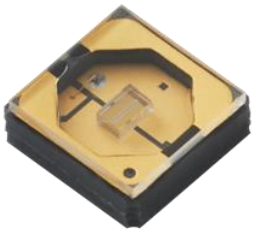
Marktech Optoelectronics

Ultraviolet Emitter

Product No: **MTSM275UV2-F1120**

Peak Emission Wavelength: 275nm

The MTSM275UV2-F1120 is a deep ultraviolet light emitting diode with peak emmission wavelengths from 270nm to 278nm. The LED is sealed in a Ceramic package with an optical transparent window. It incorporates state of the art surface mount device (SMD) design and low thermal resistance.



FEATURES

> Deep ultraviolet LED
> Low thermal resistance
> SMT solderable

APPLICATIONS

> Disinfection
> Fluorescent spectroscopy
> Chemical and Biological Analysis

Absolute Maximum Ratings (Ta=25°C)

RoHS

ITEMS	SYMBOL	RATINGS	UNIT
Forward Current	If	200	mA
Power Dissipation	Pd	1.45	W
Thermal Resistance [5]	Rθ j-s	31.0	°C/W
Storage Temperature	Tstg	-40 to 100	°C
Junction Temperature	Tj	105	°C

Note: Also available on PCB - Star Board MTSM275UV2-F1120S

Electrical & Optical Characteristics (Ta=25°C, RH=30%)

ITEMS	SYMBOL	CONDITION	VALUE	UNIT
Peak Wavelength [1]	λp	IF=100mA	275	nm
Radiant Flux [2]	Θe[3]	IF=100mA	11.5	mW
Forward Voltage [4]	Vf	IF=100mA	5.6	V
FWHM	Δλ	IF=100mA	11	nm
Viewing Angle	$2\Theta_{1/2}$	IF=100mA	125	deg

Notes:
[1] Peak wavelength measurement tolerance is ± 3 nm
[2] Radiant Flux Measurement tolerance is ± 10%
[3] Θe is the Total Radiant Flux as measured with an integrated sphere.
[4] Forward voltage measurement tolerance is ± 3%
[5] RΘ j-s is the thermal resistance between chip junction to solder.
[6] The exposure to the absolute maximum rated conditons may afect device reliability

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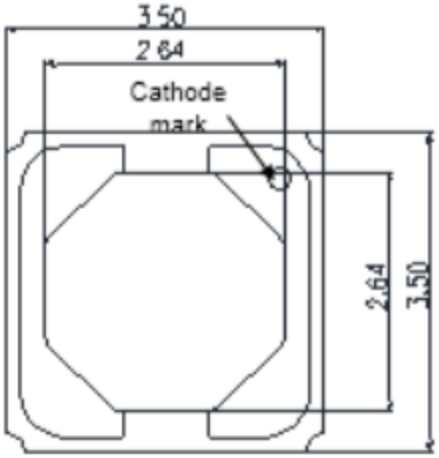
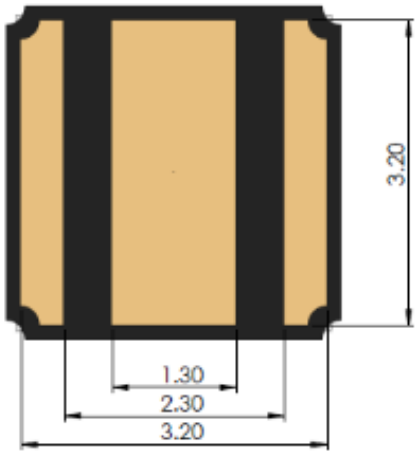
Top View

