

# HSMW-C120, HSMW-C130, HSMW-C191, HSMW-C197, HSMW-C265

White ChipLEDs



## Data Sheet



### Description

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

These chipLEDs come in either a side emitting package (HSMW-C120) or in top emitting packages (HSMW-C130, C191, C197 and C265).

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-C120, C130, C191 and C197 packages, and 3000 units per reel for HSMW-C265 package.

### Features

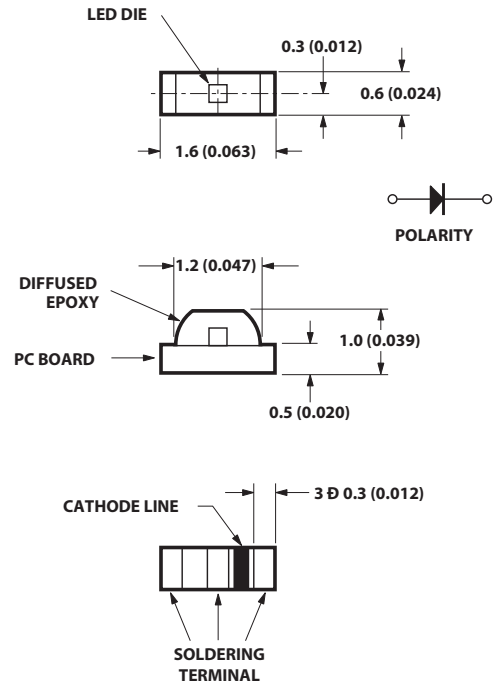
- White color
- Small size
- Industry standard footprint
- Compatible with reflow soldering
- Compatible with automatic placement equipment
- Operating temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Come in 8 mm tape on 7" diameter reels

### Applications

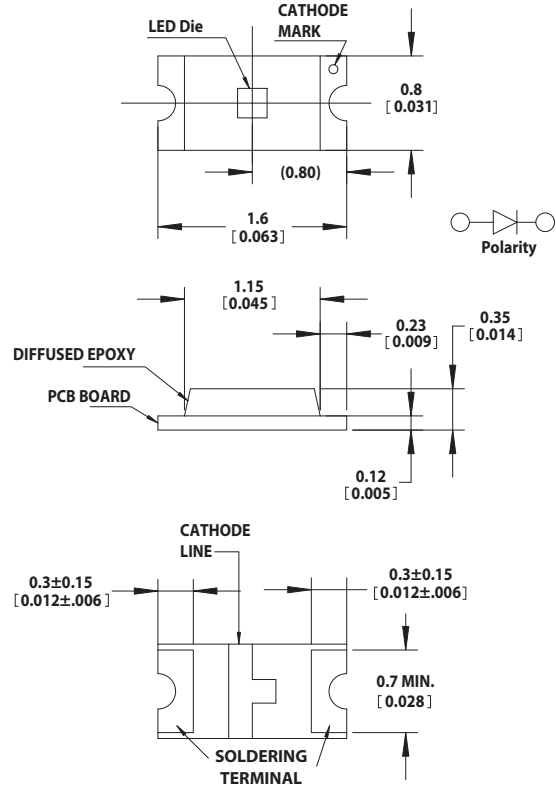
- LCD backlighting
- Keypad backlighting
- Pushbutton backlighting
- Symbol backlighting

*CAUTION: HSMW-Cxxx LEDs are Class 1A ESD sensitive per JESD22-A114C.01. Please observe appropriate precautions during handling and processing. Refer to Avago Technologies Application Note AN-1142 for additional details.*

