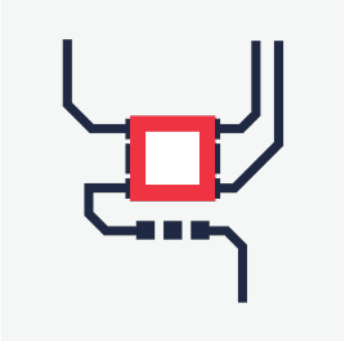
Klaran® WD Series UVC LEDs

HIGH INTENSITY UNOBSTRUCTED LED DIE

Achieves up to 10X more efficient UVC output per unit area than UV mercury lamps allowing compact and powerful water reactor chambers.

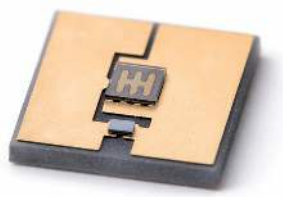
MAINTENANCE-FREE DISINFECTION

Provides consistent, reliable, on-demand disinfection performance for the lifetime of most consumer point-of-use water systems.



CONSUMER ELECTRONICS READY

Low voltage DC operation and no ballast requirements enables direct power circuit integration.



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
		Min
KL265-50S-SM-WD	260 nm - 275 nm	40 mW
KL265-50T-SM-WD	260 nm - 275 nm	50 mW
KL265-50U-SM-WD	260 nm - 275 nm	60 mW

LED Characteristics

Characteristic	Unit	Min	Typical	Max
Viewing angle[1]	degrees		130	
Forward voltage at 500 mA	V	6.5		9
Thermal resistance, junction-to-case	°C/W		7.0	
Power dissipation at 500 mA	W		4.0	4.5

NOTES:

1. Viewing angle is the angle over which the output intensity is at least half the peak output intensity (FWHM). The intensity is measured over the 180-degree arc passing through the line perpendicular to and directly above the center of the device.

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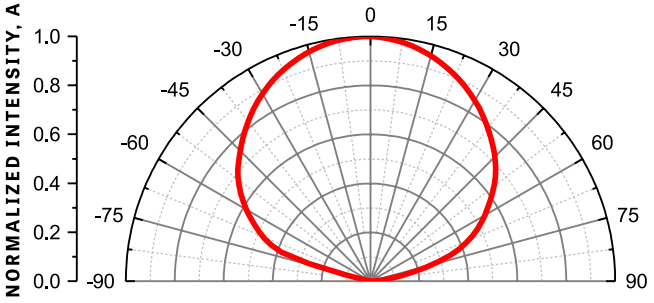
Absolute Maximum Ratings

Characteristic	Unit	Min	Typical	Max
Forward current (continuous)	mA	100	500	700
Reverse voltage	V			-5
Operating case temperature range @500mA	°C	-10		80
Storage temperature	°C	-40		100
Junction temperature	°C			115

Typical Radiation Pattern

Klaran WD LEDs have a nominal viewing angle of 130˚

TYPICAL RADIATION PATTERN

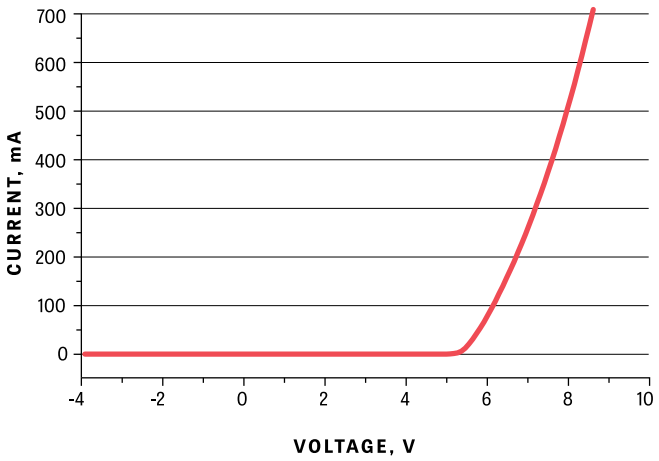


Test Conditions: I (CW) = 100 mA
CW = Continuous Wave Mode

Typical Electrical Characteristics

The typical forward voltage is less than 8.8 V at an operating current of 500 mA.

