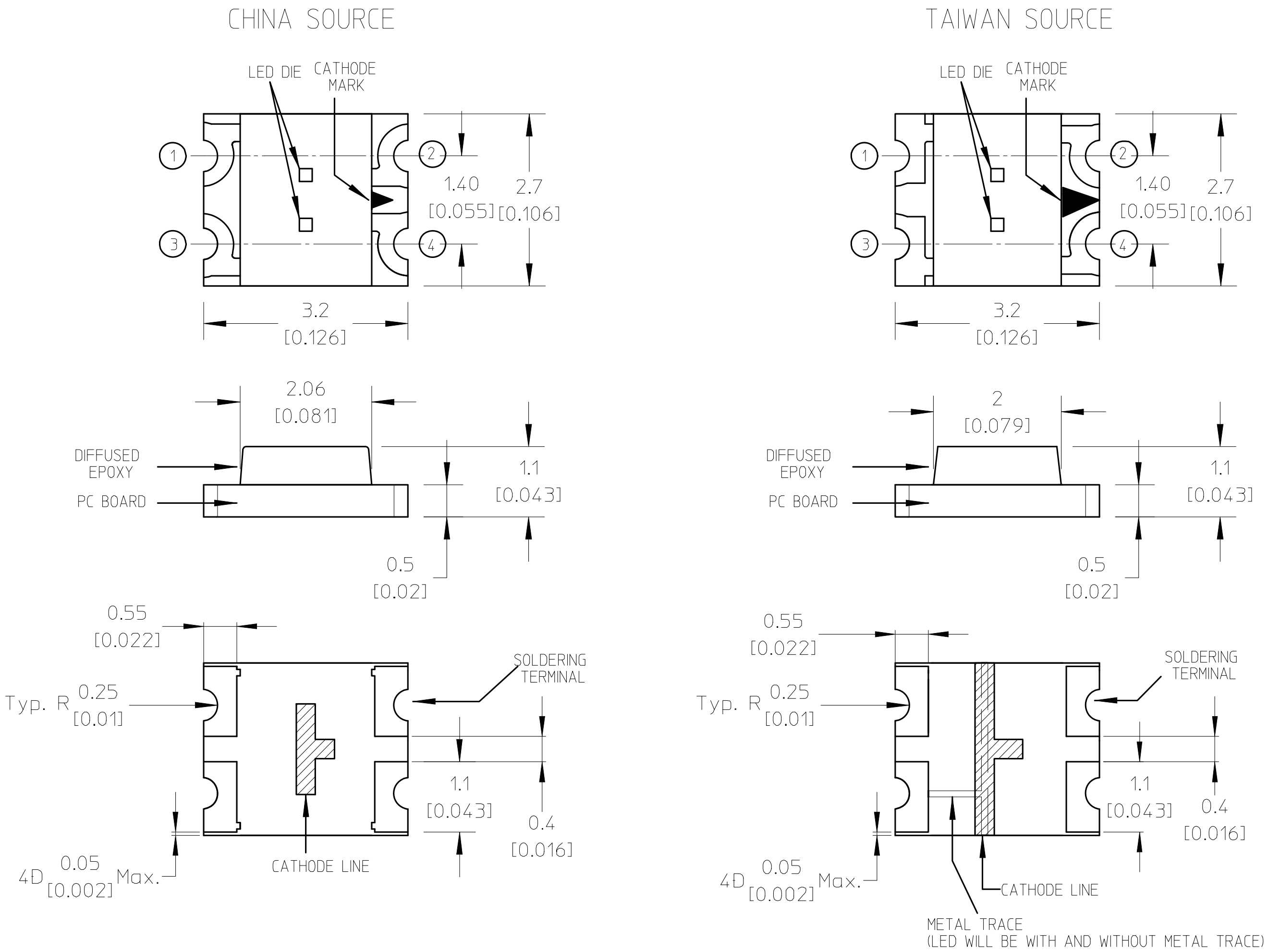
Package Dimensions



NOTES:
1. ALL DIMENSIONS IN MILLIMETERS (INCHES).
2. TOLERANCE IS ± 0.1 mm (± 0.004 IN.) UNLESS OTHERWISE SPECIFIED.

