

## 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.
- > High operating temperature up to 110°C
- > 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-Q101.
- > 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.
- > Display: full color display video notice board.
- > Industrial: white goods (eg: Oven, microwave, etc.).



**Optical Characteristics at Tj=25°C**

Part Ordering Number	Color	Viewing Angle°	Luminous Intensity @ 20mA IV (mcd) <i>Appx. 1.1</i>		
			Min.	Typ.	Max.
SSS-NLD-ST1-1	Super Red, 632 nm	160	180.00	285.00	355.00
SSR-NLD-S2T-1	Red, 625 nm	160	224.00	355.00	450.00
SSA-NLD-TU1-1	Amber, 615nm	160	285.00	450.00	560.00
SSO-NLD-TU1-1	Orange, 605 nm	160	285.00	450.00	560.00
SSY-NLD-TU1-1	Yellow, 587 nm	160	285.00	450.00	560.00
SSY-NLD-S2T1-2	Yellow, 587nm	160	224.00	285.00	355.00

**Electrical Characteristics at Tj=25°C**

Part Number	Vf @ If = 20mA <i>Appx. 3.1</i>			Vr @ Ir = 10uA <i>Appx. 6.1</i>
	Min. (V)	Typ. (V)	Max. (V)	Min. (V)
SSx-NLD	1.8	2.1	2.6	12

**Absolute Maximum Ratings**

	Maximum Value	Unit
DC forward current	30	mA
Peak pulse current; (tp ≤ 10µs, Duty cycle = 0.1)	250	mA
Reverse voltage <i>Appx. 6.1</i>	12	V
ESD threshold (HBM)	2000	V
LED junction temperature	125	°C
Operating temperature	-40 ... +110	°C
Storage temperature	-40 ... +110	°C
Power dissipation (at room temperature)	80	mW
Thermal resistance		
- Junction / ambient, R <sub>th JA</sub>	400	K/W
- Junction / solder point, R <sub>th JS</sub>	200	K/W
(Mounting on FR4 PCB, pad size >= 16 mm <sup>2</sup> per pad)		

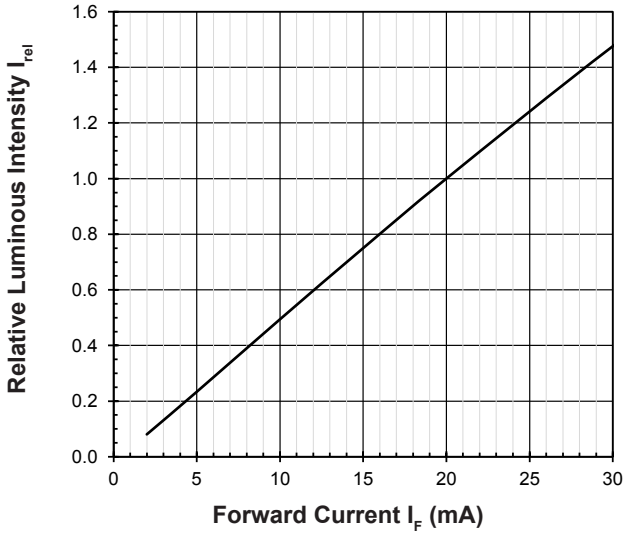
**Wavelength Grouping**

Color	Group	Wavelength distribution (nm) <i>Appx. 2.2</i>
SSS; Super Red	Full	625 - 640
SSR; Red	Full	620 - 630
SSA; Amber	Full	610 - 621
	W	610 - 615
	X	615 - 621
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

Brightness Group	Luminous Intensity <i>Appx. 1.1</i> IV (mcd)
S1	180.00...224.00
S2	224.00...285.00
T1	285.00...355.00
T2	355.00...450.00
U1	450.00...560.00

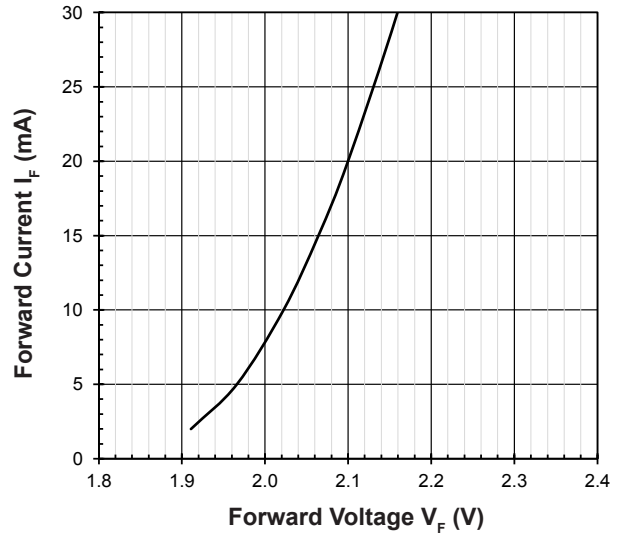
**Relative Luminous Intensity Vs Forward Current**