ELECTRICAL CHARACTERISTICS

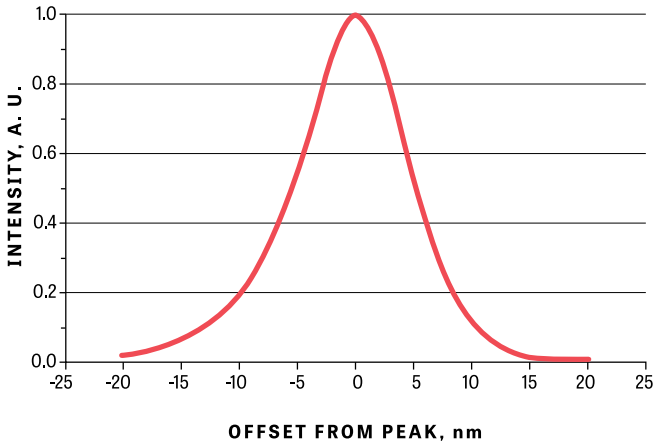


Test Conditions: Ambient Temperature (T_A) = 25 °C
Electrical sweep from -5 V to 15 V at 700 mA

Typical Spectral Characteristics Over Current

The plot below shows the stability of the peak wavelength at 500 mA. No shift is typically observed in the peak wavelength with change in drive current from 100 mA to 700 mA.

SPECTRUM OVER CURRENT

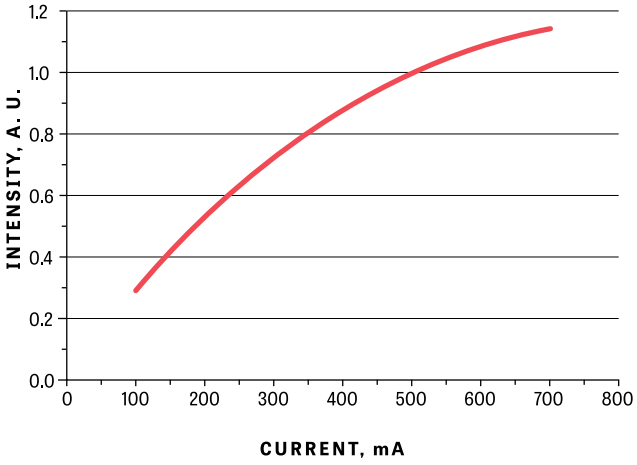


Test Conditions: Ambient Temperature (T_A)= 25 ° C

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 500 mA.

LIGHT OUTPUT OVER CURRENT

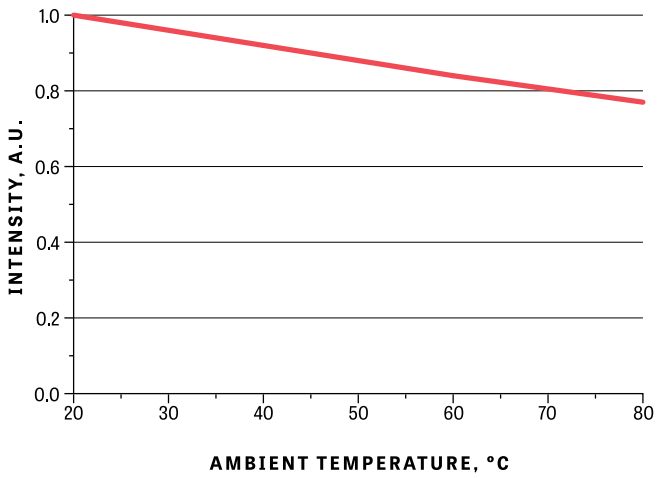


Test Conditions: Case Temperature (T_C)= 20 °C
CW operation

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 OVER TEMPERATURE

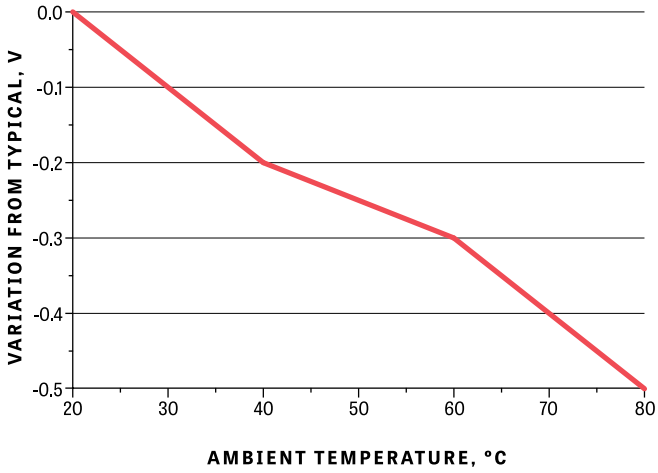


Test Conditions: Forward Voltage (I_F) = 500 mA CW operation

Voltage Shift with Temperature

Stability of voltage characteristics over temperature.

