

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: Exterior application: eg: Turn Signal, Rear Combination Light (RCL), Center High Mounted Stop Light (CHMSL).

Optical Characteristics at Tj=25°C

Part Ordering Number	Color	Viewing Angle°	Luminous Flux @ 350mA (lm) <i>Appx. 1.2</i>		
			Min.	Typ.	Max.
SVS-TZHG-QR3-3	Super Red, 635 nm	120	30.6	39.8	51.7
SVS-TZHG-Q3S2-2	Super Red, 630 nm	120	34.8	45.2	59.0
SVA-TZHG-RS3-4	Amber, 625 nm	120	39.8	51.7	67.2
SVA-TZHG-S3U2-2	Amber, 617 nm	120	59.0	76.5	99.4
SVY-TZHG-R3T2-4	Yellow, 592 nm	120	45.2	59.0	76.5
SVY-TZHG-RS3-3	Yellow, 589 nm	120	39.8	51.7	67.2
SVY-TZHG-Q3S2-2	Yellow, 586 nm	120	34.8	45.2	59.0

Electrical Characteristics at Tj=25°C

Part Number	Vf @ If = 350mA <i>Appx. 3.1</i>		
	Min. (V)	Typ. (V)	Max. (V)
SVx-TZHG	2.00	2.35	2.75

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	500	mA
Peak pulse current; (Ts = 55°C, tp ≤ 100µs, Duty cycle = 0.03)	1000	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 = 350mA, Ts = 25 °C)		
- Real Thermal Resistance Junction / solder point, R _{th JS real}		
Super Red & Amber (typ = 12)	15	K/W
Yellow (typ = 12)	15	K/W
- Electrical Thermal Resistance Junction / solder point, R _{th JS el}		
Super Red & Amber (typ = 8.5)	10.5	K/W
Yellow (typ = 10.2)	12.8	K/W
(Mounting on DOMINANT standard PCB)		

Wavelength Grouping at Tj= 25°C

Color	Group	Wavelength distribution (nm) <i>Appx. 2.2</i>
SVx; Super Red	Full	627 - 637
	W	627 - 630
	X	630 - 633
	Y	633 - 637
SVx; Amber	Full	612 - 627
	W	612 - 616
	X	616 - 620
	Y	620 - 624
	Z	624 - 627
SVx; Yellow	Full	583 - 595
	W	583 - 586
	X	586 - 589
	Y	589 - 592
	Z	592 - 595

Luminous Flux Group at Tj=25°C

Brightness Group	Luminous Flux <i>Appx. 1.2</i> (lm)
Q2	30.6 ... 34.8
Q3	34.8 ... 39.8
R2	39.8 ... 45.2
R3	45.2 ... 51.7
S2	51.7 ... 59.0
S3	59.0 ... 67.2
T2	67.2 ... 76.5
T3	76.5 ... 87.4
U2	87.4 ... 99.4

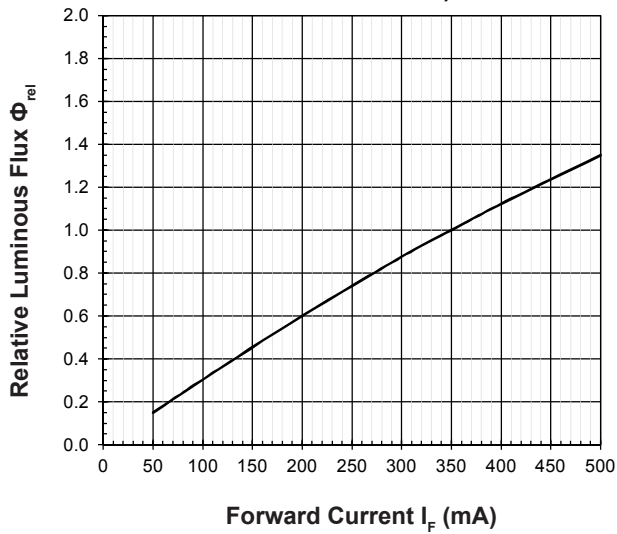
Vf Bining (Optional)

Vf Bin @ 350 mA	Forward Voltage (V) <i>Appx. 4.1</i>
V24	2.00 ... 2.15
V25	2.15 ... 2.30
V26	2.30 ... 2.45
V27	2.45 ... 2.60
V28	2.60 ... 2.75