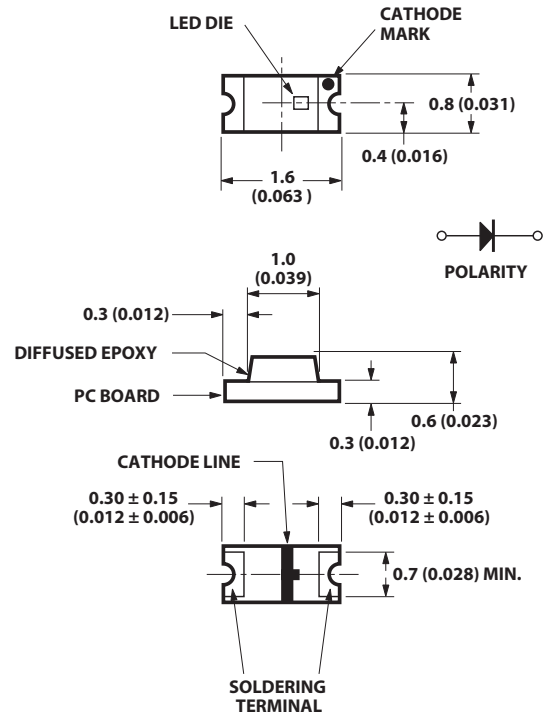
# Package Dimensions



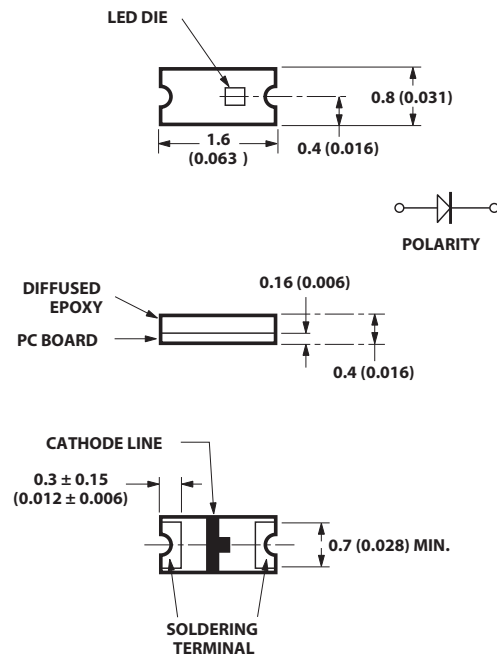
HSMW-C120



HSMW-C130



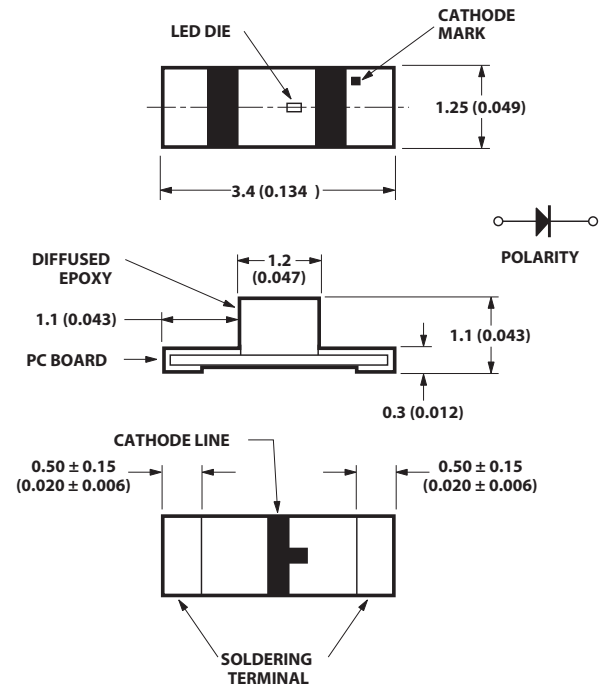
HSMW-C191



HSMW-C197

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

## Package Dimensions, continued



### 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 0.6 (W) x 1.0 (H)                 | HSMW-C120 | Untinted, Diffused  |
| 1.6 (L) x 0.8 (W) x 0.35 (H)                | HSMW-C130 | Untinted, Diffused  |
| 1.6 (L) x 0.8 (W) x 0.6 (H)                 | HSMW-C191 | Untinted, Diffused  |
| 1.6 (L) x 0.8 (W) x 0.4 (H)                 | HSMW-C197 | 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                  | -40 to +85                                     | $^\circ\text{C}$ |
| Storage Temperature Range                    | -40 to +85                                     | $^\circ\text{C}$ |
| Soldering Temperature                        | See reflow soldering profile (Figures 10 & 11) |                  |