POLARITY	**HSMF-C153**	**HSMF-C155**	**HSMF-C156**	**HSMF-C157**	**HSMF-C158**
	Yellow	Green	Green	Green	Green
	HER	HER	Yellow	Orange	Amber

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Absolute Maximum Ratings at $T_A = 25°C$

Parameter	GaP	AlInGaP Green	AlInGaP Amber	Units
DC Forward Current [1]	20	20	25	mA
Power Dissipation [2]	65	52	60	mW
Reverse Voltage (I_R = 100µA)	5	5	5	V
LED Junction Temperature	95	95	95	°C
Operating Temperature Range	-40 to 85 °C			
Storage Temperature Range	-40 to 85 °C			
Soldering Temperature	See reflow soldering profile (Figure 6 & 7)			

Notes:
1. Derate linearly as shown in Figure 4 for temperature above 25°C.
2. Pulse condition of 1/10 duty and 0.1 msec. width.

Optical Characteristics at $T_A = 25°C$

	Luminous Intensity I_V [1] (mcd) @ 20mA		Color, Peak Wavelength λd (nm)	Color, Dominant Wavelength λd [2] (nm)	Viewing Angle $2\theta_{1/2}$ [3] (Degrees)
Part Number	**Min.**	**Typ.**	**Typical**	**Typical**	**Typical**
GaP HER	2.50	10.0	630	626	170
GaP Yellow	2.50	8.0	589	586	170
GaP Green	4.00	15.0	570	572	170
GaP Orange	2.50	8.0	605	604	170
AlInGaP Green	28.50	45.0	570	572	170
AlInGap Amber	28.50	55.0	595	592	170

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 LED package.
2. The dominant wavelength, λd, is derived from the CIE Chromaticity Diagram and represents the perceived color of the device.
3. $\lambda_{1/2}$ is the off-axis angle where the luminous intensity is ½ the peak intensity.

Electrical Characteristics at $T_A = 25°C$

	Forward Voltage V_F (Volts) [1] @ IF = 20mA		Reverse Breakdown VR (Volts) @ IR = 100µA	Capacitance C (pF) @VF = 0, f = 1Mhz	Thermal Resistance RθJ-P (°C/W)
Part Number	**Typ.**	**Max.**	**Min.**	**Typ.**	**Typ.**
GaP HER	2.1	2.6	5	5	325
GaP Yellow	2.1	2.6	5	6	325
GaP Green	2.2	2.6	5	9	325
GaP Orange	2.2	2.6	5	7	325
AlInGaP Green	2.1	2.4	5	22	325
AlInGap Amber	1.9	2.4	5	45	325

Notes: The bicolor package contain two individual light sources of different color. The specifications above refer to each color of a particular package.

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Color Bin Limits

GaP HER Color Bins [1]

Bin ID	Dominant Wavelength (nm)	
	Minimum	Maximum
-	620.0	635.0

Tolerance : ±1nm

GaP Yellow / AlInGaP Amber Color Bins [1]

Bin ID	Dominant Wavelength (nm)	
	Minimum	Maximum
A	582.0	584.5
B	584.5	587.0
C	587.0	589.5
D	589.5	592.0
E	592.0	594.5
F	594.5	597.0

Tolerance : ±1nm

GaP Orange Color Bins [1]

Bin ID	Dominant Wavelength (nm)	
	Minimum	Maximum
A	597.0	600.0
B	600.0	603.0
C	603.0	606.0
D	606.0	609.0
E	609.0	612.0
F	612.0	615.0

Tolerance : ±1nm

GaP Green Color Bins [1]

Bin ID	Dominant Wavelength (nm)	
	Minimum	Maximum
A	561.5	564.5
B	564.5	567.5
C	567.5	570.5
D	570.5	573.5
E	573.5	576.5

Tolerance : ±1nm

AlInGaP Green Color Bins [1]

Bin ID	Dominant Wavelength (nm)	
	Minimum	Maximum
A	561.5	564.5
B	564.5	567.5
C	567.5	570.5
D	570.5	573.5
E	573.5	576.5

Tolerance : ±1nm

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Light Intensity (Iv) Bin Limits[1]