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

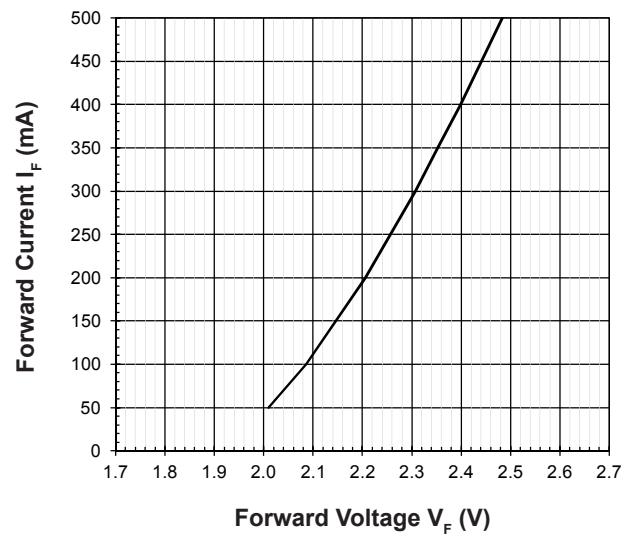
Relative Luminous Flux Vs Forward Current

$$\Phi_V/\Phi_V(350\text{mA}) = f(I_F); T_j = 25^\circ\text{C}$$



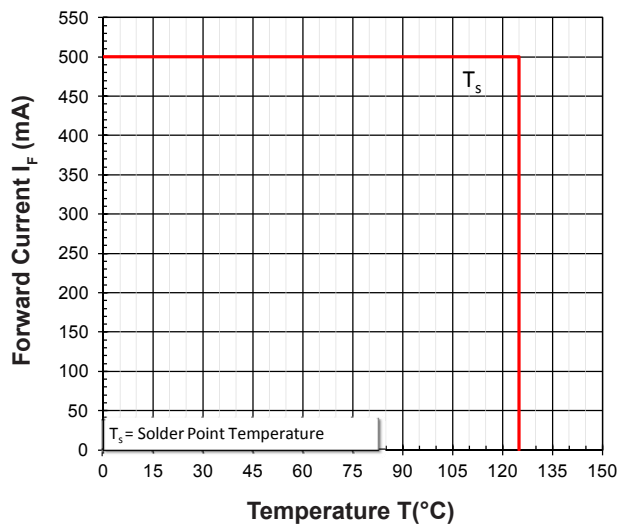
Forward Current Vs Forward Voltage

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



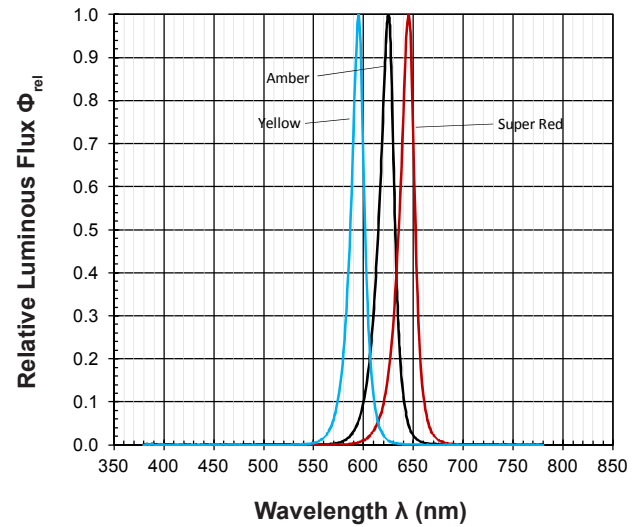
Maximum Current Vs Temperature

$$I_F = f(T)$$



Relative Spectral Emission

