

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 Number	Color	Viewing Angle°	Luminous Flux @ 50mA (lm) <i>Appx. 1.2</i>		
			Min.	Typ.	Max.
SVS-MHG-GH3-3	Super Red, 635 nm	120	3.68	4.90	6.30
SVS-MHG-HJ3-2	Super Red, 630 nm	120	4.90	6.30	8.20
SVA-MHG-J3L2-4	Amber, 625 nm	120	7.15	9.35	12.20
SVA-MHG-KL3-2	Amber, 617 nm	120	8.20	10.70	13.90
SVY-MHG-KL3-4	Yellow, 592 nm	120	8.20	10.70	13.90
SVY-MHG-J3L2-3	Yellow, 589 nm	120	7.15	9.35	12.20
SVY-MHG-JK3-2	Yellow, 586 nm	120	6.30	8.20	10.70

Electrical Characteristics at Tj=25°C

Part Number	Vf @ If = 50mA <i>Appx. 3.1</i>			Vr @ Ir = 10uA <i>Appx. 7.1</i>
	Min. (V)	Typ. (V)	Max. (V)	Min. (V)
SVx-MHG (except Yellow)	2.05	2.30	2.65	12
SVY-MHG	2.05	2.35	2.65	12

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	70	mA
Peak pulse current; (Ts = 55°C, tp ≤ 100µs, Duty cycle = 0.03)	400	mA
Reverse voltage <i>Appx. 7.1</i>	12	V
ESD threshold (HBM)	2	KV
LED junction temperature	135	°C
Operating temperature	-40 ... +125	°C
Storage temperature	-40 ... +125	°C
Thermal resistance (Rated current = 50mA, Ts = 25 °C)		
- Real Thermal Resistance Junction / solder point, R _{th JS real}		
Super Red & Amber (typ = 25)	30	K/W
Yellow (typ = 27)	37	K/W
- Electrical Thermal Resistance Junction / solder point, R _{th JS el}		
Super Red & Amber (typ = 17)	20	K/W
Yellow (typ = 23)	31	K/W

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)
G2	3.68 ... 4.20
G3	4.20 ... 4.90
H2	4.90 ... 5.50
H3	5.50 ... 6.30
J2	6.30 ... 7.15
J3	7.15 ... 8.20
K2	8.20 ... 9.35
K3	9.35 ... 10.70
L2	10.70 ... 12.20
L3	12.20 ... 13.90

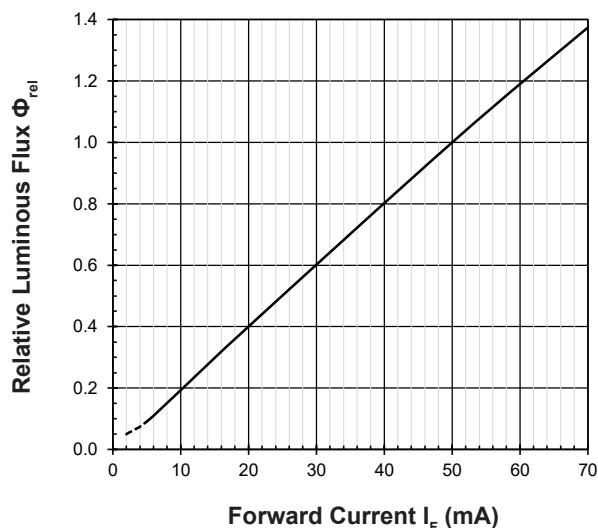
Vf Bining (Optional)

Vf Bin @ 50mA	Forward Voltage (V) <i>Appx. 4.1</i>
V44	2.05 ... 2.20
V45	2.20 ... 2.35
V46	2.35 ... 2.50
V47	2.50 ... 2.65

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

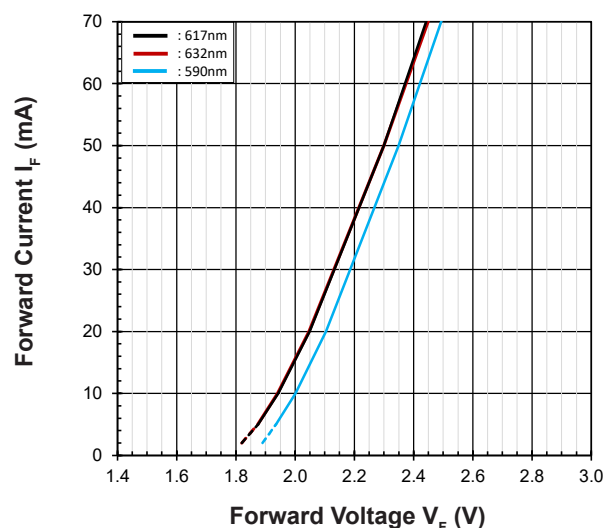
Relative Luminous Flux Vs Forward Current Appx. 4.1

