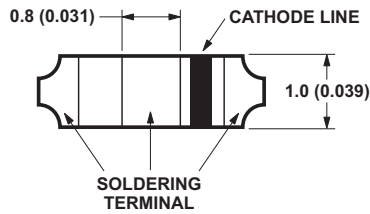
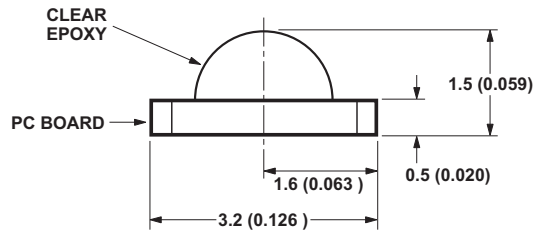
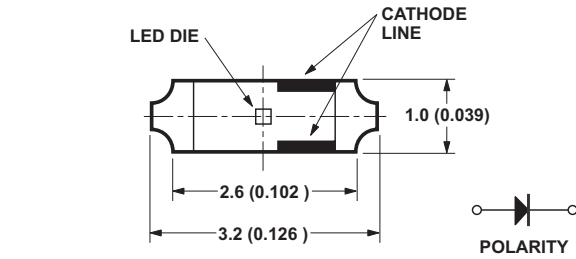
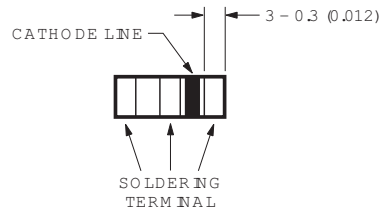
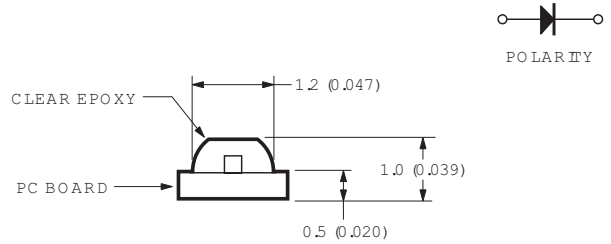
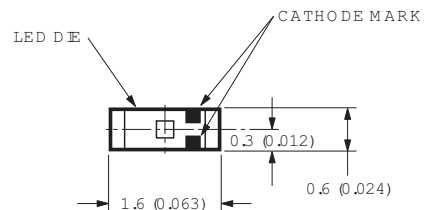


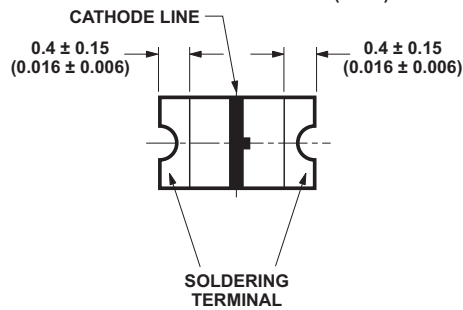
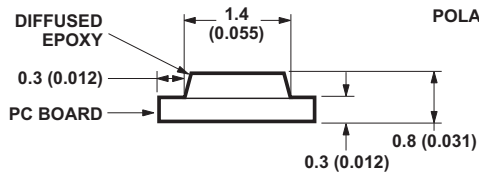
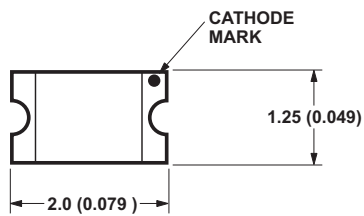
Package Dimensions



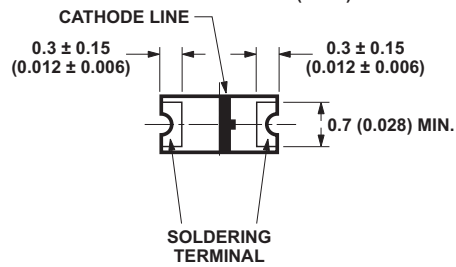
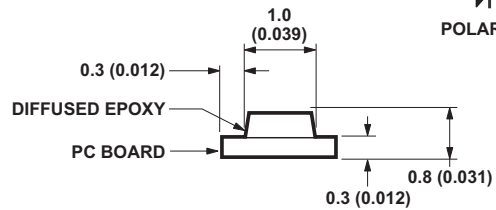
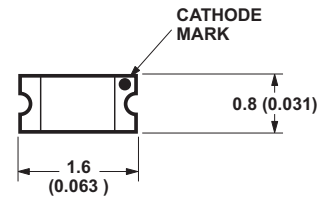
HSMx-C110



