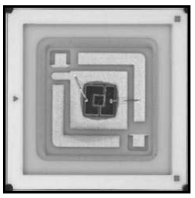
Surface Mount UV LED

NUVC66 Series

FEATURES

- SURFACE MOUNT 6.00mm x 6.00mm x 1.35mm
- WAVELENGTH 278nm FOR DISINFECTION
- RoHS COMPLIANT & HALOGEN FREE
- COMPATIBLE WITH REFLOW SOLDERING
- TAPE AND REEL PACKAGING



SPECIFICATIONS	Case Sizes
	66 (6.0x6.0x1.35mm)
Wavelength	278nm (typical)
Forward Current	20mA
Radiant Flux	1.30mW (minimum)
Power Dissipation	130mW
Operating Temperature*	-40°C ~ +60°C
Junction Temperature	<+65°C
Thermal Resistance (Typical) Note 1	37°C/W**
Viewing Angle	121°

Note 1 - Rthj-c = Thermal Resistance (Junction - Case)

*After soldering storage temperature is -40°C ~ +100°C

**See special notes regarding thermal management on page 8.

PART NUMBERING SYSTEM

NUVC66 DW 278 TR F

- F = RoHS Compliant
- TR = Tape & Reel Packaging
- Typical Wave Length
- Wavelength Code
- Series Prefix

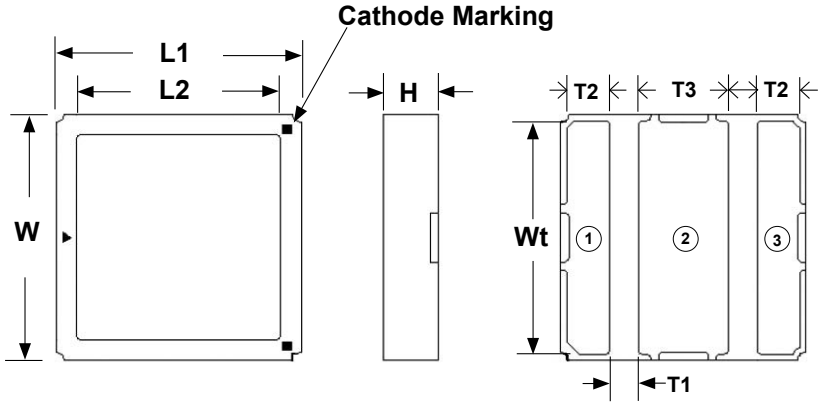
WAVELENGTH CODES

Code	Typical Wavelength
DW	278nm

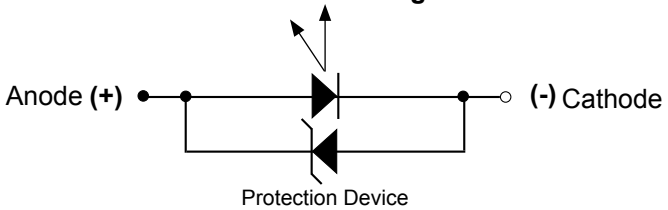
Termination	Connection
1	Cathode
2	Heat Sink
3	Anode

COMPONENT DIMENSIONS

Item	Dimension (mm)
L1	6.00 ± 0.15
L2	5.00 +0.20/-0.10
W	6.00 ± 0.15
H	1.35 ± 0.14
Wt	5.70 ± 0.10
T1	0.70 ± 0.10
T2	1.05 ± 0.10
T3	2.20 ± 0.10



Internal Circuit Diagram



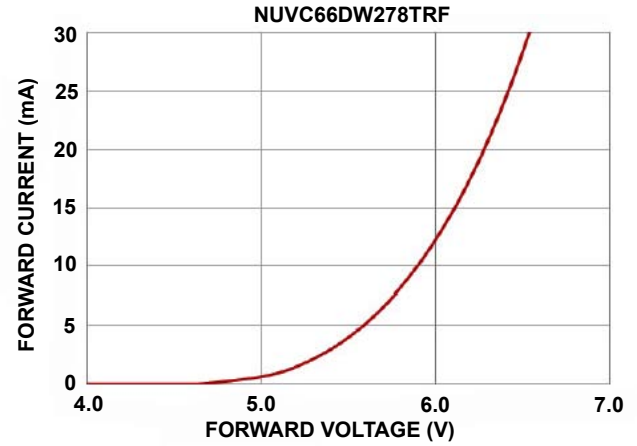
RANKING CODES (Forward Current 20mA)