$$\Phi_V / \Phi_V(50\text{mA}) = f(I_F); T_j = 25^\circ\text{C}$$



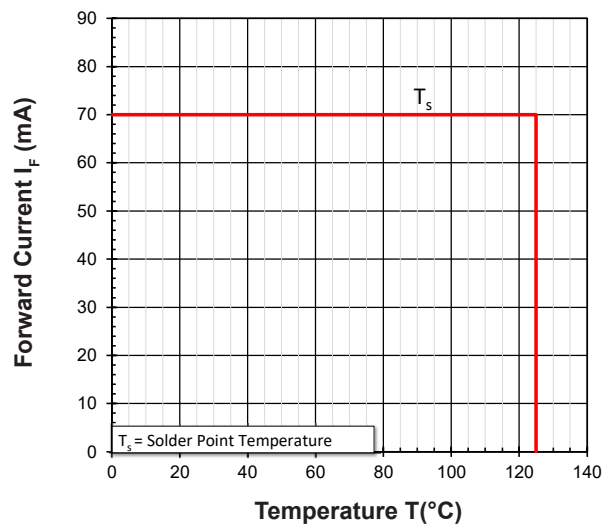
Forward Current Vs Forward Voltage Appx. 4.1

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



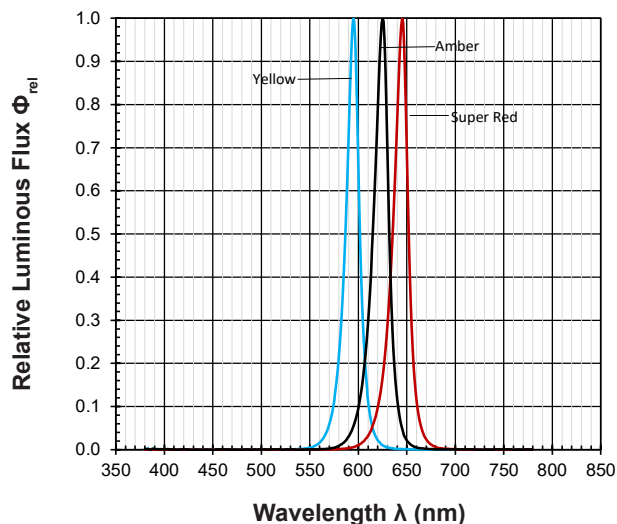
Maximum Current Vs Temperature

$$I_F = f(T)$$



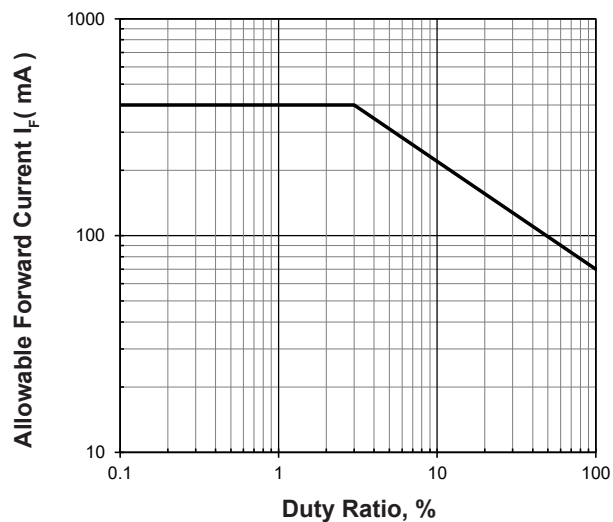
Relative Spectral Emission Appx. 4.1

$$\Phi_{rel} = f(\lambda); T_j = 25^\circ\text{C}; I_F = 50\text{mA}$$

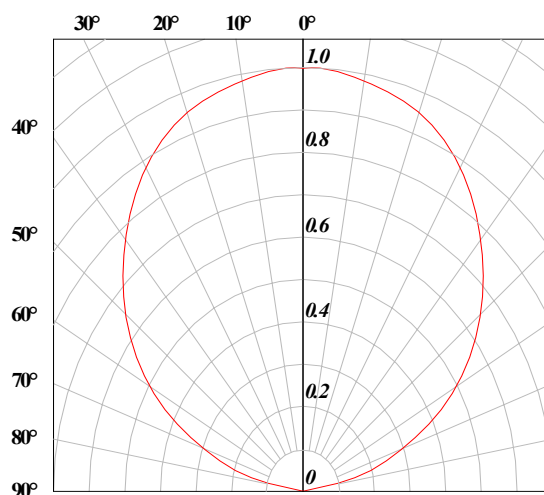


Allowable Forward Current Vs Duty Ratio

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

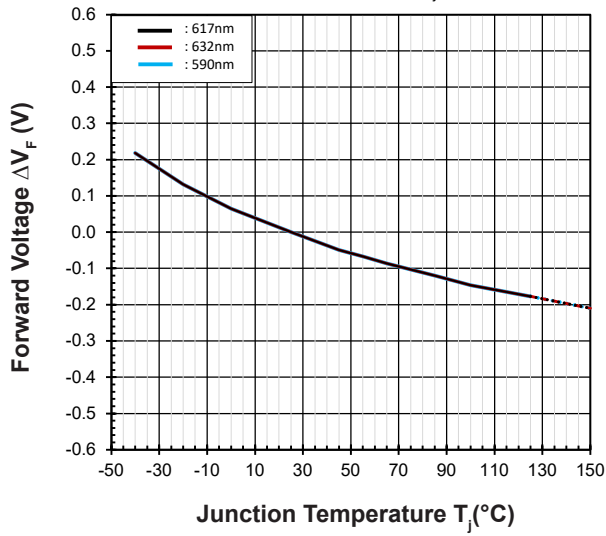


Radiation Pattern Appx. 4.1



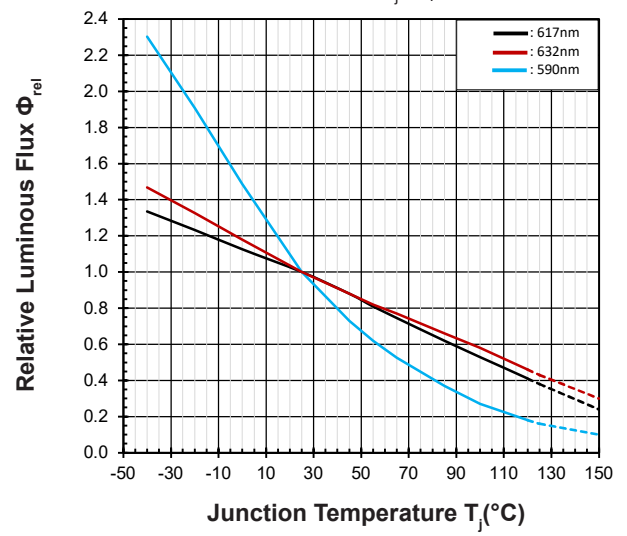
Forward Voltage Vs Junction Temperature Appx. 4.1

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 50\text{mA}$$



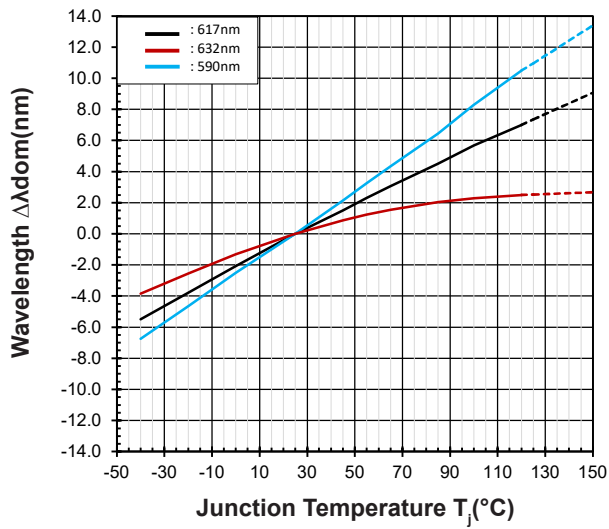
Relative Luminous Flux Vs Junction Temperature Appx. 4.1

