

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.
- > Superior Corrosion Resistant.



Applications:

- > Automotive: Interior applications, eg: switches, telematics, climate control system, dashboard, etc
- > Signage: full colour display video notice board, signage, special effect lighting.



Optical Characteristics at Tj=25°C

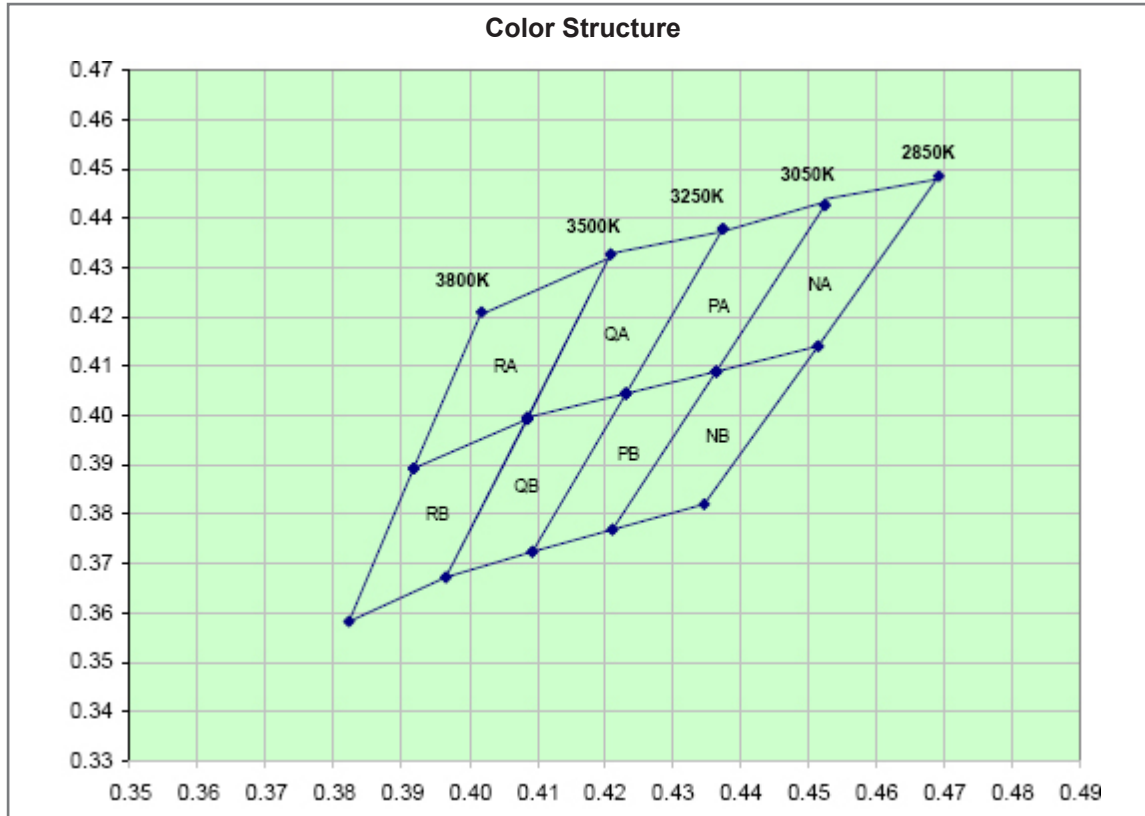
| Part Ordering Number | Color | Viewing Angle° | Luminous Intensity @ IF = 20mA IV (mcd) <i>Appx. 1.1</i> | | |
|----------------------|------------|----------------|--|--------|--------|
| | | | Min. | Typ. | Max. |
| SSF-LLG-T2U-1 | Warm White | 160 | 355.00 | 500.00 | 715.00 |

| Part Number | Vf @ If = 20mA <i>Appx. 3.1</i> | | | Vr @ Ir = 10uA |
|-------------|---------------------------------|----------|----------|----------------|
| | Min. (V) | Typ. (V) | Max. (V) | Min. (V) |
| SSF-LLG | 2.9 | 3.2 | 3.6 | 5 |