Intensity (mcd)		
Bin ID	**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

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

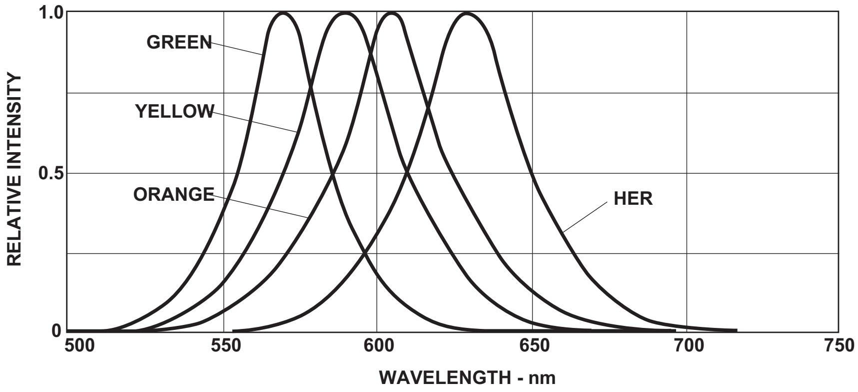

Figure 1. Relative intensity vs. wavelength.

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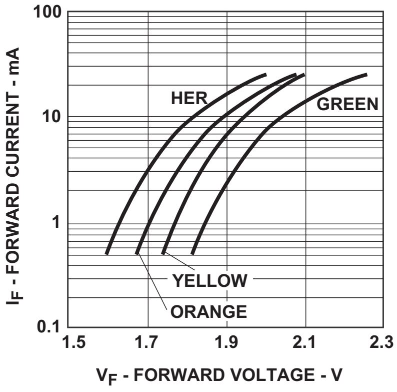


Figure 2. Forward current vs. forward voltage.

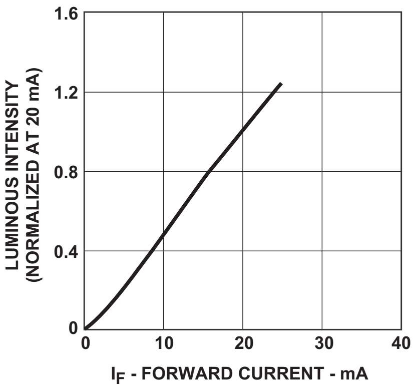


Figure 3. Luminous intensity vs. forward current (all colors).

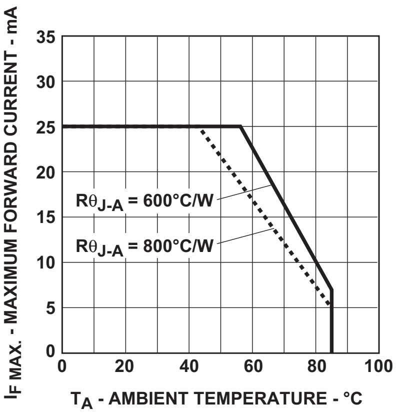


Figure 4. Maximum forward current vs. ambient temperature.

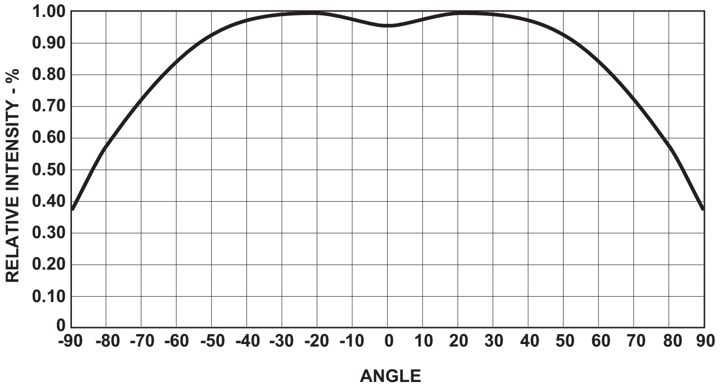


Figure 5. Relative intensity vs. angle for HSMF-C153, C155, C156, C157 and C158.

