

**Harvatek Surface Mount LED Data Sheet  
HT-U16D Series  
Preliminary**

|  |                         |                |                |
|--|-------------------------|----------------|----------------|
| Official Product   | Product: HT-U16D Series |                | Data Sheet No. |
| Tentative Product  | *****                   |                | HT-U16D        |
| Specifications are subject to change without notice. Data and drawings herein are copyrighted. | Sep. 18, 2008           | Version of 1.0 | Page 1 of 1    |

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1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, and (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in a significant injury of the user.
2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

|  |                         |                |                |
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## Product Specifications

| Product    | Emission Color         | Technology | Test Current<br>$I_F$ (mA) | Forward Voltage<br>$V_F$ (V) | Orderable<br>Part Number |
|------------|------------------------|------------|----------------------------|------------------------------|--------------------------|
| HT-U16DUSD | Ultra Bright<br>Orange | AlInGaP    | 20                         | 2.7 typ.                     | HT-U16DUSD-XXXX          |
| HT-U16DNG  | Green                  | InGaN      | 20                         | 3.3 typ.                     | HT-U16DNG-XXXX           |
| HT-U16DNBH | Blue                   | InGaN      | 150                        | 3.3 typ.                     | HT-U16DNBH-XXXX          |
| HT-U16DSWH | White                  | InGaN      | 150                        | 3.3 typ.                     | HT-U16DSWH-XXXX          |

|              | Specification        | Material                          | Quantity         |
|--------------|----------------------|-----------------------------------|------------------|
| ESD          | 2000V (HBM)          |                                   |                  |
| Resin        | Water clear          | Silicone                          |                  |
| Carrier tape | Per EIA 481-1A specs | Conductive black tape             | 1000pcs per reel |
| Reel         | Per EIA 481-1A specs | Conductive black                  |                  |
| Label        | HT standard          | Paper                             |                  |
| Packing bag  | 220x240mm            | Aluminum laminated bag/ no-zipper | One reel per bag |
| Carton       | HT standard          | Paper                             |                  |

|  |                         |               |                |
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Others:

Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of Iv, λ<sub>D</sub> and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.


**ATTENTION: Electrostatic Discharge (ESD) protection**



The symbol to the left denotes that ESD precaution is needed. ESD protection for GaP and AlGaAs based chips is necessary even though they are relatively safe in the presence of low static-electric discharge. Parts built with AlInGaP, GaN, or/and InGaN based chips are **STATIC SENSITIVE devices**. ESD precaution must be taken during design and assembly.

If manual work or processing is needed, please ensure the device is adequately protected from ESD during the process.

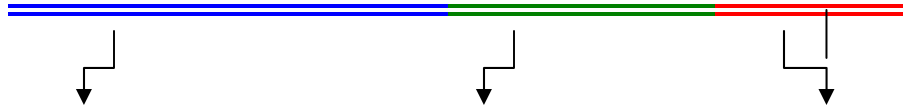
### Label Specifications

|                              |   |                      |
|------------------------------|---|----------------------|
| <b>HARVATEK</b>              |  | Date: yyyy/mm/dd<br> |
| CUSTOMER P/N:<br>            |   |                      |
| HARVATEK P/N:<br>            | QTY: PCS<br>  |                      |
| LOT NO:<br>                  |   | QC                   |
| Iv BIN:    COLOR BIN:    Vf: |   |                      |

|  |                         |                |
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■ Harvatek P/N:

**H T - U16D    YYY -    XXXX**



| Series Name  | Emitting Color  | Customer Code                 |
|--|---|-------------------------------|
| <b>HT-U16D</b><br>HT: Harvatek<br>U16D: Mid-power series<br>3.5 (L) x 2.8 (W) x 1.3 (H) mm | YYY<br>USD: Super Bright Orange@20mA<br>NG: Green@20mA<br>NBH: Blue@150mA<br>SWH: White@150mA | XXXX<br>Customer Product Code |

Lot No.:

1    2    3    4    5    6    7    8    9    10  
**P   1   2   2   3   0   A   -   D   T**

| Code 1                | Code 2  | Code 3   | Code 4, 5  | Code 6, 7       | Code 9                  | Code 10        |
|-----------------------|---|--|------------|-----------------|-------------------------|----------------|
|                       | Mfg. Year   | Mfg. Month   | Mfg. Date  | Lots            | Resin Color             | Packaging      |
| Internal Tracing Code | Z: 2000<br>1: 2001<br>2: 2002<br>3: 2003<br>..... | 1: Jan.<br>2: Feb.<br>....<br>9: Sep.<br>A: Oct.<br>B: Nov.<br>C: Dec. | 1~31/ (30) | 01~99, A,B,C... | D: Diffused<br>C: Clear | T: Tape & Reel |

|  |                         |                |
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■ Luminous Intensity (Iv) Bin:

| Bin  | Luminous Intensity Range (mcd) |         | Bin  | Luminous Intensity Range (mcd) |         |
|------|--------------------------------|---------|------|--------------------------------|---------|
|      | Minimum                        | Maximum |      | Minimum                        | Maximum |
|      |                                |         | Z2   | 1270.0                         | 1440.0  |
| AA1  | 1440.0                         | 1610.0  | AA2  | 1610.0                         | 1800.0  |
| AB1  | 1800.0                         | 2010.0  | AB2  | 2010.0                         | 2250.0  |
| AC1  | 2250.0                         | 2530.0  | AC2  | 2530.0                         | 2850.0  |
| AD1  | 2850.0                         | 3200.0  | AD2  | 3200.0                         | 3600.0  |
| AE1  | 3600.0                         | 4000.0  | AE2  | 4000.0                         | 4500.0  |
| AES1 | 3600.0                         | 4000.0  | AES2 | 4000.0                         | 4350.0  |
| AFS1 | 4350.0                         | 4710.0  | AFS2 | 4710.0                         | 5100.0  |
| AF1  | 4500.0                         | 5000.0  | AF2  | 5000.0                         | 5600.0  |
| AG1  | 5600.0                         | 6300.0  | AG2  | 6300.0                         | 7150.0  |
| AH1  | 7150.0                         | 8000.0  | AH2  | 8000.0                         | 9000.0  |
| AJ1  | 9000.0                         | 10000.0 |      |                                |         |
|      |                                |         |      |                                |         |