Absolute Maximum Ratings

| | Maximum Value | Unit |
|---|---------------|------|
| DC forward current | 30 | mA |
| Peak pulse current; (tp ≤ 10μs, Duty cycle = 0.1) | 100 | mA |
| Reverse voltage; Ir _{max} = 10μA | 5 | V |
| ESD threshold (HBM) | 2000 | V |
| LED junction temperature | 110 | °C |
| Operating temperature | -40 ... +100 | °C |
| Storage temperature | -40 ... +100 | °C |
| Power dissipation (at room temperature) | 80 | mW |
| Thermal resistance | | |
| - Junction / ambient, R _{th JA} | 215 | K/W |
| - Junction / solder point, R _{th JS} | 125 | K/W |
| (Mounted on FR4 PCB; pad size ≥16mm ² per pad) | | |

Wavelength Grouping *Appx. 2.1*



| Bin | | 1 | 2 | 3 | 4 |
|-----|----|-------|-------|-------|-------|
| RA | Cx | 0.402 | 0.392 | 0.409 | 0.421 |
| | Cy | 0.421 | 0.389 | 0.399 | 0.433 |
| RB | Cx | 0.392 | 0.382 | 0.397 | 0.409 |
| | Cy | 0.389 | 0.358 | 0.367 | 0.399 |
| QA | Cx | 0.421 | 0.409 | 0.423 | 0.437 |
| | Cy | 0.433 | 0.400 | 0.405 | 0.438 |
| QB | Cx | 0.409 | 0.397 | 0.409 | 0.423 |
| | Cy | 0.400 | 0.367 | 0.372 | 0.405 |
| PA | Cx | 0.437 | 0.423 | 0.436 | 0.452 |
| | Cy | 0.438 | 0.405 | 0.409 | 0.443 |
| PB | Cx | 0.423 | 0.409 | 0.421 | 0.436 |
| | Cy | 0.405 | 0.372 | 0.377 | 0.409 |
| NA | Cx | 0.452 | 0.436 | 0.451 | 0.469 |
| | Cy | 0.443 | 0.409 | 0.414 | 0.448 |
| NB | Cx | 0.436 | 0.421 | 0.435 | 0.451 |
| | Cy | 0.409 | 0.377 | 0.382 | 0.414 |

InGaN wavelength is very sensitive to drive current. Operating at lower current is not recommended and may yield unpredictable performance. Current pulsing should be used for dimming purposes.

Luminous Intensity Group at Tj=25°C

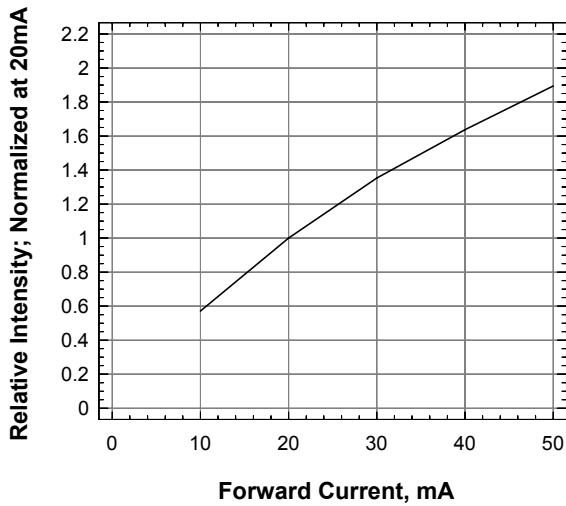
| Brightness Group | Luminous Intensity ^{Appx. 1.1} IV (mcd) |
|------------------|---|
| T2 | 355.0 ... 450.0 |
| U1 | 450.0 ... 560.0 |
| U2 | 560.0 ... 715.0 |

Vf Binning (Optional)

