

### **SpicePlus**

Like spice, its diminutive size is a stark contrast to its standout performance in terms of brightness, durability and reliability. Despite being the smallest in size yet the SpicePlus packs a powerful performance and is a highly reliable design device.



### **Features:**

- > Super high brightness surface mount LED automotive exterior applications.
- > 120° viewing angle.
- > Compact package outline (LxW) of 2.5 x 2.0mm.
- > Ultra low height profile - 0.7mm.
- > Low thermal resistance.
- > Superior corrosion robustness.
- > Compatible to IR reflow soldering.
- > Compliance to automotive standard; AEC-Q102.
- > Environmental friendly; RoHS compliance.



### **Applications:**

- > Automotive: Interior application, eg: Ambient lighting
- > Automotive: Exterior application, eg: Welcome lighting.

## Optical Characteristics at T<sub>j</sub>=25°C

Part Number	Color	Viewing Angle°	Luminous Flux <sup>Appx. 1.2</sup> If = 200mA IV (lm)			Luminous Intensity <sup>Appx. 1.1</sup> If = 200mA IV (mcd)
			Min.	Typ.	Max.	
SVB-EZHG-KL3-2	Blue, 455nm	120	8.20	10.70	13.90	3600
SVB-EZHG-K3M2-3	Blue, 460nm	120	9.35	12.20	15.80	4100

## Electrical Characteristics at T<sub>j</sub>=25°C

Part Number	Vf @ If = 200mA <sup>Appx. 3.1</sup>		
	Min. (V)	Typ. (V)	Max. (V)
SVB-EZHG	2.80	3.10	3.40

## Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	250	mA
Peak pulse current; (Ts = 55°C, tp ≤ 100μs, Duty cycle = 0.03)	500	mA
Reverse voltage	Not designed for reverse bias	V
ESD threshold (HBM)	8	kV
LED junction temperature	150	°C
Operating temperature	-40 ... +125	°C
Storage temperature	-40 ... +125	°C
Thermal resistance (Rated current = 200mA, Ts = 25 °C)		
- Real Thermal Resistance		
Junction / solder point, R <sub>th JS real</sub> (typ = 18)	29	K/W
- Electrical Thermal Resistance		
Junction / solder point, R <sub>th JS el</sub> (typ = 12)	18	K/W

### Wavelength Grouping at Tj= 25°C

Color	Group	Wavelength distribution (nm) <small>Appx. 2.2</small>
SVB, Blue	Full	450 - 465
	A	450 - 455
	B	455 - 460
	C	460 - 465

### Luminous Flux Group at Tj=25°C

Brightness Group	Luminous Flux <small>Appx. 1.2</small> (lm)
K2	8.20 ... 9.35
K3	9.35 ... 10.70
L2	10.70 ... 12.20
L3	12.20 ... 13.90
M2	13.90 ... 15.80

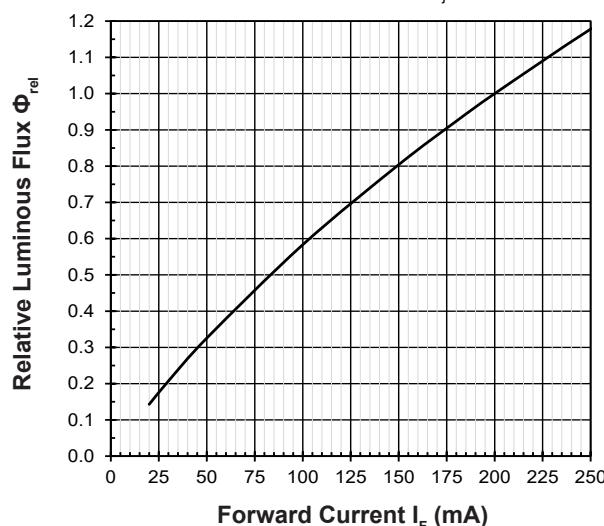
### Vf Bining (Optional)

Vf Bin @ 200 mA	Forward Voltage (V) <small>Appx. 4.1</small>
VR7	2.80 ... 3.10
VR8	3.10 ... 3.40

Please consult sales and marketing for special part number to incorporate Vf binning.

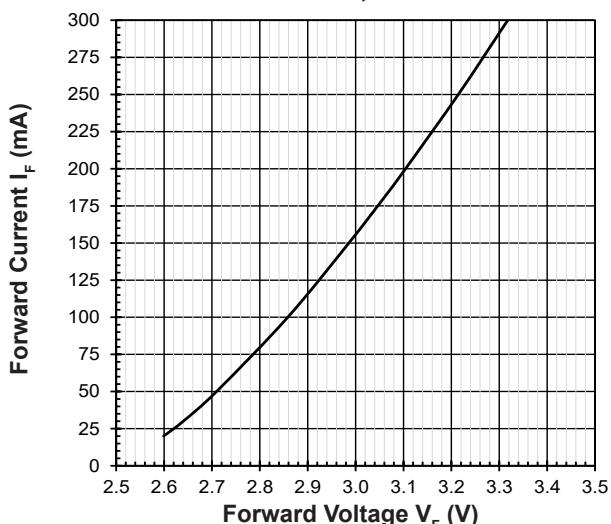
### Relative Luminous Flux Vs Forward Current