@150mA / Ta=25° C, Tolerance: ± 10%

■ Luminous Flux Bin:

| Rank Code | Symbol | Condition             | Min. | Typ. | Max. | Unit |
|-----------|--------|-----------------------|------|------|------|------|
| PN        | ΦV     | I <sub>F</sub> =150mA | 18.0 | -    | 23.5 | lm   |
| PP        |        |                       | 23.5 | -    | 30.6 |      |

@150mA / Ta=25° C, Tolerance: ± 10%

|  |                         |               |                |
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■ Wavelength ( $\lambda$ ) Bin:

| Bin | Wavelength Range (nm)     |       |                 |       |           |       |
|-----|---------------------------|-------|-----------------|-------|-----------|-------|
|     | Super Bright Orange (USD) |       | True Green (NG) |       | Blue (NB) |       |
|     | Min                       | Max   | Min             | Max   | Min       | Max   |
| -   | 615.0                     | 630.0 |                 |       |           |       |
| A   |                           |       | 515.0           | 520.0 | 460.0     | 464.0 |
| B   |                           |       | 520.0           | 525.0 | 464.0     | 468.0 |
| C   |                           |       | 525.0           | 530.0 | 468.0     | 472.0 |
| D   |                           |       | 530.0           | 535.0 | 472.0     | 476.0 |
| E   |                           |       | 535.0           | 540.0 | 476.0     | 480.0 |
| F   |                           |       |                 |       | 480.0     | 485.0 |
| H   |                           |       |                 |       |           |       |
| J   |                           |       |                 |       |           |       |

@150mA / Ta=25<sup>o</sup> C, Tolerance:  $\pm$  0.5nm

■ Forward Voltage (V<sub>F</sub>) Bin:

| Color                     | Bin Code | Spec. Range |
|---------------------------|----------|-------------|
| Blue (NB)                 | H6       | 3.0 – 3.2 V |
| Green (NG)                | J5       | 3.2 – 3.4 V |
| White (TW)                | J6       | 3.4 – 3.6 V |
| Super Bright Orange (USD) | G6       | 2.6 – 2.8 V |
|                           | H5       | 2.8 – 3.0 V |

@150mA / Ta=25<sup>o</sup>C, Tolerance:  $\pm$  0.05 V

|  |                         |                |                |
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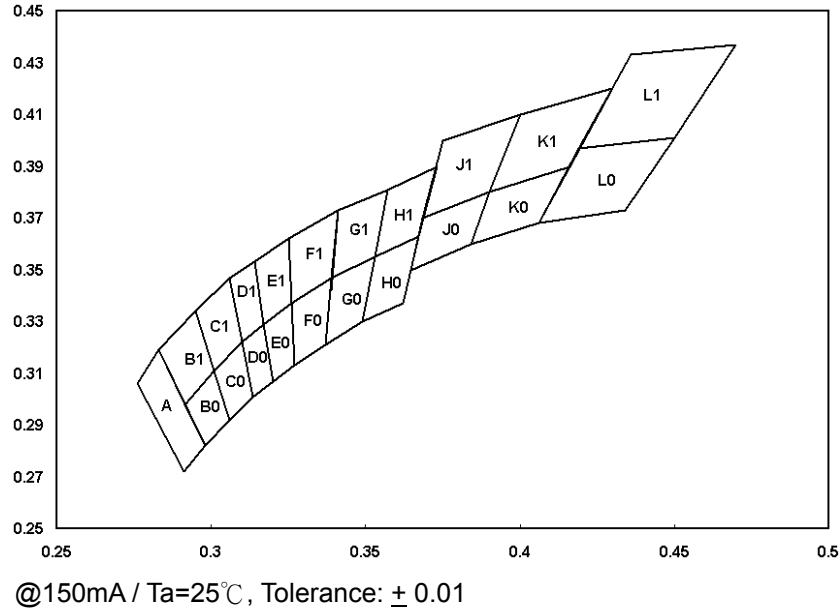
## Correlated Color Temperature Rank (TW only)

