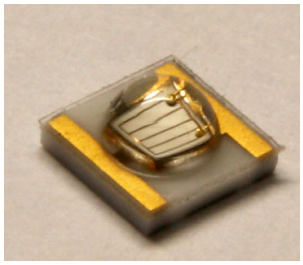
SEMILEDS

PRODUCT DATASHEET

C35L
High Power LED

Introduction



The C35L LED from SemiLEDs brings industry leading technology to the solid state lighting market with its high quality and performance. With a silicone lens, C35L LEDs from SemiLEDs feature very high brightness and efficacy, as well as excellent lifetime.

C35L LEDs also feature a special design to fit secondary optics for various lighting applications. The user can easily get uniform light with any secondary optics.

Table of Contents

RoHS Compliant

Characteristics

Absolute Ratings

Parameter	Rating
	Royal Blue / Blue / Green / Cyan / Amber / Red
DC Forward Current (mA)	700 mA
LED Junction Temperature	125℃
LED Operating Temperature	-40℃~110℃
Storage Temperature	-40℃~110℃
Soldering Temperature	Max. 260℃ / Max. 10sec. (JEDEC 020c)
ESD Sensitivity	2,000 V HBM (JESD-22A-114-B)
Reverse Voltage	Not design to be driven in reverse bias (VR≦5V)
Preconditioning	Acc. to JEDEC Level 2

General Characteristics at 350mA

Part number	Color	Dominant Wavelength λ_d Peak Wavelength λp *		$2\theta_{1/2}$	Temperature Coefficient of Vf (mV/℃)	Thermal Resistance Junction to Pad
		Min	Max		$\Delta V_F/\Delta T_J$	(℃/W) $R\Theta_{J-L}$
C35L-U	UV	390	420	125	-4	8
C35L-R	Red	620	635	125	-	-
C35L-A	Amber	580	600	125	-	-
C35L-G	Green	520	535	125	-3	8
C35L-C	Cyan	500	510	125	-3	8
C35L-B	Blue	460	470	125	-3	8
C35L-D	Royal Blue	440	460*	125	-3	8

Notes:

1. The peak/dominant wavelength is measured with an accuracy of ±1nm

Luminous Flux and Forward Voltage

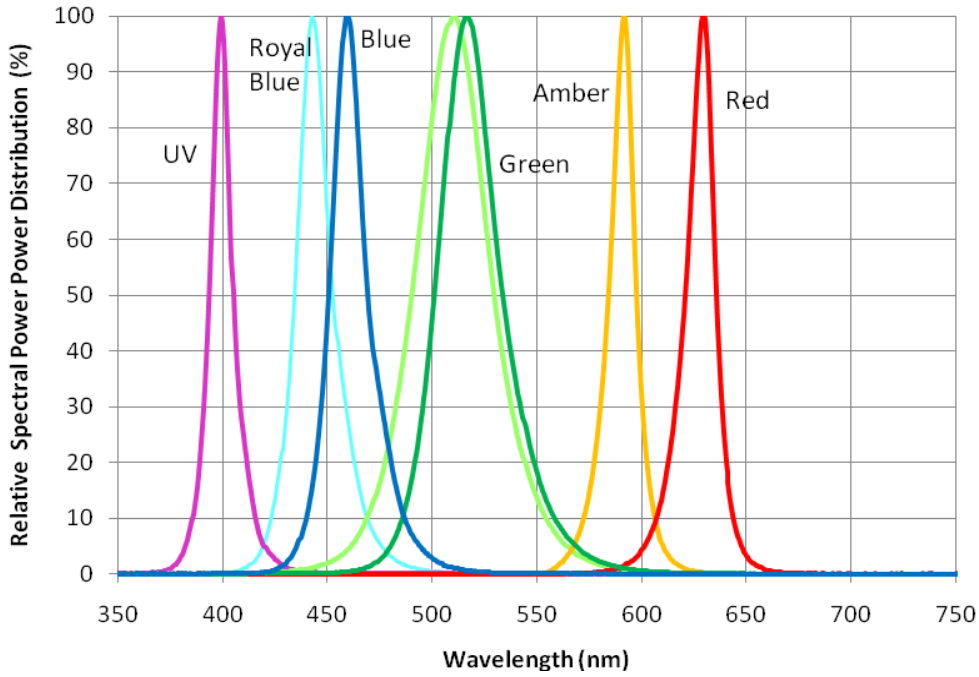
Part number	Color	Performance at Test Current (350mA)				Performance at 700mA
		Group	Minimum Luminous Flux (lm) or Radiometric Power* (mW)	VF		Typical Luminous Flux (lm) or Radiometric Power* (mW)
				Min	Max	
C35L-U	U50 (390~400nm)	D1	200*	3.0	4.0	340*
		D2	240*	3.0	4.0	410*
		D3	280*	3.0	4.0	475*
	U60 (400~410nm)	D1	200*	3.0	4.0	340*
		D2	240*	3.0	4.0	410*
		D3	280*	3.0	4.0	475*
		D4	320*	3.0	4.0	545*
	U70 (410~420nm)	D2	240*	3.0	4.0	410*
		D3	280*	3.0	4.0	475*
		D4	320*	3.0	4.0	545*
		D5	360*	3.0	4.0	610*
C35L-R	Red	KC	35.2	2.0	3.5	68
		MB	39.8	2.0	3.5	77
		MC	45.7	2.0	3.5	85
C35L-A	Amber	KC	35.2	2.0	3.5	68
		MB	39.8	2.0	3.5	77
		MC	45.7	2.0	3.5	85
C35L-G	Green	NC	56.8	2.75	3.75	100
		ND	62	2.75	3.75	110
C35L-C	Cyan	NC	56.8	2.75	3.75	100
		ND	62	2.75	3.75	110
C35L-B	Blue	IC	14	2.75	3.75	27
		JB	18	2.75	3.75	33
C35L-D	Royal Blue	D2	240*	2.75	3.75	435*
		D3	280*	2.75	3.75	500*
		D4	320*	2.75	3.75	570*

Note:

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

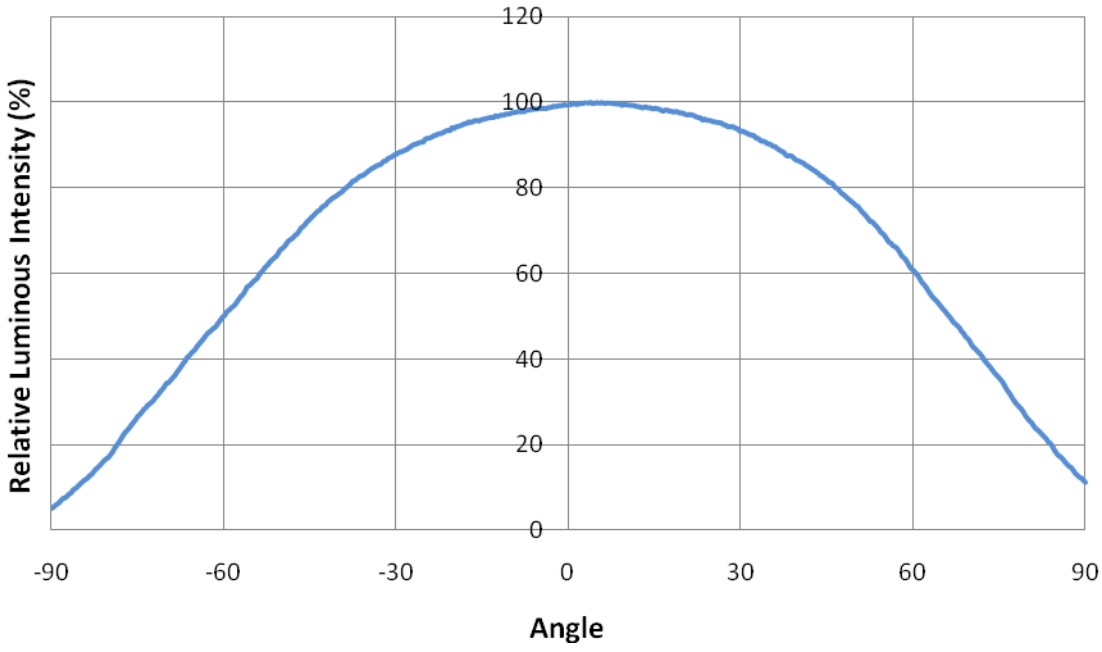
Relative Spectral Power Distribution, Ta=25 ℃

