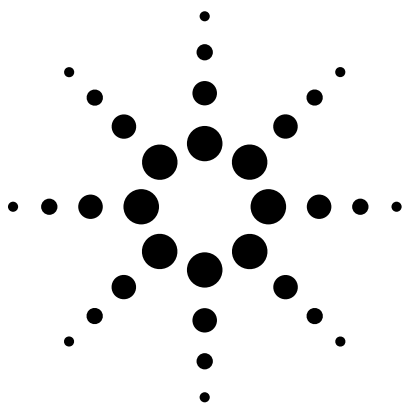


# Agilent HSMx-C191 Low Profile ChipLED Data Sheet



## Description

This series of ChipLEDs is designed with the smallest footprint to achieve high density of components on board. The HSMx-C191 has the industry standard 1.6 mm x 0.8 mm footprint. Its low 0.6 mm profile and wide viewing angle make this LED exceptional for backlighting applications. The available colors in this surface mount series are HER, orange, yellow, green, and AS AlGaAs red.

This package is fully binned by color and intensity, except for red color. In order to facilitate pick and place operation, these ChipLEDs are shipped in tape and reel, with 4000 units per reel. These packages are compatible with IR soldering process.

## Features

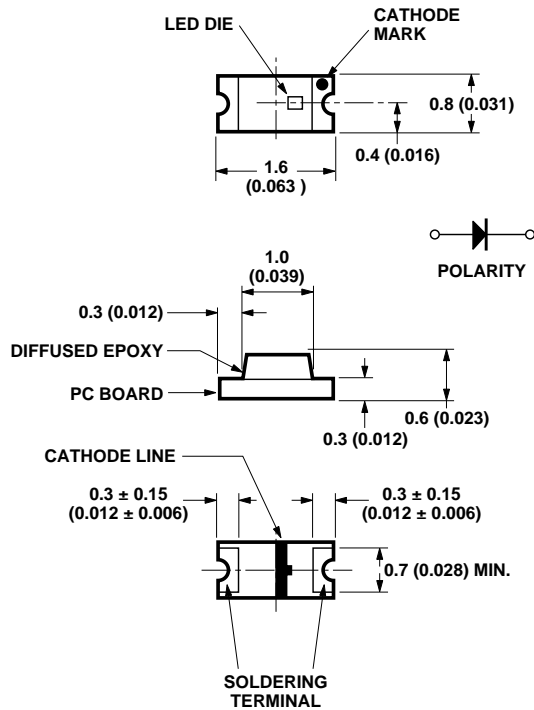
- **Small size**  
1.6 mm x 0.8 mm x 0.6 mm
- **Industry standard footprint**
- **Diffused optics**
- **Operating temperature range of**  
-30°C to 85°C
- **Available in 5 colors**  
(HER, orange, yellow, green,  
AS AlGaAs red)
- **Compatible with IR solder reflow**
- **Available in 8 mm tape on**  
7" diameter reel

## Applications

- **Keypad backlighting**
- **Push button backlighting**
- **LCD backlighting**
- **Symbol indicator**
- **Front panel indicator**



## Package Dimensions



HSMx-C191

**Notes:**

1. All dimensions in millimeters (inches).
2. Tolerance is  $\pm 0.1$  mm ( $\pm 0.004$  in.) unless otherwise specified.
3. Polarity for HSMH-C191 will be the opposite of what is shown on above drawing.

### Device Selection Guide

Footprint (mm) <sup>[1,2]</sup>	HER	Orange	Yellow	Green	AS AlGaAs Red	Package Description
1.6 x 0.8 x 0.6	HSMS-C191	HSMD-C191	HSMY-C191	HSMG-C191	HSMH-C191	Untinted, Diffused

**Notes:**

1. Dimensions in mm.
2. Tolerance  $\pm 0.1$  mm unless otherwise noted.

## Absolute Maximum Ratings

$T_A = 25^\circ\text{C}$

Parameter	HSMS/HSMD/HSMY/HSMG-C191	HSMH-C191	Units
DC Forward Current <sup>[1]</sup>	20	25	mA
Peak Pulsing Current <sup>[2]</sup>	100	100	mA
Power Dissipation	52	65	mW
Reverse Voltage ( $I_R = 100 \mu\text{A}$ )	5	5	V
LED Junction Temperature	95	95	$^\circ\text{C}$
Operating Temperature Range	-30 to +85	-30 to +85	$^\circ\text{C}$
Storage Temperature Range	-40 to +85	-40 to +85	$^\circ\text{C}$
Soldering Temperature	See IR soldering profile (Figure 6)		