| Color      | Condition             | Bin Code | Min.  | Typ.  | Max.  |
|------------|-----------------------|----------|-------|-------|-------|
| Warm White | I <sub>F</sub> =150mA | L1       | 2,750 | 3,000 | 3,250 |
|            |                       | L0       | 2,750 | 3,000 | 3,250 |
|            |                       | K1       | 3,250 | 3,500 | 3,750 |
|            |                       | K0       | 3,250 | 3,500 | 3,750 |
|            |                       | J1       | 3,750 | 4,000 | 4,250 |
|            |                       | J0       | 3,750 | 4,000 | 4,250 |
|            |                       | H1       | 4,250 | 4,500 | 4,750 |
| Pure White |                       | H0       | 4,250 | 4,500 | 4,750 |
|            |                       | G1       | 4,750 | 5,000 | 5,250 |
|            |                       | G0       | 4,750 | 5,000 | 5,250 |
|            |                       | F1       | 5,250 | 5,500 | 5,750 |
|            |                       | F0       | 5,250 | 5,500 | 5,750 |
|            |                       | E1       | 5,750 | 6,000 | 6,250 |
|            |                       | E0       | 5,750 | 6,000 | 6,250 |
| Cold White | I <sub>F</sub> =150mA | D1       | 6,250 | 6,500 | 6,750 |
|            |                       | D0       | 6,250 | 6,500 | 6,750 |
|            |                       | C1       | 6,750 | 7,000 | 7,500 |
|            |                       | C0       | 6,750 | 7,000 | 7,500 |
|            |                       | B1       | 7,500 | 8,000 | 8,500 |
|            |                       | B0       | 7,500 | 8,000 | 8,500 |
|            |                       | A        | 8,500 | 9,000 | 9,500 |

Tolerance: ±5%

|  |                         |                |                |
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## Correlated Color Temperature and Chromaticity Correlation (TW only)



|  |                         |                |                |
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## Product Characteristics

### Absolute Maximum Ratings

| Product    | Emission Color      | P <sub>d</sub> (mW) | I <sub>F</sub> (mA) | I <sub>FP</sub> * (mA) | V <sub>R</sub> (V) | T <sub>OP</sub> (°C) | T <sub>ST</sub> (°C) |
|------------|---------------------|---------------------|---------------------|------------------------|--------------------|----------------------|----------------------|
| HT-U16DUSD | Ultra Bright Orange |                     |                     |                        |                    |                      |                      |
| HT-U16DNG  | Green               |                     |                     |                        |                    |                      |                      |
| HT-U16DNBH | Blue                | 570                 | 180                 | 200                    | 5                  | -40~+100             | -40~+100             |
| HT-U16DSWH | White               | 570                 | 180                 | 200                    | 5                  | -40~+100             | -40~+100             |

\* Condition for I<sub>FP</sub> is pulse of 1/10 duty and 0.1msec width

### Electro-Optical Characteristics

(T<sub>a</sub> = 25 °C)

| Product    | Emission Color      | I <sub>F</sub> (mA) | V <sub>F</sub> (V) |     | λ(nm)          |                |    | I <sub>v</sub> (mcd) |        |
|------------|---------------------|---------------------|--------------------|-----|----------------|----------------|----|----------------------|--------|
|            |                     |                     | typ                | max | λ <sub>D</sub> | λ <sub>P</sub> | Δλ | min                  | typ    |
| HT-U16DUSD | Ultra Bright Orange | 20                  | 2.8                | 3.0 | 622            | 636            | 17 | 2500.0               | 6200.0 |
| HT-U16DNG  | Green               | 20                  | 3.3                | 3.6 | 527            | 520            | 40 | 4850.0               | 5025.0 |
| HT-U16DNBH | Blue                | 150                 | 3.3                | 3.6 | 465            | 468            | 40 | 1220.0               | 1340.0 |

| Product    | Emission Color | I <sub>F</sub> (mA) | V <sub>F</sub> (V) |     | λ(nm)          |                |    | Φ <sub>V</sub> (lm) |     |
|------------|----------------|---------------------|--------------------|-----|----------------|----------------|----|---------------------|-----|
|            |                |                     | typ                | max | λ <sub>D</sub> | λ <sub>P</sub> | Δλ | min                 | typ |
| HT-U16DSWH | White          | 150                 | 3.3                | 3.6 | X=0.29 Y=0.31  |                |    | 18.1                | 23  |

