

N5TL-WX-A

High Power LED

Introduction

The N5TL-WX-A LED from SemiLEDs brings industry leading technology to the solid state lighting market with its high quality and performance. With a silicone lens and uniquely designed ceramic substrate, N5TL-WX-A LEDs from SemiLEDs feature optimized brightness and efficacy, as well as excellent reliability.

With SemiLEDs' new phosphor technology, N5TL-WX-A is able to provide consistent CIE coordinates under various environmental conditions. In-house testing showed typical CCT change of less than 50K and 100K for warm white and cool white, respectively.

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RoHS Compliant

Characteristics

Absolute Maximum Ratings (Tj=25°C)

Parameter	Rating
	White Series
DC Forward Current (mA)	700 mA
Peak Forward Current (mA)	1000 mA (less than 1/10 duty cycle @1KHz)
LED Junction Temperature	150°C
LED Operating Temperature	-40°C~125°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 (VR ≤ 5V)
Preconditioning	Acc. to JEDEC Level 2

General Characteristics at 350mA (Tj=25°C)

Part number	Color	Correlated Color Temperature, CCT		2θ _{1/2}	Temperature Coefficient of Vf (mV/°C)	Thermal Resistance Junction to Pad (°C/W) Rθ _{J-L}
		Min	Max			
N5TL-W0-A	Daylight	4750K	7000K	145	-3	1.5
N5TL-W7-A	Warm White	2600K	3700K	145	-3	1.5

Notes:

1. The CCT is measured with an accuracy of ±200K
2. The CRI is measured with a tolerance of ±2
 Typical CRI for Cool White (4750 K – 10,000 K CCT) is 70.
 Minimum CRI for Warm White (2600 K – 3700 K CCT) is 80.

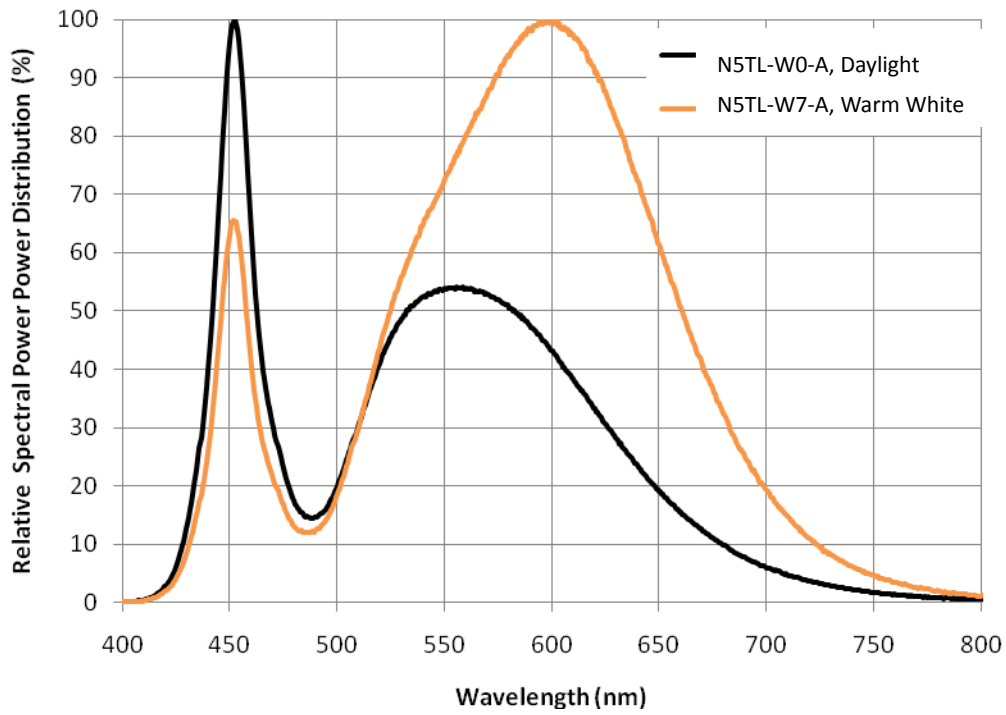
Luminous Flux and Forward Voltage (Tj=25°C)