### Notes:

1. Derate linearly as shown in Figure 4.
2. Pulse condition of 1/10 duty and 0.1 msec width.

## Electrical Characteristics

$T_A = 25^\circ\text{C}$

Part Number	Color	Forward Voltage $V_F$ (Volts) @ $I_F = 20 \text{ mA}$		Reverse Breakdown $V_R$ (Volts) @ $I_R = 100 \mu\text{A}$	Capacitance C (pF), $V_F = 0$ , $f = 1 \text{ MHz}$	Thermal Resistance $R_{\theta\text{J-PIN}}$ ( $^\circ\text{C/W}$ )
		Typ.	Max.	Min.	Typ.	Typ.
HSMS-C191	HER	2.1	2.6	5	5	250
HSMD-C191	Orange	2.2	2.6	5	7	250
HSMY-C191	Yellow	2.1	2.6	5	6	250
HSMG-C191	Green	2.2	2.6	5	9	250
HSMH-C191	AlGaAs	1.8	2.6	5	18	300

## Optical Characteristics

$T_A = 25^\circ\text{C}$

Part Number	Color	Luminous Intensity $I_v$ (mcd) @ 20 mA <sup>[1]</sup>		Peak Wavelength $\lambda_{\text{peak}}$ (nm)	Color, Dominant Wavelength $\lambda_d$ <sup>[2]</sup> (nm)	Viewing Angle $2 \theta_{1/2}$ Degrees <sup>[3]</sup>
		Min.	Typ.	Typ.	Typ.	Typ.
HSMS-C191	HER	2.50	10.0	630	626	170
HSMD-C191	Orange	2.50	8.0	605	604	170
HSMY-C191	Yellow	2.50	8.0	589	586	170
HSMG-C191	Green	4.00	15.0	570	572	170
HSMH-C191	AlGaAs	6.30	17.0	660	639	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 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.

## Color Bin Limits<sup>[1]</sup>

### Green Color Bins<sup>[1]</sup>

Bin ID	Dom. Wavelength (nm)	
	Min.	Max.
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:  $\pm 0.5$  nm

### Yellow/Amber Color Bins<sup>[1]</sup>

Bin ID	Dom. Wavelength (nm)	
	Min.	Max.
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:  $\pm 0.5$  nm

### Orange Color Bins<sup>[1]</sup>

Bin ID	Dom. Wavelength (nm)	
	Min.	Max.
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:  $\pm 1$  nm

### Light Intensity (Iv) Bin Limits<sup>[1]</sup>

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:  $\pm 15\%$

#### 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.

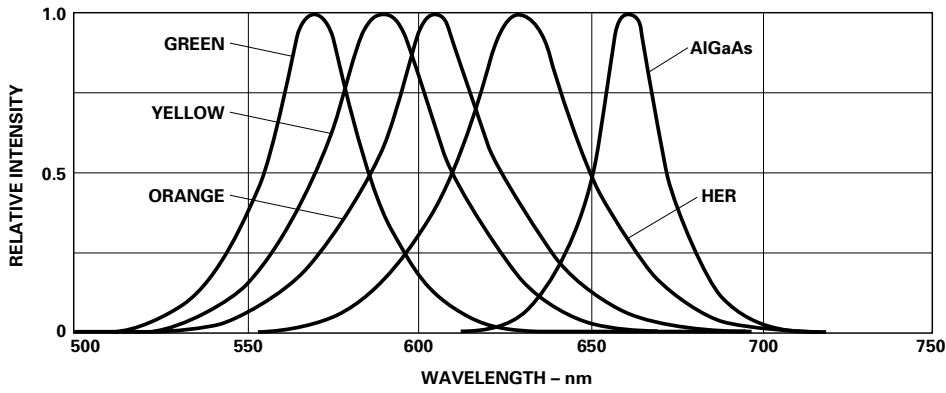


Figure 1. Relative intensity vs. wavelength.

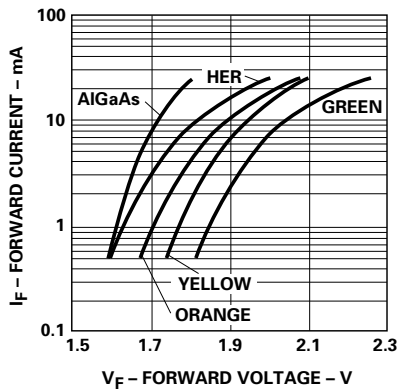


Figure 2. Forward current vs. forward voltage.

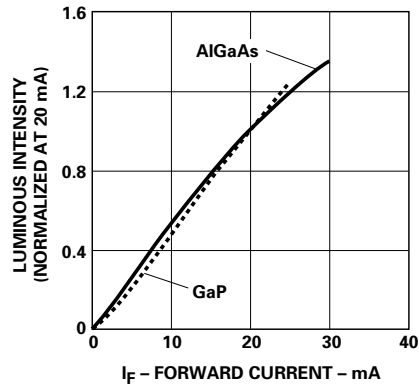


Figure 3. Luminous intensity vs. forward current.