$$\Phi_{rel} = f(\lambda); T_j = 25^\circ\text{C}; I_F = 350\text{mA}$$

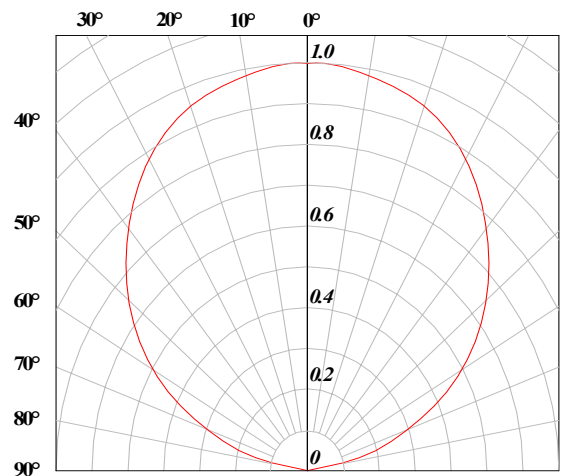


Allowable Forward Current Vs Duty Ratio

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

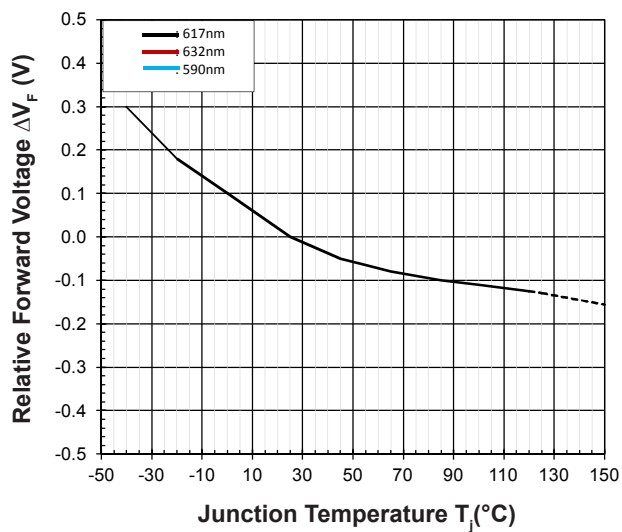


Radiation Pattern



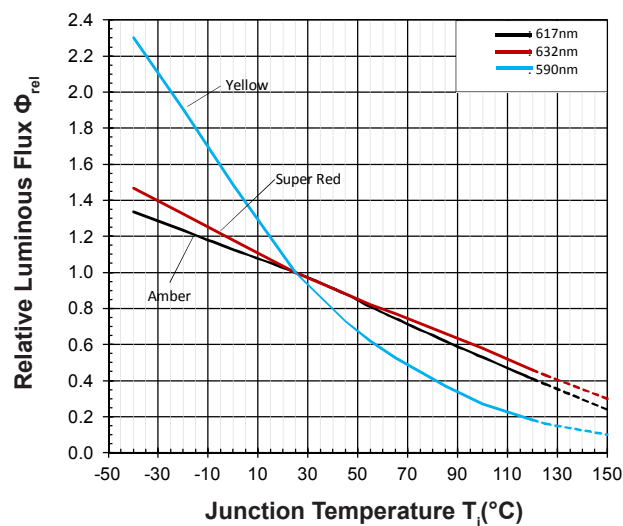
Relative Forward Voltage Vs Junction Temperature

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 350\text{mA}$$



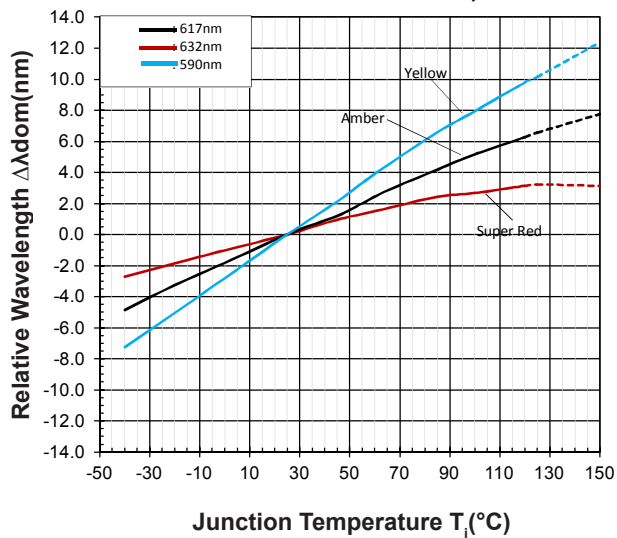
Relative Luminous Flux Vs Junction Temperature

