



## VL440-EMITTER



### TECHNICAL DATA

## High Power UV LED, Emitter

### Features

- Zener diode is built in the protective circuit against static electricity
- Low Voltage DC Operated
- High Power Intensity
- Lambertian Radiation Pattern
- Instant light (less than 100ns)



### Specifications (25°C)

Item	Symbol	Value	Unit
<b>Absolute Maximum Ratings</b>			
DC Forward Current	$I_F$	350	mA
Peak Pulse Forward Current *	$I_{FP}$	500	mA
Reverse Voltage	$U_R$	5	V
Power Dissipation	$P_D$	1300	mW
Operating Temperature	$T_{OP}$	-40 ... +105	°C
Storage Temperature	$T_{STG}$	-40 ... +120	°C
Soldering Temperature (for 5 sec.)	$T_{SOL}$	260 ± 5	°C

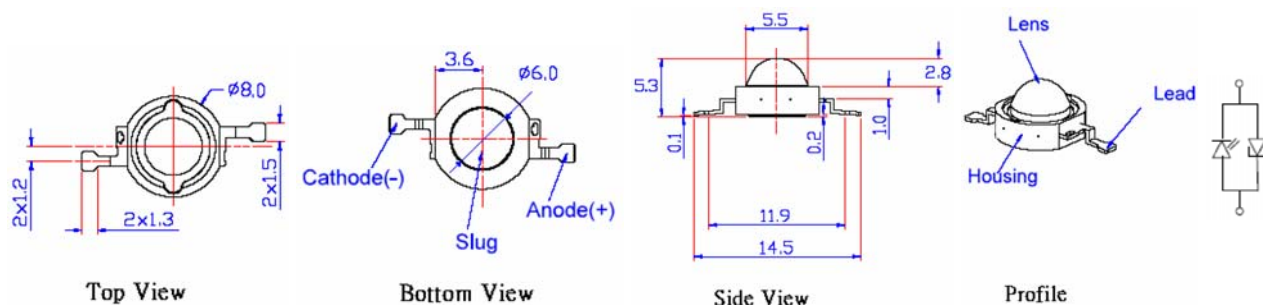
\* Note: 1/10 duty cycle at 1KHz

Item	Symbol	Min.	Typ.	Max.	Unit
<b>Optical Specifications</b>					
CW Output Power * <sup>1</sup>	$P_O$	250	-	350	mW
Peak Wavelength * <sup>2</sup>	$\lambda_P$	435	440	445	nm
Viewing Angle	$\varphi$	140			deg.
<b>Electrical Specifications</b>					
Forward Current	$I_F$	-	350	-	mA
Forward Voltage * <sup>3</sup>	$V_F$	3.2	-	4.2	V

\* Note:

1. Peak wavelength measurement allowance is ± 2 nm
2. Optical output measurement allowance is ± 10%
3. Forward voltage measurement allowance is ± 0.2 V