HSMx-C120

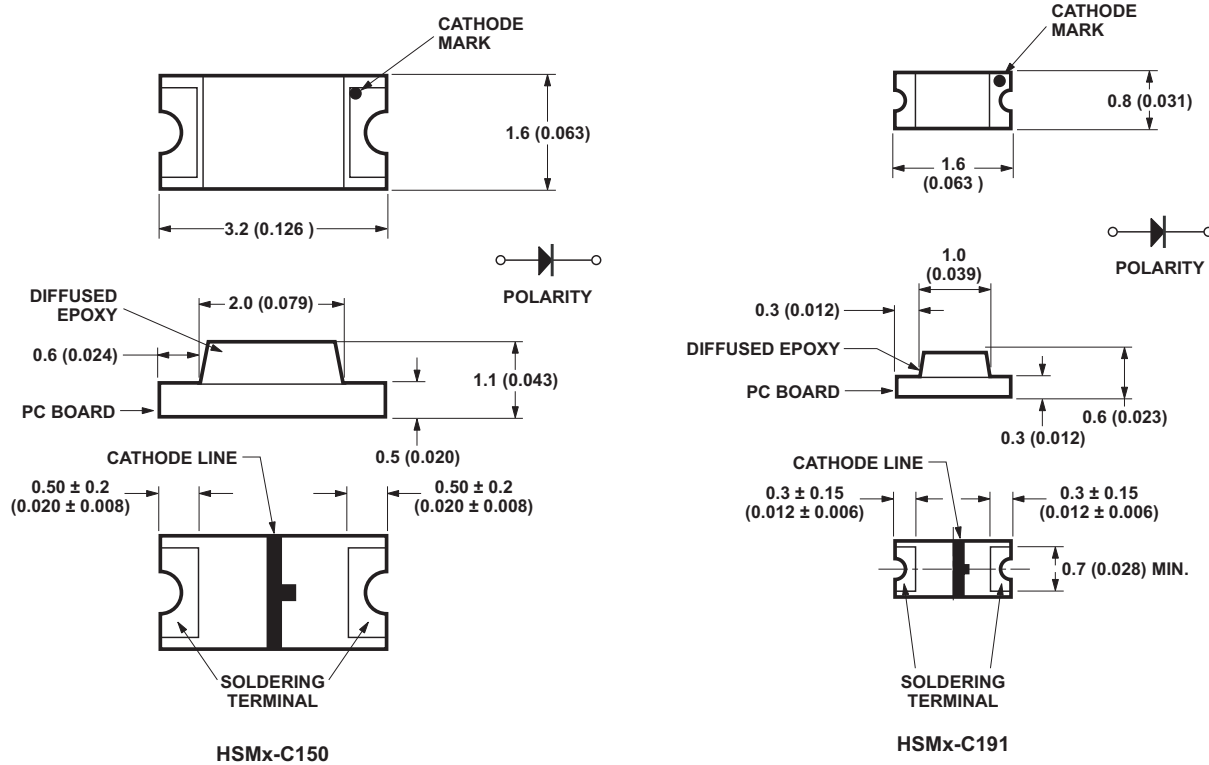


HSMx-C170



HSMx-C190

Package Dimensions, continued



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

Parameter	HSMx-C110/C120/C170/C190/C150 HSMN-C110/C120/C170/C190/C191/C150	Units
DC Forward Current ^[1]	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 (Figure 7)	

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) @ $I_F = 20 \text{ mA}$		Reverse Breakdown V_R (Volts) @ $I_R = 100 \mu\text{A}$ Min.	Capacitance C (pF), $V_F = 0$, $f = 1 \text{ MHz}$ Typ.	Thermal Resistance $R_{\theta J-PIN}$ ($^\circ\text{C/W}$) Typ.
	Typ.	Max.			
HSMx-C110/C150	3.3	3.9	5	70	450
HSMN-C110/C150	3.3	3.9	5	70	450
HSMx-C120	3.3	3.9	5	45	450
HSMN-C120	3.3	3.9	5	45	450
HSMx-C170/C190	3.3	3.9	5	70	300
HSMN-C170/C190/C191	3.3	3.9	5	70	300

V_F Tolerance: ±0.1 V.

