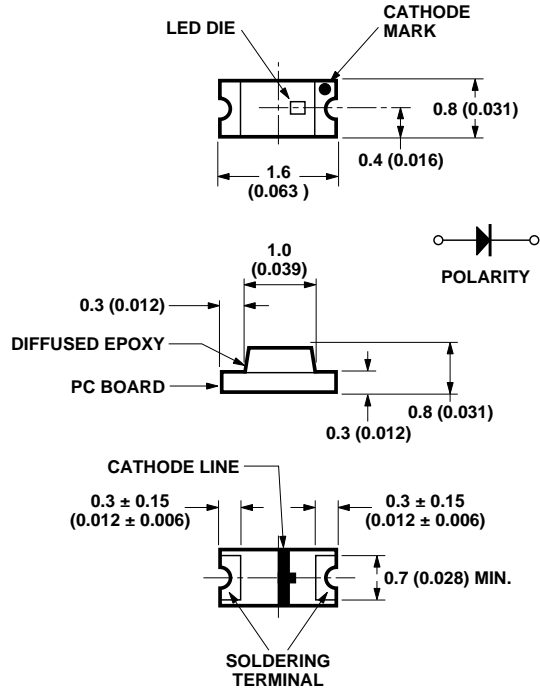
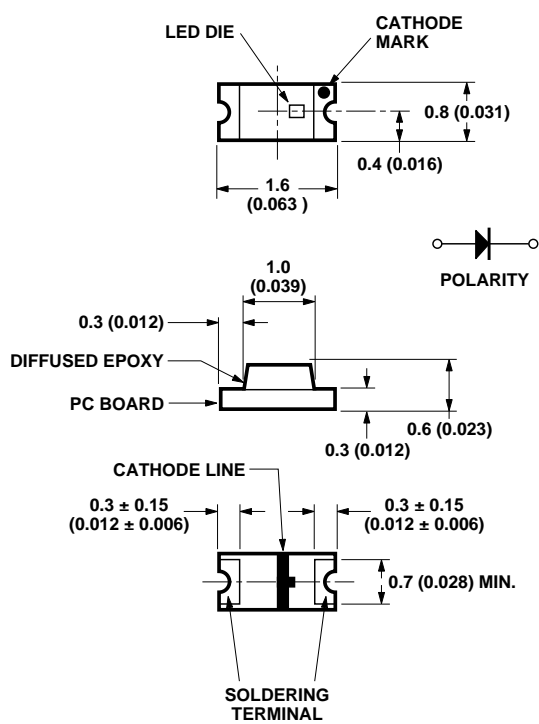
## Applications

- LCD backlighting
- Keypad backlighting
- Pushbutton backlighting
- Front panel indicator
- Symbol indicator

*CAUTION: HSMW-Cxxx LEDs are Class 1 ESD sensitive per MIL-STD-1686. Please observe appropriate precautions during handling and processing. Refer to Agilent Technologies Application Note AN-1142 for additional details.*