Part number	Color	Performance at Test Current 350mA				Performance at 700mA
		Group	Minimum Luminous Flux (lm)	VF		Typical Luminous Flux (lm)
				Min	Max	
N5TL-W0-A	Daylight	VG	400	11	15	680
		VH	440	11	15	750
		VI	480	11	15	815
		VJ	520	11	15	885
N5TL-W7-A	Warm White	UH	320	11	15	545
		UI	340	11	15	580
		UJ	360	11	15	615
		UK	380	11	15	645

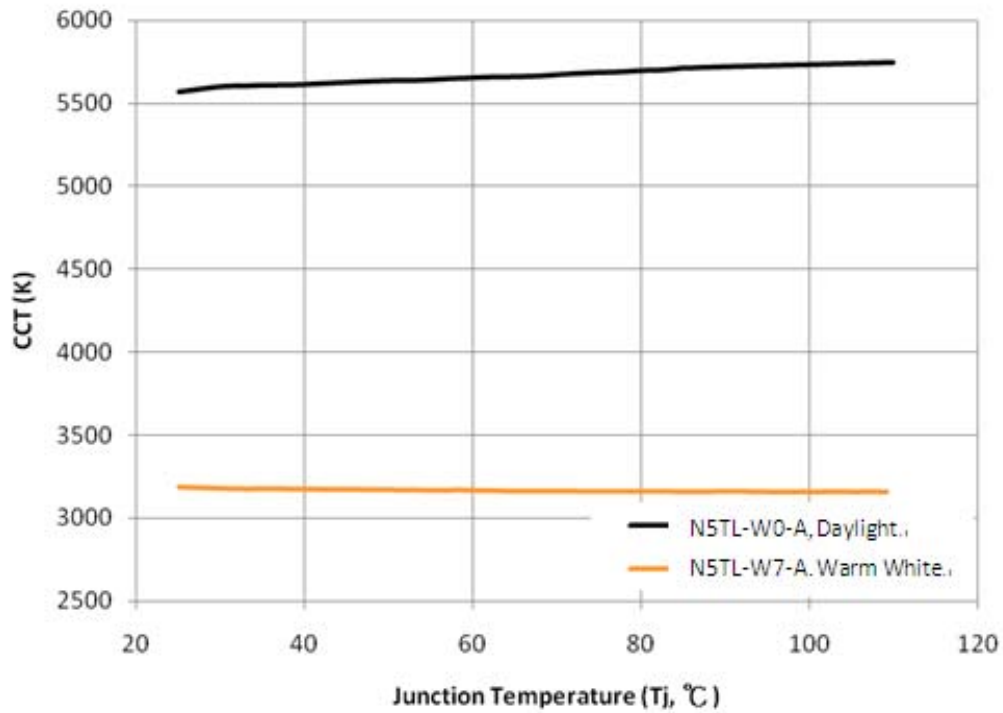
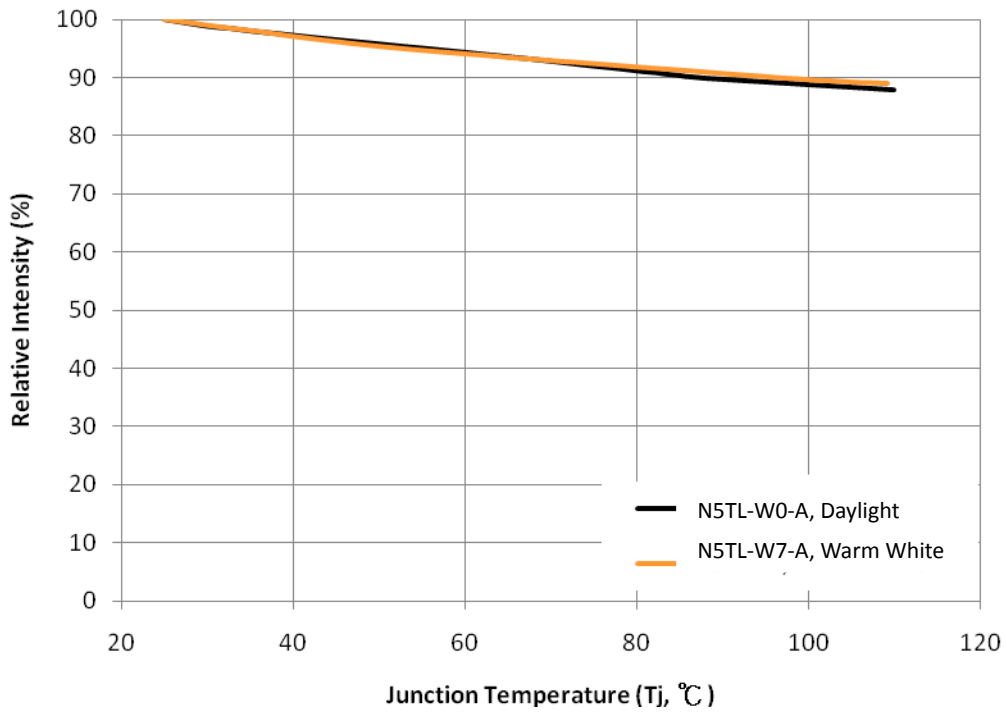
Note:

1. Luminous flux is measured with an accuracy of $\pm 10\%$
2. The forward voltage is measured with an accuracy of $\pm 0.1V$

Relative Spectral Power Distribution, T_j=25°C

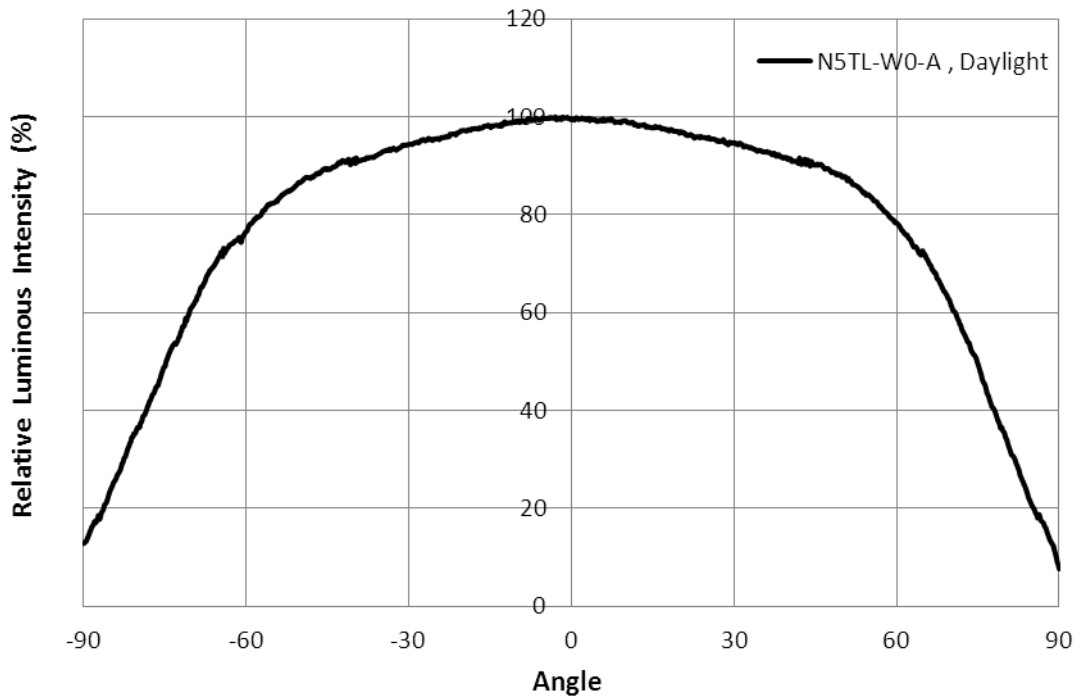


Typical Light Output Characteristics Vs. Temperature

