Crystal IS™
High Performance UVC LEDs

# Optan™ SMD
by Crystal IS

OPTAN SMD — UVC LEDS IN A SURFACE MOUNT PACKAGE WHICH OFFER SUPERIOR LIGHT OUTPUT, LONG LIFETIMES AND LOW POWER CONSUMPTION. AVAILABLE IN PEAK WAVELENGTHS OF 255 nm, 265 nm AND 275 nm, WITH OPTICAL LIGHT OUTPUTS FROM 2 mW TO GREATER THAN 8 mW, THESE LEDS ARE IDEAL FOR IMAGING, FLUORESCENCE SPECTROSCOPY, BIOFOULING CONTROL AND OTHER INSTRUMENTATION APPLICATIONS.

## Features

> WIDE RADIATION PATTERN WITH A VIEWING ANGLE OF 100°
> MAXIMUM DRIVE CURRENT OF 300 mA IN CONTINUOUS MODE
> PEAK WAVELENGTH BINS: 255 nm, 265 nm, 275 nm
> AVAILABLE IN LIGHT OUTPUT BINS FROM 2 mW TO > 8 mW
> TYPICAL L50 OF 3000 HOURS AT 100 mA
> NON-HERMETIC, SURFACE-MOUNT DESIGN
> RoHS-COMPLIANT

## Benefits

> AMENABLE FOR TRADITIONAL SURFACE MOUNT ASSEMBLY METHODS
> OPTIMIZED FOR HIGHER TOTAL LIGHT OUTPUT
> ADVANTAGEOUS PERFORMANCE FOR PRICE
> SUPERIOR LIGHT OUTPUT (mW) AT HIGHER DRIVE CURRENT
> HIGH CURRENT PACKAGE

## Product Nomenclature

Optan SMD is binned by wavelength and total optical power output.

| Part Number[1] | Peak Wavelength | | | Optical Output at 100 mA[2] | |
|---|---|---|---|---|---|
| | Min | Typical | Max | Min | Max |
| OPTAN-255N-SMD | 250 nm | 255 nm | 260 nm | 2 mW | 4 mW |
| OPTAN-255P-SMD | 250 nm | 255 nm | 260 nm | 4 mW | 6 mW |
| OPTAN-265N-SMD | 260 nm | 265 nm | 270 nm | 2 mW | 4 mW |
| OPTAN-265P-SMD | 260 nm | 265 nm | 270 nm | 4 mW | 6 mW |
| OPTAN-265Q-SMD | 260 nm | 265 nm | 270 nm | 6 mW | 8 mW |
| OPTAN-265R-SMD | 260 nm | 265 nm | 270 nm | 8 mW | |
| OPTAN-275N-SMD | 270 nm | 275 nm | 280 nm | 2 mW | 4 mW |
| OPTAN-275P-SMD | 270 nm | 275 nm | 280 nm | 4 mW | 6 mW |
| OPTAN-275Q-SMD | 270 nm | 275 nm | 280 nm | 6 mW | 8 mW |
| OPTAN-275R-SMD | 270 nm | 275 nm | 280 nm | 8 mW | |

*Notes:*

*1. LEDs are produced with semiconductor technology that is subject to process variation, yielding a range of flux performance that is approximately Gaussian in nature. To provide customers with fine granularity within the overall flux distribution, Crystal IS separates LEDs into optical power bins.*

*2. Output power is measured using a 100 mA current pulse of < 1s duration at an ambient temperature of 25 °C ± 5 °C with the diode inserted into an integrating sphere.*

## LED Characteristics

| Characteristic | Unit | Min | Typical | Max |
|---|---|---|---|---|
| **Viewing angle[1]** | degrees | | 100 | |
| **Forward voltage at 100 mA[2]** | V | | | 10 |
| **Lifetime, L50 at 100 mA** | hours | | 3000 | |
| **Thermal resistance, junction-to-case** | °C/W | | 12 | |
| **Power dissipation at 100 mA** | W | | | 1 |

*Notes:*

*1. Viewing angle is twice of half-value angle. A half-value angle is the angle between axial direction and direction in which the light intensity value is half of the axial intensity.*

*2. Voltage tolerance is ± 5 %.*

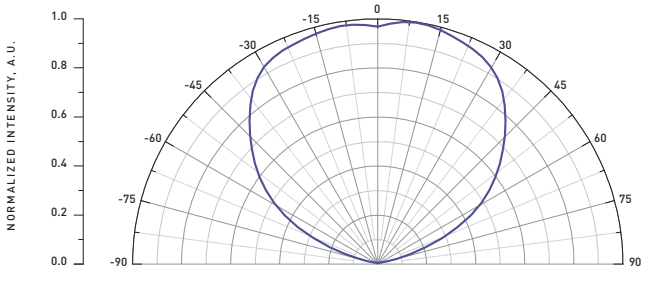
## Absolute Maximum Ratings

| | Unit | Min | Max |
|---|---|---|---|
| **Forward current** | mA | | 300 |
| **Reverse voltage** | V | | -5 |
| **Operating temperature range** | °C | -10 | 55 |
| **Storage temperature** | °C | -40 | 100 |
| **Junction temperature** | °C | | 100 |

## Typical Radiation Pattern

Optan SMD LEDs have a nominal viewing angle of 100°.

