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| SPECIFICATION SHEET NO. | S1120 – BDD4SPA000000S | |
| ORIGINAL MFG/PART NO. | Oriental Technology (BND) / BDD-4SPA-00-0-000 | |
| NEXTGEN PART CODE | BDD4SPA000000S | Indicate This Orderable Code For RFQ / Order |
| DATE | Nov. 20, 2025 | |
| REVISION | A6 | Updated With Most Recent Data |
| DESCRIPTION AND MAIN PARAMETRICS | <p>Automotive Side Emitting LED SMD 4040 0.2W PC-Amber Color, BDD4S Series L4.00*W4.00*H3.55mm, Colorless & Clear Lens Transparency, 2.4mm Dia. Viewing Angle 120°, Lens Round with Flat Top Forward Voltage (VF) 2.8~3.4V Color Bin Rank (DWL) 587.5~592.5nm Luminous Flux Rank (IV) 8.9~15.8 lm Operating Temp. Range -40°C ~+105°C, Package in Tape/Reel, 1000pcs/Reel RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863) and Halogen Free (HF)</p> | |
| CUSTOMER | | |
| CUSTOMER PART NUMBER | | |
| CROSS REF. PART NUMBER | | |
| MEMO | | |

| | | | |
|-------------------------------|---|--|---|
| VENDOR APPROVE | | | |
| Issued/Checked/Approved |  |  |  |
| Effective Date: Nov. 20, 2025 | | | |

| | |
|-------------------------|--|
| CUSTOMER APPROVE | |
| | |
| Date: | |

MAIN FEATURE

- PC-Amber Color Side Emitting 4040 Package
- Luminous Flux@50mA: 8.9~15.8 lm
- Emitting Material: InGaAlP Chip
- View Angle at 50% Iv of 120°
- Corrosion Robustness: Excellent Corrosion Robustness
- Suitable for SMT process
- Meet MSL 1 Requirement
- Cross Competitors Parts and More.
- RoHS/RoHS III compliant, RoHS Annex III lead Exemption (Exempt per RoHS EU 2015/863)



Image shown is a representation only. Exact specifications should be obtained from the product dimension.

APPLICATION

- Auto Signaling
- Auto Lighting Interior and Exterior
- Signal and Symbol Luminary



ELECTRICAL CHARACTERISTICS

- See Page 6 ~ Page 8.
- All Products Parameters are Subject To NextGen Components' Final Confirmation.

HOW TO ORDER

- Please Follow Up Part Code Guide And Indicate NextGen Part Code BDD4SPA000000S For RFQ and Order.

PART CODE GUIDE

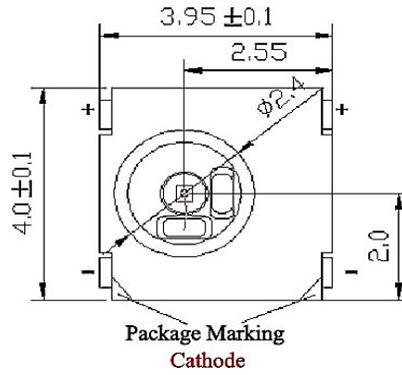
RFQ
[Request For Quotation](#)

| CODE | NAME | KEY SPECIFICATION OPTION |
|-------|---------------------------|--|
| BDD4S | Product Series Code | Automotive Side Emitting LED with lens 120° Package 4040, 0.2W Lens Round with Flat Top, Dimension L4.00*W4.00*H3.55mm |
| PA | Color Code | PA: PC-Amber Color |
| 00 | Forward Voltage Rank (VF) | Custom letter A~Z, a-z or digits (0-9) 00: 2.8V ~3.4V; V6: 2.8V ~3.0V; V7: 3.0V ~3.2V; V8: 3.2V ~3.4V |
| 0 | Color Bin Rank (DWL) | Custom letter A~Z, a-z or digits (0-9) 0: 587.5nm~ 592.5nm; 2: 587.5nm~ 589.7nm 3: 589.7nm~ 592.5nm |
| 000 | Luminous Flux Rank (Flux) | Custom letter A~Z, a-z or digits (0-9) 000: 8.9 lm ~15.8 lm; LS7: 8.9 lm~11.3 lm; LS8: 11.3 lm ~13.4 lm; LS9: 13.4 lm ~15.8 lm |
| S | Internal Control Code | Custom letter A~Z, a-z or digits (0-9) |
| XX | Special/Custom Parameters | Blank: N/A; XX: Letter A~Z, a~z or digits (0~9) for Special/Custom Parameters |