### Outline Dimensions (Unit: mm, Tolerance: ±0.2 mm)

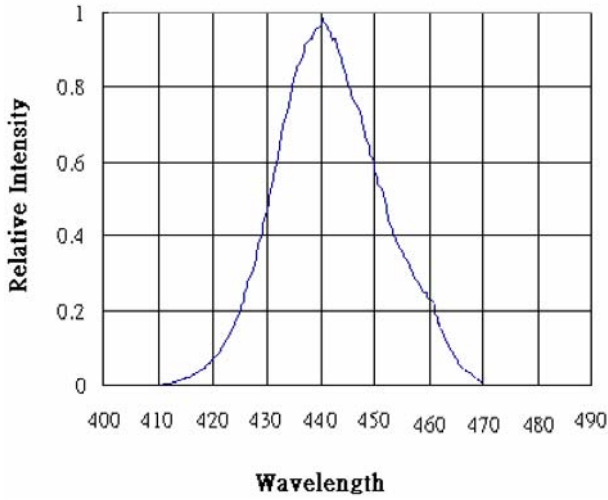


\* Note: the anode of the device is denoted by a hole in the lead frame

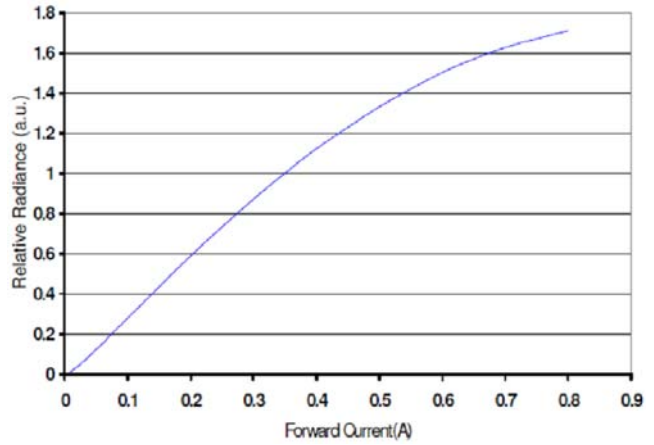


## Typical Performance Curves

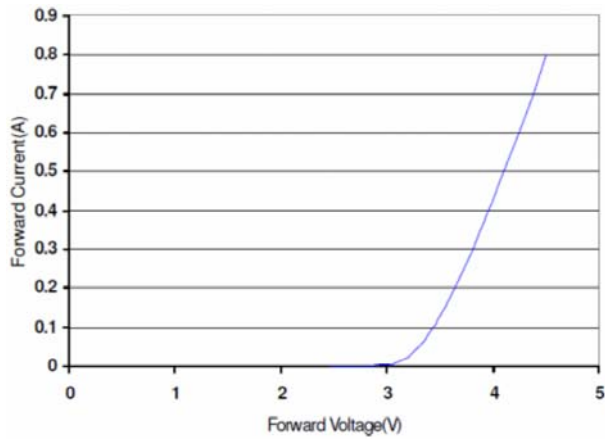
### Relative Intensity vs. Wavelength



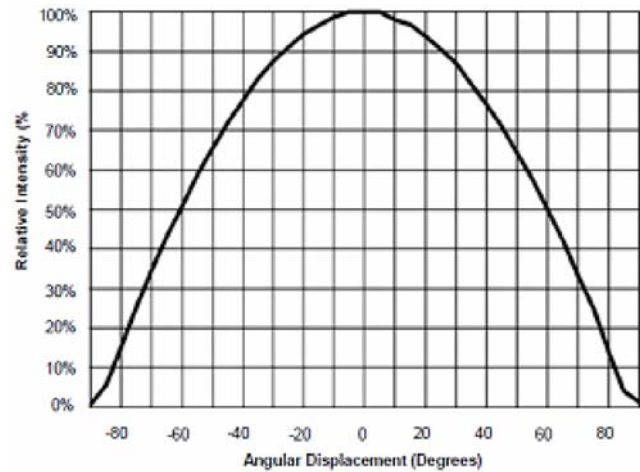
### Forward Voltage vs. Forward Current



### Forward Voltage vs. Forward Current



### Radiation Pattern





## Reliability

No.	Test Item	Test Conditions	Note	Sample	Pass
1	Room Temperature Operating Life	T <sub>a</sub> =25°C, I <sub>F</sub> =350mA	1000 hrs.	20	OK
2	Solder Heat Resistance	260±5°C, 5secs		20	OK
3	High Temperature / High Humidity Operation Life	T <sub>a</sub> =85°C, RH=85%, I <sub>F</sub> =350mA	1000 hrs.	20	OK
4	Temperature Cycle	-40°C ... +105°C, 30 min dwell, 5 min transfer	200 Cycles	20	OK
5	Thermal Shock	-40°C ... +105°C, 20 min dwell, 20 sec transfer	200 Cycles	20	OK
6	High Temperature Storage	T <sub>stg</sub> =120°C	1000 hrs.	20	OK
7	Low Temperature Storage	T <sub>stg</sub> =-40°C	1000 hrs.	20	OK
8	Variable Vibration Frequency	10-2000-10Hz 20G 1 min, 1.5mm, 3timesx/axis		20	OK
9	Mechanical Shock	1500G, 0.5msec pulse, 5 shocks each 6 axis		20	OK
10	Natural Drop	On concrete from 1.2m, 3times		20	OK

### Conclusions:

1. The reliability tests were designed to evaluate both package integrity as well as workability of product performance over time.
2. All samples have done well by completed test required and passed all the qualification criteria with zero failure. From design standpoint, this package is robust enough to meet it's data sheet conditions.
3. Based on the food result shown on the above test, this product is qualified and released for market.

## Precaution for Use

### 1. Cautions

- This device is a UV LED, which radiates UV light during operation.
- DO NOT look directly into the UV light or look through the optical system. To prevent in adequate exposure of UV radiation, wear UV protective glasses.

