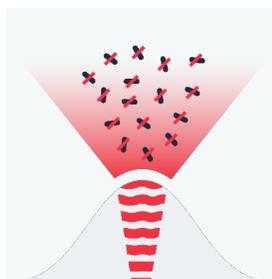




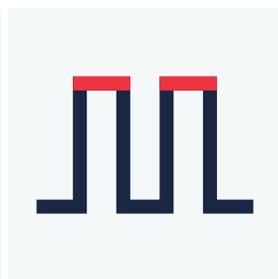
## Klaran® LA Series UVC LEDs

Klaran LA Series UVC LEDs are compact and cost effective UVC emitters that enable long life water, air, and surface disinfection systems. Achieving high intensity output at the most effective wavelengths for disinfection, a single Klaran LA UVC LED can provide on-demand disinfection directly into your products.



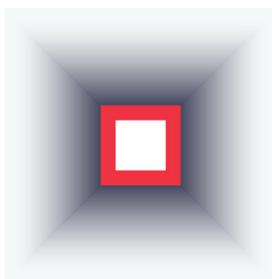
### 260 NM TO 270 NM: MOST EFFECTIVE FOR DISINFECTION

Klaran LA's 260 nm to 270 nm wavelength range for disinfection assures that products built with Klaran LEDs require less total UVC power to achieve product performance certification than UV LEDs with peak wavelengths greater than 270 nm or mercury lamps at 254 nm.



### ON DEMAND PERFORMANCE: GET LONGER LIFE DISINFECTION

Compared to UV lamps, which are constantly operating and require annual replacement, UVC LEDs are on only when disinfection is needed. This conserves UVC LED lifetime and helps extend disinfection maintenance cycles to many years.



### HIGHEST INTENSITY AND EASY INTEGRATION

The high etendue Aluminum Nitride die eliminates the need for an expensive and bulky sealed quartz package allowing the highest intensity operation in a compact low cost package.



### PREDICTABLE SERVICE LIFE: PERFORMANCE YOU CAN COUNT ON

Robustly characterized, Klaran LA UVC LEDs provide confidence that your disinfection solution perform reliably for its design lifetime.



### LOW COST DISINFECTION

Klaran LA Series LEDs are produced from Crystal IS' proprietary Aluminum Nitride substrates which support high yields of UVC LEDs for cost effective solutions.

#### Safety Notice

Product provides or uses ultraviolet light from a LED at specific light output levels. Buyer expressly acknowledges that, depending on wavelength and exposure time, light in this spectrum can have a harmful effect on, among other things, the eyes and skin of an unprotected individual, and must be used with caution. It is the Buyer's responsibility to provide notice that UV light is present where the Product is in use and ensure that product label and labeling effectively communicates the proper and safe use of the product. Buyer assumes full responsibility to become educated in and to protect from harmful irradiation, and agrees to indemnify Seller against all claims, suits, complaints or other disputes related to the presence of UV light that is alleged to originate with Product.



## Product Nomenclature

Klaran LEDs are binned by peak wavelength and total power output ( $P_t$ ).

Part Number	Peak Wavelength	Total Optical Power Output at 500 mA <sup>1</sup>	
		Unit	Min
KL265-50W-SM-LA	260 nm - 270 nm	mW	80
KL265-50V-SM-LA	260 nm - 270 nm	mW	70
KL265-50U-SM-LA	260 nm - 270 nm	mW	60

### NOTES:

1. Optical Power Output Tolerance of +/- 8% (Tested at 500mA and 25°C Ambient Temperature)

## LED Characteristics

Characteristic	Symbol	Unit	Min	Typical	Max
Peak Wavelength <sup>1</sup>	$\lambda_P$	nm	260		270
Forward voltage at 500 mA	$V_f$	V	5.0	6.5	8.0
Thermal resistance, junction-to-solder point <sup>2</sup>	$R_{th}$	°C/W		7.0	
Power dissipation at 500 mA	$W$	W			4
Viewing angle <sup>3</sup>	$\theta$	degrees		130	

### NOTES:

1. Peak Wavelength Tolerance of +/- 1.8nm

2. Power Dissipation, is calculated as  $W = I_f \times V_f$

3. Viewing Angle: Angle of which the output intensity is at least half the peak output. The intensity is measured over a 180-degree arc passing through the line perpendicular to/and above the center of the device itself.