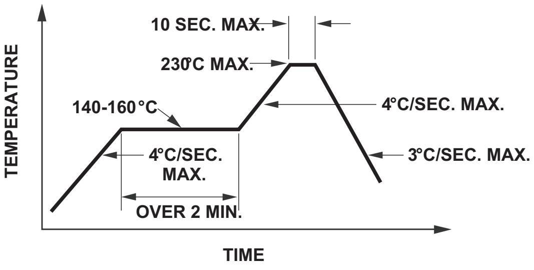
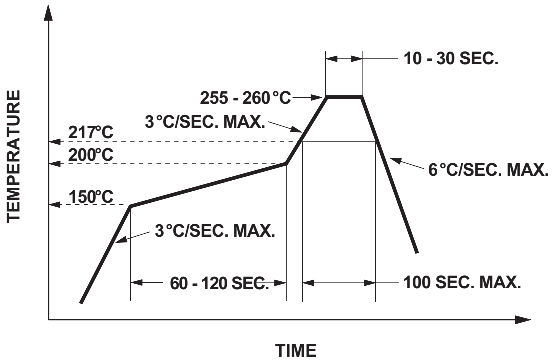
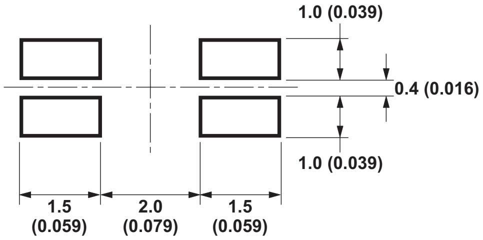


Figure 6. Recommended reflow soldering profile.



(Acc. to J-STD-020C)

Figure 7. Recommended Pb free reflow soldering profile.



Note: 1. All dimensions in millimeters (inches).

Figure 8. Recommended solder pad pattern.

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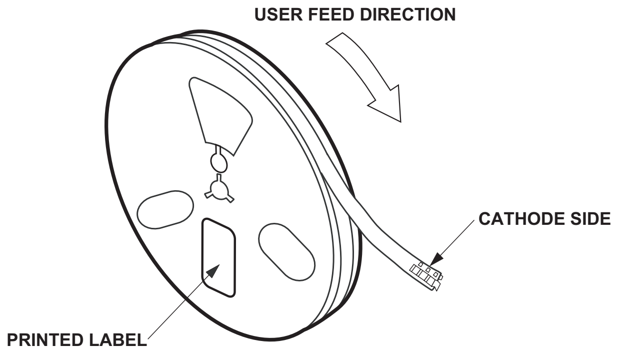
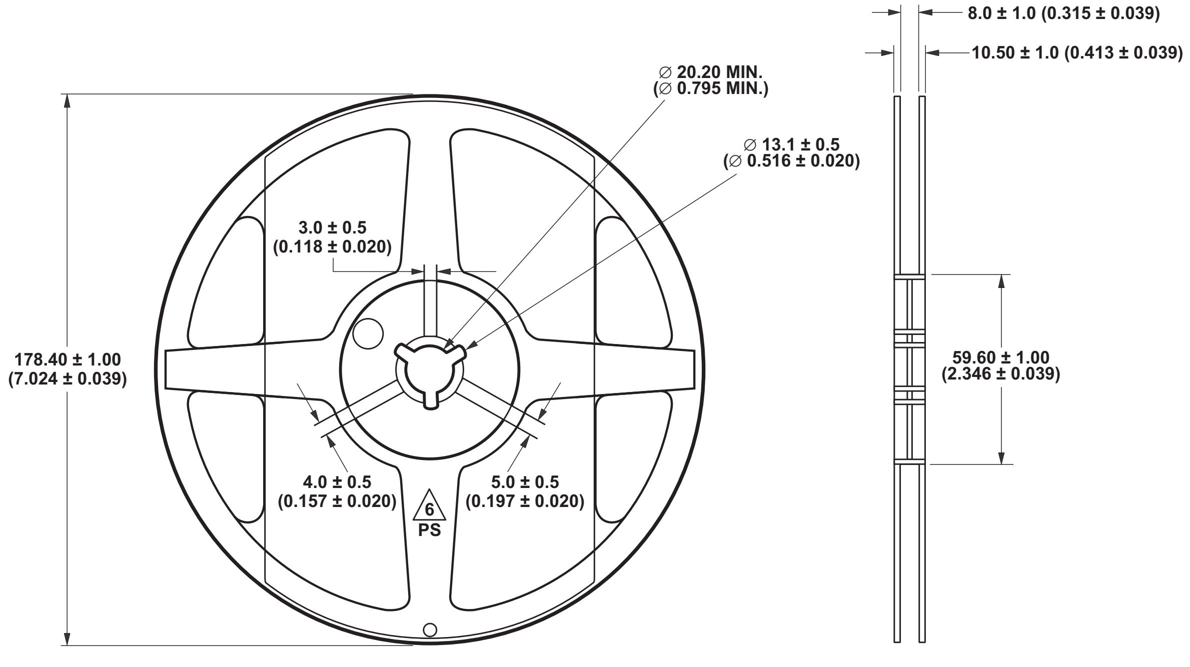


