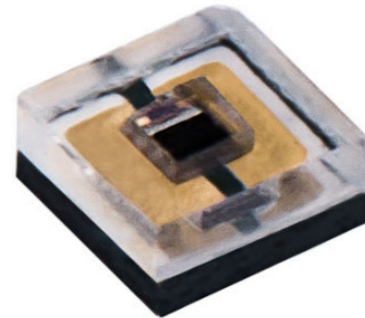


# **XBT-1313-UV**

## **Surface Mount**

### **UVC LED**



### **Table of Contents**

|                             |                       |    |
|-----------------------------|-----------------------|----|
| Binning and Ordering .....  | Information.....      | 2  |
| Optical and Electrical      | Characteristics ..... | 4  |
| Mechanical Dimensions ..... |                       | 7  |
| Soldering Profile .....     |                       | 8  |
| Product Shipping & Labeling | Information.....      | 9  |
| Precautions for Use.....    |                       | 10 |
| History of Changes .....    |                       | 11 |

### **Features:**

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- UVC LED with emission wavelength between 280 nm and 286 nm
- Ultra-compact form factor: 1.3 mm x 1.3 mm x 0.85 mm package
- Wide viewing angle >120 deg
- High reliability package with ESD protection
- Standard SMD Process
- RoHS and REACH compliant

### **Applications**

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- Water/ Air/ Surface Disinfection
- Florescence analyzer
- Food & Pharmaceutical Processing
- Horticulture
- Medical Spectroscopy

### XBT-1313-UV Binning Structure

XBT-1313 LEDs are tested for radiometric flux and chromaticity at a drive current of 20 mA, 40 ms single pulse and placed into one of the following radiometric flux (FF) and wavelength (WWW) bins

#### Radiometric Flux Bins

| Flux Bin (FF) | Minimum Flux (mW) | Maximum Flux (mW) |
|---------------|-------------------|-------------------|
| AA            | 1                 | 2                 |
| AB            | 2                 | 3                 |
| AC            | 3                 | 4                 |
| AD            | 4                 | 5                 |
| AE            | 5                 | 6                 |

#### Wavelength Bins

| Wavelength Bin (WWW) | Minimum Wavelength (nm) | Maximum Wavelength (nm) |
|----------------------|-------------------------|-------------------------|
| 280                  | 280                     | 286                     |

*Note 1: Luminus maintains a +/- 6% tolerance on flux measurements and +/- 1 nm on wavelength measurements.*

*Note 2: Individual bins are not orderable. Please refer to product ordering information on page 3 for a list of ordering part numbers.*

### Part Number Nomenclature

XBT — 1313 — UV — <A###> — <FFWW-##>

| Product Family                 | Package Type           | Spectrum    | Package Configuration  | Bin kit  |
|--------------------------------|------------------------|-------------|------------------------|--|
| XBT: UVC Surface Mount Package | 1313 : 1.3 mm x 1.3 mm | Ultraviolet | A130 : 130 degree lens | Flux and Wavelength bin kit code - See bin kit order codes table |

### Ordering Part Numbers

The table below lists ordering part numbers available for XBT-1313-UV LEDs. The part number includes a bin kit, a group of flux and wavelength bins described in page 2, that are shippable for a given ordering part number . Individual flux or wavelength bins are not orderable . Flux bin listed is minimum bin shipped - higher bins may be included at Luminus' discretion.

| Wavelength Range | Wavelength Bins | Radiometric Flux  |           | Ordering Part Number      |
|------------------|-----------------|-------------------|-----------|---------------------------|
|                  |                 | Bin Kit Flux Code | Min. Flux |                           |
| 280              | 280             | AA                | 1         | XBT-1313-UV-A130-AA280-00 |
|                  |                 | AB                | 2         | XBT-1313-UV-A130-AB280-00 |

### Optical and Electrical Characteristics

| Parameter                                  | Symbol          | Typical | Unit |
|--|-----------------|---------|------|
| Test Current                               | $I_f$           | 20      | mA   |
| Output Radiant Power                       | $P_{opt}$       | 2.6     | mW   |
| Minimum Forward Voltage                    | $V_{f-min}$     | 4.0     | V    |
| Typical Forward Voltage                    | $V_{f-typ}$     | 5.2     | V    |
| Maximum Forward Voltage                    | $V_{f-max}$     | 7.0     | V    |
| FWHM                                       | $\Delta\lambda$ | 10      | nm   |
| Viewing Angle                              | $2\theta_{1/2}$ | 150     | °    |
| Thermal Resistance (junction-solder point) | $R_{th}$        | 30      | °C/W |

