

# C3535L.C3535M-xxL1

## High Power LED

### Introduction

The C3535x-xxL1 LED from SemiLEDs brings industry leading technology to the solid state lighting market with its high quality and performance. With a silicone lens, C3535x-xxL1 LEDs from SemiLEDs feature very high brightness and efficacy, as well as excellent lifetime.



### Table of Contents

Characteristics .....	1
Mechanical Dimensions .....	4
Recommended Solder Pad Design .....	5
Relative Spectral Power Distribution .....	6
Typical Spatial Radiation Pattern .....	7
Typical Forward L-I Characteristics .....	10
Typical Forward I-V Characteristics .....	11
Typical L-Tj Characteristics .....	12
Recommended Soldering Profile .....	13
Thermal Design .....	14
Packing Information .....	15

### RoHS Compliant

## Characteristics

### Absolute Maximum Ratings (T<sub>j</sub> = 25°C)

Parameter	Rating
	White / Royal Blue / Blue / Green / Cyan / Amber / Red
DC Forward Current (mA)	1000 mA (White / Royal Blue / Blue / Green / Cyan)
DC Forward Current (mA)	700 mA (Amber/ Red / Super Red)
LED Junction Temperature	150°C (White / Royal Blue / Blue / Green / Cyan)
LED Junction Temperature	125°C (Red / Amber / Super Red)
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 <sub>R</sub> ≤ 5V)
Preconditioning	Acc. to JEDEC Level 1

### General Characteristics at 350mA (T<sub>j</sub>=25°C)

Part number	Color	Dominant Wavelength λ <sub>d</sub> Peak Wavelength λ <sub>p</sub> * Correlated Color Temperature, CCT		2θ <sub>1/2</sub>	Temperature Coefficient of V <sub>f</sub> (mV/°C)	Thermal Resistance Junction to Pad (°C/W)
		Min	Max			
C3535L-C0L1-A1J11H	Daylight	4750K	10000K	135	-2~-4	8
C3535L-N1L1-A1J11H	Neutral White	3700K	4750K	130	-2~-4	8
C3535L-W7L1-A1J11H	Warm White	2600K	3700K	130	-2~-4	8
C3535M-SNL1-E1H11N	Super Red	650	670	125	-2~-4	10
C3535M-RNL1-E1H11N	Red	620	635	125	-2~-4	10
C3535M-ANL1-E1H11N	Amber	580	600	125	-2~-4	10
C3535M-GNL1-A1J11H	Green	520	535	125	-2~-4	8
C3535M-CNL1-A1J11H	Cyan	500	520	125	-2~-4	8
C3535M-BNL1-A1J11H	Blue	455	470	125	-2~-4	8
C3535M-DNL1-A1J11H	Royal Blue	440*	460*	125	-2~-4	8

Notes:

- The peak/dominant wavelength is measured with an accuracy of ±1nm
- Semileds maintains a tolerance of ±2 on CRI measurements.  
Typical CRI for Cool White (4750 K – 10,000 K CCT) is 70.

Typical CRI for Neutral White (3700 K – 4750 K CCT) is 75.

Minimum CRI for Warm White (2600 K – 3700 K CCT) is 80.

### Luminous Flux and Forward Voltage (T<sub>j</sub>=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	
C3535L-C0L1- A1J11H	Daylight	NQE	107	2.8	3.6	180
		NRB	114	2.8	3.6	190
		NRC	122	2.8	3.6	205
		NRD	130	2.8	3.6	220
		NRE	139	2.8	3.6	235
C3535L-N1L1- A1J11H	Neutral White	NQD	100	2.8	3.6	170
		NQE	107	2.8	3.6	180
		NRB	114	2.8	3.6	190
		NRC	122	2.8	3.6	205
C3535L-W7L1- A1J11H	Warm White	NQB	87.4	2.8	3.6	145
		NQC	93.9	2.8	3.6	160
		NQD	100	2.8	3.6	170
		NQE	107	2.8	3.6	180
		NRB	114	2.8	3.6	190

Note:

1. Luminous flux is measured with an accuracy of  $\pm 10\%$
2. The forward voltage is measured with an accuracy of  $\pm 0.2V$

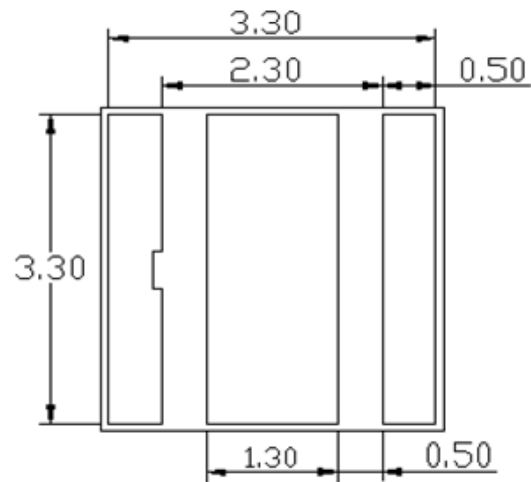
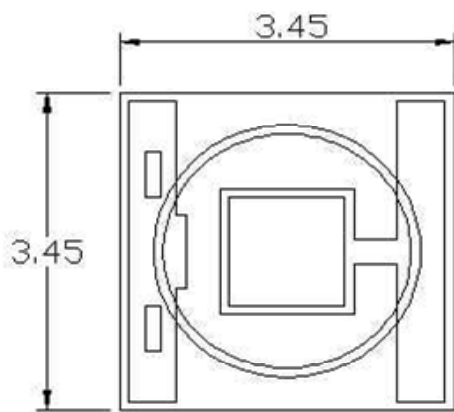
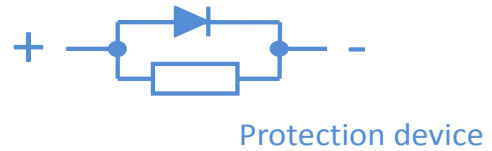
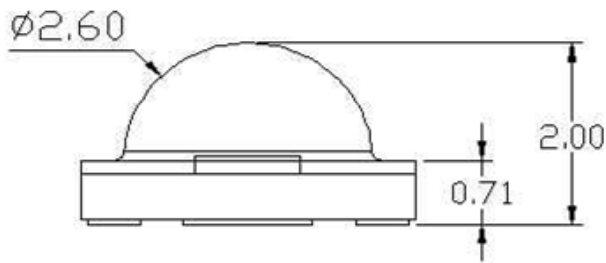
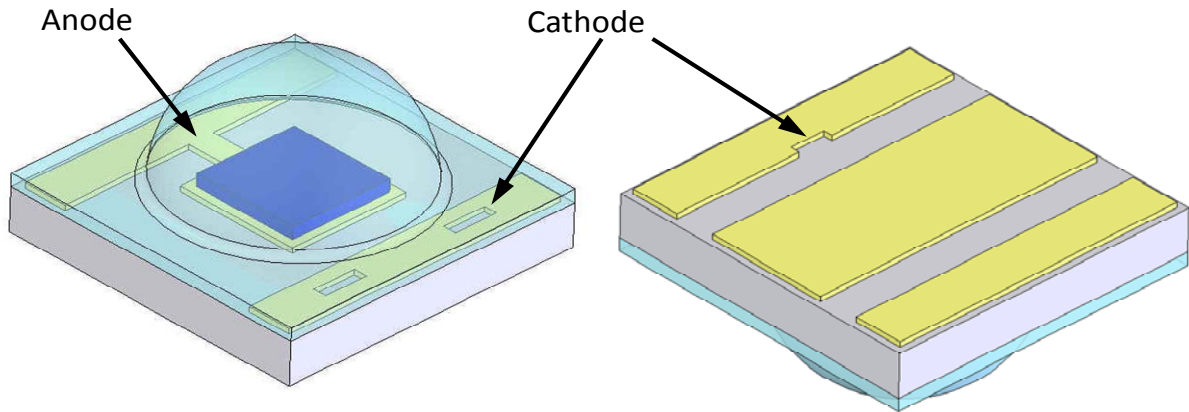
Luminous Flux and Forward Voltage (T<sub>j</sub>=25°C)