$$\Phi_V/\Phi_V(25^\circ\text{C}) = f(T_j); I_F = 350\text{mA}$$



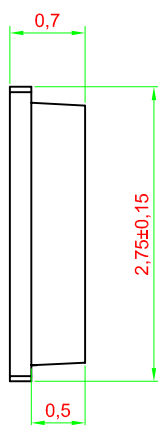
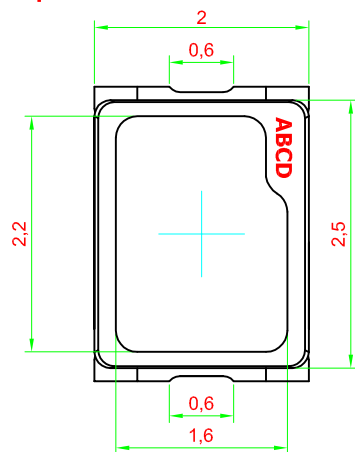
Relative Wavelength Vs Junction Temperature

$$\Delta \lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25^\circ\text{C}) = f(T_j); I_F = 350\text{mA}$$

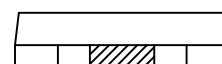
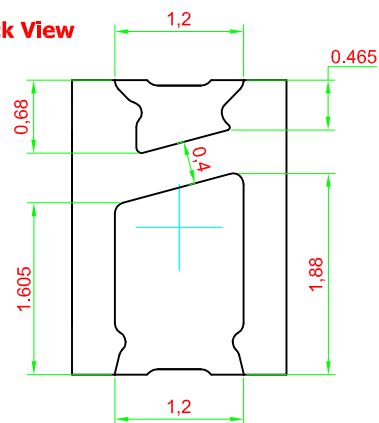


SpicePlus 2520 AllnGaP : SVx-TZHG Package Outlines

Top View



Back View



Solder wetting indicator

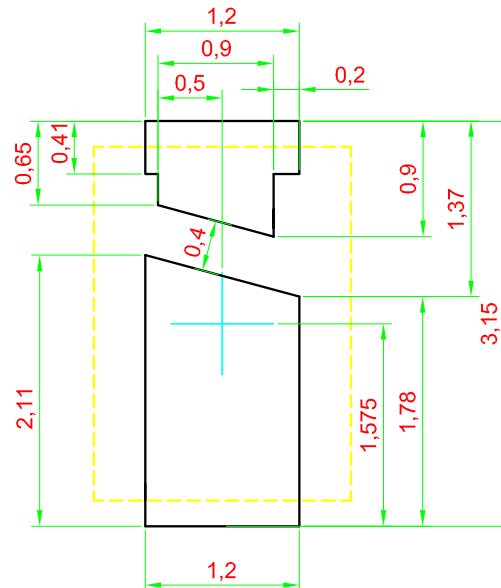
Note : Primary thermal path is through Anode lead of LED package
General Tolerances ± 0.10