Part Numbers	Ranking Codes (Note 2)	Wavelength (nm)	Radiant Flux (mW)	Voltage (V)		Thermal Resistance (Typical) Note 1	Spectrum Half Width (Typical)	Viewing Angle (Typical)
		Typical	Min.	Min.	Max.	Rth j-c	Δλ	2 θ 1/2
NUVC66DW278TRF	R1-V1	278	1.30	5.70	6.25	37°C/W	12.0nm	121°
	R1-V2			6.25	6.75			
	R1-V3			6.75	7.30			
	R2-V1		1.60	5.70	6.25			
	R2-V2			6.25	6.75			
	R2-V3			6.75	7.30			
	R3-V1		1.90	5.70	6.25			
	R3-V2			6.25	6.75			
	R3-V3			6.75	7.30			
	R4-V1		2.20	5.70	6.25			
	R4-V2			6.25	6.75			
	R4-V3			6.75	7.30			
	R5-V1		2.50	5.70	6.25			
	R5-V2			6.25	6.75			
	R5-V3			6.75	7.30			

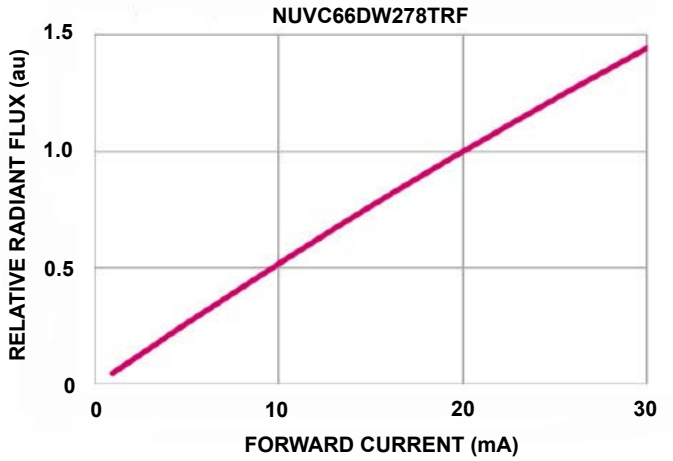
Note 1 - Rthj-c = Thermal Resistance (Junction - Case)
Note 2 - Actual ranking code will be specified by NIC on reel label.