RADIATION PATTERN

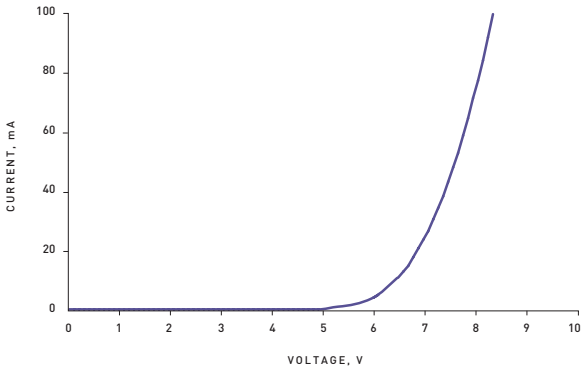



*Test Conditions: I (CW) = 100 mA*
*CW = Continuous Wave Mode*

## Typical Electrical Characteristics

The typical forward voltage is less than 10 V at an operating current of 100 mA.

ELECTRICAL CHARACTERISTICS

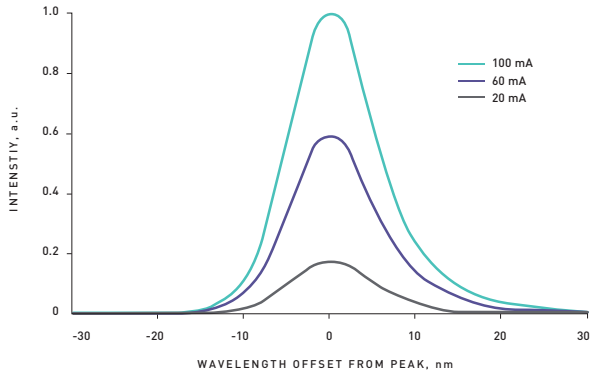



*Test Conditions: I (CW) = 1 mA to 100 mA; Case Temperature ($T_C$) = 25 °C*

## Typical Spectral Characteristics Over Current

The plot below shows the stability of the peak wavelength with various applied currents. No shift is typically observed in the peak wavelength with change in drive current from 20 mA to 100 mA.

SPECTRUM OVER CURRENT

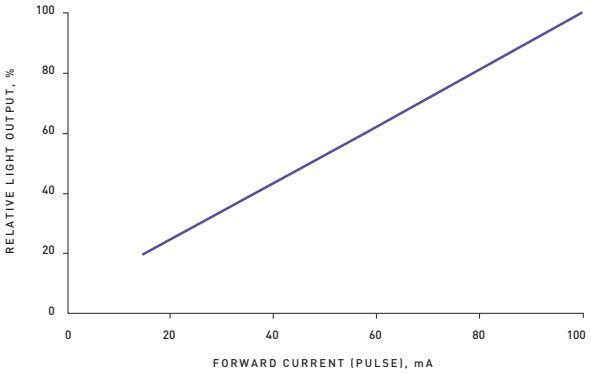



*Test Conditions: Case Temperature ($T_C$) = 25 °C*

## Typical Light Output Characteristics Over Current

The plot below shows the typical variation in light output with forward current. The light output data is normalized to the light output at 100 mA.

LIGHT OUTPUT OVER CURRENT

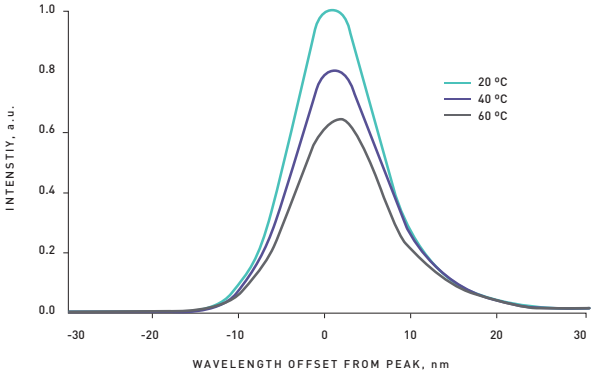



*Test Conditions: Case Temperature ($T_C$) = 25 °C*

## Typical Spectral Characteristics Over Temperature

The plot below illustrates the stability of the spectral characteristics with change in case temperature.

SPECTRUM OVER TEMPERATURE

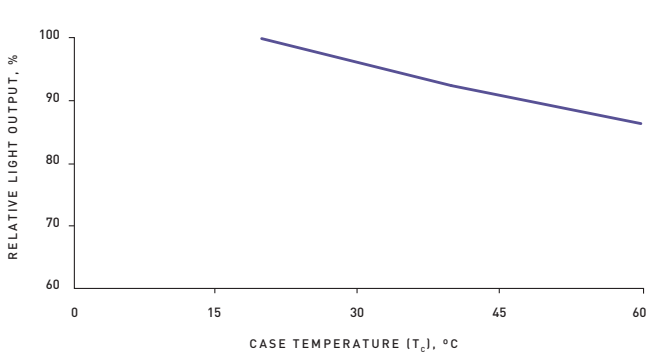



*Test Conditions: I (CW) = 100 mA*

## Typical Light Output Characteristics Over Temperature

Output power is sensitive to case temperature, so proper thermal management techniques are suggested to control case temperature.