$$\Phi V / \Phi V(25^\circ\text{C}) = f(T_j); I_F = 50\text{mA}$$

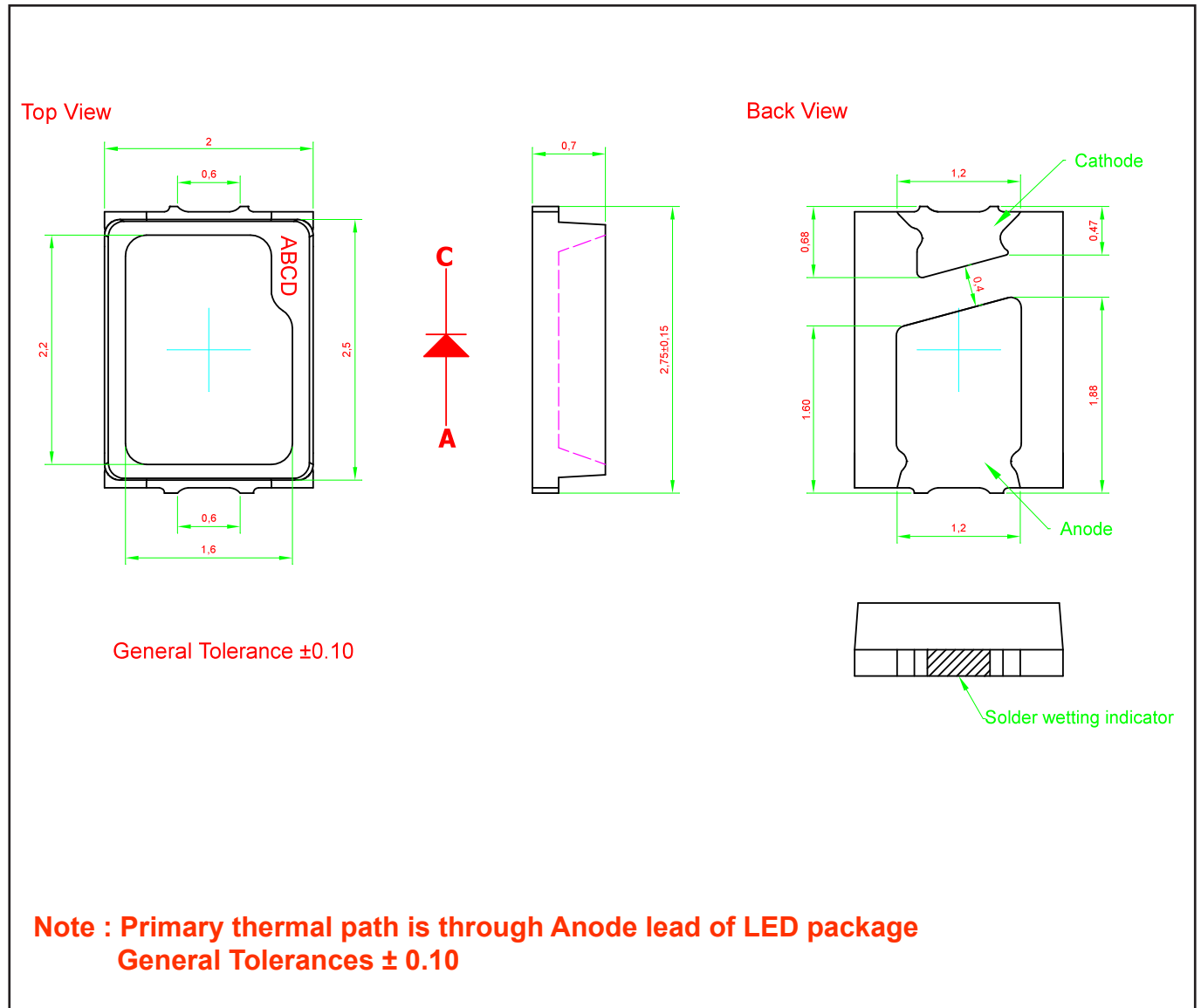


Wavelength Vs Junction Temperature Appx. 4.1

$$\Delta \lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25^\circ\text{C}) = f(T_j); I_F = 50\text{mA}$$



