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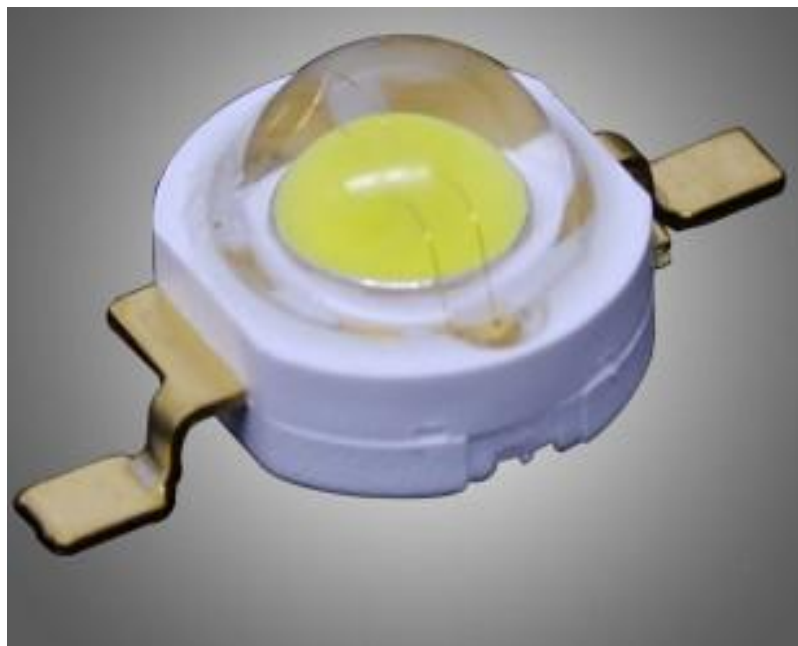
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## VPL-1/NW

### High Power LEDs Technical Data Sheet

**Emitted Color: Natural White**



## ● Features

1. Feature of the device: Small package with high efficiency
2. Typical color temperature: 6000 K.
3. Typical viewing angle: 120°
4. Typical light flux output: 90 lm @ 350mA..
5. Soldering methods: SMT
6. Grouping parameter: Luminous Flux, Forward Voltage and CCT.
7. Thermal resistance (Junction to Heat sink): 15°C /W
8. The product itself will remain within RoHS compliant..