TYPICAL CHARACTERISTIC CURVES

FORWARD VOLTAGE VS. FORWARD CURRENT @ +25°C

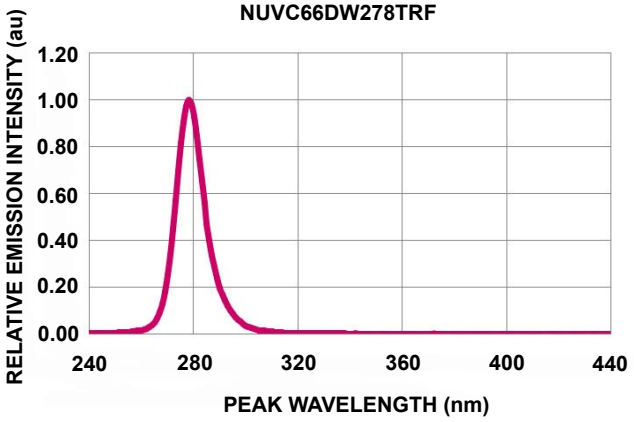


FORWARD CURRENT VS. RELATIVE RADIANT FLUX @ +25°C



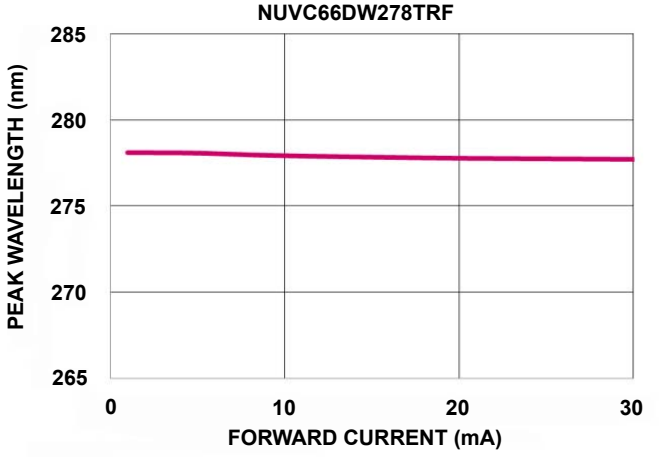
SPECTRUM @ +25°C & 20mA

NUVC66DW278TRF



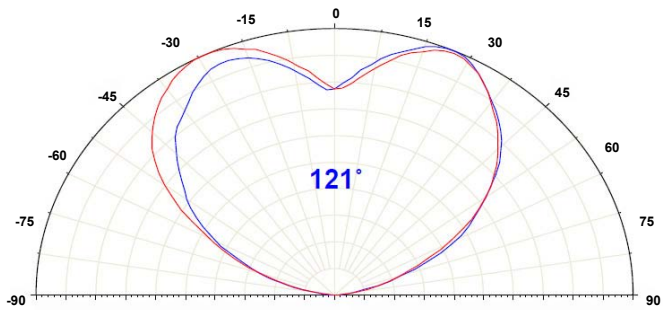
FORWARD CURRENT VS. PEAK WAVELENGTH @ +25°C