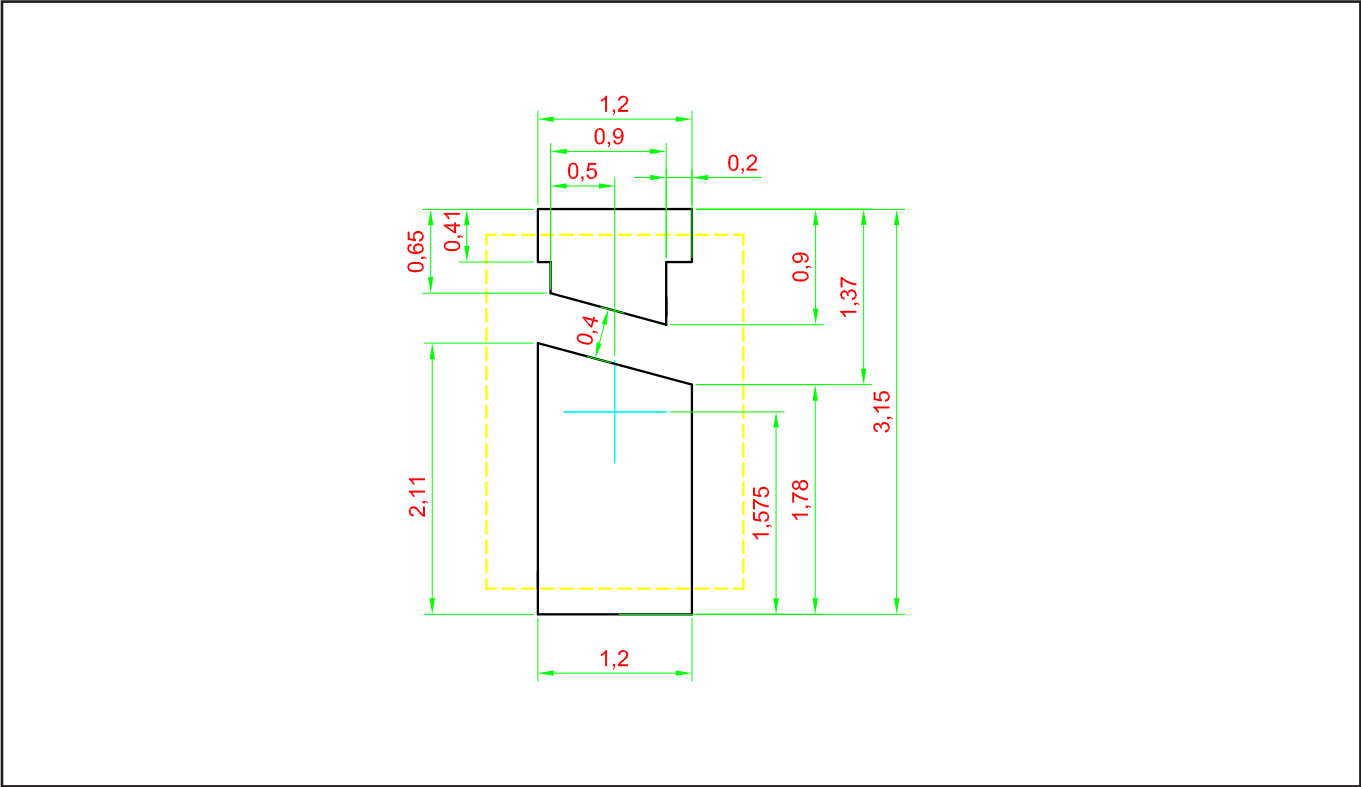
SpicePlus 2520 AlInGaP : SVx-MHG Package Outlines *Appx. 5.1*