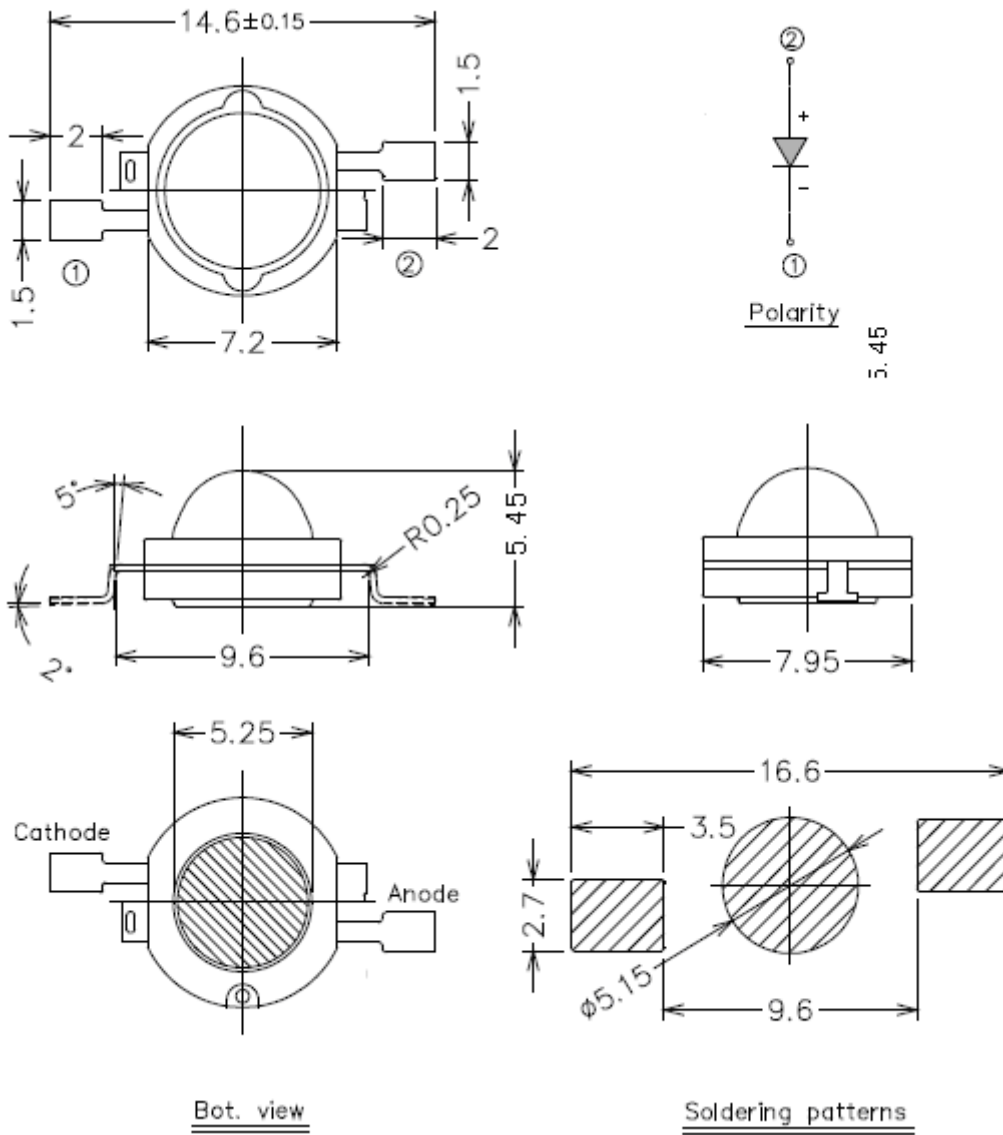
## ● Applications

1. Design and effect illumination
2. Interior automotive lighting(e.g. dashboard backlighting)
3. Room lighting (e.g. luminaries, spotlights)
4. Reading light (aircraft, car, bus)
5. Signal and symbol luminaries
6. Marker lights (e.g. steps, exit ways, etc.)
7. Architectural illumination

## ● Device Selection Guide

Chip	Emitted Color	Resin Color
Material		
InGaN	Natural White	Water Clear

● Package Outline Dimensions



**Note:** Tolerances unless mentioned is  $\pm 0.1$ mm; Unit = mm

● **Absolute Maximum Ratings (Ta=25°C)**

Parameter	Symbol	Rating	Unit
Reverse Voltage	V <sub>R</sub>	5	V
Forward Current	I <sub>F</sub>	400	mA
Peak Forward Current (Duty 1/10 @10ms)	I <sub>FP</sub>	700	mA
Electrostatic Discharge(HBM)	ESD	4000	V
Operating Temperature	Topr	-40 ~ +85	°C
Storage Temperature	Tstg	-40 ~ +90	°C
Soldering Temperature	Tsol	Reflow Soldering: 260 °C for 10 sec. Hand Soldering : 350 °C for 3 sec.	

**Note:** The products are sensitive to static electricity and must be carefully taken when handling products.

● **Electro-Optical Characteristics (Ta=25°C)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Luminous Flux	Φ	90	-----	100	lm	I <sub>F</sub> =350mA
Viewing Angle	2θ1/2	-----	120	-----	deg	I <sub>F</sub> =350mA
Forward Voltage	V <sub>F</sub>	3.0	-----	3.6	V	I <sub>F</sub> =350mA
CCT	CCT	5500	-----	6500	K	I <sub>F</sub> =350mA

**Notes:**

1. Luminous Flux tolerance: ±7%
2. Tolerance of Forward Voltage: ±0.05V
3. Tolerance of CCT: ±100K

**Bin Range of Luminous Flux**

Bin Code	Min.	Max.	Unit	Condition
24-25	90	100	lm	I <sub>F</sub> =350mA

Luminous Flux measurement tolerance: ±7%

### Bin Range of Forward Voltage

Bin Code	Min.	Max.	Unit	Condition
1-9	3.00	3.20	V	I <sub>F</sub> =350mA
2-1	3.20	3.40		
2-2	3.40	3.60		

