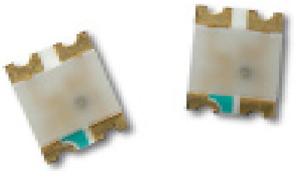
HSMF-C117
Tricolor ChipLED

Data Sheet



Description

The HSMF-C117 tricolor chip-type LED is designed in an ultra small package for miniaturization. It is the first of its kind to achieve such small packaging for 3 dies. With the freedom to have any combination of colors from mixing of the 3 primary colors, this will yield a wide variety of colors to suit every application and product theme.

The small size, narrow footprint, and low profile make this LED excellent for back-lighting, status indication, and front panel illumination applications.

In order to facilitate pick and place operation, this ChipLED is shipped in tape and reel, with 3000 units per reel. The package is compatible with IR soldering and binned by both color and intensity.

Features

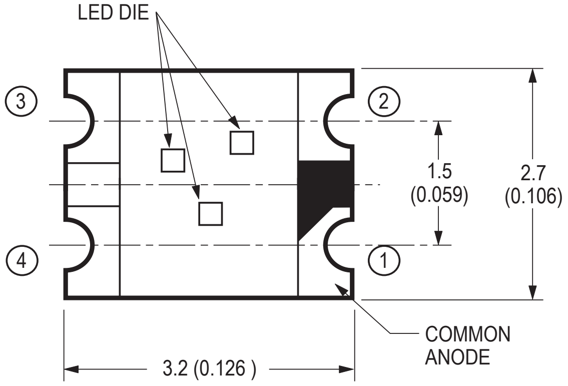
- Common anode
- Small 3.2 x 2.7 x 1.1 mm package
- Diffused optics
- Red/Green/Blue color
- Available in 8 mm tape on 7" diameter reels
- High brightness using AlInGaP and InGaN die technology
- Compatible with reflow soldering

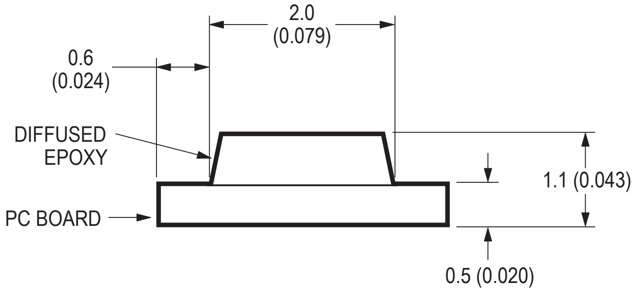
Applications

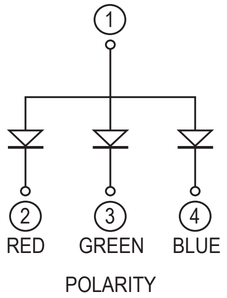
- Backlighting
- Status indicator
- Front panel indicator
- Office automation, home appliances, industrial equipment

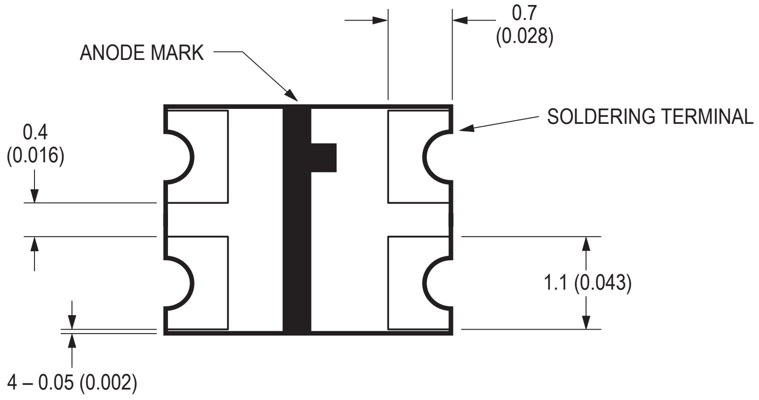
CAUTION: HSMF-C117 LEDs are Class 1A ESD sensitive per MIL-STD-1686. Please observe appropriate precautions during handling and processing. Refer to Avago Technologies Application Note AN-1142 for additional details.