VOLTAGE SHIFT WITH TEMPERATURE

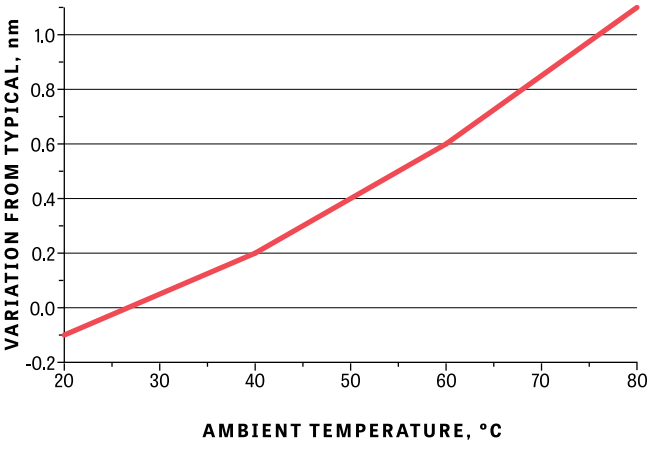


Test Conditions: Forward Voltage (I_F) = 500 mA
CW Operation

Wavelength Shift with Temperature

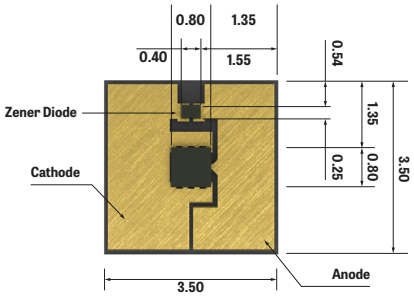
Stability of wavelength characteristics over temperature.