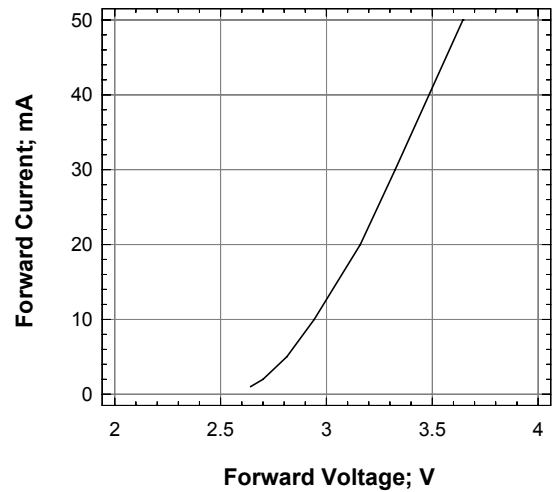
| Vf Bin @ 20mA | Forward Voltage (V) ^{Appx. 3.1} |
|---------------|--|
| 01 | 2.90 ... 3.00 |
| 02 | 3.00 ... 3.10 |
| 03 | 3.10 ... 3.20 |
| 04 | 3.20 ... 3.30 |
| 05 | 3.30 ... 3.40 |
| 06 | 3.40 ... 3.50 |
| 07 | 3.50 ... 3.60 |

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

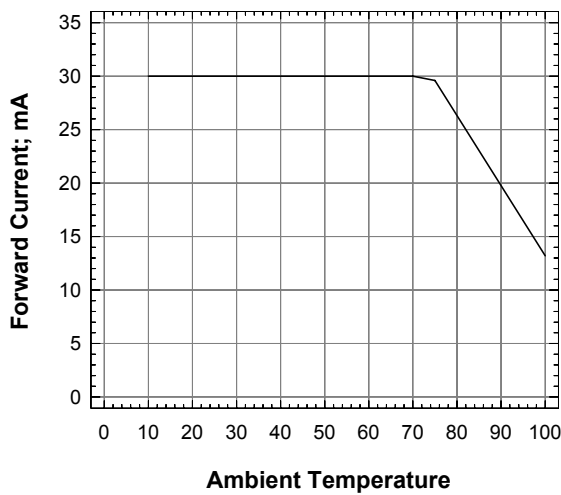
Relative Luminous Intensity Vs Forward Current