### Absolute Maximum Ratings

| Parameter            | Symbol      | Value | Unit |
|----------------------|-------------|-------|------|
| Forward Current      | $I_{f-max}$ | 40    | mA   |
| Junction Temperature | $T_j$       | 65    | °C   |

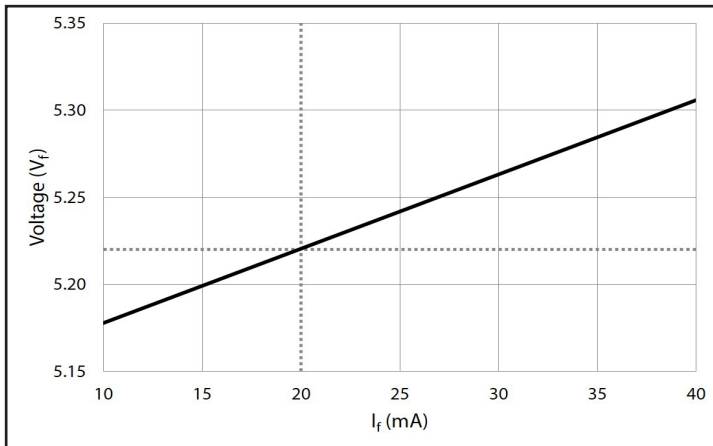
Note 1: Ratings are based on operation at a constant junction temperature of  $T_j = 25^\circ\text{C}$ . Test condition is a single 40 ms pulse at  $25^\circ\text{C}$ .

Note 2: Luminus XBT-1313 LEDs are designed for operation up to an absolute maximum forward drive current as specified above. Product lifetime data is specified at typical forward drive currents. Sustained operation at absolute maximum currents will result in a reduction of device lifetime compared to typical forward drive currents. Actual device lifetimes will also depend on junction temperature. Refer to the current vs. junction temperature derating curves for further information. In pulsed operation, rise time from 10-90% of forward current should be larger than 0.5 microseconds.

Note 3: Caution must be taken not to stare at the radiation emitted from these UV LEDs.

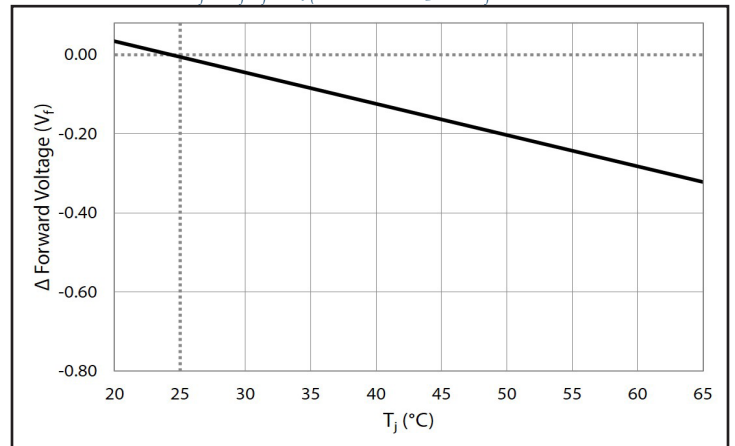
## Optical & Electrical Characteristics

### Forward Voltage vs Forward Current



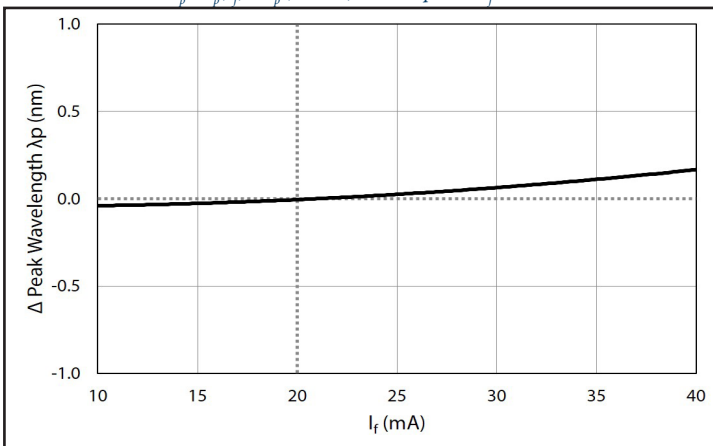
### Forward Voltage Shift vs. Junction Temperature

$$\Delta V_f = V_f(T_j) - V_f(25^\circ\text{C}), 40 \text{ ms pulse}, I_f = 20 \text{ mA}$$