\* Per NIST standard

|  |                         |               |                |
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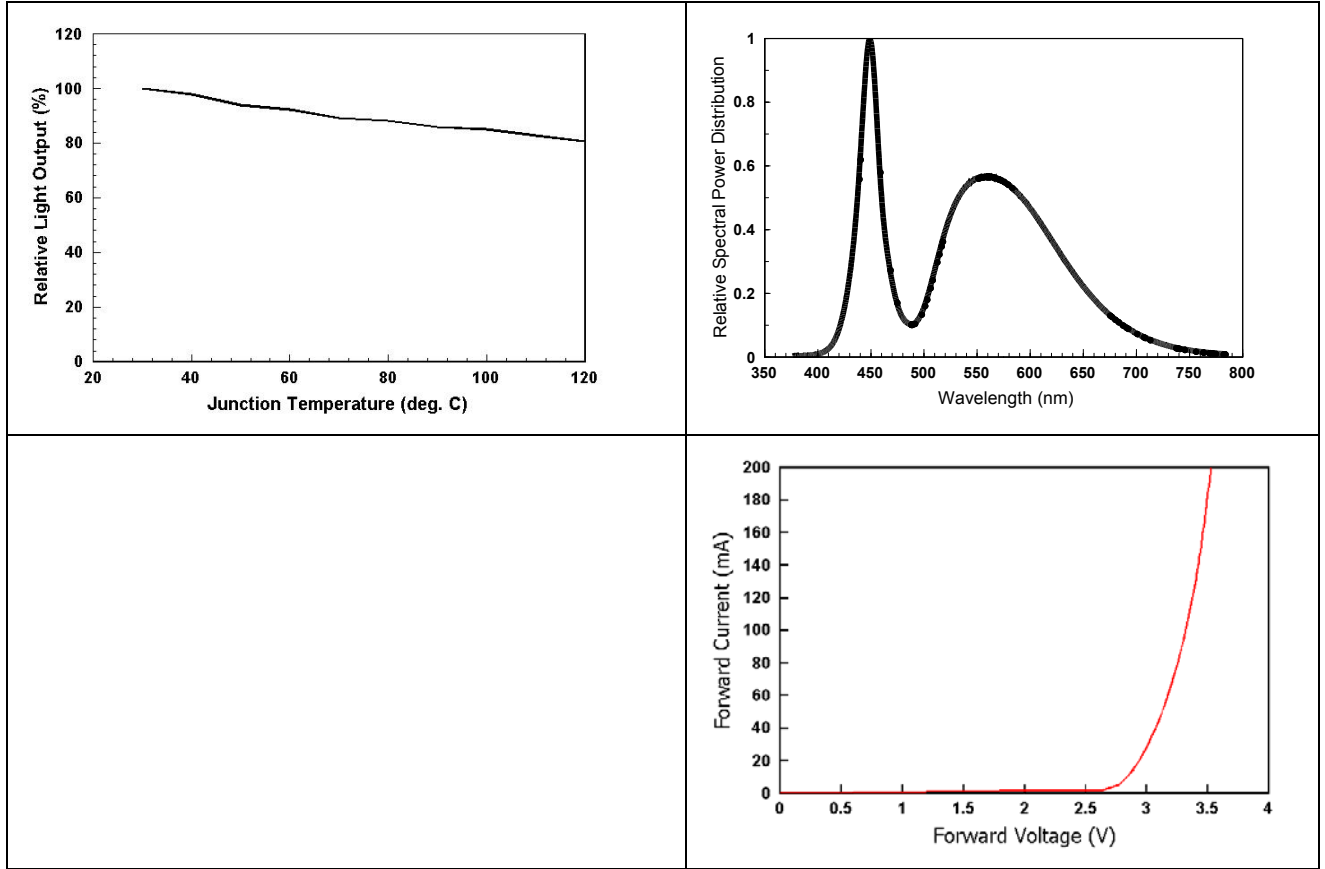
**Package Outline Dimension and Recommended Soldering Pattern**

Unit: mm Tolerance: +/-0.1

| Outline Dimension  | Solder Pattern  |
|--|---|
| <p>Technical drawings of the HT-U16D SMD LED package. The top view shows a circular anode mark with a diameter of 2.40 mm and a square lead frame with overall dimensions of 2.80 mm by 3.50 mm. A side view shows the package height with a lead frame width of 1.30 mm and a resin thickness of 0.80 mm. A bottom view shows the lead frame with dimensions 2.20 mm by 2.05 mm. A polarity symbol is also shown.</p> | <p>Recommended soldering pattern for the HT-U16D SMD LED package. It shows a top view of the package with a 2.4 mm wide lead frame. The soldering pattern includes two rectangular pads for the leads, each 0.7 mm wide and 1.2 mm high, with a 1.0 mm gap between them. The overall dimensions of the soldering area are 2.5 mm by 2.4 mm.</p> |
| <p>Soldering terminals may shift in the x, y direction.</p>  | <p>Unit: mm</p>   |

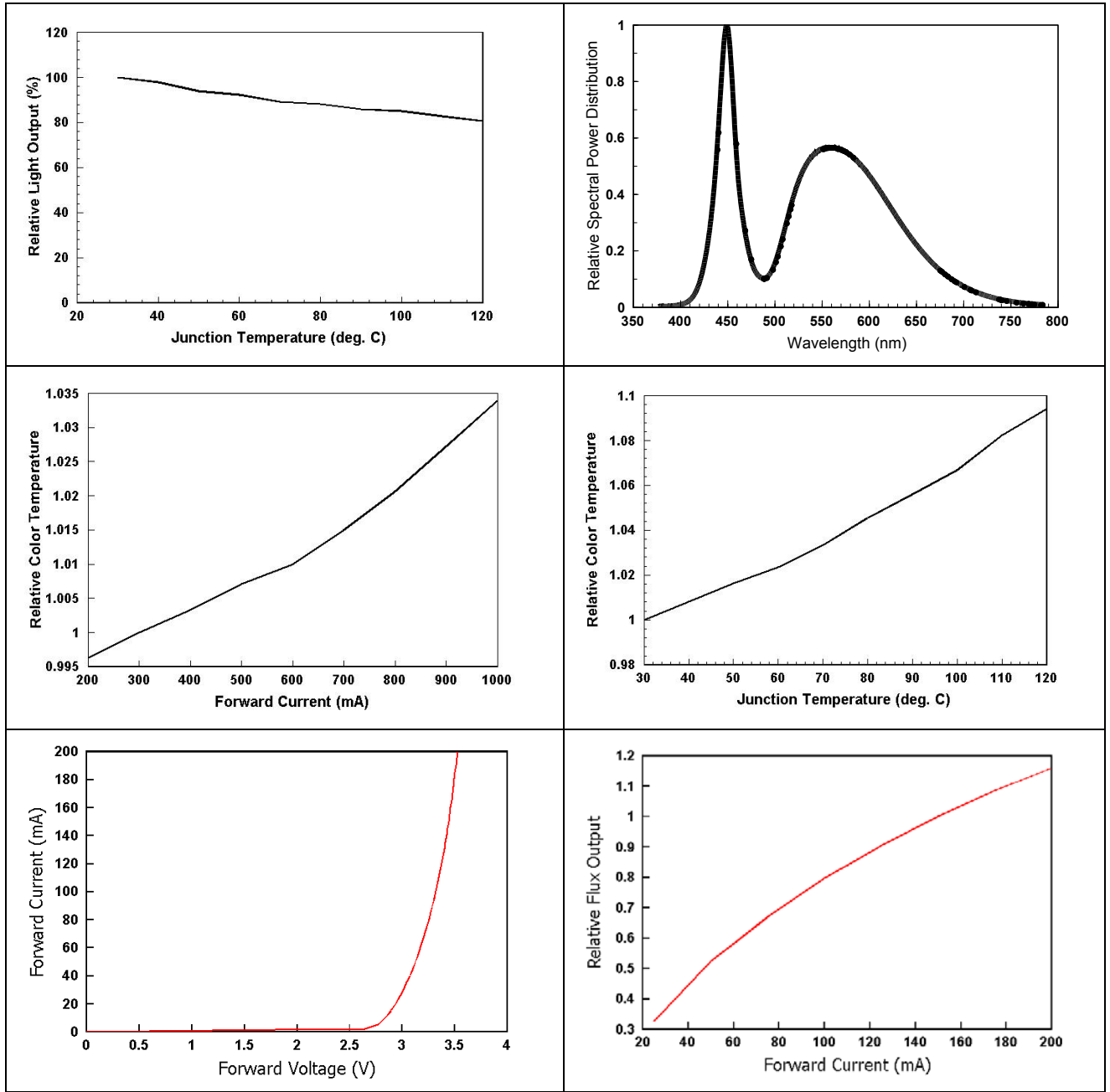
|  |                         |                                 |
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**Characteristic Curves for NB**