Optical Characteristics at T_A = 25°C

Part Number	Color	Luminous Intensity I _v (mcd) @ 20 mA ^[1]		Peak Wavelength λ _{peak} (nm) Typ.	Color, Dominant Wavelength λ _d ^[2] (nm) Typ.	Viewing Angle 2 θ _{1/2} Degrees ^[3] Typ.	Luminous Efficacy η _v (lm/w) Typ.
		Min.	Typ.				
HSMM-C110	Green	45	126	523	525	130	490
HSMM-C120	Green	45	120	523	525	155	490
HSMM-C170/C190/ /C150	Green	45	120	523	525	170	490
HSMN-C110	Blue	11.2	39	468	470	130	77
HSMN-C120	Blue	11.2	35	468	470	155	80
HSMN-C170/C190/ C191/C150	Blue	11.2	35	468	470	170	77

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, λ_d, is derived from the CIE Chromaticity Diagram and represents the perceived color of the device.
3. θ_{1/2} is the off-axis angle where the luminous intensity is 1/2 the peak intensity.

Color Bin Limits^[1]

Bin ID	Blue Color Bins ^[1]	
	Dom. Wavelength (nm)	
	Min.	Max.
A	460.0	465.0
B	465.0	470.0
C	470.0	475.0
D	475.0	480.0

Tolerance: ± 1 nm

Bin ID	InGaN Green Color Bins ^[1]	
	Dom. Wavelength (nm)	
	Min.	Max.
A	515.0	520.0
B	520.0	525.0
C	525.0	530.0
D	530.0	535.0

Tolerance: ± 1 nm

Note:

1. 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.

Light Intensity (I_v) Bin Limits^[1]

Bin ID	Intensity (mcd)		Bin ID	Intensity (mcd)	
	Min.	Max.		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 categories. Please contact your Avago representative for information on currently available bins.
2. The I_v binning specification set-up is for lowest allowable I_v binning only. There is no upper I_v bin limits.

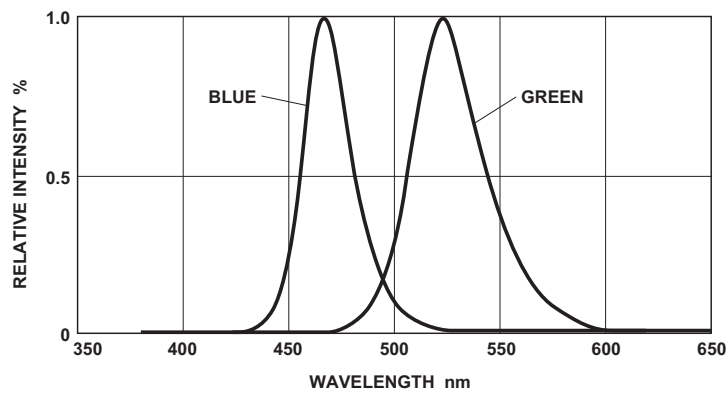


Figure 1. Relative intensity vs. wavelength.

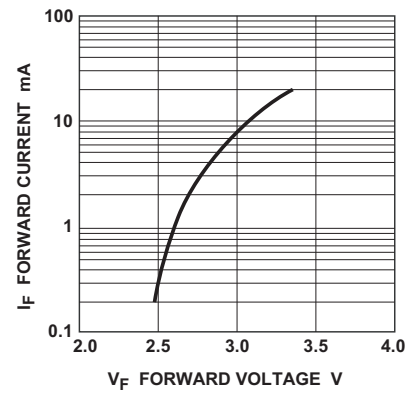


Figure 2. Forward current vs. forward voltage.

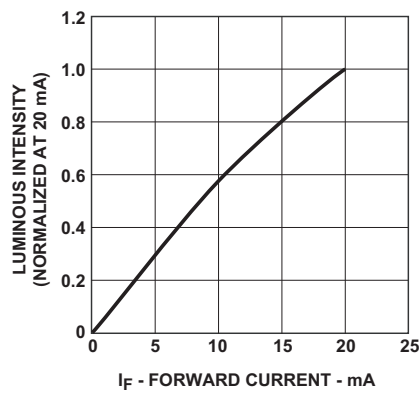


Figure 3. Luminous intensity vs. forward current.