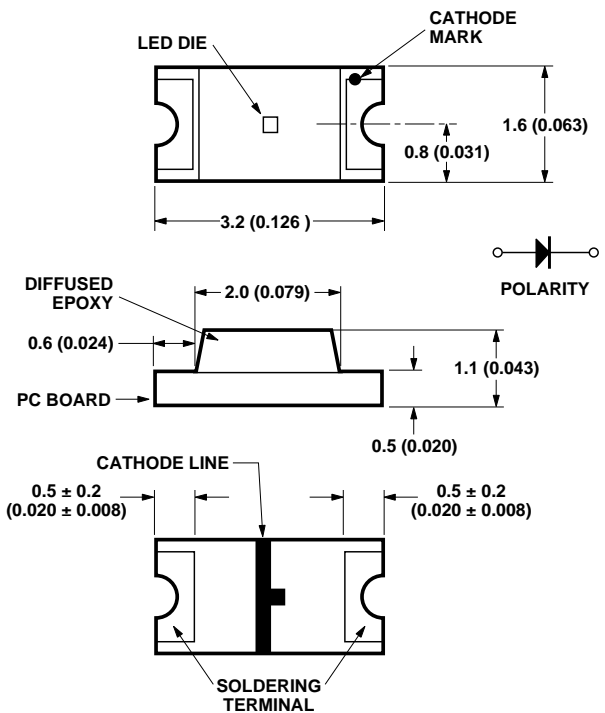
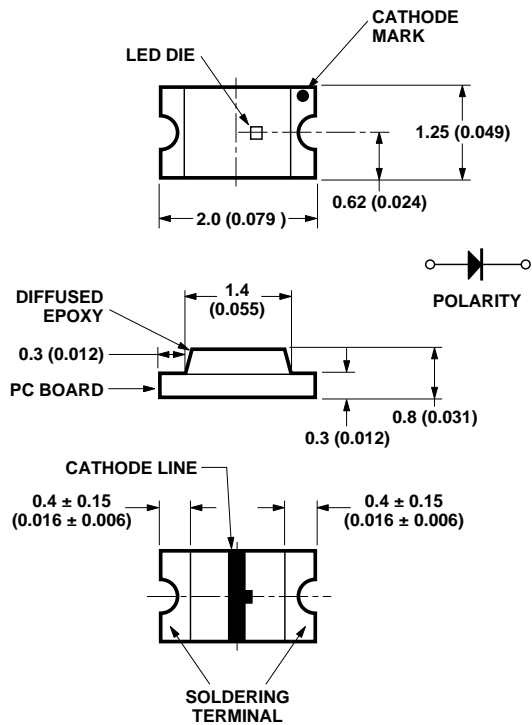


## Package Dimensions



HSMW-C191

HSMW-C190



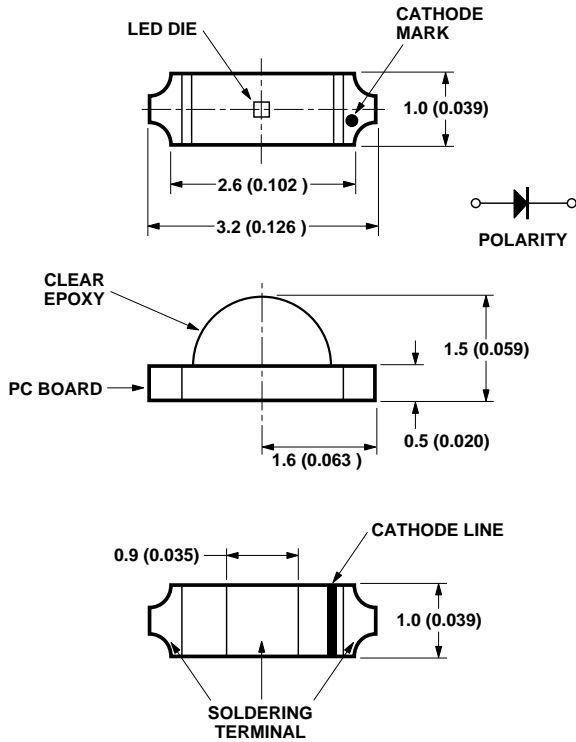
HSMW-C170

HSMW-C150

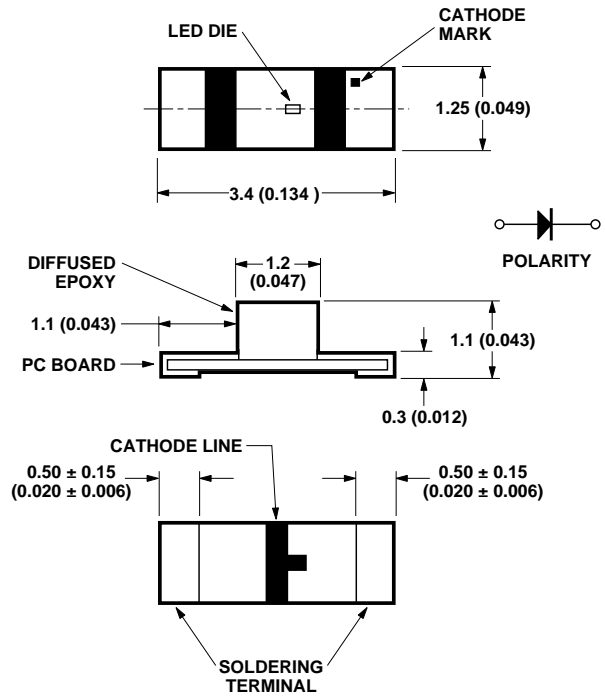
### NOTES:

1. DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. TOLERANCE ±0.1 mm UNLESS OTHERWISE NOTED.

## Package Dimensions



HSMW-C110



HSMW-C265

### NOTES:

1. DIMENSIONS ARE IN MILLIMETERS (INCHES).
2. TOLERANCE  $\pm 0.1$  mm UNLESS OTHERWISE NOTED.

### Device Selection Guide

Package Dimension (mm)	White	Package Description
1.6 (L) x 0.8 (W) x 0.6 (H)	HSMW-C191	Untinted, Diffused
1.6 (L) x 0.8 (W) x 0.8 (H)	HSMW-C190	Untinted, Diffused
2.0 (L) x 1.25 (W) x 0.8 (H)	HSMW-C170	Untinted, Diffused
3.2 (L) x 1.0 (W) x 1.5 (H) <sup>[1]</sup>	HSMW-C110	Untinted, Diffused
3.2 (L) x 1.6 (W) x 1.1 (H)	HSMW-C150	Untinted, Diffused
3.4 (L) x 1.25 (W) x 1.1 (H) <sup>[2]</sup>	HSMW-C265	Untinted, Diffused

### Notes:

1. Right angle package.
2. Reverse mount package.

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

Parameter	HSMW-Cxxx	Units
DC Forward Current <sup>[1]</sup>	20	mA
Power Dissipation	78	mW
Reverse Voltage ( $I_R = 100\ \mu\text{A}$ )	5	V
LED Junction Temperature	95	$^\circ\text{C}$
Operating Temperature Range	-30 to +85	$^\circ\text{C}$
Storage Temperature Range	-40 to +85	$^\circ\text{C}$
Soldering Temperature	See IR soldering profile (Figure 8)	

**Note:**

1. Derate linearly as shown in Figure 4.

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

Part Number	Forward Voltage $V_F$ (Volts) @ $I_F = 20\ \text{mA}$ <sup>[1]</sup>		Reverse Breakdown $V_R$ (Volts) @ $I_R = 100\ \mu\text{A}$	Capacitance C (pF), $V_F = 0$ , $f = 1\ \text{MHz}$	Thermal Resistance $R_{\theta\text{J-PIN}}$ ( $^\circ\text{C}/\text{W}$ )
	Typ.	Max.	Min.	Typ.	Typ.
HSMW-C110/C150	3.6	3.9	5	60	450
HSMW-C170/C190/B191	3.6	3.9	5	55	450
HSMW-C265	3.6	3.9	5	55	450

**Note:**

1.  $V_F$  tolerance:  $\pm 0.1\ \text{V}$ .

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

Part Number	Luminous Intensity $I_v$ (mcd) @ $20\ \text{mA}$ <sup>[1]</sup>		Chromaticity Coordinates <sup>[2]</sup>		Viewing Angle $2\ \theta_{1/2}$ Degrees <sup>[3]</sup>	Luminous Efficacy $\eta_v$ (lm/w)
	Min.	Typ.	x	y	Typ.	Typ.
HSMW-C110	25	100	0.31	0.33	130	240
HSMW-C150/C170/C190/C191	25	95	0.31	0.33	140	240
HSMW-C265	16	65	0.31	0.33	150	240

**Notes:**

1. The luminous intensity  $I_v$  is measured at the peak of the spatial radiation pattern which may not be aligned with the mechanical axis of the lamp package.
2. The coordinate 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.

## Light Intensity (Iv) Bin Limits<sup>[1]</sup>

Bin ID	Intensity (mcd)	
	Min.	Max.
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:**

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

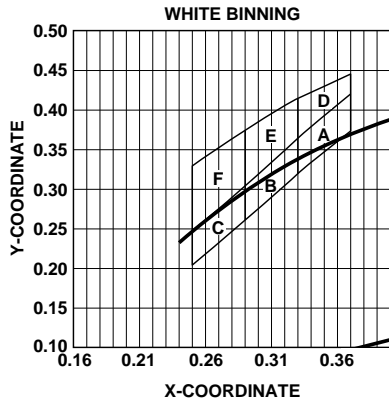


Figure 1. Color bin limits (CIE 1931 Chromaticity Diagram) [Tolerance:  $\pm 0.02$ ].

