

Peak Emission Wavelength: 395nm

The MTSM395UV-FP7140 is a ultraviolet light emitting diode with peak emission wavelength of 395nm. The High power UV LED is designed for high current operation and high power output operations. It incorporates state of the art SMD design and low thermal resistant material.



FEATURES

- > Super high power output
- > Low thermal resistance
- > Package-less module
- > Designed for high current operation

APPLICATIONS

- > UV Curing
- > Printing
- > Coating
- > Counterfeit Detection / Security

Absolute Maximum Ratings (Ta=25°C)



| ITEMS | SYMBOL | RATINGS | UNIT |
|-------------------------------------|--------|-------------|------|
| Forward Current | If | 700 | mA |
| Pulsed Forward Current ¹ | Ifp | 1000 | mA |
| Junction Temperature ² | Tj | 125 | °C |
| Operating Temperature | Topr | -30 to +85 | °C |
| Storage Temperature | Tstg | -40 to +100 | °C |

¹ 1/10 Duty, f=1KHz

² Measurement condition; Metal Core PCB

Note: Also available on PCB - Star Board MTSM395UV-FP7140S

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

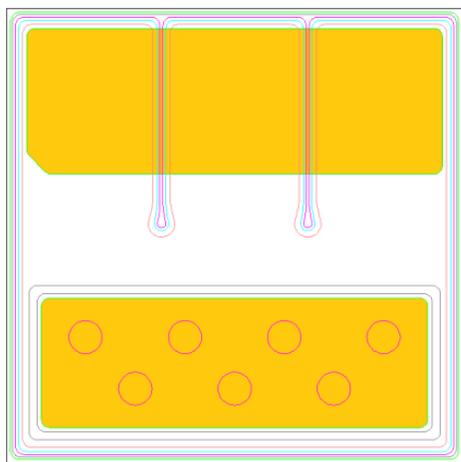
| ITEMS | SYMBOL | CONDITION | MINIMUM | TYPICAL | MAXIMUM | UNIT |
|-------------------------|-----------------|-----------|---------|---------|---------|------|
| Dominant Wavelength [1] | λ_d | IF=500mA | 390 | -- | 400 | nm |
| Turn-on Voltage | Vf1 | IF=1uA | 2.0 | -- | 3.0 | V |
| Forward Voltage | Vf | IF=500mA | 3.4 | -- | 3.6 | V |
| Reverse Current | Ir | Vr=5V | 0 | -- | 1.0 | uA |
| Full Width Half Maximun | $\Delta\lambda$ | IF=500mA | -- | 12 | -- | nm |
| Radiant Power [2] | Po | IF=500mA | -- | 910 | -- | mW |

Notes:

[1] Dominant Wavelength +/-1nm

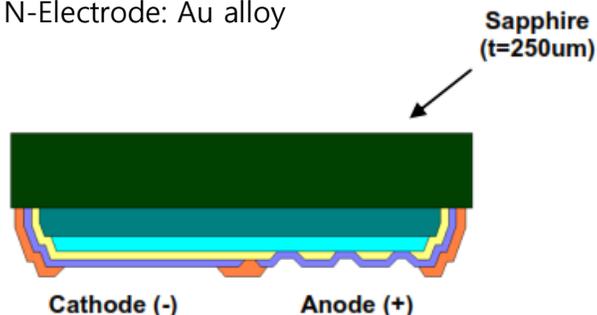
[2] Radiant Power: +/-10%

Chip Diagram



Plane View

- Substrate: Al₂O₃ (Sapphire)
- Epitaxial Layer: GaN Based LED Structure
- P-Electrode: Au alloy
- N-Electrode: Au alloy



Cross Sectional View

Mechanical Specifications

(Unit: μm)

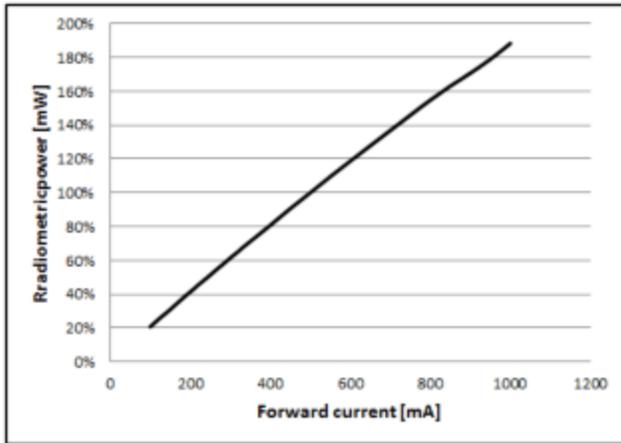
| Description | Dimension | Tolerance |
|-------------------|-----------------|-----------|
| Top emitting area | 1100um x 1100um | ± 40 |
| Bottom substrate | 1100um x 1100um | ± 40 |
| Chip Thickness | 250um | ± 15 |
| P-Pad Diameter | 932um x 313um | ± 50 |
| N-Pad Diameter | 1002um x 351um | ± 50 |