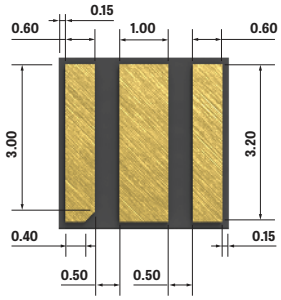
WAVELENGTH SHIFT WITH TEMPERATURE

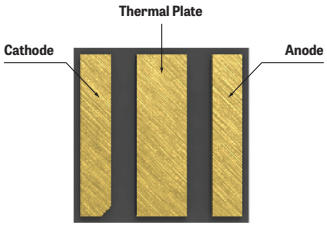


Test Conditions: Forward Voltage (I_F) = 500 mA
CW Operation

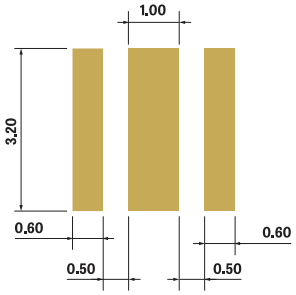
Mechanical Dimensions







SOLDER PATTERN

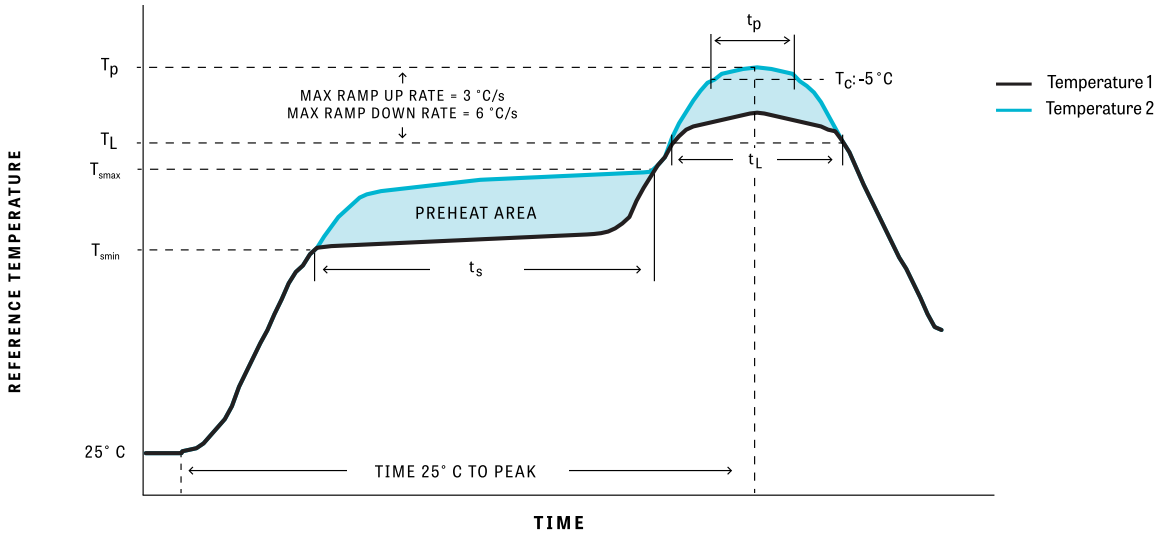


All dimensions are in millimeters. Unless noted otherwise, all dimensions have a tolerance of ± 0.05 mm.

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



Guidelines

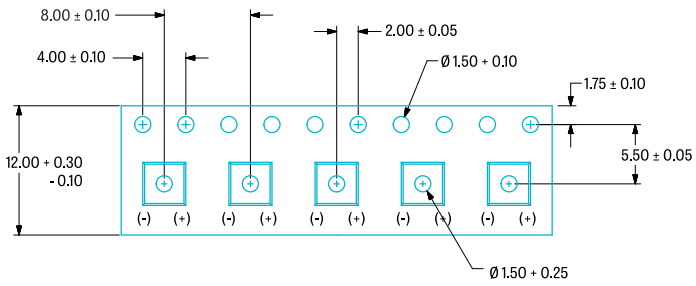
Profile Feature	Pb-Free Assembly
Preheat/Soak	
> Temperature Min (T_{smin})	150 °C
> Temperature Max (T_{smax})	200 °C
> Maximum Time (t_s) from T_{smin} to T_{smax}	60~120 seconds
Ramp-up rate (T_L to T_P)	3 °C/second max.
Liquidous Temperature (T_L)	217 °C
Time (t_L) maintained above T_L	60~150 seconds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

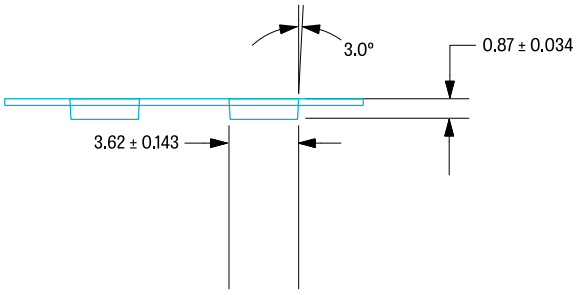
Klaran WD is packaged in tape and reel in quantities of 1000 for machine manufacturing.

TAPE DIMENSIONS

Top View

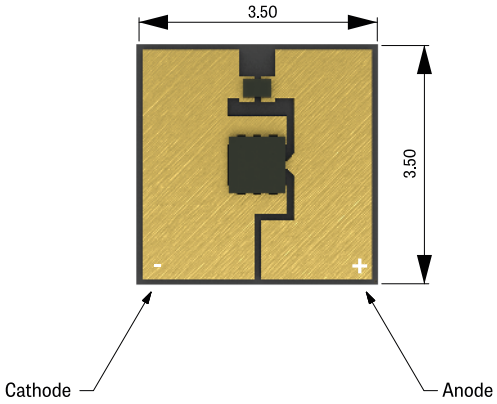


Side View



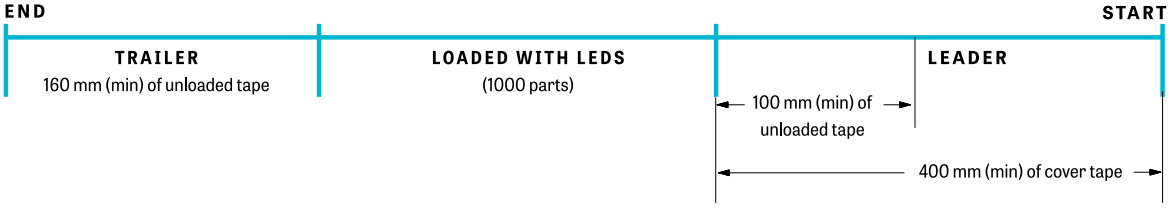
All measurements are in millimeters (mm).

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 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 MSL3 or equivalent and is shipped in a moisture proof package (with silica desiccant). See IPC/JEDEC STD-202 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).

WE INVITE YOU TO LEARN MORE ABOUT OUR UVC LEDs.

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