

SpiceLED

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 SpiceLED packs a powerful performance and is a highly reliable design device. Its versatility enables its application in automotive appliances, key-pad illumination, hand-held devices such as PDAs, notebooks, compact back-lighting applications, consumer appliances, office equipment, audio and video equipment.



Features:

- > High brightness surface mount LED.
- > Super wide viewing angle of 160°.
- > Equivalent to 0603 package outline. Copper lead-frame construction.
- > Qualified according to JEDEC moisture sensitivity Level 2.
- > Compatible to IR reflow soldering.
- > Environmental friendly; RoHS compliance.
- > Compliance to automotive standard; AEC-Q102.
- > Superior Corrosion Resistant.



Applications:

- > Automotive: interior applications, eg: switches, telematics, climate control system, dashboard, etc.
- > Consumer Appliances: LCD illumination as in PDAs, LCD TV.
- > Communication: indicator and backlight in mobilephone.
- > Industrial: white goods (eg: Oven, microwave, etc.).

Optical Characteristics at Tj=25°C

Part Number	Color	Viewing Angle°	Luminous Intensity @ 2mA		IV (mcd) <i>Appx. 1.1</i>
			Min.	Typ.	Max.
● SSS-CLD-HJ2-1-I2	Super Red, 632 nm	160	2.80	4.50	7.20
● SSO-CLD-JK2-1-I2	Orange, 605 nm	160	4.50	7.20	11.20
● SSY-CLD-JK2-1-I2	Yellow, 587 nm	160	4.50	7.20	11.20
● Not for new design					

Electrical Characteristics at Tj=25°C

Part Number	Min. (V)	Vf @ If = 2mA <i>Appx. 3.1</i>			Vr @ Ir = 10uA <i>Appx. 6.1</i>
		Typ. (V)	Max. (V)		Min. (V)
SSx-CLD	1.6	1.8	2.4		5

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	30	mA
Peak pulse current; (Ts = 55°C, tp ≤ 100μs, Duty cycle = 0.03)	100	mA
Reverse voltage; Ir _{max} = 10μA <i>Appx. 6.1</i>	5	V
ESD threshold (HBM)	2000	V
LED junction temperature	110	°C
Operating temperature	-40 ... +105	°C
Storage temperature	-40 ... +110	°C
Power dissipation (at room temperature)	40	mW
Thermal resistance (Rated current = 2mA, Ts = 25 °C)		
- Junction / ambient, R _{th JA}	450	K/W
- Junction / solder point, R _{th JS}	250	K/W

Wavelength Grouping at Tj=25°C

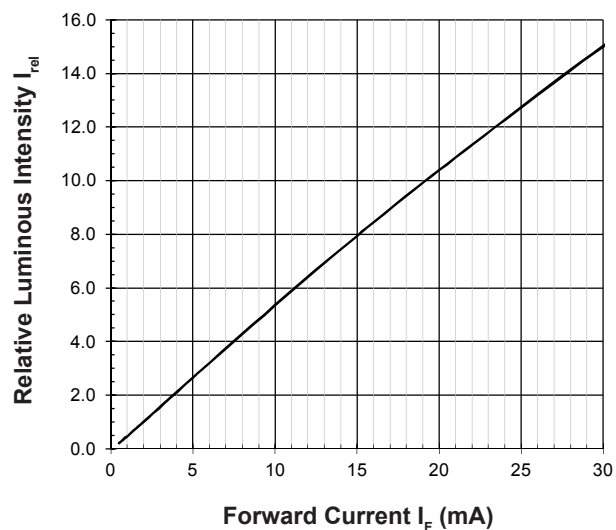
Color	Group	Wavelength distribution (nm) <i>Appx. 2.2</i>
SSS; Super Red	Full	625 - 640
SSO; Orange	Full	600 - 612
	W	600 - 603
	X	603 - 606
	Y	606 - 609
	Z	609 - 612
SSY; Yellow	Full	582 - 594
	W	582 - 585
	X	585 - 588
	Y	588 - 591
	Z	591 - 594

Luminous Intensity Group at Tj=25°C

Brightness Group	Luminous Intensity <i>Appx. 1.1</i> IV (mcd)
H1	2.80 ... 3.55
H2	3.55 ... 4.50
J1	4.50 ... 5.60
J2	5.60 ... 7.20
K1	7.20 ... 9.00
K2	9.00 ... 11.20

