SEMILEDS

PRODUCT DATASHEET

N5SL-W-A

High Power LED

Introduction

The N5SL-W-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, N5SL-W-A LEDs from SemiLEDs feature optimized brightness and efficacy, as well as excellent reliability. N5SL-W-A LEDs light output degradation is less than 10% under market's most stringent test conditions (If=1400mA, ambient temperature=85°C and relative humidity=85%).

N5SL-W-A LEDs also feature a special design-to-fit secondary optics for various emission angles for differentiated lighting applications. Users can easily achieve desired light uniformity with appropriate secondary optics.

With SemiLEDs' new phosphor technology, N5SL-W-A is able to provide consistant 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 Ratings

Parameter	Rating
	White Series
DC Forward Current (mA)	1400 mA
Peak Forward Current (mA)	2000 mA (less than 1/10 duty cycle @1KHz)
LED Junction Temperature	150℃
LED Operating Temperature	-40℃~125℃
Storage Temperature	-40℃~125℃
Soldering Temperature	Max. 260℃ / 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 700mA

Part number	Color	Typ. CRI	Correlated Color Temperature, CCT		$2\theta_{1/2}$	Temperature Coefficient of Vf (mV/℃)	Thermal Resistance Junction to Pad
			Min	Max		$\Delta V_F / \Delta T_J$	(℃/W) $R\Theta_{J-L}$
N5SL-W-A	Daylight	70	4750K	7000K	-	-3	1.5
	Warm White	80	2600K	3700K	-	-3	1.5

Notes:

1. The CCT is measured with an accuracy of ±200K
2. The CRI is measured with a tolerance of ±2

Luminous Flux and Forward Voltage

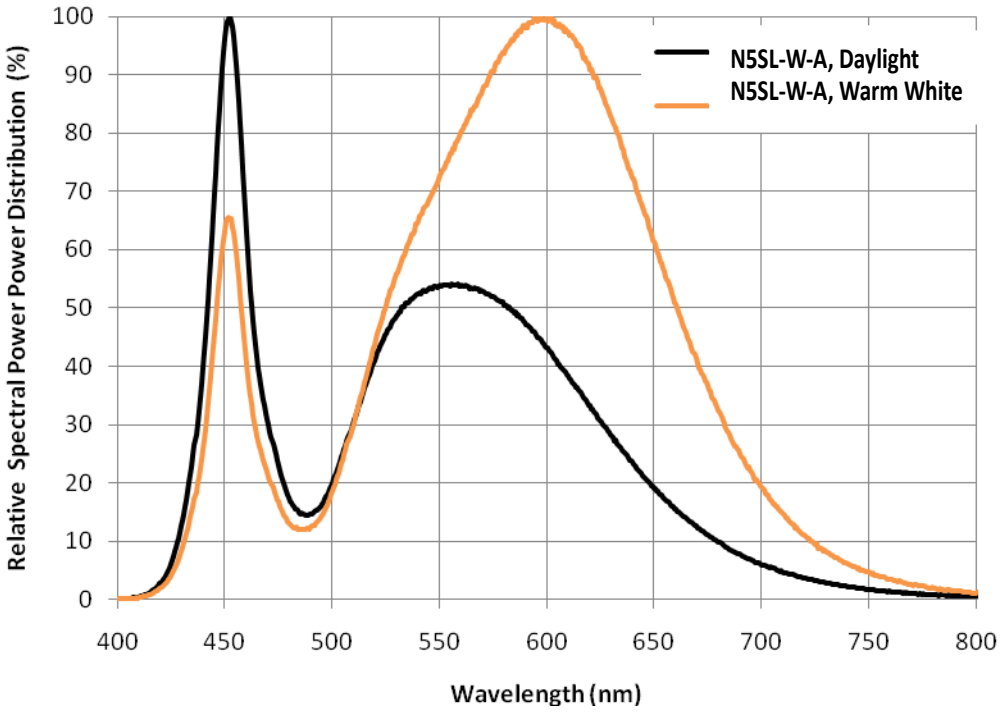
Part number	Color	Performance at Test Current 700mA				Performance at 1400mA
		Group	Minimum Luminous Flux (lm)	VF		Typical Luminous Flux (lm)
				Min	Max	
N5SL-W-A	Daylight	VG	400	5.5	7.5	680
		VH	440	5.5	7.5	750
		VI	480	5.5	7.5	815
		VJ	520	5.5	7.5	885
		VK	560	5.5	7.5	955
	Warm White	UH	320	5.5	7.5	545
		UI	340	5.5	7.5	580
		UJ	360	5.5	7.5	615
		UK	380	5.5	7.5	645