$$\Phi_V/\Phi_{V(200\text{mA})} = f(I_F); T_j = 25^\circ\text{C}$$



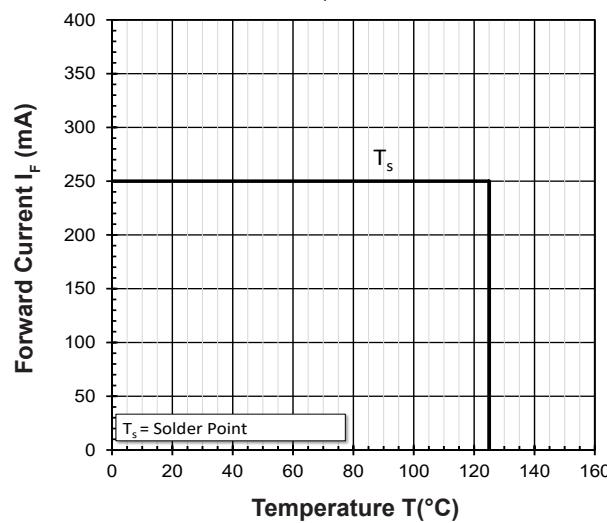
### Forward Current Vs Forward Voltage

$$I_F = f(V_F); T_j = 25^\circ\text{C}$$



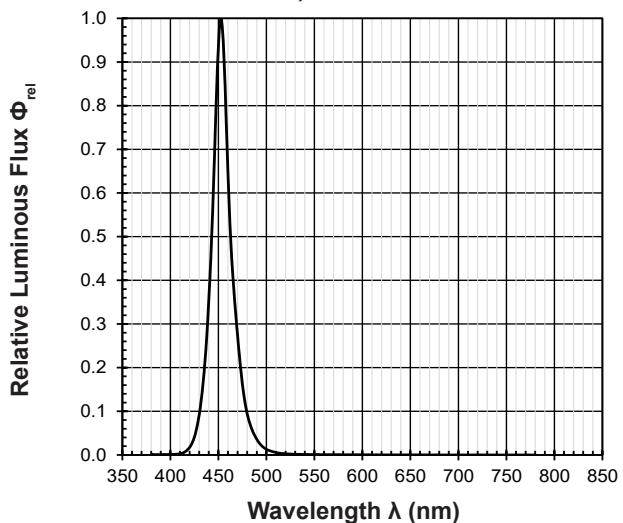
### Maximum Current Vs Temperature

$$I_F = f(T)$$



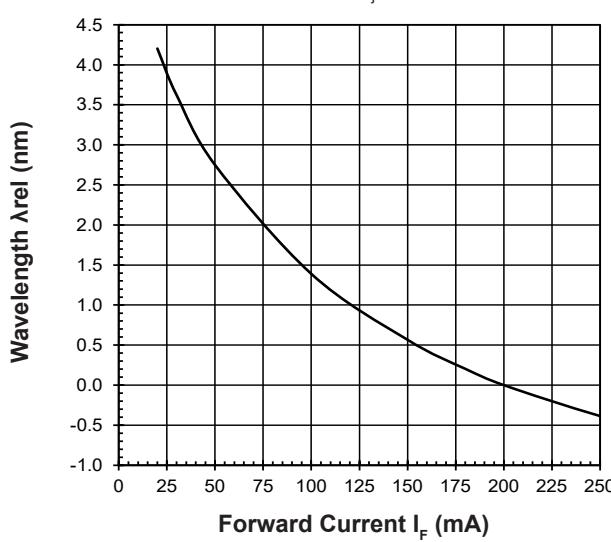
### Relative Spectral Emission

$$\Phi_{rel} = f(\lambda); T_j = 25^\circ\text{C}; I_F = 200\text{mA}$$



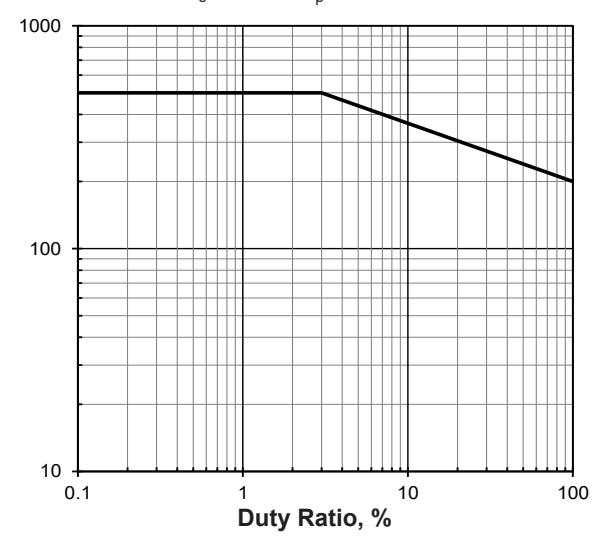