$I_v/I_v(20mA) = f(I_F); T_j = 25^\circ C$



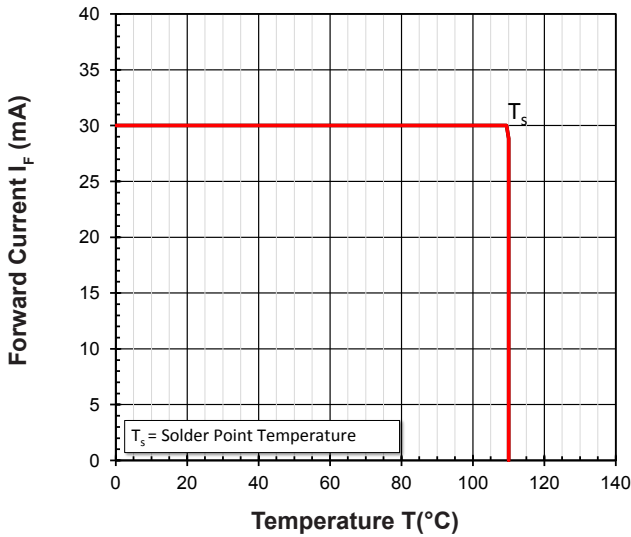
**Forward Current Vs Forward Voltage**

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



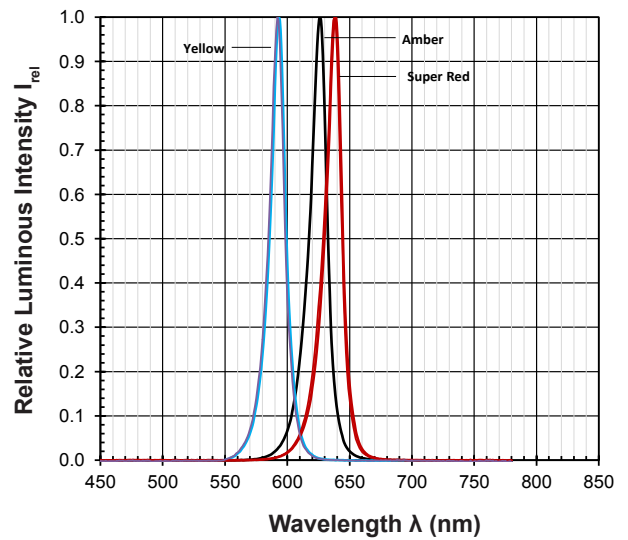
**Maximum Current Vs Temperature**

$I_F = f(T)$



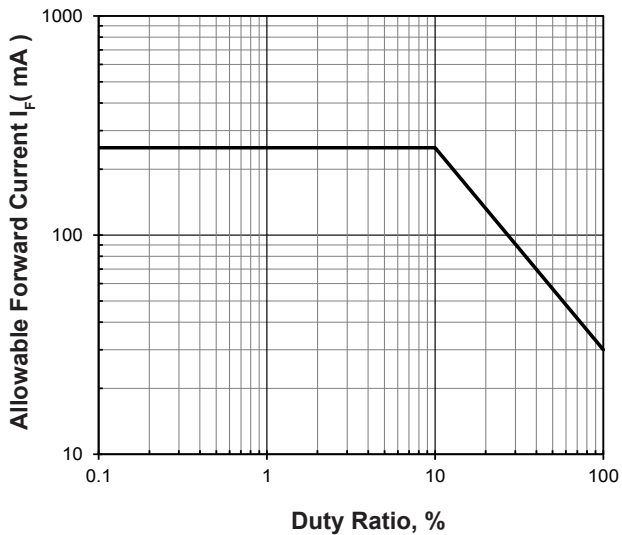
**Relative Spectral Emission**

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

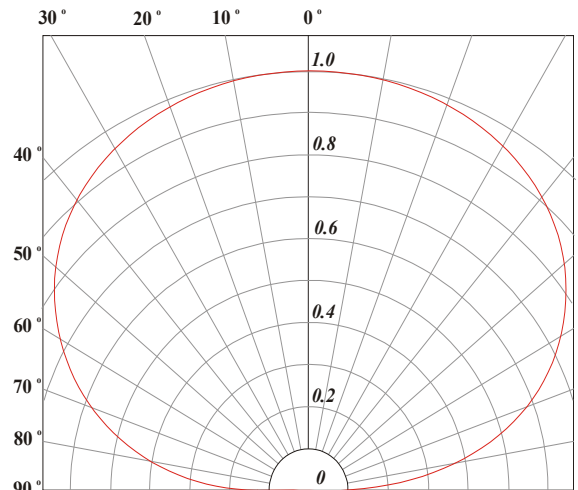