NUVC66DW278TRF

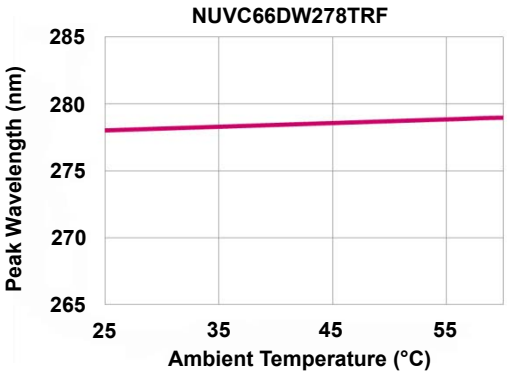


RADIATION CHARACTERISTICS
(Angle of Beam Spread, Directivity)
+25°C, 20mA If

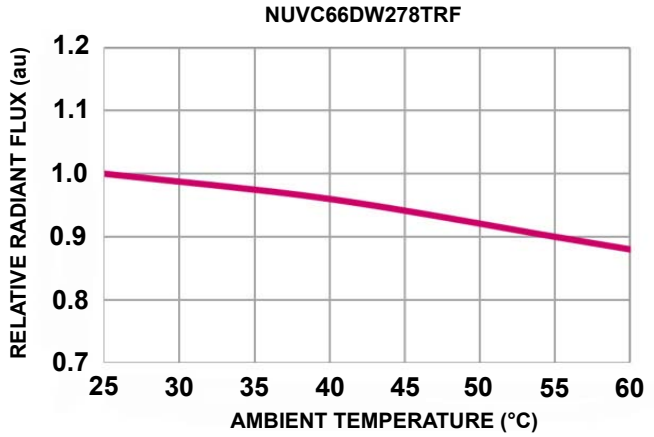
NUVC66DW278TRF



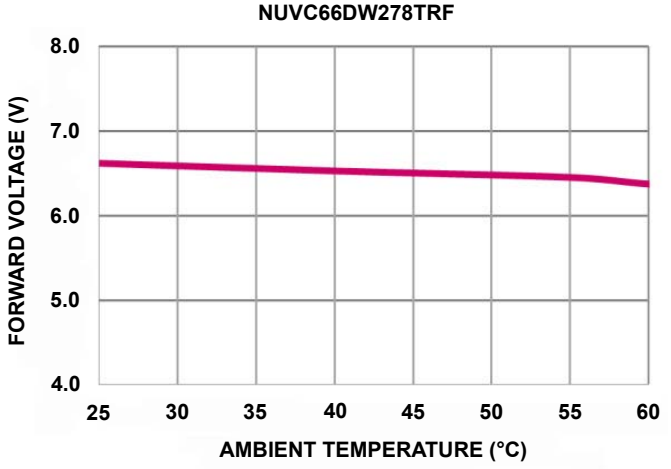
AMBIENT TEMPERATURE VS. PEAK WAVELENGTH
@ 20mA If