UV / Royal Blue / Blue / Cyan / Green / Amber / Red

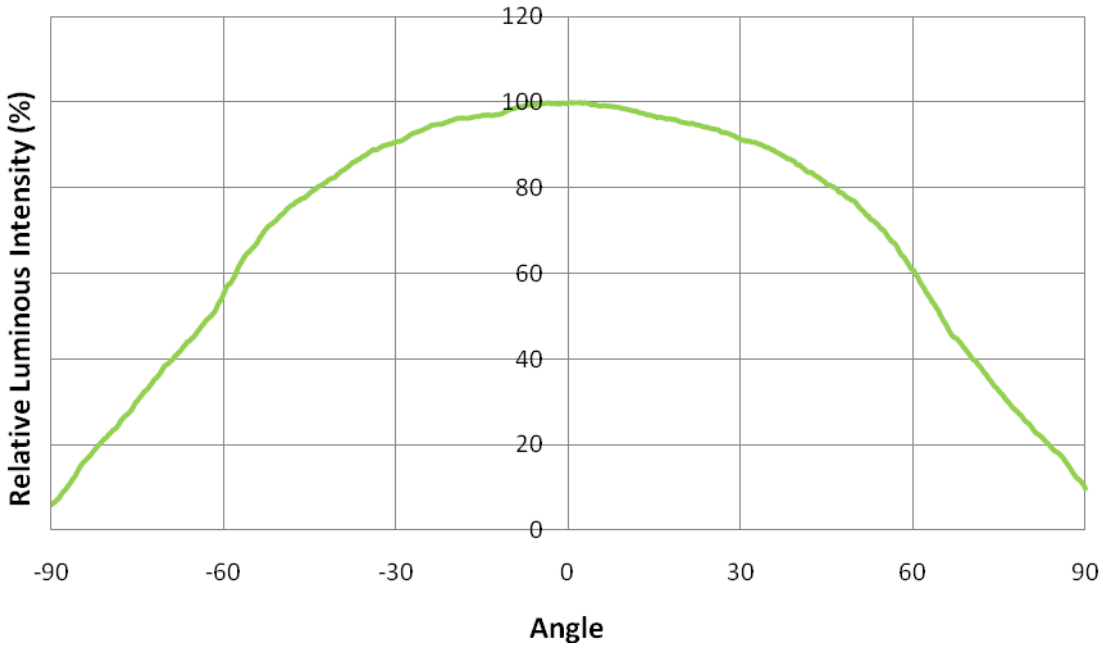


Typical Spatial Radiation Pattern

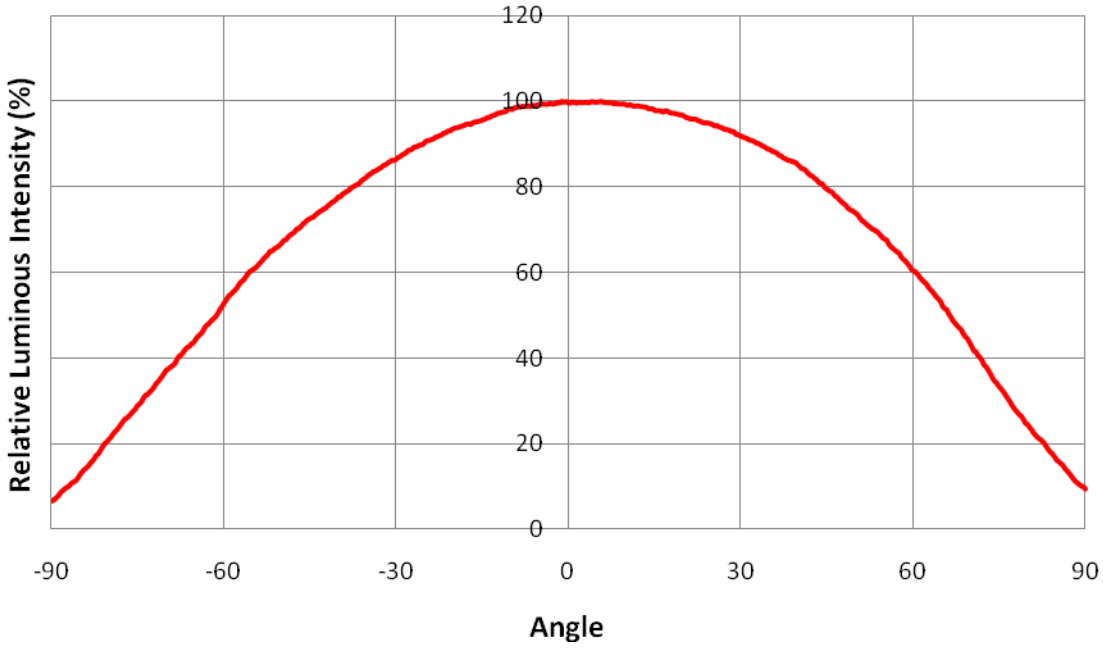
C35L-D, C35L-B



C35L-G, C35L-C

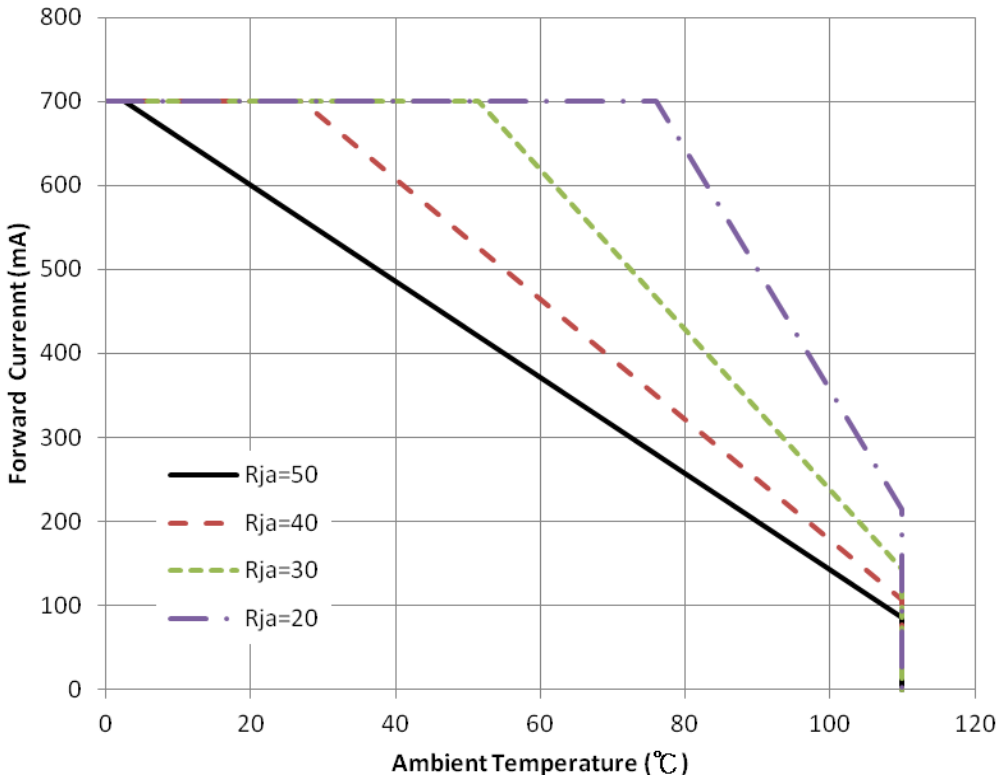


C35L-A, C35L-R



Thermal Design

Thermal design of the end product is important. The thermal resistance between the junction and the solder point ($R\Theta_{J\text{-}P}$) is 8℃/W, 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