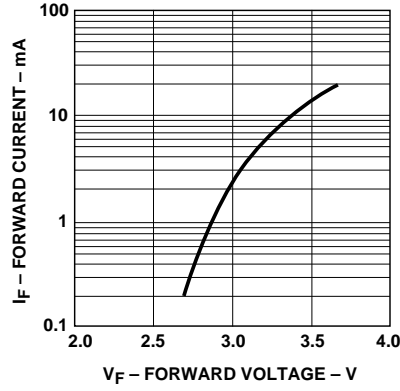


Figure 2. Forward current vs. forward voltage.

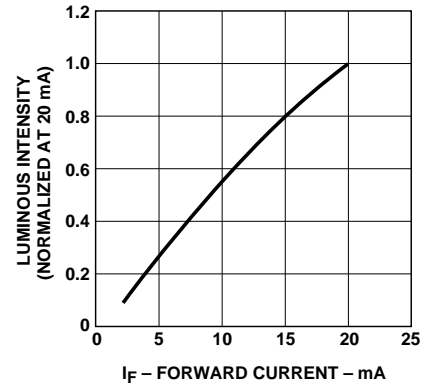


Figure 3. Luminous intensity vs. forward current.

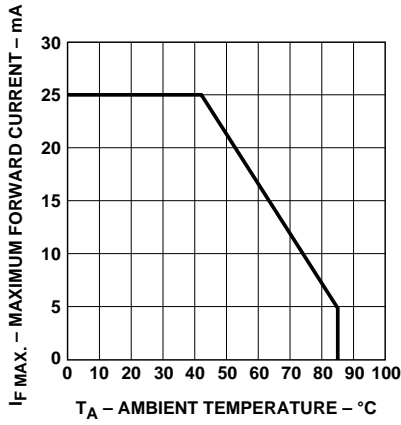


Figure 4. Maximum forward current vs. ambient temperature.

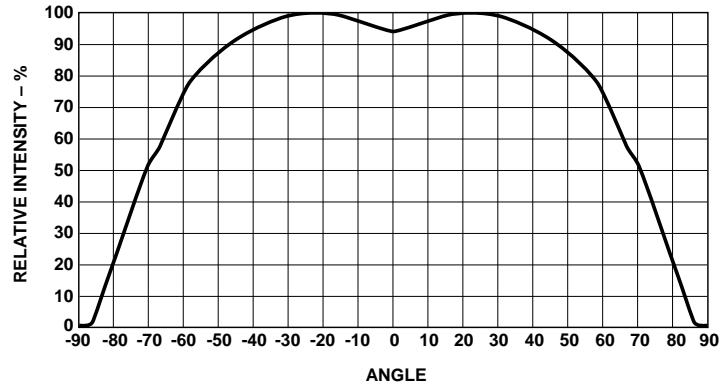


Figure 5. Relative intensity vs. angle for HSMW-C191/190/170/150.

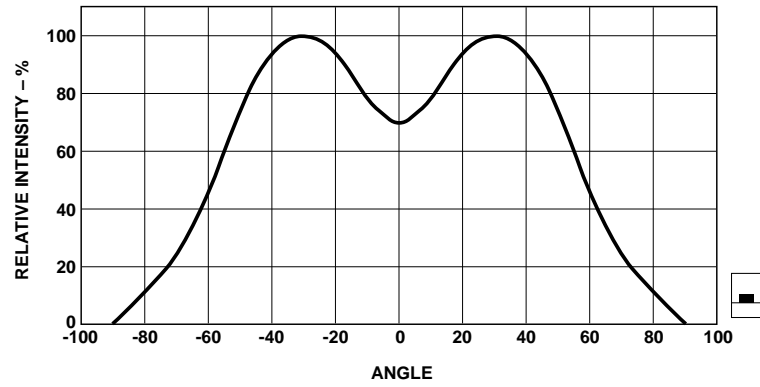
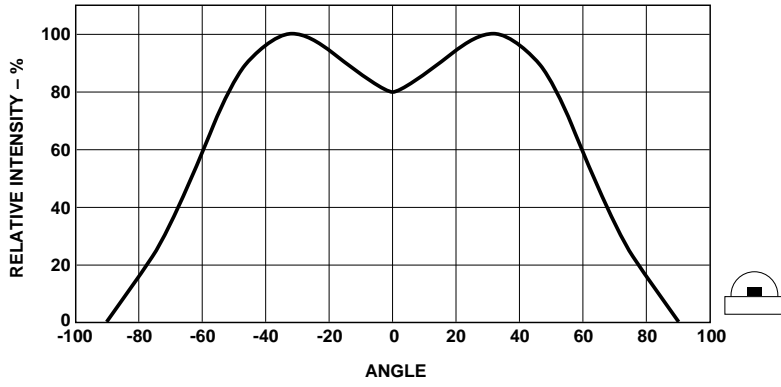