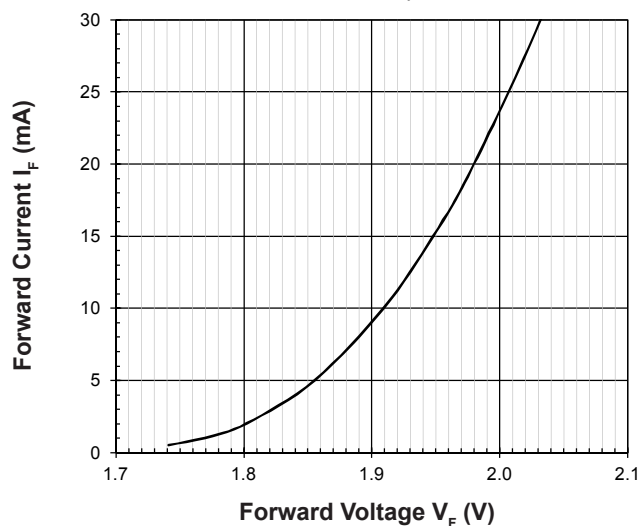
Relative Luminous Intensity Vs Forward Current Appx. 4.1

$$I_V/I_V(2\text{mA}) = f(I_F); T_j = 25^\circ\text{C}$$



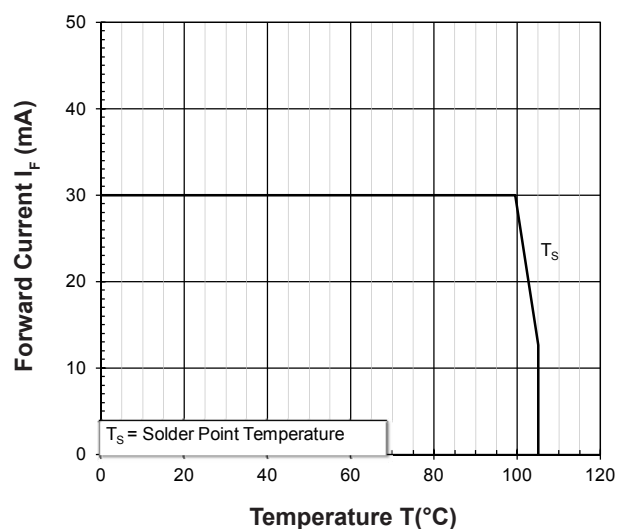
Forward Current Vs Forward Voltage Appx. 4.1

