DOMINANT™
Opto Technologies
Innovating Illumination

DATA SHEET:

SpiceLED

InGaN S-Spice : SSx-HLD

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 versality enables its application in automotive applicances, 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.
> Superior Corrosion Resistant.
> Compliance to automotive standard, AEC-Q102.

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.
> Display: full color display video notice board.
> Industrial: white goods (eg: Oven, microwave, etc.).

Optical Characteristics at Tj=25˚C

Part Number	Color	Viewing Angle˚	Luminous Intensity @ IF = 20mA IV (mcd) Appx. 1.1		
			Min.	Typ.	Max.
SSB-HLD-P2R1-1	Blue, 470 nm	160	56.0	100.0	140.0
SSB-HLD-Q2R-1	Blue, 470 nm	160	90.0	140.0	180.0
SST-HLD-TU2-1	True Green, 525nm	160	285.0	450.0	715.0

Electrical Characteristics at Tj=25˚C

Part Number	Vf @ If = 20mA Appx. 3.1			Vr @ Ir = 10uA Appx. 6.1
	Min. (V)	Typ. (V)	Max. (V)	Min. (V)
SSx-HLD	2.8	3.2	3.6	5

Absolute Maximum Ratings

	Maximum Value	Unit
DC forward current	20	mA
Peak Pulse Current; (Ts = 55°C, tp = 100µs, D = 0.03)	100	mA
Reverse voltage; Ir_{max} = 10µA Appx. 6.1	5	V
ESD threshold (HBM)	2000	V
LED junction temperature	120	˚C
Operating temperature	-40 … +110	˚C
Storage temperature	-40 … +110	˚C
Power dissipation (at room temperature)	75	mW
Thermal resistance		
- Junction / ambient, $R_{th\ JA}$	480	K/W
- Junction / solder point, $R_{th\ JS}$	280	K/W

Wavelength Grouping at Tj=25˚C

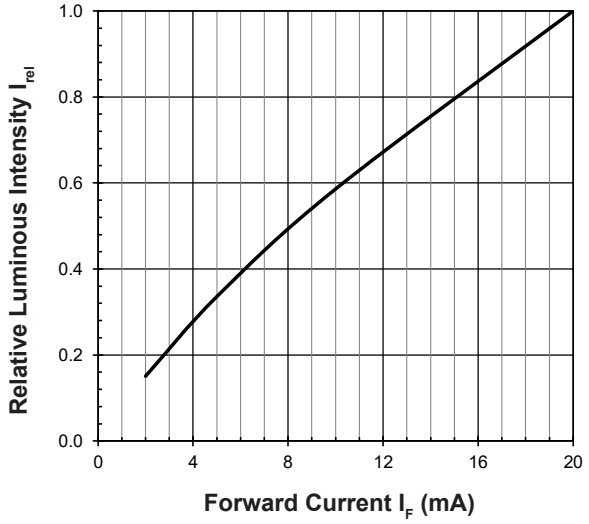
Color	Group	Wavelength distribution (nm) *Appx. 2.2*
SSB; Blue	Full	464 - 476
	A	464 - 470
	B	470 - 476
SST; True Green	Full	520 - 535
	A	520 - 525
	B	525 - 530
	C	530 - 535

Luminous Intensity Group at Tj=25˚C

Brightness Group	Luminous Intensity *Appx. 1.1* IV (mcd)
P2	56.0 ... 71.5
Q1	71.5 ... 90.0
Q2	90.0 ... 112.5
R1	112.5 ... 140.0
R2	140.0 ... 180.0
T1	285.0 ... 355.0
T2	355.0 ... 450.0
U1	450.0 ... 560.0
U2	560.0 ... 715.0

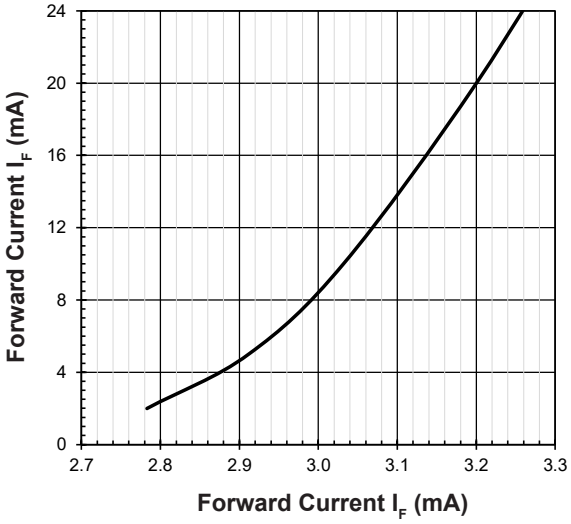
Relative Luminous Intensity Vs Forward Current *Appx. 4.1*

