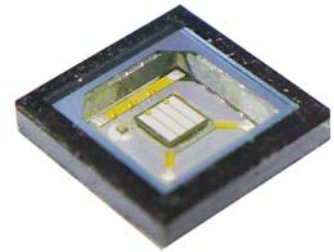


# S5050U-VNB1

## High Power UV LED

### Introduction

The S5050U-VNB1 is a compact and reliable 1-chip UV LED with a quartz glass cover. Featuring high radiometric power density and design flexibility, the S5050U-VNB1 spectrum can be tailored to your printer, inkjet, glue adhesive curing, contact lens, and black light applications.



### Table of Contents

Characteristics .....	1
Mechanical Dimensions .....	3
Recommended Solder Pad Design.....	4
Relative Spectral Power Distribution.....	5
Typical Spatial Radiation Pattern .....	5
Typical Forward L-I Characteristics .....	6
Typical Forward I-V Characteristics .....	6
Recommended Soldering Profile .....	7
Thermal Design.....	8

**RoHS Compliant**

## Characteristics

### Absolute Maximum Ratings ( $T_j = 25^\circ\text{C}$ )

Parameter	Rating
	UV Series
DC Forward Current (mA)	700 mA
LED Junction Temperature	150°C
LED Operating Temperature	-40°C ~ 85°C
Storage Temperature	-40°C ~ 125°C
Soldering Temperature	Max. 260°C / Max. 10sec. (JEDEC 020c)
ESD Sensitivity	2,000 V HBM (JESD-22A-114-B)
Reverse Voltage	Not designed to be driven in reverse bias ( $V_R \leq 5V$ )
Preconditioning	Acc. to JEDEC Level 2

### General Characteristics at 700mA

Part number	Color	Peak Wavelength $\lambda_p$		$2\theta_{1/2}$	Temperature Coefficient of Vf (mV/°C)	Thermal Resistance Junction to Pad (°C/W)
		Min	Max		$\Delta V_f / \Delta T_j$	$R\theta_{j-L}$
S5050U-VNB1-A1J11H	U2B	365	370	110	-3~-5	5
	U3A	370	375	110	-3~-5	5

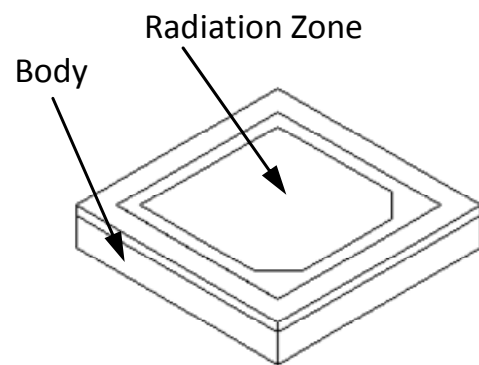
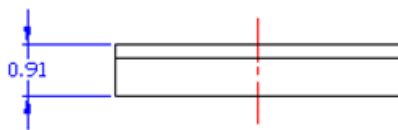
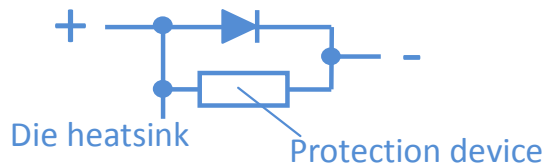
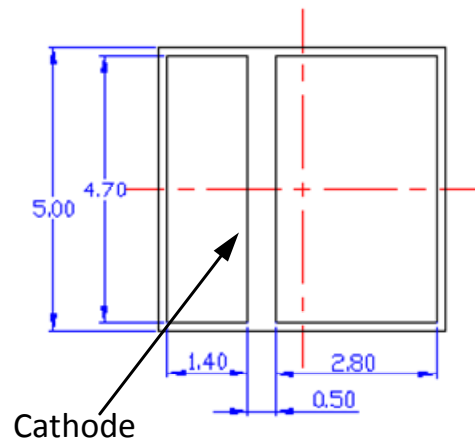
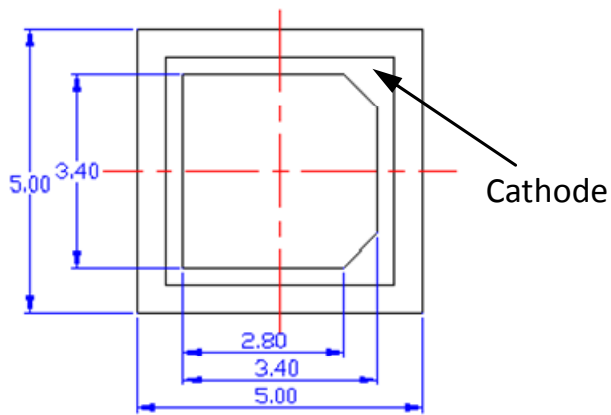
Notes: The peak wavelength is measured with an accuracy of  $\pm 1\text{nm}$