### Wavelength Shift Vs Forward Current

$$\lambda_{dom} = f(I_F); T_j = 25^\circ\text{C}$$

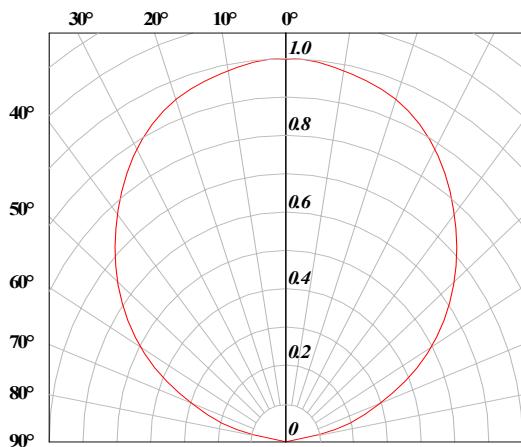


### Allowable Forward Current Vs Duty Ratio

$$(T_s = 55^\circ\text{C}; t_p \leq 100\mu\text{s})$$

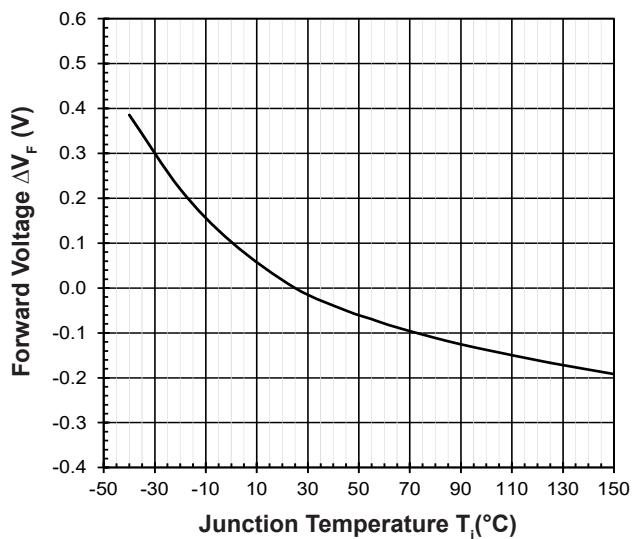


### Radiation Pattern



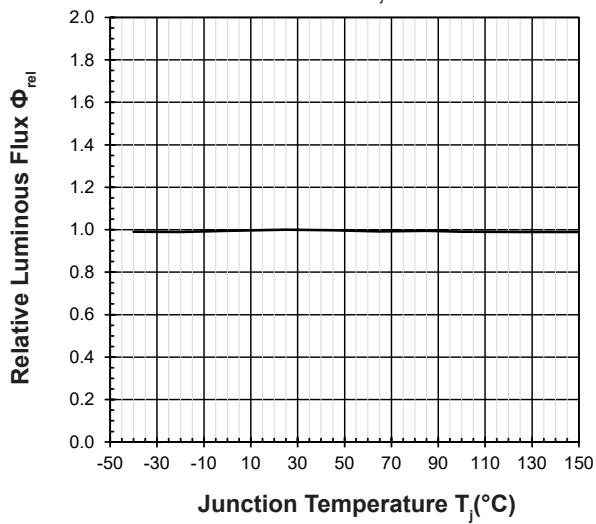
### Forward Voltage Vs Junction Temperature

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 200\text{mA}$$



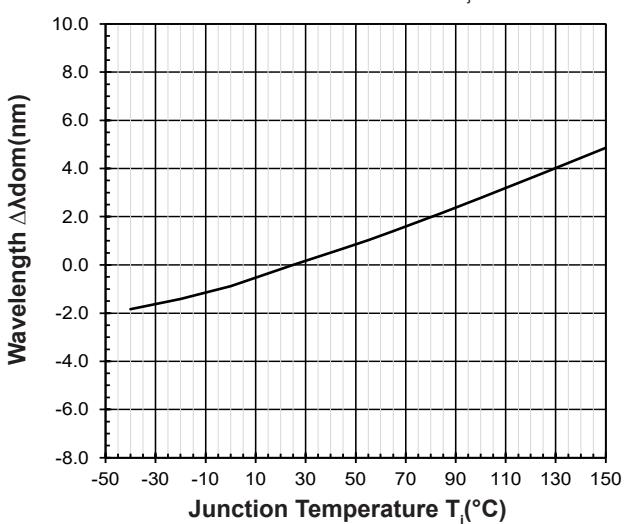
### Relative Luminous Flux Vs Junction Temperature