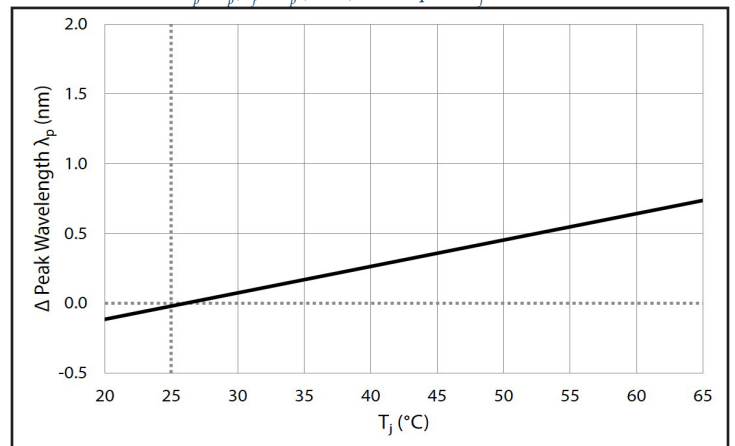
### Peak Wavelength Shift vs. Forward Current

$$\lambda_p = \lambda_p(I_f) - \lambda_p(20 \text{ mA}), 40 \text{ ms pulse}, T_j = 25^\circ\text{C}$$



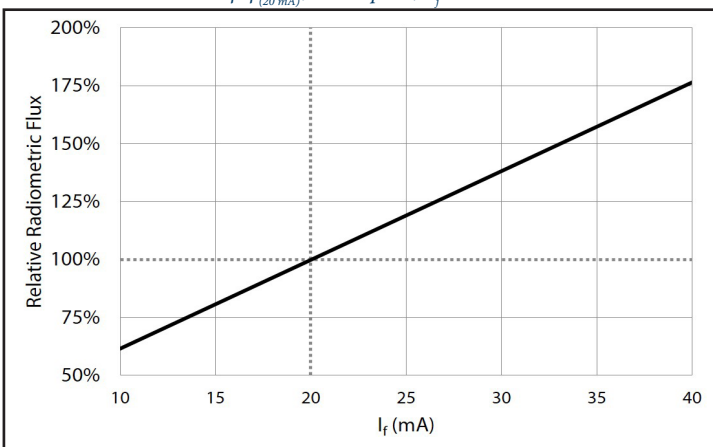
### Peak Wavelength Shift vs. Junction Temperature

$$\lambda_p = \lambda_p(T_j) - \lambda_p(25^\circ\text{C}), 40 \text{ ms pulse}, I_f = 20 \text{ mA}$$