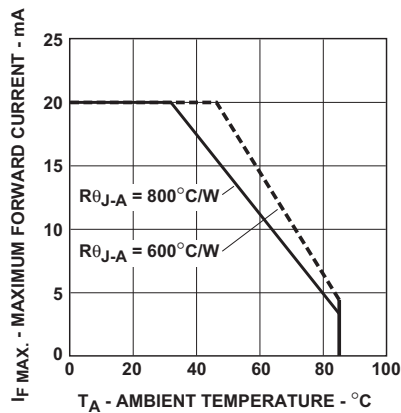
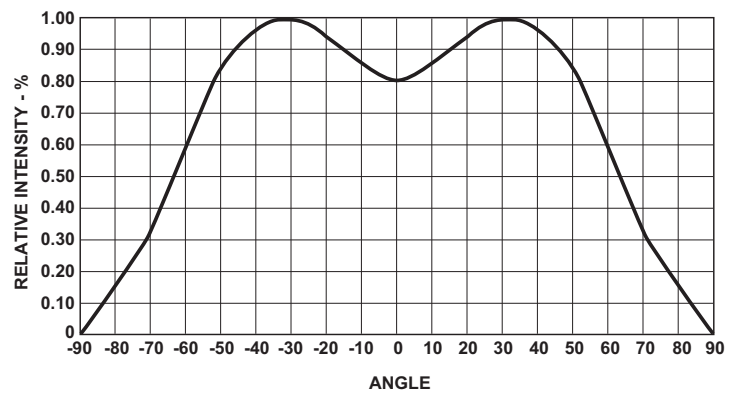


Figure 4. Maximum forward current vs. ambient temperature.

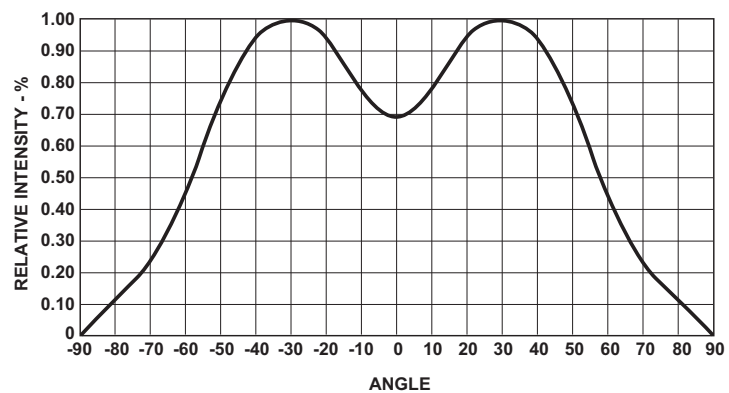


Figure 5. Relative intensity vs. angle for HSMx-C110.

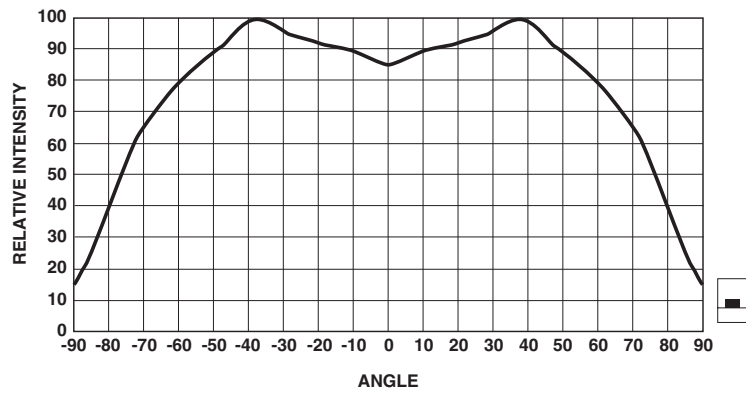
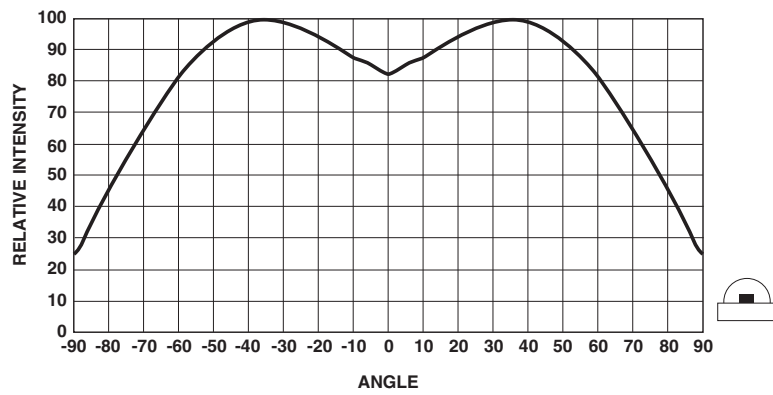