$$\Phi V / \Phi V(25^\circ\text{C}) = f(T_j); I_F = 200\text{mA}$$

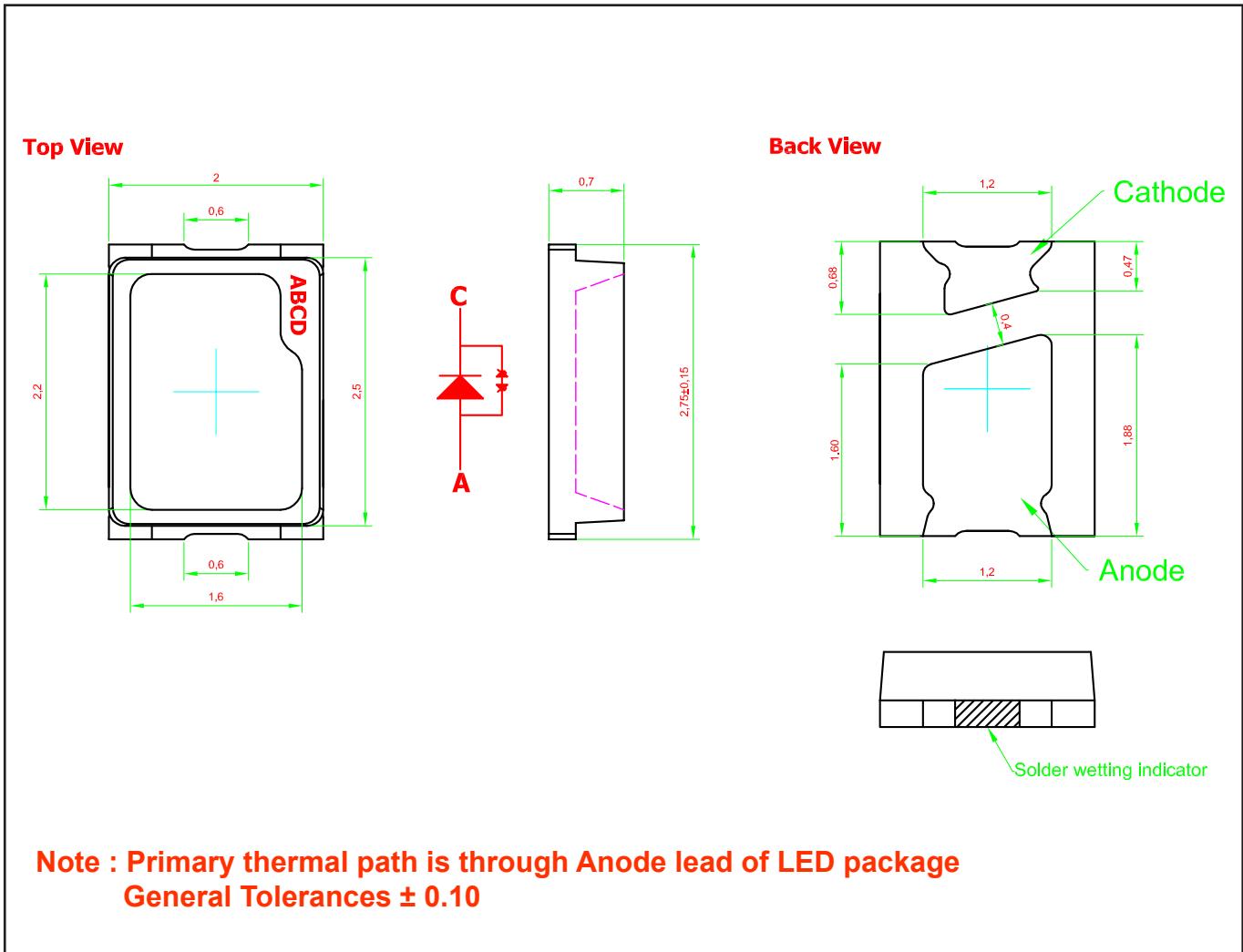


### Wavelength Vs Junction Temperature

$$\Delta\lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25^\circ\text{C}) = f(T_j); I_F = 200\text{mA}$$



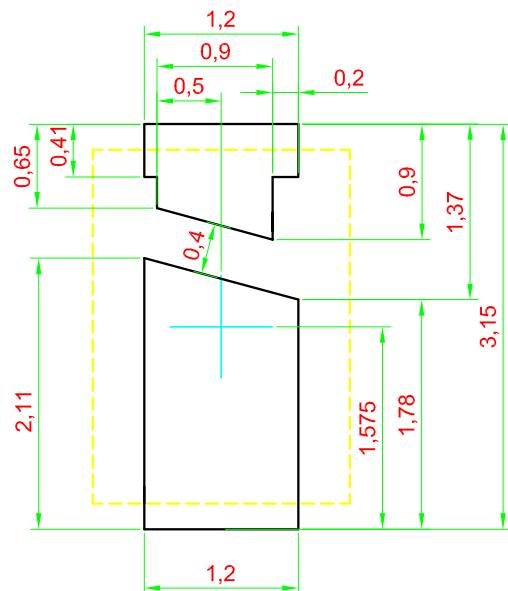
## SpicePlus 2520 InGaN: SVB-EZHG Package Outlines