Part number	Color	Performance at Test Current (350mA)				Performance at 700mA
		Group	Minimum Luminous Flux (lm) or Radiometric Power* (mW)	VF		Typical Luminous Flux (lm) or Radiometric Power* (mW)
				Min	Max	
C3535M-SNL1 -E1H11N	Super Red	ND2	240*	2.0	3.0	455*
		ND3	280*	2.0	3.0	530*
C3535M-RNL1 -E1H11N	Red	NMC	45.7	2.0	3.0	85
		NNB	51.7	2.0	3.0	95
		NNC	56.8	2.0	3.0	105
C3535M-ANL1 -E1H11N	Amber	NMC	45.7	2.0	3.0	85
		NNB	51.7	2.0	3.0	95
		NNC	56.8	2.0	3.0	105
C3535M-GNL1 -A1J11H	Green	NPB	67.2	2.8	3.6	105
		NPC	73.9	2.8	3.6	115
		NPD	80.6	2.8	3.6	125
		NQB	87.4	2.8	3.6	135
C3535M-CNL1 -A1J11H	Cyan	NND	62.0	2.8	3.6	95
		NPB	67.2	2.8	3.6	105
		NPC	73.9	2.8	3.6	115
		NPD	80.6	2.8	3.6	125
C3535M-BNL1 -A1J11H	Blue	NJB	18.0	2.8	3.6	30
		NJC	23.5	2.8	3.6	39
		NKB	30.6	2.8	3.6	50
C3535M-DNL1 -A1J11H	Royal Blue	NE1	400*	2.8	3.6	680*
		NE2	440*	2.8	3.6	745*
		NE3	480*	2.8	3.6	815*
		NE4	520*	2.8	3.6	880*

Note:

1. Luminous flux & Radiometric power is measured with an accuracy of ±10%
2. The forward voltage is measured with an accuracy of ±0.2V

## Mechanical Dimensions

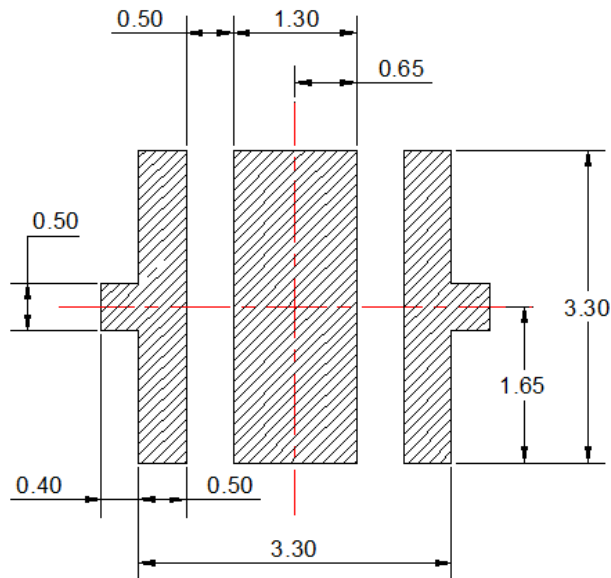


Notes :

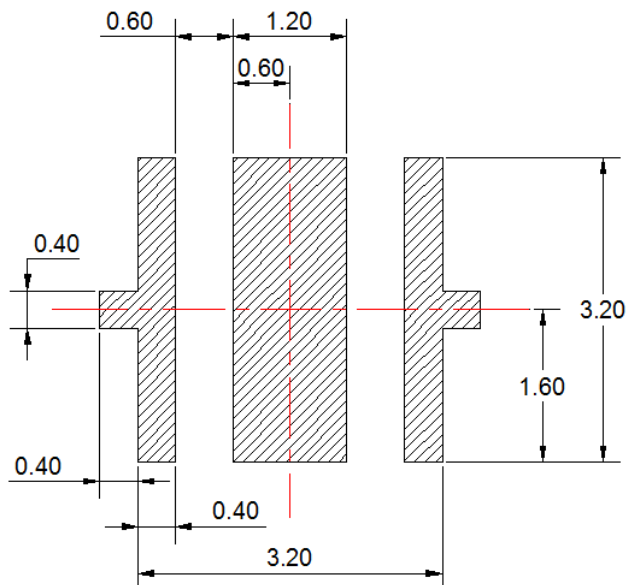
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are  $\pm 0.13$ mm unless otherwise indicated