**Allowable Forward Current Vs Duty Ratio**

$(T_j = 25^\circ C; t_p \le 10\mu s)$

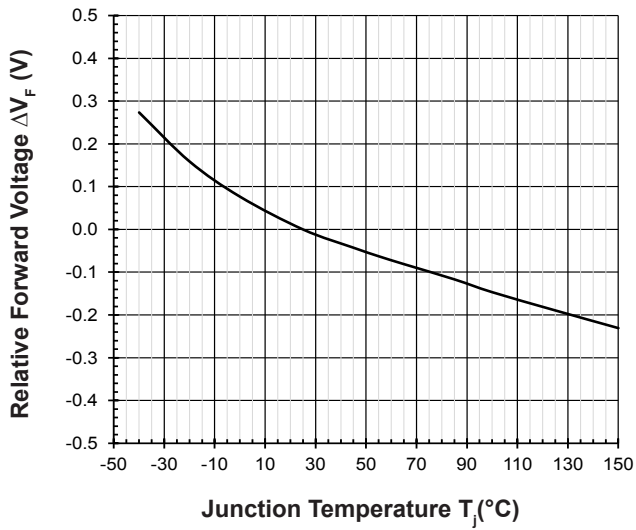


**Radiation Pattern**



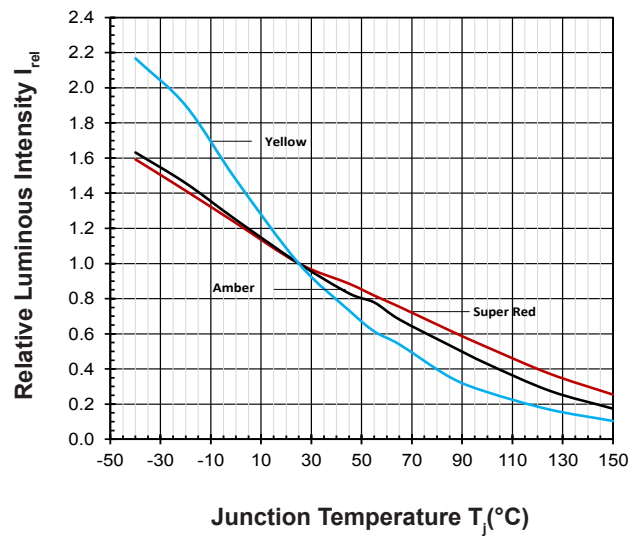
**Relative Forward Voltage Vs Junction Temperature**

$$\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j); I_F = 20\text{mA}$$



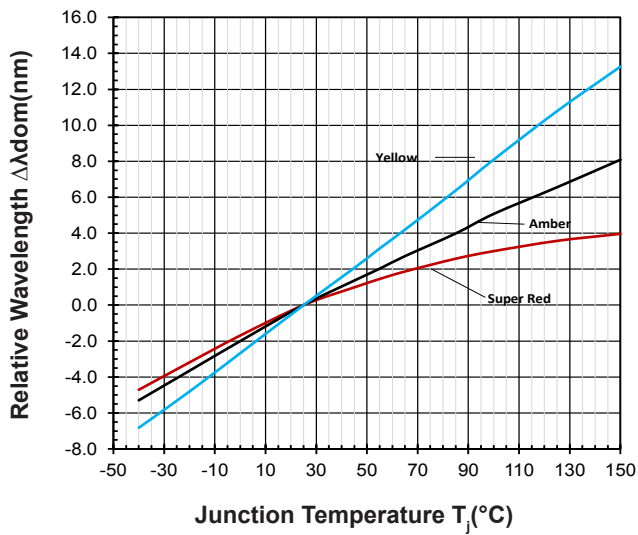
**Relative Luminous Intensity Vs Junction Temperature**