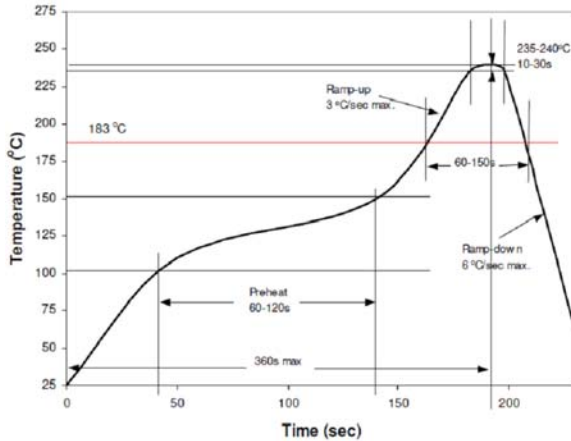
### 2. Reflow Soldering Characteristics

Profile Feature	Sn-Pd Eutectic Assembly	Lead(Pb)-Free Assembly
Average Ramp-Up Rate (T <sub>Smax</sub> to T <sub>P</sub> )	3°C / second max.	3°C / second max.
Preheat Temperature Min (T <sub>Smin</sub> )	100°C	150°C
Preheat Temperature Max (T <sub>Smax</sub> )	150°C	200°C
Preheat Time (t <sub>Smin</sub> to t <sub>Smax</sub> )	60-120 seconds	60-180 seconds
Time maintained above Temperature (T <sub>L</sub> )	183°C	217°C
Time maintained above Time (t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak / Classification Temperature (T <sub>P</sub> )	240°C	260°C
Time Within 5°C of Actual Peak Temperature (t <sub>p</sub> )	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.



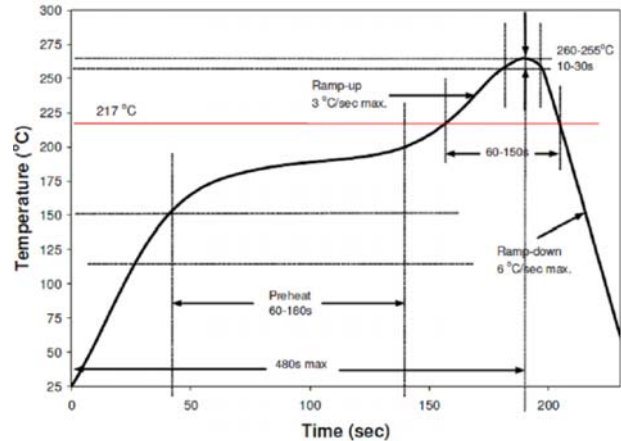
## Lead Solder

Classification Reflow Profile (JEDEC J-STD-020C)

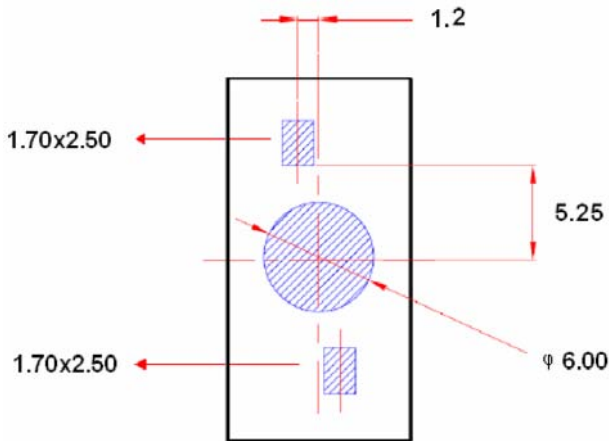


## Lead-Free Solder

Classification Reflow Profile (JEDEC J-STD-020C)



## Recommended Soldering Pattern



### Note:

- Electrical isolation is required between Slug and solder Pad.
- For optimal thermal performance, maximize board metalization at heat slug contact.
- Reflow soldering should not be done more than one time.
- When soldering, do not put stress on the emitters during heating.
- After soldering, do not warp the circuit board

### 3. Static Electricity

- The LEDs are very sensitive to Static Electricity and surge voltage. So it is recommended that a wrist band or an anti-electrostatic glove be used when handling the LEDs.
- All devices, equipment and machinery must be grounded properly. It is recommended that precautions should be taken against surge voltage to the equipment that mounts the LEDs.

### 4. Heat Generation

- The powered LEDs generate heat. Heat dissipation should be considered in the application design to avoid the environmental conditions for operation in excess of the absolute maximum ratings.