Agilent HSMF-C118 TriColor ChipLED
Data Sheet

Features

- **Common anode**
- **Small 3.2 x 2.7 x 1.1 mm package**
- **Diffused optics**
- **Red/Green/Blue color combination**
- **Available in 8 mm tape on 7 inch (178 mm) 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**

Description

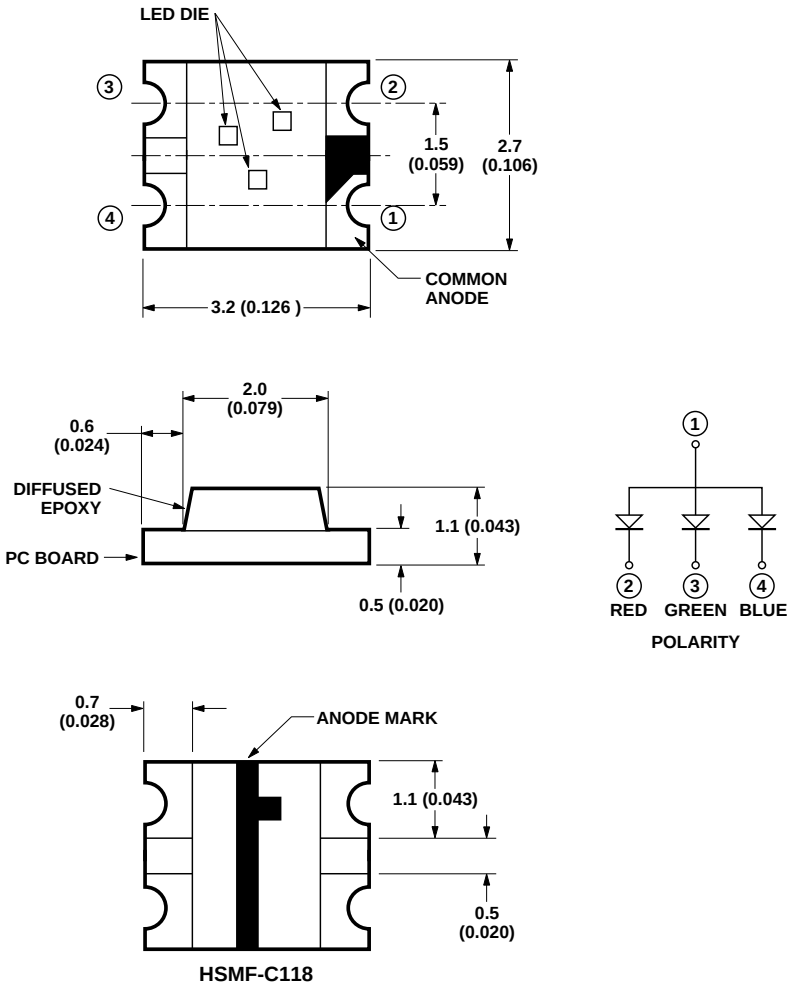
The HSMF-C118 tricolor chip-type LED is designed in an ultra small package for miniaturization. It is the first of its kind to achieve such small packaging for 3 dies. With the freedom to have any combination of colors from mixing of the 3 primary colors, this will yield a wide variety of colors to suit 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.

***CAUTION**: HSMF-C118 is 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



HSMF-C118

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

Absolute Maximum Ratings at T_A = 25°C

Parameter	AlInGaP Red	InGaN Green	InGaN Blue	Units
DC Forward Current[1, 3, 4]	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		–40 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

Color	Forward Voltage V_F (Volts) @ I_F = 20 mA Typ.	Forward Voltage V_F (Volts) @ I_F = 20 mA Max.	Reverse Breakdown V_R (Volts) @ I_R = 100 μA Min.	Capacitance C (pF), @ V_F = 0, f = 1 MHz Typ.	Thermal Resistance $R\theta_{J\text{-}PIN}$ (°C/W) Typ.
AlInGaP Red	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

Optical Characteristics at T_A = 25°C

Color	Luminous Intensity I_v (mcd) @ I_F = 20 mA[1] Min.	Luminous Intensity I_v (mcd) @ I_F = 20 mA[1] Typ.	Peak Wavelength λ_{peak} (nm) Typ.	Color, Dominant Wavelength λ_d[2] (nm) Typ.	Viewing Angle 2 $\theta_{1/2}$ Degrees[3] Typ.	Luminous Efficacy η_v (lm/W) Typ.
AlInGaP Red	25	90	637	626	135	155
InGaN Green	40	120	523	525	130	490
InGaN Blue	10	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 Chromatically 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.