$I_V/I_V(20mA) = f(I_F)$; $T_j = 25°C$



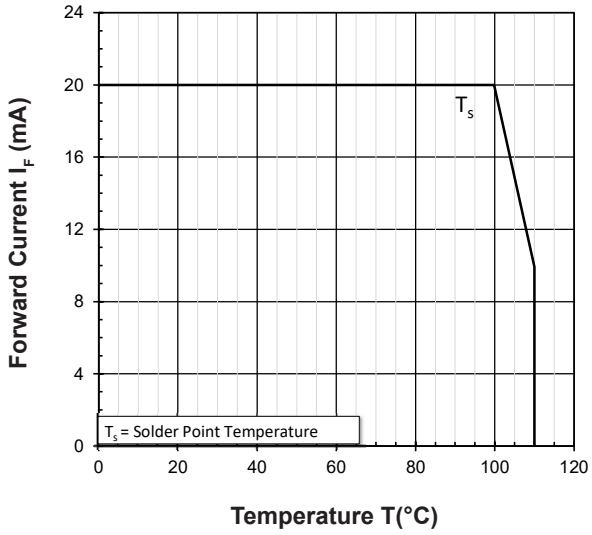
Forward Current Vs Forward Voltage *Appx. 4.1*

$I_F = f(V_F)$; $T_j = 25°C$



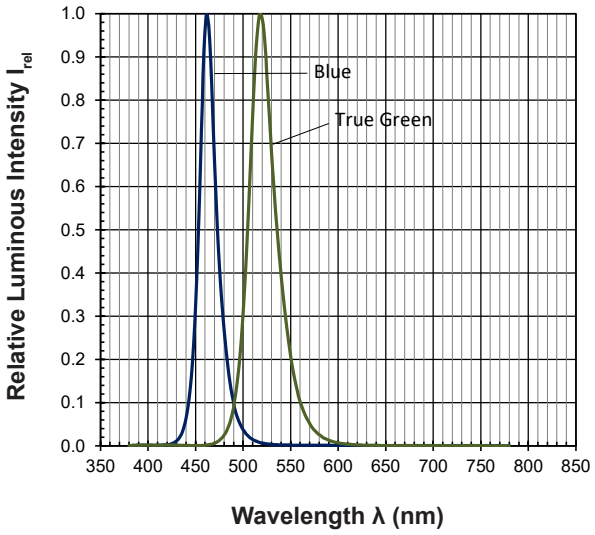
Maximum Current Vs Temperature

$I_F=f(T)$



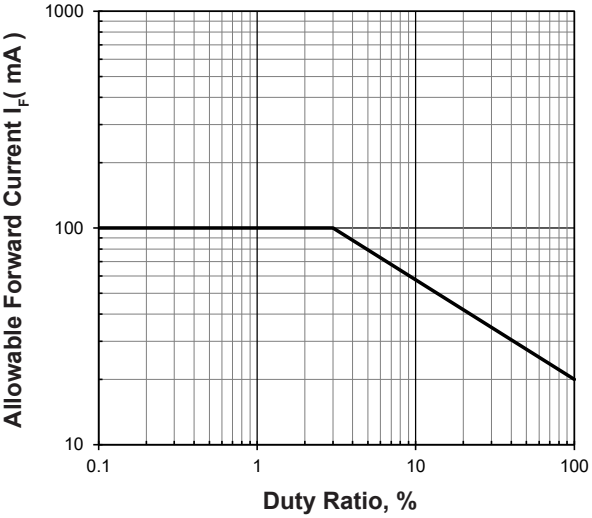
Relative Spectral Emission *Appx. 4.1*

$I_{rel} = f(\lambda)$; $T_j = 25°C$; $I_F = 20mA$

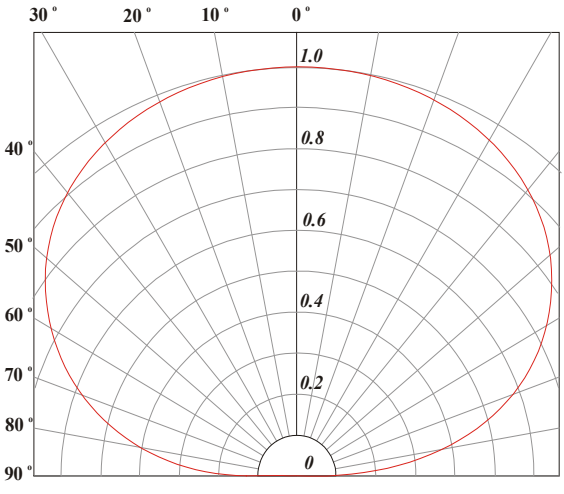


Allowable Forward Current Vs Duty Ratio

($T_j = 25°C$; $t_p \leq 10\mu s$)