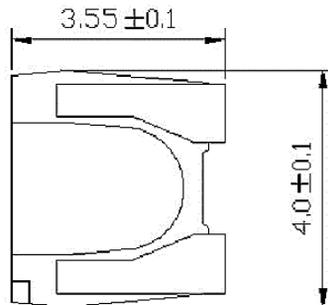
DIMENSION -- Unit: (mm), Case 4040 Outline, Tolerance: +/-0.1mm)

- Lens Round with Flat Top, L4.00*W4.00*H3.55mm

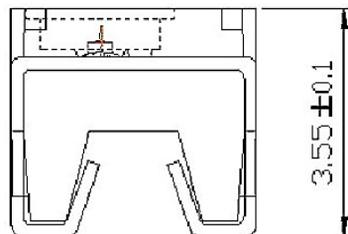
Top View



Side View



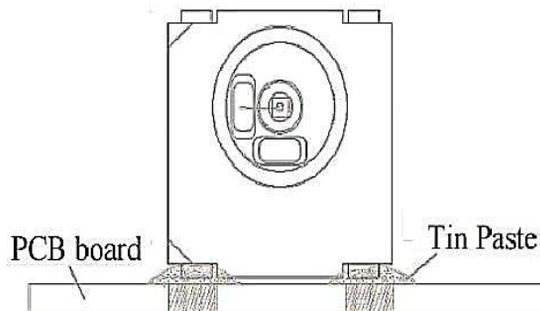
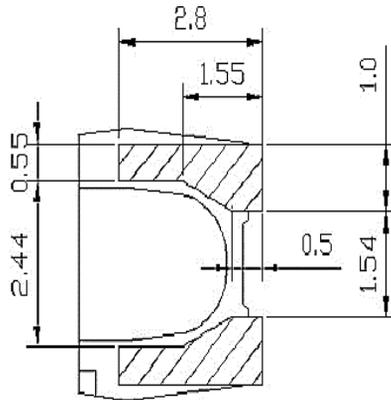
Side View



Circuit



Recommend Pad Layout (Unit: mm, Tolerance: +/-0.1mm)



MAXIMUM RATINGS $T_s=25^{\circ}\text{C}$, RH60%

| PARAMETERS | SYMBOL | VALUES | UNIT |
|--|--------|----------|--------------------|
| Operating Temperature | Top | -40~+105 | $^{\circ}\text{C}$ |
| Storage Temperature | Tstg | -40~+105 | $^{\circ}\text{C}$ |
| Junction Temperature | Tj | 125 | $^{\circ}\text{C}$ |
| Forward Current ($T_s=25^{\circ}\text{C}$) | IF | 70 | mA |
| Surge Current ($t \leq 10\mu\text{s}$; $D=0.005$; $T_s=25^{\circ}\text{C}$) | IFS | 100 | mA |
| Reverse Voltage ($T_s=25^{\circ}\text{C}$) | VR | 5 | V |
| Electrostatic Discharge (acc.to ANSI/ESDA/JEDEC JS-001-2017) | VESD | ≥ 8 | kV |

OPTICAL & ELECTRICAL CHARACTERISTICS $I_F=50\text{mA}$, $T_s=25^{\circ}\text{C}$, RH60%

| PARAMETERS | SYMBOL | VALUES | | | UNIT |
|---|-----------------|--------|------|------|---------------|
| | | MIN. | TYP. | MAX. | |
| Chromaticity coordinates (CIE 1931) | Cx | - | 0.57 | - | |
| | Cy | - | 0.42 | - | |
| Forward Current | IF | 5 | - | 70 | mA |
| Luminous Flux Rank @50mA | IV | 8.9 | - | 15.8 | lm |
| Viewing Angle | $2\theta_{1/2}$ | - | 120 | - | Deg |
| Forward Voltage | VF | 2.8 | - | 3.4 | V |
| Reverse Current | IR (VR=5V) | - | 0.2 | 10 | μA |
| Thermal Resistance junction/solder point | Rth(j-sp)real | - | 100 | 115 | K/W |
| Electrical Thermal Resistance junction/solder point with efficiency $\eta=57\%$ | Rth(j-sp)elec | - | 66 | 77 | K/W |