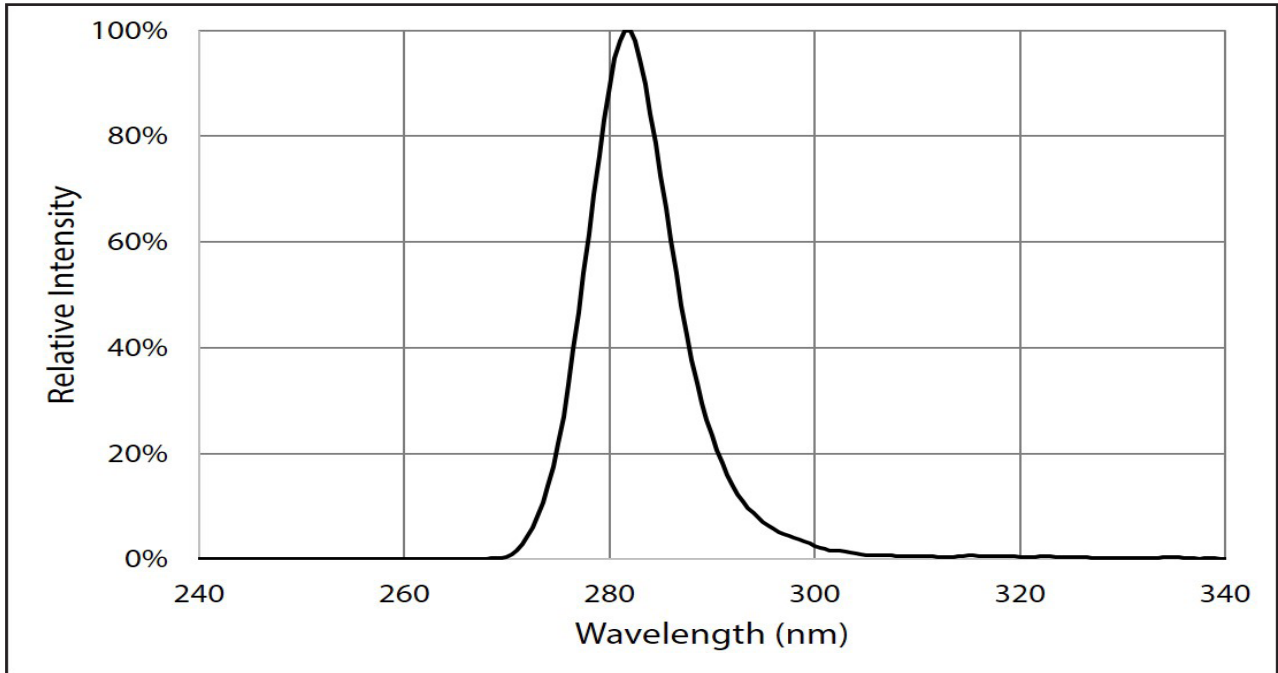


### Relative Power vs. Forward Current

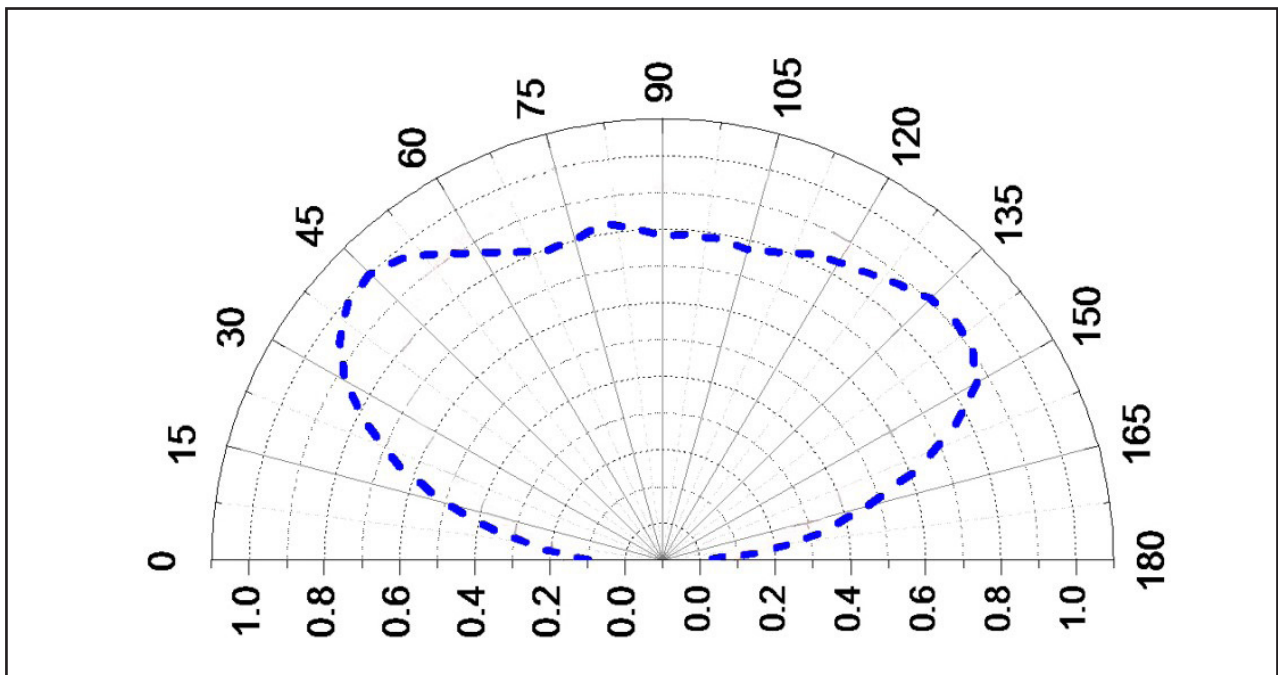
$$\phi/\phi_{(20 \text{ mA})}, 40 \text{ ms pulse}, T_j = 25^\circ\text{C}$$