Figure 6. Relative intensity vs. angle for HSMW-C110.

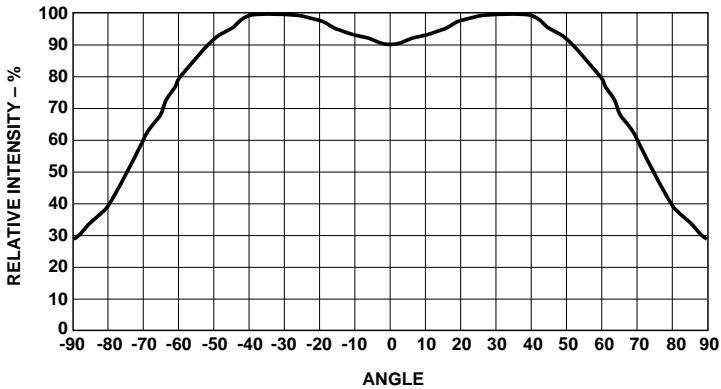


Figure 7. Relative intensity vs. angle for HSMW-C265.

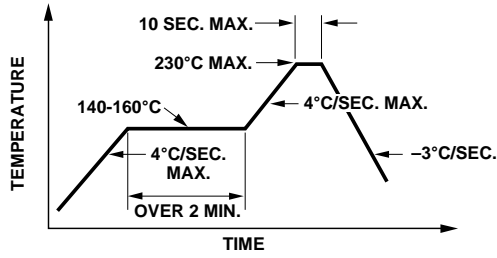


Figure 8. Recommended reflow soldering profile.

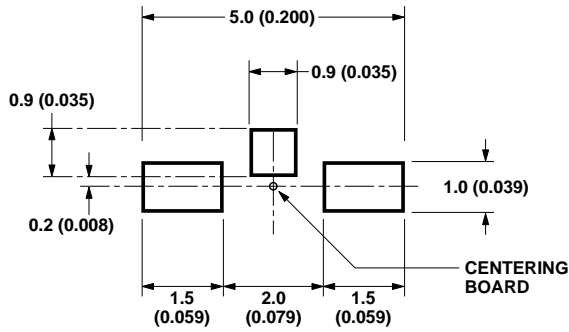


Figure 9. Recommended soldering pattern for HSMW-C110.

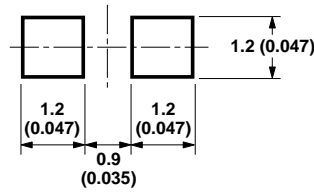


Figure 10. Recommended soldering pattern for HSMW-C170.

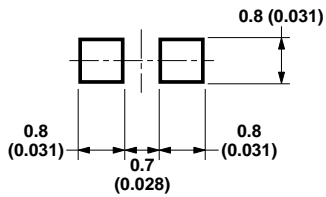


Figure 11. Recommended soldering pattern for HSMW-C191 and HSMW-C190.

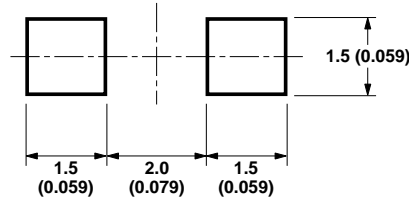


Figure 12. Recommended soldering pattern for HSMW-C150.

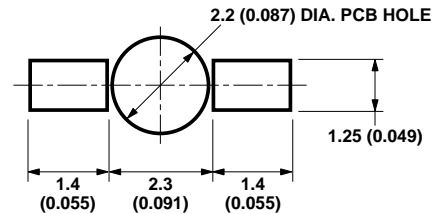


Figure 13. Recommended soldering pad pattern for HSMW-C265.