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



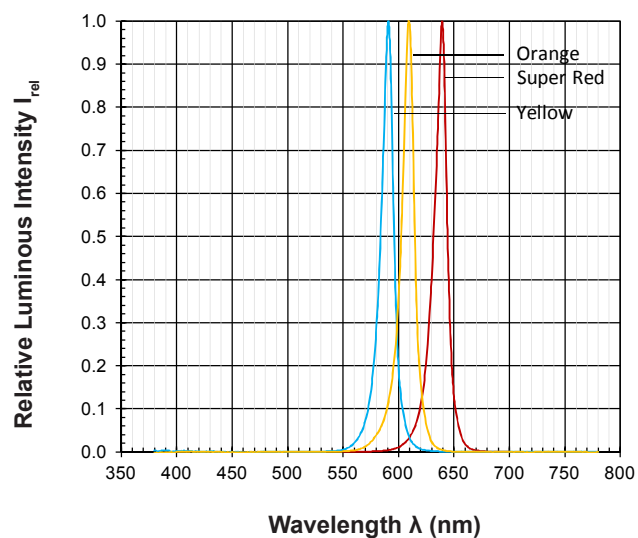
Maximum Current Vs Temperature

$$I_F = f(T)$$



Relative Spectral Emission Appx. 4.1

$$I_{rel} = f(\lambda); T_j = 25^\circ\text{C}; I_F = 2\text{mA}$$

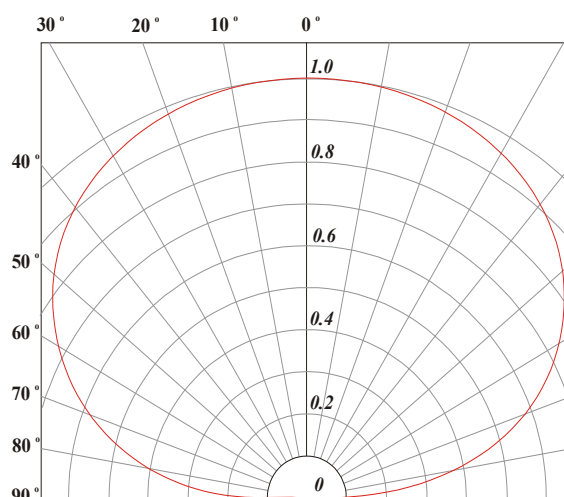


Allowable Forward Current Vs Duty Ratio

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

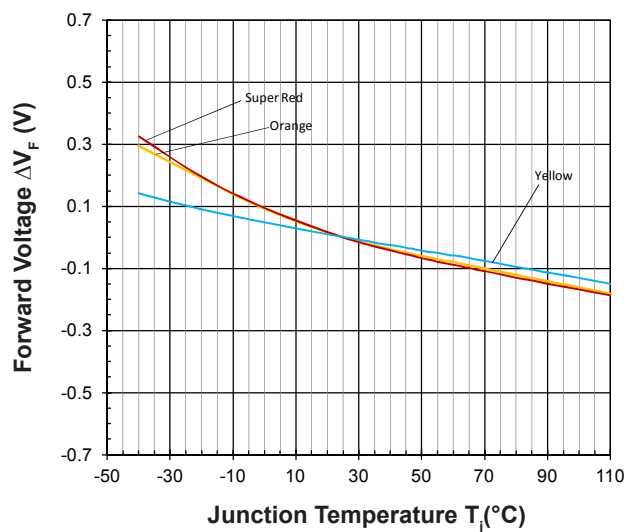


Radiation Pattern Appx. 4.1



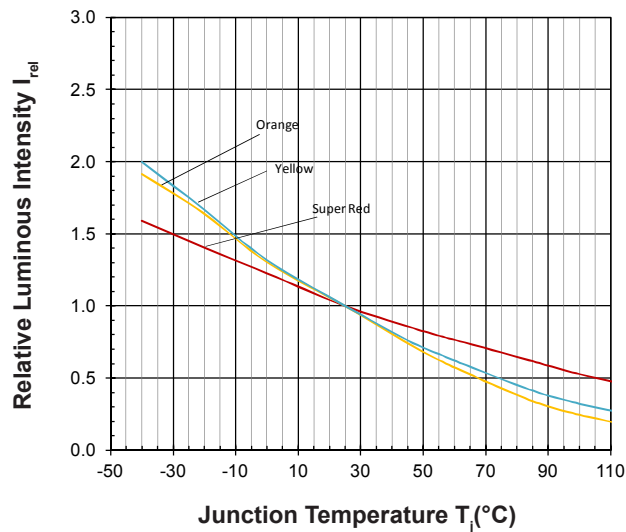
Forward Voltage Vs Junction Temperature Appx. 4.1

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 2\text{mA}$$



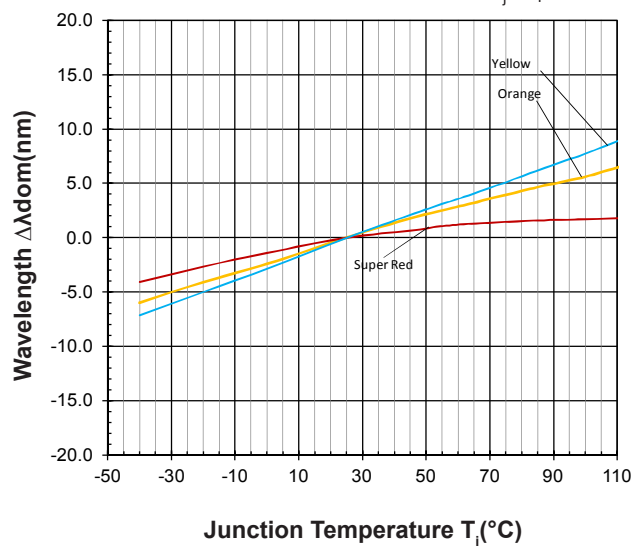
Relative Luminous Intensity Vs Junction Temperature Appx. 4.1

