Technical Data Sheet

Specification

S-S35F-F3-275-01-4-110

RoHS

SETi		Customer
Drawn	Approval	Approval

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Technical Data Sheet

S-S35F-F3-275-01-4

Description:

S-S35F-F3-275-01-4 is a deep ultraviolet light emitting diode with peak emission wavelengths from 270nm to 280nm. The LED is sealed in a ceramic package with UV stable encapsulation.

It incorporates state of the art surface mount device (SMD) design and low thermal resistance.

S-S35F-F3-275-01-4 is designed for air and water sterilization, medical and analytical instrumentation, chemical and biological analysis in deep UV spectral range.

Features:

- Deep ultraviolet LED
- Low thermal resistance
- SMT solderable
- Lead free product
- RoHS compliant

Applications:

- Disinfection
- Fluorescent spectroscopy
- Chemical and Biological Analysis

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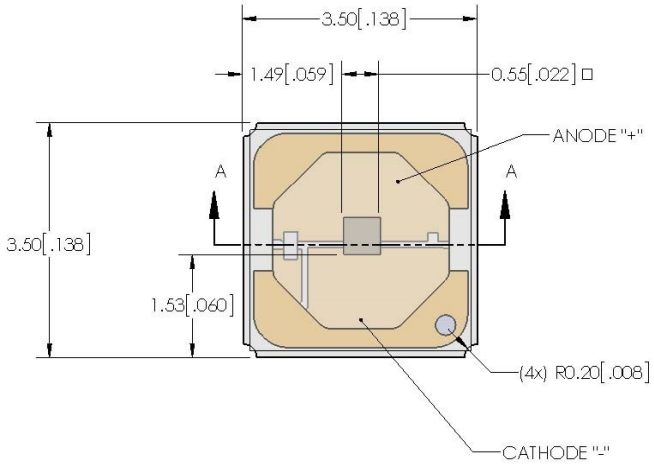
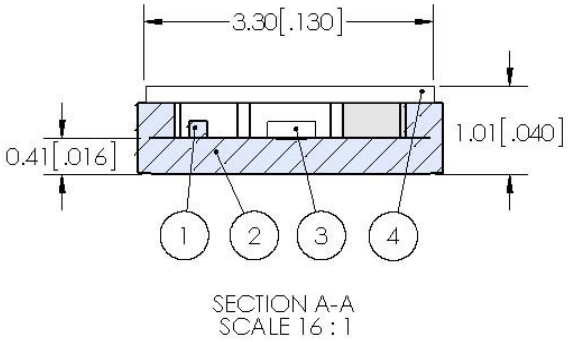
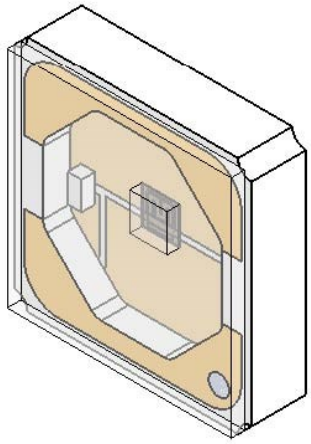
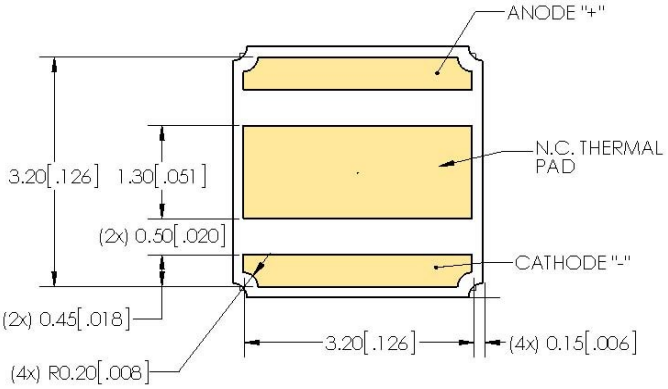
Mechanical Dimensions









Material Information	
PKG Body	**Ceramic**
Lens	**Fused Silica Window**

Notes:
[1] All dimensions in millimeters [inches]
[2] Drawings not to scale
[3] All dimensions are for reference only

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Characteristics

Electro-Optical Characteristics at 20mA

T_a = 25°C, with external heat sink Rth (sp-a)[5] ≤ 20 °C/W, Forward Current=20mA, 20%<RH<70%-range

Parameter	Symbol	Minimum	Maximum	Unit
Peak Wavelength [1]	λ_p	270	280	nm
Output Optical Power [2]	Popt [3]	1.0	2.0	mW
Forward Voltage [4]	V_F	5.0	7.0	V
FWHM	$\Delta\lambda$	9.0	15.0	nm
Viewing Angle	$2\theta_{1/2}$	125 +/- 5		°
Thermal Resistance (T_j-T_{sp})	R_{th}	20		°C/W

Absolute Maximum Ratings

T_a = 25°C

Parameter	Symbol	Value	Unit
Forward Current	I_F	30	mA
Power Dissipation	P_d	210	mW
Reverse Voltage	V_r	6	V
Storage Temperature	T_{stg}	100	°C