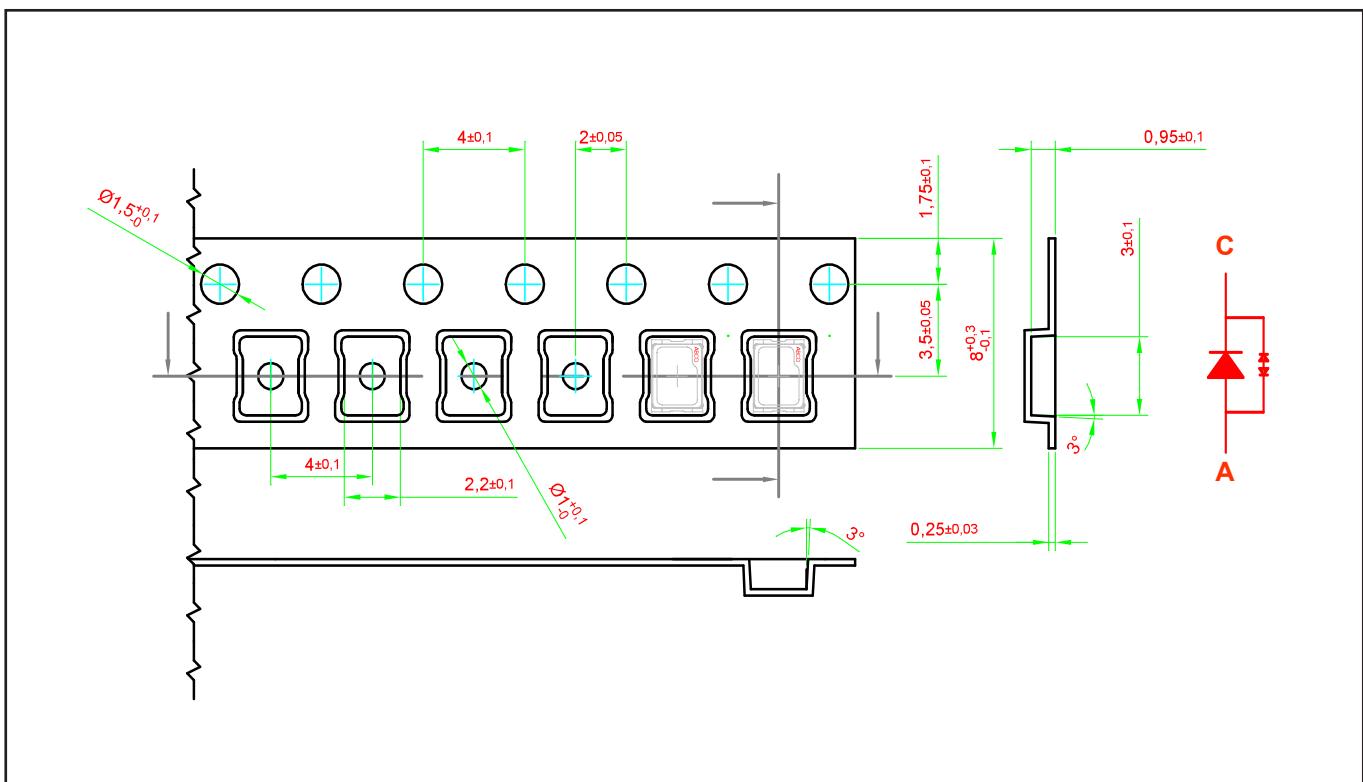
## Material

Material	
Lead-frame	Cu Alloy With Au Plating
Package	High Temperature Resistant Plastic
Encapsulant	Silicone Resin
Soldering Leads	Sn Plating