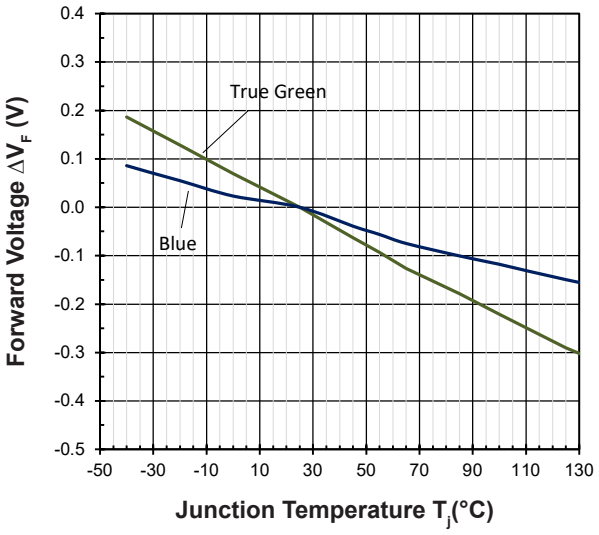


Radiation Pattern *Appx. 4.1*



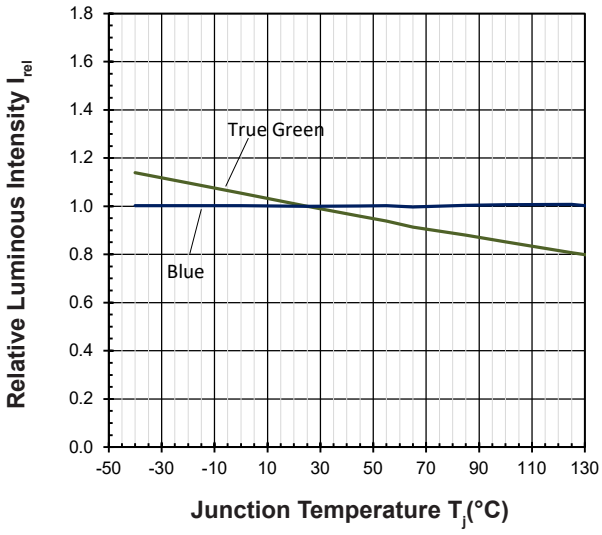
Forward Voltage Vs Junction Temperature *Appx. 4.1*

$\Delta V_F = V_F - V_F(25°C) = f(T_j)$; I_F =20mA



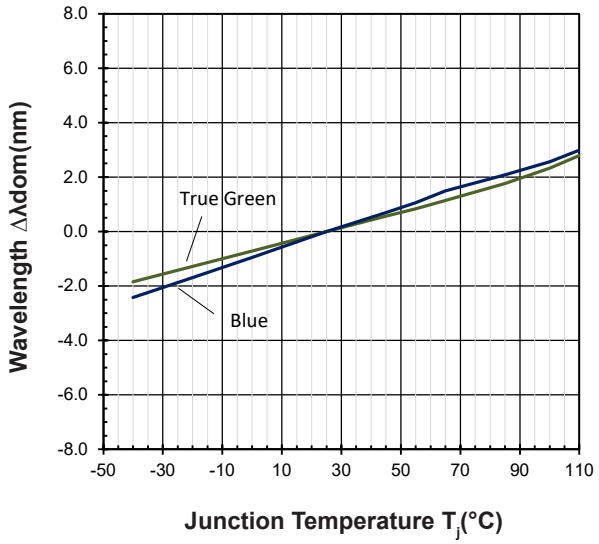
Relative Luminous Intensity Vs Junction Temperature *Appx. 4.1*

$I_V/I_V(25°C) = f(T_j)$; I_F = 20mA



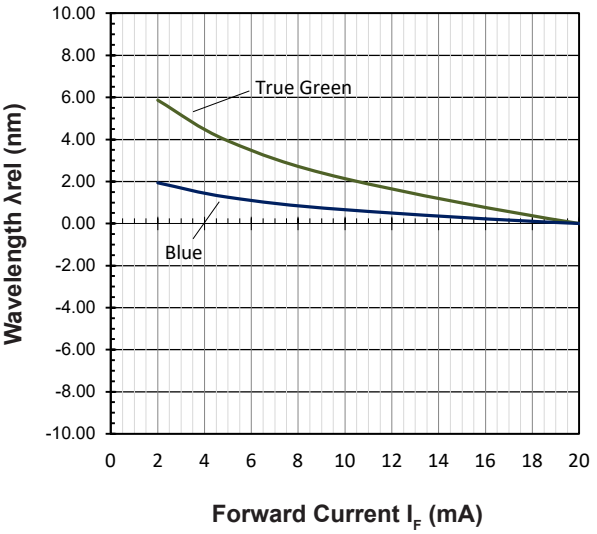
Wavelength Vs Junction Temperature *Appx. 4.1*