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 color mixing, color consistency over time, or uniformity in luminous intensity when more than 1 LED is lit.
3. Please refer to Agilent Technologies' *Application Brief AB D-007* for additional details/explanation on driving the part in parallel circuit.

Intensity (I_V) Bin Limits[1]

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

Tolerance: ±15%.

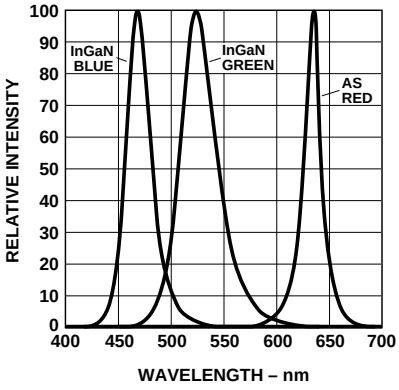


Figure 1. Relative intensity vs. wavelength.

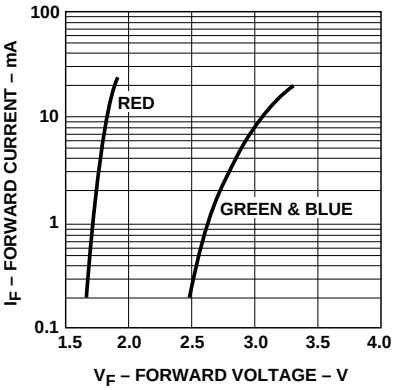


Figure 2. Forward current vs. forward voltage.

Color Bin Limits[1]

	Blue Color Bins	
	Dom. 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 Bins	
	Dom. Wavelength (nm)	
Bin ID	**Min.**	**Max.**
–	615.0	630.0

Tolerance: ± 1 nm

	Green Color Bins	
	Dom. 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

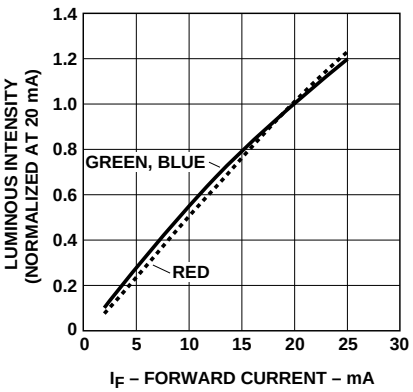


Figure 3. Luminous intensity vs. forward current.

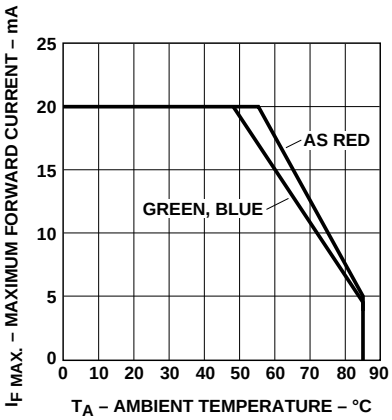


Figure 4. Maximum forward current vs. ambient temperature (1 chip lit up).

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.

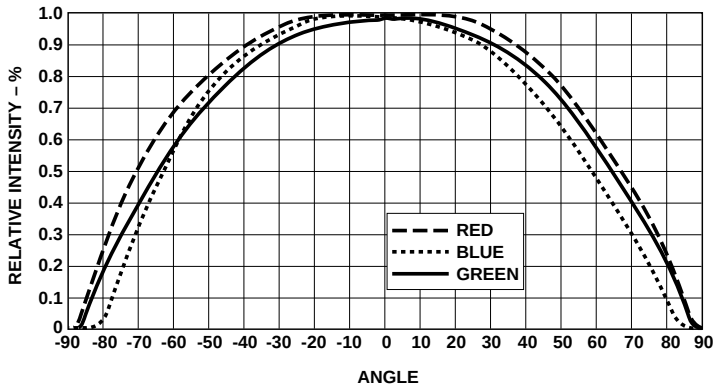


Figure 5. Relative intensity vs. angle.