Material

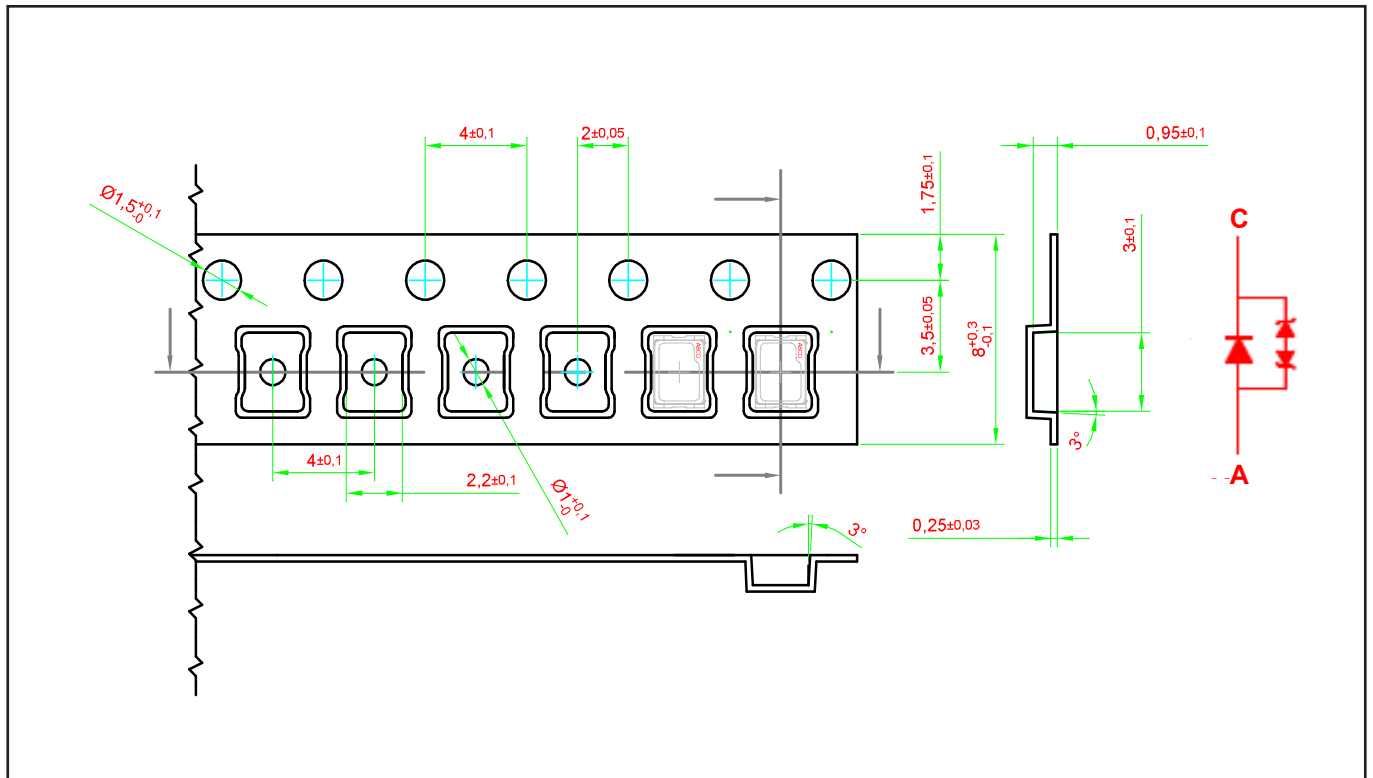
Material	
Lead-frame	Cu Alloy With Au Plating
Package	High Temperature Resistant Plastic, PPA
Encapsulant	Silicone Resin
Soldering Leads	NiSn Plating