Note:

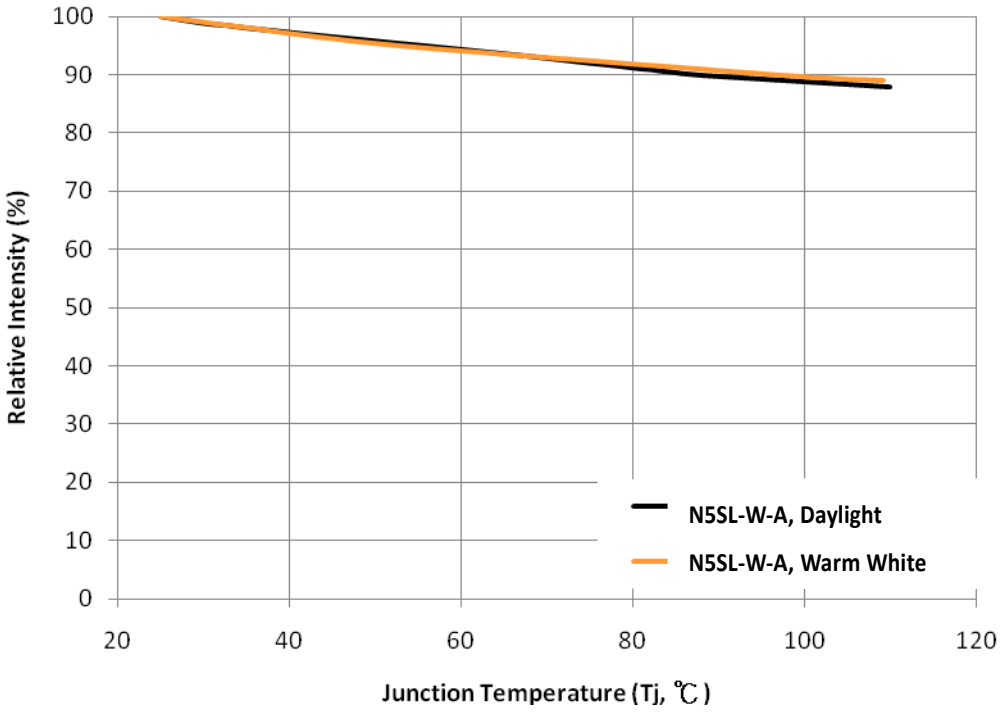
1. Luminous flux is measured with an accuracy of ±10%
2. The forward voltage is measured with an accuracy of ±0.1V