CAUTION

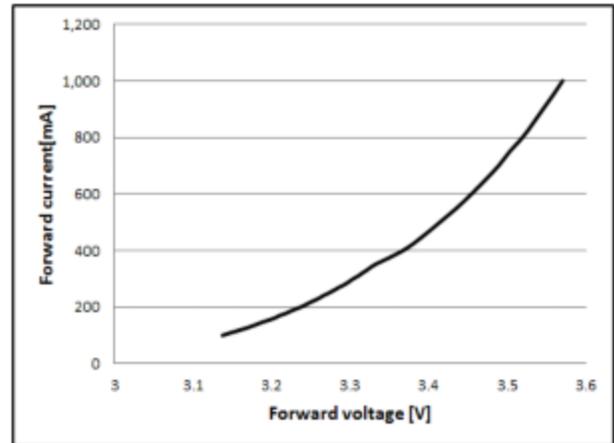
- UV LEDs emit high intensity UV light.
- Do not look directly into the UV light during operation. This can be harmful to your eyes and skin.
- Wear protective eyewear to avoid exposure to UV light.
- Attach caution labels to your products which contain UV LEDs.

**Avoid direct eye and skin exposure to UV light.
Keep out of reach of children.**

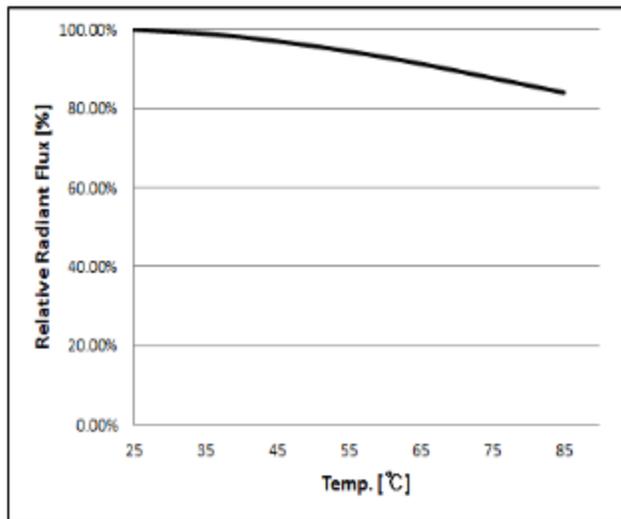
Characteristic Graphs



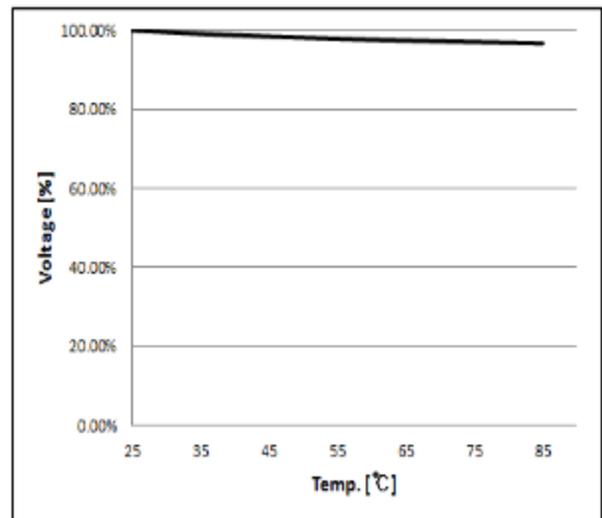
Forward Current vs. Light Output



Forward Voltage vs. Forward Current



Temperature vs. Relative Radiant Flux



Temperature vs. Relative Forward Voltage

Printed Circuit Board Guideline

NUV VICOP is recommended to be soldered onto a Metal Core PCB (MCPCB) for optimal performance and to be designed to minimize the overall thermal resistance between the LED and the heat sink.

Also NUV VICOP is recommended to be open PSR between Anode and Cathode for reduce LED fail shown in Figure 4.