Note: product is Pb free

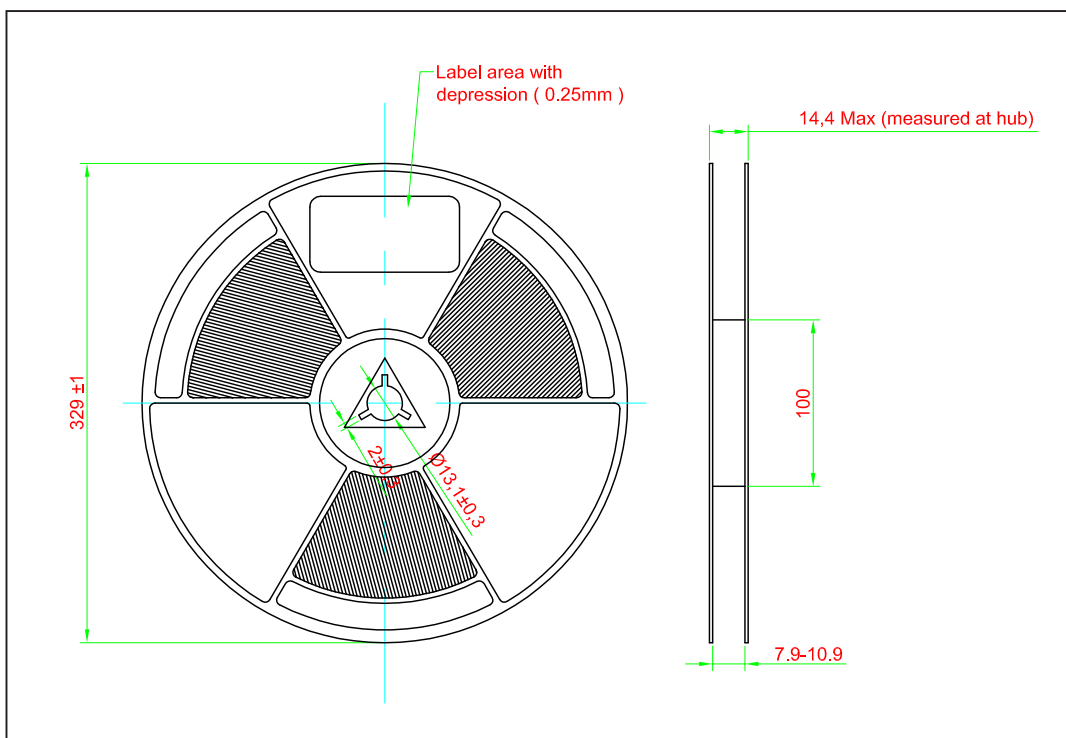
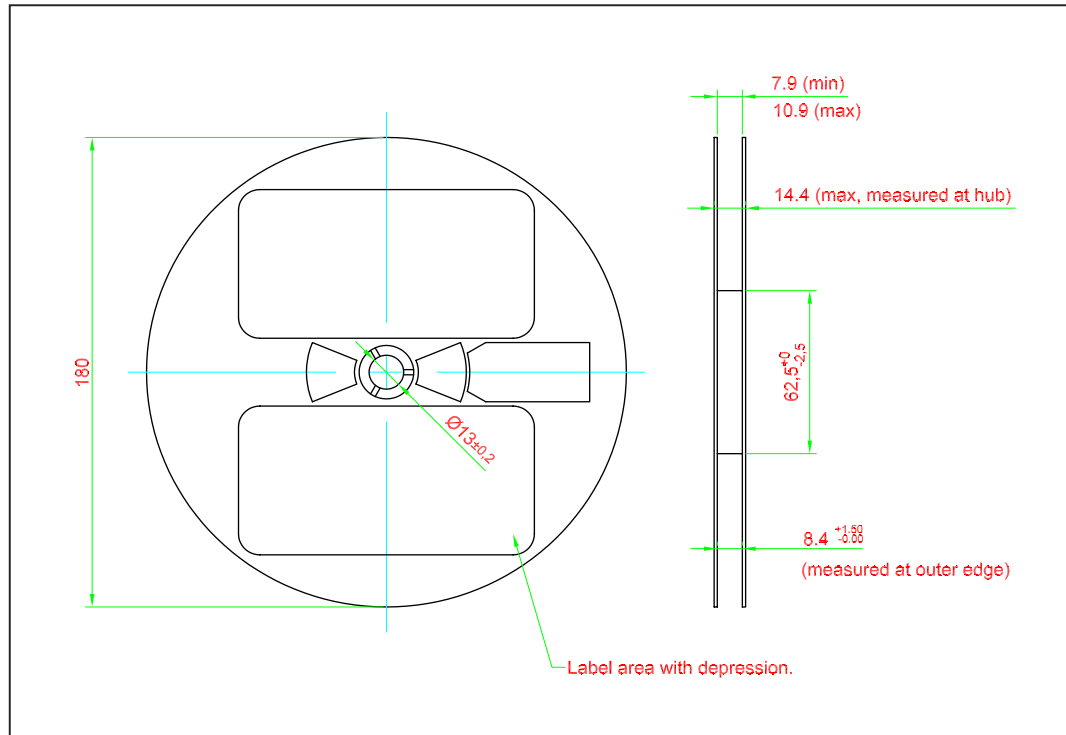
Recommended Solder Pad