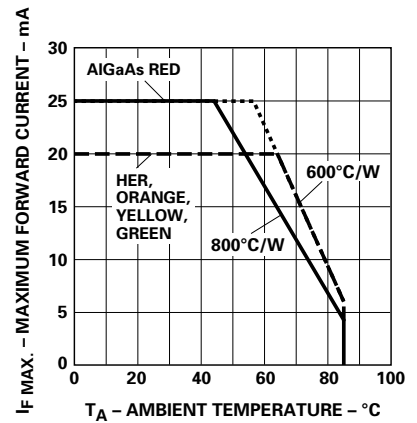


Figure 4. Maximum forward current vs. ambient temperature.

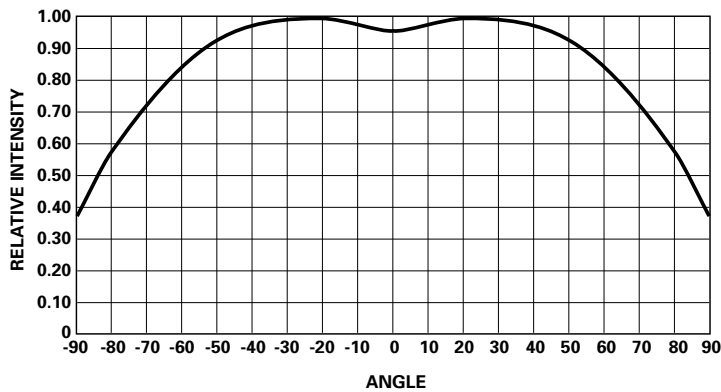


Figure 5. Relative intensity vs. angle for HSMx-C191.

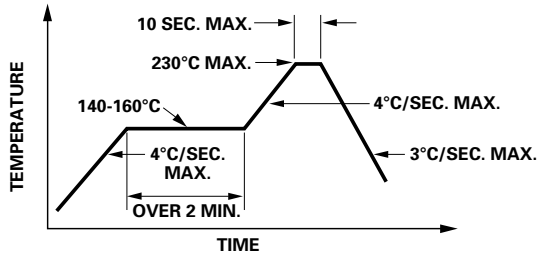


Figure 6. Recommended reflow soldering profile.

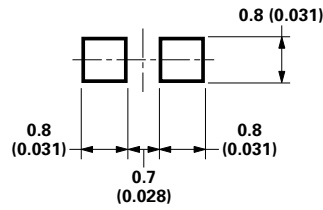


Figure 7. Recommended Soldering Pattern for HSMx-C191.

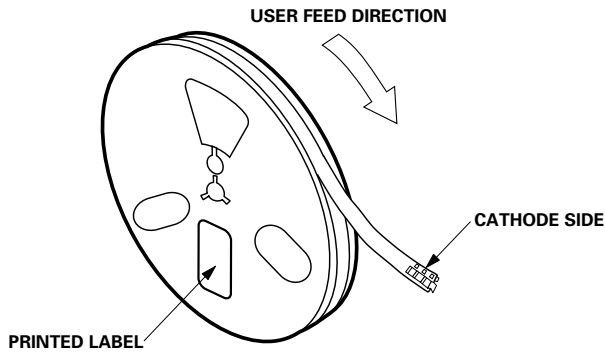


Figure 8. Reeling orientation.