## Absolute Maximum Ratings

Characteristic	Symbol	Unit	Min	Typical	Max
Forward current (continuous)	$I_f$	mA	100	500	700
Reverse voltage	$V_r$	V			-5
Operating case temperature range @500mA	$T_s$	°C	-40		85
Storage temperature	$T_{stg}$	°C	-40		100
Junction temperature	$T_j$	°C			115

### NOTES:

1. Solder Point temperature is defined by temperature observed at the Thermal Plate.

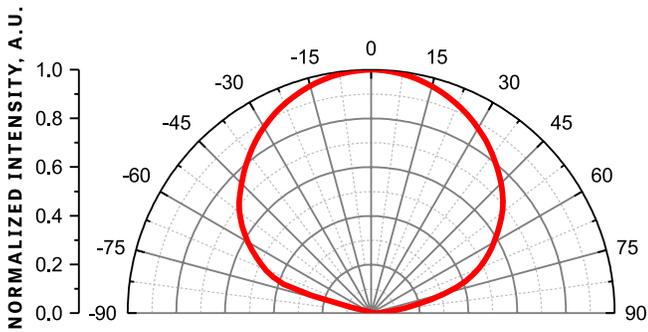
2. Junction temperature:  $T_j = T_s + R_{th} \times W$  ( $T_s$ : Temperature of solder point)

**Klaran LA Series UVC LEDs**

**Typical Radiation Pattern**

Klaran LA LEDs have a nominal viewing angle of 130°.

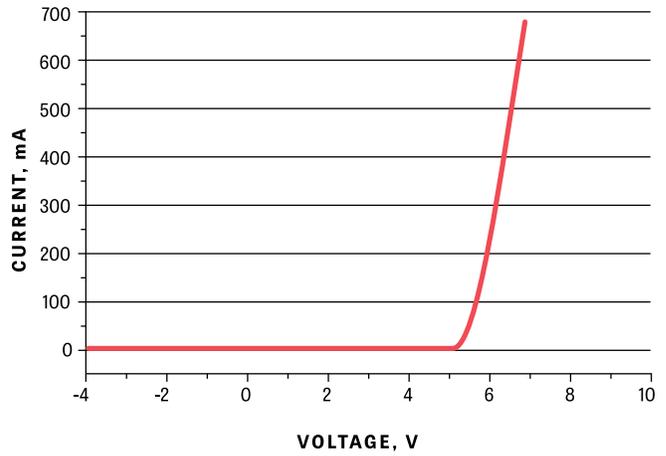
**TYPICAL RADIATION PATTERN**



Test Conditions:  $I_f = 100 \text{ mA}$ ,  $T_A = 25^\circ\text{C}$

**Typical Electrical Characteristics**

**ELECTRICAL CHARACTERISTICS**

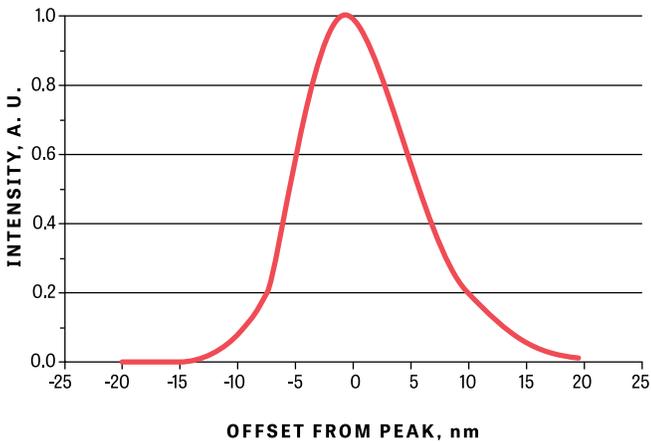


Test Conditions:  $T_A = 25^\circ\text{C}$

**Typical Spectral Characteristics**

The plot below shows the stability of the peak wavelength at 500 mA.