Package Dimensions









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

Device Selection Guide

Package Dimension (mm)	Parts per Reel	Package Description
3.2 (L) x 2.7 (W) x 1.1 (H)	3000	Untinted, Diffused

Absolute Maximum Ratings at $T_A = 25$°C

Parameter	AlInGaP Red	InGaN Green	InGaN Blue	Units
DC Forward Current[1,3]	20	20	20	mA
Power Dissipation[1]	48	78	78	mW
DC Forward Current[2]	15	15	15	mA
Power Dissipation[2]	36	59	59	mW
Reverse Voltage ($I_R = 100$ μA)	5	5	5	V
LED Junction Temperature	95	95	95	°C
Operating Temperature Range	–30 to +85		°C	
Storage Temperature Range	–40 to +85		°C	
Soldering Temperature	See IR soldering profile (Figure 6)			

Notes:

1. Applies when single LED is lit up.
2. Applies when all 3 LEDs are lit up simultaneously.
3. Derate linearly as shown in Figure 4.
4. Drive currents above 5 mA are recommended for best long term performance.

Electrical Characteristics at $T_A = 25$°C

	Forward Voltage V_F (Volts) @ $I_F = 20$ mA		Reverse Breakdown V_R (Volts) @ $I_R = 100$ μA	Capacitance C (pF, @ $V_F = 0$, f = 1 MHz	Thermal Resistance $R\theta_{J\text{-}PIN}$ (°C/W)
Part Number	**Typ.**	**Max.**	**Min.**	**Typ.**	**Typ.**
AlInGaP Red Orange	1.9	2.4	5	17	400
InGaN Green	3.5	3.9	5	110	450
InGaN Blue	3.5	3.9	5	110	450

Vf Toleranc: ± 0.1 V.

Optical Characteristics at $T_A = 25$°C

	Luminous Intensity I_v (mcd) @ 20 mA[1]		Peak Wavelength λ_{peak} (nm)	Dominant Wavelength λ_d (nm)	Viewing Angle $2\,\theta_{1/2}$ Degrees[3]	Luminous Efficacy η_v (lm/w)
Part Number	**Min.**	**Typ.**	**Typ.**	**Typ.[2]**	**Typ.**	**Typ.**
AlInGaP Red	28.5	90	637	615	135	155
InGaN Green	45.0	120	523	525	130	490
InGaN Blue	11.2	40	468	470	125	80

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. $\theta_{1/2}$ is the off-axis angle where the luminous intensity is 1/2 the peak intensity.

Light Intensity (Iv) Bin Limit[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
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 Technologiesrepresentative for information on currently available bins.

Color Bin Limits[1]

Blue Color Bin Limits

	Dominant Wavelength (nm)	
Bin ID	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.

Red Color Bin Limits

	Dominant Wavelength (nm)	
Bin ID	Min.	Max.
–	620.0	635.0

Tolerance: ± 1 nm.

Green Color Bin Limits

	Dominant Wavelength (nm)	
Bin ID	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 Technologiesrepresentative for information on currently available bins.

CAUTION:

1. The above optical performance specifications are valid in the case when single LED is lit up.
2. The above product specifications DO NOT provide any guarantee on the color mixing, color consistency over time, or uniformity in luminous intensity when more than 1 LED is lit up.
3. Please refer to Avago Technologies' *Application Brief AB D-007* for additional details/explanation on driving the part in parallel circuit.

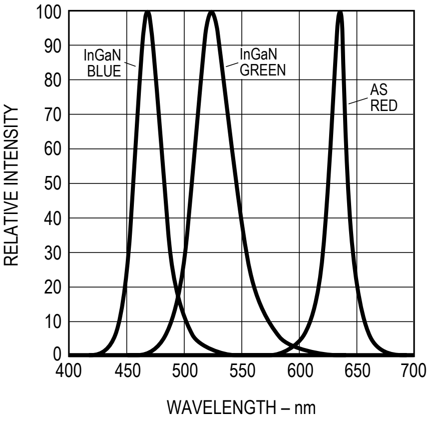


Figure 1: Relative intensity vs. wavelength.

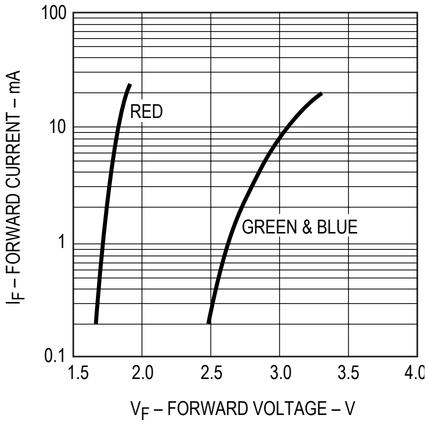


Figure 2: Forward current vs. forward voltage.