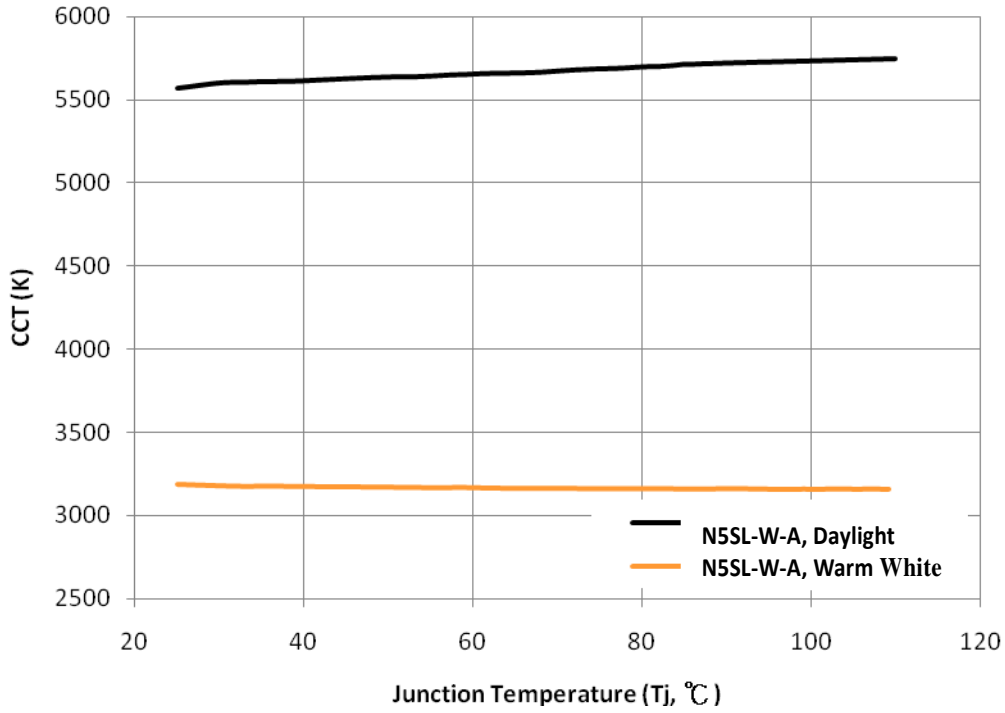
Relative Spectral Power Distribution, Ta=25 ℃

White light



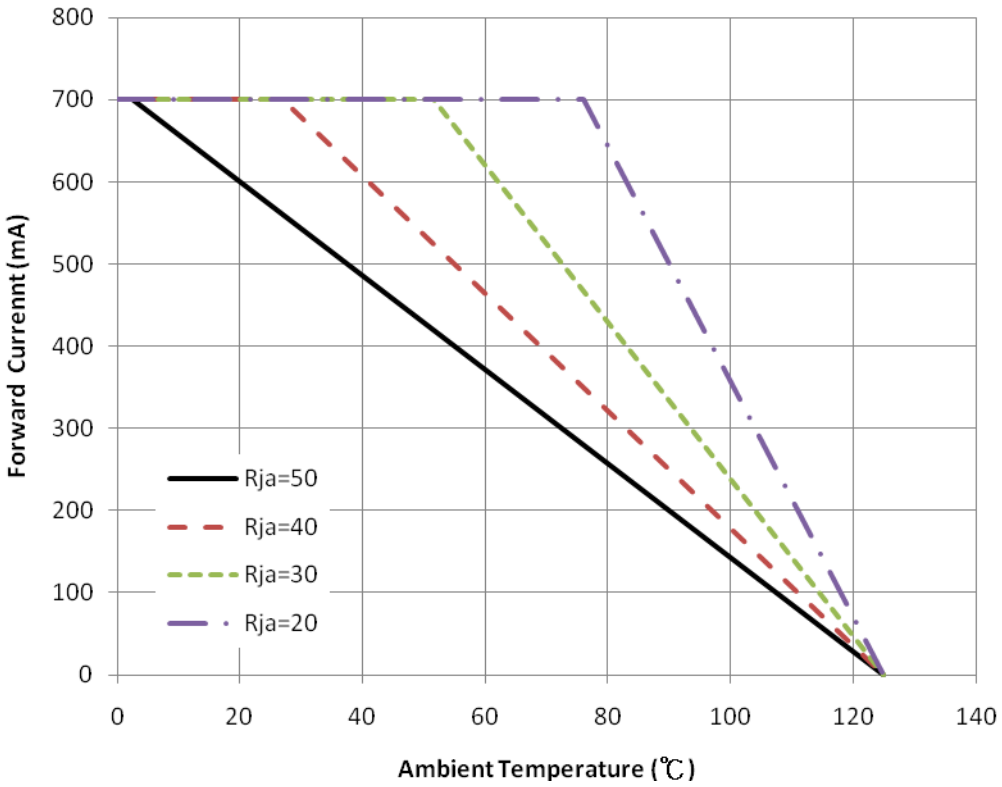
Typical Light Output Characteristics Vs. Temperature