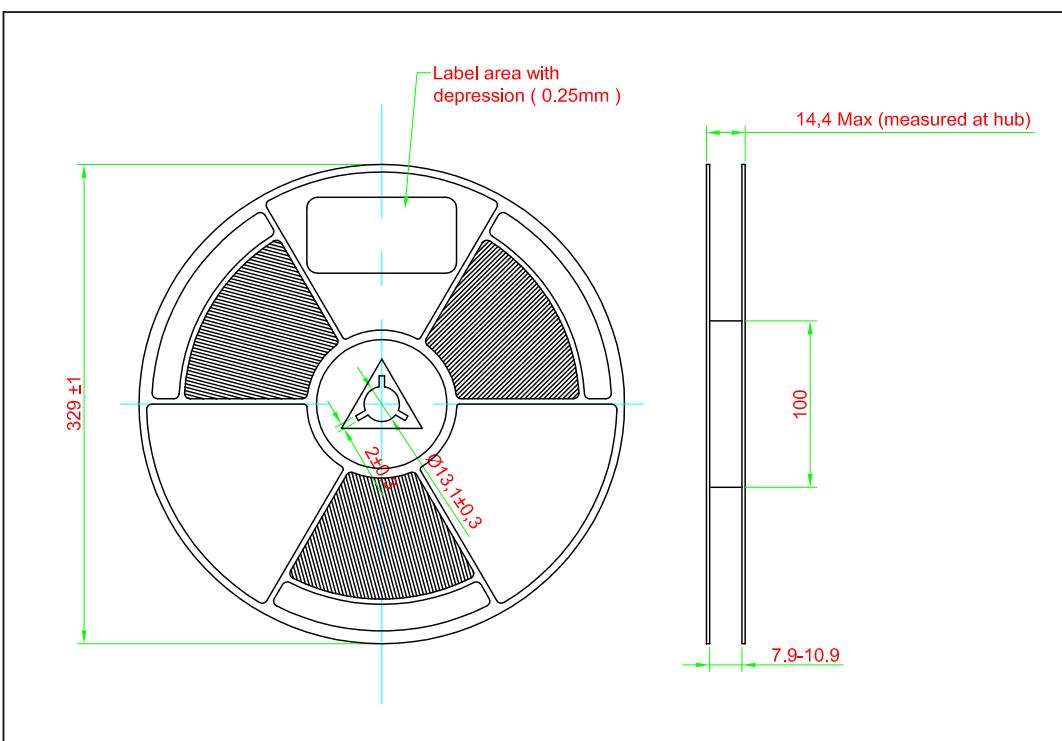
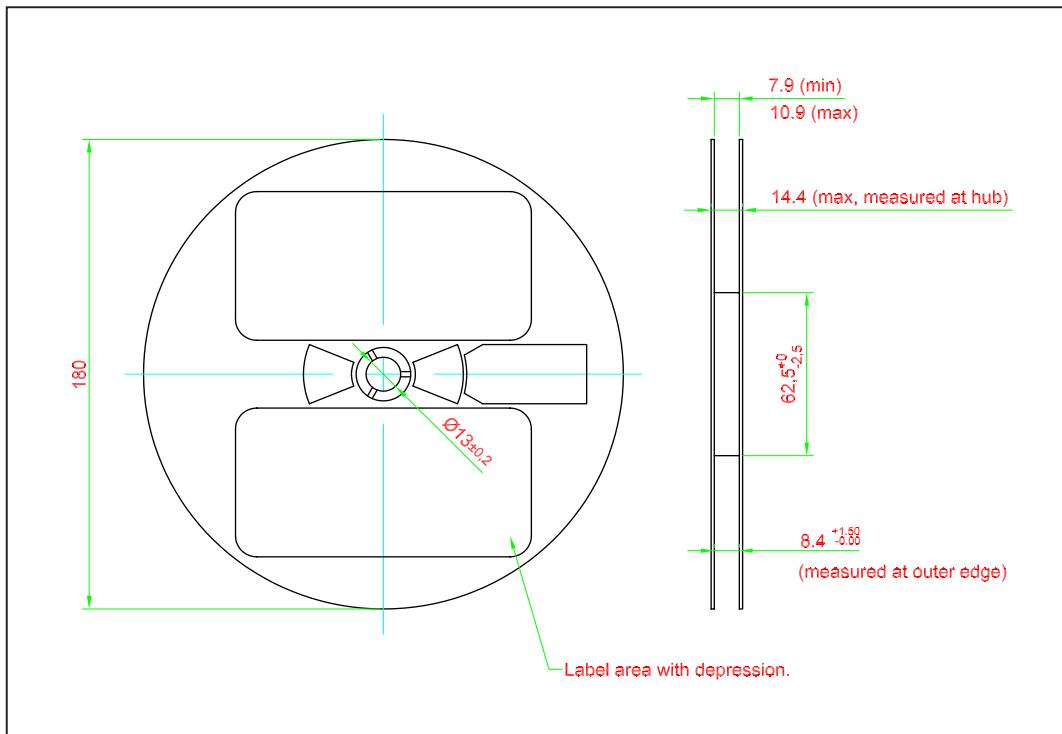
## Recommended Solder Pad