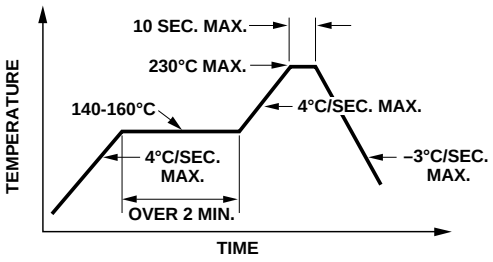
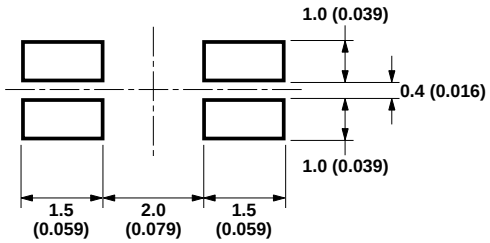


Figure 6. Recommended reflow soldering profile.



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

Figure 7. Recommended soldering pattern.

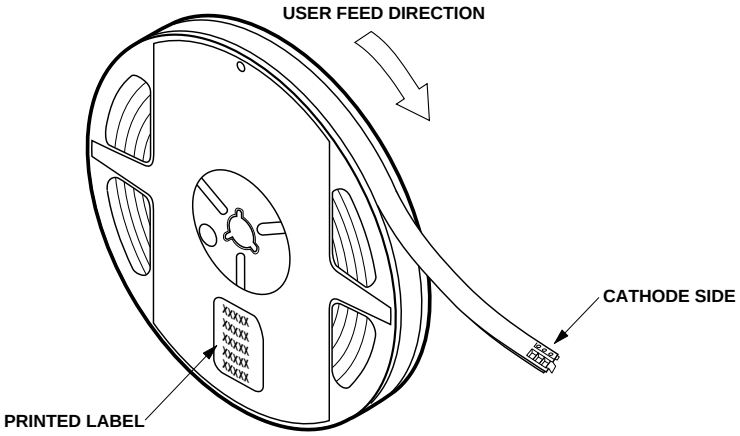
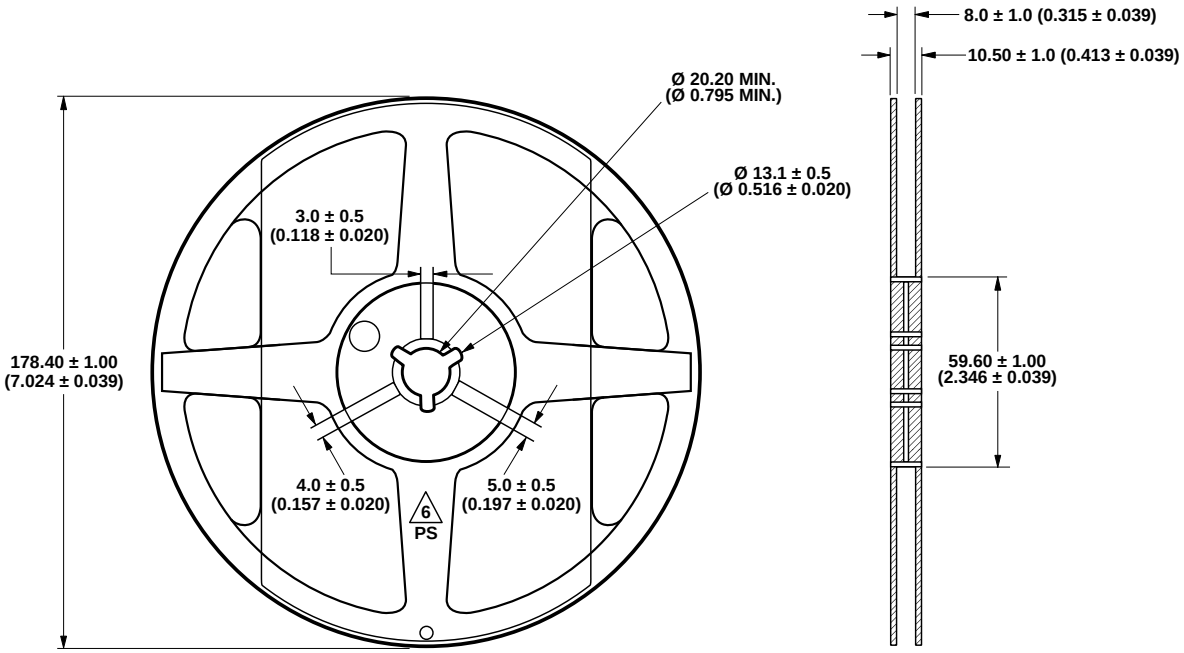


Figure 8. Reeling orientation.