Thermal Design

Thermal design of the end product is important. The thermal resistance between the junction and the solder point ($R\Theta_{J\text{-}P}$) 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 (Rja) by the following equation.

$$Tj=Ta + Rja*W$$

Tj: LED junction temperature

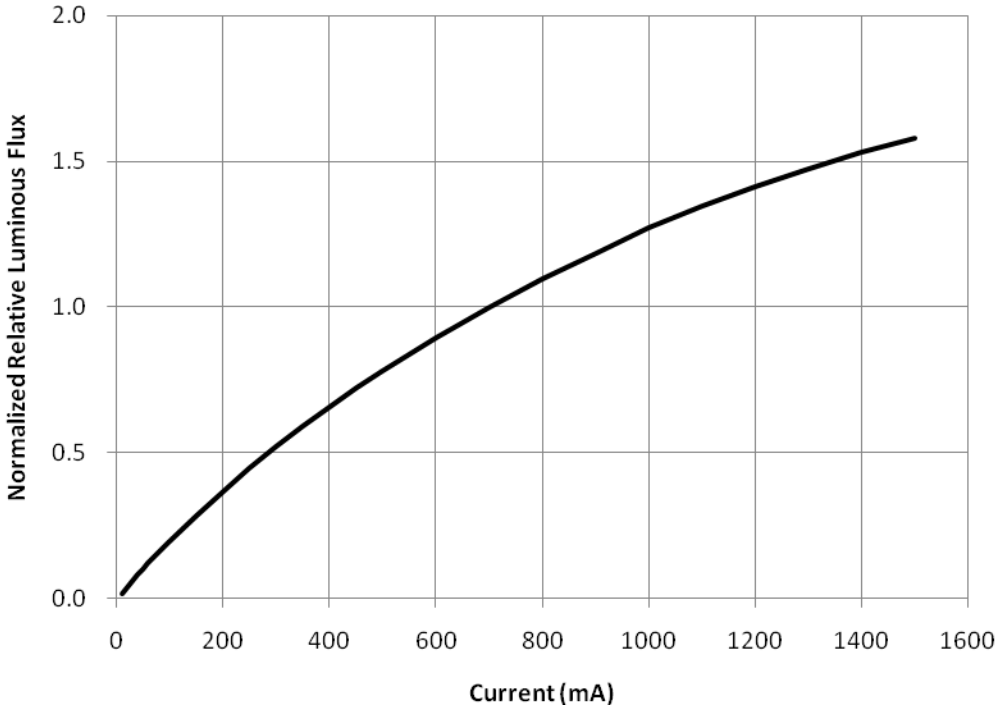
Ta: Ambient temperature

Rja: Thermal resistance between the junction and ambient

W: Input power (I_F*V_F)