**WAVELENGTH SPECTRA**

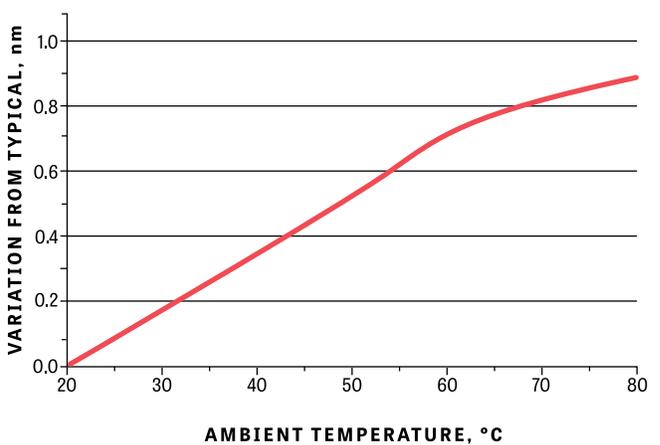


Test Conditions: Ambient Temperature ( $T_A$ ) =  $25^\circ\text{C}$

**Wavelength Shift with Temperature**

Stability of wavelength characteristics over temperature.

**WAVELENGTH SHIFT WITH TEMPERATURE**



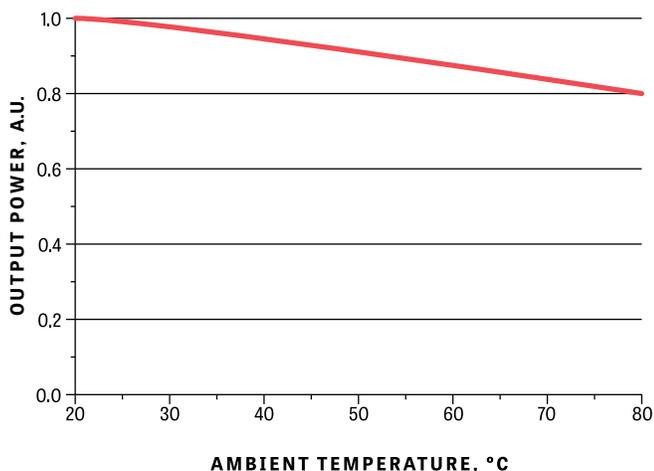
Test Conditions:  $I_f = 500 \text{ mA}$

**Klaran LA Series UVC LEDs**

**Thermal Derating**

Output power is very sensitive to junction temperature, which is affected by both ambient temperature and the use of proper thermal management techniques. Lower junction temperatures will ensure the optimal performance and lifetime of the LED. The plot below shows the change in optical power with increase in ambient temperature while employing effective thermal management.