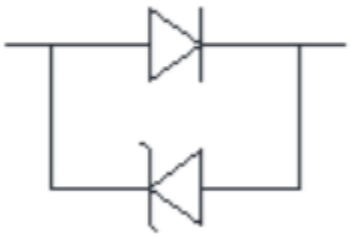


Bottom View



Side View

CIRCUIT



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

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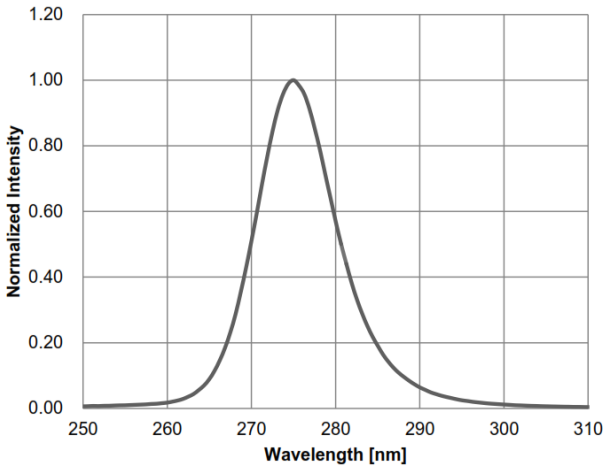
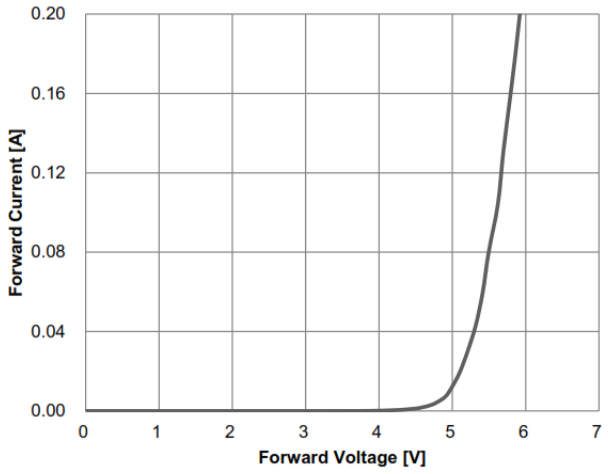
1. Relative Spectral Power Distribution

Ts =25 °C, IF=100mA



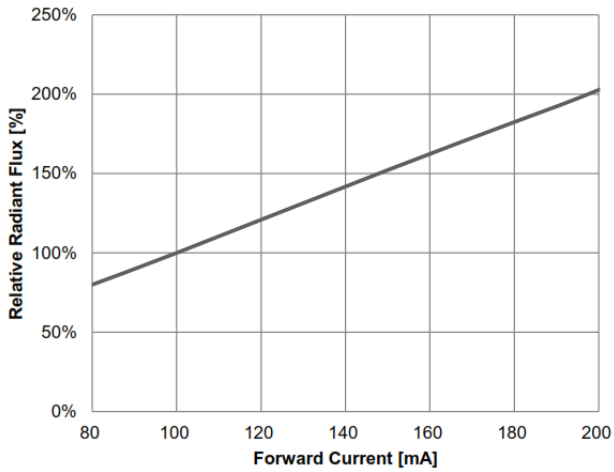
2. Forward Current vs. Forward Voltage

Ts =25 °C



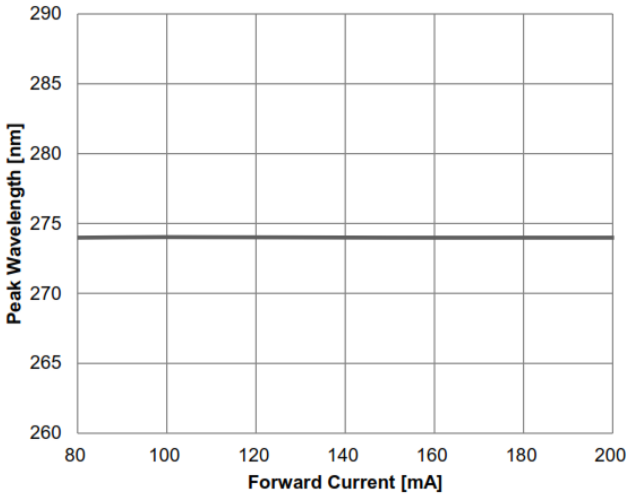
3. Relative Radiant Flux vs. Forward Current

Ts =25 °C



4. Peak Wavelength vs. Forward Current

Ts =25 °C



Notes:

[3] All dimensions are for reference only

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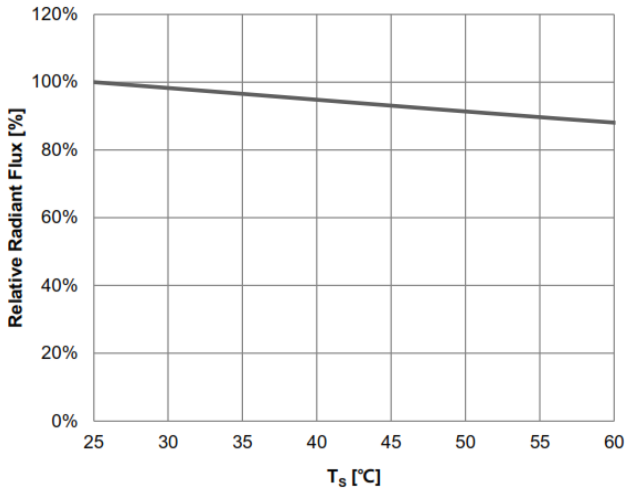
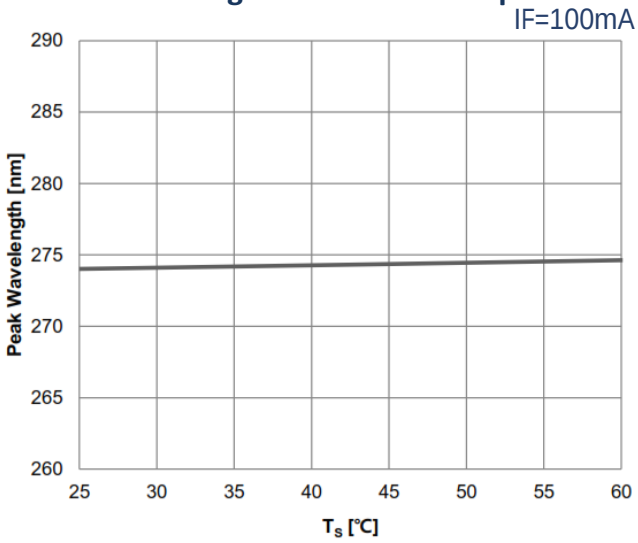
5. Relative Radiant Flux vs. Surface Temperature

IF=100mA



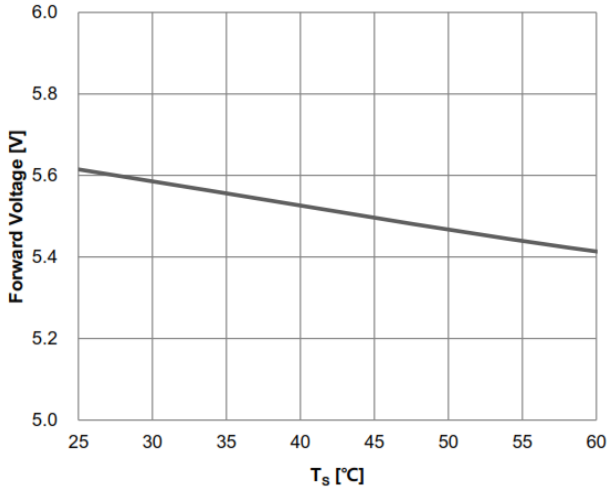
6. Peak Wavelength vs. Surface Temperature

IF=100mA



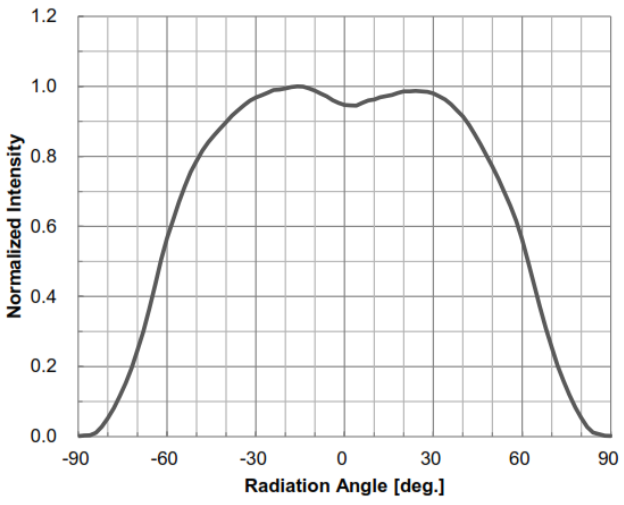
7. Forward Voltage vs. Surface Temperature