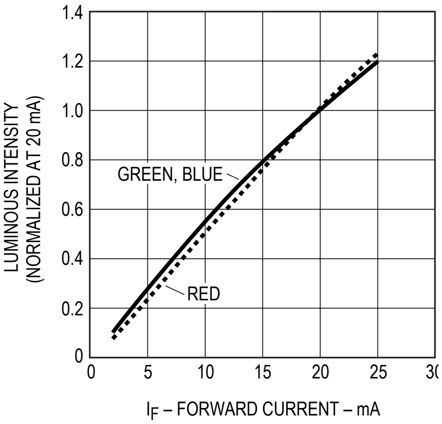


Figure 3: Luminous intensity vs. forward current.

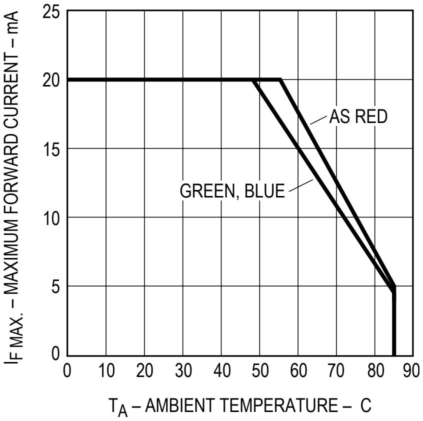


Figure 4: Maximum forward current vs. ambient temperature (1 chip lit up).

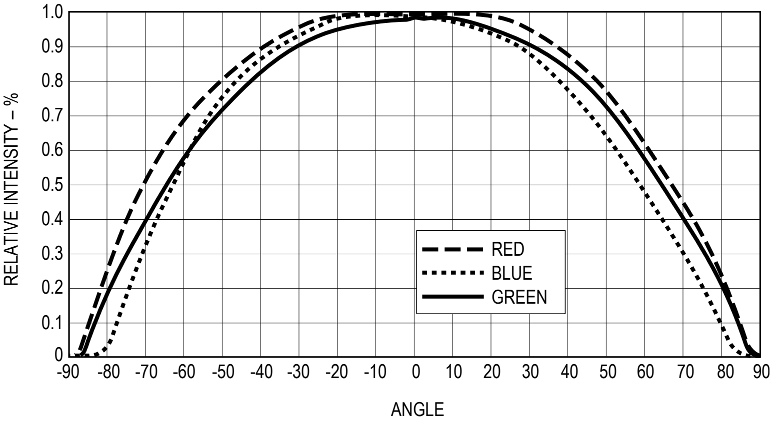


Figure 5: Relative intensity vs. angle.

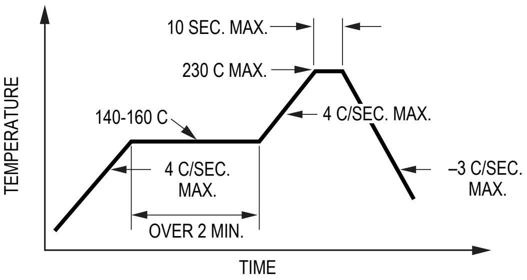
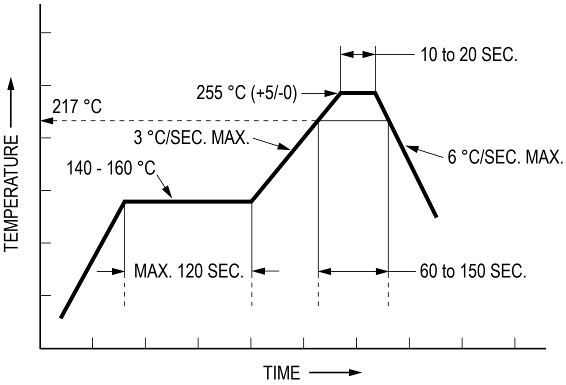


Figure 6: Recommended Pb-Free reflow soldering profile.



* THE TIME FROM 25 °C TO PEAK TEMPERATURE = 6 MINUTES MAX.

Figure 7: Recommended Pb-Free reflow soldering profile.