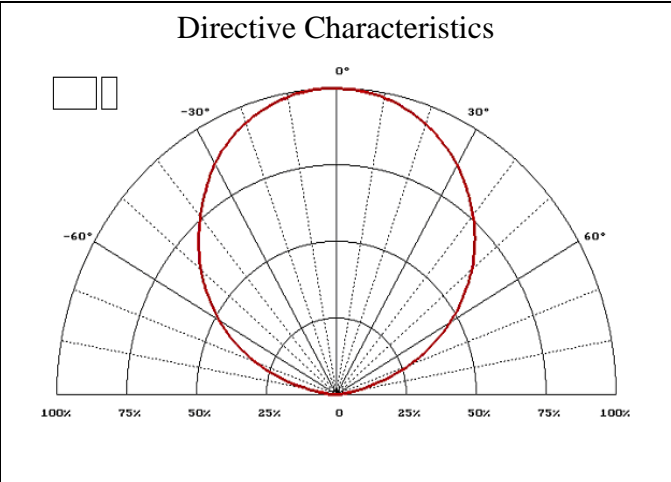
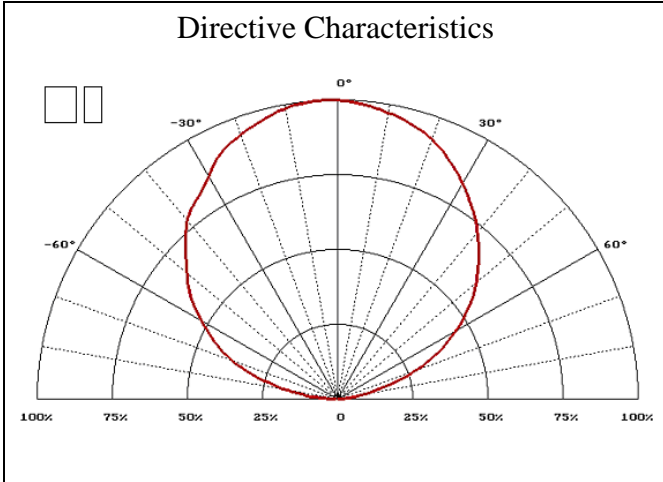
|  |                         |                |
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**Characteristic curves for TW**



|  |                         |                |               |
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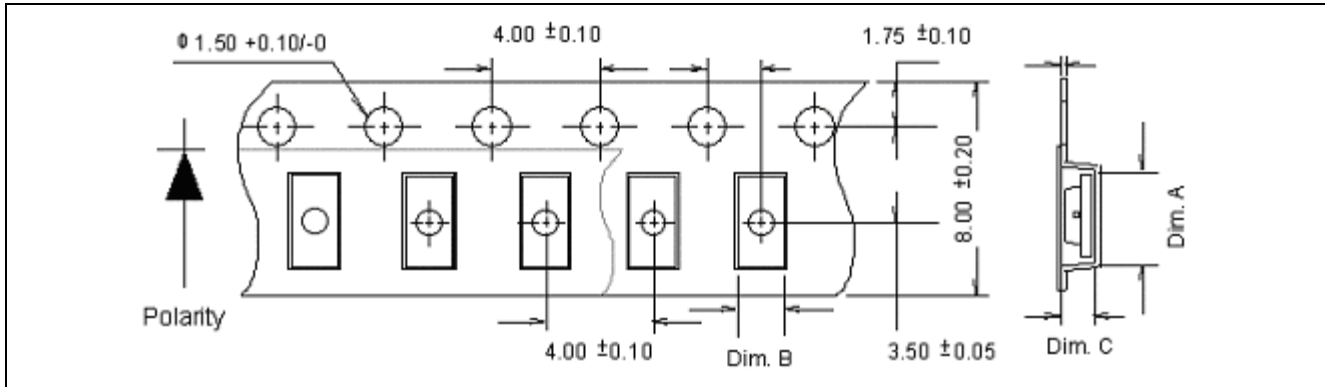
**Radiation Pattern**



|  |                         |                |               |
|--|-------------------------|----------------|---------------|
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## Packaging