## Recommended Solder Pad Design

### Recommended Soldering Pad Design



### Recommended Stencil Pattern Design (Marked Area is Opening)

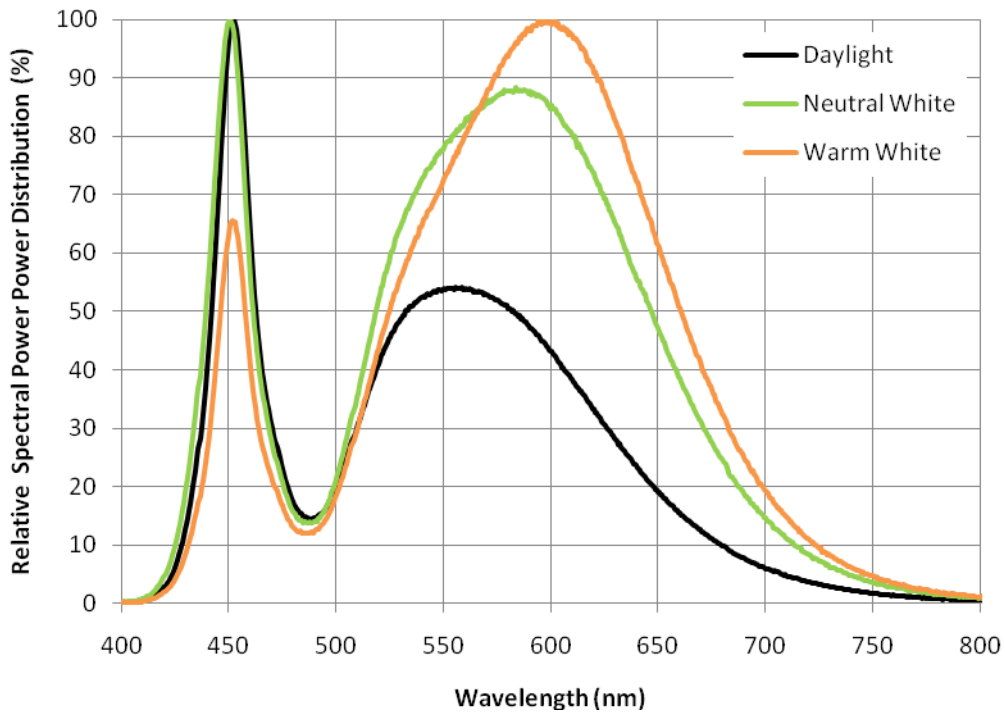


#### Notes :

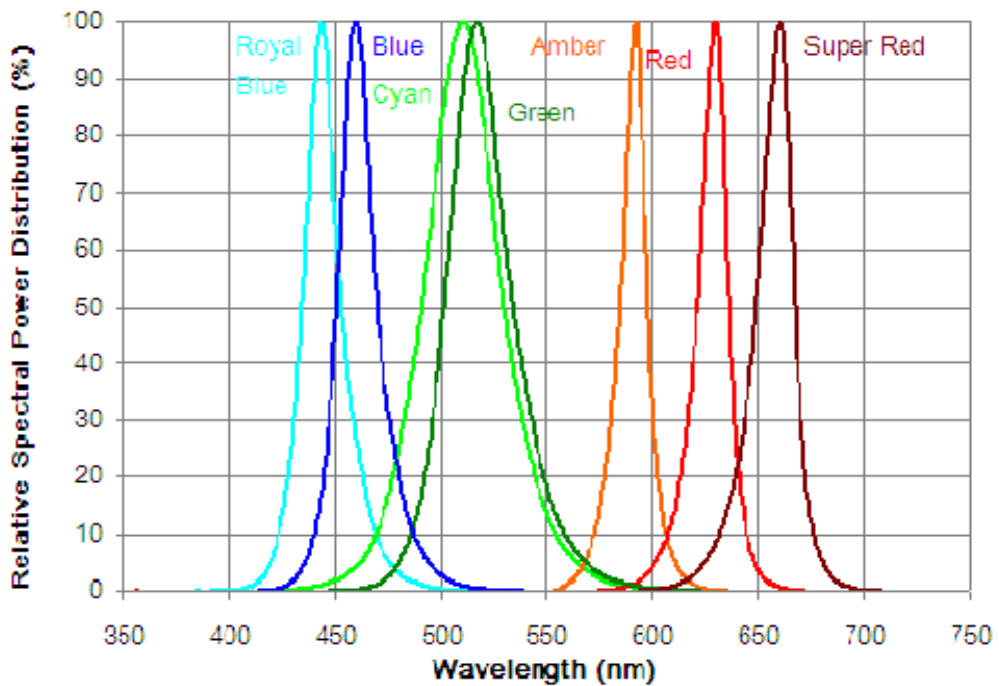
1. Drawing is not to scale
2. All dimensions are in millimeter