$$I_V/I_V(25^\circ\text{C}) = f(T_j); I_F = 2\text{mA}$$

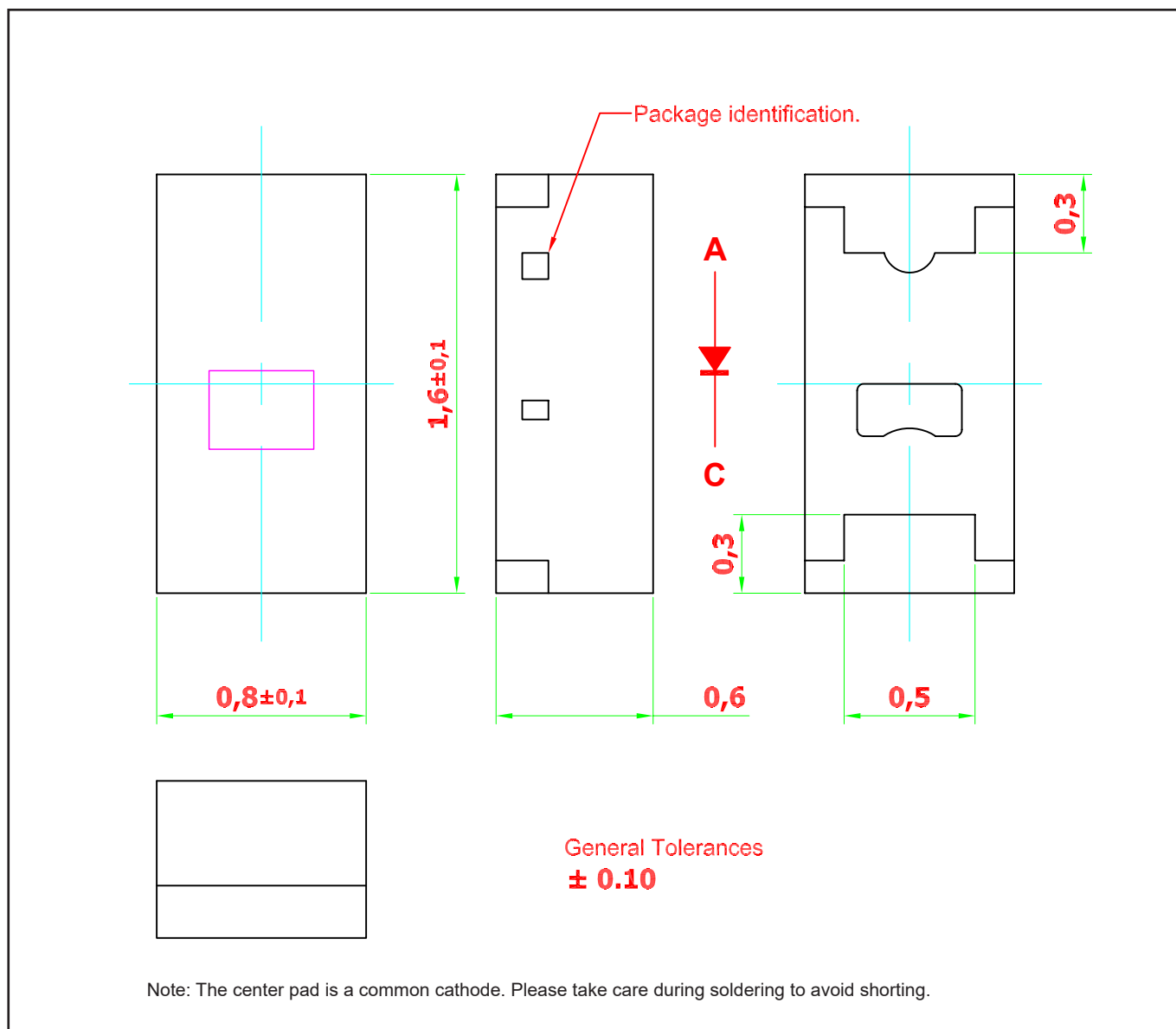


Wavelength Vs Junction Temperature Appx. 4.1

$$\Delta \lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}}(25^\circ\text{C}) = f(T_j); I_F = 2\text{mA}$$



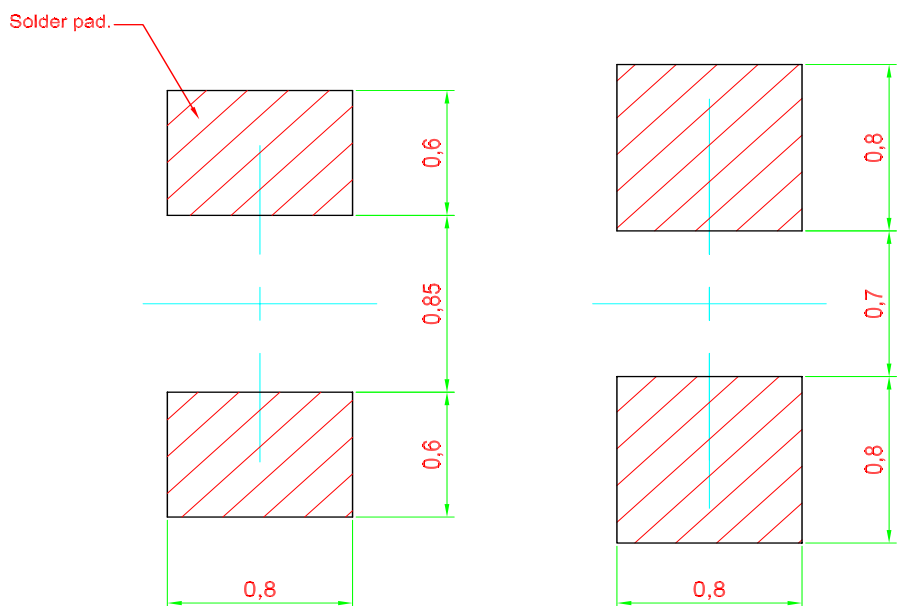
SpiceLED • AllnGaP S-Spice : SSx-CLD-I2 Package Outlines *Appx. 5.1*