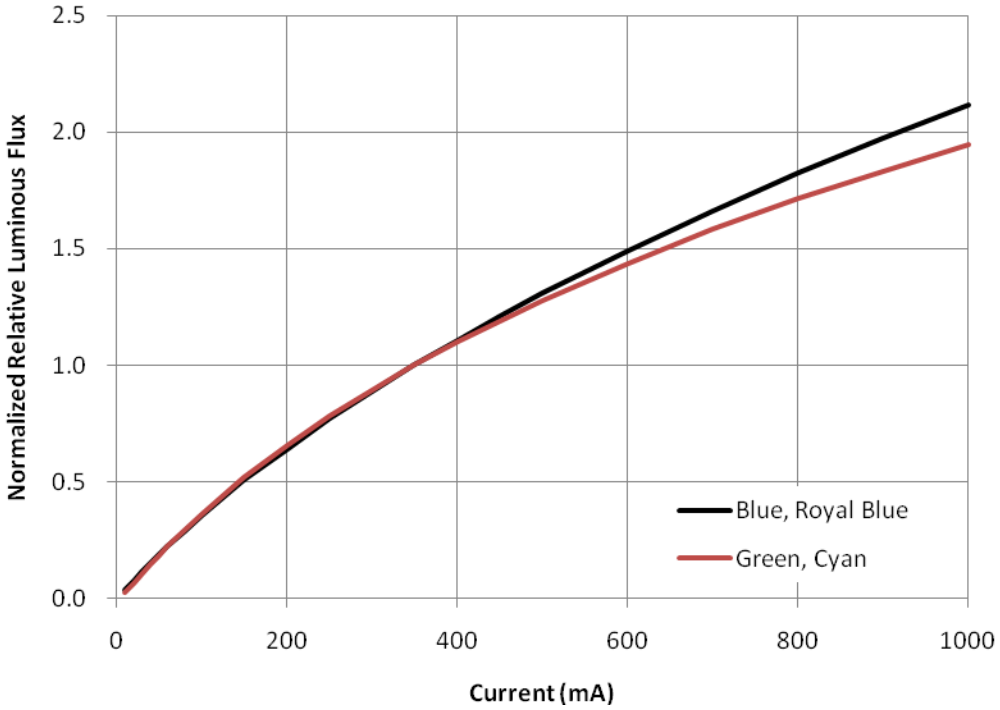
Ta: Ambient temperature

Rja: Thermal resistance between the junction and ambient

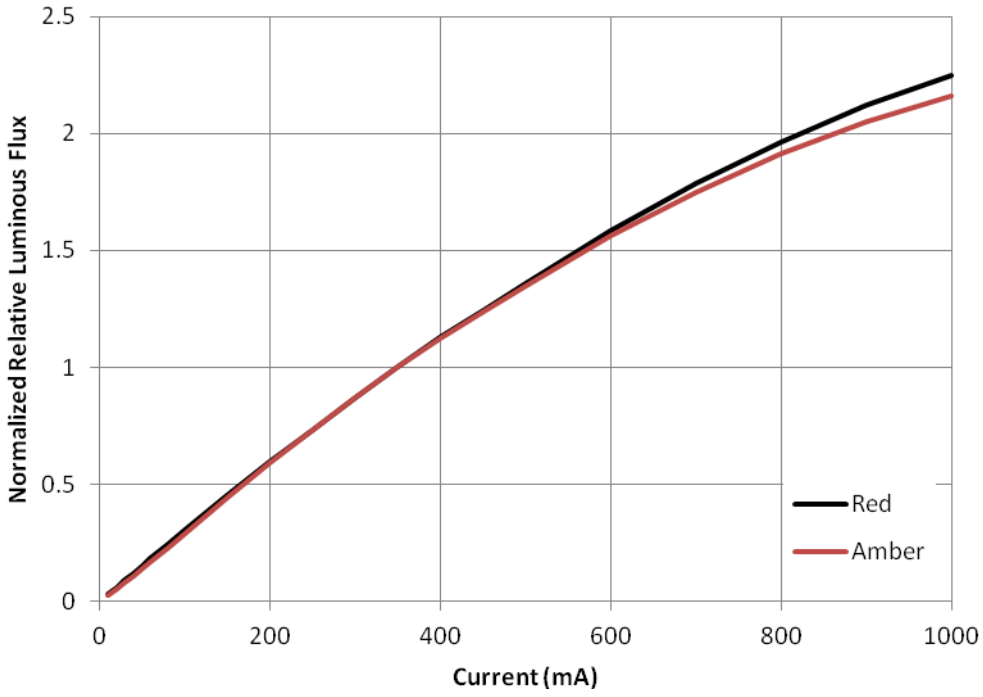