**NOTE:**

1. DIMENSIONS ARE IN MILLIMETERS (INCHES).



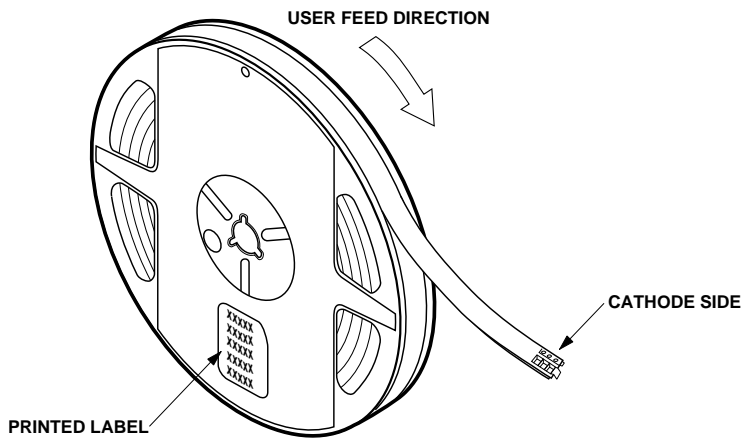


Figure 14. Reeling orientation.

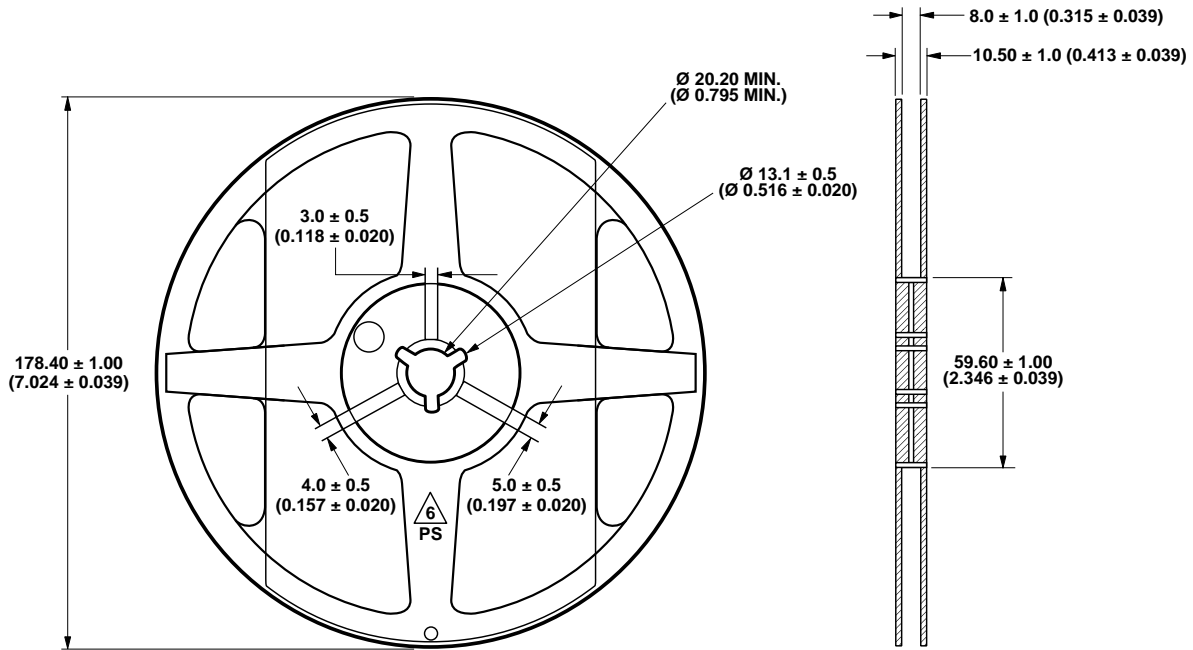


Figure 15. Reel dimensions.

NOTE:  
1. DIMENSIONS ARE IN MILLIMETERS (INCHES).