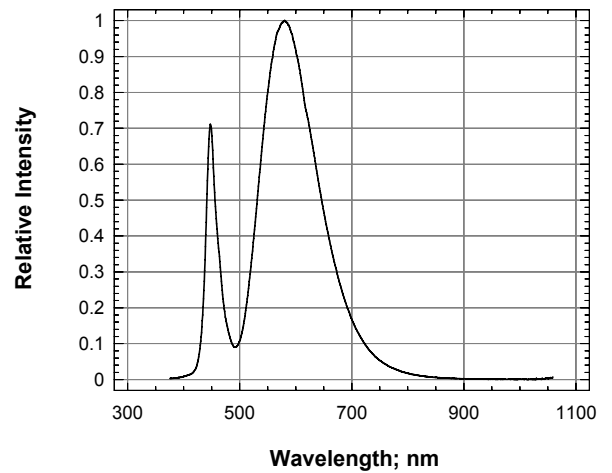
Forward Current Vs Forward Voltage



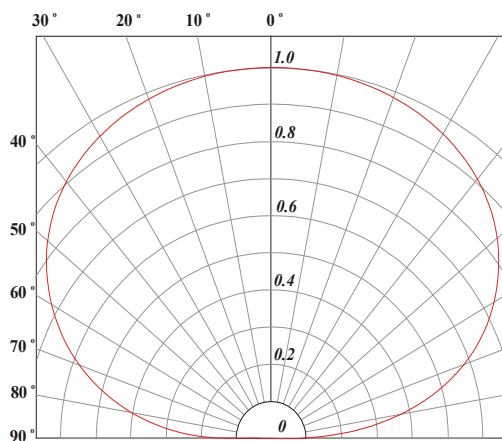
Forward Current Vs Ambient Temperature



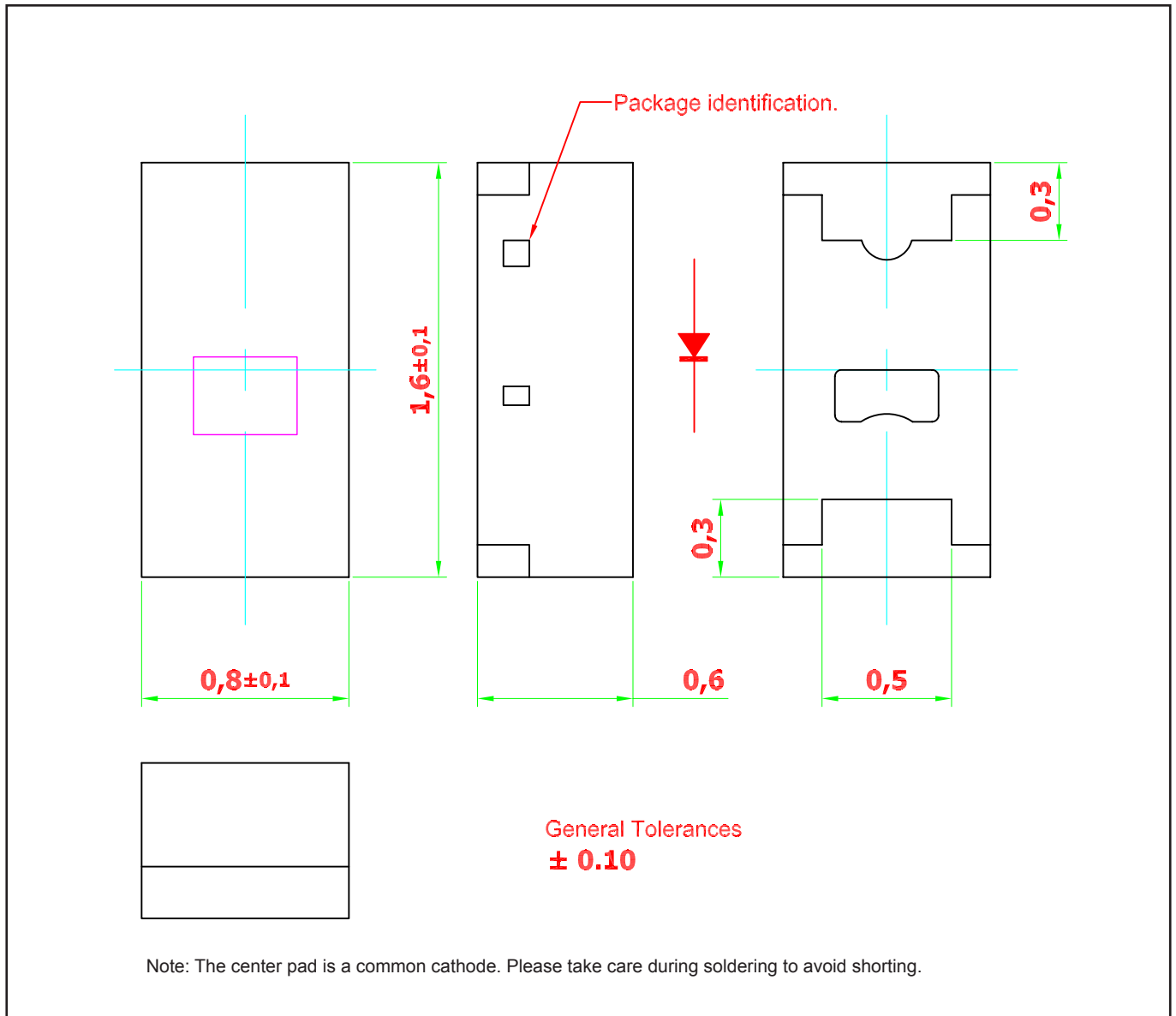
Relative Intensity Vs Wavelength



Radiation Pattern