$$I_V/I_V(25^\circ\text{C}) = f(T_j); I_F = 20\text{mA}$$

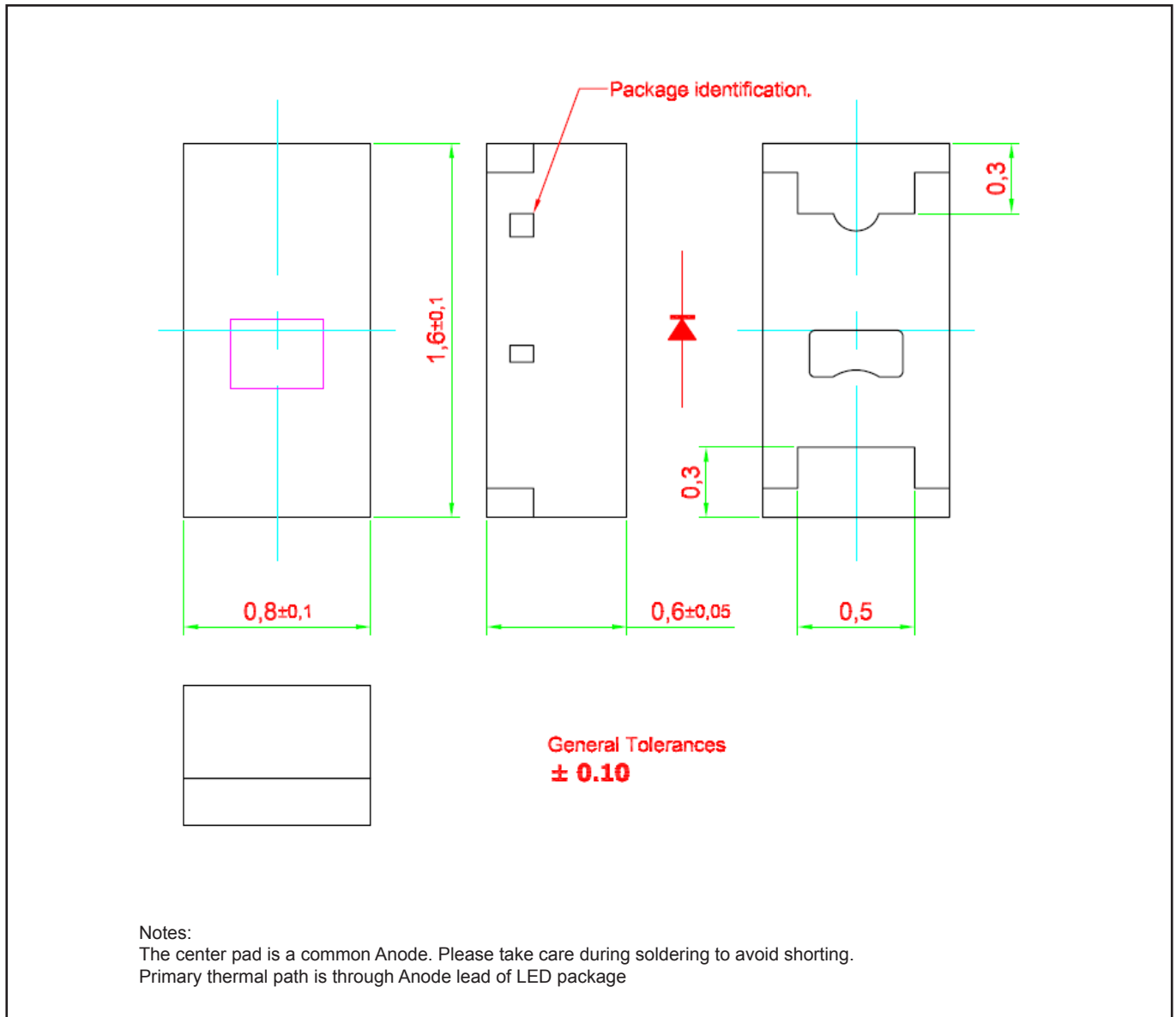


**Relative Wavelength Vs Junction Temperature**

$$\Delta \lambda_{dom} = \lambda_{dom} - \lambda_{dom}(25^\circ\text{C}) = f(T_j); I_F = 20\text{mA}$$