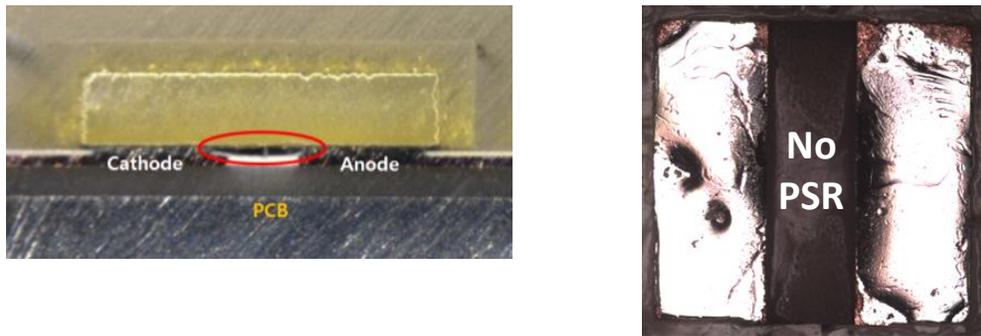
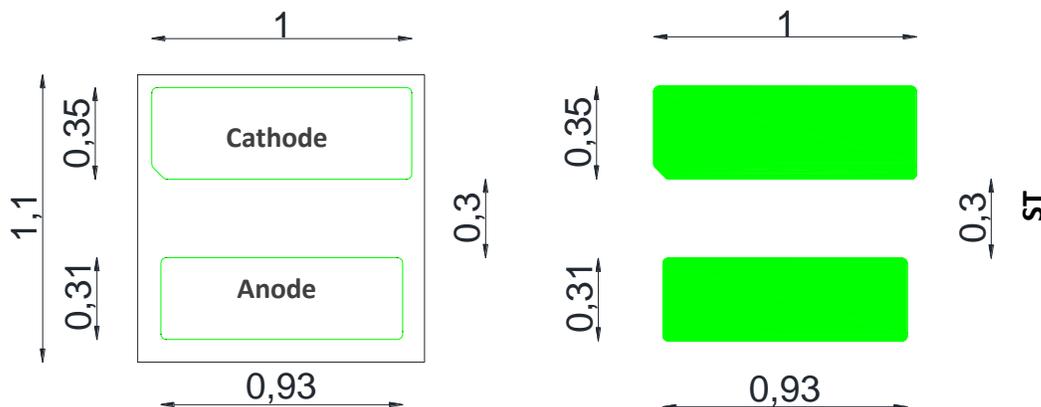


Figure 4. Recommended open PSR between Anode and Cathode.

Recommended Solder Footprint

For proper operation, the NUV VICOP anode and cathode need to be soldered onto corresponding pads on a PCB. The size of the pads and the corresponding size of the solder stencil are shown in Figure 5.

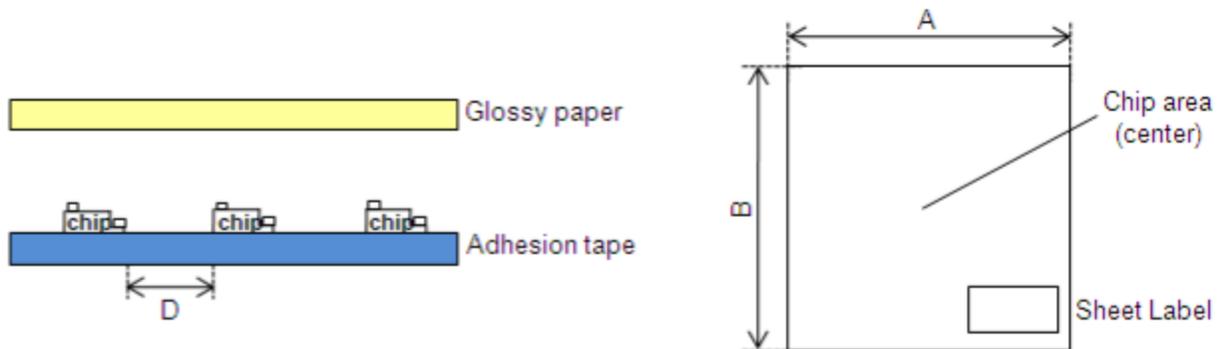
The electrical pads of the NUV VICOP also serve as thermal pads between the LED and the PCB. To enhance heat dissipation from a NUV VICOP into the PCB, we recommend extended the copper area around each electrode, where possible.



Packing

(1) Chips on tape

- (a) Electro-Optical measurement data should be labeled and tacked on the backside of the glossy paper. Chip area should be placed in the center of adhesion tape, and the wire-bonding pad should face towards the covered glossy paper.