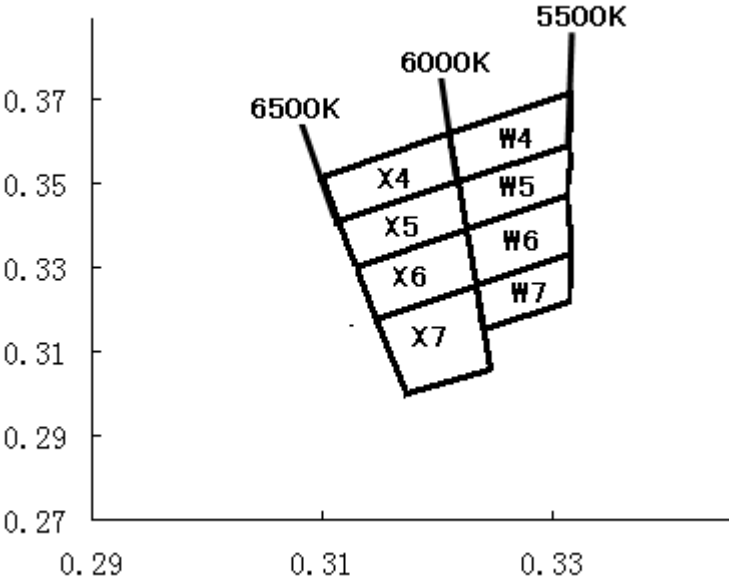
Tolerance of Forward Voltage: ±0.05V

### Bin Range of Chromaticity Coordinates

CCT	Bin Code	CIE_x	CIE_y	CCT	Bin Code	CIE_x	CIE_y
5500K~6000K	W4	0.3316	0.3715	6000K~6500K	X4	0.321	0.3619
		0.3316	0.3592			0.3218	0.3506
		0.3218	0.3506			0.3114	0.3411
		0.321	0.3619			0.31	0.3513
	W5	0.3316	0.3592		X5	0.3218	0.3506
		0.3314	0.3473			0.3225	0.3391
		0.3225	0.3391			0.3129	0.3301
		0.3218	0.3506			0.3114	0.3411
	W6	0.3314	0.3473		X6	0.3225	0.3391
		0.3316	0.3333			0.3233	0.3258
		0.3233	0.3258			0.3146	0.3177
		0.3225	0.3391			0.3129	0.3301
	W7	0.3316	0.3333		X7	0.3233	0.3258
		0.3315	0.322			0.3245	0.3059
		0.3239	0.3152			0.3172	0.2999
		0.3233	0.3258			0.3146	0.3177

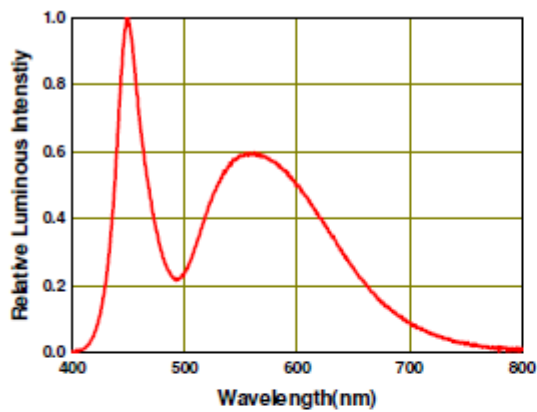
**Note:** Tolerance of the Chromaticity Coordinates: ±0.005

### The C.I.E. 1931 Chromaticity Diagram

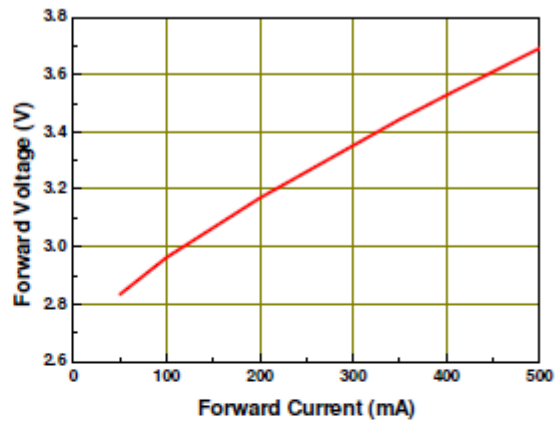


## Typical Electro-Optical Characteristics Curves

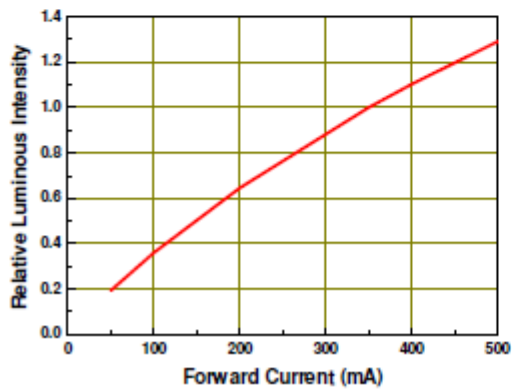
Relative Spectral Distribution,  
 $I_f=350\text{mA}$ ,  $T_{\text{Soldering}}=25^\circ\text{C}$