$\Delta\lambda dom = \lambda dom - \lambda dom\ (25°C) = f(T_j)$; I_F =20mA

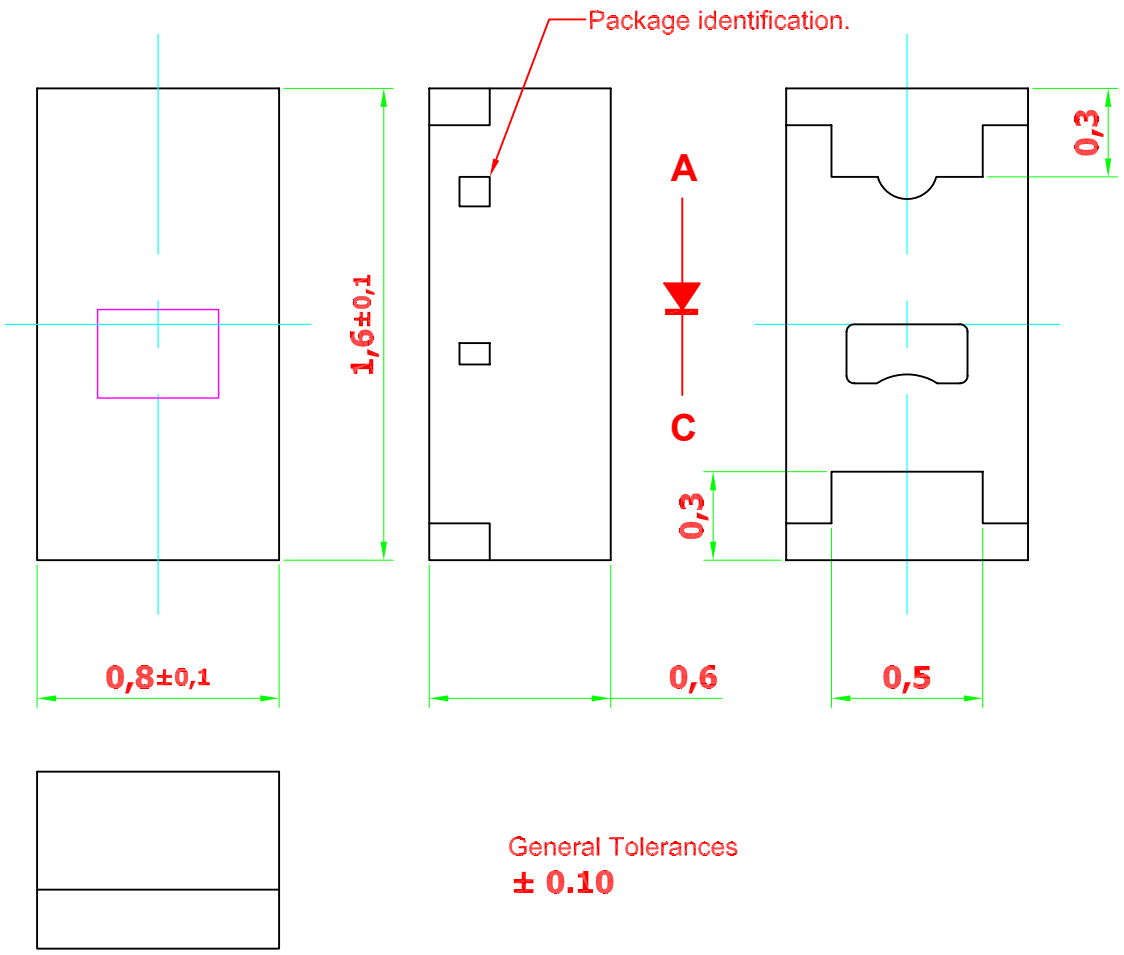


Wavelength Shift Vs Forward Current *Appx. 4.1*

$\lambda dom = f(I_F)$; T_j = 25°C



SpiceLED • InGaN S-Spice : SSx-HLD Package Outlines *Appx. 5.1*

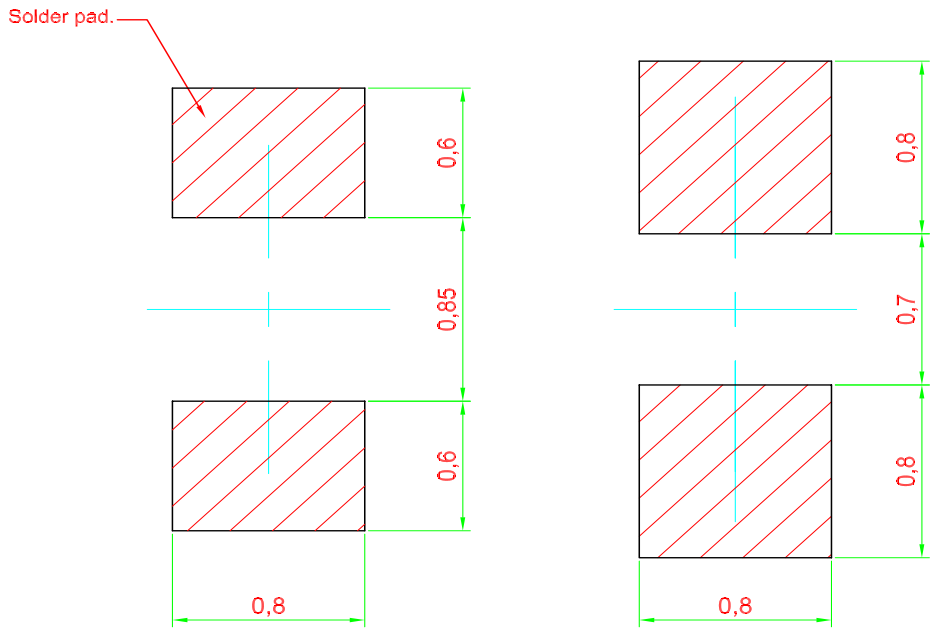


Note: The center pad is a common cathode. Please take care during soldering to avoid shorting.