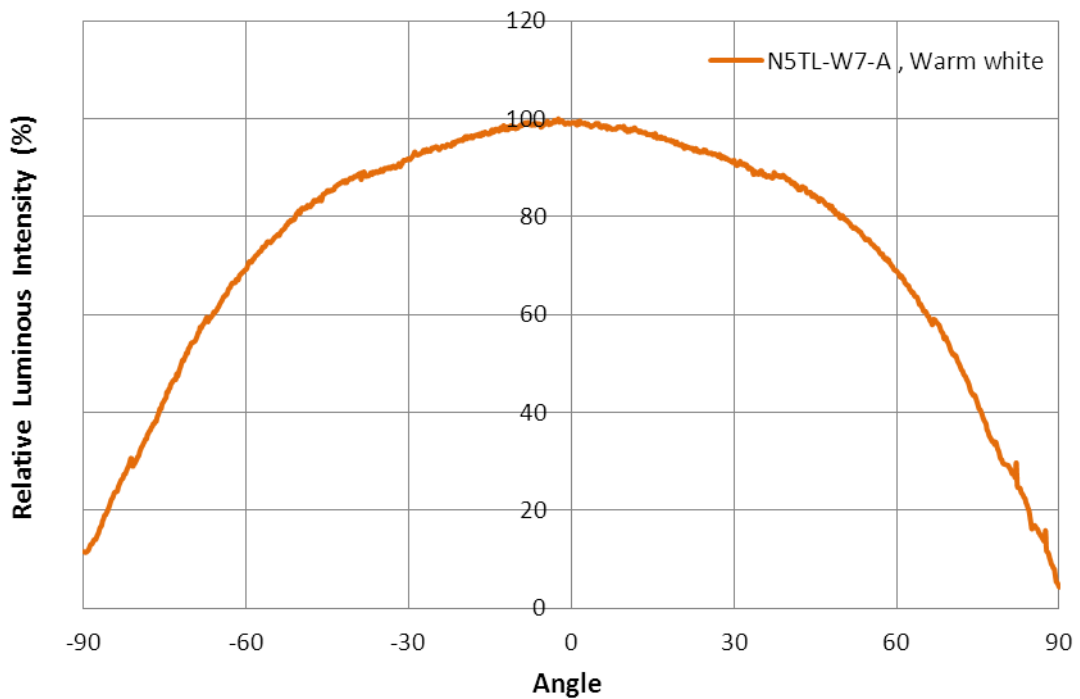


Typical Spatial Radiation Pattern

N5TL-W0-A , Daylight

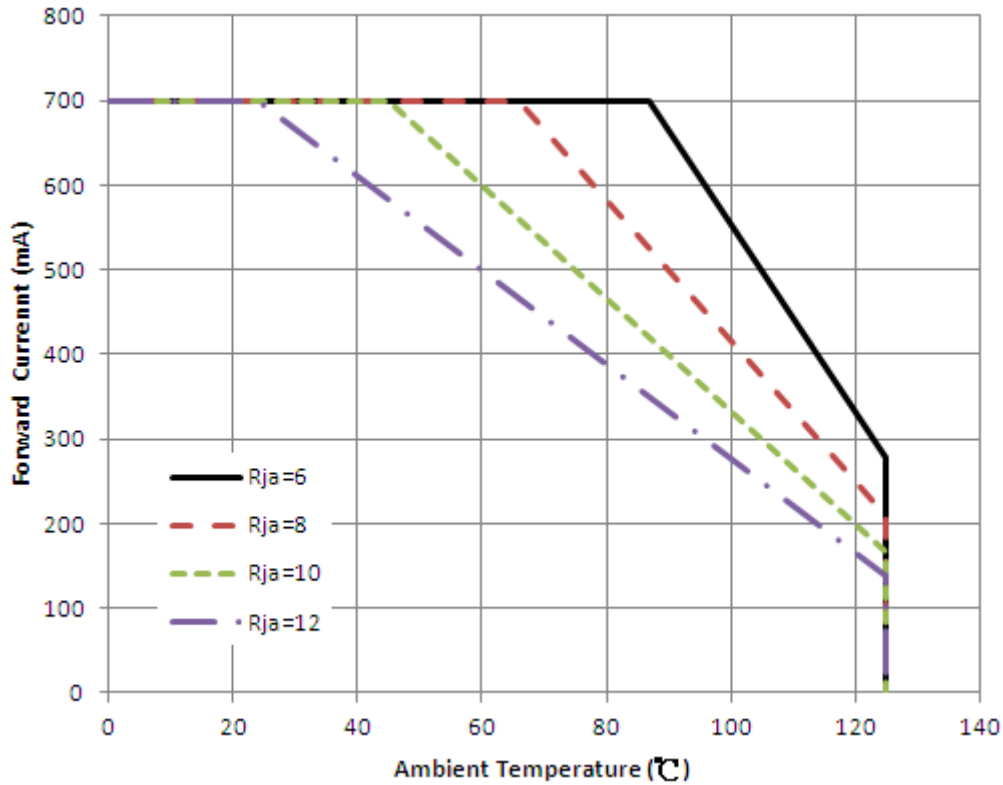


N5TL-W7-A , Warm White



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.