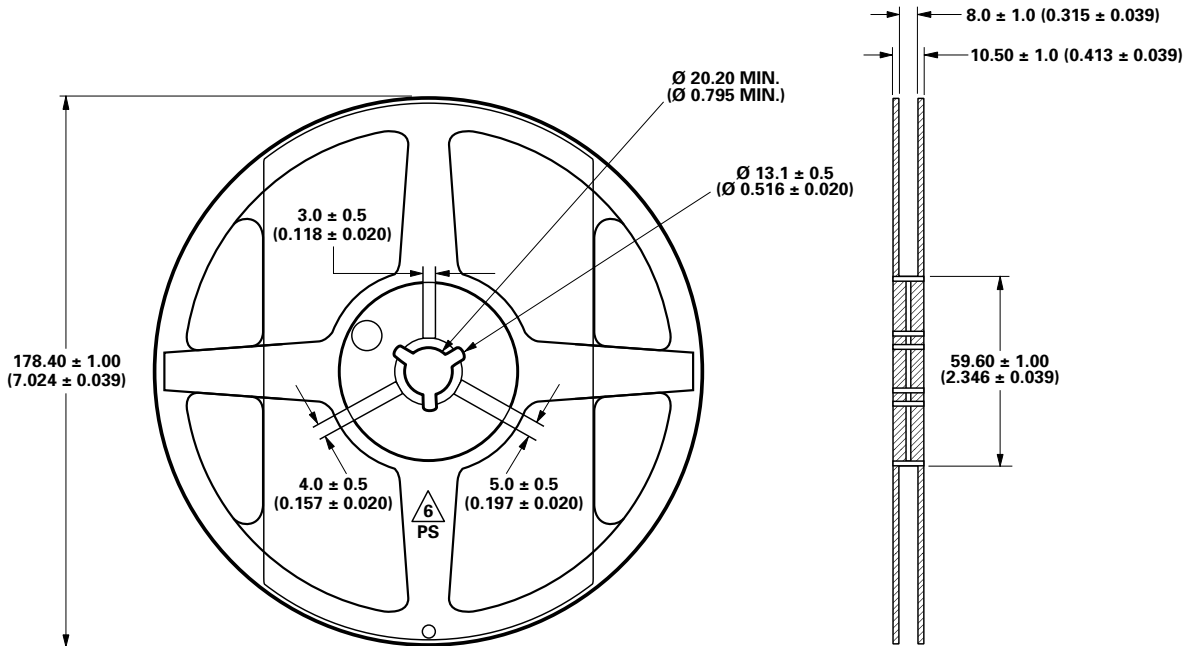


Figure 9. Reel dimensions.

Note: All dimensions in millimeters (inches).

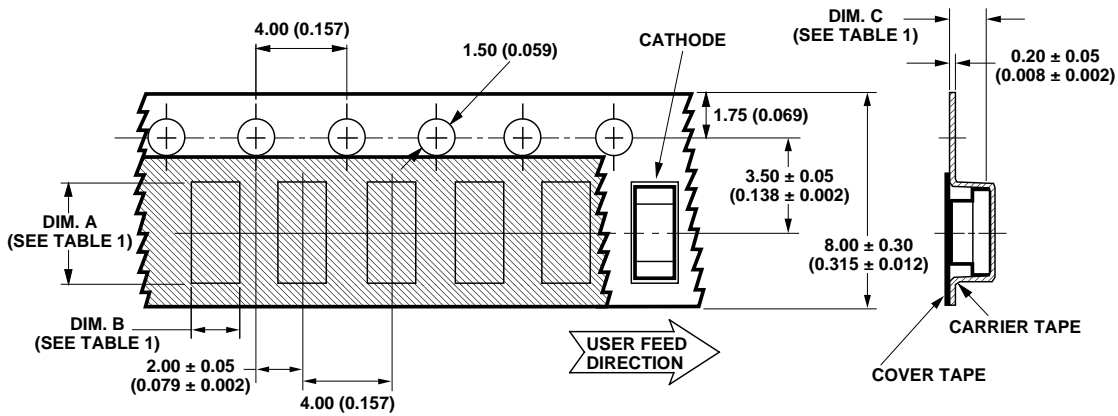
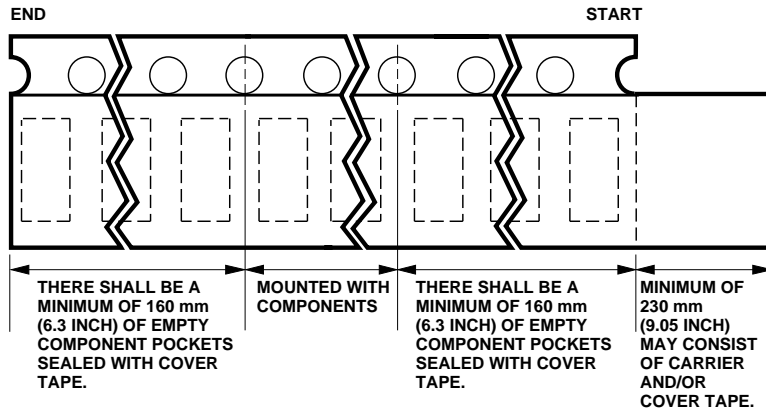


TABLE 1  
DIMENSIONS IN MILLIMETERS (INCHES)

PART NUMBER	DIM. A ± 0.10 (0.004)	DIM. B ± 0.10 (0.004)	DIM. C ± 0.10 (0.004)
HSMx-C191 SERIES	1.80 (0.071)	0.95 (0.037)	0.75 (0.030)

Figure 10. Tape dimensions.



### Convective IR Reflow Soldering

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

Figure 11. Tape leader and trailer dimensions.

Notes:

- All dimensions in millimeters (inches).
- Tolerance is  $\pm 0.1$  mm ( $\pm 0.004$  in.) unless otherwise specified.

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

Baking is required under the condition:

- the blue silica gel indicator becoming white/transparent color
- the pack has been opened for more than 1 week

Baking recommended condition: 60  $\pm$  5° C for 20 hours.

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