Material

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

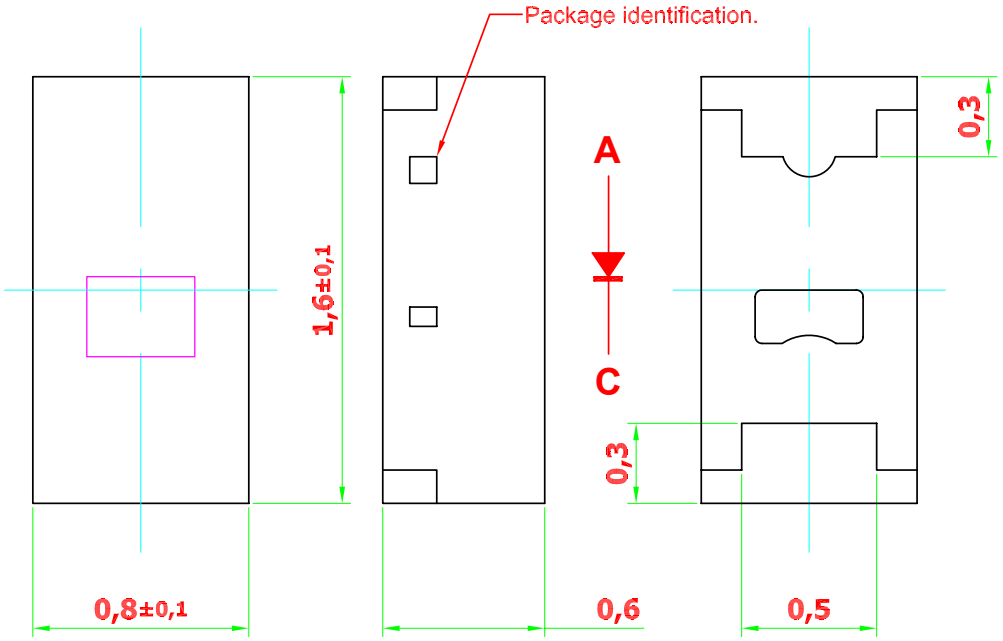
Recommended Solder Pad *Appx. 5.1*

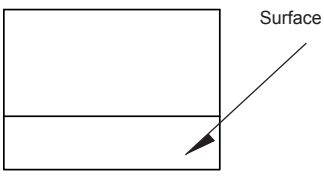


Recommended Solder-pad

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.