**OUTPUT POWER OVER TEMPERATURE**

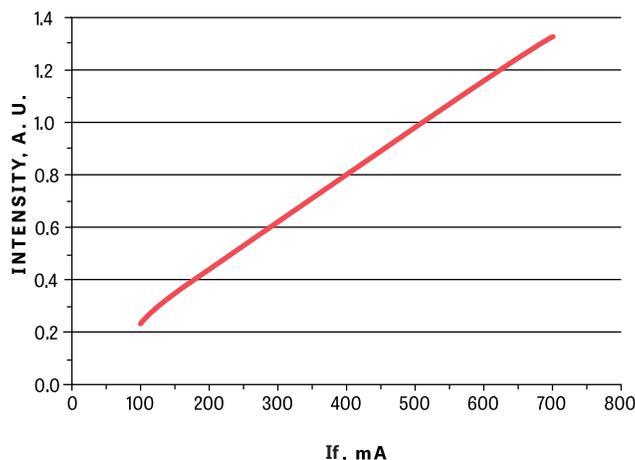


Test Conditions:  $I_f = 500 \text{ mA}$

**Typical Power Output Characteristics vs. 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 500 mA.

**LIGHT OUTPUT OVER CURRENT**

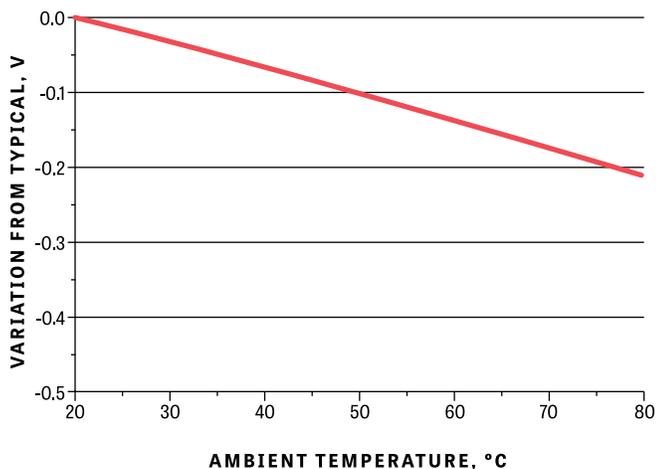


Test Conditions: Ambient Temperature ( $T_A$ ) = 25°C

**Voltage Shift with Temperature**

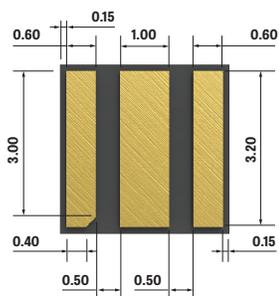
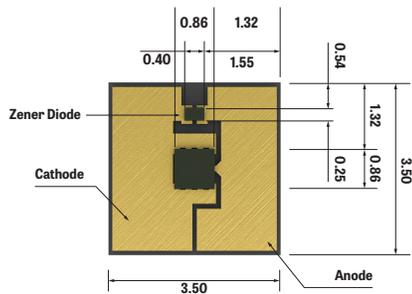
Stability of voltage characteristics over temperature.

**VOLTAGE SHIFT WITH TEMPERATURE**

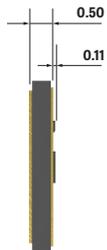
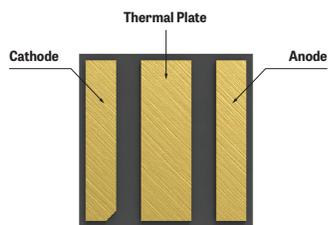
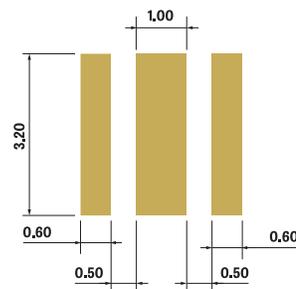