Radiometric Power and Forward Voltage ( $T_j = 25^\circ\text{C}$ )

Part number	Color	Performance at Test Current (700mA)				
		Group	Radiometric Power (mW)		VF	
			Min	Max	Min	Max
S5050U-VNB1-A1J11H	U2B (365-370nm)	ND1	200	240	3.25	5.0
		ND2	240	280	3.25	5.0
		ND3	280	320	3.25	5.0
		ND4	320	360	3.25	5.0
		ND5	360	400	3.25	5.0
		NE1	400	440	3.25	5.0
		NE2	440	480	3.25	5.0
	U3A (370-375nm)	ND1	200	240	3.25	5.0
		ND2	240	280	3.25	5.0
		ND3	280	320	3.25	5.0
		ND4	320	360	3.25	5.0
		ND5	360	400	3.25	5.0
		NE1	400	440	3.25	5.0
		NE2	440	480	3.25	5.0

- Note: 1. Radiometric power is measured with an accuracy of  $\pm 10\%$   
 2. The forward voltage is measured with an accuracy of  $\pm 0.2\text{V}$

## Mechanical Dimensions



### Notes :

1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are  $\pm 0.13\text{mm}$  unless otherwise indicated

### Materials

Chip : MvpLED UV LED

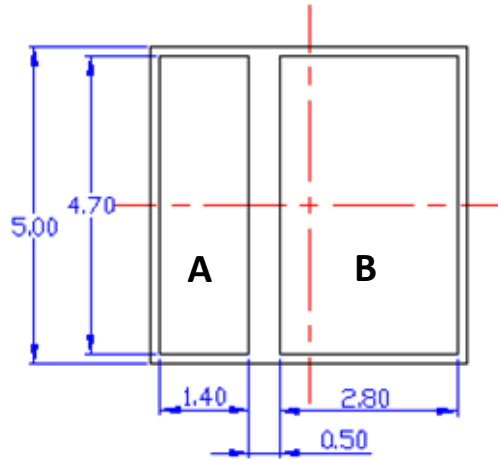
Submount : Silicon