- (b) Chip type, Lot No. and quantity etc. should be labeled and tacked to the corner of the glossy paper.

| Item | Instruction |
|---------------------|------------------------|
| Adhesion tape | Semi- transparent blue |
| Glossy paper (A×B) | 197mm × 220mm |
| Chip Qty tape | Typ. 2,000ea |
| Chip separation (D) | D : 0.40mm |

(2) Packing for shipment

- (a) The sheets (adhesion tape + glossy paper) are packed in an anti-static electricity bag. Each anti-static bag can contain up to 20 sheets.
- (b) The anti-static bags are packed in a box. The size of this box is 250mm×65mm×275mm (a × b × c). Each box can contain up to 5 anti-static electricity bags.
- (c) The boxes which contain anti-static electricity bags are packed in the other box. The size of this outer box is 260mm×340mm×290mm (a × b × c). Each outer box can contain up to 5 inner boxes.
- (d) Each sheet / box is labeled with information describing its content. (Details please refer to section 12)

Precaution

(1) Quality Guarantee

The chip guarantee period is three months after the delivery under the following preservation conditions. If any defective is found, the customer shall immediately inform of that to Seoul Viosys Co., Ltd. Preservation conditions (when the shipping package is unopened.)

- Temperature: 0 ~ 60 °C
- Atmosphere: Keep the chips in a desiccator with silica gel or with nitrogen substitution.

(2) General precautions for use

- Chips should be stored in a clean environment. If the Chips are to be stored for 3 months or more after being shipped from Marktech, they should be packed by a sealed container with nitrogen gas injected.

(Shelf life of sealed bags : 1year, 0~40°C of temperature , 20~70% of RH)

- This chip should not be used directly in any type of fluid such as water, oil, organic solvent, etc. When washing is required, IPA is recommended to use.

- After storage bag is open, device subjected to soldering, solder flow, or other high temperature processes must be:

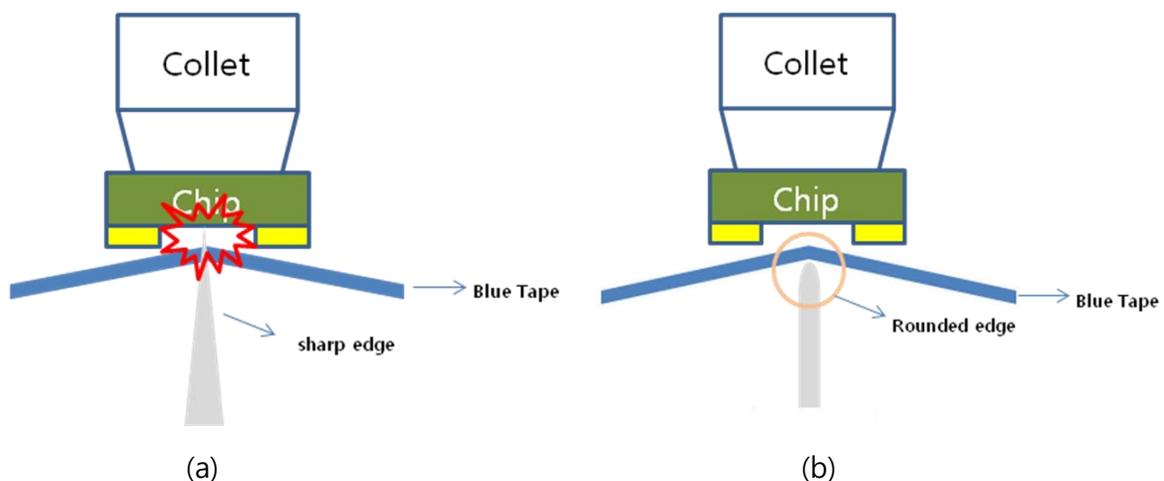
Mounted within 168 hours (7days) at an assembly line with a condition of no more than 30°C and 60% RH

- Chips require baking before mounting, if humidity card reading is >60% at, 23.5°C. chips must be baked for 24Hrs. at 65.5°C, if baking required.

- When the chips are illuminating, the maximum ambient temperature should be first considered before operation. If voltage exceeding the absolute maximum rating is applied to chips, it may cause damage or even destruction to chips. Damaged LEDs will show some abnormal characteristics such as remarkable increase of leak current, lower turn-on voltage and getting unlit at low current.
- The appearance and specifications of the products may be modified for improvement without further notice.
- The chips are sensitive to the static electricity and surge. It is strongly recommended to use a grounded wrist band and anti-electrostatic glove when handling the LEDs.

(3) Precautions for Die Attach (Pick and Place)

- Unlike the top of chip, the bottom (The opposite side of sapphire substrate) is the epitaxial Layer where the p-n junction is located. It is not mechanically protected and can be damaged if a sharp and hard ejector pin material is used.
- Seoul Viosys recommends an ejector pin with rounded edge to minimize the risk of mechanical damage.



(a) Sharp ejector pin tip may damage the Flip Chip (left). (b) A rounded tip minimizes the risk of damage caused by ejector pin (right).