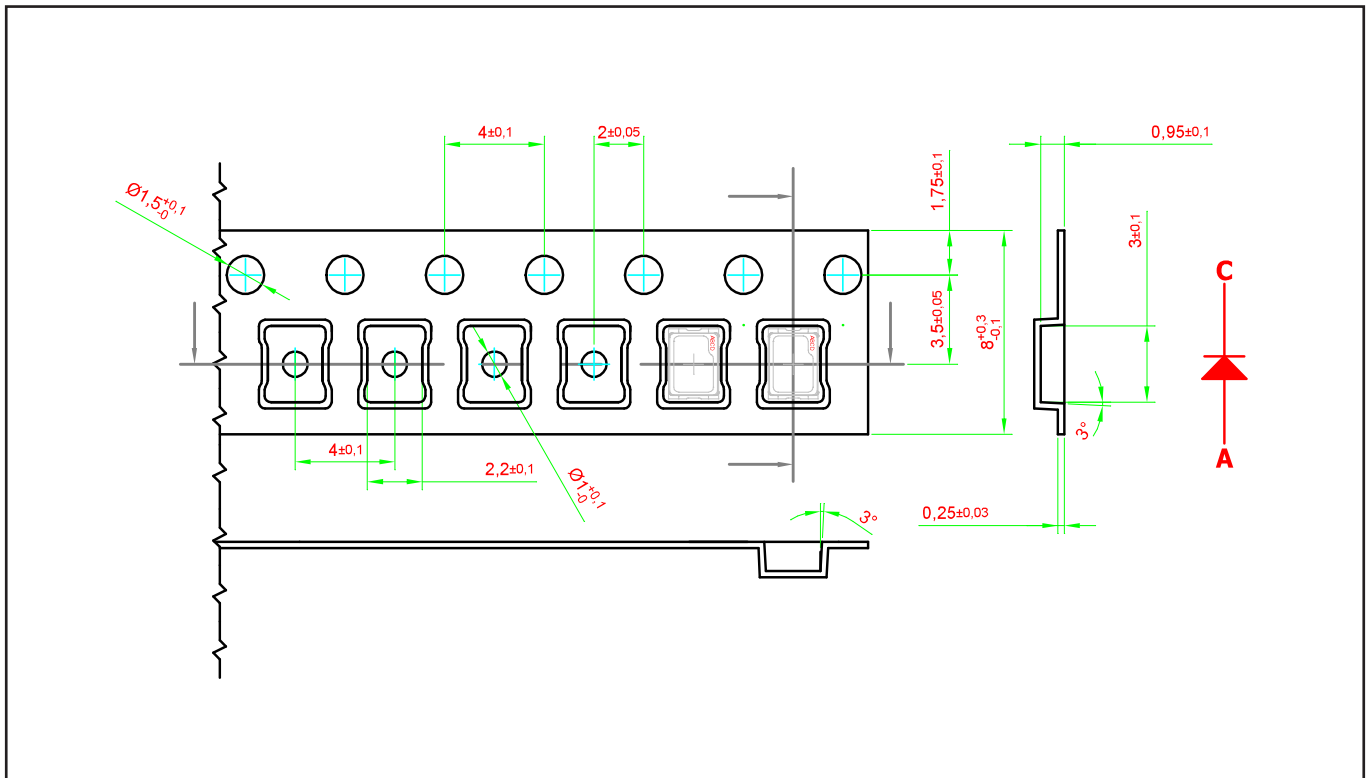
Material

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