Note:

1. Derate linearly as shown in Figure 4.

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

| Part Number | Forward Voltage<br>$V_F$ (Volts)<br>@ $I_F = 20\ \text{mA}$ <sup>[1]</sup> |      | Reverse<br>Breakdown<br>$V_R$ (Volts)<br>@ $I_R = 100\ \mu\text{A}$ | Capacitance C<br>(pF), $V_F = 0$ ,<br>$f = 1\ \text{MHz}$ | Thermal<br>Resistance<br>$R_{\theta\text{J-PIN}}$ ( $^\circ\text{C}/\text{W}$ ) |
|-------------|--|------|---|---|---|
|             | Typ.   | Max. | Min.  | Typ.  | Typ.  |
| HSMW-Cxxx   | 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<br>Intensity<br>$I_v$ (mcd)<br>@ $20\ \text{mA}$ <sup>[1, 4]</sup> |      | Chromaticity<br>Coordinates <sup>[2]</sup> |      | Luminous<br>Viewing Angle<br>$2\ \theta_{1/2}$ Degrees <sup>[3]</sup> | Efficacy<br>$\eta_v$ (lm/w) |
|-------------|---|------|--|------|---|-----------------------------|
|             | Min.  | Typ. | x  | y    | Typ.  | Typ.                        |
| HSMW-C120   | 45  | 160  | 0.29                                       | 0.27 | 155   | 240                         |
| HSMW-C130   | 45  | 150  | 0.29                                       | 0.27 | 145   | 240                         |
| HSMW-C191   | 71.5  | 200  | 0.29                                       | 0.27 | 140   | 240                         |
| HSMW-C197   | 45  | 160  | 0.29                                       | 0.27 | 130   | 240                         |
| HSMW-C265   | 71.5  | 180  | 0.29                                       | 0.27 | 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 dominant wavelength,  $\lambda_d$ , 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. Luminous intensity ( $I_v$ ) tolerance:  $\pm 15\%$ .

### 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:

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

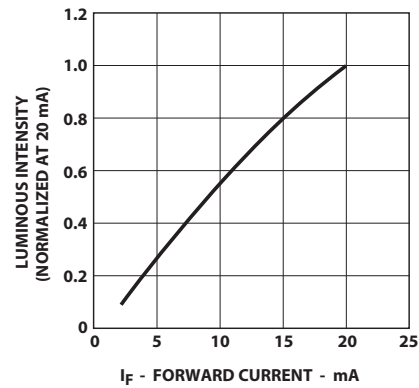


Figure 1. Color bin limits (CIE 1931 Chromaticity Diagram) [Tolerance:  $\pm 0.02$ ].

| Bin | Limits (Chromaticity Coordinate) |       |
|-----|----------------------------------|-------|
|     | x                                | y     |
| A1  | 0.270                            | 0.246 |
|     | 0.270                            | 0.278 |
|     | 0.250                            | 0.250 |
|     | 0.250                            | 0.218 |
| A2  | 0.270                            | 0.246 |
|     | 0.270                            | 0.213 |
|     | 0.250                            | 0.185 |
|     | 0.250                            | 0.218 |
| B1  | 0.270                            | 0.246 |
|     | 0.270                            | 0.278 |
|     | 0.290                            | 0.306 |
|     | 0.290                            | 0.274 |
| B2  | 0.270                            | 0.246 |
|     | 0.270                            | 0.213 |
|     | 0.290                            | 0.241 |
|     | 0.290                            | 0.274 |
| C1  | 0.290                            | 0.306 |
|     | 0.310                            | 0.336 |
|     | 0.310                            | 0.303 |
|     | 0.290                            | 0.274 |
| C2  | 0.290                            | 0.241 |
|     | 0.310                            | 0.271 |
|     | 0.310                            | 0.303 |
|     | 0.290                            | 0.274 |
| D1  | 0.310                            | 0.303 |
|     | 0.310                            | 0.336 |
|     | 0.330                            | 0.365 |
|     | 0.330                            | 0.333 |
|     | 0.330                            | 0.333 |
| D2  | 0.310                            | 0.303 |
|     | 0.310                            | 0.271 |
|     | 0.330                            | 0.300 |
|     | 0.330                            | 0.333 |
|     | 0.330                            | 0.333 |