IF=100mA



8. Typical Spatial Distribution

IF=100mA



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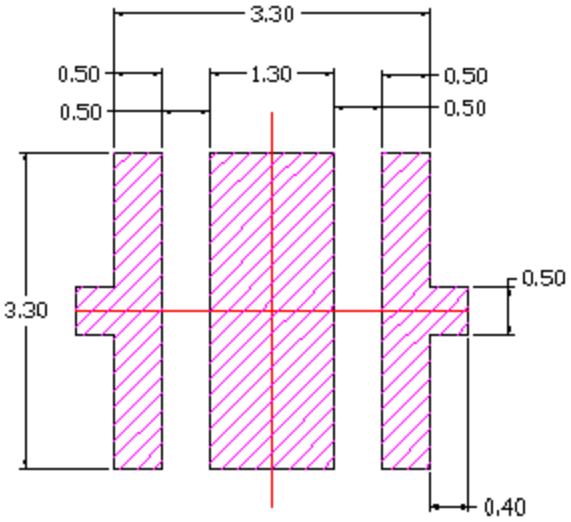
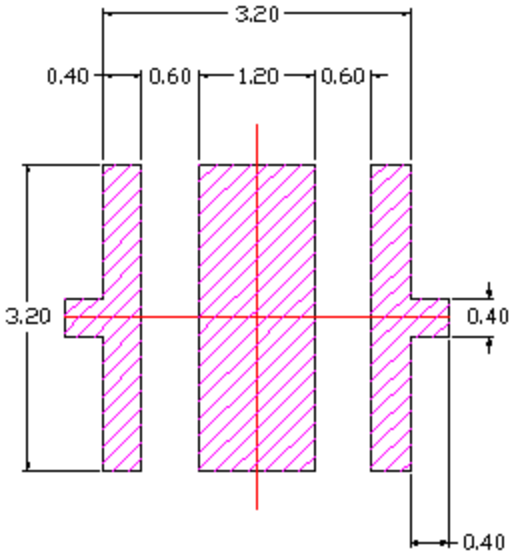
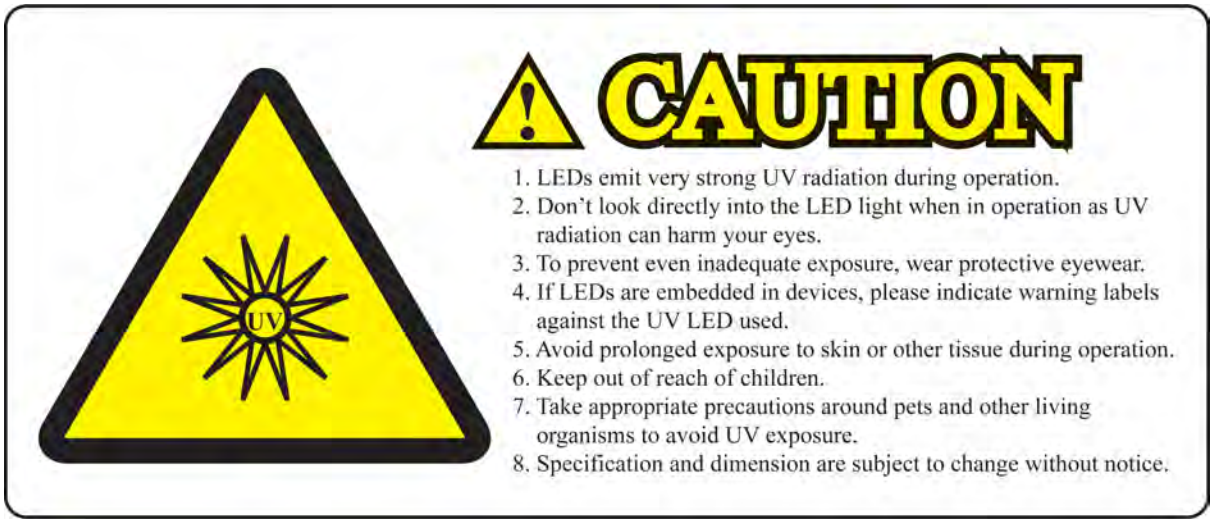
Recommended Solder Pad



Recommended PCB Solder Pad



Recommended Stencil Pattern



The information contained herein is subject to change without notice.