Glass protection : UV resistant Hard Glass

Electrodes : Au Plating

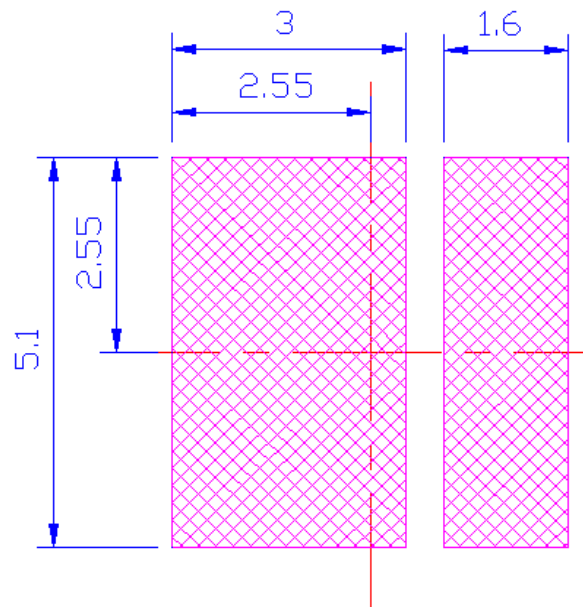
## Recommended Solder Pad Design

### Emitter Pad Design



Pad	Function
A	Cathode
B	Anode and Thermal

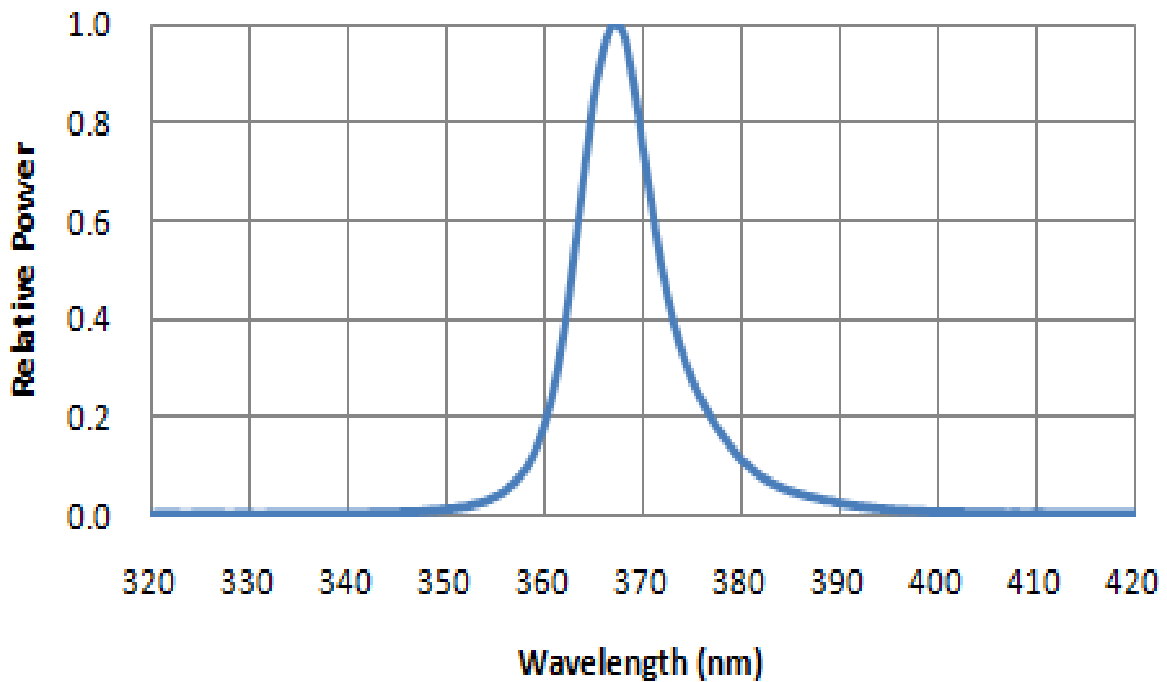
### Solder Pad Design



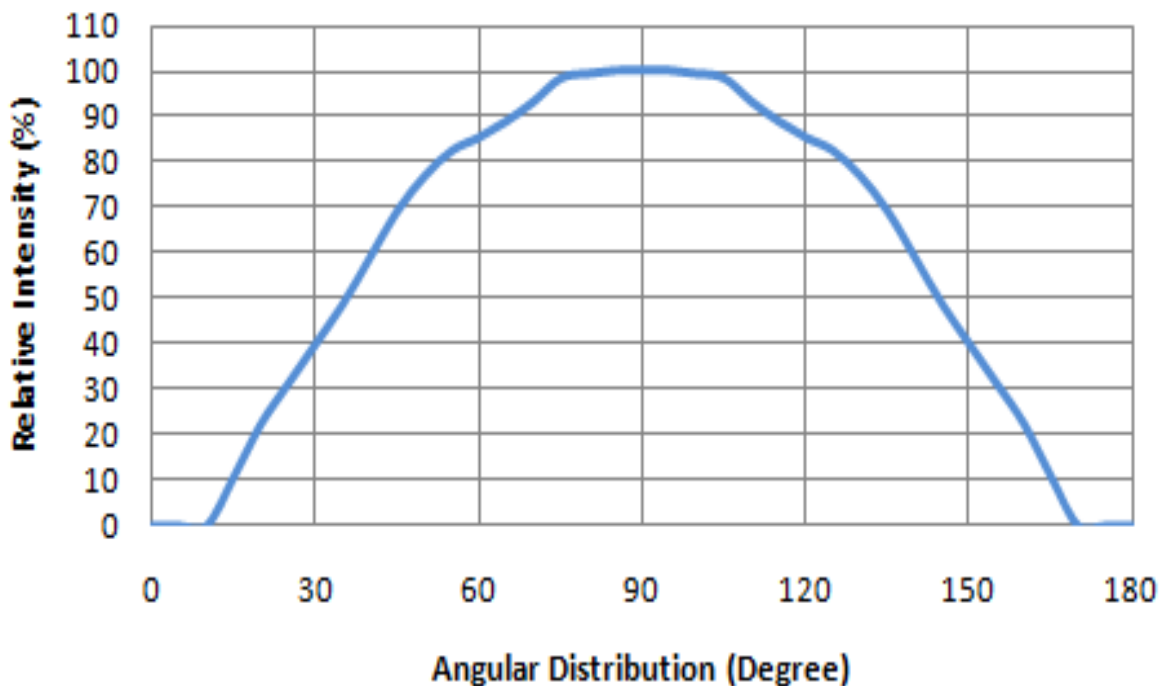
Notes :

1. Drawing is not to scale
2. All dimensions are in millimeter

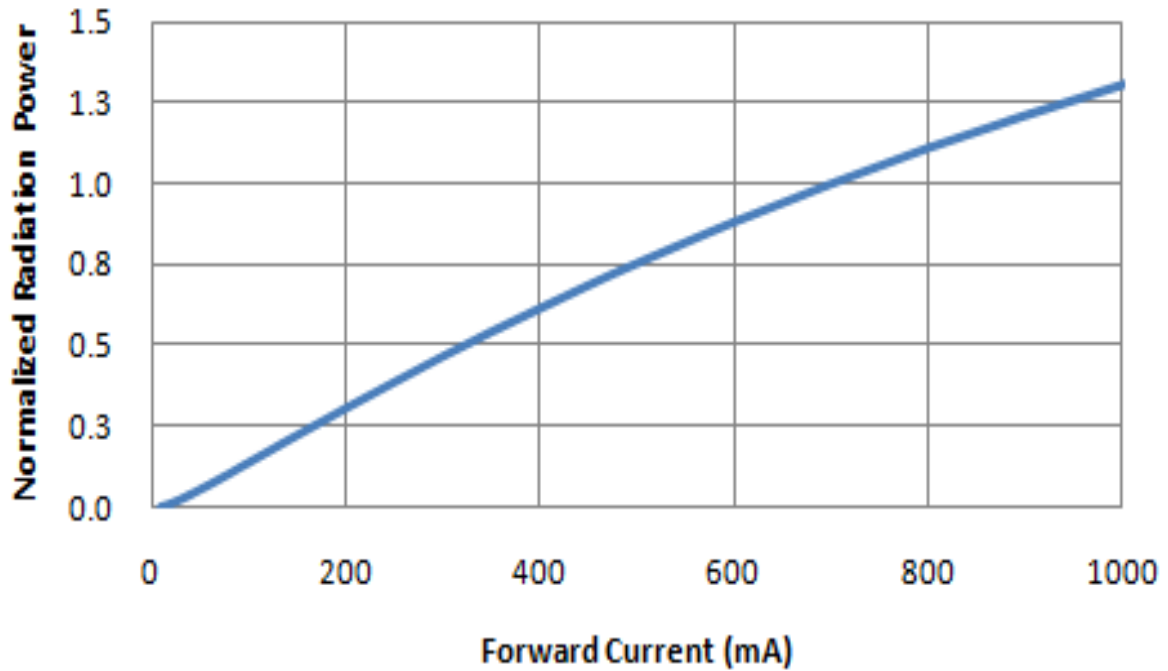
## Relative Spectral Power Distribution, $T_j=25^\circ\text{C}$