Notes:
[1] Peak wavelength measurement tolerance is ± 2 nm
[2] Optical power output measurement tolerance is ± 10%
[3] Popt is the Output Optical Power as measured with a radiometer with an integrated sphere
[4] Forward voltage measurement tolerance is ± 2%
[5] $R_{th(sp-a)}$ defined as thermal resistance from solder point to ambient
[6] The exposure to the absolute maximum rated conditions may affect device reliability

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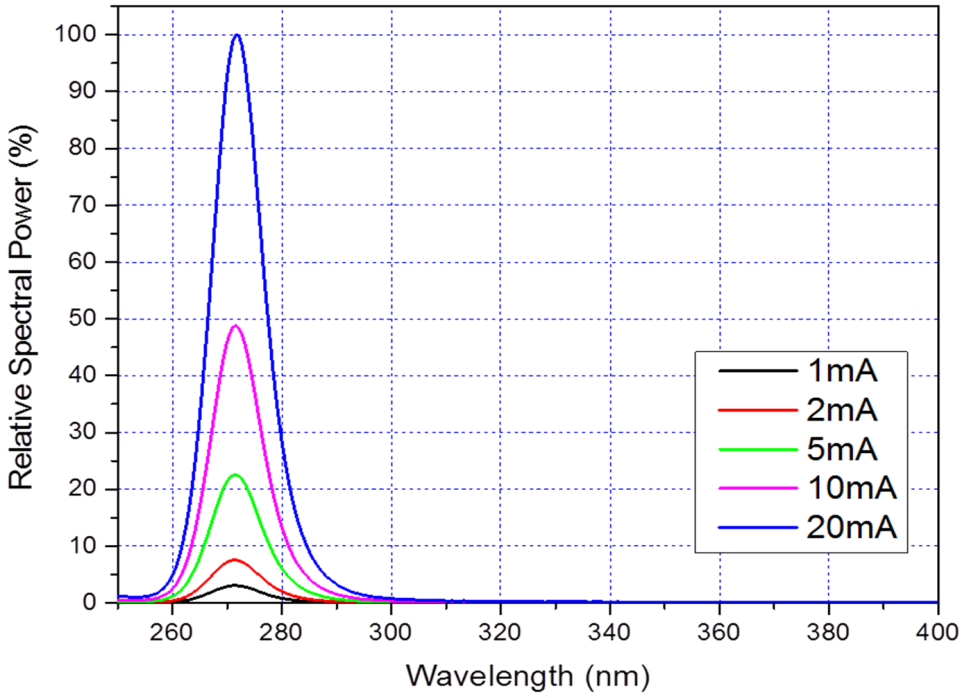
Characteristic Diagrams