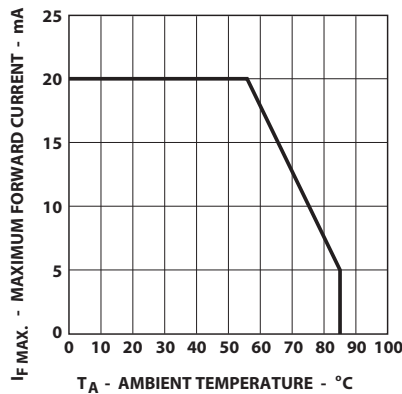


Figure 2. Forward current vs. forward voltage.

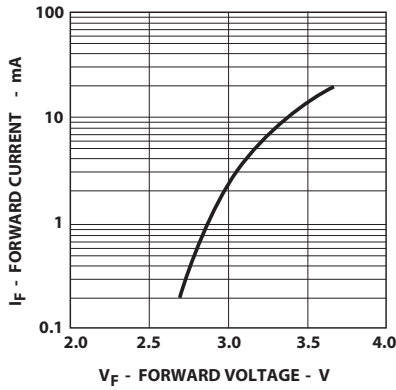
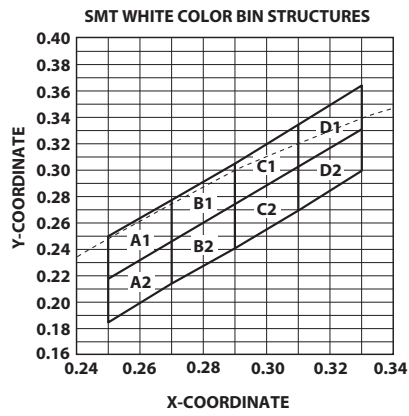


Figure 3. Luminous intensity vs. forward current.

Figure 4. Maximum forward current vs. ambient temperature.

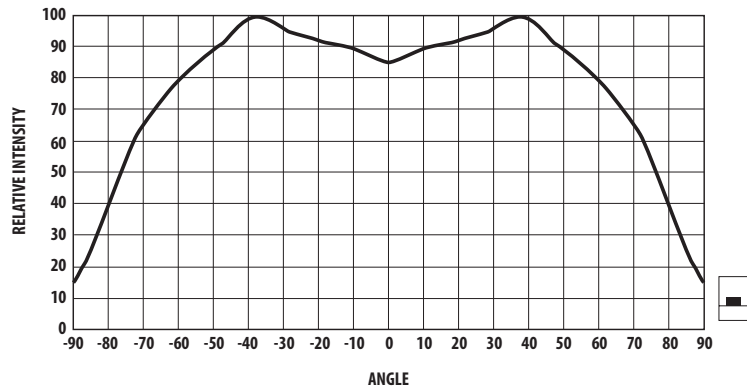
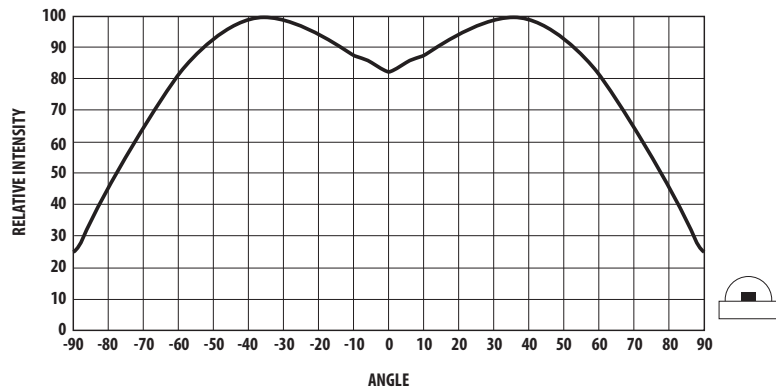