**SpiceLED • AllnGaP S-Spice : SSx-NLD Package Outlines**

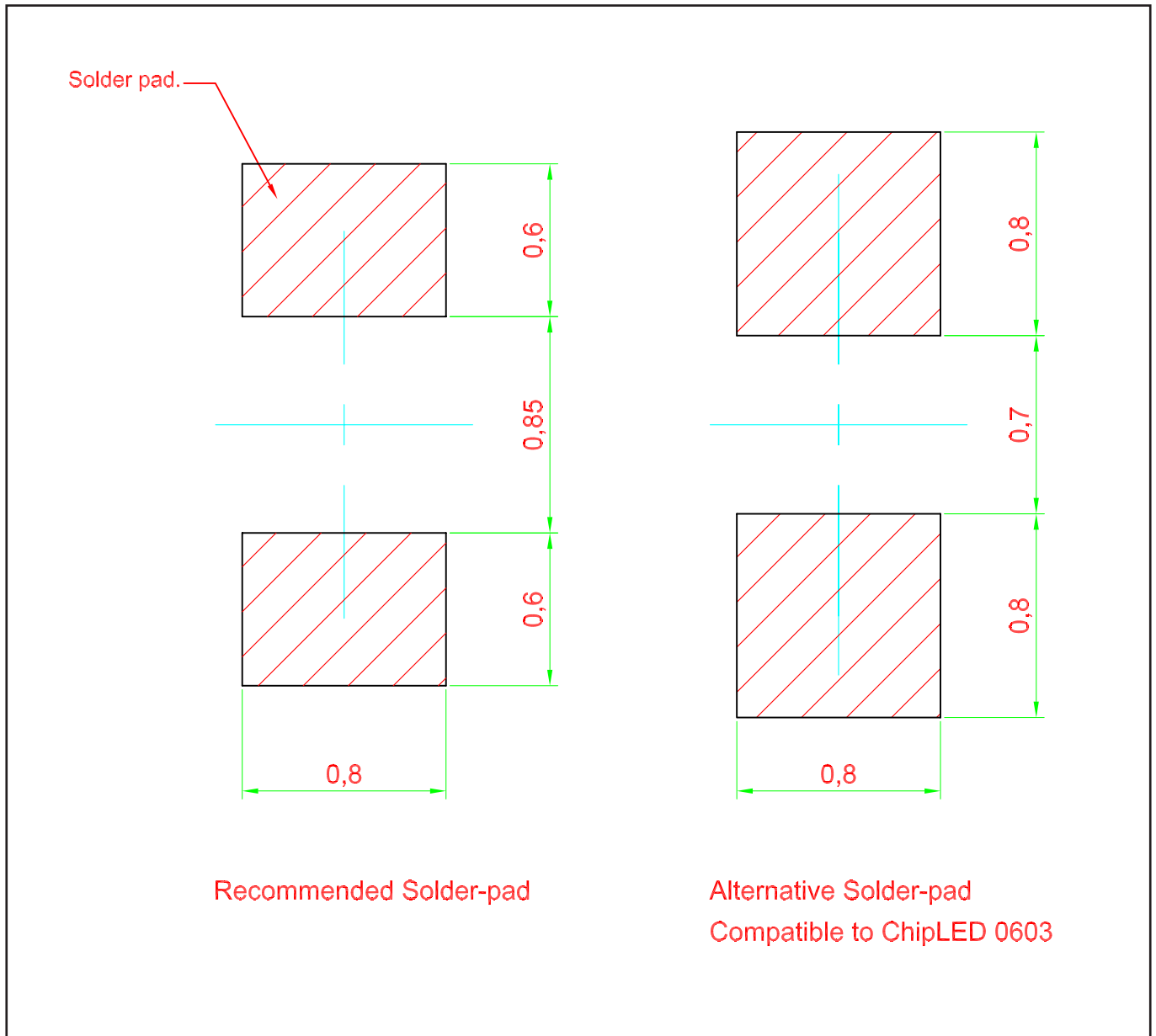


**Material**

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

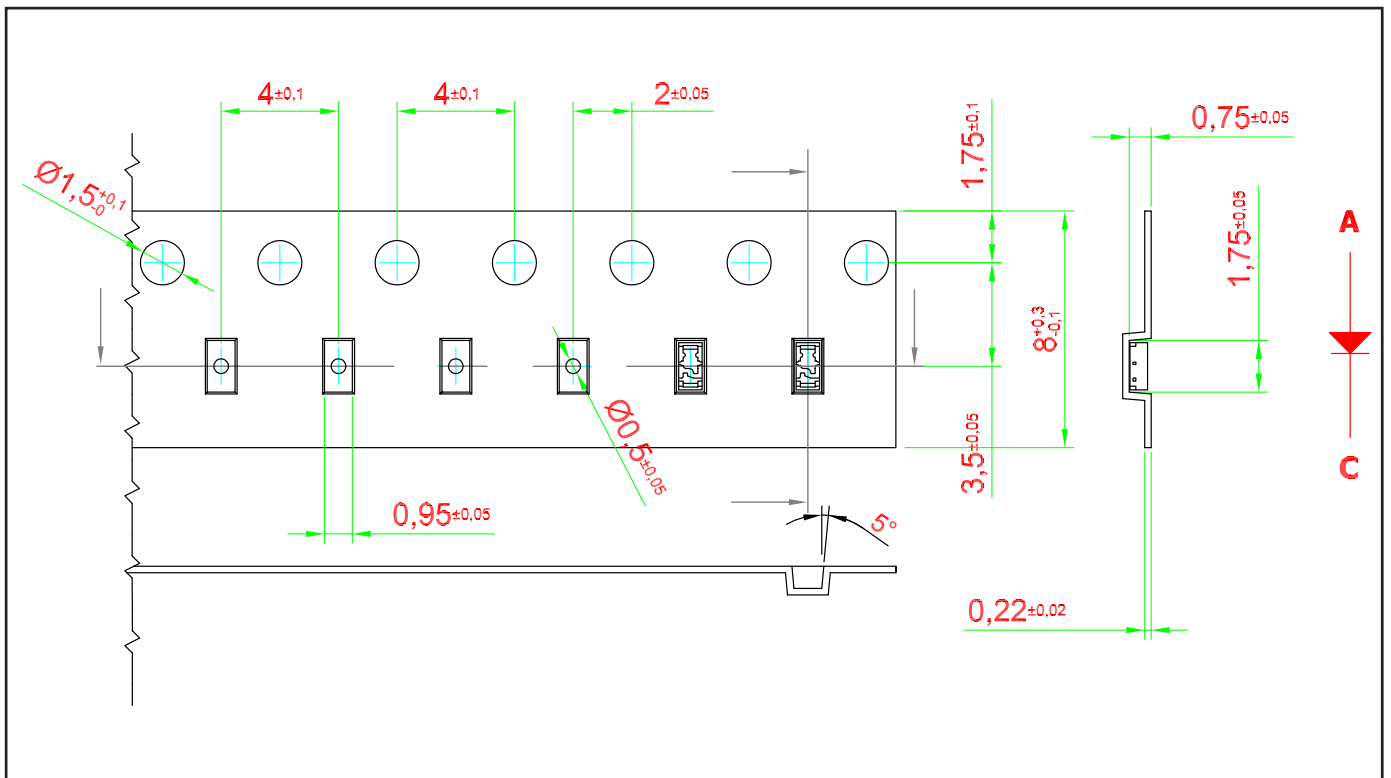