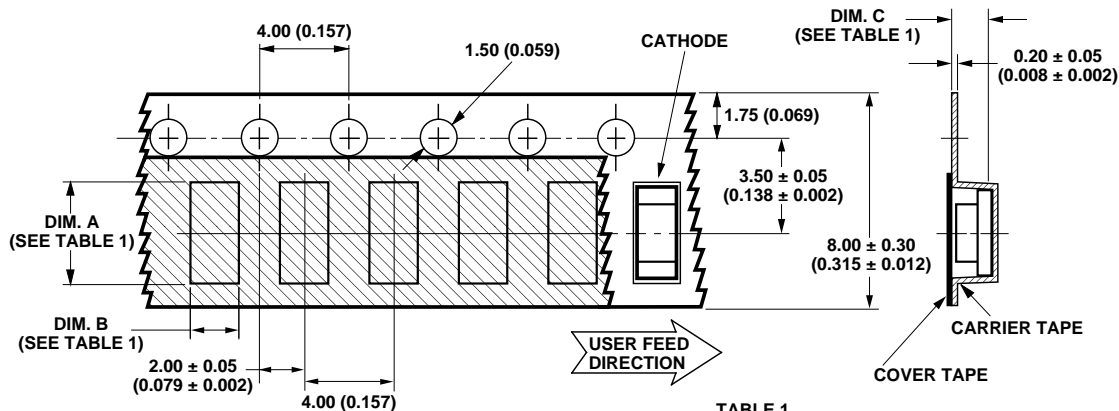


TABLE 1  
DIMENSIONS IN MILLIMETERS (INCHES)

PART NUMBER	DIM. A ± 0.10 (± 0.004)	DIM. B ± 0.10 (± 0.004)	DIM. C ± 0.10 (± 0.004)
HSMW-C191 SERIES	1.80 (0.071)	0.95 (0.037)	0.75 (0.030)
HSMW-C190 SERIES	1.80 (0.071)	0.95 (0.037)	0.87 (0.034)
HSMW-C170 SERIES	2.40 (0.094)	1.60 (0.063)	1.20 (0.047)
HSMW-C110 SERIES	3.40 (0.134)	1.70 (0.067)	1.20 (0.047)
HSMW-C150 SERIES	3.75 (0.148)	2.10 (0.083)	1.20 (0.047)
HSMW-C265 SERIES	3.70 (0.146)	1.45 (0.057)	1.30 (0.051)

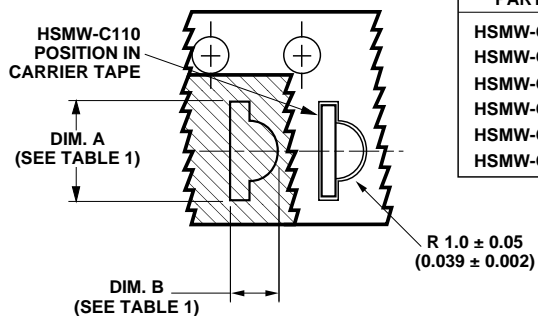


Figure 16. Tape dimensions.

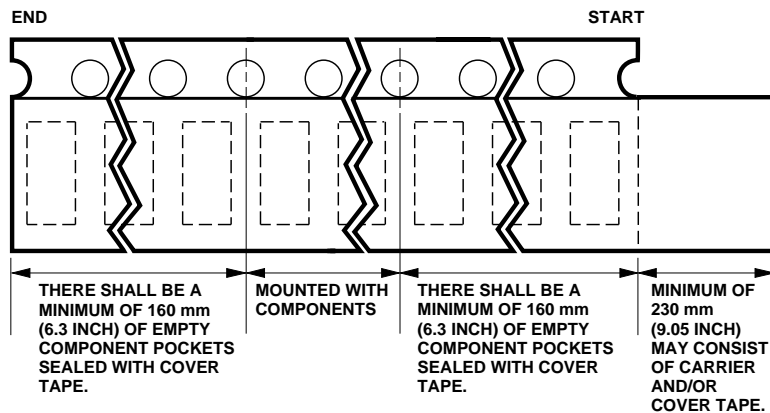


Figure 17. Tape leader and trailer dimensions.

NOTE:  
1. DIMENSIONS ARE IN MILLIMETERS (INCHES).

### Convective IR Reflow Soldering

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

### 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 open for more than 1 week

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

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