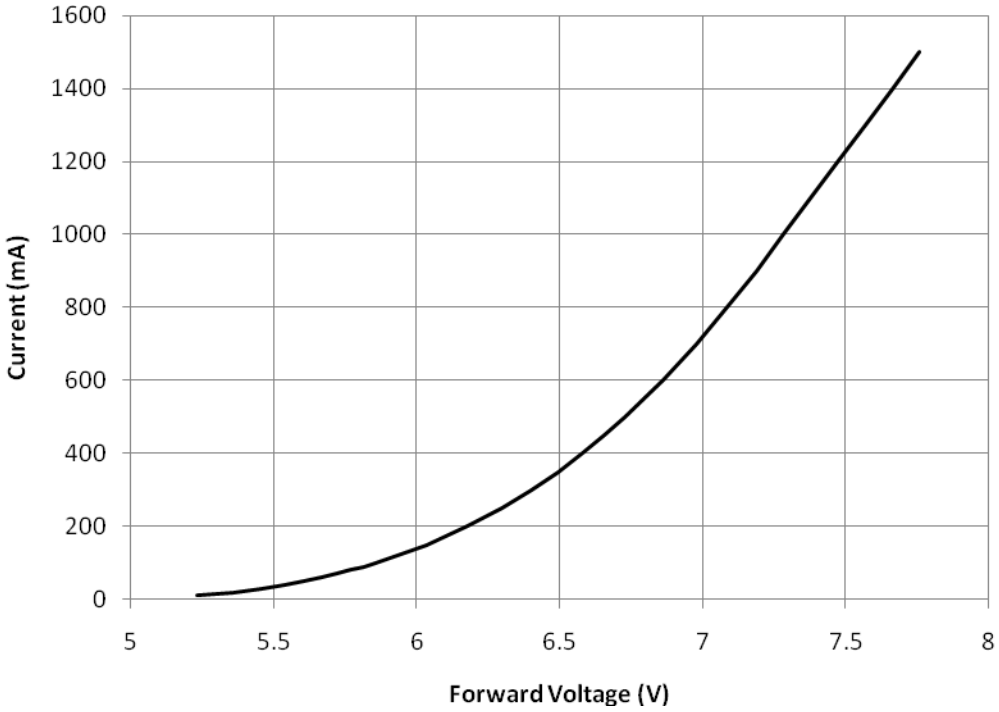
Typical Forward L-I Characteristics

White Series

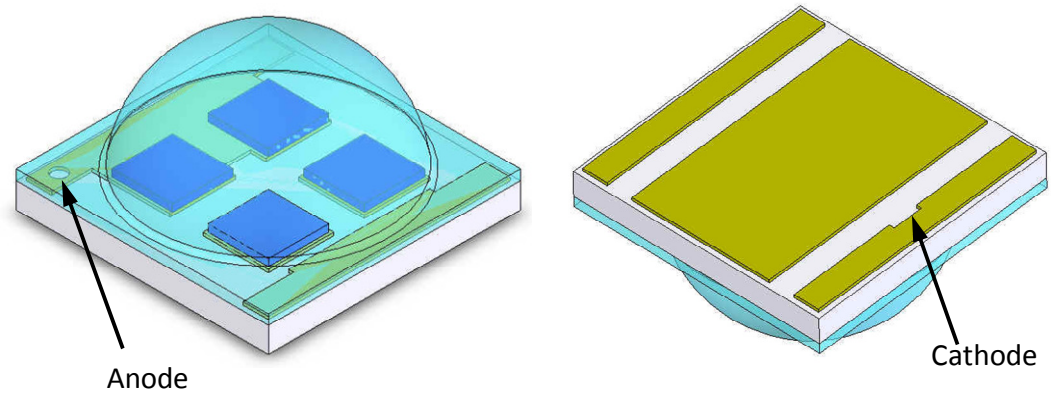


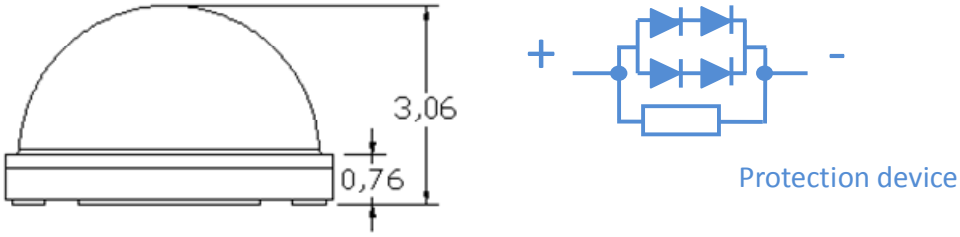
Typical Forward I-V Characteristics

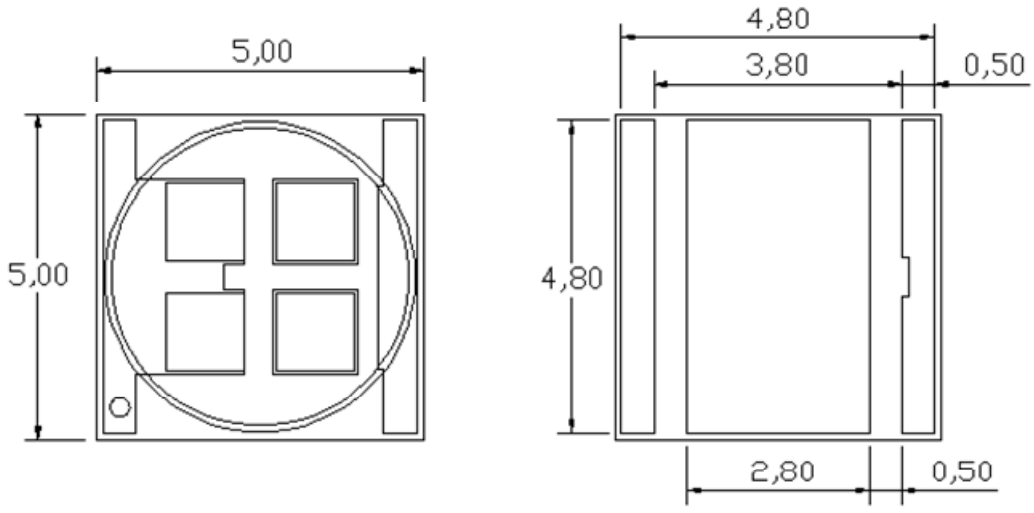
