

Klaran™

by Crystal IS

CRYSTAL IS MANUFACTURES LIGHT EMITTING DIODES (LEDS) THAT EMIT UVC RADIATION IN THE WAVELENGTH RANGE FROM 250 NM – 280 NM. KLARAN LEDS ARE USED IN DISINFECTION APPLICATIONS FOR AIR, WATER AND SURFACES. THE DESIGN FLEXIBILITY PROVIDED BY KLARAN LEDS MAKES THEM AN ATTRACTIVE SOLUTION FOR INNOVATIVE NEW PRODUCTS IN HEALTHCARE, CONSUMER, INDUSTRIAL, FOOD AND BEVERAGE, AND TRANSPORTATION INDUSTRIES.

Features

- > DELIVERS EFFECTIVE DEEP UV (UVC) GERMICIDAL RADIATION
- > VIEWING ANGLE OF 105 DEGREES
- > INSTANT ON/OFF
- > RoHS-COMPLIANT AND MERCURY-FREE

Benefits

- > COMPACT SIZE ENABLES INNOVATIVE PRODUCT CONFIGURATIONS
- > ROBUST, RUGGED DESIGN FOR PORTABLE APPLICATIONS
- > FLEXIBLE FOR ON-DEMAND OPERATION USING LOW ENERGY DC POWER SOURCES
- > SAFE DISPOSAL—NO SPECIAL HANDLING
- > PRECISE DISINFECTION DELIVERY



Product Nomenclature

Klaran LEDs are binned by germicidal power output (P₀).

Part Number	Peak Wavelength	Germicidal output at 400 mA ¹	
		Min	Max
KLARAN-GER-P-S01	250 nm – 280 nm	15 mW	20 mW
KLARAN-GER-Q-S01	250 nm – 280 nm	20 mW	25 mW
KLARAN-GER-R-S01	250 nm – 280 nm	25 mW	30 mW

Notes:

1. Output power is defined as P₀ [see explanation in "Definition of P₀" for more information].



LED Characteristics

Characteristic	Unit	Typical	Max
Viewing angle ¹	degrees	105	
Forward voltage at 400 mA at T _s 35 °C ²	V	8.45	10
Thermal resistance, junction-to-case at T _s 35 °C	°C/W	10	
Power dissipation at 400 mA at T _s 35 °C	W	3.4	4

Notes:

- 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.
- T_s is defined as the temperature at the solder point. See Crystal IS AN010 for more information

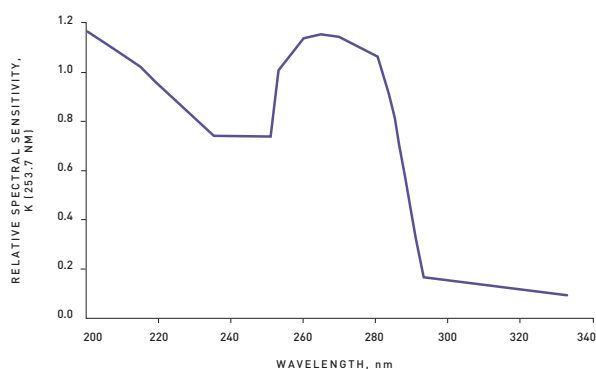
Absolute Maximum Ratings

	Unit	Min	Max
Forward current	mA	40	400
Reverse voltage	V		-5
Operating temperature range	°C	-10	55
Storage temperature	°C	-40	100
Junction temperature	°C		85

Definition of P₀

P₀ is defined by an integration of the measured LED emission multiplied by the ÖNORM standard spectra of *B. subtilis*. Crystal IS application note AN005 provides more information on this specification.

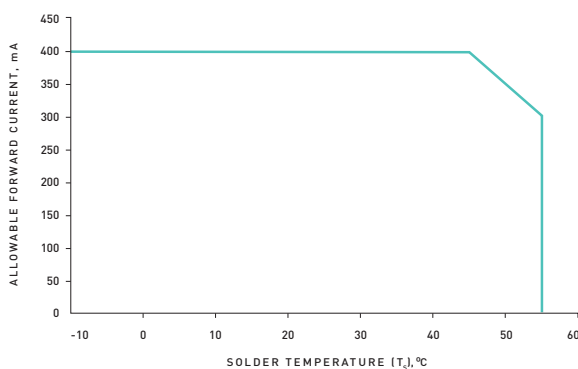
SPECTRA FOR ÖNORM



Safe Operating Area

The plot below represents the safe operating area for Klaran LEDs. Circuits should be designed for constant current. Please refer to the Crystal IS thermal management note AN010 for heat sink recommendations.

SAFE OPERATING AREA

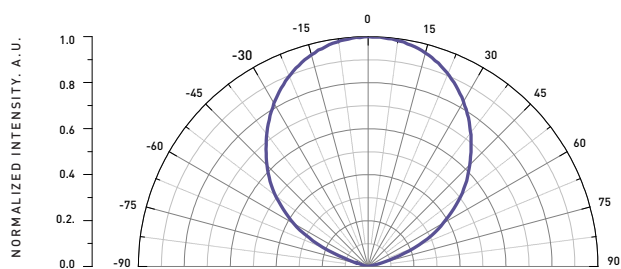




Typical Radiation Pattern

Klaran LEDs have a nominal viewing angle of 105°.