## Taping and orientation



## Packaging Specification

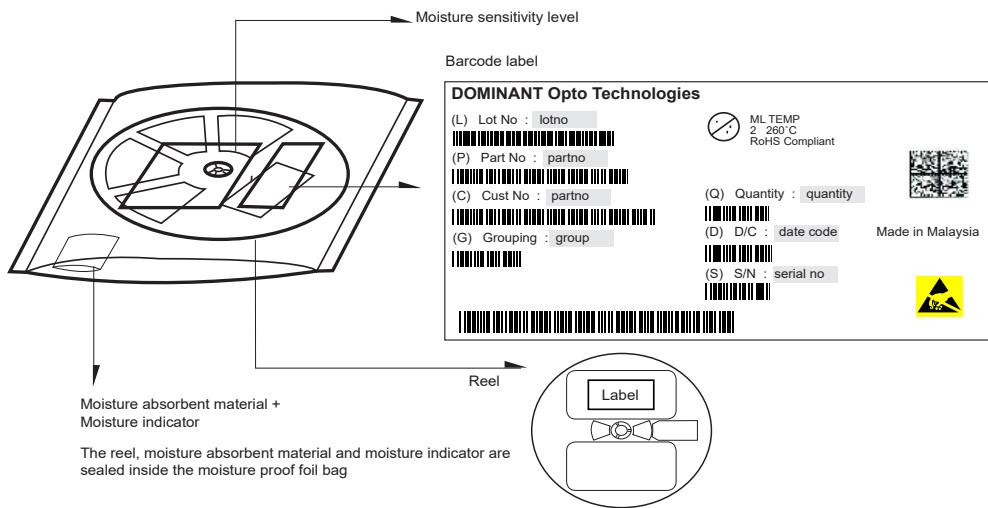


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	4000	SVB-EZHG-xxx-x
Optional Packing	329	15000	SVB-EZHG-xxx-x-L

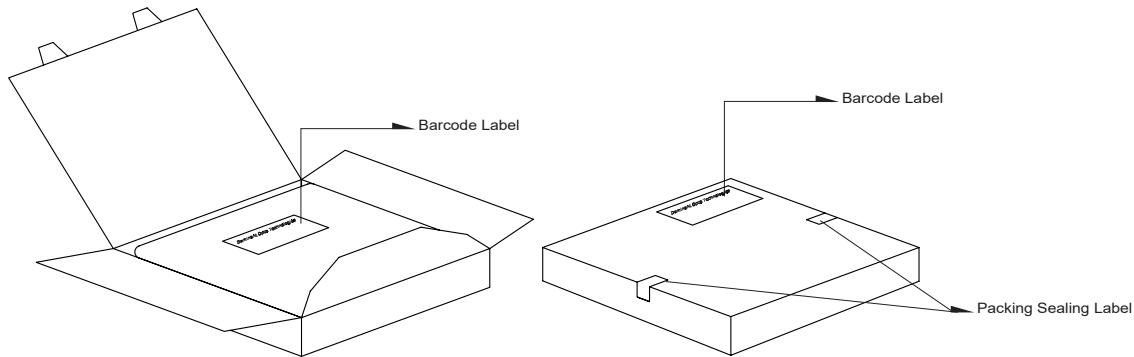
Notes:

\* For ordering purpose only. Please consult sales and marketing for details.

## Packaging Specification



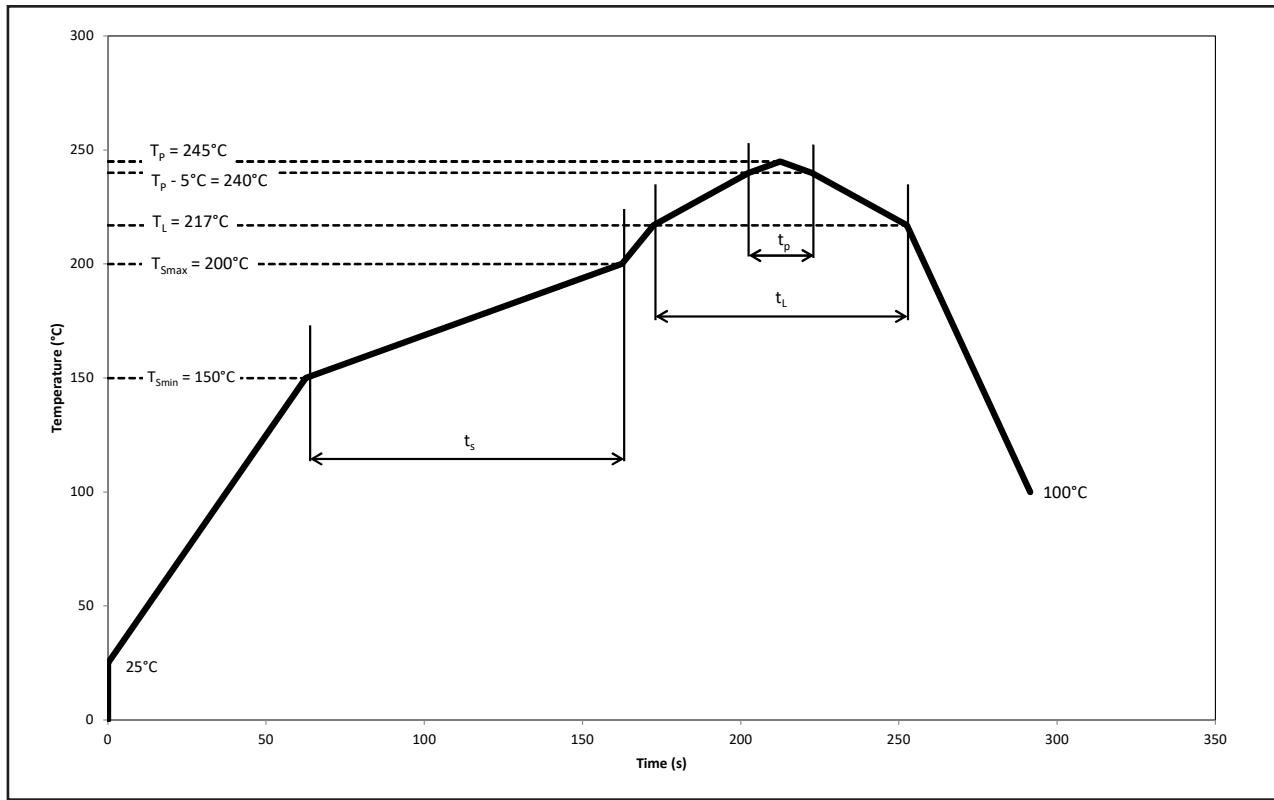
Quantity per bag (pcs)	Average 1pc SpicePlus 2520	1 completed bag (gram)
4000	0.0089	150 ± 10
15000	0.0089	600 ± 10