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

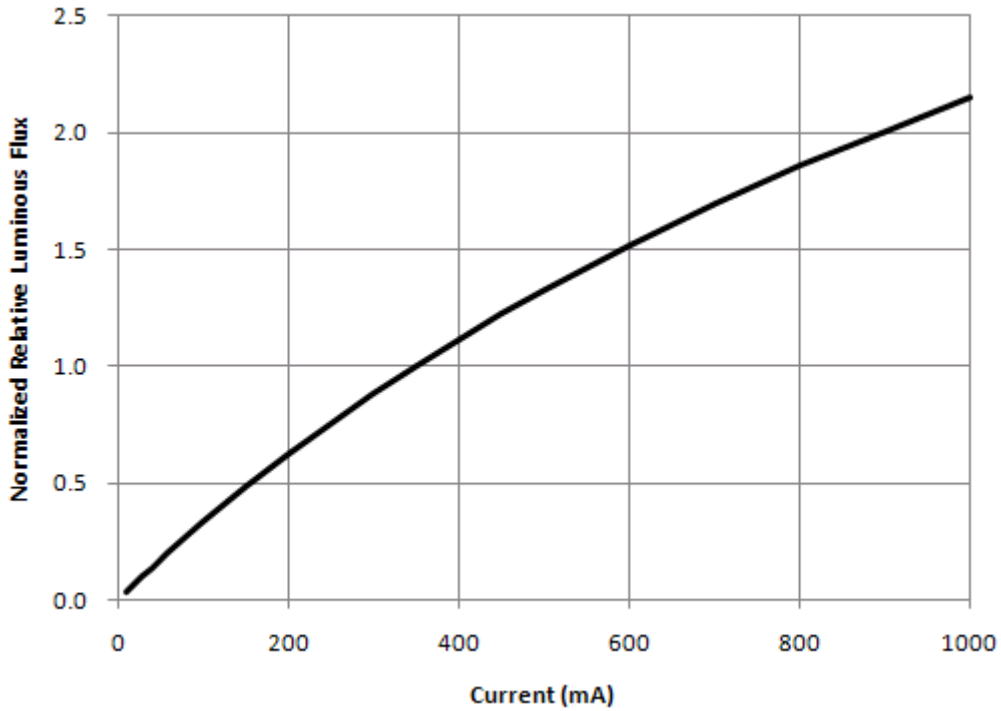
T_j : LED junction temperature

T_a : Ambient temperature

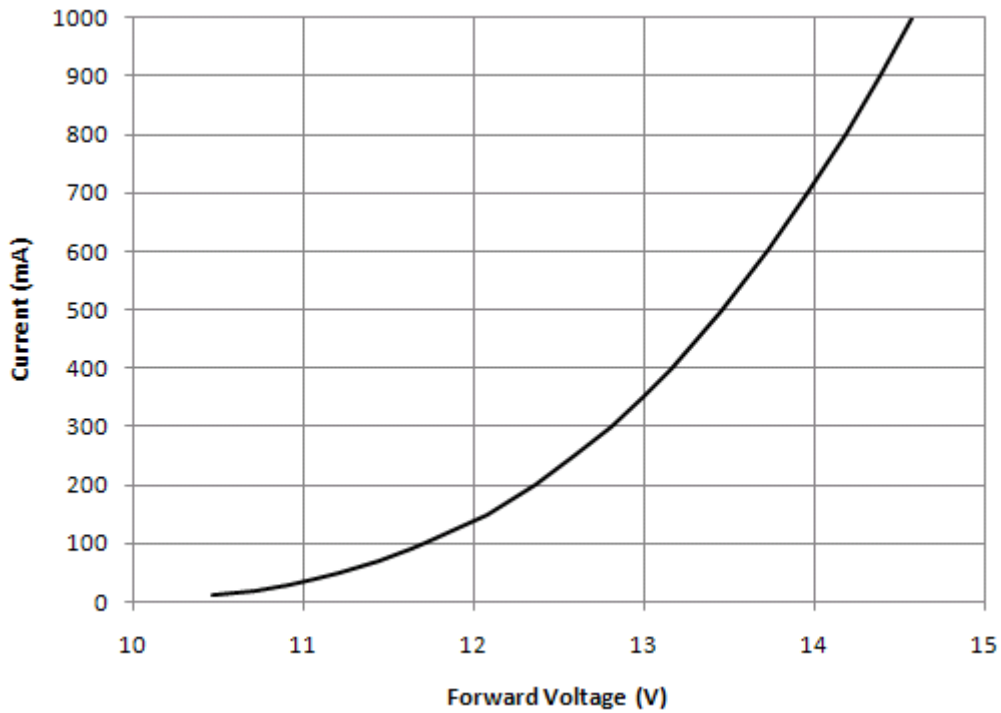