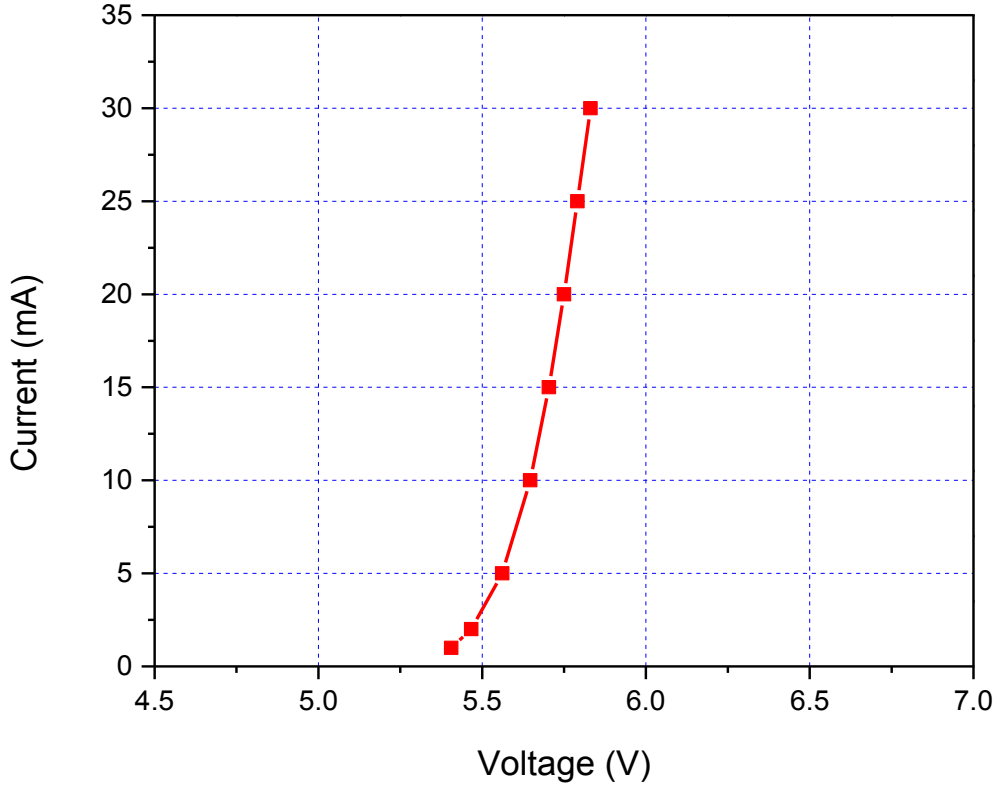
1. Relative Spectral Power Distribution

T_a =25 °C, RH=30%



2. Forward Current vs. Forward Voltage

T_a =25 °C



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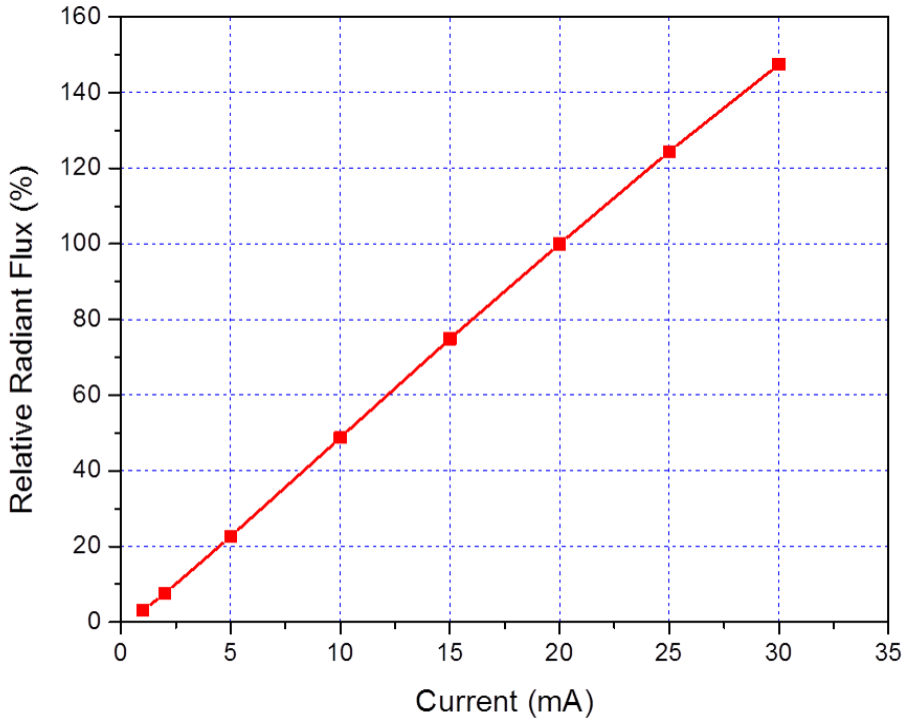
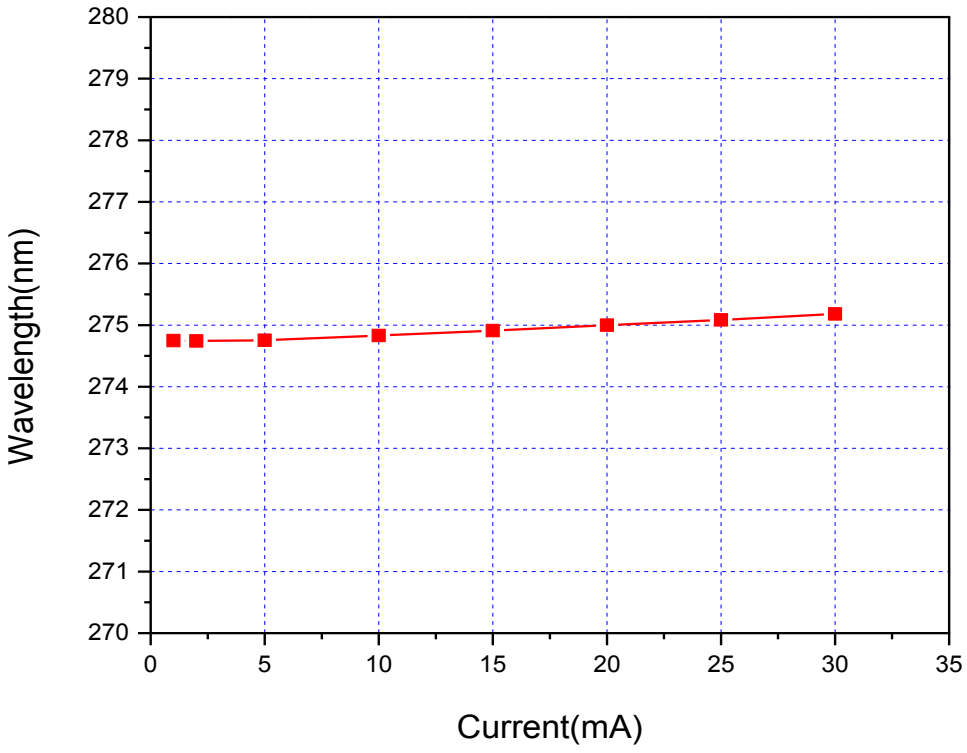
3. Relative Radiant Flux vs. Forward Current