## Tape Dimension



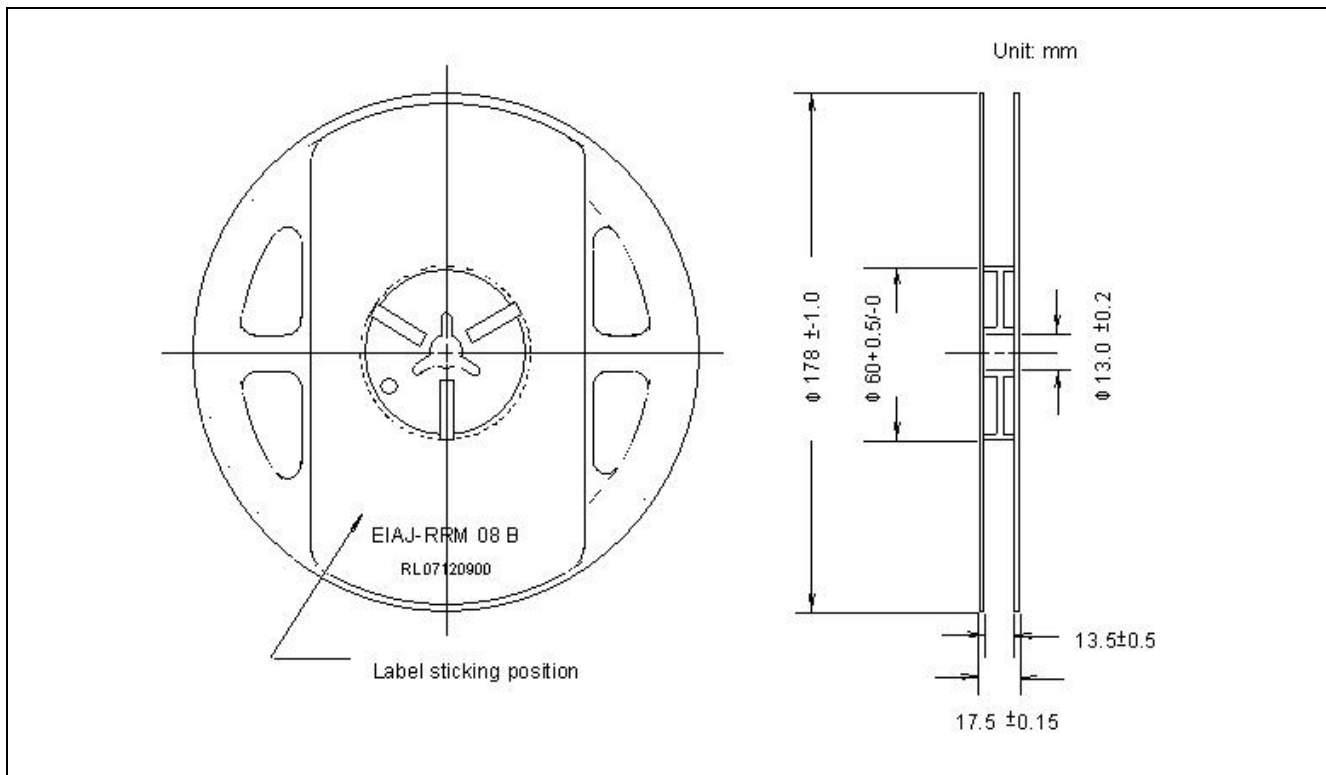
| Part No. | Dim. A      | Dim. B      | Dim. C      | Q'ty/Reel |
|----------|-------------|-------------|-------------|-----------|
| HT-U16D  | 3.7+/-0.1mm | 3.0+/-0.1mm | 1.5+/-0.1mm | 2K        |