SpiceLED™ • InGaN Warm White S-Spice : SSF-LLG Package Outlines

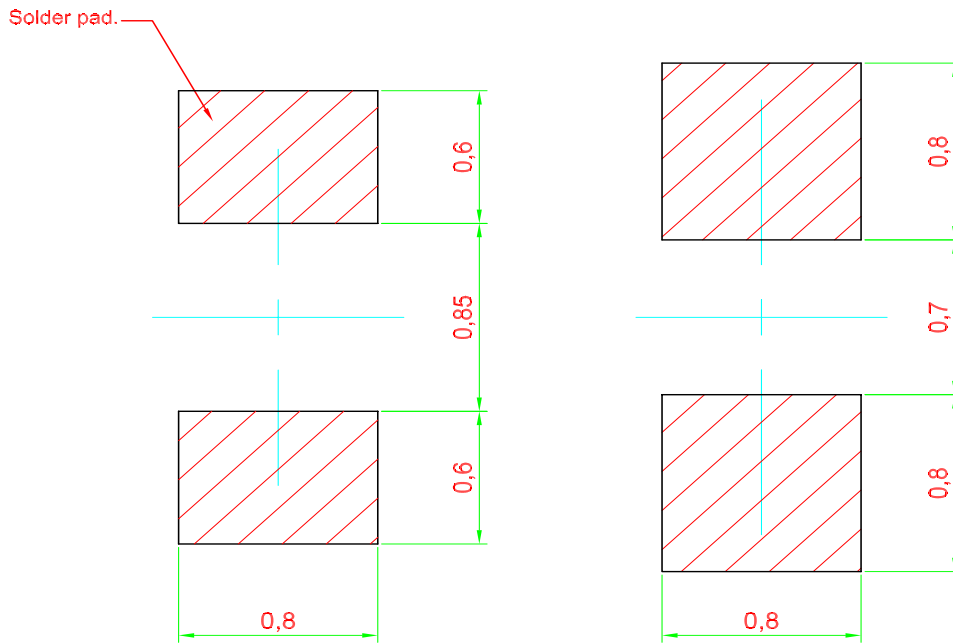


Material

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

Note: product is Pb free

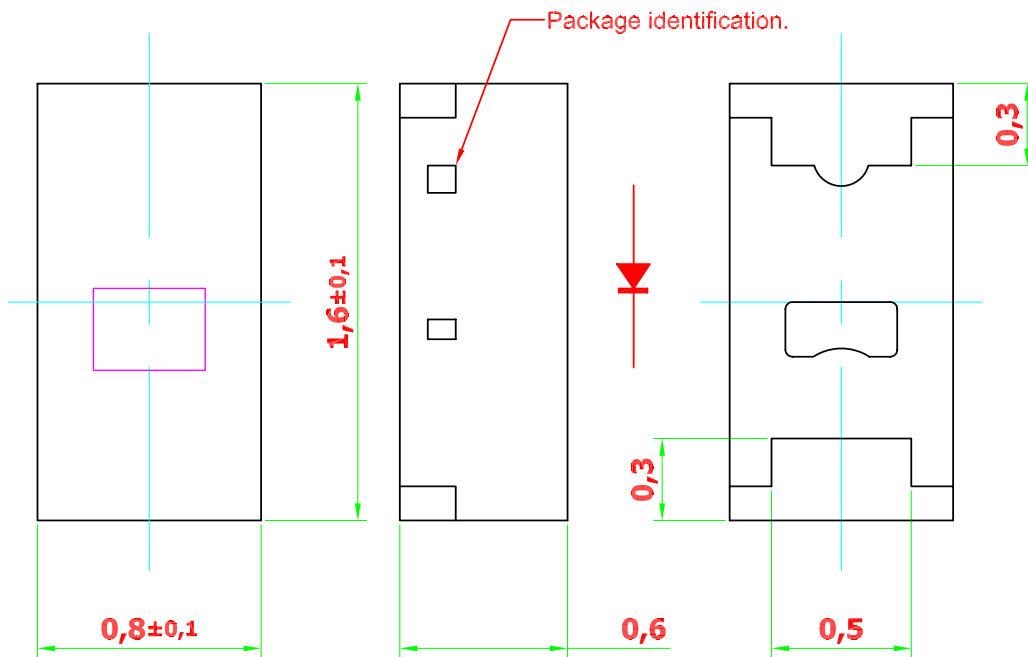
Recommended Solder Pad



Recommended Solder-pad

Alternative Solder-pad