Material

Material	
Lead-frame	Cu Alloy With Au Plating
Package	High Temperature Resistant Epoxy Resin

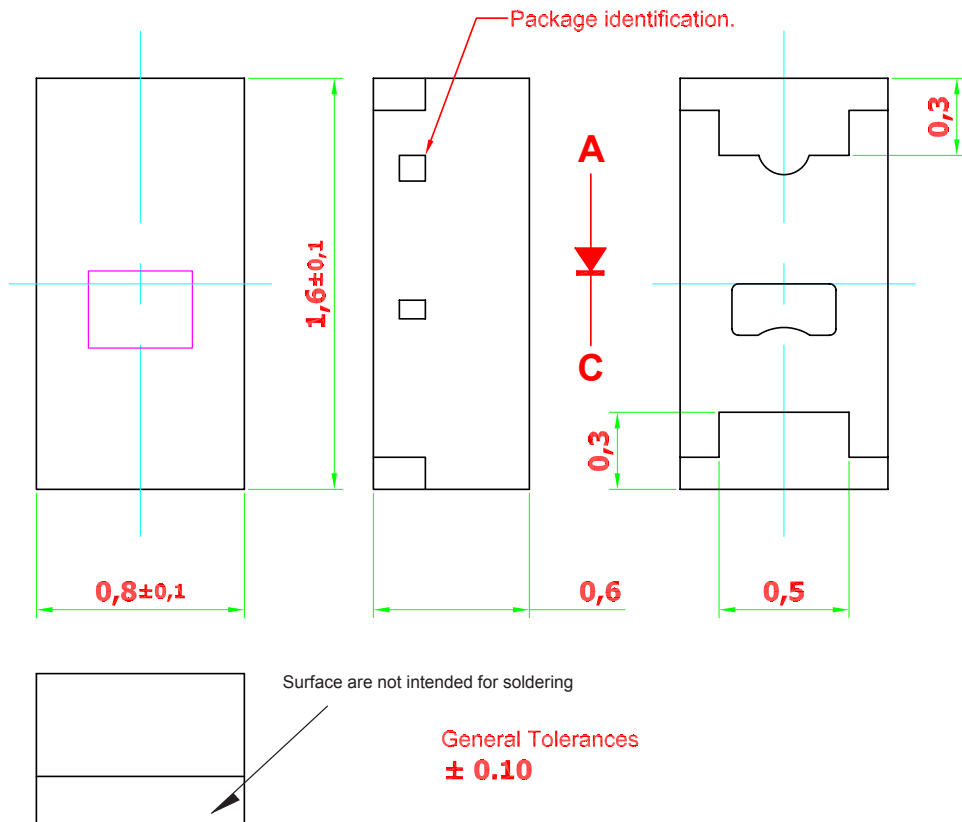
Recommended Solder Pad Appx. 5.1



Recommended Solder-pad

Alternative Solder-pad
 Compatible to ChipLED 0603

Note: Component is based on a new package platform, which features "Bottom Only Terminations". Solder joints are only formed at the bottom of the component and solder fillet will not be observable as the sides of the component.



General Tolerances
 ± 0.10

Technical drawing of a mechanical part, showing a top view and a side view. The drawing includes dimensions and tolerances in millimeters.

Top View Dimensions:

- Overall width: $8^{+0.3}_{-0.1}$
- Overall height: $1.75^{+0.1}_{-0.1}$
- Distance from left edge to first hole center: 0.95 ± 0.05
- Distance between first and second hole centers: 4 ± 0.1
- Distance between second and third hole centers: 4 ± 0.1
- Distance between third and fourth hole centers: 2 ± 0.05
- Distance from fourth hole center to right edge: 0.75 ± 0.05
- Hole diameter: $\varnothing 1.5^{+0.1}_{-0.1}$
- Distance from bottom edge to hole center line: 3.5 ± 0.05
- Distance from bottom edge to hole center line (alternative): 0.22 ± 0.02
- Angle: 5°