Note: product is Pb free

**Recommended Solder Pad**



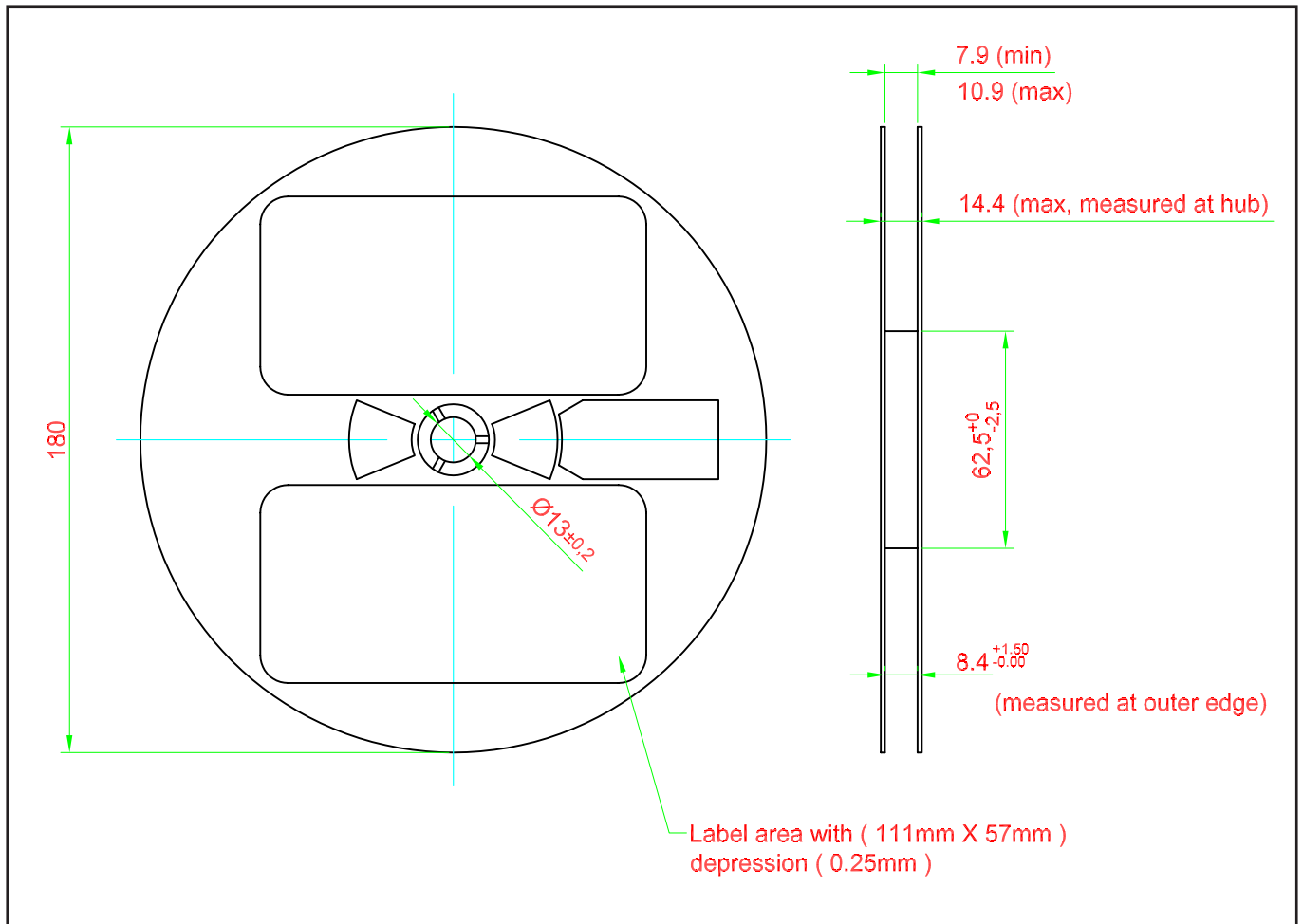
### Taping and orientation

- Reels come in quantity of 3000 units.
- Reel diameter is 180 mm.