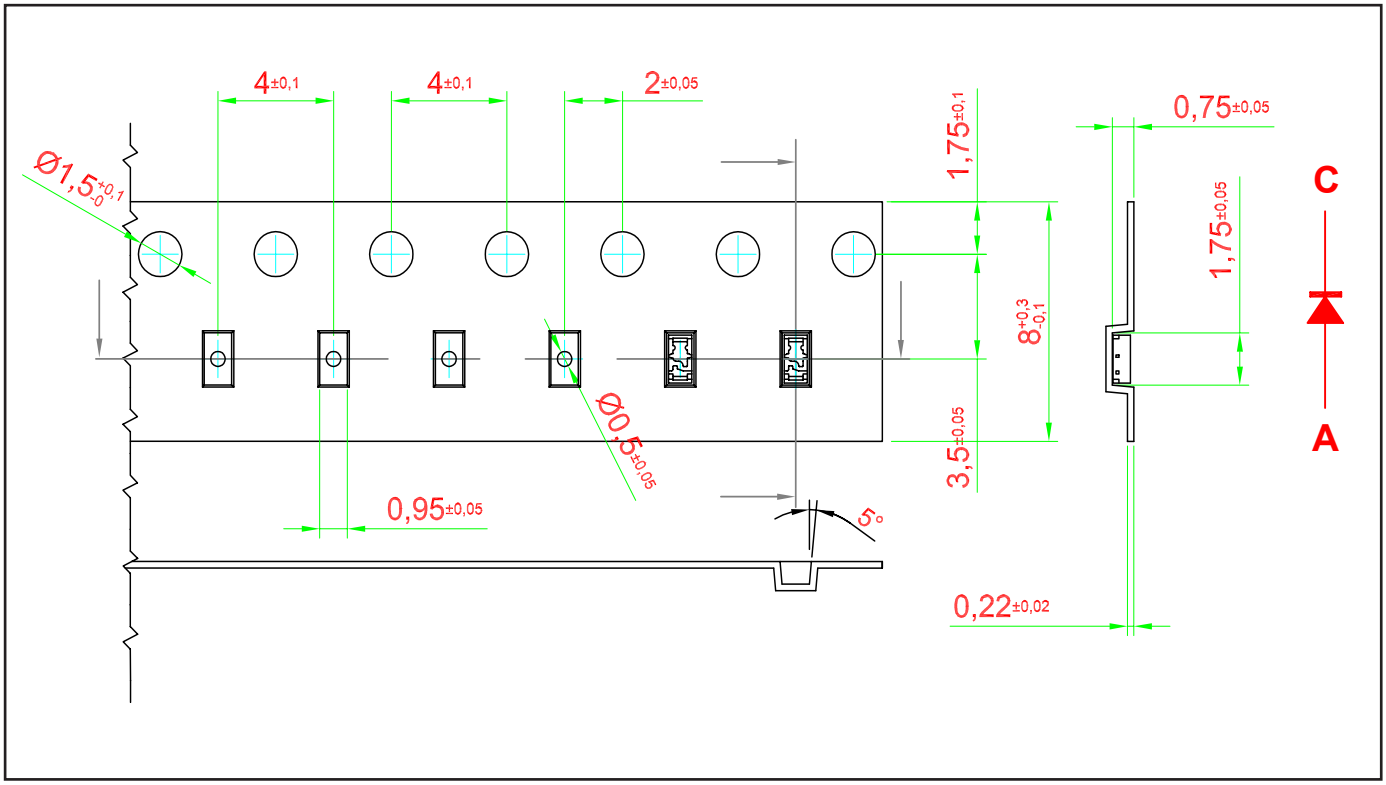




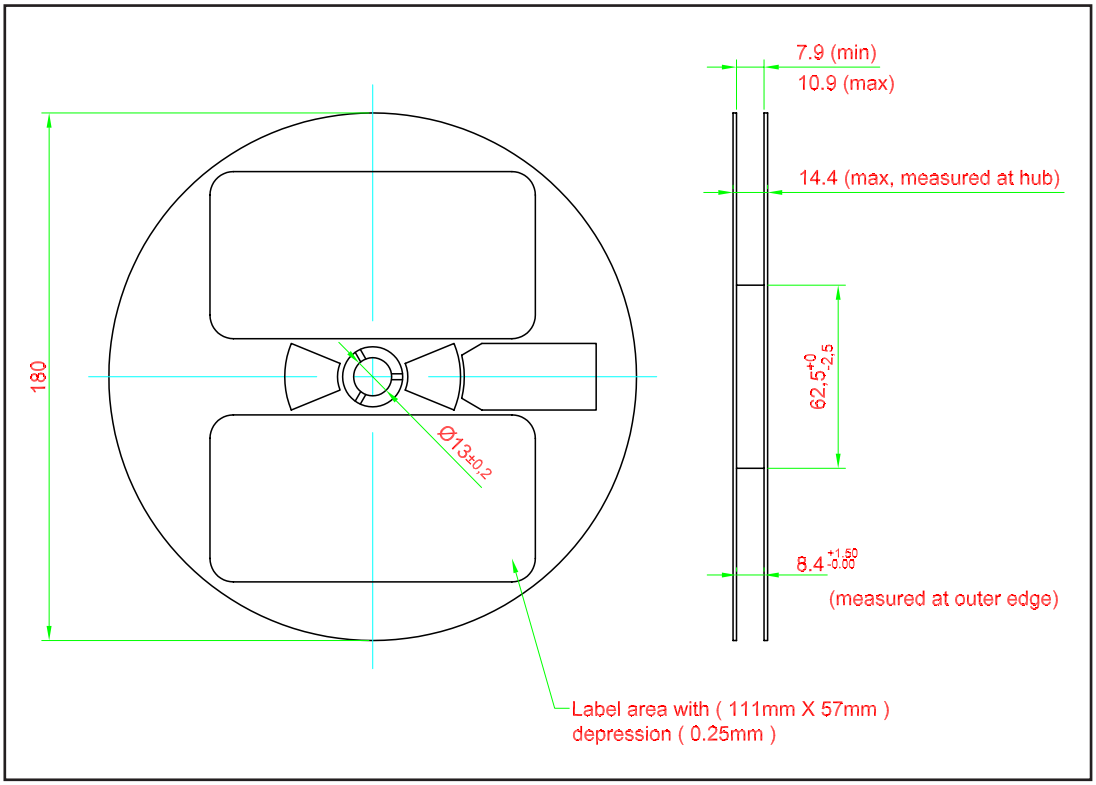
Surface are not intended for soldering

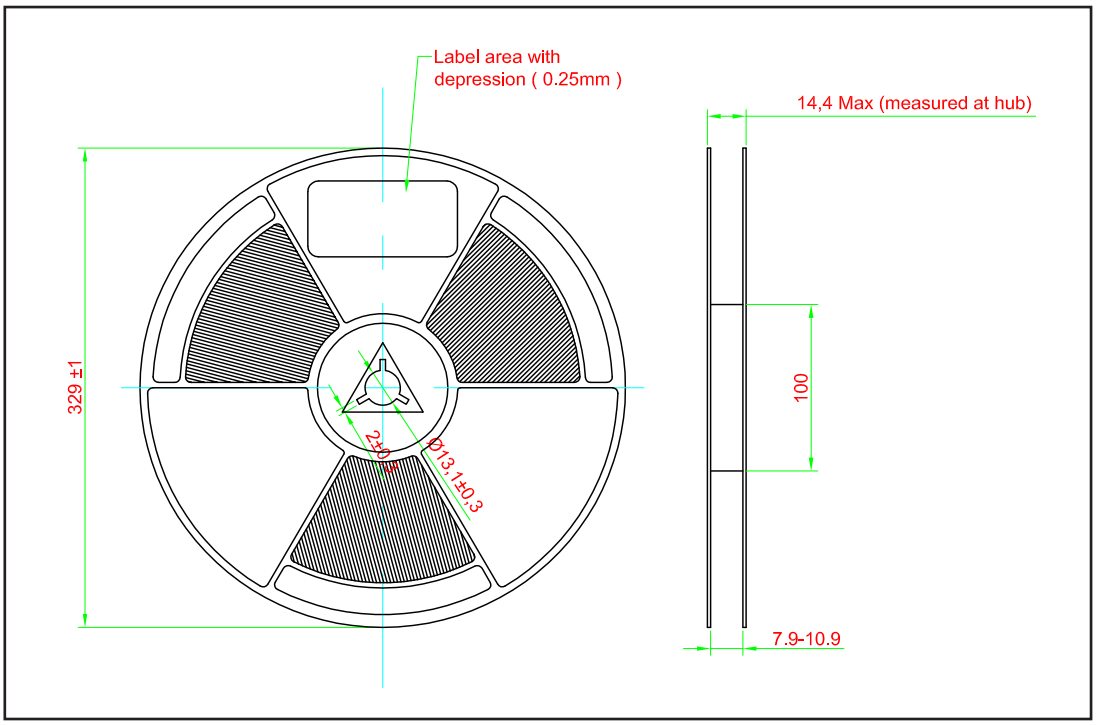
General Tolerances
± 0.10

Taping and orientation *Appx. 5.1*