## Relative Spectral Power Distribution, T<sub>j</sub>=25°C

White

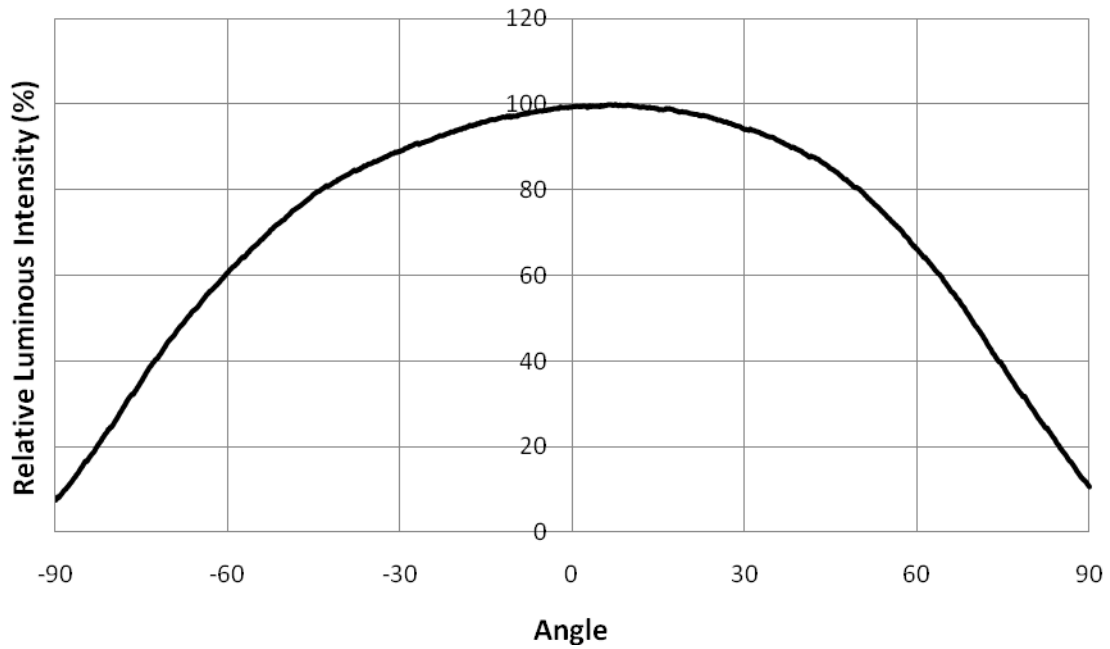


Royal Blue / Blue / Cyan / Green / Amber / Red / Super Red

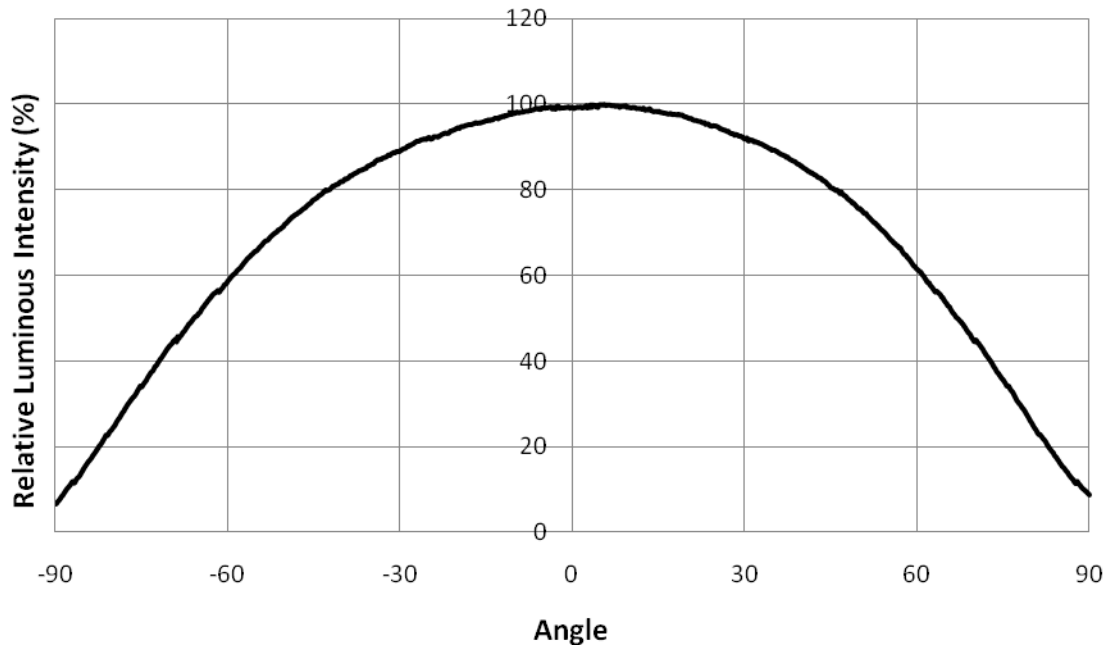


## Typical Spatial Radiation Pattern

Daylight

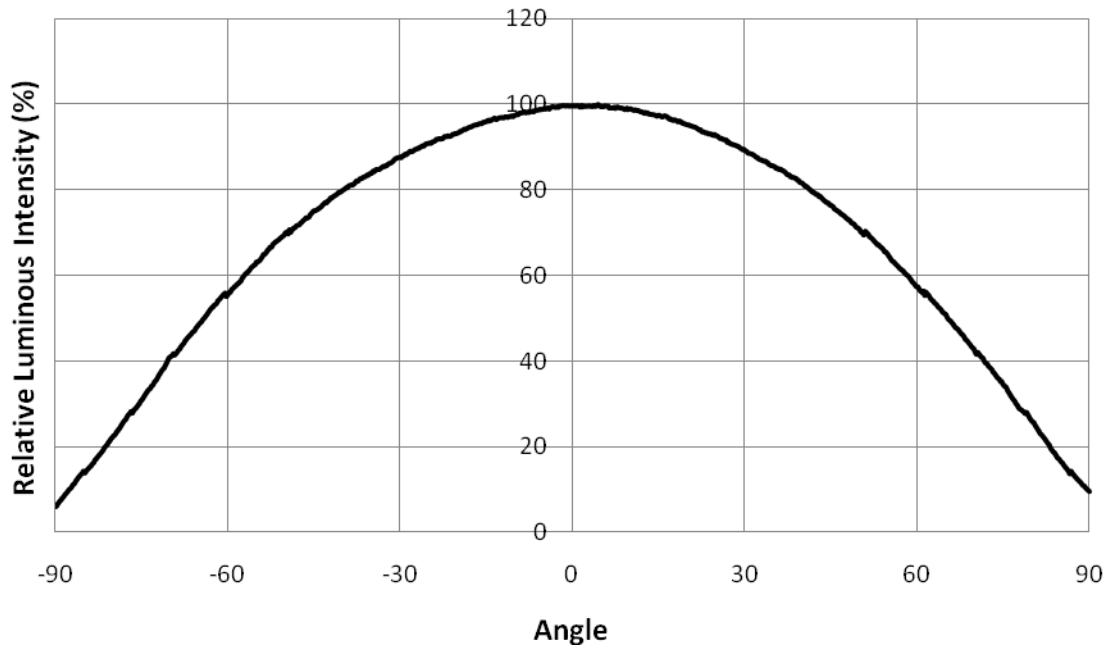


Neutral White

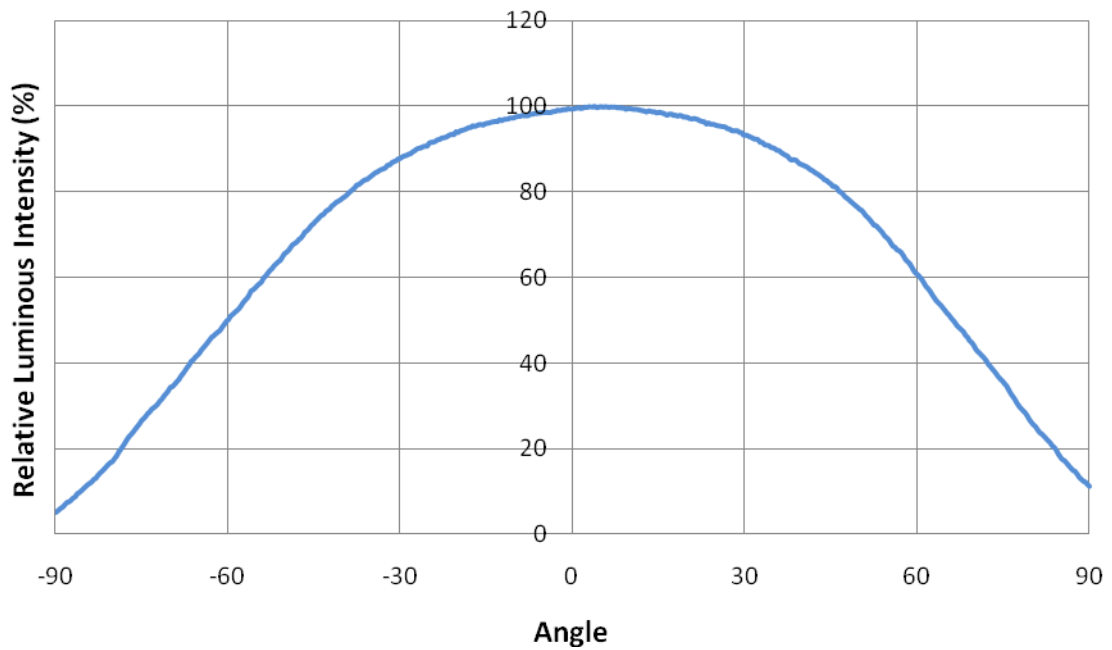