TYPICAL RADIATION PATTERN

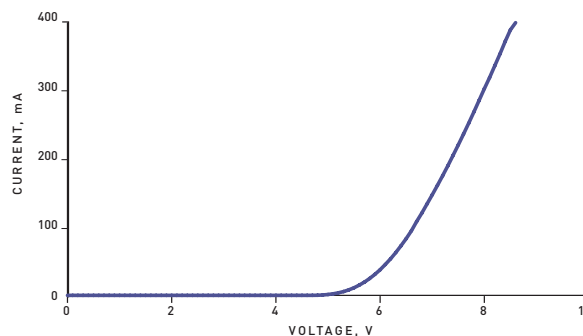


Test Conditions: $I(CW) = 100\text{ mA}$
 CW = Continuous Wave Mode

Typical Electrical Characteristics

The typical forward voltage is less than 10 V at an operating current of 400 mA.

ELECTRICAL CHARACTERISTICS

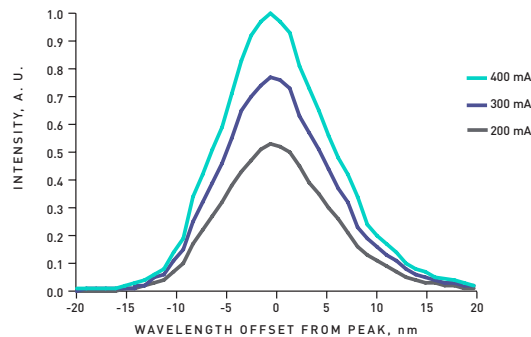


Test Conditions: Solder temperature $[T_s] = 35\text{ °C}$
 Pulse mode operation from 1 mA to 400 mA

Typical Spectral Characteristics Over Current

The plot below shows the typical spectral emission curve for Klaran LEDs.

SPECTRUM OVER CURRENT

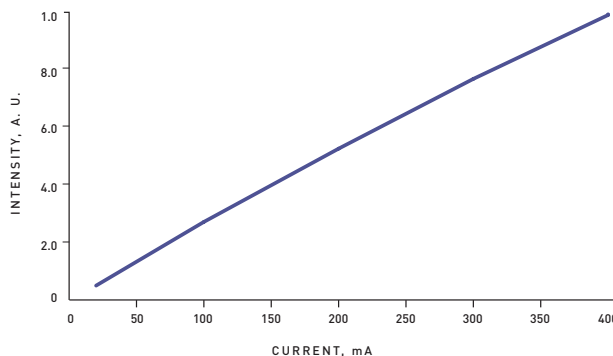


Test Conditions: Solder temperature $[T_s] = 35\text{ °C}$
 Pulse mode operation

Typical Light Output Characteristics Over Current

The plot below shows the typical variation in light output with forward current.