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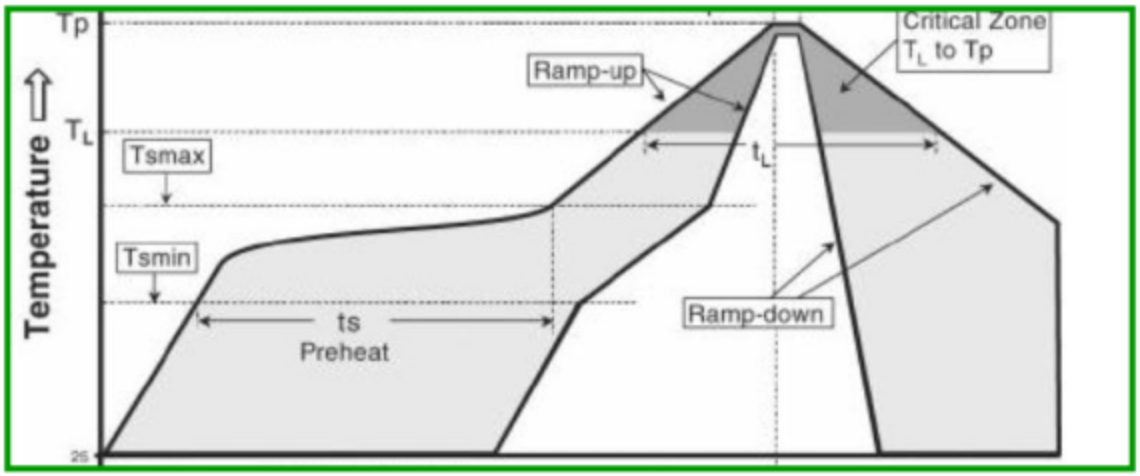
Reflow Soldering Characteristics



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (Ts_max to Tp)	3° C/second max.	3° C/second max.
Preheat - Temperature Min (Ts_min) - Temperature Max (Ts_max) - Time (Ts_min to Ts_max) (ts)	 100 °C 150 °C 60-120 seconds	 150 °C 200 °C 60-180 seconds
Time maintained above: - Temperature (TL) - Time (tL)	 183 °C 60-150 seconds	 217 °C 60-150 seconds
Peak Temperature (Tp)	215℃	260℃
Time within 5°C of actual Peak Temperature (t)2	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.

* Caution

1. Reflow soldering should not be done more than one time.
2. Repairs should not be done after the LEDs have been soldered.
   When repair is unavoidable, suitable tools must be used.
3. Die slug is to be soldered.
4. When soldering, do not put stress on the LEDs during heating.
5. After soldering, do not warp the circuit board.
6. Recommend to use a convection type reflow machine with 7 ~ 8 zones.

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Precaution for Use

(1) Storage

To avoid the moisture penetration, we recommend storing LEDs in a dry box with a desiccant . The recommended storage temperature range is 5℃ to 30℃ and a maximum humidity of RH50%.

(2) Use Precaution after Opening the Packaging

Use proper SMD techniques when the LED is to be soldered dipped as separation of the lens may affect the light output efficiency.

Pay attention to the following:

a. Recommend conditions after opening the package

- Sealing / Temperature : 5 ~ 30℃ Humidity : less than RH60%

b. If the package has been opened more than 7days (MSL 3) or the color of the desiccant changes, components should be dried for 10-24hr at 65±5℃

c. Baking should only be done once.

(3) Do not apply mechanical force or excess vibration during the cooling process to normal temperature after soldering.

(4) Do not rapidly cool device after soldering.

(5) Components should not be mounted on warped (non coplanar) portion of PCB.

(6) Radioactive exposure is not considered for the products listed here in.