Taping and orientation

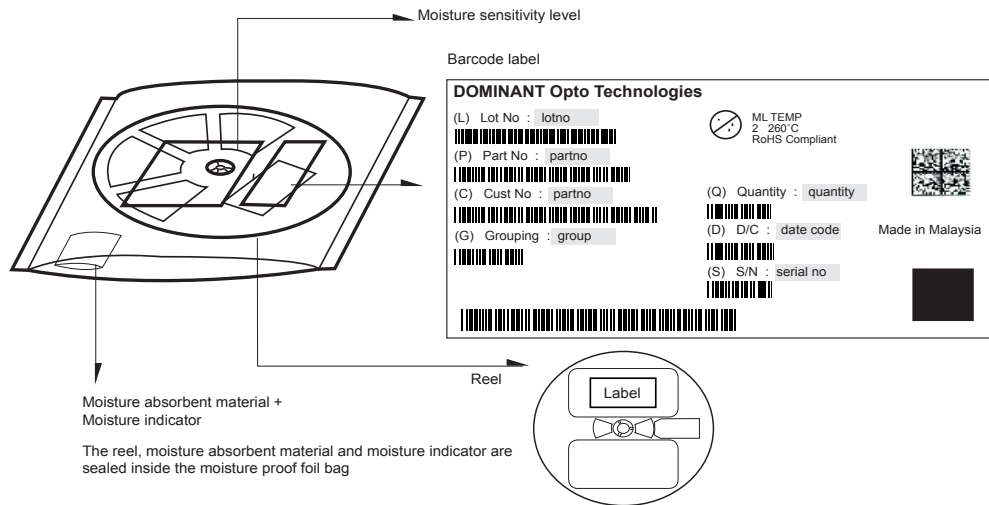


Packaging Specification

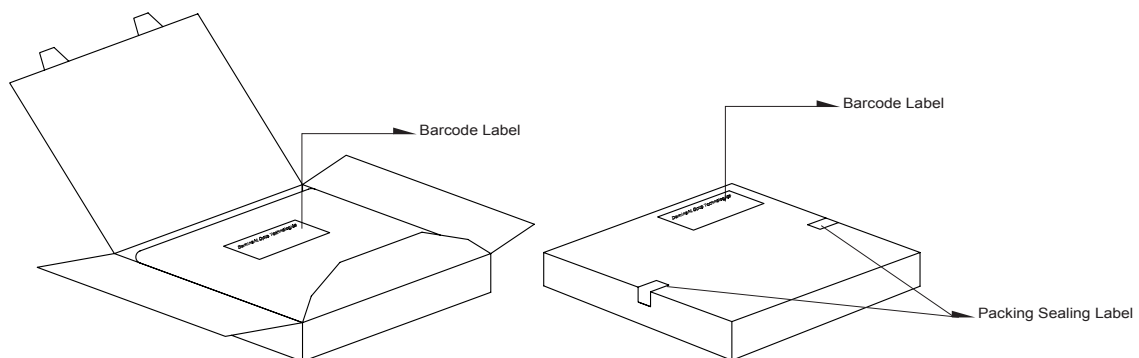


	Reel Diameter (mm)	Quantity (pcs)	Partno
Standard Packing	180	4000	SVx-TZHG-xxx-x
Optional Packing	329	15000	SVx-TZHG-xxx-x-L