Figure 5. Relative intensity vs. angle for HSMW-C120.

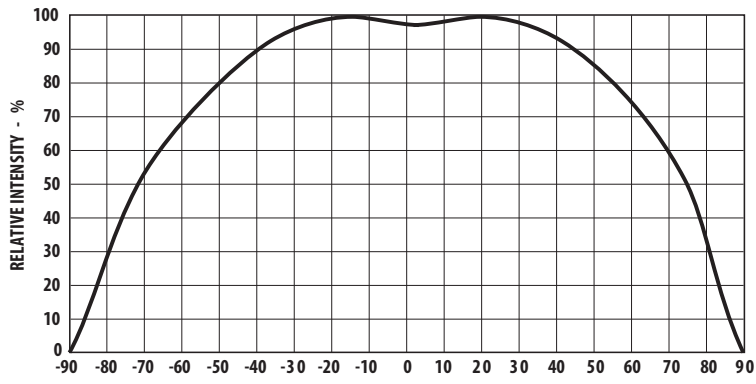


Figure 6. Relative intensity vs. angle for HSMW-C130.

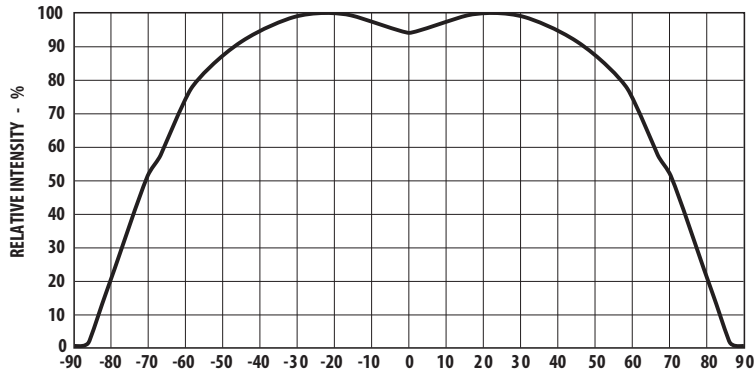


Figure 7. Relative intensity vs. angle for HSMW-C191.

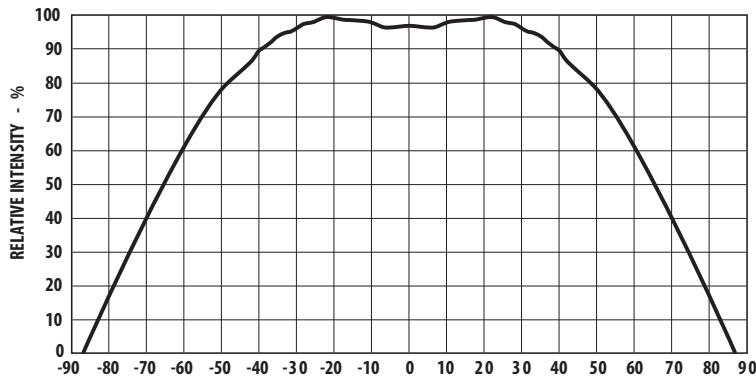


Figure 8. Relative intensity vs. angle for HSMW-C197.