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

Figure 9. Reel dimensions.

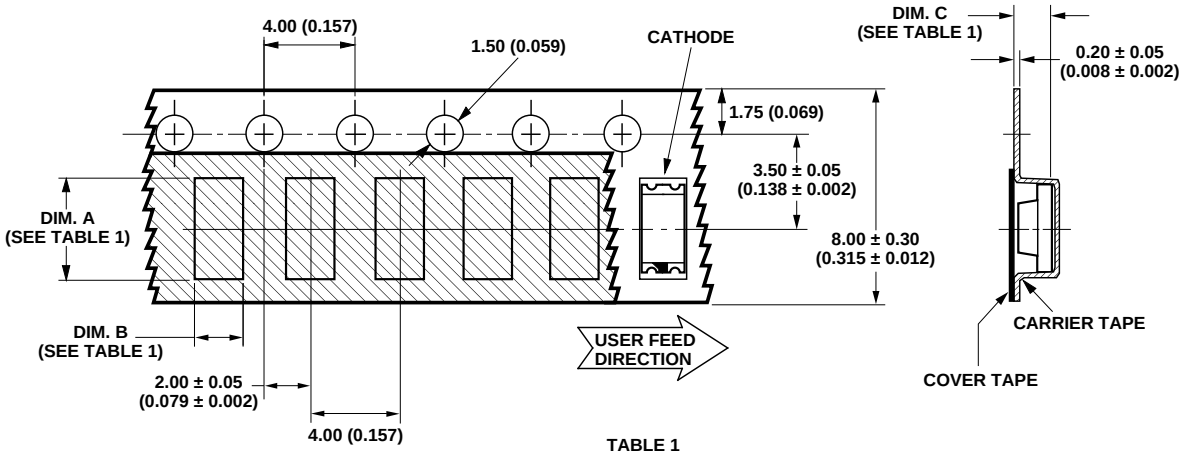


TABLE 1
DIMENSIONS IN MILLIMETERS (INCHES)

PART NUMBER	DIM. A ± 0.10 (± 0.004)	DIM. B ± 0.10 (± 0.004)	DIM. C ± 0.10 (± 0.004)
HSMF-C118	3.52 (0.139)	3.02 (0.119)	1.40 (0.055)

Figure 10. Tape dimensions.

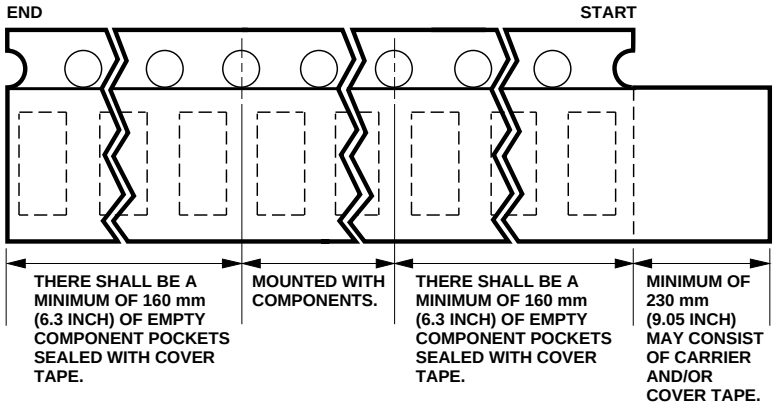


Figure 11. Tape leader and trailer dimensions.

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) 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.

www.agilent.com/semiconductors

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

For technical assistance call:

Americas/Canada: +1 (800) 235-0312 or (408) 654-8675

Europe: +49 (0) 6441 92460

China: 10800 650 0017

Hong Kong: (+65) 6271 2451

India, Australia, New Zealand: (+65) 6271 2394

Japan: (+81 3) 3335-8152(Domestic/International), or 0120-61-1280(Domestic Only)

Korea: (+65) 6271 2194

Malaysia, Singapore: (+65) 6271 2054

Taiwan: (+65) 6271 2654

Data subject to change.

June 3, 2002
5988-6892EN

Agilent Technologies