T_a =25 °C



4. Peak Wavelength vs. Forward Current

T_a =25 °C



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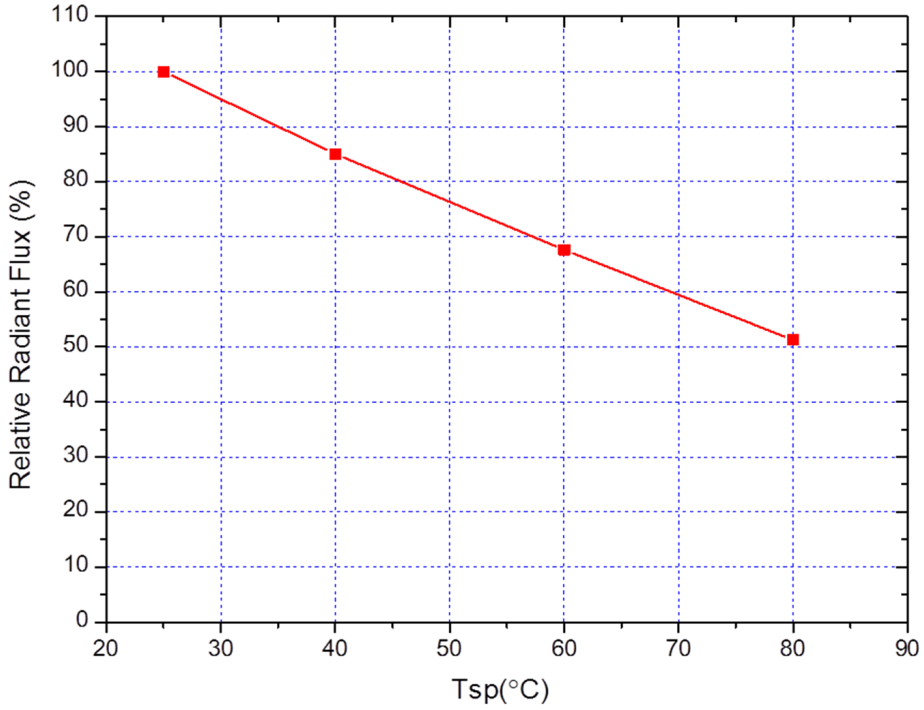
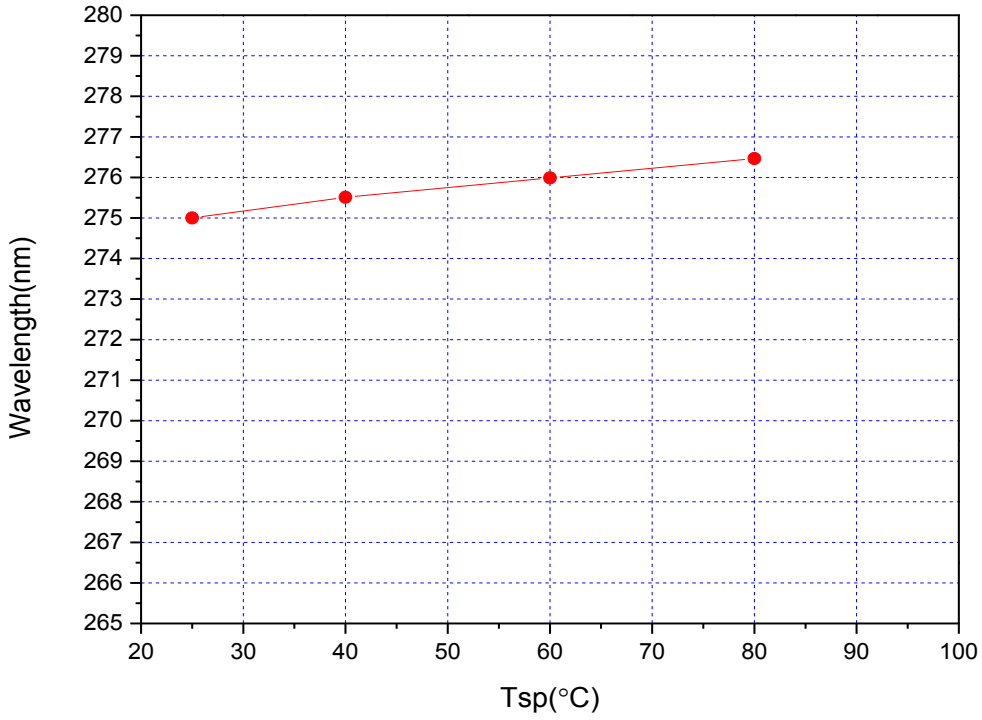
5. Relative Radiant Flux vs. Ambient Temperature