R_{ja} : Thermal resistance between the junction and ambient

W : Input power ($I_f * V_f$)

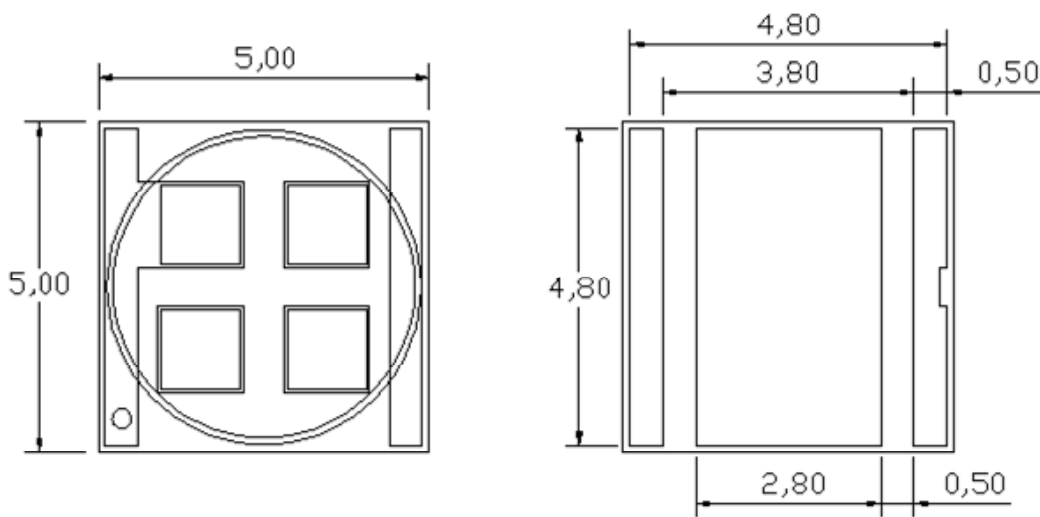
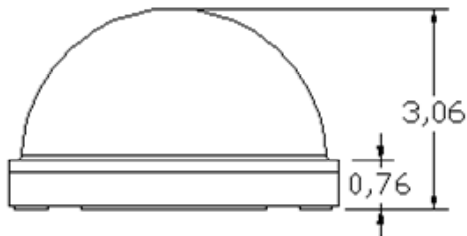
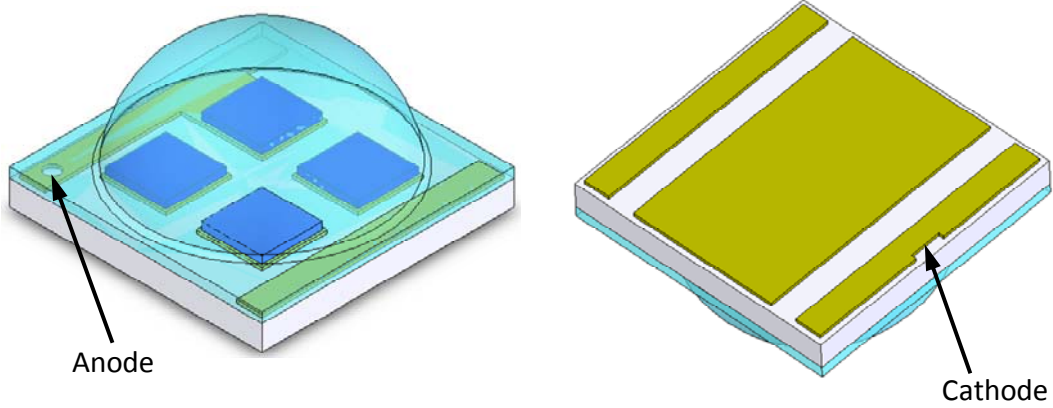
Typical Forward L-I Characteristics