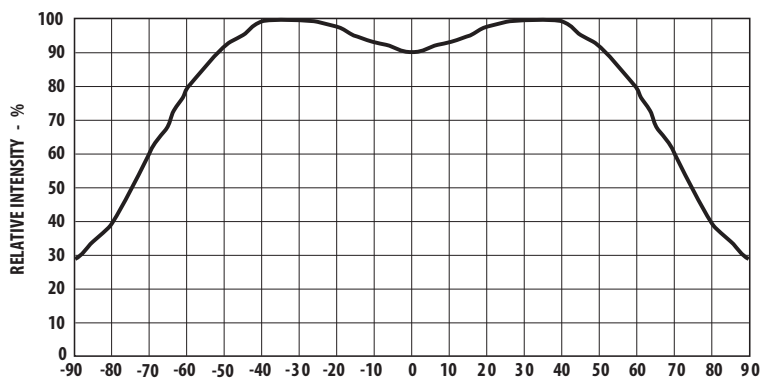


Figure 9. Relative intensity vs. angle for HSMW-C265.





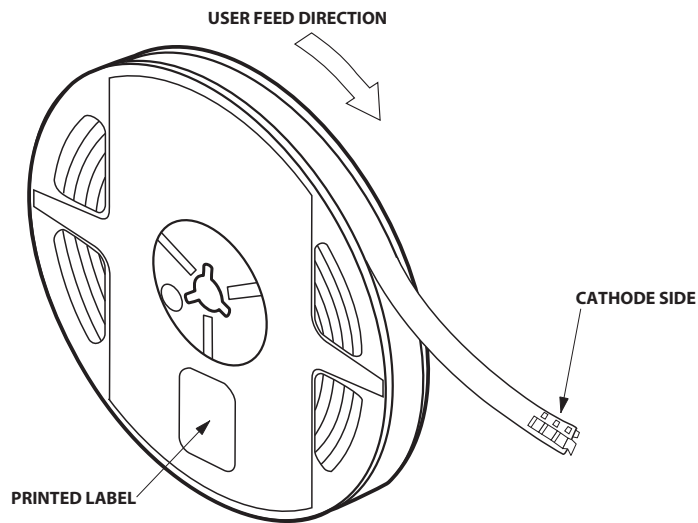


Figure 15. Reeling orientation.