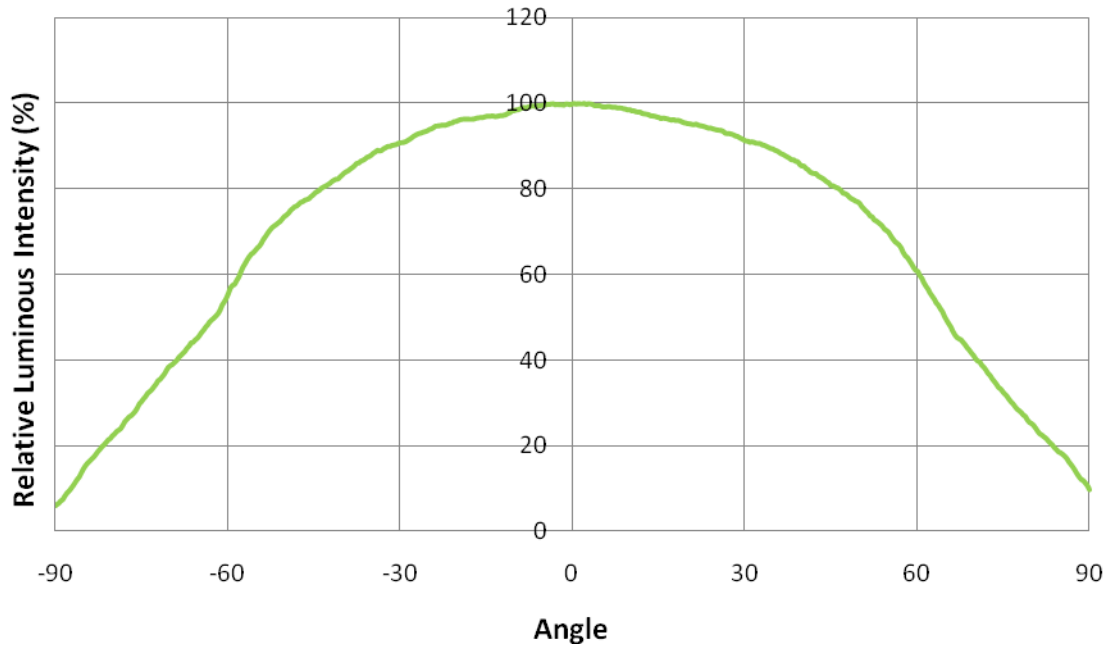
Warm White



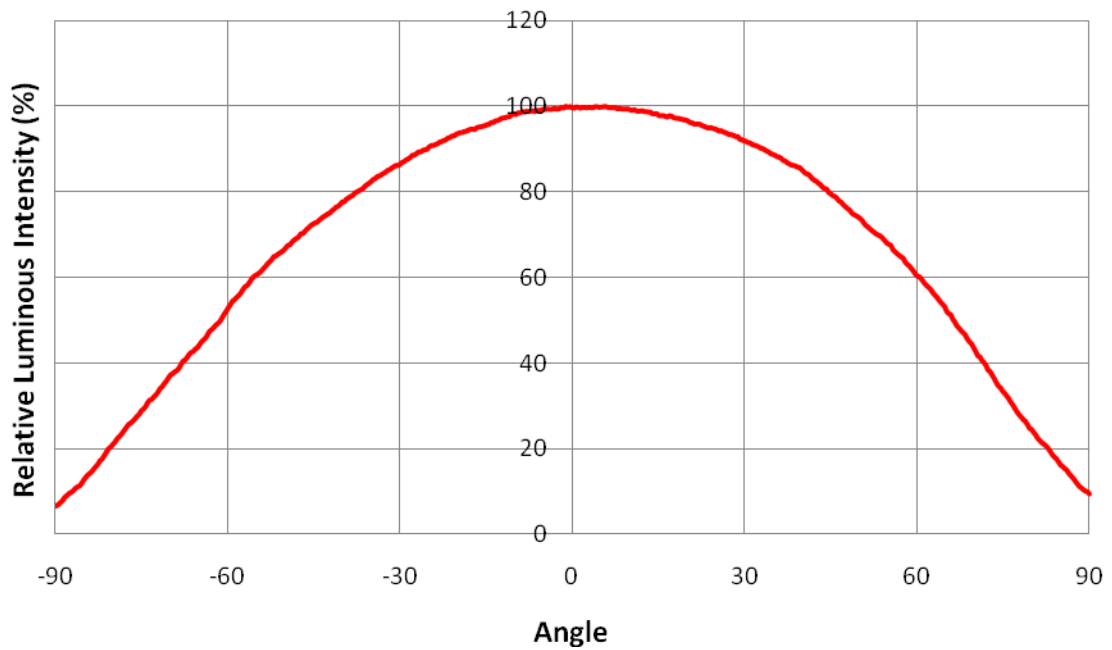
Royal Blue / Blue



Green / Cyan

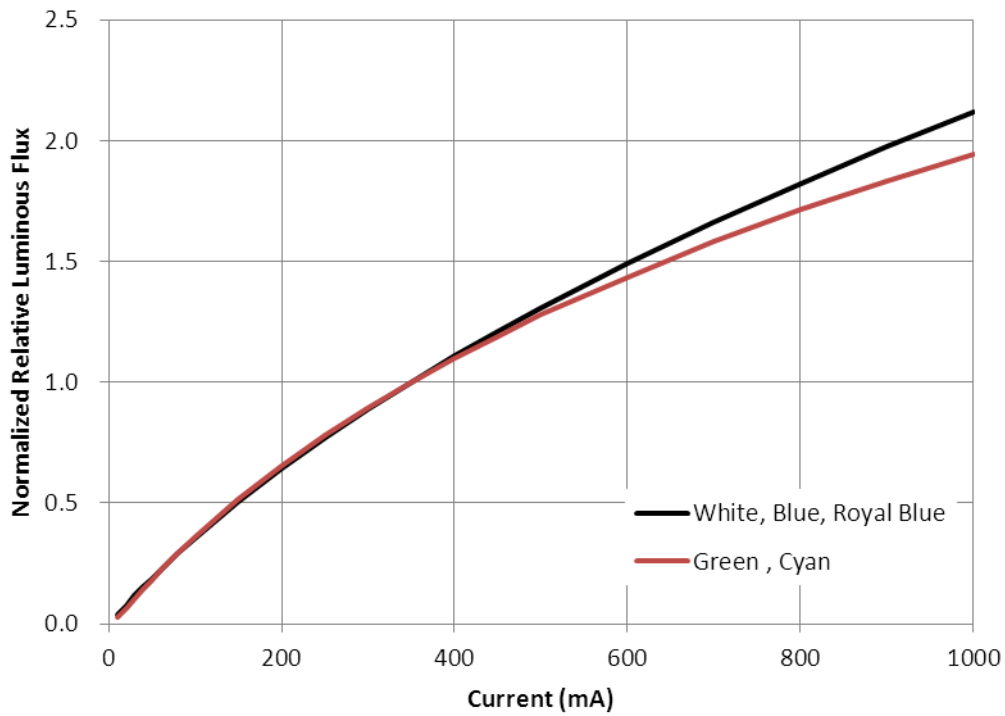


Amber / Red / Super Red

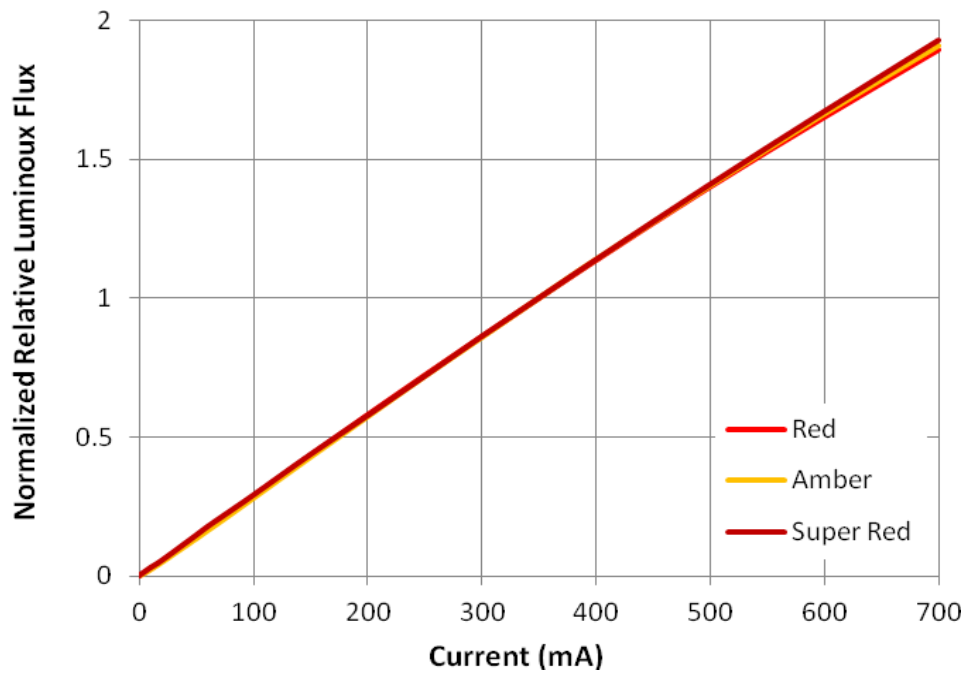


## Typical Forward L-I Characteristics

White Series / Blue / Royal Blue / Green / Cyan

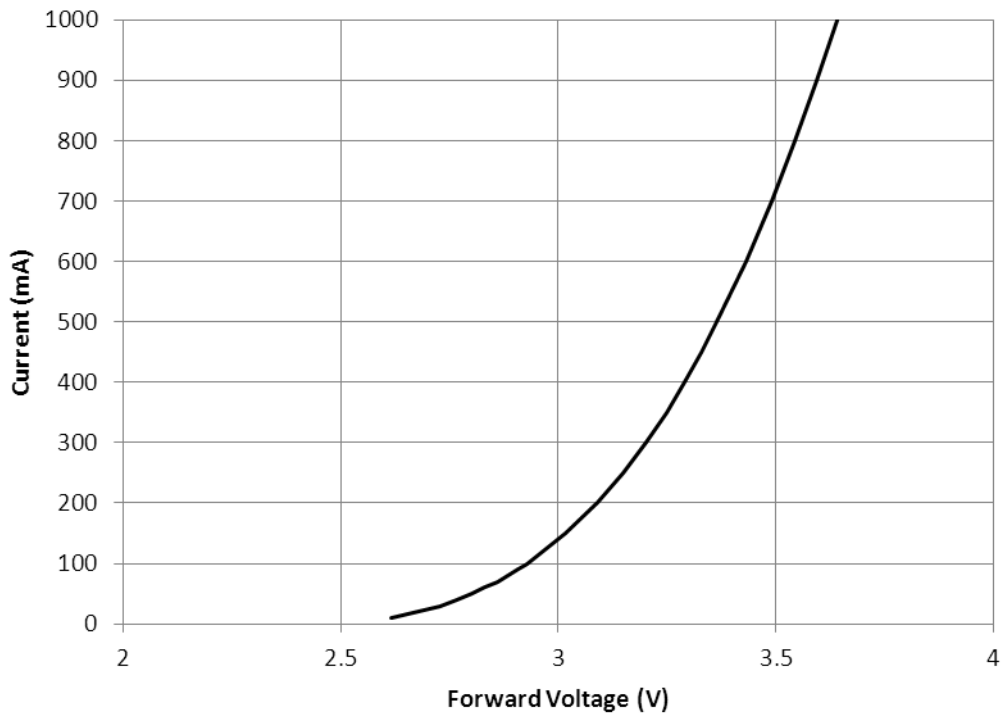


Amber / Red / Super Red