Typical Forward I-V Characteristics



Mechanical Dimensions

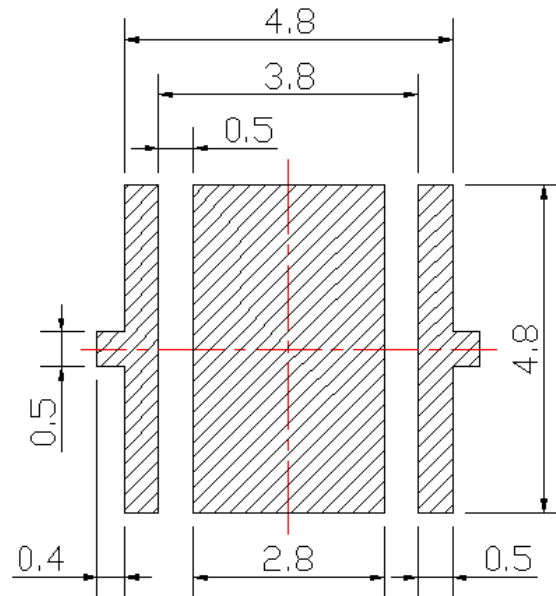


Notes:

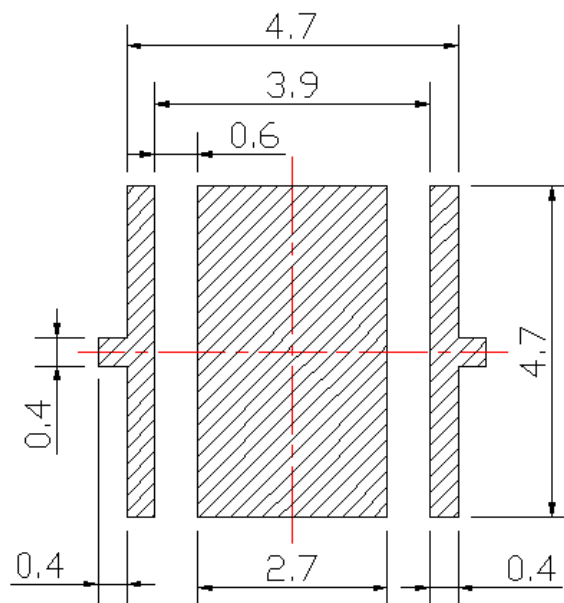
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are ± 0.13 mm unless otherwise indicated

Recommended Solder Pad Design

Recommended Soldering Pad Design



Recommended Stencil Pattern Design (Marked Area is Opening)