Packaging Specification



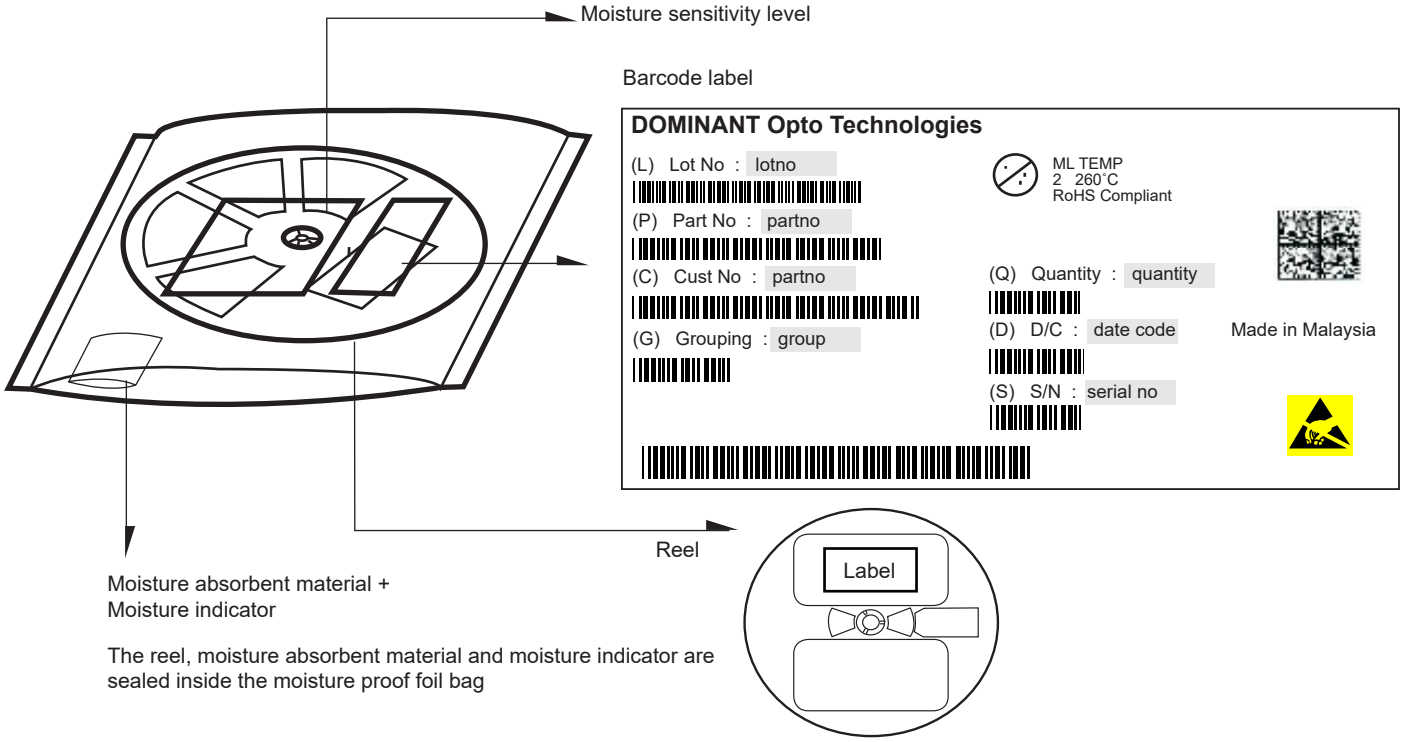


	Reel Diameter (mm)	Quantity (pcs)	*Ordering Number
Standard Packing	180	5000	SSx-HLD-XXX-X
Optional Packing	329	18000	SSx-HLD-XXX-X-M