Test Conditions:  $I_f = 500 \text{ mA}$

## Mechanical Dimensions



### SOLDER PATTERN



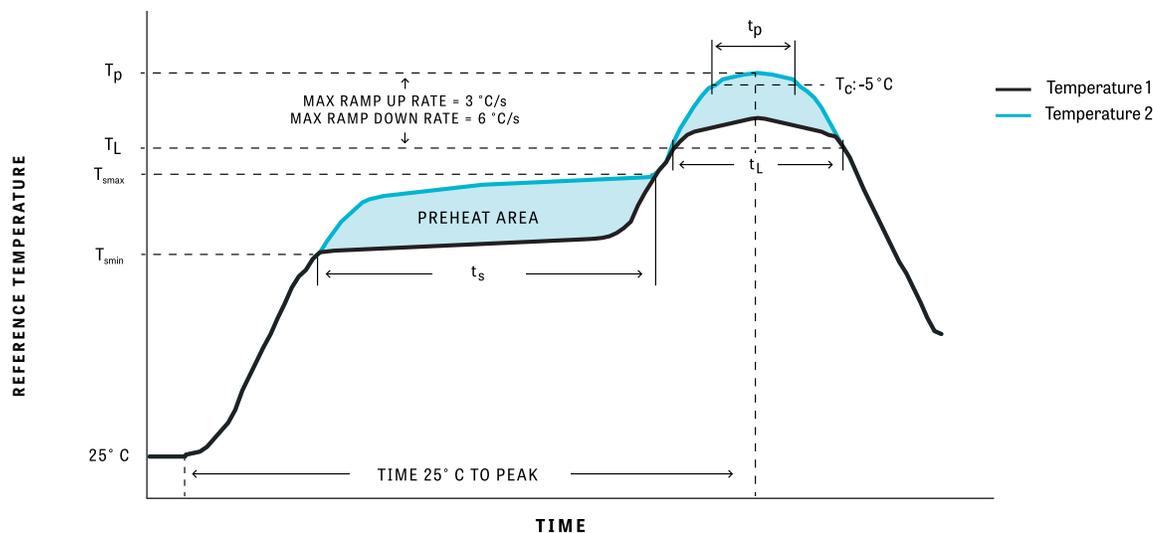
\*All dimensions are in millimeters. Unless noted otherwise, all dimensions have a tolerance of  $\pm 0.05$  mm.

## 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



## Guidelines

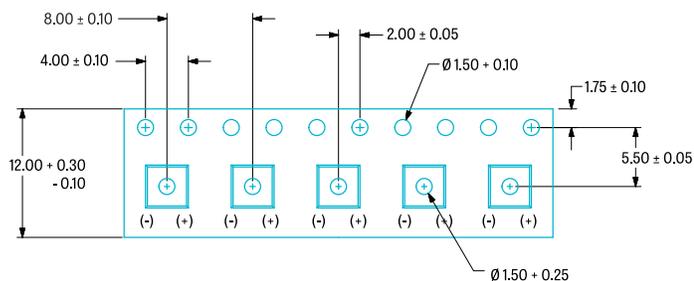
Profile Feature	Pb-Free Assembly
<b>Preheat/Soak</b>	
> Temperature Min ( $T_{smin}$ )	150 °C
> Temperature Max ( $T_{smax}$ )	200 °C
> Maximum Time ( $t_s$ ) from $T_{smin}$ to $T_{smax}$	60-120 seconds
Ramp-up rate ( $T_L$ to $T_p$ )	3 °C/second max.
Liquidous Temperature ( $T_L$ )	217 °C
Time ( $t_L$ ) 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

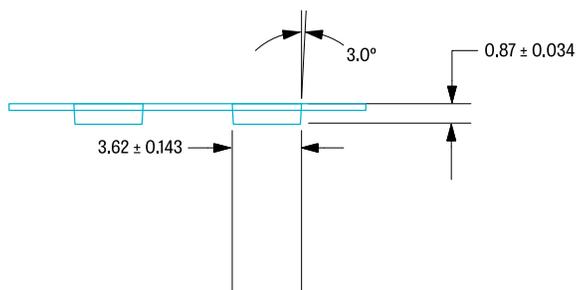
Klaran LA is packaged in tape and reel in quantities of 1000 for machine manufacturing.