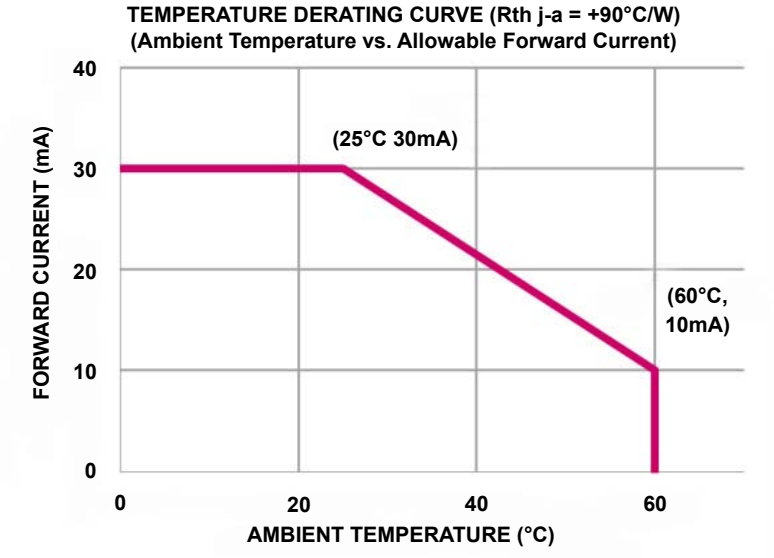


AMBIENT TEMPERATURE VS. RELATIVE RADIANT FLUX
@ 20mA If

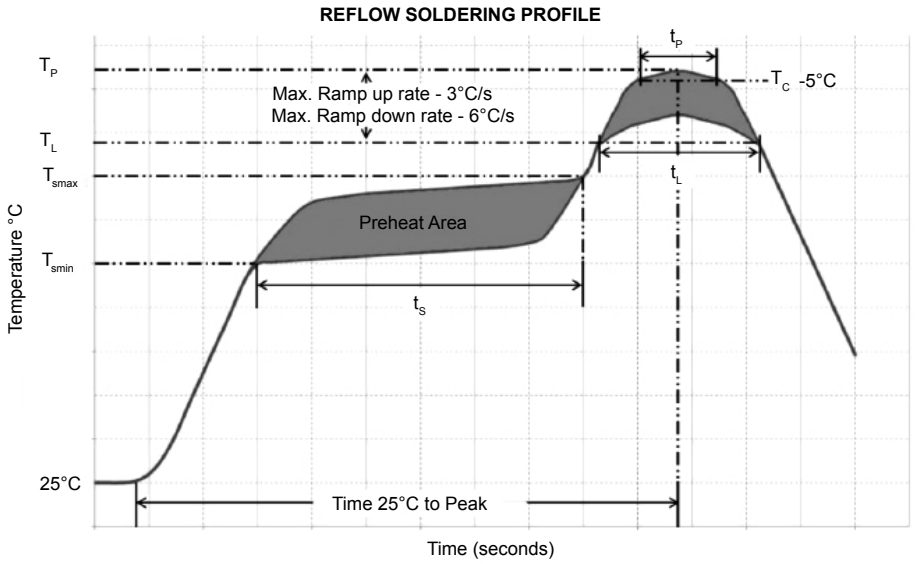


AMBIENT TEMPERATURE VS. FORWARD VOLTAGE
@ 20mA If



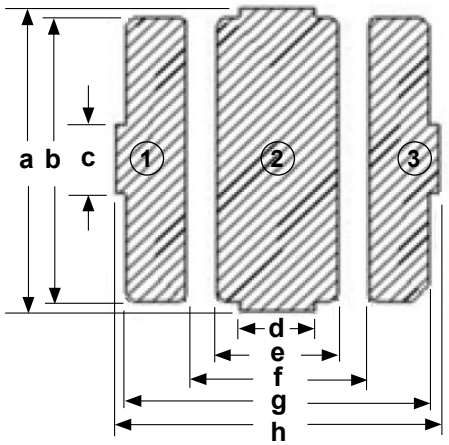


Item	Specification
Preheat (Soak Time) T_{smin} T_{smax} T_{smin} ~ T_{smax}	 150°C 200°C 60 ~ 120 sec.
Ramp Up Rate	3°C/sec.
T_L (Liquidous Temp.)	217°C
Time above T_L	60 ~ 150 sec.
T_P (Peak Temp.)	260°C
Time at T_P ±5°C	30 sec.
Ramp Down Rate	6°C/sec.
Maximum Time from 25°C to T_P	8 minutes



LAND PATTERN DIMENSIONS

Item	Dimension (mm)
a	7.44 ± 0.10
b	6.18 ± 0.10
c	1.40 ± 0.10
d	1.40 ± 0.10
e	2.30 ± 0.10
f	3.50 ± 0.10
g	6.18 ± 0.10
h	7.44 ± 0.10



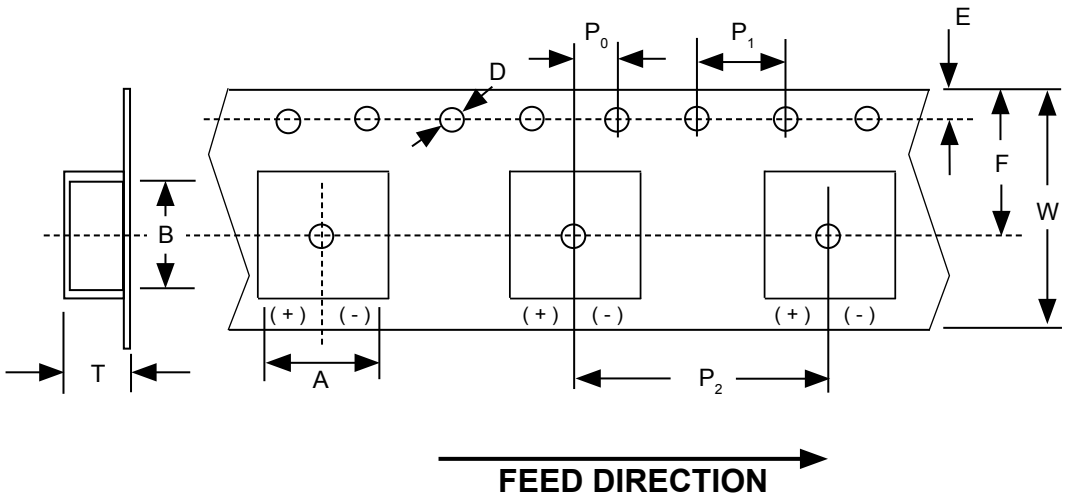
Termination	Connection
1	Anode
2	Thermal Pad (Heat Sink)
3	Cathode