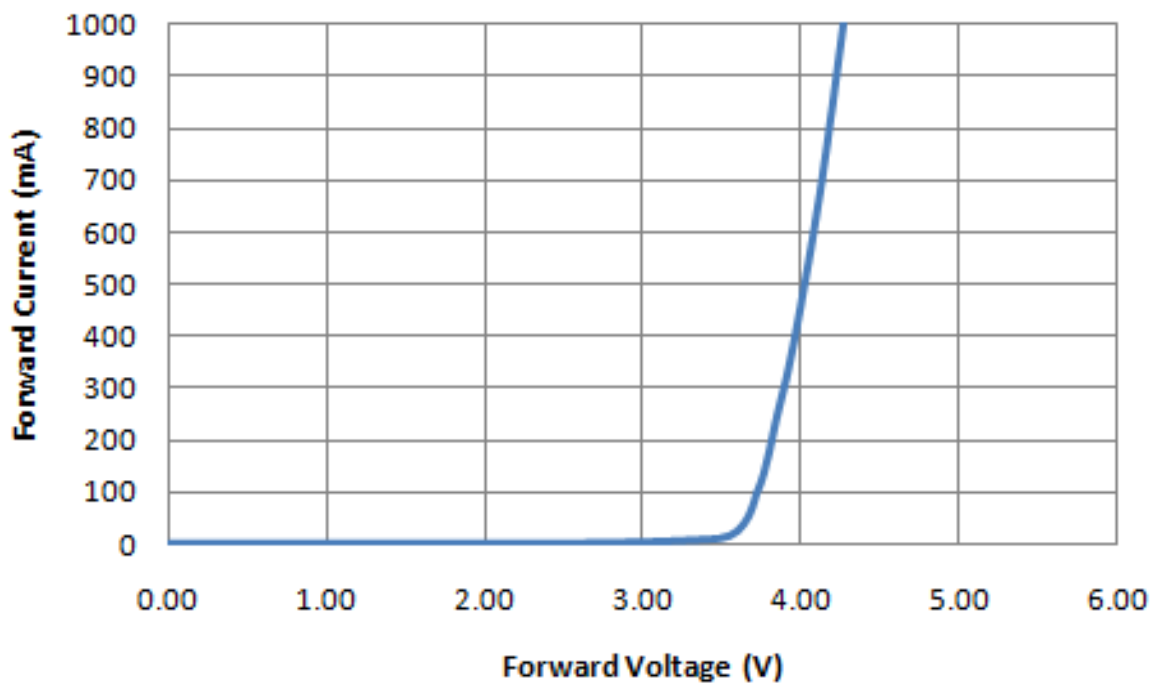
## Typical Spatial Radiation Pattern



### Typical Forward L-I Characteristics, $T_j=25^\circ\text{C}$

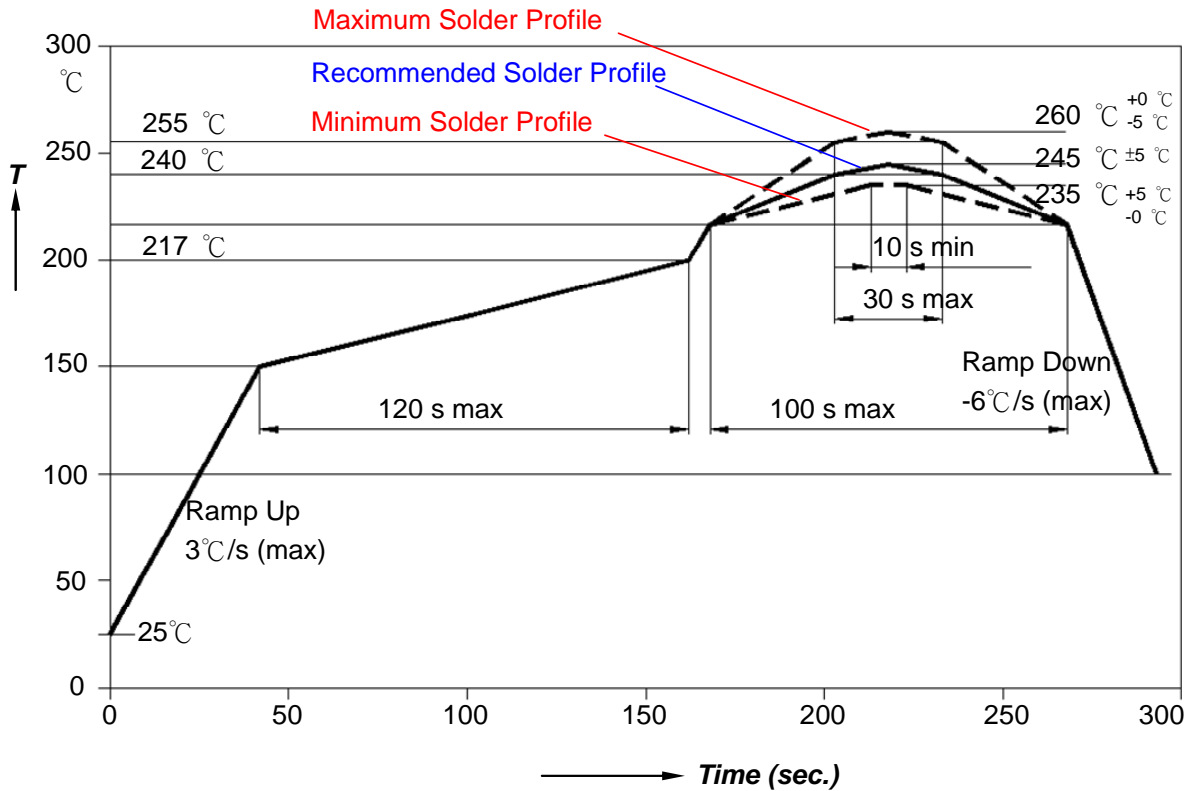


### Typical Forward I-V Characteristics, $T_j=25^\circ\text{C}$



## Recommended Soldering Profile

The LEDs can be soldered using the parameters listed below. As a general guideline, the users are suggested to follow the recommended soldering profile provided by the manufacturer of the solder paste. Although the recommended soldering conditions are specified in the list, reflow soldering at the lowest possible temperature is advised for the LEDs.