### Typical Spectrum

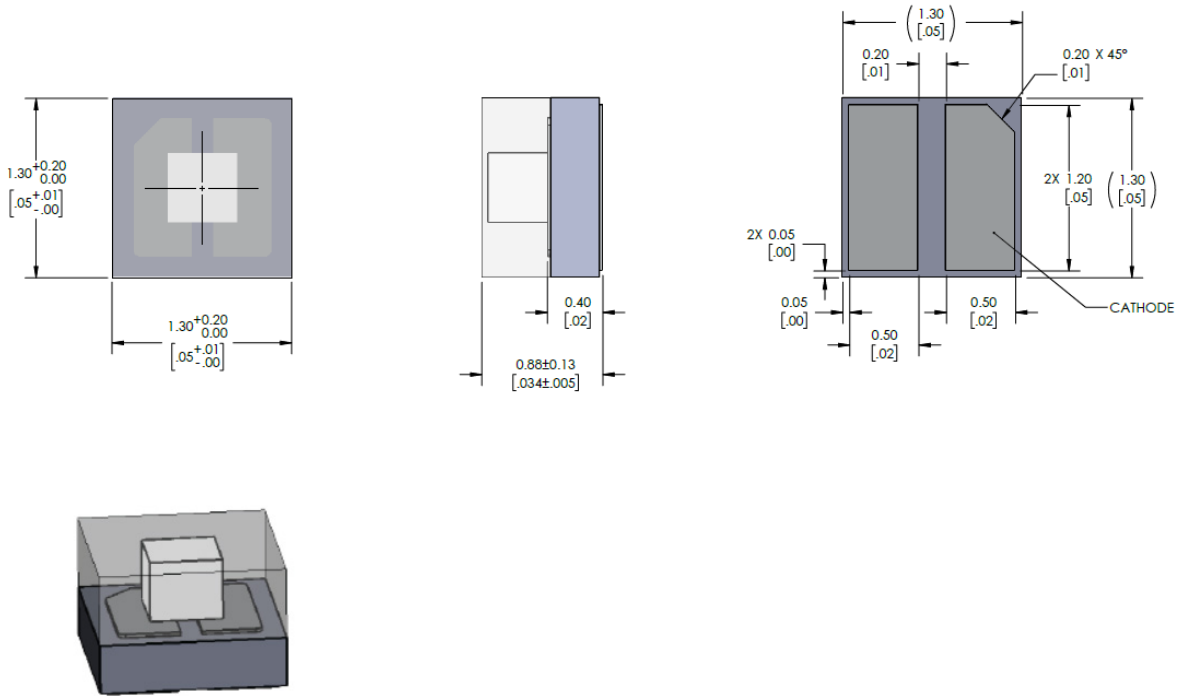


### Radiation Pattern

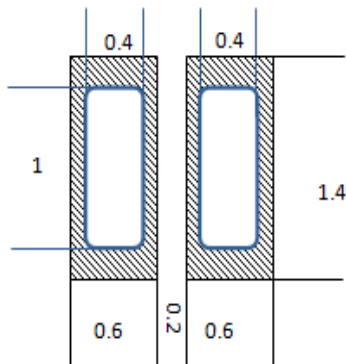


Note 1 : Typical spectrum at 20 mA drive current.