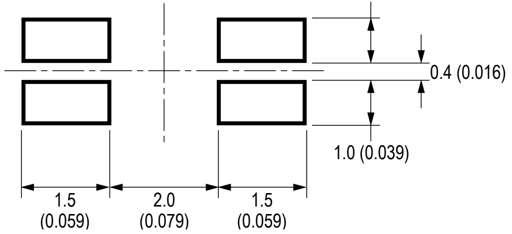


Figure 8: Recommended soldering pattern

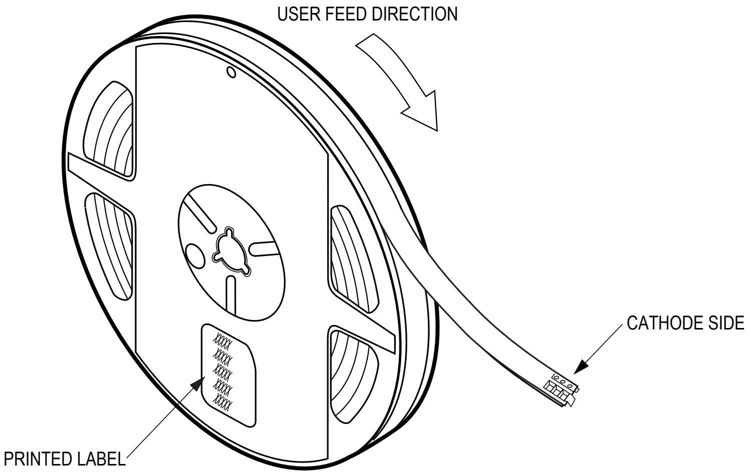


Figure 9: Reeling orientation.

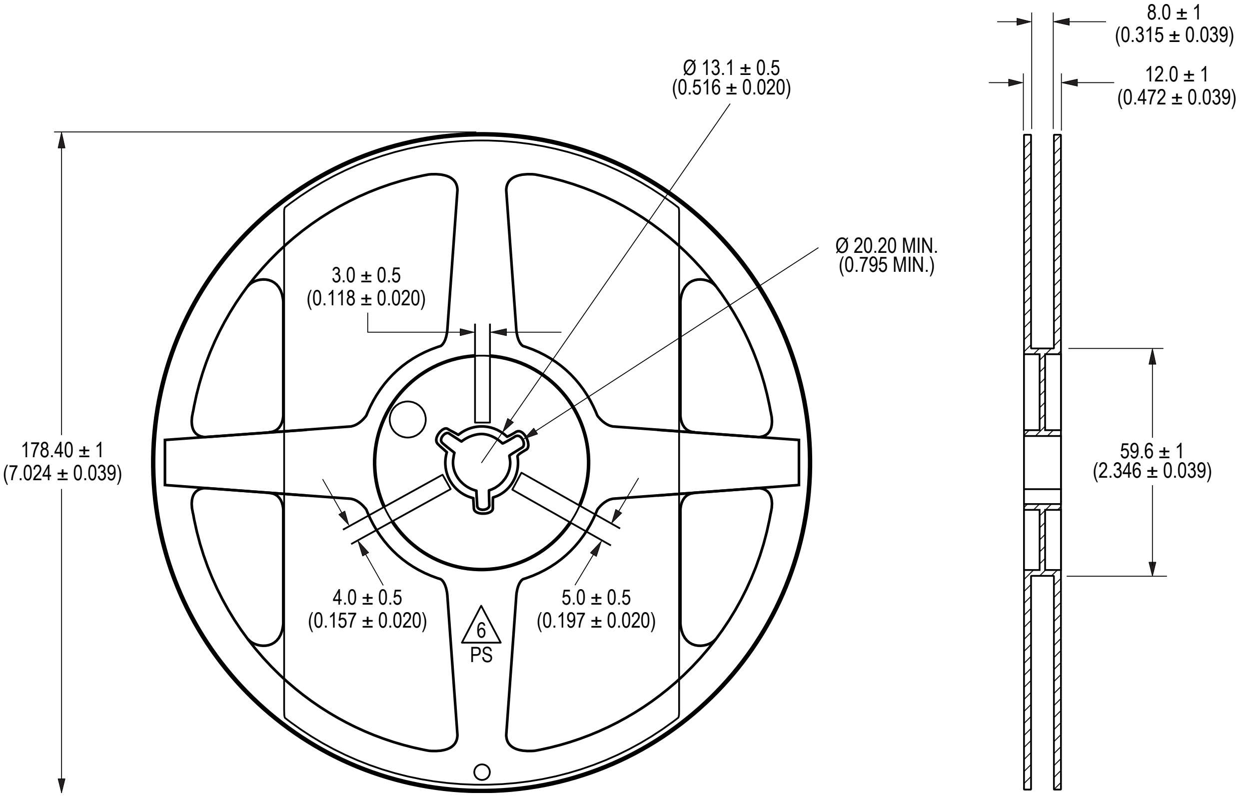


Figure 10: Reel dimensions.