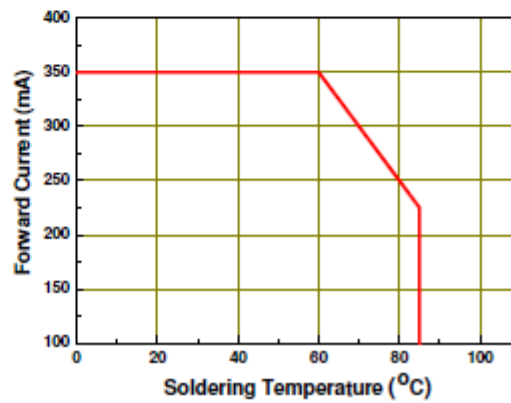
Forward Voltage vs Forward Current,  
 $T_{\text{Soldering}}=25^\circ\text{C}$



Relative Luminous Intensity vs Forward Current,  $T_{\text{Soldering}}=25^\circ\text{C}$



Forward Current Derating Curve,  
 Derating based on  $T_{\text{MAX}}=125^\circ\text{C}$



● **Reliability Test Items and Conditions**

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%

LTPD : 10%

No.	Items	Test Condition	Test Hours/Cycles	Sample Size	Ac/Re
1	Reflow Soldering	Temp. : 260°C±5°C Min. 10 sec.	6 Min.	22 PCS	0/1
2	Temperature Cycle	H : +100°C 15min J 5 min L : -40°C 15min	300 Cycles	22 PCS.	0/1
3	Thermal Shock	H : +100°C 5min J 10 sec L : -10°C 5min	300 Cycles	22 PCS.	0/1
4	High Temperature Storage	Temp. : 100°C	1000 Hrs.	22 PCS.	0/1
5	Low Temperature Storage	Temp. : -40°C	1000 Hrs.	22 PCS.	0/1
6	DC Operating Life	I <sub>F</sub> = 350 mA / 25°C	1000 Hrs.	22 PCS.	0/1
7	High Temperature / High Humidity	85°C/85%RH	1000 Hrs.	22 PCS.	0/1



## ● Precautions for Use

### 1. Over-current-proof

Customer must apply resistors for protection; otherwise slight voltage shift will cause big current change (Burn out will happen).

### 2. Storage

2.1 Do not open moisture proof bag before the products are ready to use.

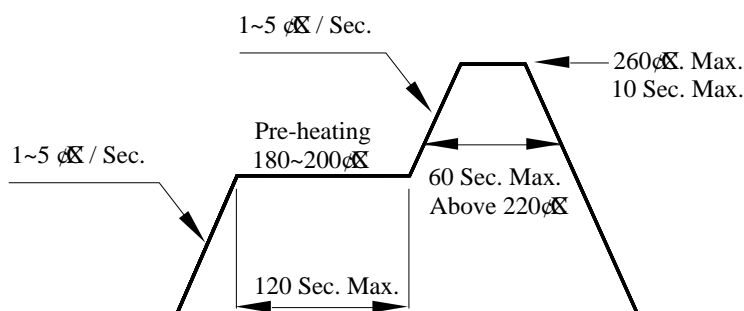
2.2 Before opening the package: The LEDs should be kept at 30°C or less and 90%RH or less.

2.3 After opening the package: The LED's floor life is 1 year under 30°C or less and 60% RH or less. If unused LEDs remain, it should be stored in moisture proof packages.

2.4 If the moisture absorbent material (silica gel) has faded away or the LEDs have exceeded the storage time, baking treatment should be performed using the following conditions.  
Baking treatment: 60±5°C for 24 hours.

### 3. Soldering Condition

#### 3.1 Pb-free solder temperature profile



3.2 Reflow soldering should not be done more than two times.

3.3 When soldering, do not put stress on the LEDs during heating.

3.4 After soldering, do not warp the circuit board.

#### 4. Soldering Iron

Each terminal is to go to the tip of soldering iron temperature less than 350°C for 3 seconds within once in less than the soldering iron capacity 25W. Leave two seconds and more intervals, and do soldering of each terminal. Be careful because the damage of the product is often started at the time of the hand solder.

#### 5. Repairing

Repair should not be done after the LEDs have been soldered. When repairing is unavoidable, a double-head soldering iron should be used (as below figure). It should be confirmed beforehand whether the characteristics of the LEDs will or will not be damaged by repairing.