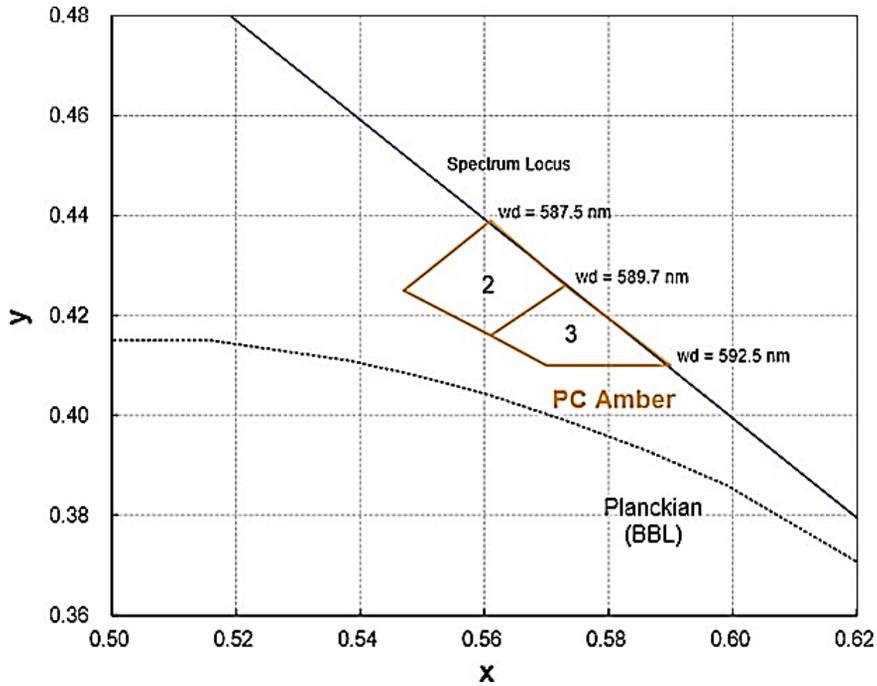
ELECTRICAL CHARACTERISTICS IF=50mA, Ts=25°C, RH60%

| Part Code | Forward Voltage - VF (V) | Color Bin Rank (K) | Luminous Flux Rank (Flux) (lm) |
|----------------|-----------------------------|-----------------------|-----------------------------------|
| BDD4SPA000000S | 2.8~3.4 | 587.5~592.5 | 8.9~15.8 |

BIN CODE LIST

| PARAMETERS | SYMBOL | VALUES | TOLERANCE | UNIT |
|---|--------|-------------|-----------|------|
| Forward Voltage Rank (VF) @IF=50mA, Ts=25°C, RH60% | 00 | 2.8~3.4 | ±0.05 | V |
| | V6 | 2.8~3.0 | | |
| | V7 | 3.0~3.2 | | |
| | V8 | 3.2~3.4 | | |
| | | | | |
| Color Bin Rank @IF=50mA, Ts=25°C, RH60% | 0 | 587.5~592.5 | ±1.5 | nm |
| | 2 | 587.5~589.7 | | |
| | 3 | 589.7~592.5 | | |
| | | | | |
| | | | | |
| Luminous Flux Rank (Flux) @IF=50mA, Ts=25°C, RH60% | 000 | 8.9~15.8 | ±5.0% | lm |
| | LS7 | 8.9~11.3 | | |
| | LS8 | 11.3~13.4 | | |
| | LS9 | 13.4~15.8 | | |
| | | | | |

COLOR BIN - PC-Amber Binning Structure Graphical Representation



| 2 (nm) | | 3 (nm) | |
|-------------|--------|-------------|--------|
| 587.5~589.7 | | 589.7~592.5 | |
| x | y | x | y |
| 0.5470 | 0.4250 | 0.5610 | 0.4160 |
| 0.5610 | 0.4160 | 0.5730 | 0.4260 |
| 0.5730 | 0.4260 | 0.5900 | 0.4100 |
| 0.5610 | 0.4390 | 0.5700 | 0.4100 |

Note:

1. Tolerance on each color bin (x , y) is ± 0.005
2. IF=50mA, TS=25°C, RH60%

OPTICAL & ELECTRICAL CHARACTERISTICS CURVES -IF=50mA, Ts=25°C, RH60%

Figure 1. Relative Spectral Emission, $I_{rel}=f(\lambda)$

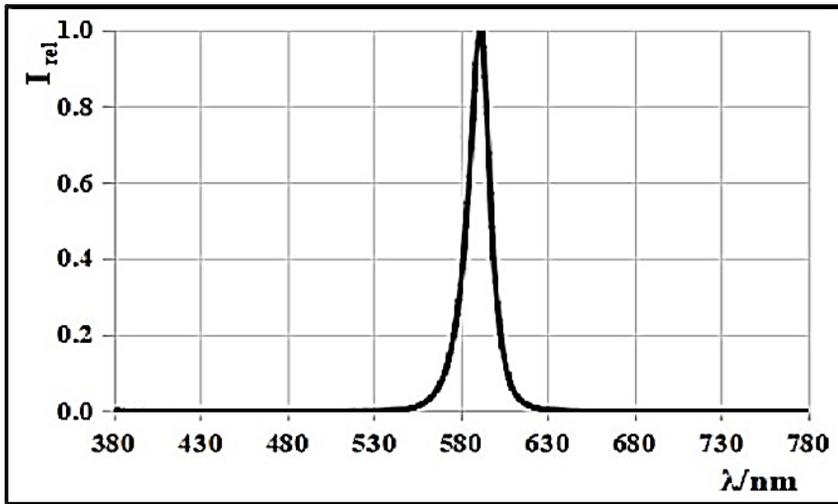
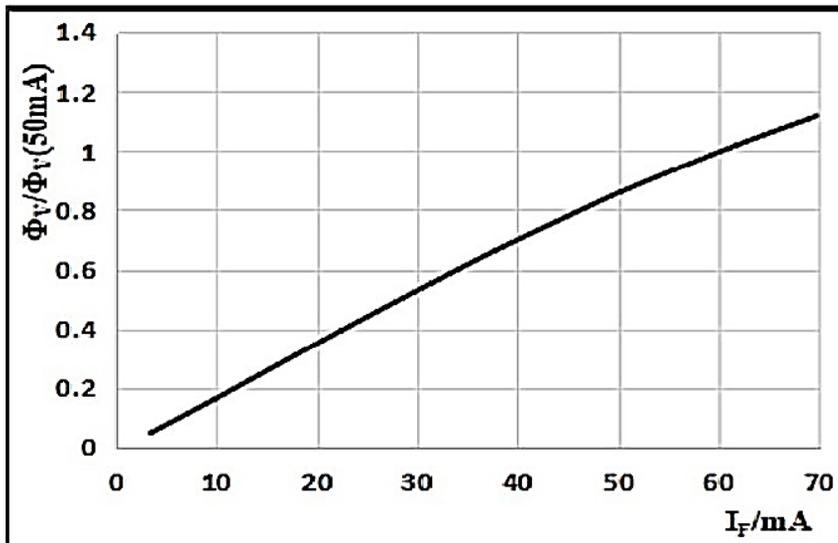


Figure 2. Forward Current Vs. Relative Intensity, $\Phi_V/\Phi_V(50mA)=f(I_F)$



OPTICAL & ELECTRICAL CHARACTERISTICS CURVES -IF=50mA, Ts=25°C, RH60%

Figure 3. Forward Voltage Vs. Forward Current, IF = f (VF)

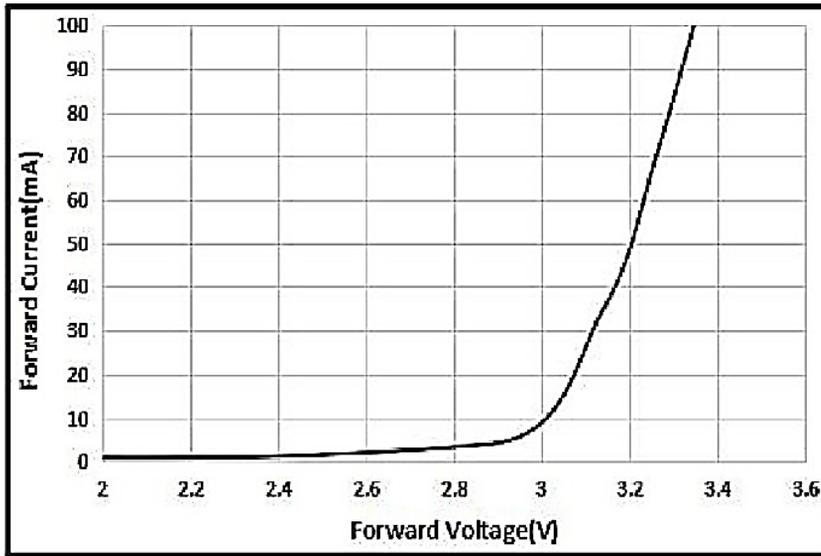
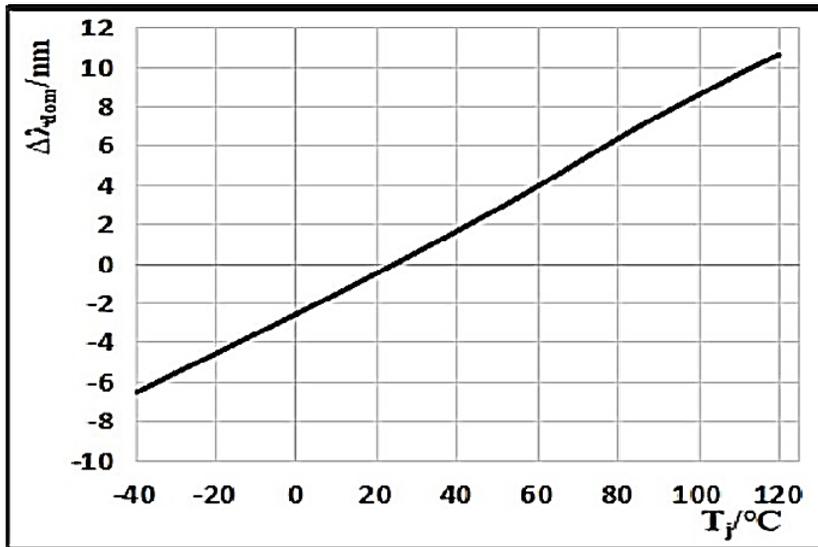