I_f =20mA



6. Peak Wavelength vs. Ambient Temperature

I_f =20mA



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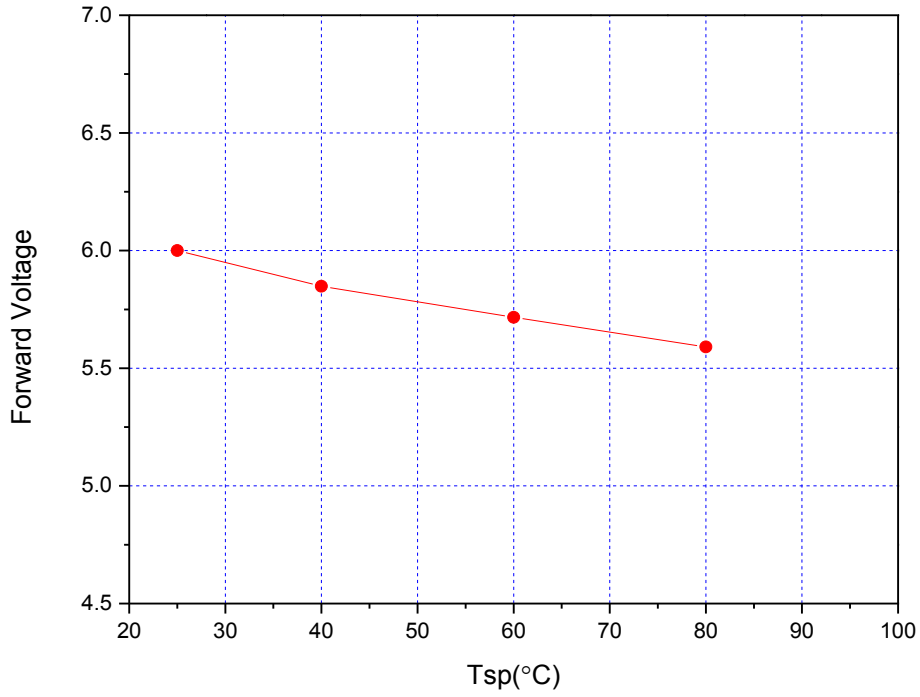
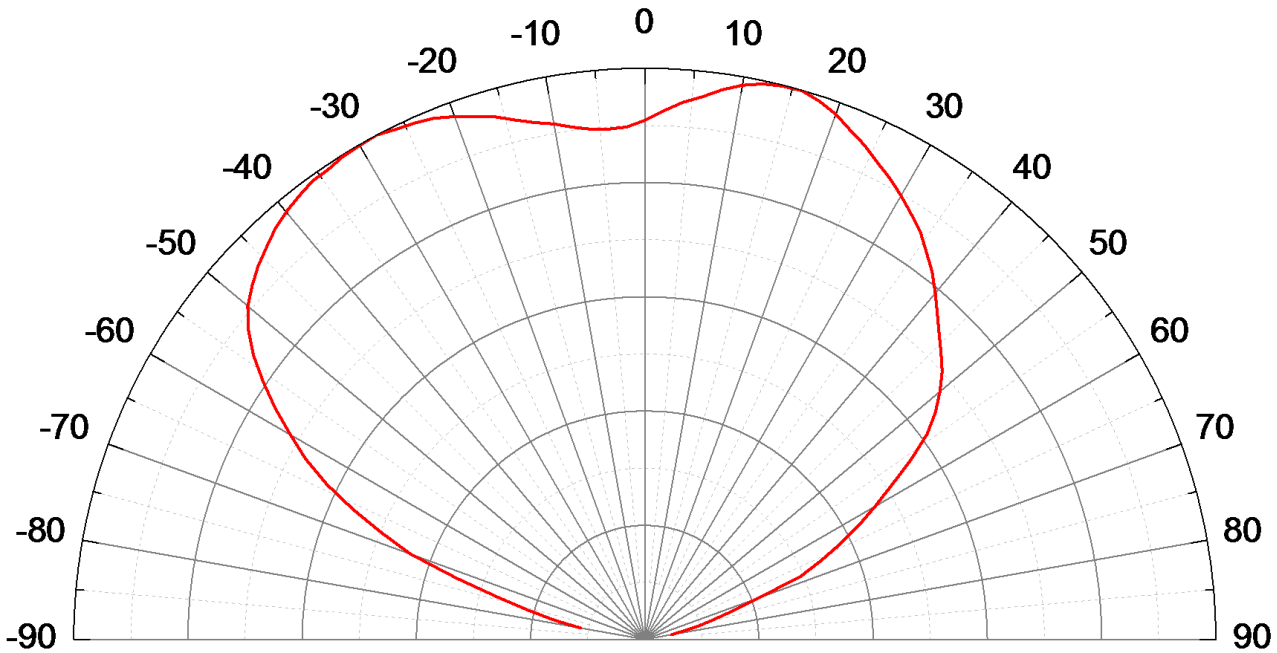
7. Forward Voltage vs. Ambient Temperature