Reel Diameter (mm)	Packing Box Dimensions (mm)
180	210 x 210 x 16
329	345 x 345 x 16

## Recommended Pb-free Soldering Profile

Product complies to MSL Level 2 acc. to JEDEC J-STD-020E



Pb-Free Assembly					
Profile Feature	Symbol	Min.	Recommended	Max.	Unit
Ramp-up rate to preheat $25^\circ\text{C}$ to $T_{smin}$	-	-	2	3	$^\circ\text{C}/\text{s}$
Time $t_s$ $T_{smin}$ to $T_{smax}$	$t_s$	60	100	120	s
Ramp-up rate to peak $T_L$ to $T_p$	-	-	2	3	$^\circ\text{C}/\text{s}$
Liquidous temperature	$T_L$	-	217	-	$^\circ\text{C}$
Time above liquidous temperature	$t_L$	60	80	150	s
Peak temperature	$T_p$	-	245	260	$^\circ\text{C}$
Time within 5°C of the specified peak temperature $T_p - 5^\circ\text{C}$	$t_p$	10	20	30	s
Ramp-down rate $T_p$ to 100°C	-	-	3	6	$^\circ\text{C}/\text{s}$
Time $25^\circ\text{C}$ to $T_p$	-	-	-	480	s

## Appendix

### 1) Brightness:

- 1.1 Luminous intensity is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (according to GUM with a coverage factor of k=3).
- 1.2 Luminous flux is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (according to GUM with a coverage factor of k=3).
- 1.3 Radiant intensity is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (according to GUM with a coverage factor of k=3).
- 1.4 Radiant flux is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 8\%$  and an expanded uncertainty of  $\pm 11\%$  (according to GUM with a coverage factor of k=3).

### 2) Color:

- 2.1 Chromaticity coordinate groups are measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 0.005$  and an expanded uncertainty of  $\pm 0.01$  (accordingly to GUM with a coverage factor of k=3).
- 2.2 Dominant wavelength is measured at current pulse 25 ms(typ) with an internal reproducibility of  $\pm 0.5\text{nm}$  and an expanded uncertainty of  $\pm 1\text{nm}$  (accordingly to GUM with a coverage factor of k=3).

### 3) Voltage:

- 3.1 Forward Voltage, Vf is measured when a current pulse of 8 ms(typ) with an internal reproducibility of  $\pm 0.05\text{V}$  and an expanded uncertainty of  $\pm 0.1\text{V}$  (accordingly to GUM with a coverage factor of k=3).

### 4) Typical Values:

- 4.1 At special conditions of LED manufacturing processes, typical data or calculated correlations of technical parameters only reflect the statistical figures. But not necessarily correspond to the actual parameters of each single product, which could differ from the typical data or calculated correlations or the typical characteristic line. These typical data may change whenever technical improvements happen.

### 5) Tolerance of Measure

- 5.1 Unless otherwise noted in drawing, tolerances are specified with  $\pm 0.1$  and dimension are specified in mm.

### 6) Corrosion Robustness:

- 6.1 Test conditions: 40 °C / 90 % rh / 15 ppm H<sub>2</sub>S / 336 h.  
= Stricter than IEC 60068-2-43 (H<sub>2</sub>S) [25 °C / 75% rh / 10 ppm H<sub>2</sub>S / 21 days].

## Revision History

Page	Subjects	Date of Modification
-	Initial Release	02 Aug 2021
6	Add Polarity in Package Outline	11 Aug 2022

### NOTE

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DOMINANT Opto Technologies is a dynamic company that is amongst the world's leading automotive LED manufacturers. With an extensive industry experience and relentless pursuit of innovation, DOMINANT's state-of-art manufacturing and development capabilities have become a trusted and reliable brand across the globe. More information about DOMINANT Opto Technologies, an IATF 16949 and ISO 14001 certified company, can be found under <http://www.dominant-semi.com>.

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