Figure 6. Relative intensity vs. angle for HSMx-C120

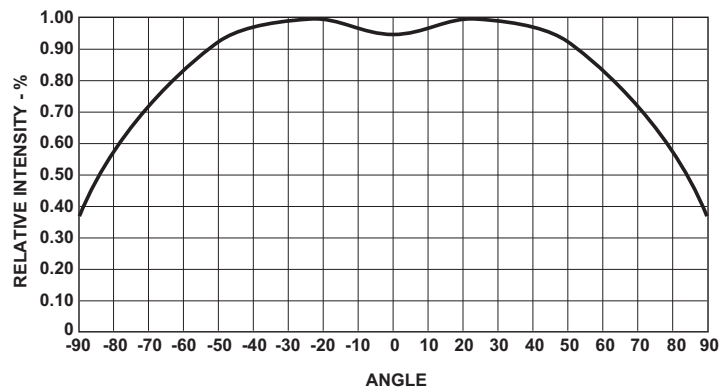


Figure 7. Relative intensity vs. angle for HSMx-C170, C190, C191, and C150.

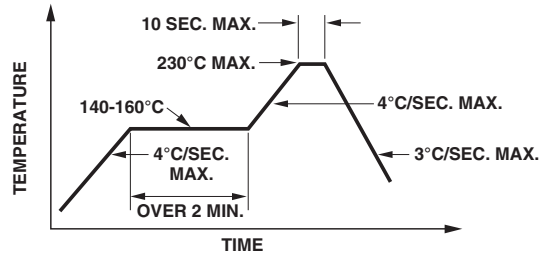


Figure 8. Recommended reflow soldering profile.

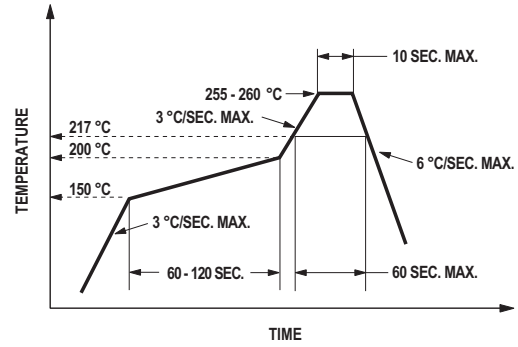


Figure 9. Recommended Pb-free reflow soldering profile.

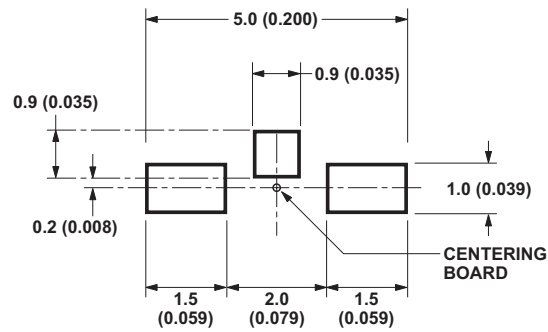


Figure 10. Recommended soldering pattern for HSMx-C110.

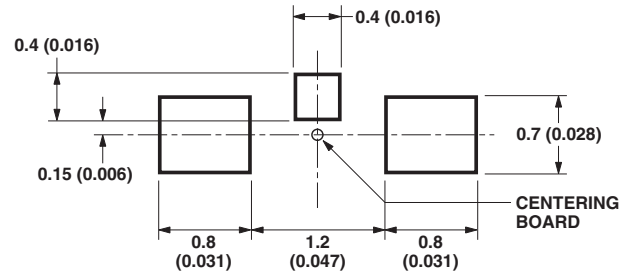


Figure 11. Recommended soldering pattern for HSMx-C120.

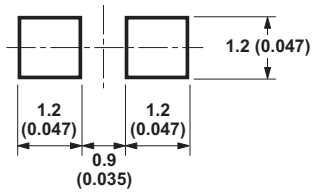


Figure 12. Recommended soldering pattern for HSMx-C170.