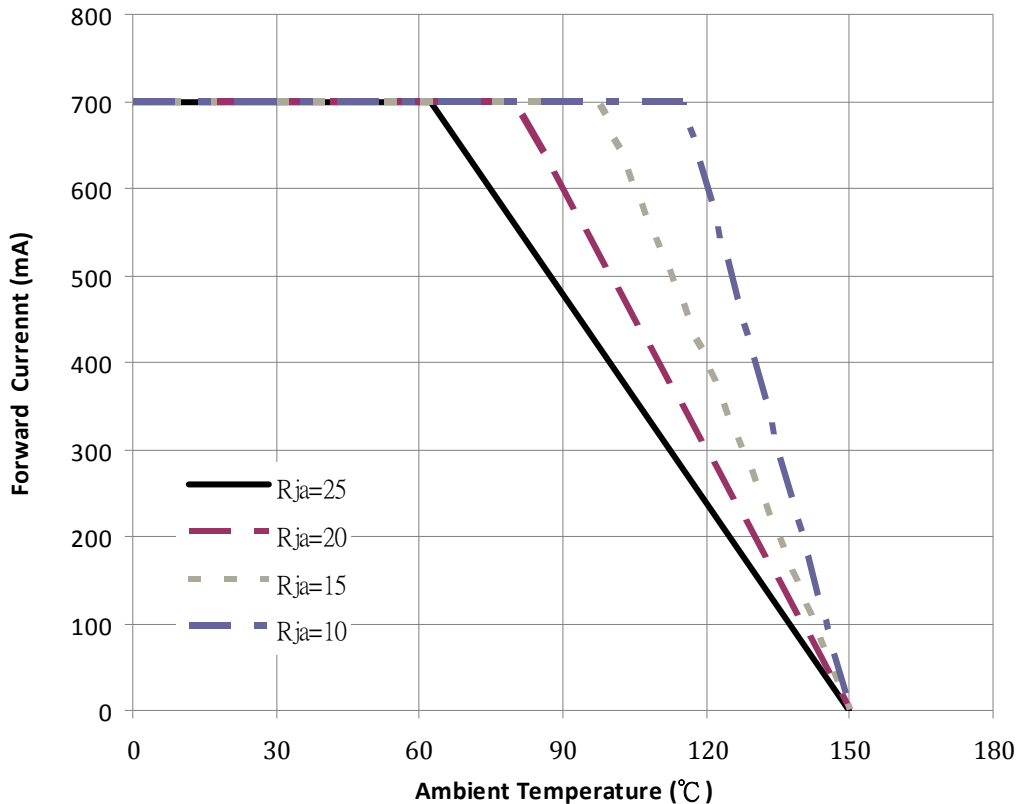


Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate (T <sub>Smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
- Temperature Min(T <sub>Smin</sub> )	100°C	150°C
- Temperature Max(T <sub>Smax</sub> )	150°C	200°C
- Time(t <sub>Smin</sub> to t <sub>Smax</sub> )	60-120 seconds	60-180 seconds
Time maintained above:		
- Temperature(T <sub>L</sub> )	183°C	217°C
- Time(t <sub>L</sub> )	60-150 seconds	60-150 seconds
Peak/classification Temperature(T <sub>p</sub> )	215°C	260°C
Time within 5°C of actual Peak Temperature(tp)	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.



## Thermal Design

Thermal design of the end product is important. The thermal resistance between the junction and the solder point ( $R_{\theta_{j-p}}$ ) and the end product should be designed to minimize the thermal resistance from the solder point to ambient in order to optimize the emitter life and optical characteristics. The maximum operation current is determined by the plot of Allowable Forward Current vs. Ambient Temperature.



The junction temperature can be correlated to the thermal resistance between the junction and ambient ( $R_{ja}$ ) by the following equation.

$$T_j = T_a + R_{ja} * W$$

$T_j$ : LED junction temperature

$T_a$ : Ambient temperature

$R_{ja}$ : Thermal resistance between the junction and ambient

$W$ : Input power ( $I_F * V_F$ )

## About Us

SemiLEDs is an innovative manufacturer of chip-level and packaged LEDs that enable today's advanced solid state lighting solutions. Fully ISO9001 certified, with state of the art fabrication facilities in Hsinchu Science Park, Taiwan, the company employs patented and proprietary technologies that deliver high performance with increased color stability and lumen maintenance. SemiLEDs visible- and ultraviolet-LEDs are found in a wide variety of general lighting applications, including street lights and commercial, industrial and residential architectural lighting, along with specialty industrial applications such as UV curing, medical/cosmetic, counterfeit detection, and horticulture.

SemiLEDs is a publicly traded company on NASDAQ Global Select Market (stock symbol "LEDS"). For investor information, please contact us at [investors@semileds.com](mailto:investors@semileds.com).

For further company or product information, please visit us at [www.semileds.com](http://www.semileds.com) or please contact [sales@semileds.com](mailto:sales@semileds.com).



[www.semileds.com](http://www.semileds.com)

### ASIA PACIFIC

3F, No. 11, KeJung Rd.

Chu-Nan Site

Hsinchu Science Park

Chu-Nan 350, Miao-Li County

Taiwan, ROC

Tel: +886-37-586788

Fax: +886-37-582688

[sales@semileds.com](mailto:sales@semileds.com)