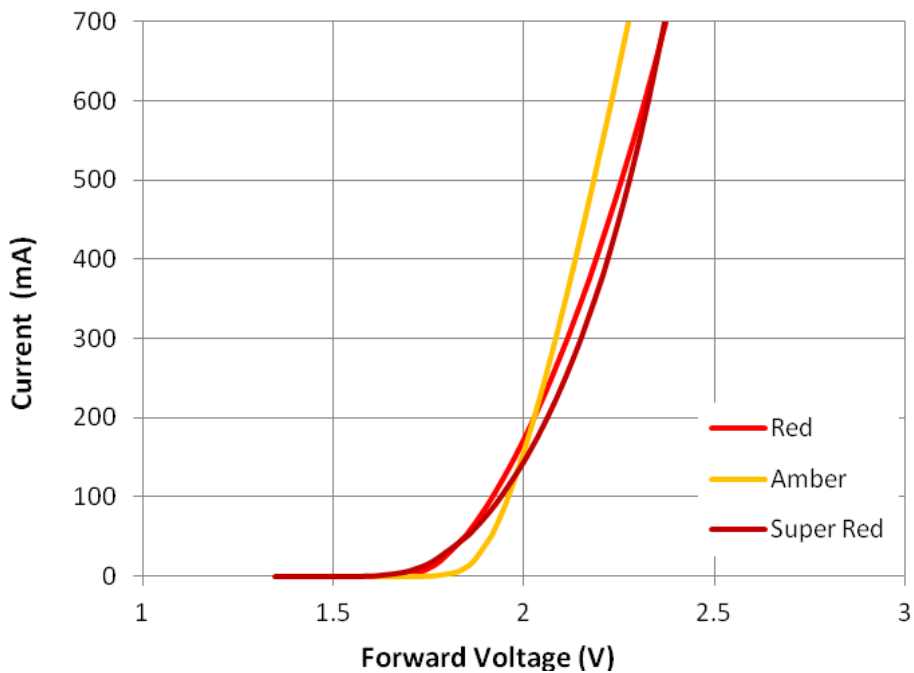


## Typical Forward I-V Characteristics

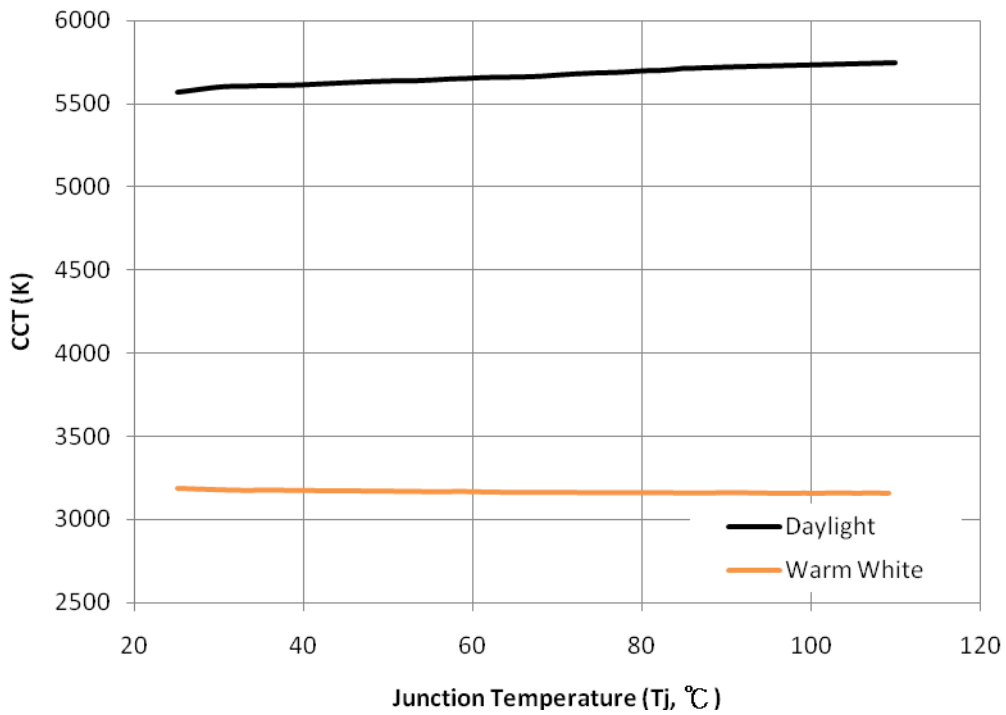
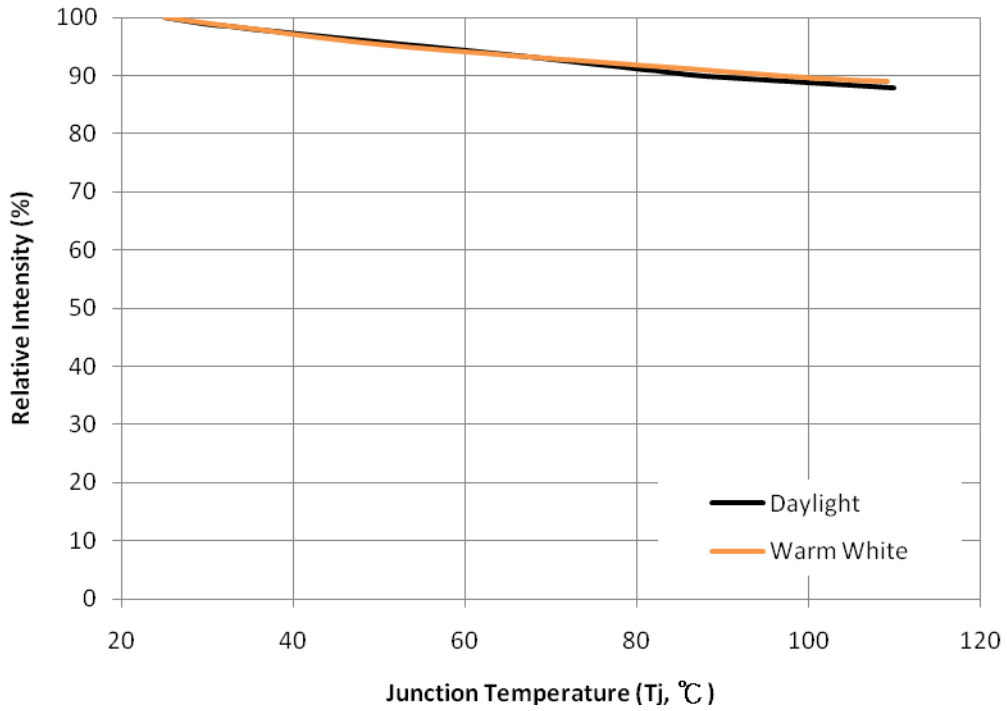
White Series / Blue / Royal Blue / Green / Cyan



Amber / Red / Super Red

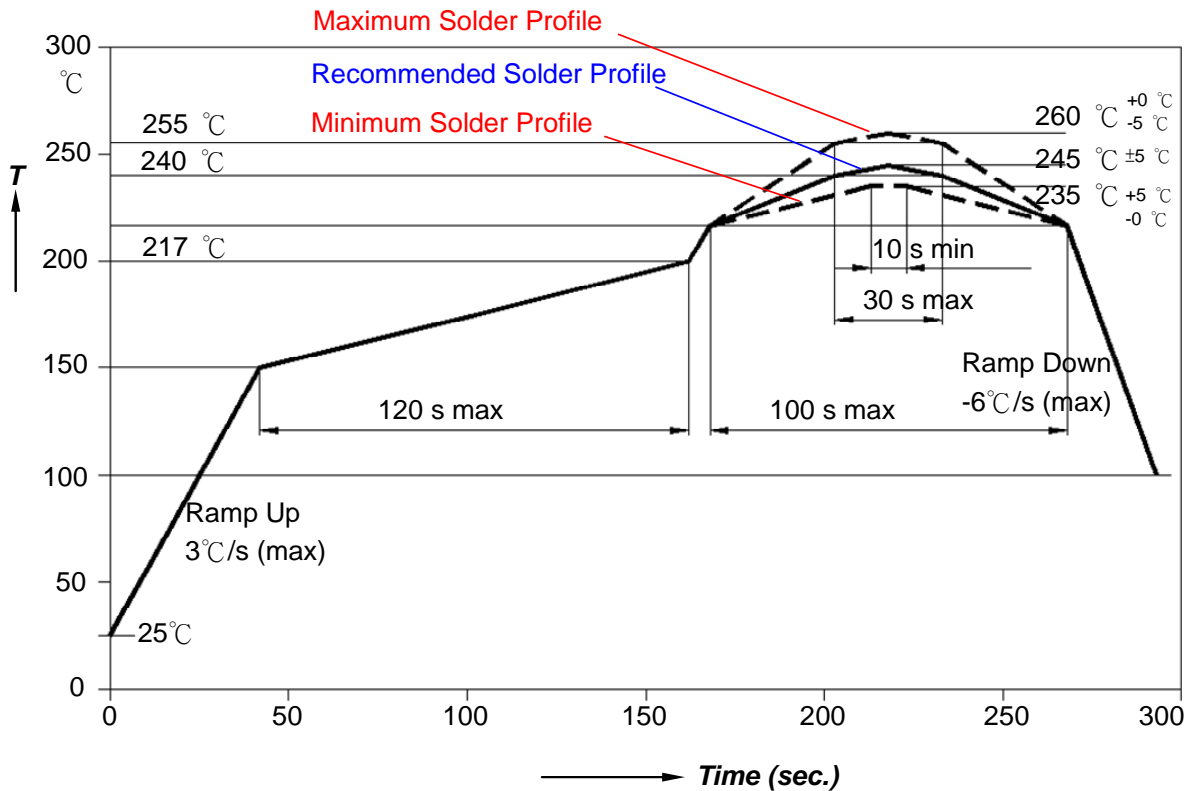


## Typical L-Tj Characteristics



## 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.

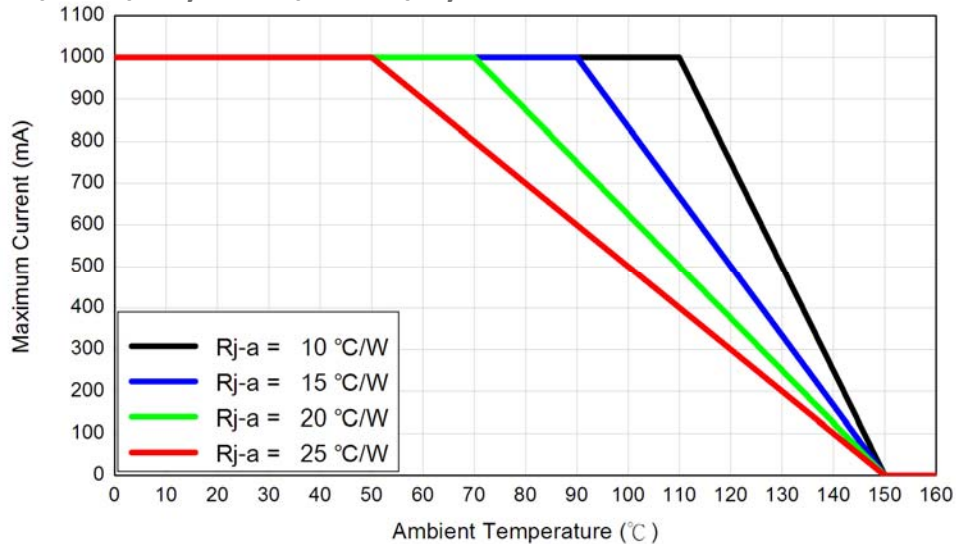


Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate (T <sub>smax</sub> to T <sub>p</sub> )	3°C/second max.	3°C/second max.
Preheat		
- Temperature Min(T <sub>smin</sub> )	100°C	150°C
- Temperature Max(T <sub>smax</sub> )	150°C	200°C
- Time(t <sub>smin</sub> to t <sub>smax</sub> )	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.