I_f=20mA



8. Typical Radiant Diagram

I_f=20mA



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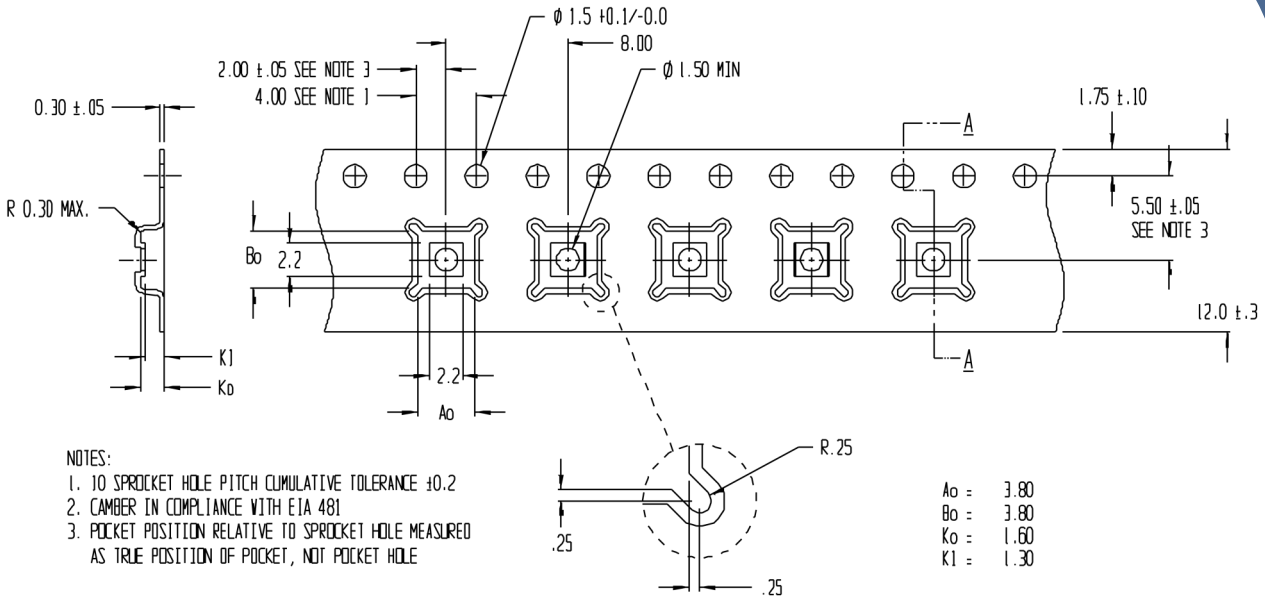
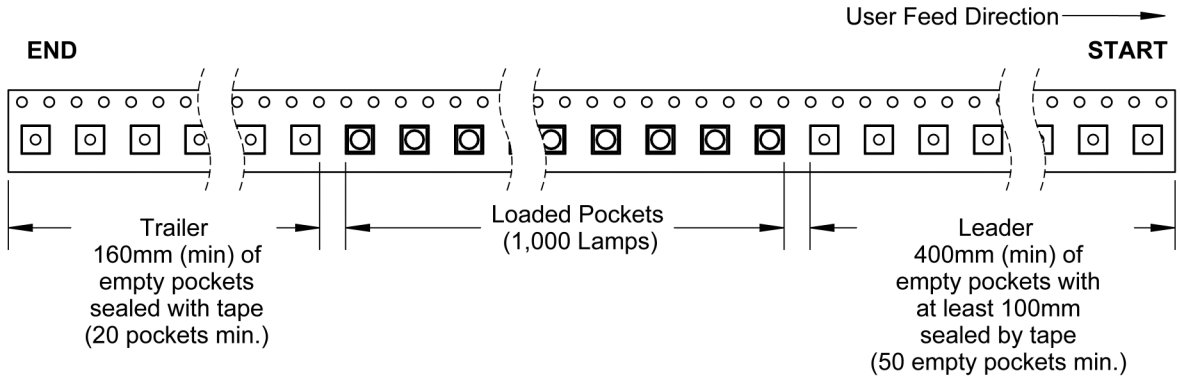
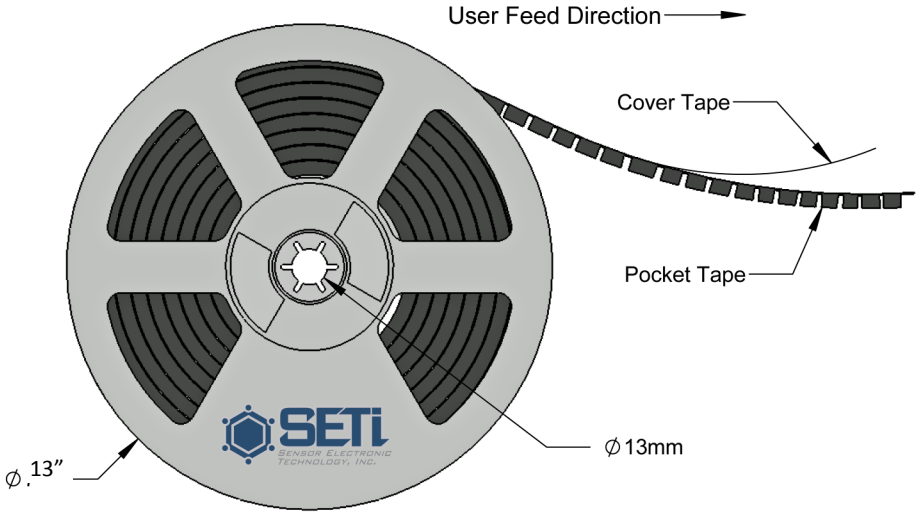
Reel Packaging

All SETi carrier tapes conform to EIA-481, Automated Component Handling Systems Standard.