### TAPE DIMENSIONS

#### Top View

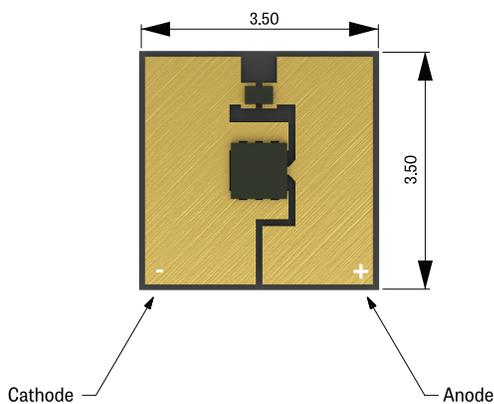


#### Side View



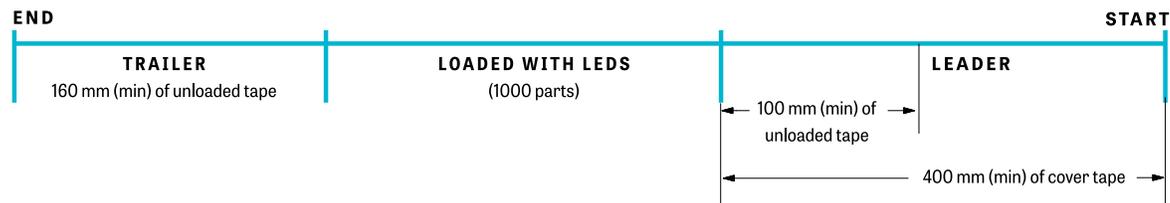
\*All dimensions are in millimeters (mm).

### 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 ESD (electrostatic discharge) sensitive; static electricity and surge voltages seriously damage UV LEDs and can result in product failure
  - Ensure that tools, jigs and machines being used are properly grounded
  - LED mounting equipment should include protection against voltage surge
  - Use proper ESD protection, including grounded wrist straps, ESD footwear and clothes
- The UVC LED is not protected by a lens and requires careful handling
  - Do not handle the LED with bare hands as it may contaminate the LED surface and affect the optical characteristics.
  - Avoid touching the LED die
- Do not use adhesives that outgas organic vapor
- Dropping the product may cause damage
- If handling the product with tweezers, use only the side of the package and be careful not to apply excessive force
- When populating boards in SMT production avoid excessive mechanical pressure on the product
- Pick and place nozzles must not impinge on the product die or zener diode
- Verify the PCB with the product before use
- PCB warpage after mounting products onto a PCB can cause the package to break.
  - LEDs should be placed in a way to minimize stress on the LED due to board flexing
  - Soldering should be done as soon as possible after opening the moisture-proof bag.
  - Do not rapidly cool device after soldering.
  - Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.

## Storage Precautions

- Product complies with JEDEC MSL1 or equivalent and is shipped in a moisture proof package (with silica desiccant). See IPC/JEDEC STD-020 for moisture sensitivity details.
- Product should be stored in a controlled dust-free environment < 30 °C
- Soldering should be performed as soon as possible after opening the moisture-proof package.
- Unused LEDs should be stored with silica-gel desiccants in a hermetically sealed container.
  - LEDs stored for extended periods may need to be baked prior to soldering

## 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 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 2015/863 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).

## Safety Notice

Product provides or uses ultraviolet light from a LED at specific light output levels. Buyer expressly acknowledges that, depending on wavelength and exposure time, light in this spectrum can have a harmful effect on, among other things, the eyes and skin of an unprotected individual, and must be used with caution. It is the Buyer's responsibility to provide notice that UV light is present where the Product is in use and ensure that product label and labeling effectively communicates the proper and safe use of the product. Buyer assumes full responsibility to become educated in and to protect from harmful irradiation, and agrees to indemnify Seller against all claims, suits, complaints or other disputes related to the presence of UV light that is alleged to originate with Product.

## Disclaimer

The specifications, characteristics, and technical data presented in this datasheet are subject to change without prior notice. It is recommended that the most updated specifications, characteristics, and technical data be used in your application.

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WE INVITE YOU TO LEARN MORE ABOUT OUR UVC LEDs.



**Crystal IS, Inc., an Asahi Kasei Company**

70 Cohoes Avenue, Green Island, NY 12183

518.271.7375 | [www.cisuvc.com](http://www.cisuvc.com) | [sales@cisuvc.com](mailto:sales@cisuvc.com)

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