(7) This device should not be used in any type of fluid such as water, oil, organic solvent and etc. When washing is required, IPA (Isopropyl Alcohol) should be used.

(8) When the LEDs are in operation the maximum current should be decided after measuring the package temperature.

(9) LEDs must be stored in a clean environment. We recommend LEDs store in nitrogen-filled container.

(10) The appearance and specifications of the product may be modified for improvement without notice.

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Precaution for Use

(11) VOCs (Volatile organic compounds) emitted from materials used in the construction of fixtures ca n penetrate silicone encapsulants of LEDs and discolor when exposed to heat and photonic energy. T he result can be a significant loss of light output from the fixture. Knowledge of the properties of the m aterials selected to be used in the construction of fixtures can help prevent these issues.

(12) The slug is electrically isolated.

(13) Attaching LEDs, do not use adhesives that outgas organic vapor.

(14) The driving circuit must be designed to allow forward voltage only when it is ON or OFF. If the rev erse voltage is applied to LED, migration can be generated resulting in LED damage.

(15) LEDs are sensitive to Electro-Static Discharge (ESD) and Electrical Over Stress (EOS). Below is a list of suggestions that minimize these effects.

a. ESD (Electro Static Discharge)

Electrostatic discharge (ESD) is the defined as the release of static electricity when two objects come into contact. While most ESD events are considered harmless, it can be an expensive problem in many industrial environments during production and storage. The damage from ESD to an LEDs may cause the product to demonstrate unusual characteristics such as:

- Increase in reverse leakage current lowered turn-on voltage
- Abnormal emissions from the LED at low current

The following recommendations are suggested to help minimize the potential for an ESD event.
One or more recommended work area suggestions:

- Ionizing fan setup
- ESD table/shelf mat made of conductive materials
- ESD safe storage containers

One or more personnel suggestion options:

- Antistatic wrist-strap
- Antistatic material shoes
- Antistatic clothes

Environmental controls:

- Humidity control (ESD gets worse in a dry environment)

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Precaution for Use

b. EOS (Electrical Over Stress)

Electrical Over-Stress (EOS) is defined as damage that may occur when an electronic device is subjected to a current or voltage that is beyond the maximum specification limits of the device. The effects from an EOS event can be noticed through product performance like:

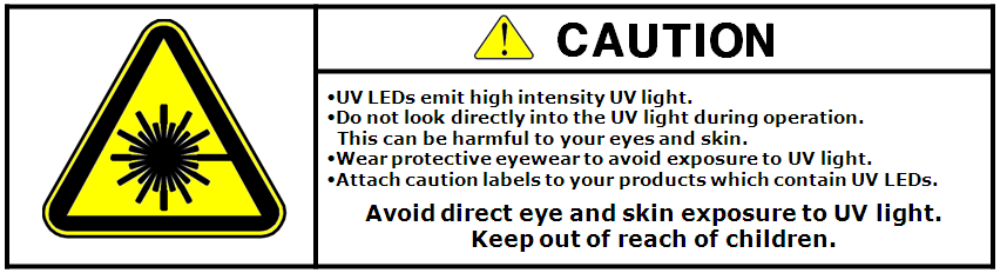
- Changes to the performance of the LED package
  (If the damage is around the bond pad area and since the package is completely encapsulated the package may turn on but flicker show severe performance degradation.)
- Changes to the light output of the luminaire from component failure
- Components on the board not operating at determined drive power

Failure of performance from entire fixture due to changes in circuit voltage and current across total circuit causing trickle down failures. It is impossible to predict the failure mode of every LED exposed to electrical overstress as the failure modes have been investigated to vary, but there are some common signs that will indicate an EOS event has occurred:

- Damaged may be noticed to the bond wires (appearing similar to a blown fuse)
- Damage to the bond pads located on the emission surface of the LED package
  (shadowing can be noticed around the bond pads while viewing through a microscope)
- Anomalies noticed in the encapsulation and phosphor around the bond wires.
- This damage usually appears due to the thermal stress produced during the EOS event.

c. To help minimize the damage from an EOS event we recommend utilizing:

- A surge protection circuit
- An appropriately rated over voltage protection device
- A current limiting device



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