 Compatible to ChipLED 0603

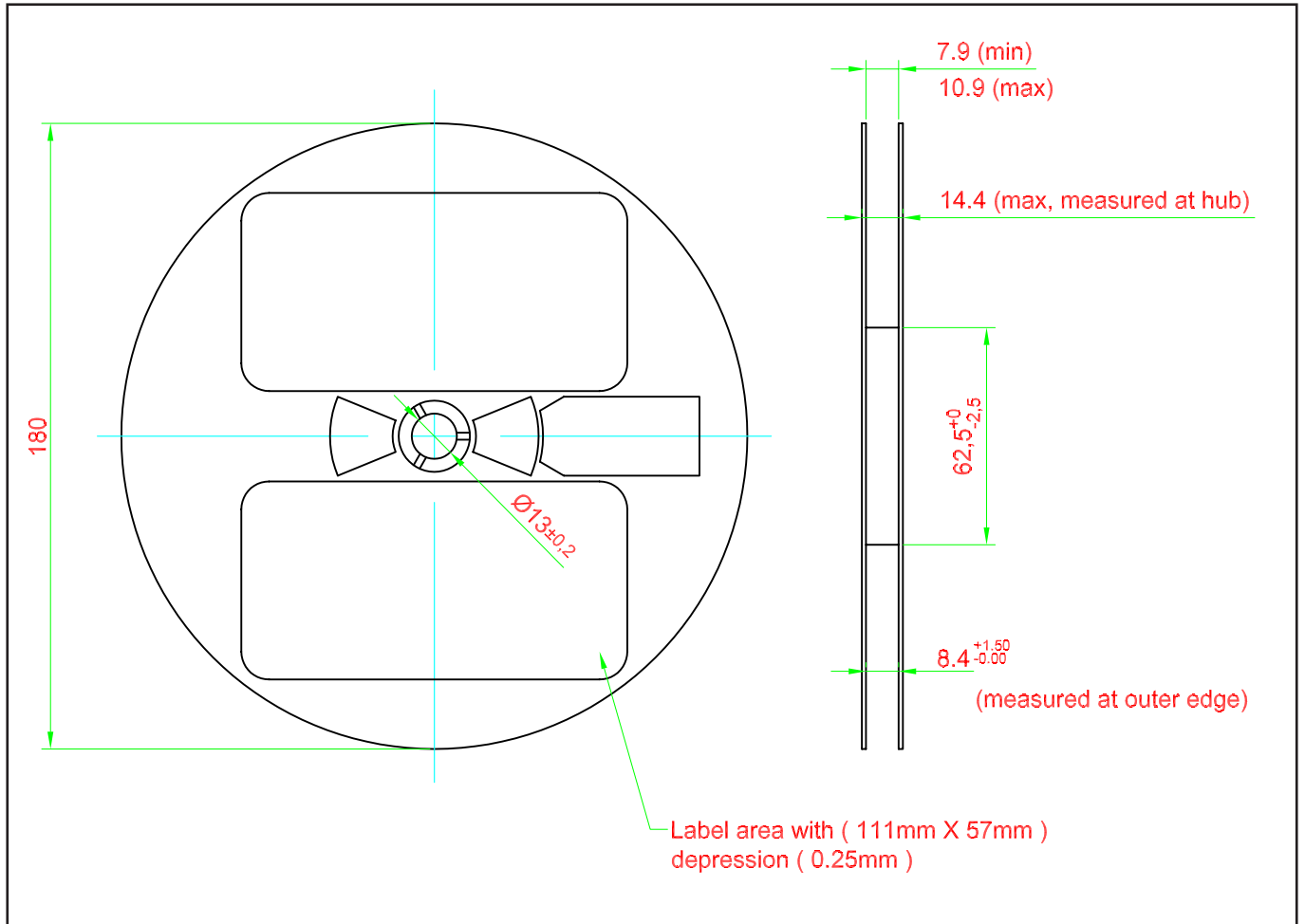
Note: Component is based on a new package platform, which features “Bottom Only Terminations”. Solder joints are only formed at the bottom of the component and solder fillet will not be observable as the sides of the component.