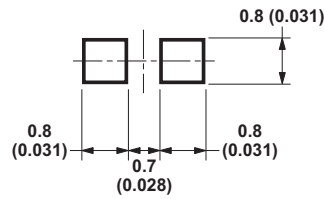


Figure 13. Recommended soldering pattern for HSMx-C190/C191

NOTE:

1. All dimensions in millimeters (inches).

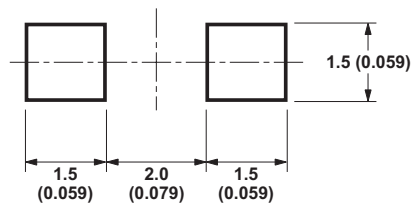


Figure 14. Recommended soldering pattern for HSMx-C150.

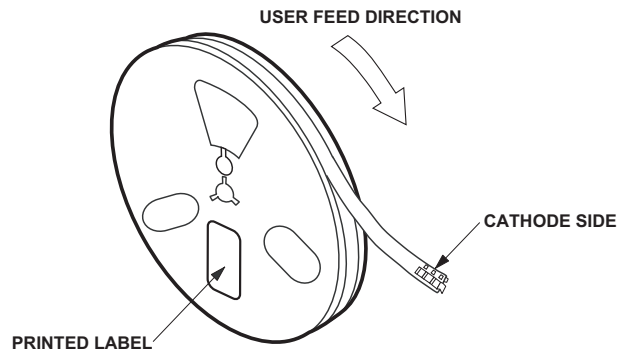
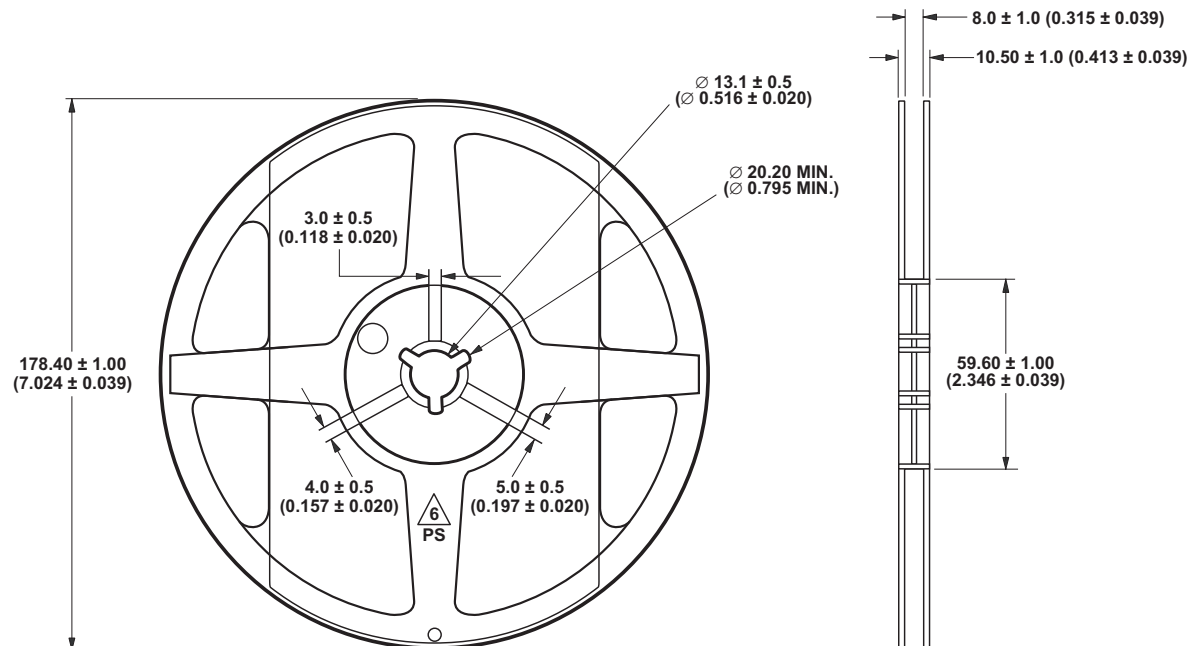


Figure 15. Reeling orientation.



NOTE:

1. All dimensions in millimeters (inches).

Figure 16. Reel dimensions.