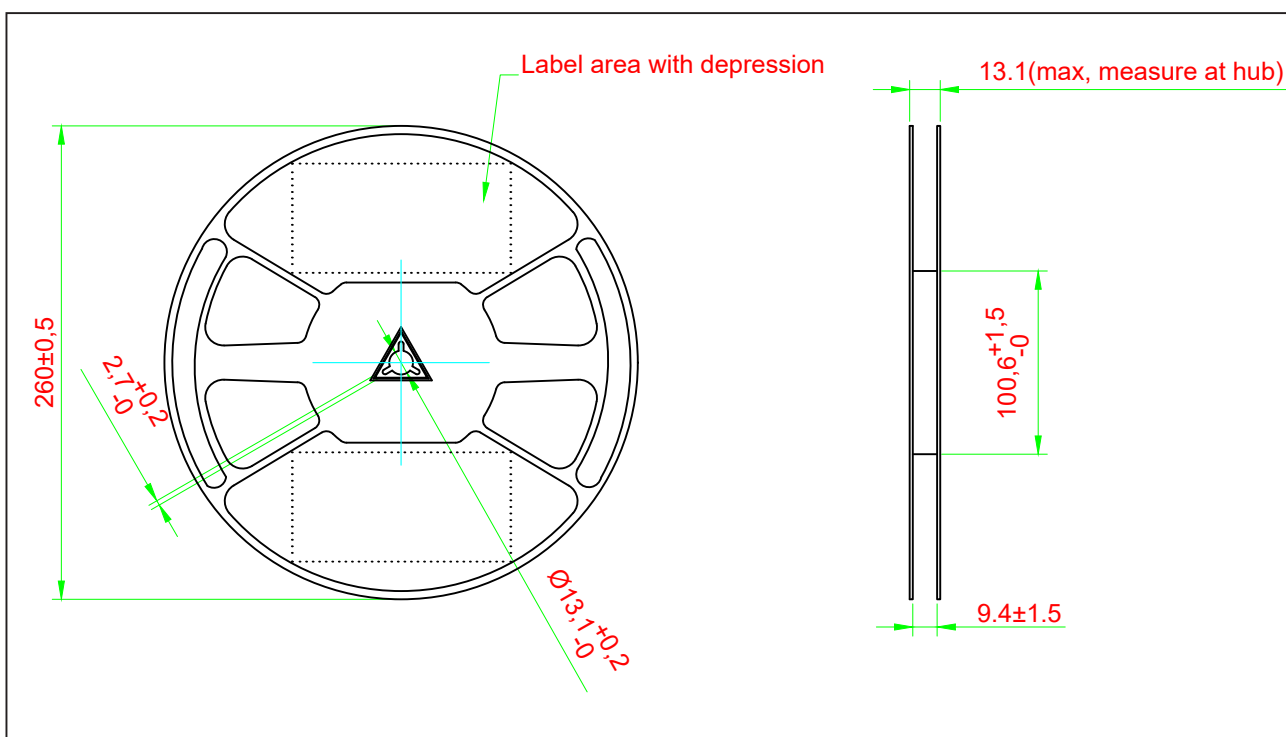
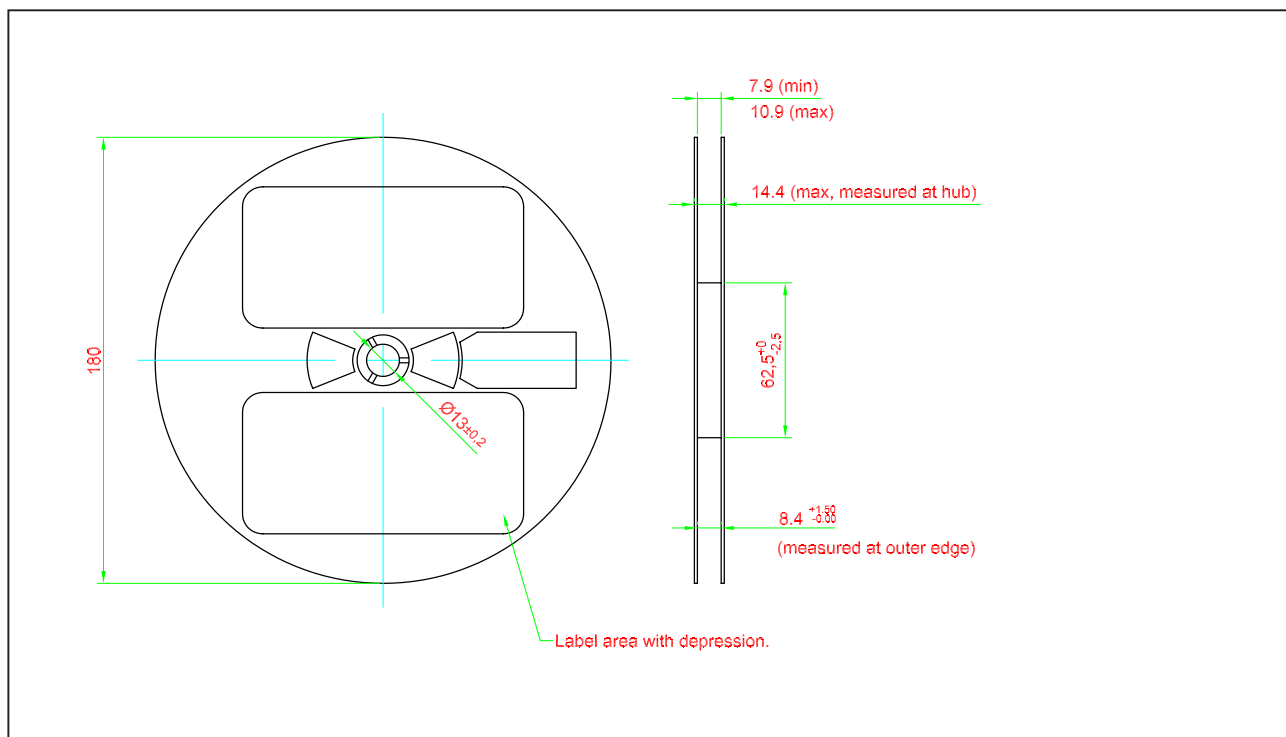
Recommended Solder Pad *Appx. 5.1*