### Mechanical Dimensions



### Recommended Solder Pad & Stencil Pattern

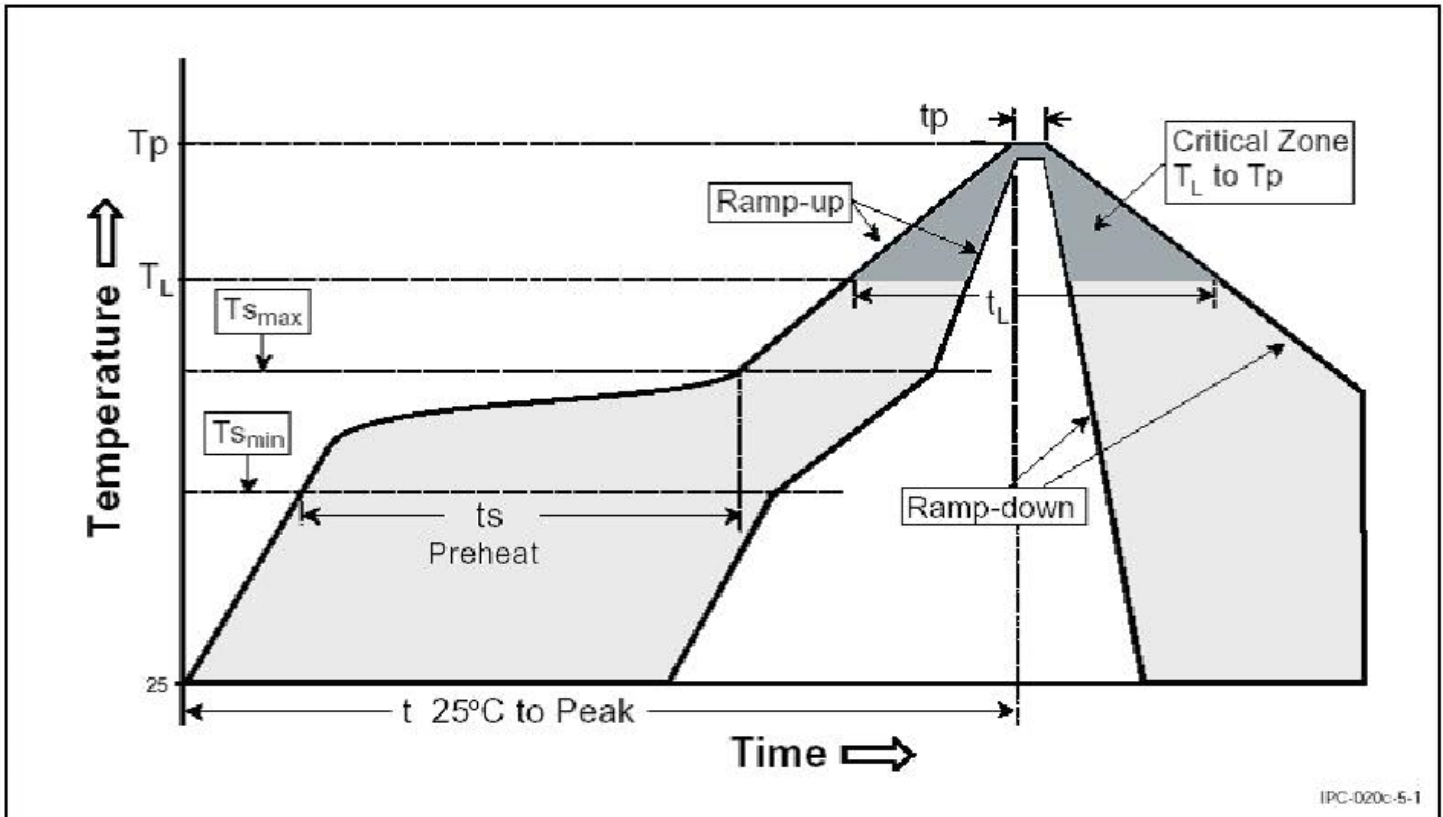


|                 |               |
|-----------------|---------------|
| Solder Pad      | 1.4mm x 0.6mm |
| Stencil Pattern | 1.0mm x 0.4mm |

### Soldering Profile

| Profile Setting                                 | Pb-Free Profile |
|---|-----------------|
| Average Ramp-up Rate ( $T_{s_{max}}, T_p$ )     | 1 °C/sec        |
| Preheat Temperature Min ( $T_{s_{min}}$ )       | 100-150 °C      |
| Preheat Temperature Max ( $T_{s_{max}}$ )       | 180-200 °C      |
| Preheat Time ( $t_{s_{min}}$ to $t_{s_{max}}$ ) | 60-120 sec      |
| Liquidus Temperature ( $T_L$ )                  | 217 °C          |
| Time Maintained Above $T_L$ ( $t_L$ )           | 50-80 sec       |
| Peak / Classification Temperature ( $T_p$ )     | 260 °C          |
| Time within 5°C of Actual Peak Temp ( $t_p$ )   | Max 10 sec      |
| Ramp-Down Rate                                  | 2-3 °C /sec     |
| 25°C to Peak Temperature time                   | 4 mins          |