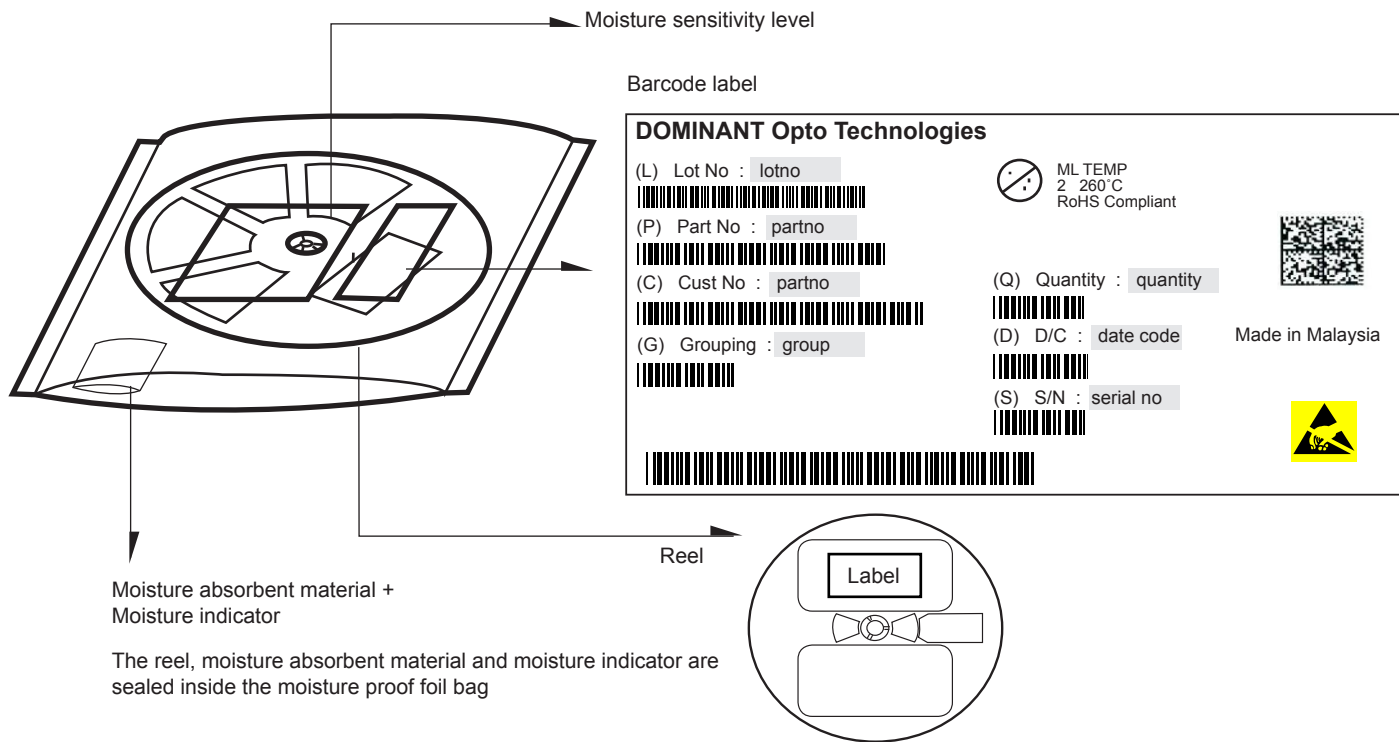
Surface are not intended for soldering

General Tolerances
± 0.10

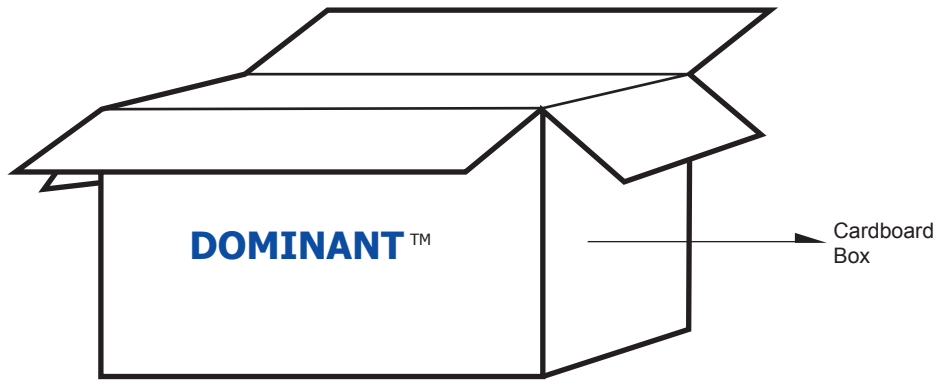
Packaging Specification



Packaging Specification



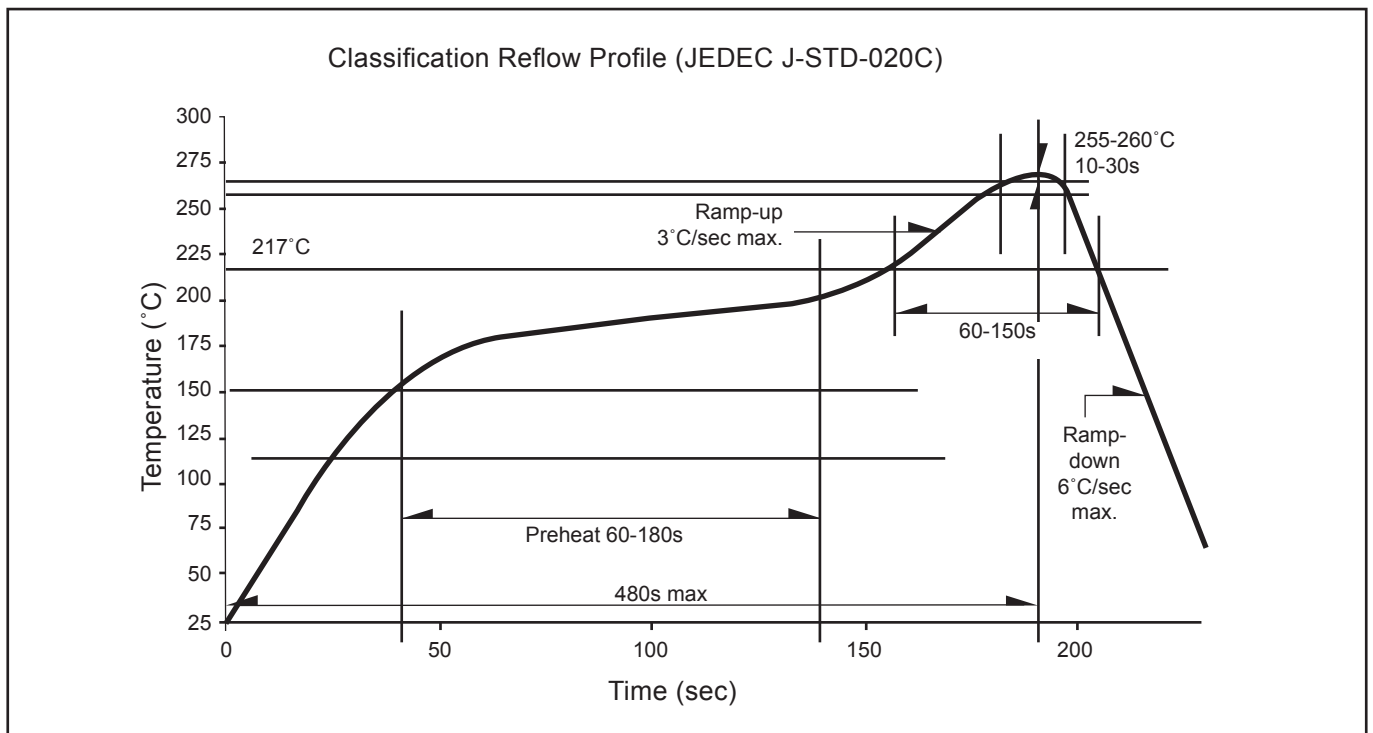
| | Average 1pc SpiceLED | 1 completed bag (3000pcs) |
|---------------|----------------------|---------------------------|
| Weight (gram) | 0.001 | 140 ± 10 |



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 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 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 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 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 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 $k=3$).

Revision History

| Page | Subjects | Date of Modification |
|--------------|---|----------------------|
| - | Initial release | 29 Oct 2013 |
| 8 | Update Carrier Tape | 13 Feb 2014 |
| 1, 8, 10, 12 | Error on Taping and Orientation Update Packaging Specification Add Appendix | 03 Nov 2016 |
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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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