Figure 4. . Junction Temperature Vs. $\Delta\lambda_{\text{dom}}$, $\Delta\lambda_{\text{dom}} = \lambda_{\text{dom}} - \lambda_{\text{dom}} (25^\circ\text{C}) = f(T_j)$



OPTICAL & ELECTRICAL CHARACTERISTICS CURVES -IF=50mA, Ts=25°C, RH60%

Figure 5. Junction Temperature Vs. Relative Intensity, $\Phi_V/\Phi_V(25^\circ\text{C}) = f(T_j)$

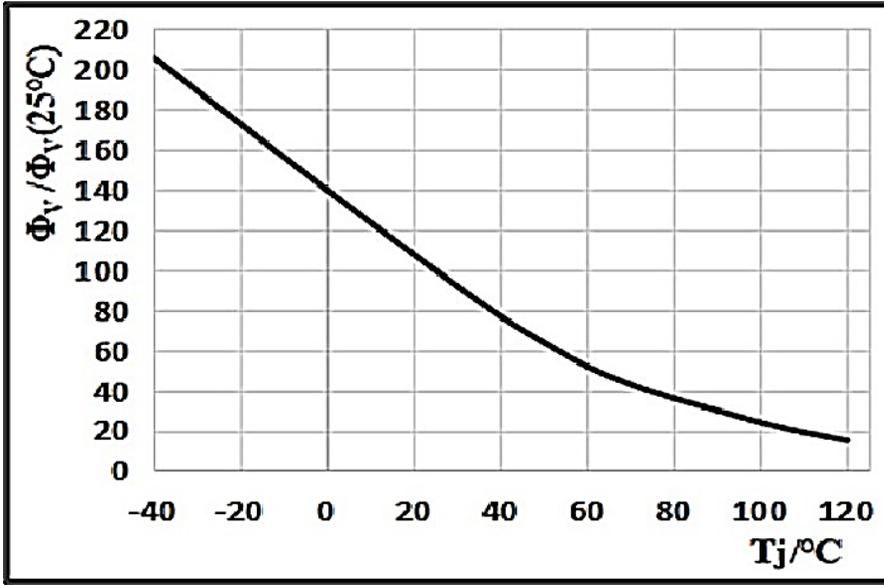
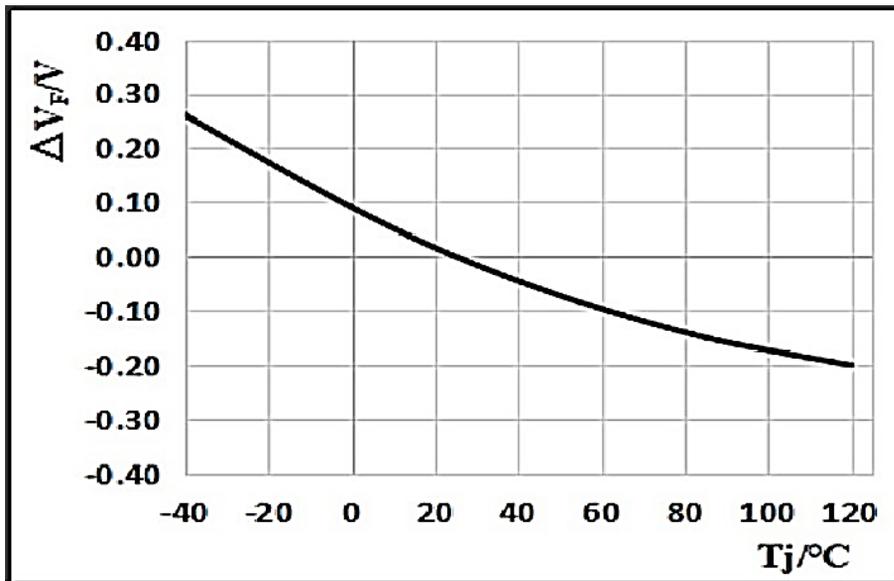


Figure 6. Junction Temperature Vs. ΔV_F , $\Delta V_F = V_F - V_F(25^\circ\text{C}) = f(T_j)$



OPTICAL & ELECTRICAL CHARACTERISTICS CURVES -IF=50mA, Ts=25°C, RH60%

Figure 7 Ts Vs. Max. Permissible IF, IF = f(Ts)