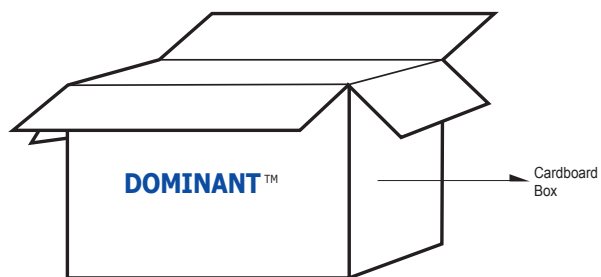
Packaging Specification



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



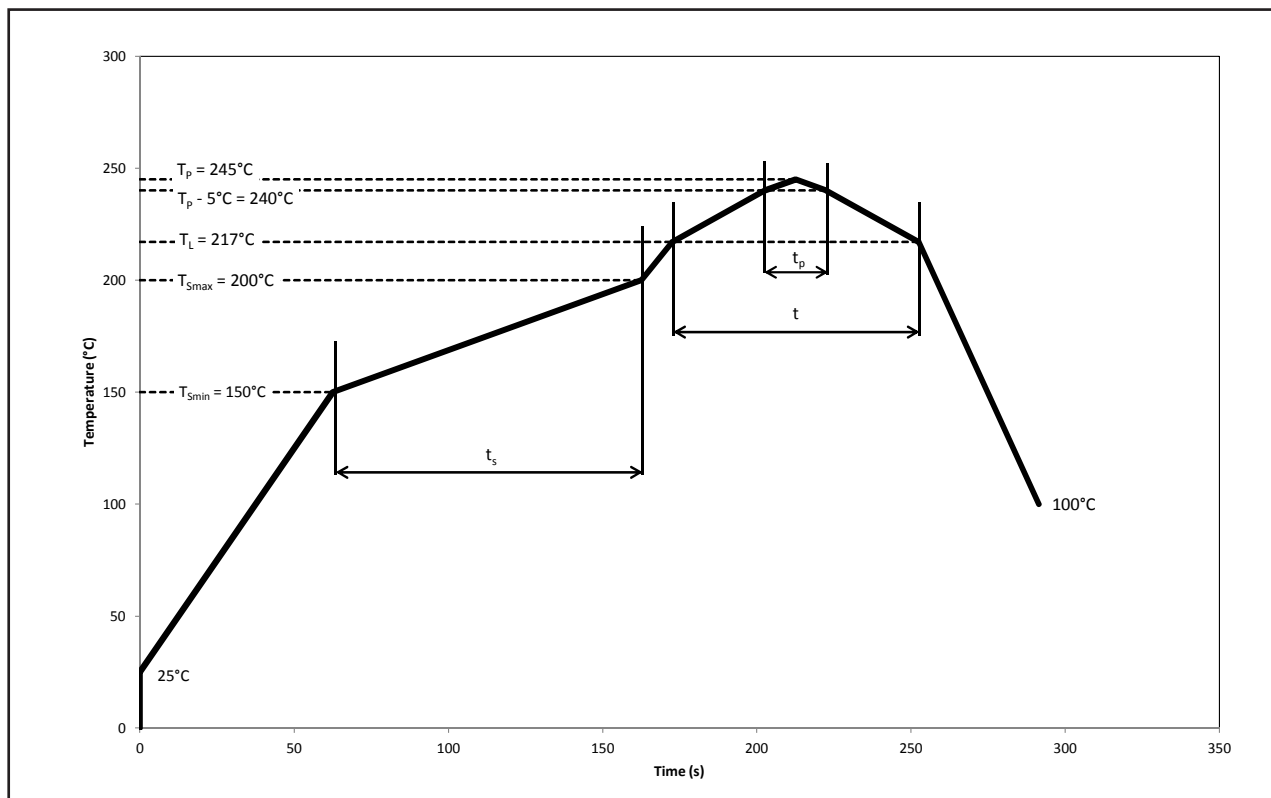
Reel Diameter (mm)	Packing Box Dimensions (mm)
180	210 x 210 x 16
329	345 x 345 x 16



Reel Diameter (mm)	Cardboard Box Size	Dimensions (mm)	Empty Box Weight (kg)	Reel / Box
180	Super Small	325 x 225 x 190	0.38	9 reels MAX
180	Small	325 x 225 x 280	0.54	15 reels MAX
180	Medium	570 x 440 x 230	1.46	60 reels MAX
180	Large	570 x 440 x 460	1.92	120 reels MAX
329	Medium	373 x 373 x 285	1.02	13 reels MAX
329	Large	580 x 373 x 405	1.50	30 reels MAX

Recommended Pb-free Soldering Profile

Product complies to MSL Level 2 acc. to JEDEC



Profile Feature	Symbol	Min.	Pb-Free Assembly		Unit
			Recommended	Max.	
Ramp-up rate to preheat 25°C to T _{smin}	-	-	2	3	°C/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	°C/s
Liquidous temperature	T _L	-	217	-	°C
Time above liquidous temperature	t	60	80	150	s
Peak temperature	T _P	-	245	260	°C
Time within 5°C of the specified peak temperature T _P - 5°C	T _P	10	20	30	s
Ramp-down rate T _P to 100°C	-	-	3	6	°C/s
Time 25°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 ± 0.005 and an expanded uncertainty of ± 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, V_f 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 ± 0.1 and dimension are specified in mm.

6) **Corrosion Robustness:**

- 6.1 Test conditions: $40^\circ\text{C} / 90\% \text{ rh} / 15 \text{ ppm H}_2\text{S} / 336 \text{ h}$.
= Stricter than IEC 60068-2-43 (H_2S) [$25^\circ\text{C} / 75\% \text{ rh} / 10 \text{ ppm H}_2\text{S} / 21 \text{ days}$].

Revision History

Page	Subjects	Date of Modification
-	Initial Release	27 Oct 2020

NOTE

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About Us

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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