Taping and orientation Appx. 5.1



Packaging Specification

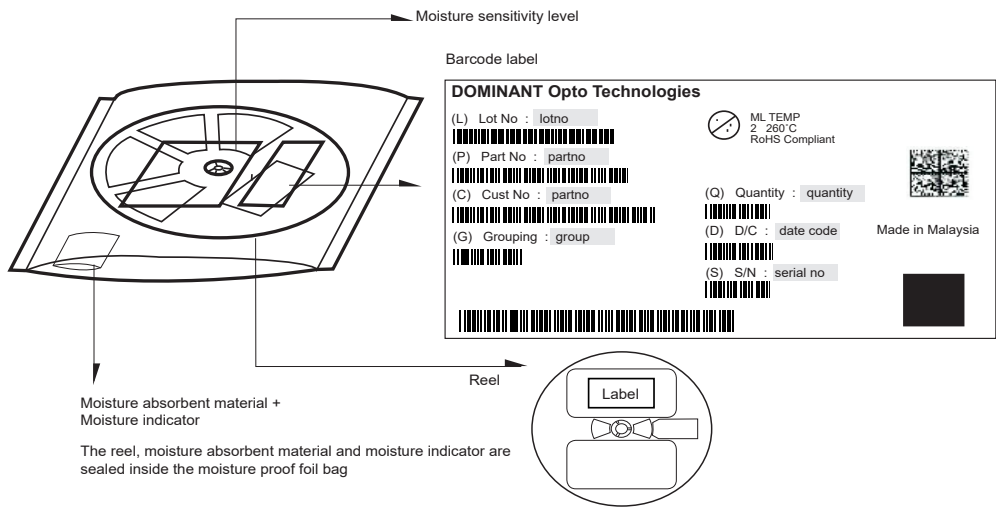


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	4000	SVx-MHG-xxx-x
Optional Packing	260	8000	SVx-MHG-xxx-x-8

Notes:

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

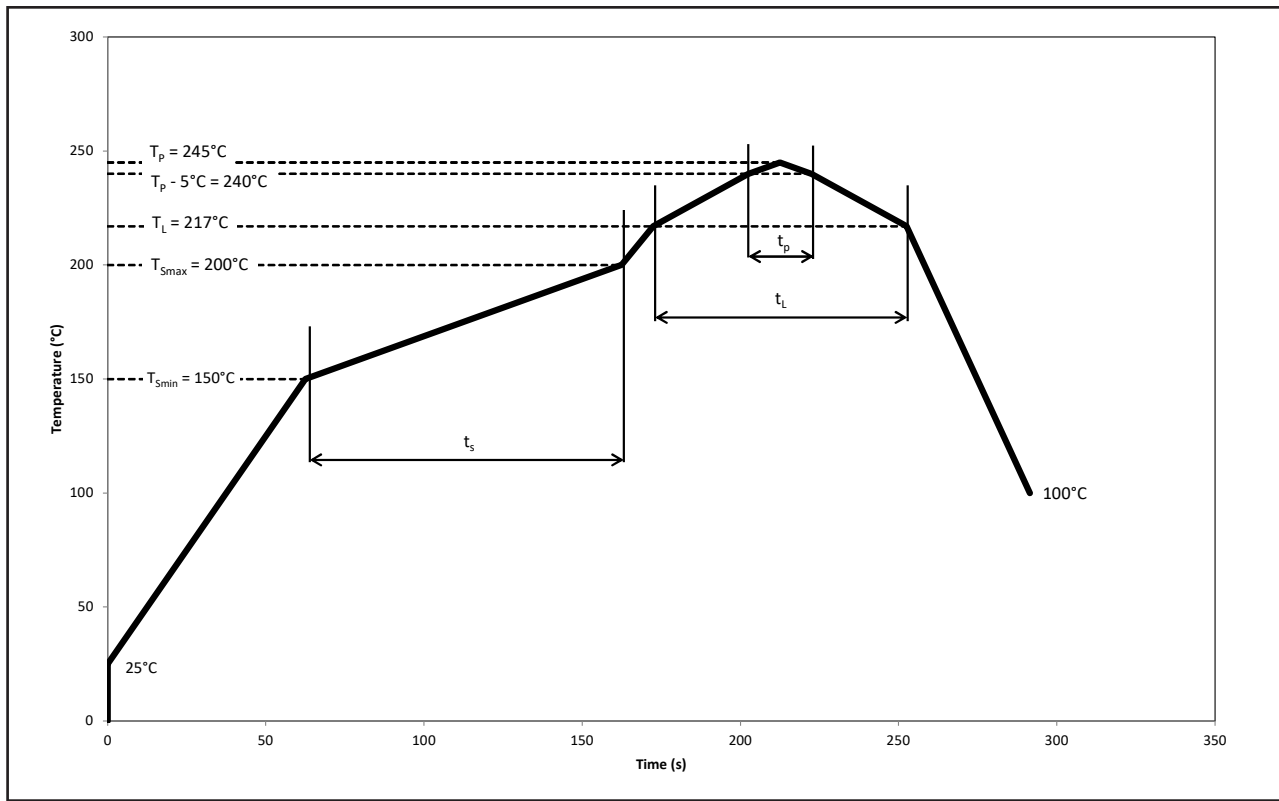
Packaging Specification



Quantity per bag (pcs)	Average 1pc SpicePlus 2520 (g)	1 completed bag (g)
4000	0.0089	150 ± 10
8000	0.0089	360 ± 10

Recommended Pb-free Soldering Profile

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



Profile Feature	Symbol	Pb-Free Assembly			Unit
		Min.	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 _L	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 Due to the specific conditions of semiconductor devices' manufacturing processes, the provided typical data and calculated correlations of technical parameters should only be considered as statistical values. It is important to note that the actual parameters of individual devices may deviate from these typical data, calculated correlations or the typical characteristic line. Dominant reserves the right to update this typical data without prior notice, particularly in response to technical enhancements.

5) **Tolerance of Measure**

- 5.1 Unless otherwise noted in drawing, tolerances are specified with ± 0.1 and dimension are specific in mm.

6) **Corrosion Robustness:**

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

7) **Reverse Voltage:**

- 7.1 Not designed for reverse operation. Continuous reverse voltage can cause migration and LED damage.

8)

- 8.1 Package edge may have plastic burr or protrusion no bigger than 0.05mm .

Revision History

Page	Subjects	Date of Modification
-	Initial Release	20 Aug 2020
8, 9, 11, 12	Update Package Outline Update Solder Pad Drawing Update Standard Packing from 2000pcs to 4000pcs	16 Oct 2020
2, 6	Update Peak Pulse Current Update Graph: Allowable Forward Current Vs Duty Ratio	21 Jul 2021
8	Add Polarity in Package Outline	11 Aug 2022
2, 6, 7	Update Electrical Characteristics Update Graph: Forward Current Vs Forward Voltage Update Graph: Forward Voltage Vs Junction Temperature	24 Feb 2023
11, 12	Update Optional Packing	06 Nov 2024
1, 8	Update Product Photo Update Packaging Outline	11 Feb 2026

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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