Unit: mm

|  |                         |                |                |
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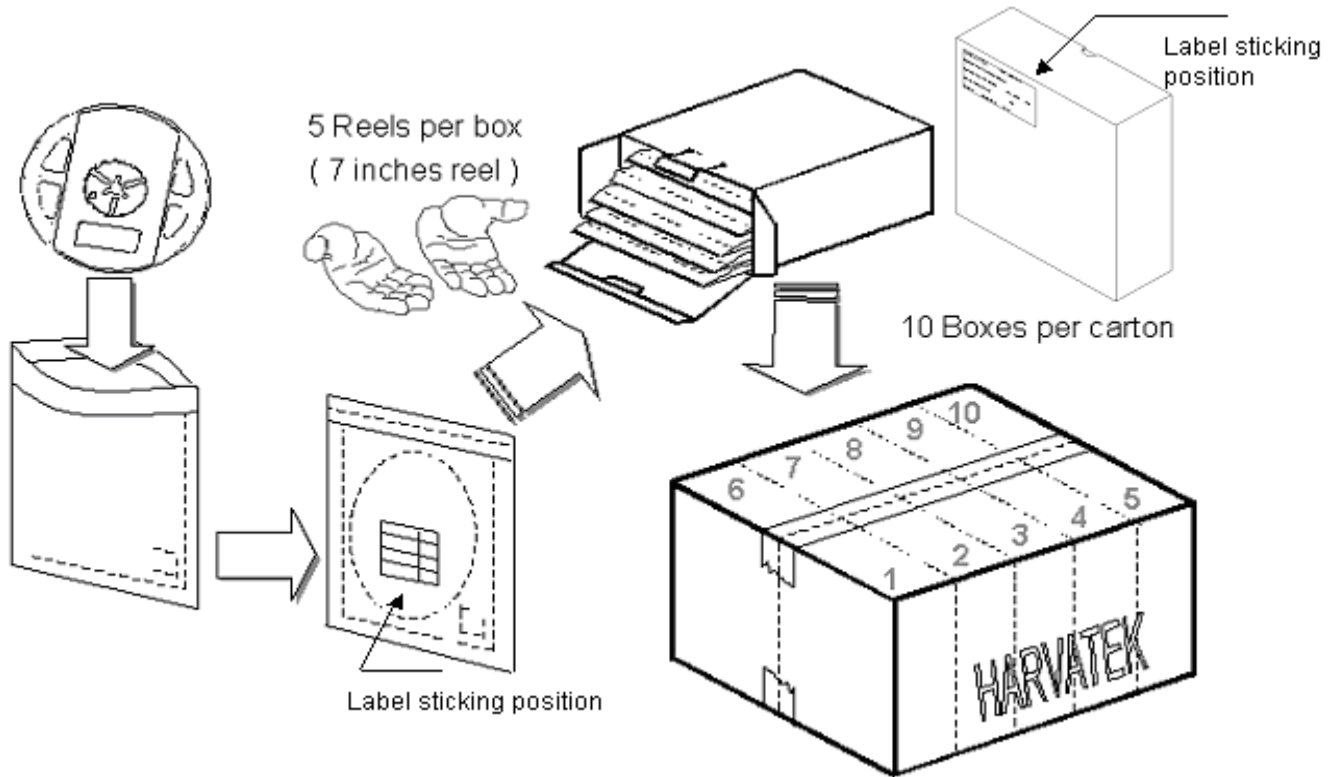


## Reel Dimension



|  |                         |                |
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## Packing



5 boxes per carton is available depending on shipment quantity.

|              | Specification        | Material                          | Quantity         |
|--------------|----------------------|-----------------------------------|------------------|
| Carrier tape | Per EIA 481-1A specs | Conductive black tape             | 2000pcs per reel |
| Reel         | Per EIA 481-1A specs | Conductive black                  |                  |
| Label        | HT standard          | Paper                             |                  |
| Packing bag  | 220x240mm            | Aluminum laminated bag/ no-zipper | One reel per bag |
| Carton       | HT standard          | Paper                             | Non-specified    |

### Others:

Each immediate box consists of 5 reels. The 5 reels may not necessarily have the same lot number or the same bin combinations of Iv,  $\lambda_D$  and Vf. Each reel has a label identifying its specification; the immediate box consists of a product label as well.

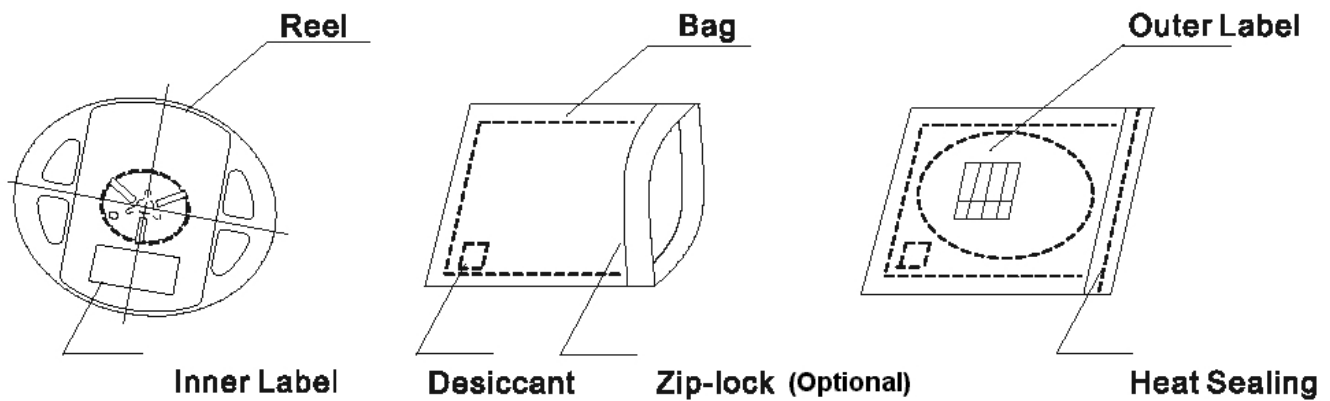
|  |                         |                |
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## Dry Pack

All SMD optical devices are **MOISTURE SENSITIVE**. Avoid exposure to moisture at all times during transportation or storage. Every reel is packaged in a moisture protected anti-static bag. Each bag is properly sealed prior to shipment.

Upon request, a humidity indicator will be included in the moisture protected anti-static bag prior to shipment.