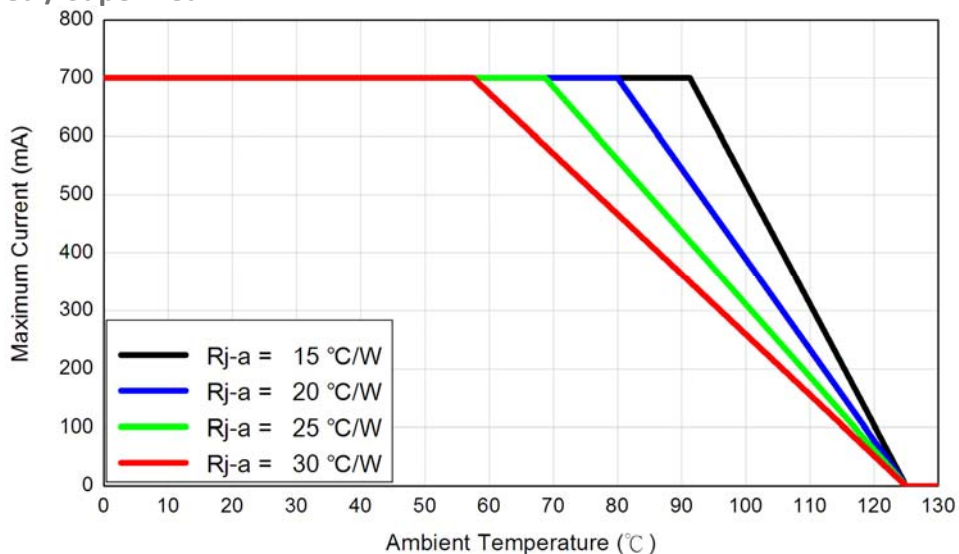
## Thermal Design

Thermal design of the end product is important. The thermal resistance between the junction and the solder point 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.

### White Series / Blue / Royal Blue / Green / Cyan



### Amber / Red / Super Red



The junction temperature can be correlated to the thermal resistance between the junction and ambient (Rja) by the following equation.

$$T_j = T_a + R_{j-a} * W$$

T<sub>j</sub>: LED junction temperature

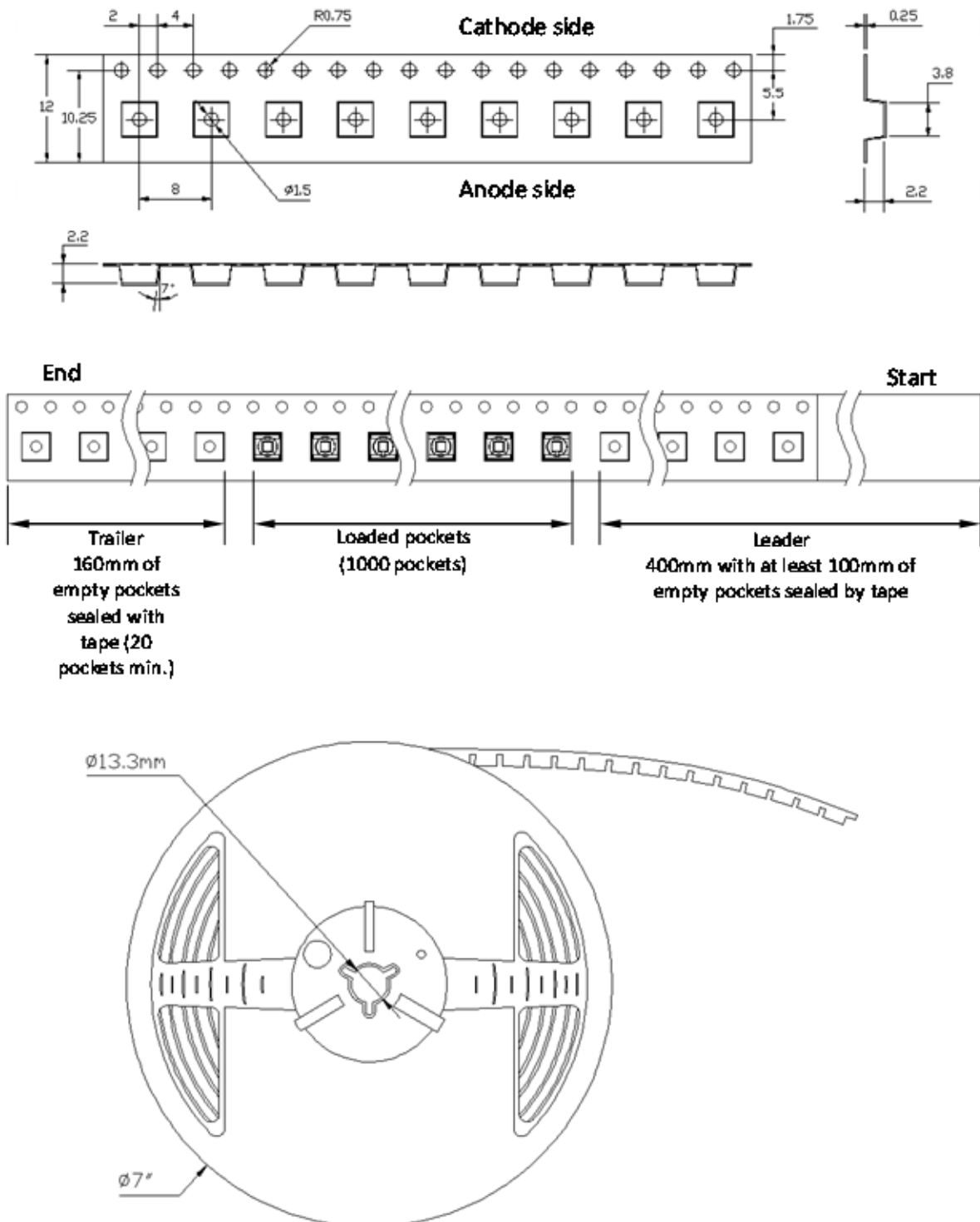
T<sub>a</sub>: Ambient temperature

R<sub>ja</sub>: Thermal resistance between the junction and ambient

W: Input power ( I<sub>F</sub>\*V<sub>F</sub> )

## Packing Information

The carrier tape conform to EIA-481D.



Note:

All dimensions are in millimeter.



## About Us

SemiLEDs is devoted to developing high-density, and multi-size emitters with powerful output to satisfy the needs of every customer.

SemiLEDs is the leader in LED solutions. Unlimited design flexibility for interior and exterior spaces with high-end lighting effect; energy-efficient for UV curing to improve the quality of medical care; horticulture solutions create a better environment for everyone; high-intensity rotatable lightings for the entertainment industry, SemiLEDs is always there for your lighting needs.

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)