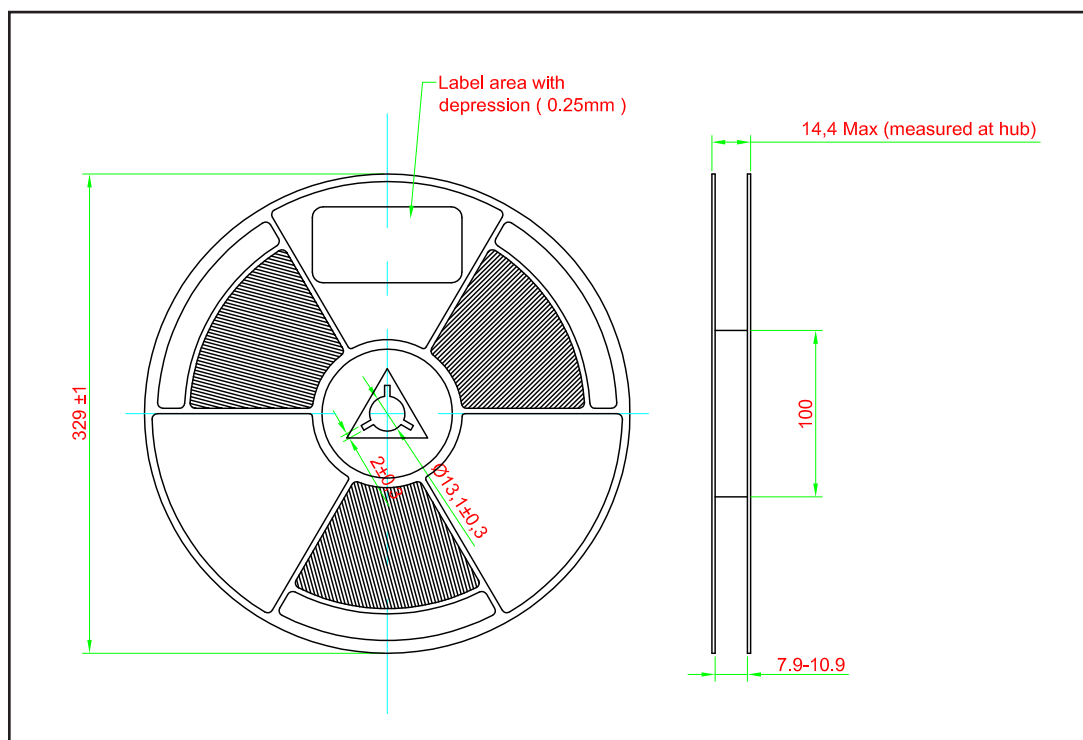
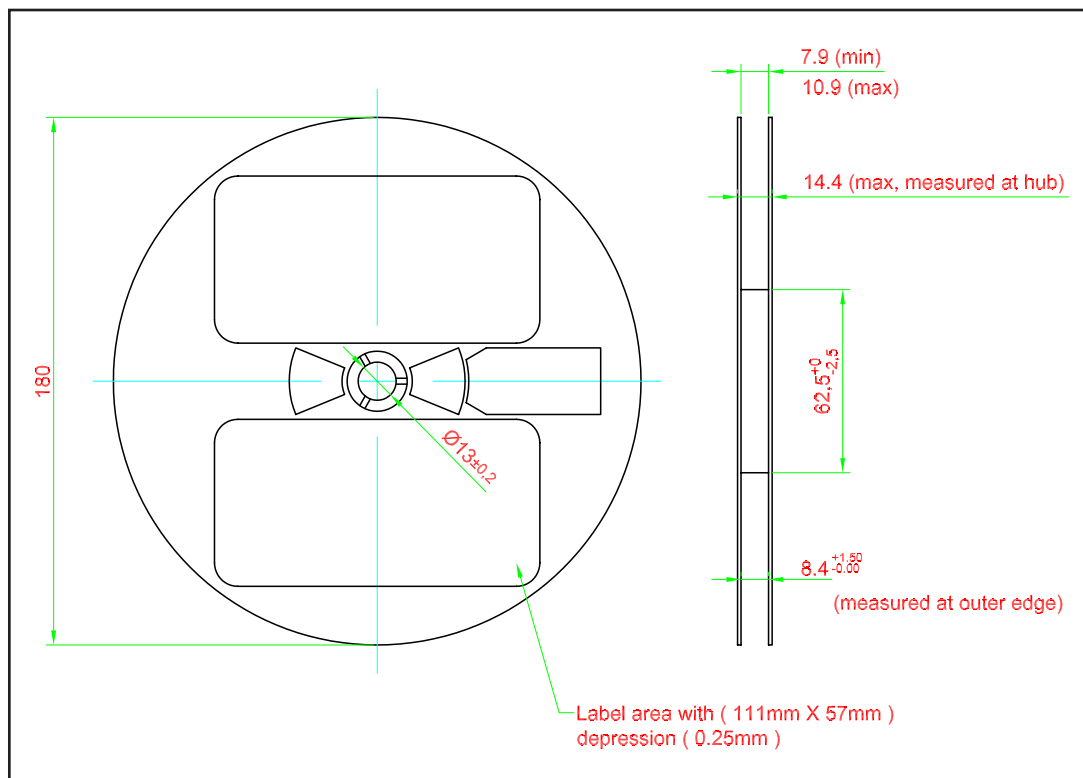
Side View Dimensions:

- Overall height: 1.75 ± 0.05
- Distance from bottom edge to hole center line: 0.75 ± 0.05

Section Labels:

- A-A
- B-B
- C-C

Packaging Specification

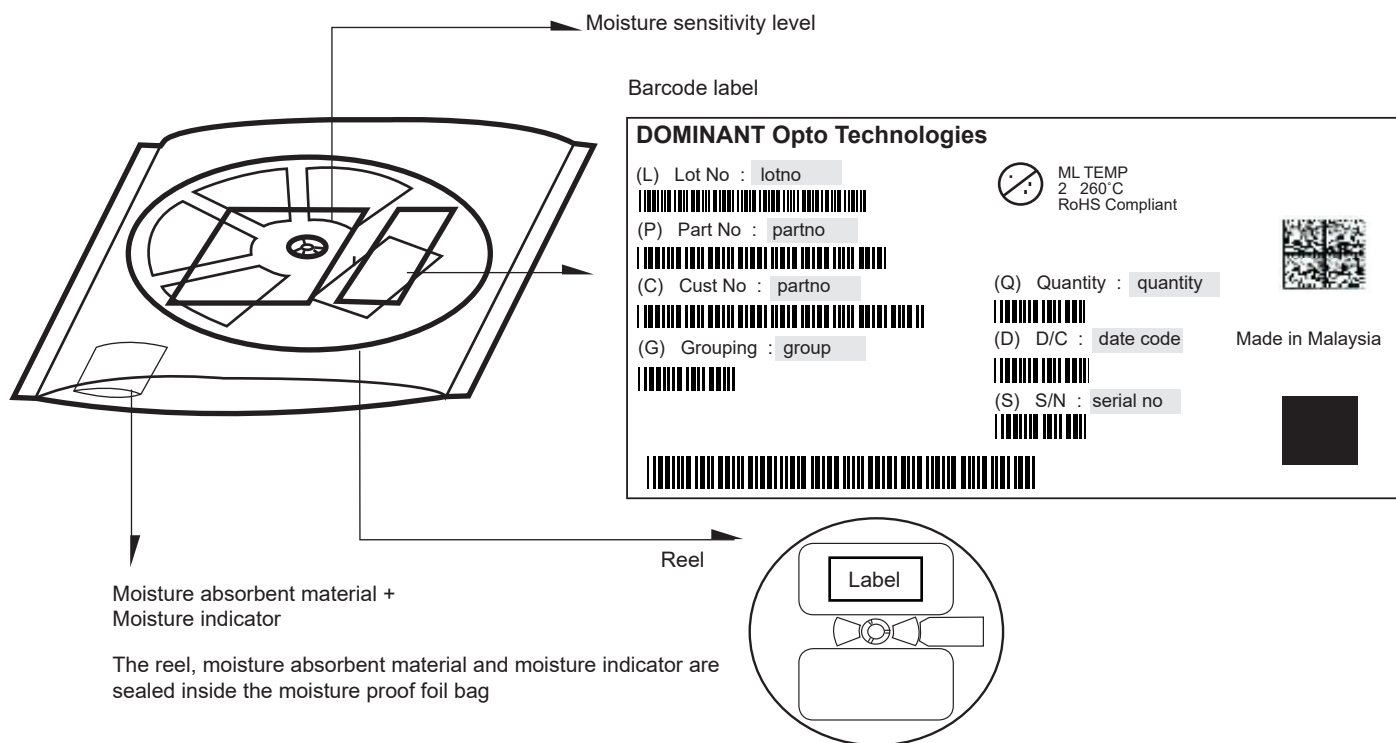


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	5000	SSx-CLD-xxx-x-I2
Optional Packing	329	18000	SSx-CLD-xxx-x-I2-M

Notes:

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

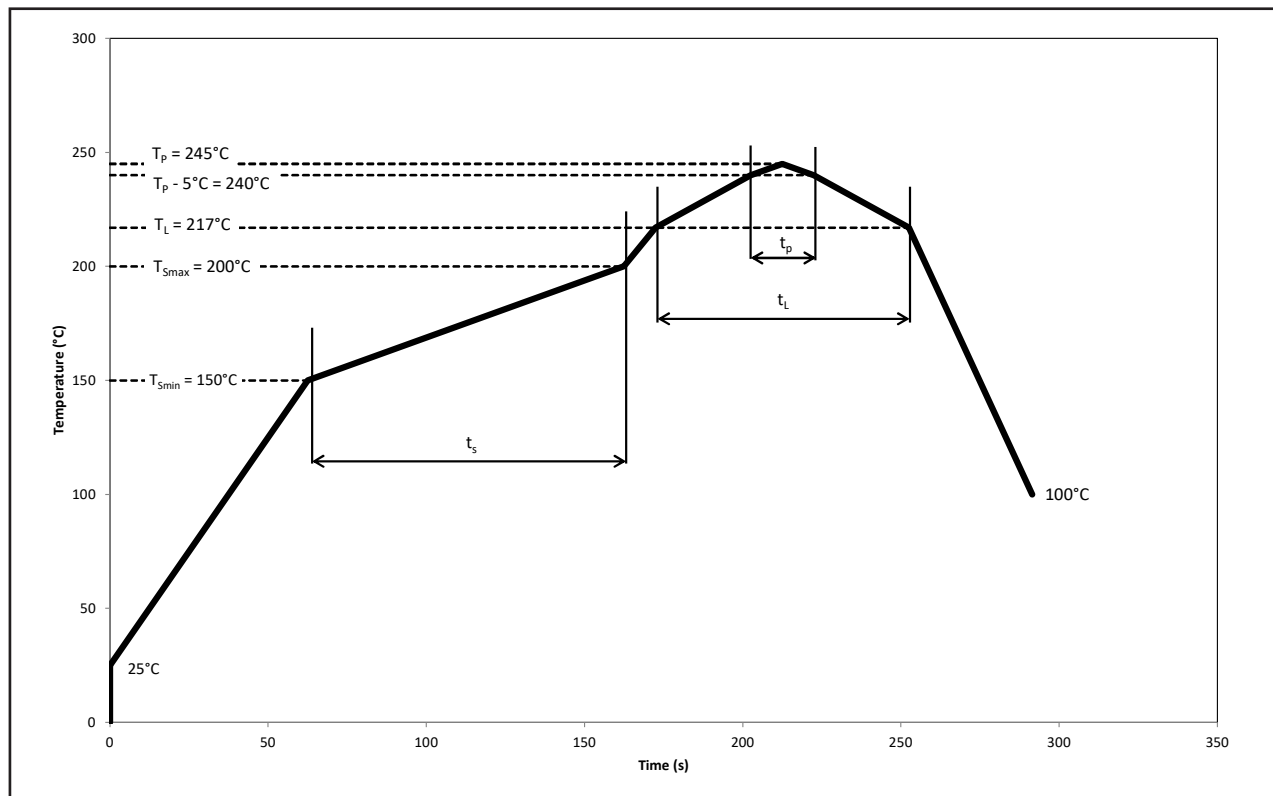
Packaging Specification



Quantity per bag (pcs)	Average 1pc SpiceLED (g)	1 completed bag (g)
5000	0.001	170 ± 10
18000	0.001	470 ± 10

Recommended Pb-free Soldering Profile

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



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 _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) **Reverse Voltage:**

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

Revision History

Page	Subjects	Date of Modification
7	Update Carrier Tape	13 Feb 2014
3	Add Characteristics	24 Nov 2014
1, 8, 10, 12	Add Features Error on Taping and Orientation Update Package Specification Add Appendix	26 Oct 2016
1, 2, 4, 5, 9, 10, 11, 13	Add Features Update Operating Temperature Update Storage Temperature Update Graph Update Package Specification Update Appendix	20 Nov 2019
3, 11	Typo Error on Wavelength Naming Update Recommended Pb-free Soldering Profile	11 Mar 2022
9, 10	Update Quantity per Reel (180mm)	21 Feb 2023
6, 10	Update Polarity in Package Outline Update Packaging Specification	31 Jan 2024
2	Not for New Design: SSS-CLD-HJ2-1-I2, SSO-CLD-JK2-1-I2, SSY-CLD-JK2-1-I2	18 Feb 2025

NOTE

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Please contact us for more information:

DOMINANT Opto Technologies Sdn. Bhd.
Lot 6, Batu Berendam, FTZ Phase III, 75350 Melaka, Malaysia
Tel: (606) 283 3566 Fax: (606) 283 0566
E-mail: sales@dominant-semi.com