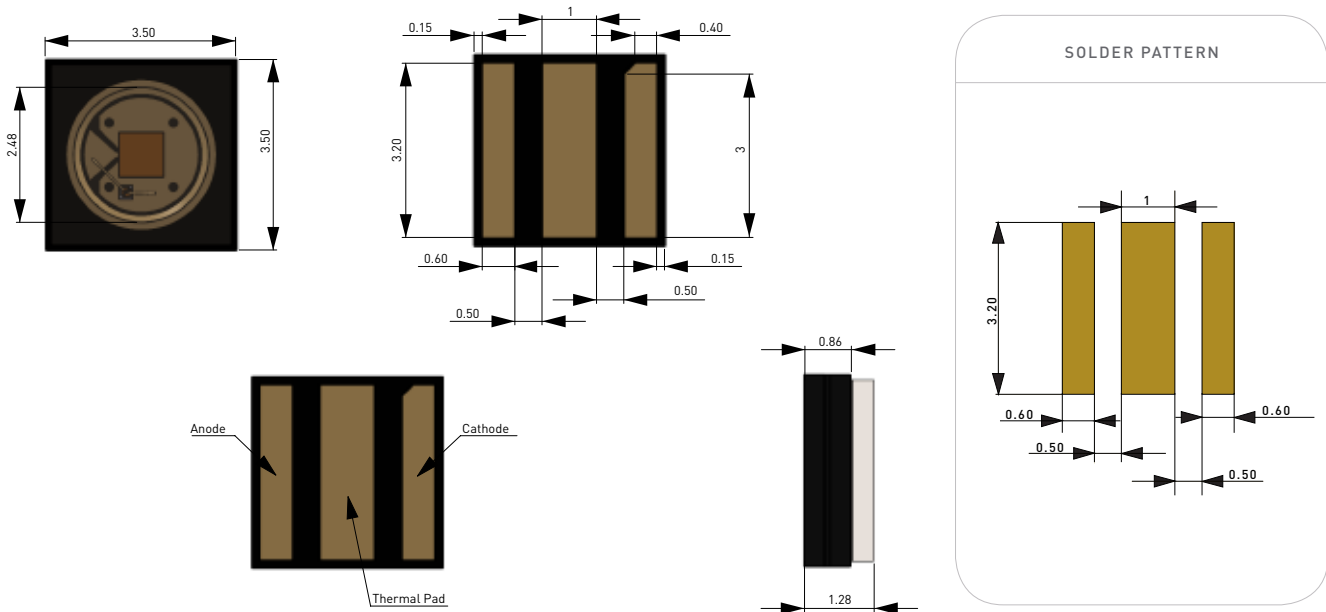
LIGHT OUTPUT OVER CURRENT



Test Conditions: Solder temperature $[T_s] = 35\text{ °C}$
 Pulse mode operation



Mechanical Dimensions

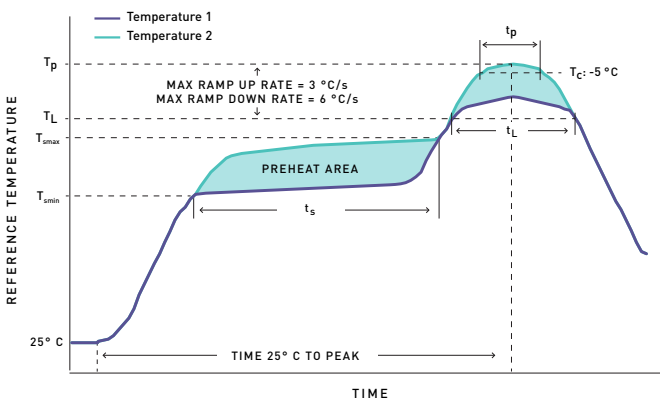


All dimensions are in millimeters. Unless noted otherwise, all dimensions have a tolerance of ± 0.05 mm.

Recommended Soldering Guidelines

The recommended solder reflow profile for Klaran UVC LEDs follows the JEDEC standard J-STD-020D. Hand soldering is not recommended for these devices.

FIGURE 1



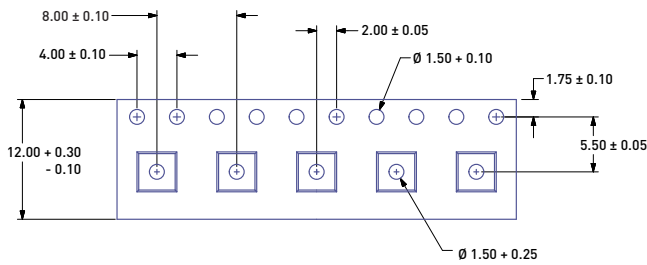
Profile Feature	Pb-Free Assembly
PREHEAT/SOAK	
> Temperature Min (T_{smin})	150 °C
> Temperature Max (T_{smax})	200 °C
> Maximum Time (t_s) from T_{smin} to T_{smax}	60-120 seconds
Ramp-up rate (T_L to T_p)	3 °C/second max.
Liquidous Temperature (T_L)	217 °C
Time (t_L) maintained above T_L	60-150 seconds
Maximum peak package body temperature (T_p)	260 °C
Time (t_p) within 5 °C of the specified temperature (T_c)	30 seconds
Ramp-down rate (T_p to T_L)	6 °C/second max.
Maximum Time 25 °C to peak temperature	8 minutes max.



Reel Packaging Specification

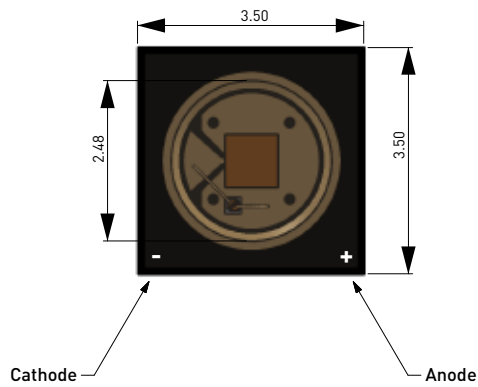
Klaran UVC LEDs are packed in tape and reel for machine manufacturing.

TAPE DIMENSIONS



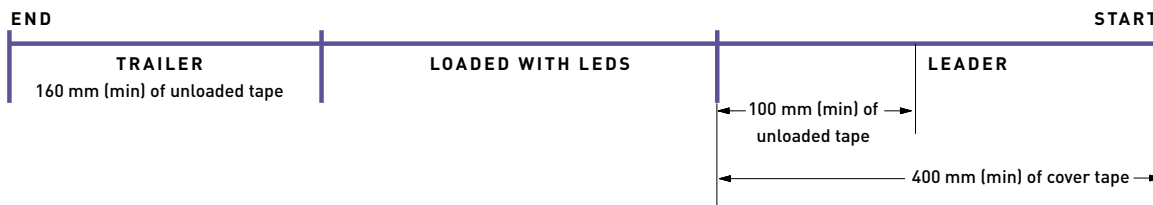
All measurements are in millimeters (mm).

LED POSITION IN TAPE



Devices are placed with the cathode to the left so the polarity direction is cathode to anode.

REEL INFORMATION



Each reel includes a leader and trailer section that is not loaded with LEDs.

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.



We invite you to learn more about our UVC LEDs.



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