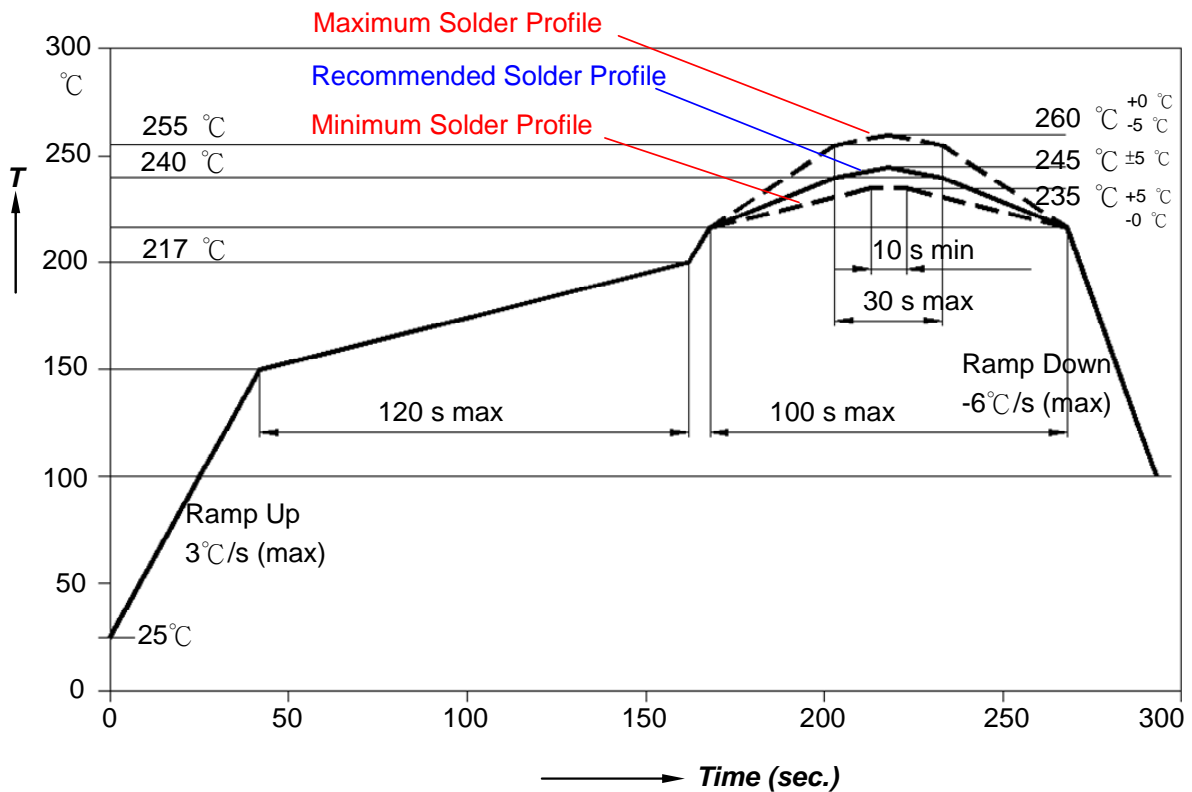


Notes :

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

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 preferred for the LEDs.



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate (T _{smax} to T _p)	3°C/second max.	3°C/second max.
Preheat		
- Temperature Min(T _{smin})	100°C	150°C
- Temperature Max(T _{smax})	150°C	200°C
- Time(t _{smin} to t _{smax})	60-120 seconds	60-180 seconds
Time maintained above:		
- Temperature(T _L)	183°C	217°C
- Time(t _L)	60-150 seconds	60-150 seconds
Peak/classification Temperature(T _p)	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.

About Us

SemiLEDs Corporation is a US based manufacturer of ultra-high brightness LED chips with state of the art fabrication facilities in Hsinchu Science Park, Taiwan. SemiLEDs specializes in the development and manufacturing of vertical LED chips in blue (white), green, and UV using a patented copper alloy base. This unique design allows for higher performance and longer lumen maintenance. In December 2008, The World Economic Forum recognized SemiLEDs innovations with the 2009 Technology Pioneer Award. SemiLEDs is fully ISO 9001:2008 and ISO 14001:2004 Certified.

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

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