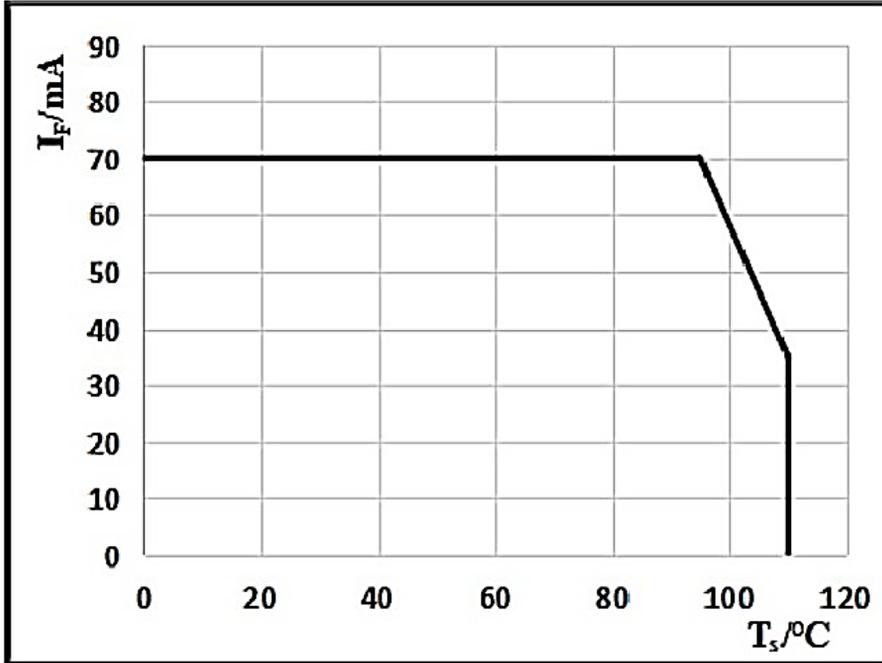
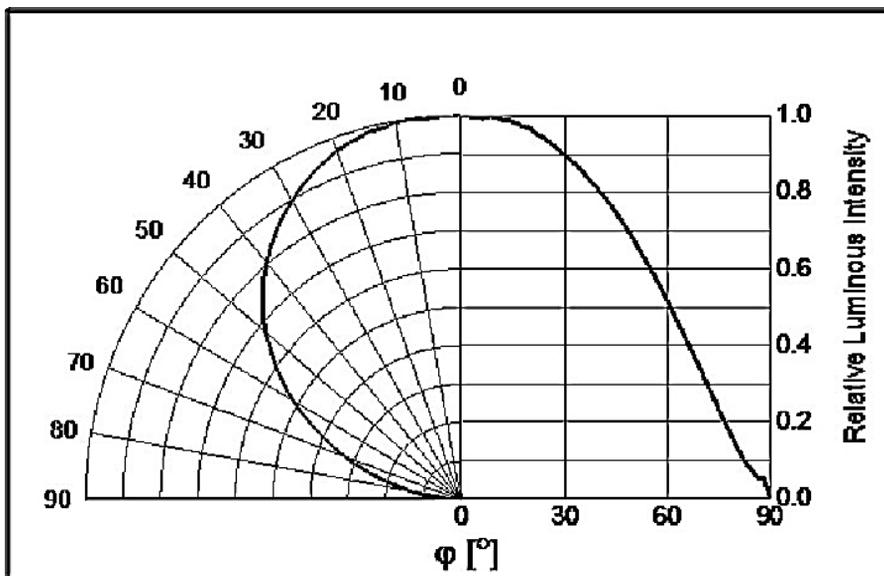
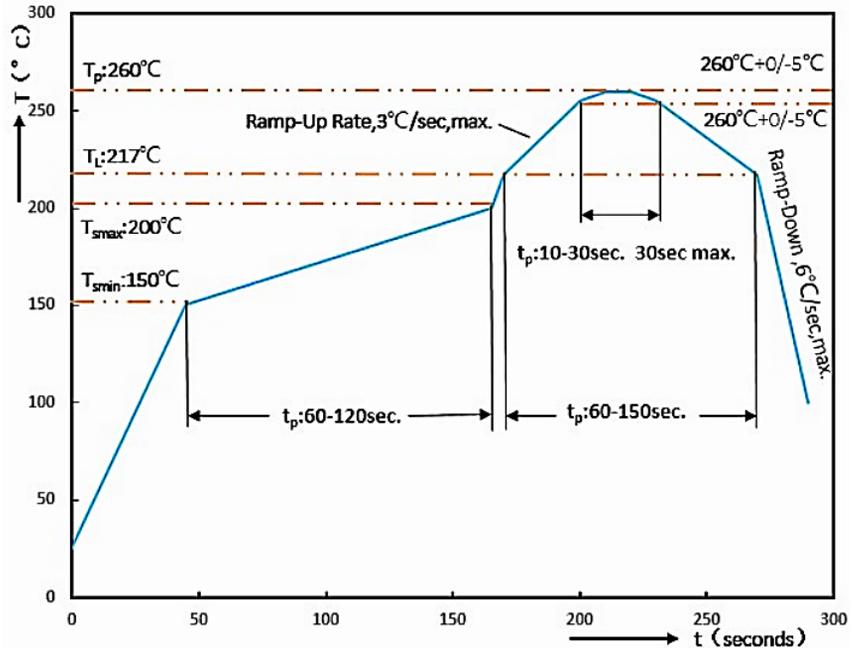