RELIABILITY TEST

Item	Conditions	Failure Critieria
Load Life 1	+25°C, 20mA for 500 hours	Forward Voltage (Vf): <110% of initial value Radiant Flux (ϕe): >50% of initial value
Load Life 2	+25°C, 30mA for 500 hours	
High Temperature Load Life	+60°C, 10mA for 500 hours	
Humidity Load Life	+60°C, 90% RH, 7mA for 500 hours	
Load Temperature Load Life	-40°C, 20mA for 500 hours	
High Temperature Storage	+100°C for 500 hours	
Low Temperature Storage	-40°C for 500 hours	
Temperature Cycling 100 Cycles	-40°C (30 minutes) ~ +25°C (5 minutes) +100°C (30 minutes) ~ +25°C (5 minutes)	
Resistance to Vibration	100Hz ~ 2,000Hz ~ 100Hz for 4 minutes, 200m/s², 3 directions for 48 minutes total	
ESD (Human Body Model)	R = 1.5KΩ, C = 100pF Test Voltage = 2KV 3 times negative/positive	
Moisture Sensitivity (MSL)	3 time reflow with peak temperature +260°C Pre-conditioning: +60°C, 60% RH for 168 hours	

EMBOSSED PLASTIC TAPE DIMENSIONS (mm)

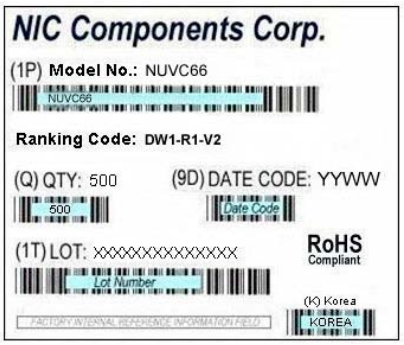
Type	Size	A ± 0.10	B ± 0.10	D +0.1/-0	E ± 0.10	F ± 0.1	P_0 ± 0.1	P_1 ± 0.1	P_2 ± 0.1	W ± 0.3	T ± 0.1
NUVC66	6.0 x 6.0	6.40	6.40	1.50	1.75	7.25	2.0	4.0	8.0	12.0	1.50

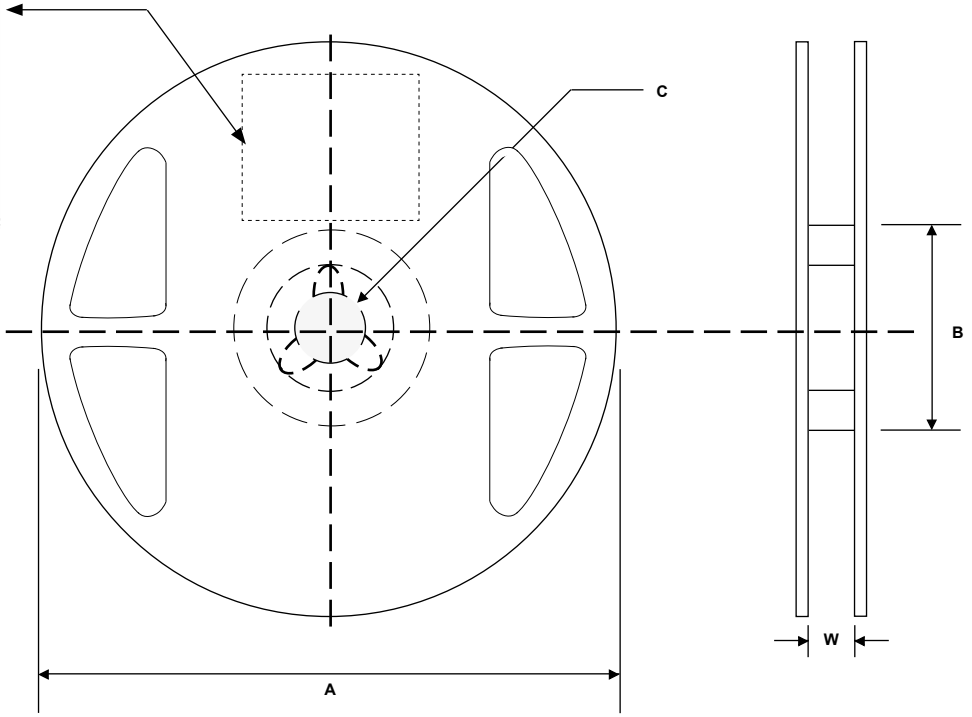


TAPE LEADER: 150mm ~ 600mm
EMPTY CARRIER AT START OF REEL: 40mm min.
EMPTY CARRIER AT END OF REEL: 40mm min.