Notes:

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

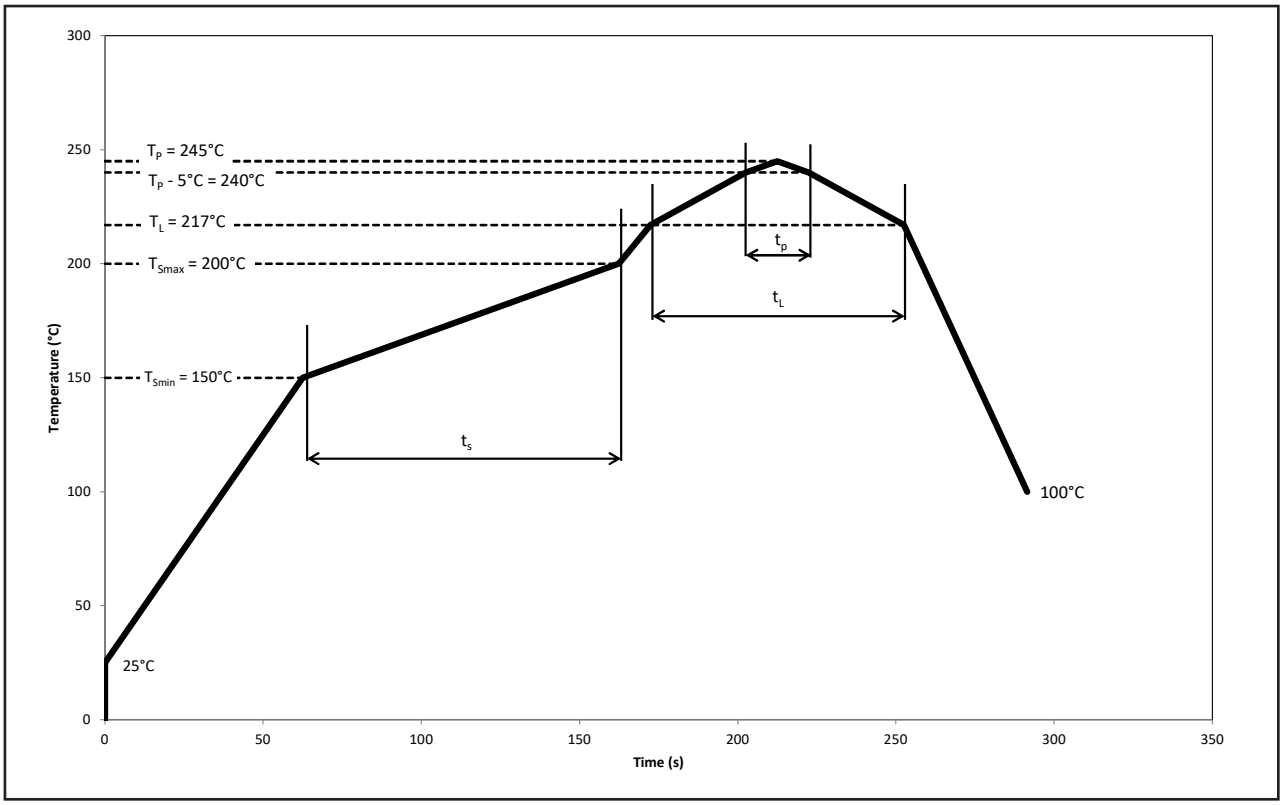
Packaging Specification



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	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 ± 8 % and an expanded uncertainty of ± 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 ± 8 % and an expanded uncertainty of ± 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 ± 8 % and an expanded uncertainty of ± 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 ± 8 % and an expanded uncertainty of ± 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 ± 0.5nm and an expanded uncertainty of ± 1nm (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 ± 0.05V and an expanded uncertainty of ± 0.1V (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
-	Initial release	26 May 2010
2	Add new partno: SSB-HLD-Q2R-1	07 May 2013
2	Add Thermal Resistance	07 Nov 2013
7	Update Carrier Tape	13 Feb 2014
1, 7, 9, 11	Add Features Error on Taping and Orientation Update Package Specification Add Appendix	02 Nov 2016
4, 5, 9, 10, 11, 13	Update Graph Update Package Specification Add Appendix	20 Nov 2019
9, 10, 11	Update Recommended Pb-free Soldering Profile Update Quantity per Reel (180mm)	21 Feb 2023
6, 8, 10	Update Polarity in Package Outline Update Polarity in Taping and orientation Update Packaging Specification	06 Mar 2024
1, 2, 4, 5	Update Features: AEC-Q101 to AEC-Q102 Update Test Condition for Peak Pulse Current Update Graph	04 Jun 2024

NOTE

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Dispose of product is in accordance with local, regional, national and international regulations.

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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