All measurements in mm.

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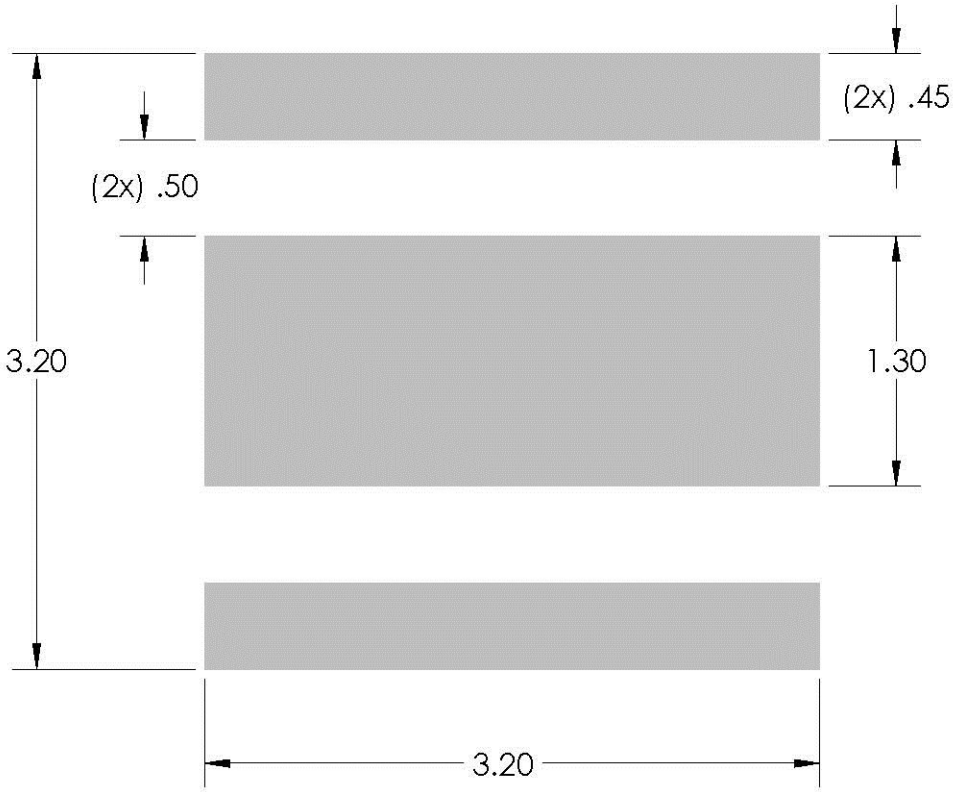
Recommended Solder Pad



Notes:
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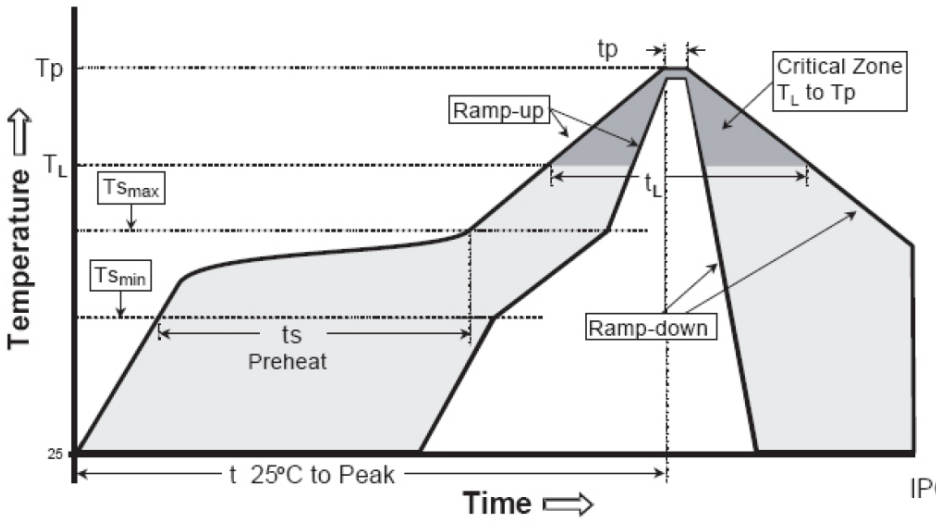
UVTOP® SMD Soldering Conditions and Handling

UVTOP® SMD LEDs reflow characteristics are compatible with JEDEC J-STD-020C . It is generally recommended to follow the solder profile provided by the manufacturer of the solder paste used. These profiles are suggested as a guideline and may require adjustment depending on the users application.
It is recommended to verify the solder process through reflow of several test PCBs and subsequent X-ray or shear testing of the devices. The solder should show minimum indication of voids or solder grains.