White Series



Mechanical Dimensions





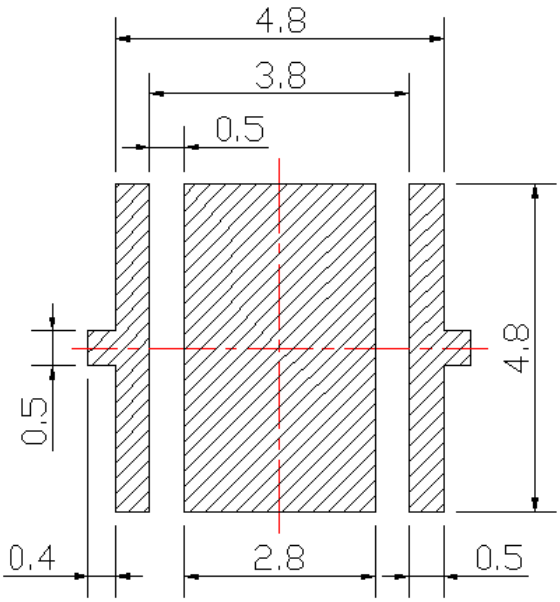


Notes :

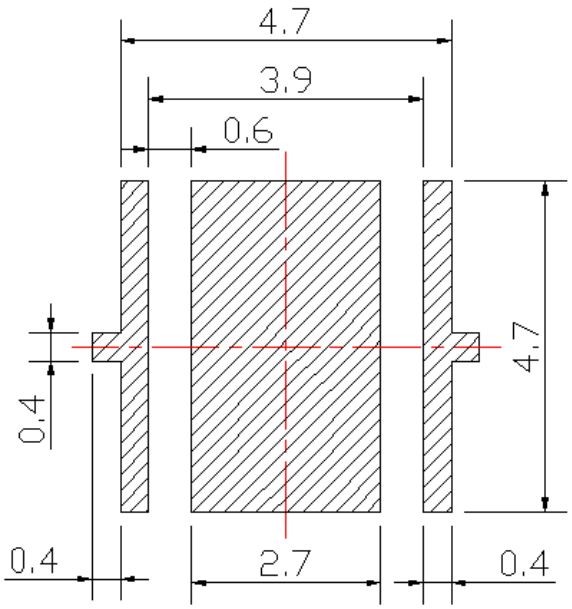
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are ±0.13mm unless otherwise indicated