Figure 9. Reeling orientation.



Note:

All dimensions in millimeters (inches).

Figure 10. Reel dimensions.

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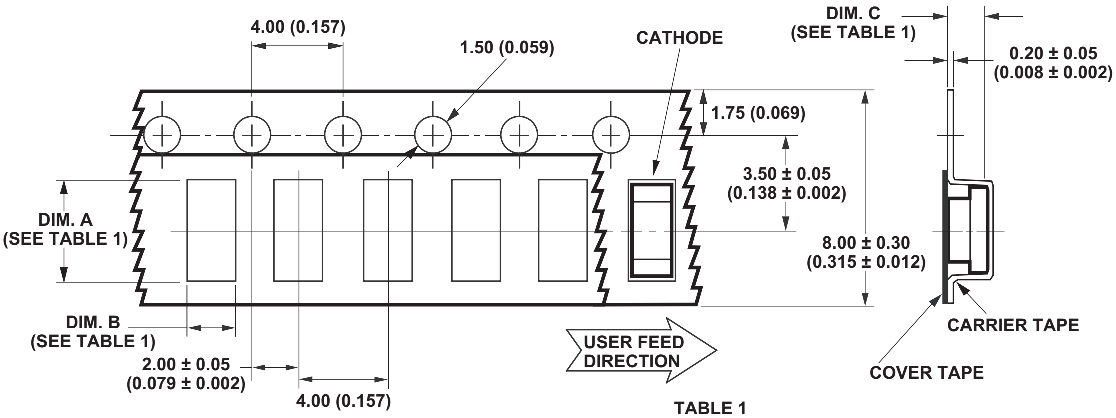

TABLE 1
DIMENSIONS IN MILLIMETERS (INCHES)

PART NUMBER	DIM. A ± 0.10 (0.004)	DIM. B ± 0.10 (0.004)	DIM. C ± 0.10 (0.004)
HSMF-C15x SERIES	3.52 (0.139)	3.02 (0.119)	1.40 (0.055)

Figure 11. Tape dimensions.

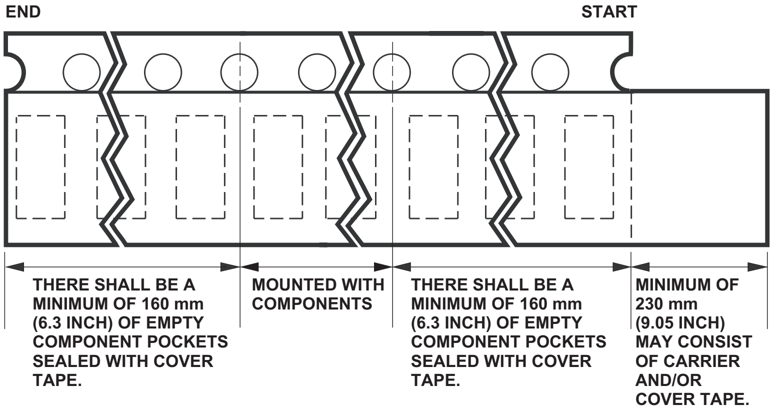

Figure 12. Tape leader and trailer dimensions.

Notes:

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

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:

a) Humidity Indicator Card is >10% when read at 23 ± 5°C

b) Device exposed to factory conditions < 30°C/60% RH more than 672 hours.

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

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