REEL DIMENSIONS (mm)

Type	A ± 2.0	B ± 2.0	C +0.5/-0.2	W ± 0.3	Qty/Reel
NUVC66	ϕ178	ϕ60	ϕ13.0	13.0	500 max.





Precautions for storage, handling and use of UV LED components

Storage Conditions:

Before opening moisture barrier bag: 5°C ~ 30°C < 50% RH. Use within 1 year from the delivery date.

After opening moisture barrier bag: 5°C ~ 30°C < 60% RH. Solder ≤ 672 hours

Baking conditions: 65°C ± 5° < 10% RH 10 ~ 24 hours

ESD Precautions:

LEDs are sensitive to static electricity or surge voltage and current. Electrostatic discharge can damage LED components and affect component reliability. When handling LEDs the following measures against ESD are recommended :

1. Wear a wrist strap, anti-static clothes, foot wear and gloves.

2. Set up a grounded or anti-static paint floors, a grounded or the ability to surge protection workstation equipment and tools.

3. Work tables and benches should have surface mat made of a conductive materials. Appropriate grounding is required for all devices, equipment, and machinery used in the product assembly.

4. Incorporate surge protection when reviewing the design of products (Curing Module, etc).

5. If tools or equipment contain insulating materials such as glass or plastics are used the following measures against ESD are strongly recommended :

   a. Dissipating static charge with conductive materials

   b. Preventing charge generation with moisture

   c. Plug in the ionizing blowers(ionizer) for neutralizing the charge

   d. The customer is advised to check if the LEDs are damaged by ESD when performing the characteristics inspection of the LEDs in the application.

   e. Damage of LED can be detected with a forward voltage checking(measuring) at low current(≤1mA). LEDs damaged by ESD may have a current flow at a low voltage.

   * Failure Criteria : VF < 4.0V at If= 0.5mA.

Thermal Management:

Thermal management is an important consideration with respect to heat dissipation and the performance of NUVC parts. The thermal design of the product must be carefully considered during the design stage.

The co-effficency between heat generation and input power is affected by the thermal resistance of the circuit board and the density of LED placement and other components.

The deep UV (UVC) LED should be soldered on a metal PCB with high thermal conductivity or a combination of metal PCB, large volume heat sink (heat block) and mini (compact/slim) air or water cooling system.

The LED module or system should be design so that the LED package does not exceed the maximum specified junction temperature (Tj).

Cleaning:

1. Do not use brushes for cleaning or organic solvents (i.e. Acetone, TCE, etc..) for washing as they may damage the resin of the LEDs.

2. Isopropyl Alcohol(IPA) is the recommended solvent for cleaning the LEDs under the following conditions.

3. Cleaning Condition : IPA, 25°C max. × 60sec max.

4. Ultrasonic cleaning is **not** recommended.

5. Pretests should be conducted with the actual cleaning process to validate that the process will not damage the LEDs.

Manual handling and soldering:

1. Use Teflon-type tweezers to grab the base of the LED and do not apply mechanical pressure on the surface of the encapsulant.

2. The recommended soldering iron condition is 260°C for <5 seconds. For higher temperatures a short contact time is required (reduce duration 1 second for every 10°C increase in temperature).

3. The power dissipation of the soldering iron should be lower than 15W and the surface temperature of the device should be controlled to ≤ 230°C

Usage:

1. The LED should not come into direct contact with hazardous materials such as sulfur, chlorine, phthalate, etc.

2. The metal parts on the LED can rust when exposed to corrosive gases. Therefore, exposure to corrosive gases must be avoided during operation and storage.

3. The silver-plated metal parts also can be affected not only by the corrosive gases emitted inside of the end-products but by the gases penetrated from outside environment.

4. Extreme environments such as sudden ambient temperature changes or high humidity that can cause condensation must be avoided.

5. Do not directly look at the light when the LEDs are on. Proceed with caution to avoid the risk of damage to the eyes when examining the LEDs with optical instruments.