Recommended Solder Pad Design

Recommended Soldering Pad Design



Recommended Stencil Pattern Design (Mark Area is Opening)

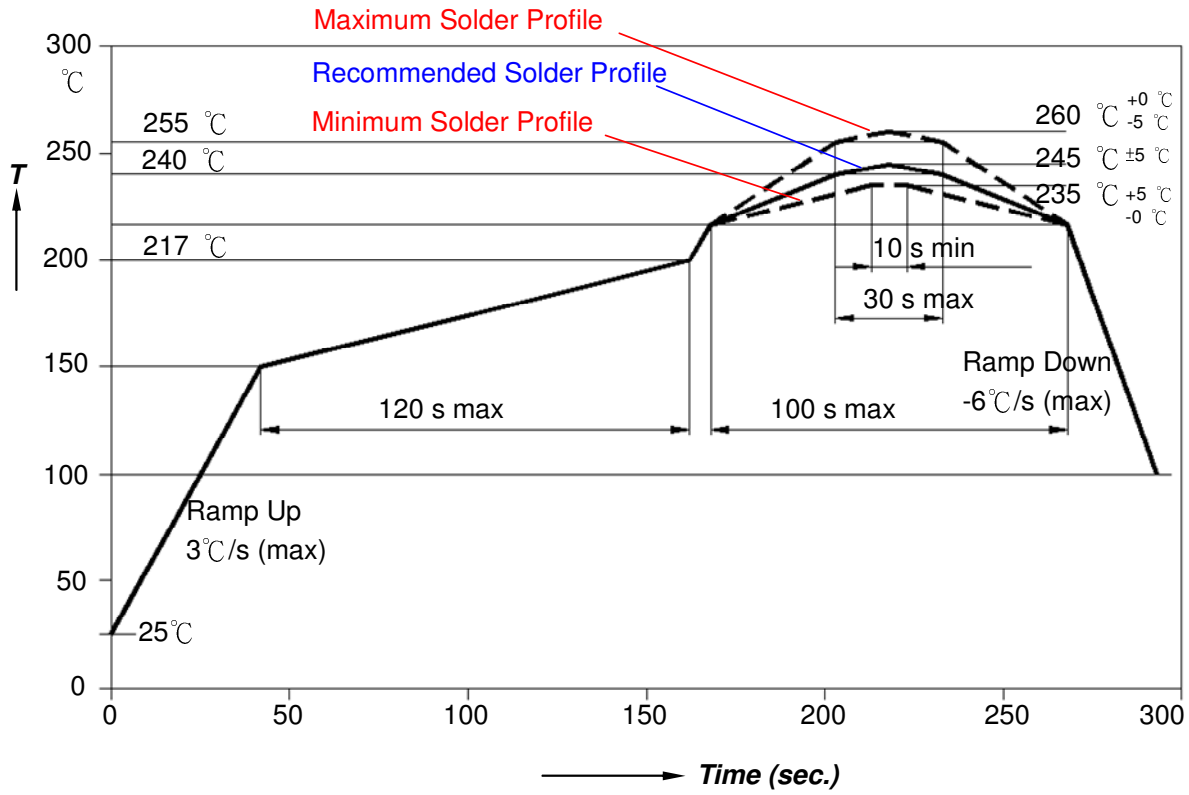


Notes :

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

Recommended Soldering Profile

The LEDs can be soldered using the parameter 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 (Tsmax to Tp)	3℃/second max.	3℃/second max.
Preheat - Temperature Min(Ts_{min}) - Temperature Max(Ts_{max}) - Time(ts_{min} to ts_{max})	 100℃ 150℃ 60-120 seconds	 150℃ 200℃ 60-180 seconds
Time maintained above: - Temperature(T_L) - Time(t_L)	 183℃ 60-150 seconds	 217℃ 60-150 seconds
Peak/classification Temperature(Tp)	215℃	260℃
Time within 5℃ of actual Peak Temperature(tp)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6℃/second max.	6℃/second max.
Time 25℃ 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 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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