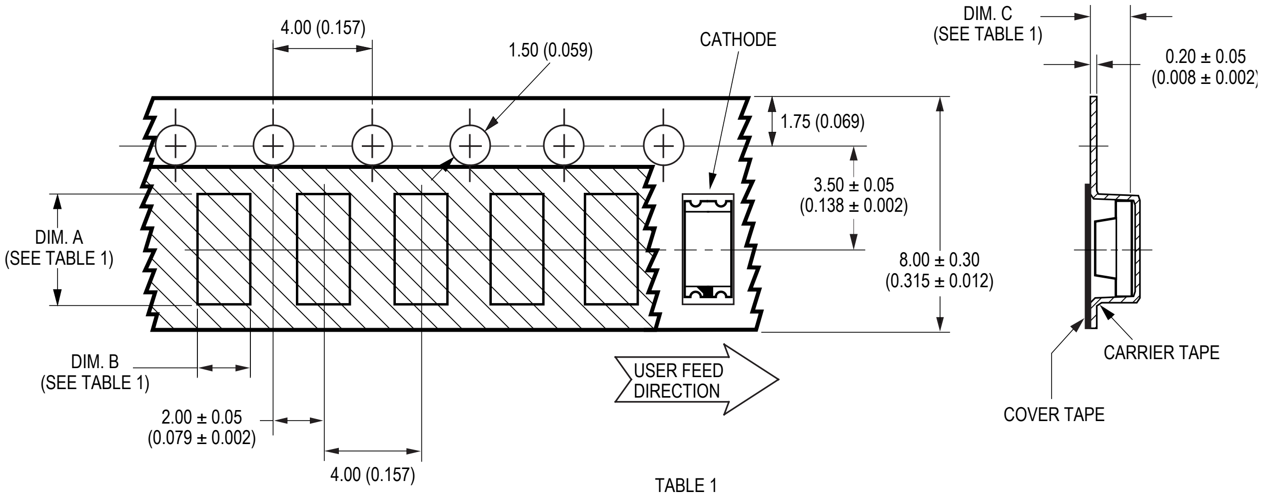


TABLE 1
DIMENSIONS IN MILLIMETERS (INCHES)

PART NUMBER	DIM. A ± 0.10 (± 0.004)	DIM. B ± 0.10 (± 0.004)	DIM. C ± 0.10 (± 0.004)
HSMF-C117	3.52 (0.139)	3.02 (0.119)	1.40 (0.055)

Figure 11: Tape dimensions.

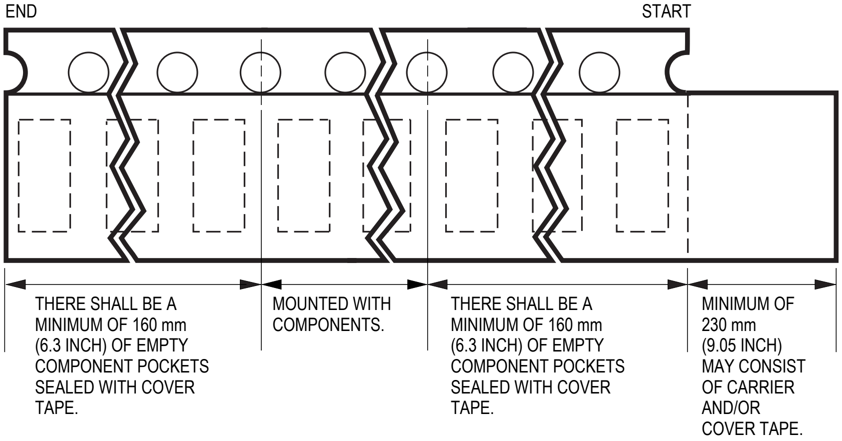


Figure 12: Tape leader and trailer dimensions.

Convective IR Reflow Soldering

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

Storage Condition: 5 to 30°C @ 60% RH max.

Baking is required under the condition:

a) the blue silica gel indicator becoming white/transparent color

b) the pack has been opened for more than 1 week.

Baking recommended 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**