Figure 8. Radiation Diagram, I rel = f (Φ)



REFLOW SOLDERING CHARACTERISTICS

Product complies to MSL Level 2a acc. To JEDEC J-STD-020 D.01

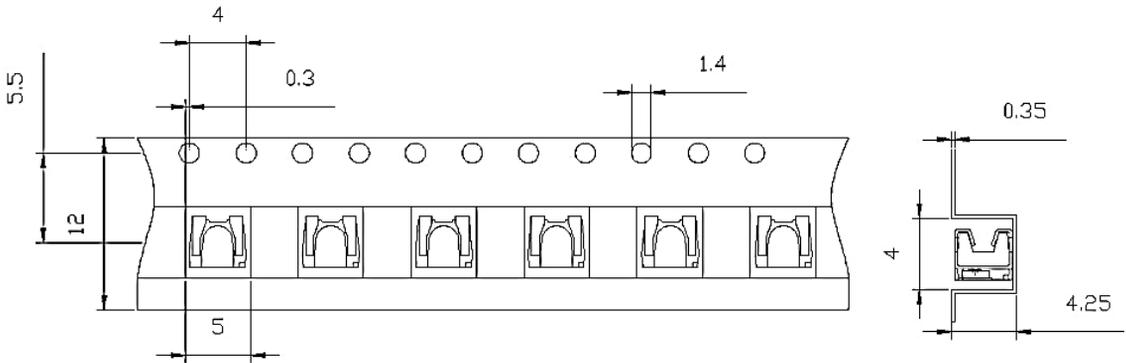


| PROFILE FEATURE | | PB-FREE ASSEMBLY |
|---|---------------------------|-------------------|
| Average Ramp-up Rate (Ts Max to Tp) | | 3°C/second Max |
| Preheat | Temperature Min (Ts Min.) | 150°C |
| | Temperature Max (Ts Max.) | 200°C |
| | Time (ts Min. to ts Max.) | 60 ~ 120 seconds |
| Time maintained above | Temperature (TL) | 217°C |
| | Time (tL) | 60 ~ 150 seconds |
| Peak/Classification Temperature (Tp) | | 260 °C |
| Time within 5°C of actual Peak Temperature (tp) | | 30 seconds Max |
| Ramp-down rate | | 6 °C /Second Max. |
| Time 25 °C to Peak Temperature | | 8 minutes Max. |
| Suggest reflow times | | 3 Times Max. |

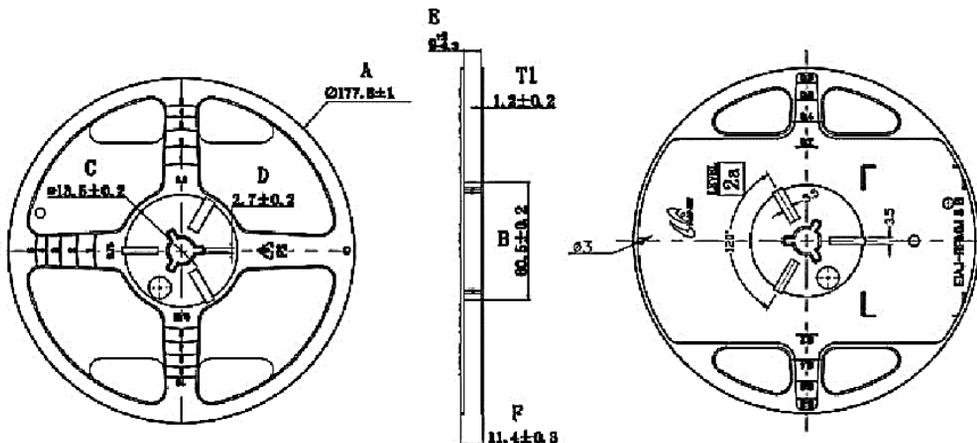
TAPE/REEL, 1000pcs/Reel (Unit: mm)