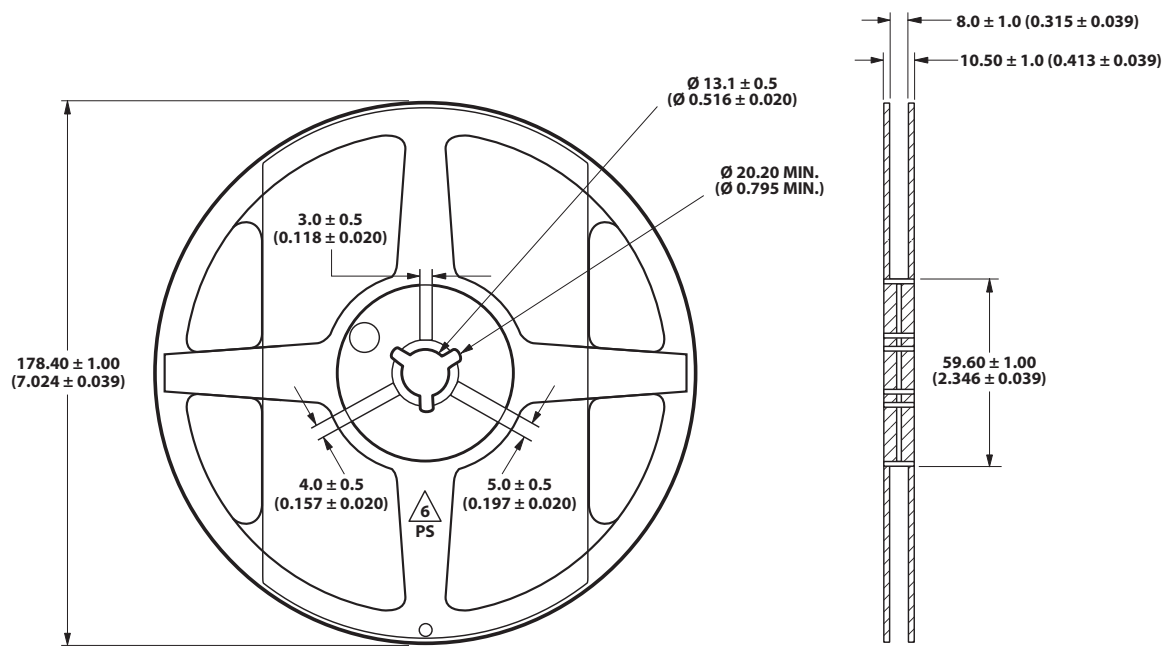
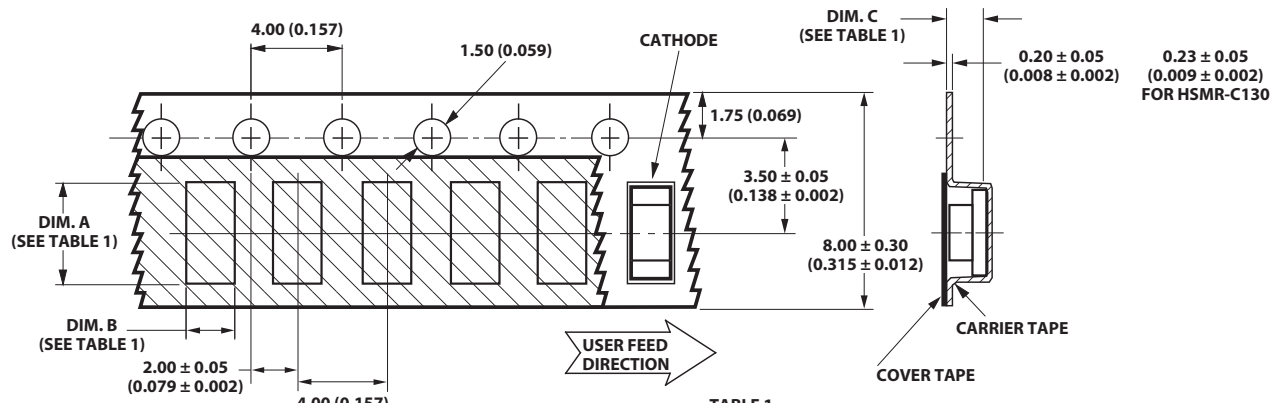


Figure 16. Reel dimensions.

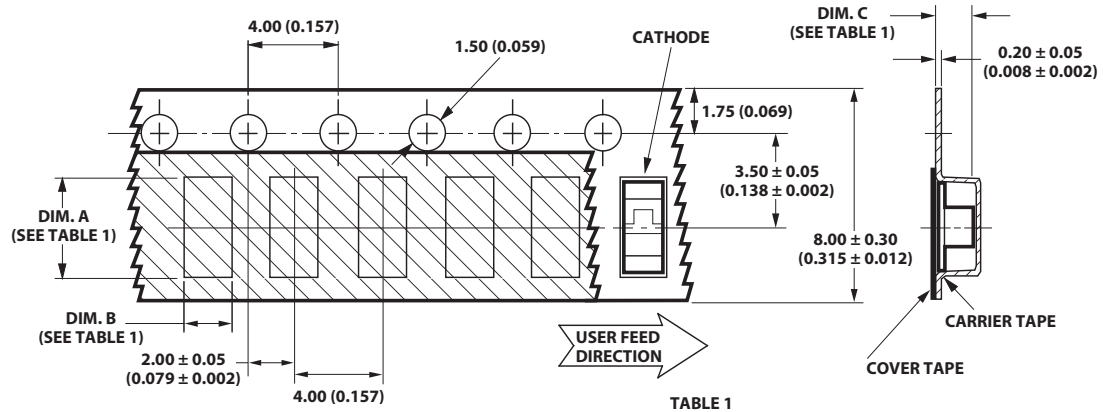
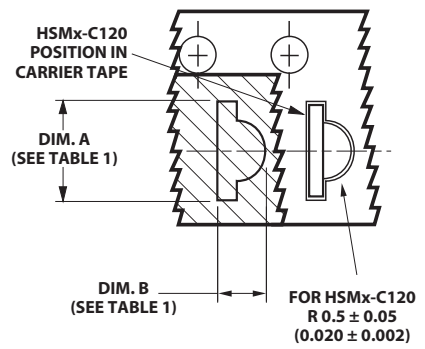
NOTE:

1. DIMENSIONS ARE IN MILLIMETERS (INCHES).



**TABLE 1**  
DIMENSIONS IN MILLIMETERS (INCHES)

| PART NUMBER      | DIM. A<br>± 0.10 (0.004) | DIM. B<br>± 0.10 (0.004) | DIM. C<br>± 0.10 (0.004) |
|------------------|--------------------------|--------------------------|--------------------------|
| HSMx-C120 SERIES | 1.90 (0.075)             | 1.15 (0.045)             | 0.80 (0.031)             |
| HSMx-C130 SERIES | 1.75 (0.069)             | 0.88 (0.035)             | 0.50 (0.020)             |
| HSMx-C191 SERIES | 1.85 (0.073)             | 0.88 (0.035)             | 0.88 (0.035)             |
| HSMx-C197 SERIES | 1.75 (0.069)             | 0.95 (0.037)             | 0.60 (0.024)             |



**TABLE 1**  
DIMENSIONS IN MILLIMETERS (INCHES)

| PART NUMBER      | DIM. A<br>± 0.10 (0.004) | DIM. B<br>± 0.10 (0.004) | DIM. C<br>± 0.10 (0.004) |
|------------------|--------------------------|--------------------------|--------------------------|
| HSMx-C265 SERIES | 3.70 (0.146)             | 1.45 (0.057)             | 1.30 (0.051)             |

**Figure 17. Tape dimensions.**

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

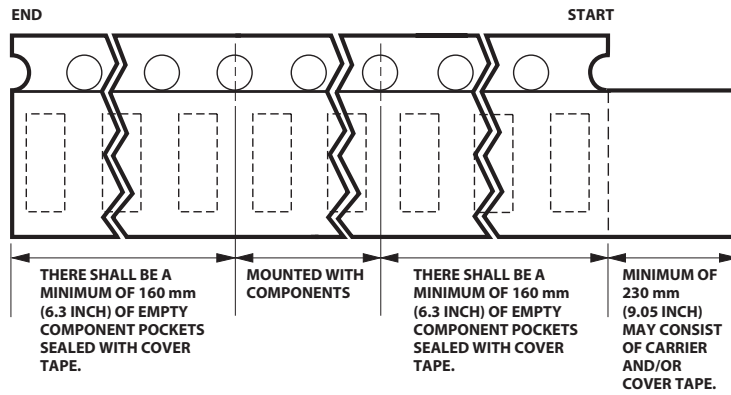


Figure 18. Tape leader and trailer dimensions.

### Convective IR Reflow Soldering

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

### Storage Condition:

**5 to 30°C @ 60% RH max.**

Baking is required under the condition:

1. Humidity Indicator Card is > 10% when read at 23±5°C.
2. Device expose to factory conditions < 30°C/60% RH more than 672 hours.

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

For product information and a complete list of distributors, please go to our website: [www.avagotech.com](http://www.avagotech.com)

Avago, Avago Technologies, and the A logo are trademarks of Avago Technologies in the United States and other countries. Data subject to change. Copyright © 2005-2010 Avago Technologies. All rights reserved. Obsoletes AV01-0685EN AV02-0186EN - May 5, 2010

**AVAGO**  
TECHNOLOGIES