The packaging sequence is as follows:

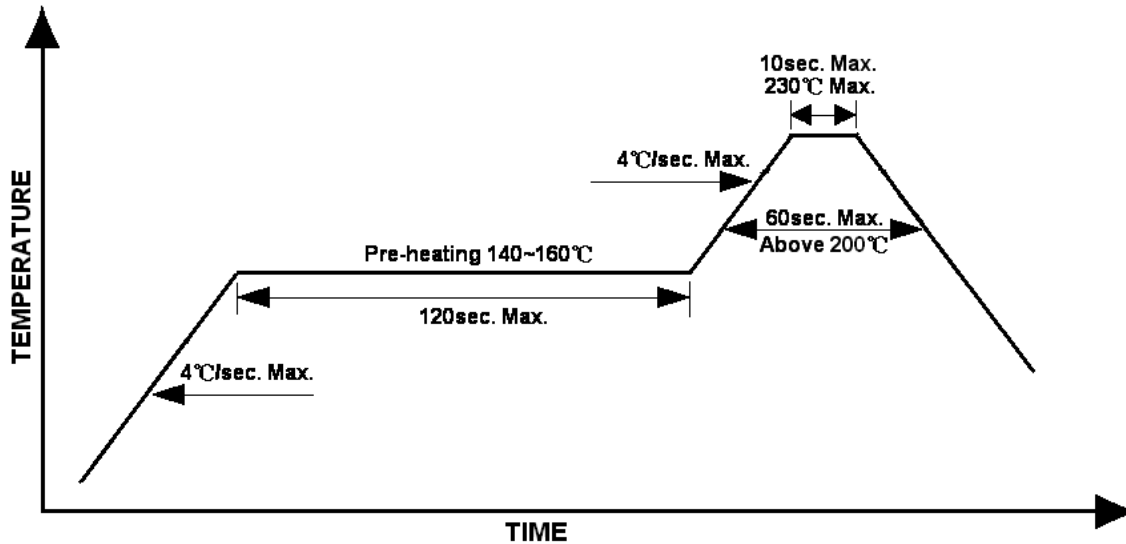


|  |                         |                |                |
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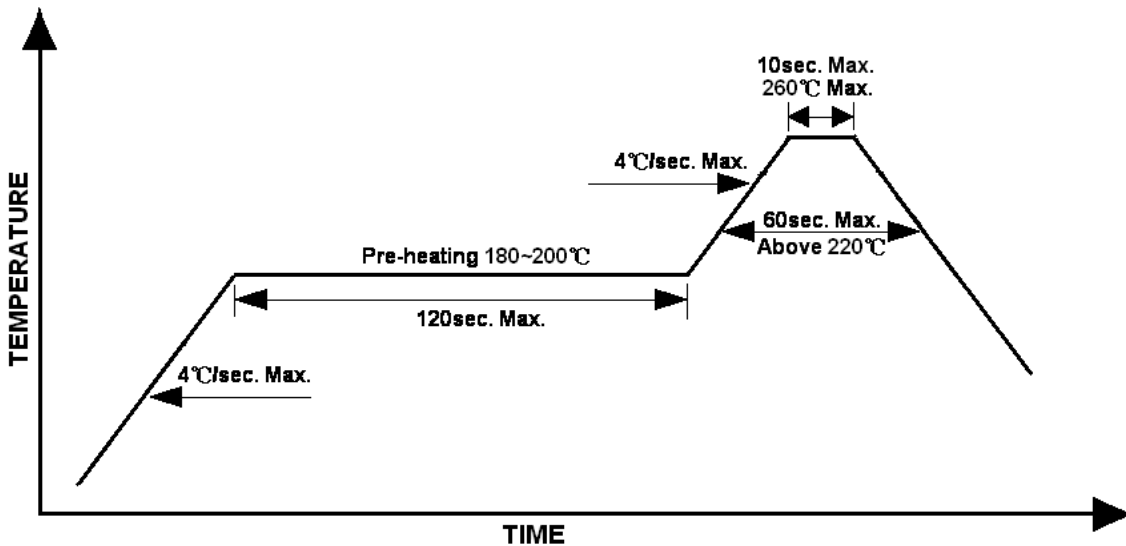
## Reflow Soldering

- Recommended tin glue specifications: melting temperature in the range of 178~192 °C
- The recommended reflow soldering profile is as follows (temperatures indicated are as measured on the surface of the LED resin):

### Lead Solder Profile



### Lead-free Solder Profile



|  |                         |                |               |
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| Specifications are subject to change without notice. Data and drawings herein are copyrighted. | Sep. 18, 2008           | Version of 1.0 | Page 20 of 20 |

**Precautions**

1. Avoid exposure to moisture at all times during transportation or storage.
2. Anti-Static precaution must be taken when handling GaN, InGaN, and AlInGaP products.
3. It is suggested to connect the unit with a current limiting resistor of the proper size. Avoid applying a reverse voltage beyond the specified limit.
4. Avoid operation beyond the limits as specified by the absolute maximum ratings.
5. Avoid direct contact with the surface through which the LED emits light.
6. If possible, assemble the unit in a clean room or dust-free environment.

**Reworking**

- Rework should be completed within 5 seconds under 260 °C.
- The iron tip must not come in contact with the copper foil.
- Twin-head type is preferred.

**Cleaning**

Following are cleaning procedures after soldering:

- An alcohol-based solvent such as isopropyl alcohol (IPA) is recommended.
- Temperature x Time should be 50°C x 30sec. or <30°C x 3min
- Ultra sonic cleaning: < 15W/ bath; bath volume ≤ 1liter
- Curing: 100 °C max, <3min

**Cautions of Pick and Place**

- Avoid stress on the resin at elevated temperature.
- Avoid rubbing or scraping the resin by any object.
- Electro-static may cause damage to the component. Please ensure that the equipment is properly grounded. Use of an ionizer fan is recommended.

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## Revision History

| Changes since last revision | Page | Version No. | Revision Date |
|-----------------------------|------|-------------|---------------|
| New format                  |      | 1.0         | 09-18-2008    |
|                             |      |             |               |
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Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

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