- All Devices are packed in accordance with EIA standard RS-481-A
- Cumulative Tolerance : Cumulative Tolerance/10 pitches to be $\pm 0.2\text{mm}$
- Adhesion Strength of Cover Tape Adhesion strength to be 0.1-0.7N when the cover tape is turned off from the carrier tape at the angle of 10° to the carrier tape.
- Moisture Resistant Package

Tape



Reel



APPLICATION NOTES - Part I

- Storage: To avoid the moisture penetration, we recommend store in a dry box with a desiccant, The maximum storage temperature range is 40°C and a maximum humidity of RH60%.
- Use Precaution after Opening the Packaging: Recommend conditions after opening the package
a) Sealing b) Temperature : 30°C Humidity: Less than RH50% c) Recommend to use up before 72hrs after opening the package.
- If the package has been opened more than 4 weeks(MSL_2a) or the color desiccant changes, LED Components should be dried for 12hrs at 60±5°C. .
- Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.
- Do not rapidly cool device after soldering.
- The LED should not be mounted on warped portion of PCB.
- The LED should not be used in any type of fluid such as water, oil, organic solvent and etc. When washing is required, IPA (Isopropyl Alcohol) should be used.
- When the LEDs are in operation the maximum current should be decided after measuring the package temperature.
- Long time exposure of sunlight or occasional UV exposure will cause lens discoloration.
- The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.
- LEDs are sensitive to Electro-Static Discharge (ESD). Below is a list of suggestions that BND purposes to minimize these effects.
- The products are sensitive to static electricity or surge voltage. ESD can damage a die and it's Reliability. When handing the products, the following measures against electrostatic discharge are strongly recommended:

APPLICATION NOTES - Part II

- a) Increase in reverse leakage current lowered turn-on voltage
- b) Abnormal emissions from the LED at low current LED

The following recommendations are suggested to help minimize the potential for an ESD event.

- One or more recommended work area suggestions:
 - a) Dissipating static charge with conductive materials
 - b) Preventing charge generation with moisture
 - c) ESD safe storage containers ESD

- One or more personnel suggestion options:
 - a) Antistatic wrist-strap b) Antistatic material shoes c) Antistatic clothes

- Environmental controls: Humidity control (ESD gets worse in a dry environment).

- Handling Precautions: During processing, mechanical stress on the surface should be minimized as much as possible. Sharp objects of all types should not be used to pierce the sealing compound. In general, LEDs should only be handled from the side. By the way, this also applies to LEDs Without a silicone sealant, since the surface can also become scratched.

- NextGen suggests using isopropyl alcohol for cleaning. In case other solvents are used, it must be assured that these solvents do not dissolve the package or resin. Please do not mold this products into another resin (epoxy, urethane, etc.) and do not handle this Product with acid or sulfur material in sealed space.

The following recommendations are suggested to help minimize the potential for an ESD event.

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GLOSSARY

- **Brightness:** Brightness values are measured during a current pulse of typically 20ms, with an internal reproducibility of $\pm 5\%$.
- **Wavelength:** The wavelength is measured at a current pulse of typically 20ms, with an internal reproducibility of ± 1.5 nm.
- **Forward Voltage:** The forward voltage is measured during a current pulse of typically 20ms, with an internal reproducibility of ± 0.05 V.
- **Reverse Operation:** Continuous reverse operation is not allowed.
- **Thermal Resistance:** RthJA results from mounting on PC board.
- **Typical Values:** Due to the special conditions of the manufacturing processes of semiconductor devices, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.
- **Characteristic curve:** In the range where the line of the graph is broken, you must expect higher differences between single devices within one packing unit.

IMPORTANT NOTES AND DISCLAIMER

1. **ROHS COMPLIANCE:** The levels of RoHS restricted materials in this product are below the maximum concentration values (also referred to as the threshold limits) permitted for such substances, or are used in an exempted application, in accordance with EU RoHS Directive (EU) 2015/863 EC (RoHS3). RoHS Test Report for this product can be obtained at Download Center.
2. **REACH COMPLIANCE:** REACH substances of high concern (SVHCs) information is available for this product. Since the European Chemical Agency (ECHA) has published notice of their intent to frequently revise the SVHC listing for the foreseeable future, REACH Test Report for this product can be obtained at Download Center.
3. All Product parametric performance is indicated in the Electrical Characteristics for the listed herein test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.
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7. *NextGen* products are not authorized for use as critical components in life support devices or systems without express written approval by *NextGen*.
8. *NextGen* requires that customers first obtain an RMA (Returned Merchandise Authorization) number prior to returning any products. Returns must be made within 30 days of the date of invoice, be in the original packaging, unused and like-new condition. At the time of quoting or purchasing, a product may say that it is Non-Cancelable/ Non-Returnable (NCNR). These products are not returnable and not refundable.