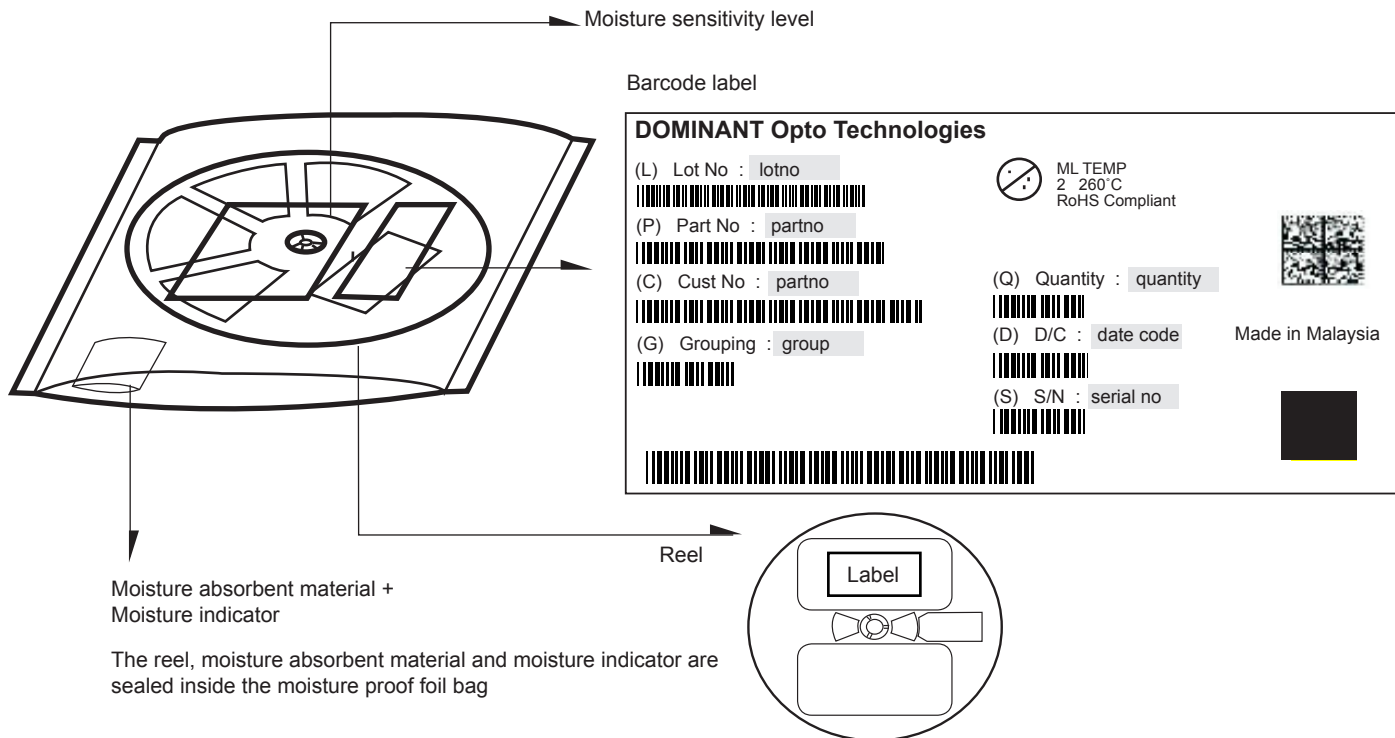




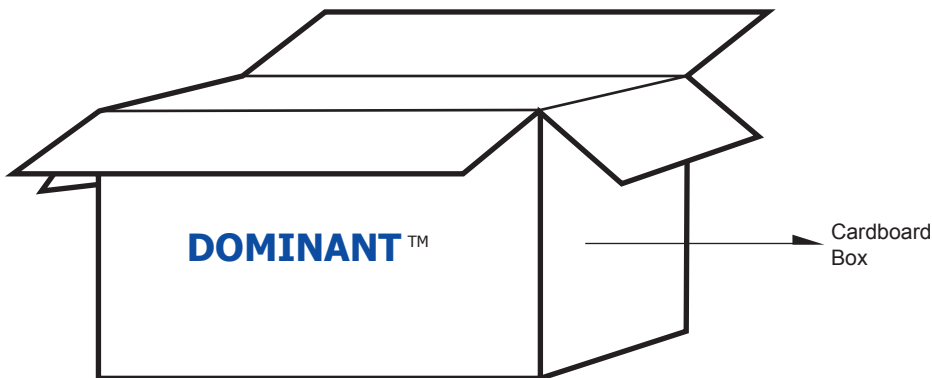
**Packaging Specification**



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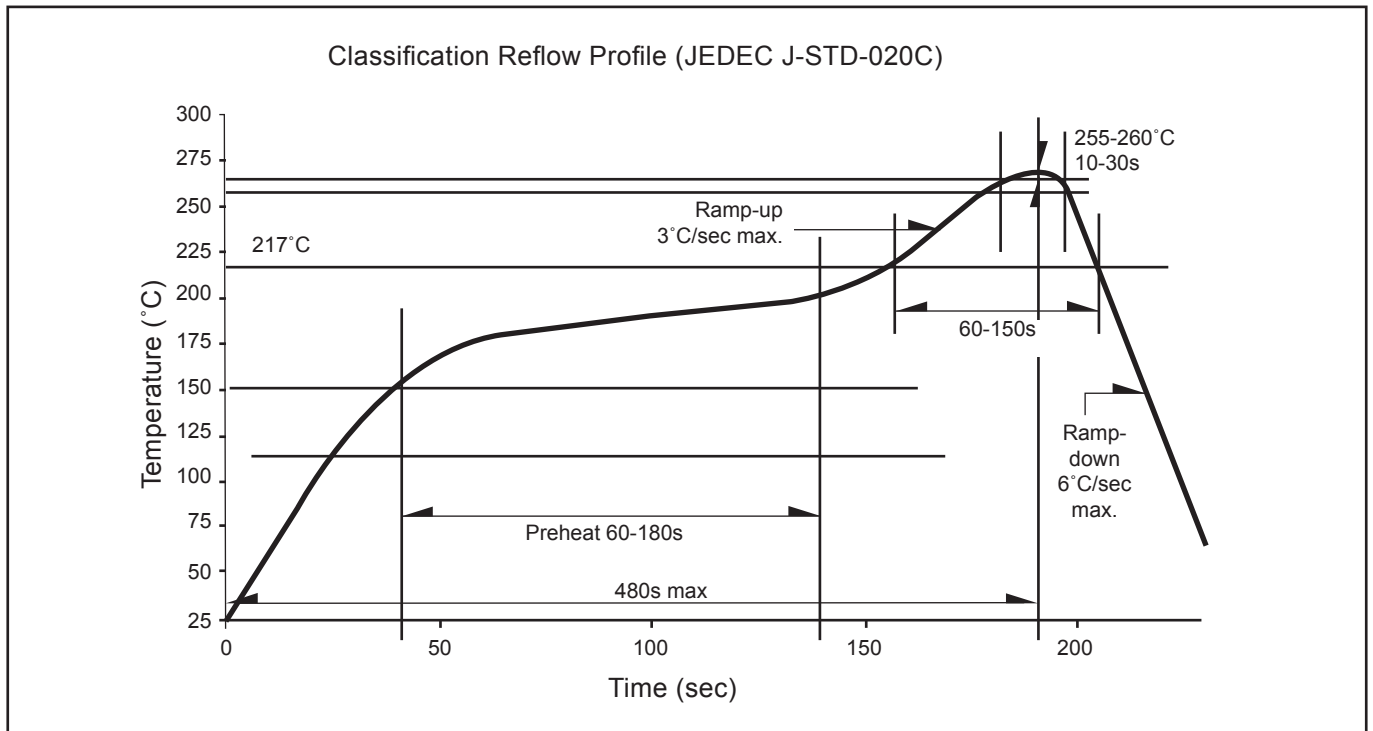
	Average 1pc SpiceLED	1 completed bag (3000pcs)
Weight (gram)	0.001	140 ± 10



**For SpiceLED**

Cardboard Box Size	Dimensions (mm)	Empty Box Weight (kg)	Reel / Box
Super Small	325 x 225 x 190	0.38	9 reels MAX
Small	325 x 225 x 280	0.54	15 reels MAX
Medium	570 x 440 x 230	1.46	60 reels MAX
Large	570 x 440 x 460	1.92	120 reels MAX

**Recommended Pb-free Soldering Profile**



## 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,  $V_f$  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  $\pm 0.1$  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**

<b>Page</b>	<b>Subjects</b>	<b>Date of Modification</b>
-	Update company name	29 Mar 2010
4	Typo error in luminous intensity	11 May 2011
3	Add Thermal resistance	15 May 2012
6	Update Package Outline	28 Nov 2012
8	Update Carrier Tape	13 Feb 2014
1, 10	Add Features Update Package Specification	26 Oct 2015
1, 5, 6	Add Features Update Graph: Relative Intensity Vs Forward Current & Forward Current Vs Forward Voltage Update Notes in Package Outline	17 Feb 2016
5	Add Graph: Allowable Forward Current Vs Duty Ratio	24 Jun 2016
8, 12	Error on Taping and Orientation Add Appendix	26 Oct 2016
2, 4, 5, 12	Add New Part No: SSY-NLD-S2T1-2 Update Graphs Update Appendix	12 Apr 2018

**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, a ISO/TS 16949 and ISO 14001 certified company, can be found under <http://www.dominant-semi.com>.

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