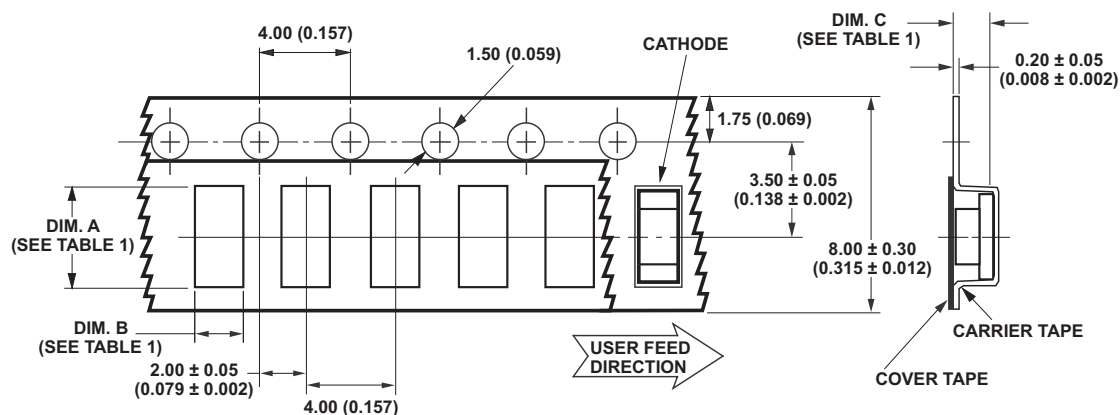


TABLE 1
DIMENSIONS IN MILLIMETERS (INCHES)

PART NUMBER	DIM. A ± 0.10 (± 0.004)	DIM. B ± 0.10 (± 0.004)	DIM. C ± 0.10 (± 0.004)
HSMx-C191 SERIES	1.85 (0.073)	0.88 (0.035)	0.85 (0.033)
HSMx-C190 SERIES	1.75 (0.069)	0.90 (0.035)	0.90 (0.035)
HSMx-C170 SERIES	2.30 (0.091)	1.45 (0.057)	0.95 (0.037)
HSMx-C110 SERIES	3.40 (0.134)	1.70 (0.067)	1.20 (0.047)
HSMx-C120 SERIES	1.90 (0.075)	1.15 (0.045)	0.75 (0.030)
HSMx-C150 SERIES	3.50 (0.138)	1.88 (0.074)	1.27 (0.050)

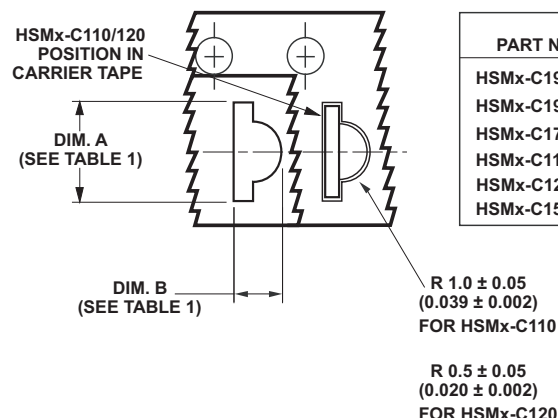
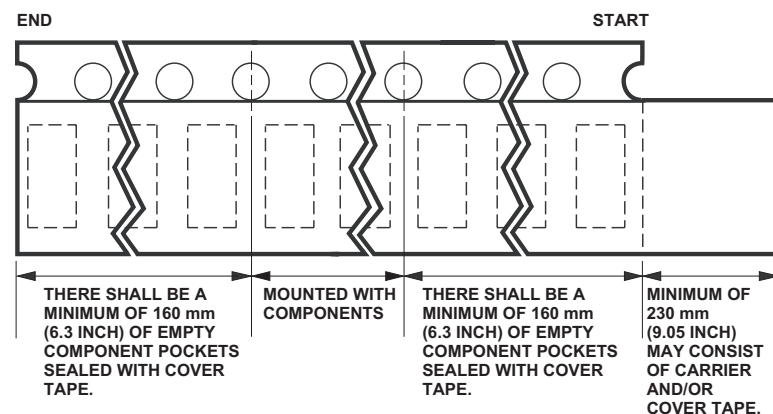


Figure 17. Tape dimensions.



NOTES:
1. All dimensions in millimeters (inches).
2. Tolerance is ± 0.1 mm (± 0.004 in.) unless otherwise specified.

Figure 18. Tape leader and trailer dimensions.

Reflow Soldering:

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

Storage Condition:

5 to 30°C @ 60%RH max.

Baking is required before mounting, if:

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.

Recommended baking condition:

60±5°C for 20 hours.

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

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