IPC/JEDEC J-STD-020C

Profile Parameters	Lead-based Solder	Lead-free Solder
Average Ramp-Up Rate (Tsmax to Tp)	3 °C/second max.	3 °C/second max.
Preheat: Temperature Min (Tsmin)	100 °C	150 °C
Preheat: Temperature Max (Tsmax)	150 °C	200 °C
Preheat: Time (tsmin to tsmax)	60-120 seconds	60-180 seconds
Time Maintained Above: Temperature (TL)	183 °C	217 °C
Time Maintained Above: Time (tL)	60-90 seconds	60-90 seconds
Peak/Classification Temperature (Tp)	215 °C	228 °C
Time Within 5 °C of Actual Peak Temperature (tp)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6 °C/second max.	6 °C/second max.
Time 25 °C to Peak Temperature	6 minutes max.	8 minutes max.

A “no clean” solder paste is recommended so that cleaning is not required after the solder reflow. The choice of application method will determine the specific amount of solder, but for consistent results a solder stencil printer or automated dispense system is suggested.

If cleaning after reflow is required, isopropyl alcohol or water is recommended. Do not use ultrasonic cleaning. Do not wave solder or hand solder UVTOP® SMD LEDs.

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Precaution for Use

UV Light

These devices are ultraviolet LEDs. 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.

Static Electricity

These products are ESD (electrostatic discharge) sensitive; 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.

Operating Conditions

In order to ensure the correct functioning of these LEDs, compliance to the maximum electrical specifications is paramount. These LEDs are particularly sensitive to any current value that exceeds the absolute maximum rating of the product. Any applied current in excess of the maximum specification will cause damage and possible complete failure of the product.

The current flowing in a LED is an exponential function of the voltage across it. A small change in voltage can produce a very large change in current and lead to complete failure of the LED. The use of current regulated drive circuits are recommended for these products.

Any attempt to drive these UV LEDs with a voltage source instead of a current source will cause damage and possible complete failure of the product.

These LEDs are susceptible to heat generation. Use care to design end product with adequate thermal management to ensure that LEDs do not exceed maximum recommended temperatures. Operating LEDs at temperatures in excess of specification will result in damage and possible complete failure of the product.

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

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Precaution for Use

1) Storage

- To avoid moisture penetration, we recommend storing UV LEDs in a dry box with a desiccant. The recommended temperature and Relative humidity are between 5ºC and 30ºC and below 50% respectively.
- LEDs must be stored properly to maintain the device. If the LEDs are stored for 3 months or more after being shipped from SVC, a sealed container with a nitrogen atmosphere should be used for storage.
- Replace the remained LEDs into the moisture-proof bag and reseal the bag after work to avoid those LEDs being exposed to moisture. Prolonged exposure to moisture can adversely affect the proper functioning of the LEDs.
- If the package has been opened more than 168hr(MSL_3) or the color of the desiccant changes, components should be dried for 10-12hr at 60±5ºC.
- The conditions of resealing are as follows:
  - Temperature is 5 to 40ºC and Relative humidity is less than 30%

2) Handling Precautions

- VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures can penetrate silicone encapsulants of LEDs and discolor them when exposed to heat and photonic energy. The result can be a significant loss of light output from the fixture. Knowledge of the properties of the materials selected to be used in the construction of fixtures can help prevent these issues.
- In case of attaching LEDs, do not use adhesives that outgas organic vapor.
- 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.
- Components should not be mounted on warped (non coplanar) portion of PCB.
- The UV LED is protected by a lens which requires careful handling as shown in the images located at the top of page 15:
  - Avoid touching glass lens parts especially with sharp tools such as Tweezers
  - Avoid leaving fingerprints on glass lens parts.
  - When populating boards in SMT production, there are basically no restrictions regarding the form of the pick and place nozzle, except that excessive mechanical pressure on the surface must be prevented.

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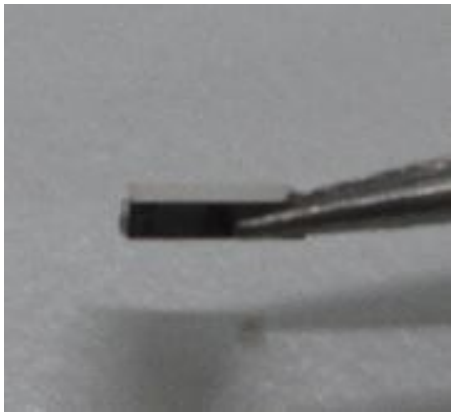

3) Safety for eyes and skin

- The products emit high intensity ultraviolet light which can harm your eyes and skin. Do not look directly into the UV light and wear protective equipment during operation.

4) Cleaning

- This device is not allowed to be used in any type of fluid such as water, oil, organic solvent, etc.

5) Others

- The appearance and specifications of the product may be modified for improvement without notice.
- When the LEDs are in operation the maximum current should be decided after measuring the package temperature.
- The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the reverse voltage is applied to LED, migration can be generated resulting in LED damage.
- Do not handle this product with acid or sulfur material in sealed space.

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Revision History

Revision	Change Date	Authorized Signature	Department
01	10-18-2016	Ahmad Heidari	Quality
		Dr. Peter Barber	Marketing
		Dr. Max Shatalov	Engineering

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