LIGHT OUTPUT OVER TEMPERATURE

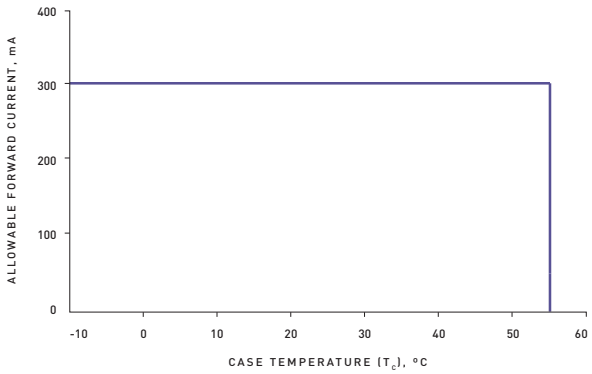



*Test Conditions: I (CW) = 100 mA*

## Reccommended Operation

Crystal IS LEDs should be operated at currents below 300 mA and mounted on a heat sink to keep the case temperature below 55 °C. Please refer to the Crystal IS thermal management note AN007 for heat sink recommendations. Circuits should be designed for constant current.

### CURRENT DERATING CURVE




*Test Conditions: CW*

## Recommended Soldering Guidelines

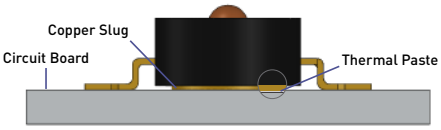
**1.** The tip of the soldering iron should never touch the lens.

**2.** Hand soldering is recommended: 300 °C maximum (temperature of soldering iron tip), 3 seconds maximum (one time only).

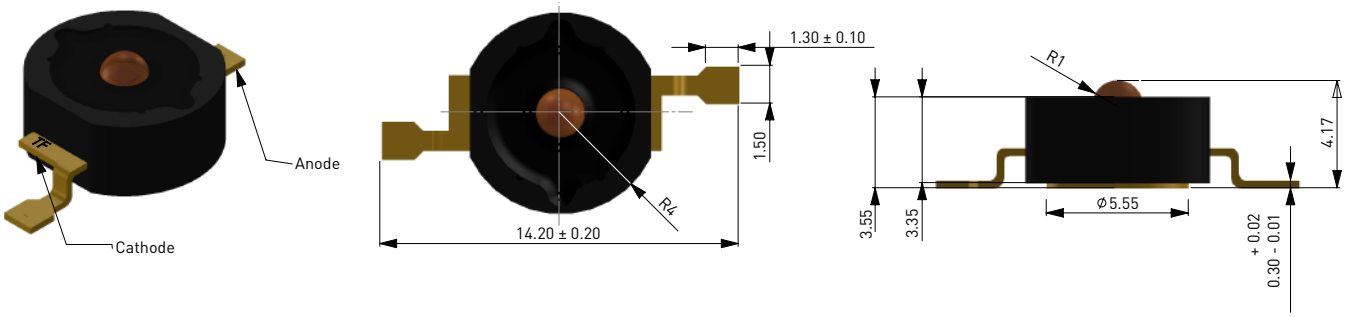
**3.** Recommended soldering pattern is illustrated in Figure 1. In addition, ensure that the central copper slug is thermally connected to the board with thermal paste or grease. A heat sink may be required to maintain the LED at the desired case temperature. Please refer to the Crystal IS thermal management note AN007 for heat sink recommendations.

**4.** After soldering, avoid applying external force, stress, and excessive vibration until the product has returned to ambient temperature.

### FIGURE 1




## Mechanical Dimensions




*All dimensions are in millimeters. Unless noted otherwise, all dimensions have a tolerance of ± 0.05 mm.*

## Handling Precautions

LEDs are sensitive to static electricity. When handling, proper ESD protection is required, including:

- Eliminating static charge
- Using grounded wriststrap, ESD footwear, clothes, and floors
- Grounded workstation and tools


## Eye Safety Guidelines

During operation, the LED emits high intensity ultraviolet (UV) light, which is harmful to skin and eyes. UV light is hazardous to skin and may cause cancer. Avoid exposure to 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 of the LED or at the LED's lens when LED is operational.

Attach the following warning labels on products/systems that use UV LEDs.


## RoHS Compliance

The levels of environmentally sensitive, persistent biologically toxic (PBT), persistent organic pollutants (POP), or otherwise 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 Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS), as adopted by EU member states on January 2, 2013.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## We invite you to learn more about our UVC LEDs.

Crystal IS™
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