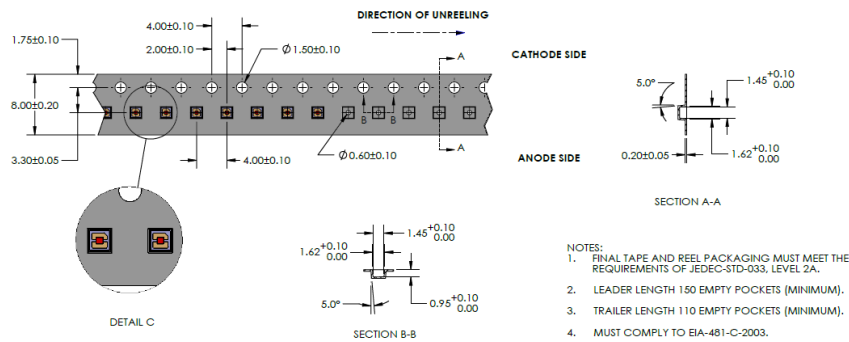
Luminus recommends that users follow the recommended soldering profile provided by the manufacturer of the solder paste used. Note that this general guideline may not apply to all PCB designs and configurations.



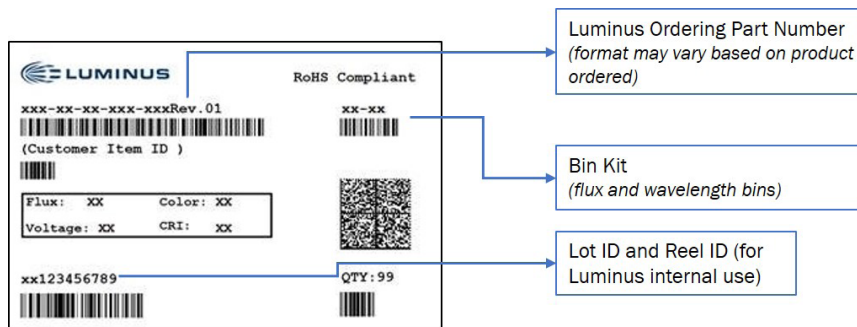


### Product Shipping & Labeling Information

All XBT-1313 products are packaged and labeled with their respective bin as outlined in the tables on pages 2 & 3. Each reel will only contain one flux and one wavelength bin



### XBT-1313-UV Label Information



## **Precautions for storage, handling and use of UV LED components**

### **1. UV Light**

XBT-1313-UV LEDs are short wavelength, deep UV LEDs. During operation, the LED emits high intensity UVC radiation, which is harmful to skin and eyes. UV light is also hazardous to skin and may cause cancer. Avoid exposure to deep UV light when LED is operational.

Precautions must be taken to avoid looking directly at the UV light without the use of UV light protective glasses. Do not look directly at the front or at the LED's lens when LED is operational.

### **2. Static Electricity (ESD)**

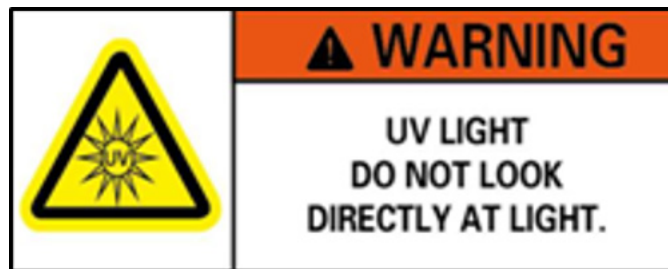
While XBT 1313 LEDs have built-in protection, they are sensitive to ESD (Electrostatic Discharge). Static electricity and surge voltages seriously damage UV LEDs and can result in complete failure of the device. Precautions must be taken against ESD when handling or operating these devices.

### **3. Operating Conditions**

In order to ensure the correct functioning of these LEDs, compliance to maximum allowed specifications is important. UV LEDs are particularly sensitive to drive currents that exceed the max operating specifications and may be damaged by such drive currents. The use of current regulated drive circuits is strongly recommended when operating these devices. Customers should also provide adequate thermal management to ensure LEDs do not exceed maximum recommended temperatures. Operating LEDs at temperatures in excess of specification will result in damage and possibly complete failure of the device.

### History of Changes

| Rev |            | Description of Change |
|-----|------------|-----------------------|
| 01  | 6/20/2019  | Initial Release       |
| 02  | 11/04/2019 | Tape and Reel drawing |



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