W: Input power (I_F*V_F)

Typical Forward L-I Characteristics

Blue / Royal Blue / Green / Cyan

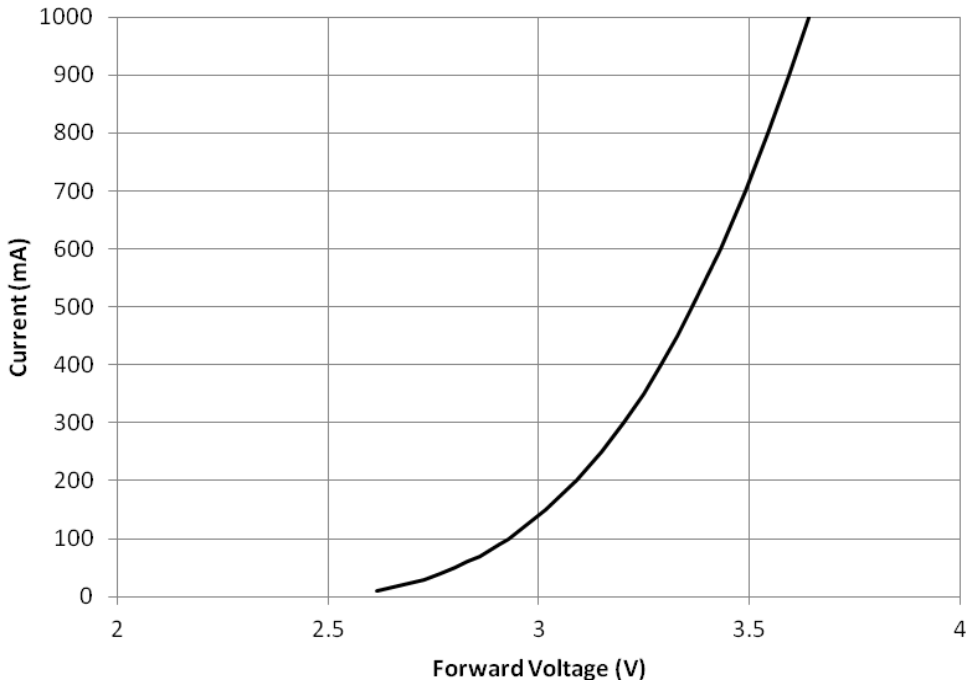


Amber / Red

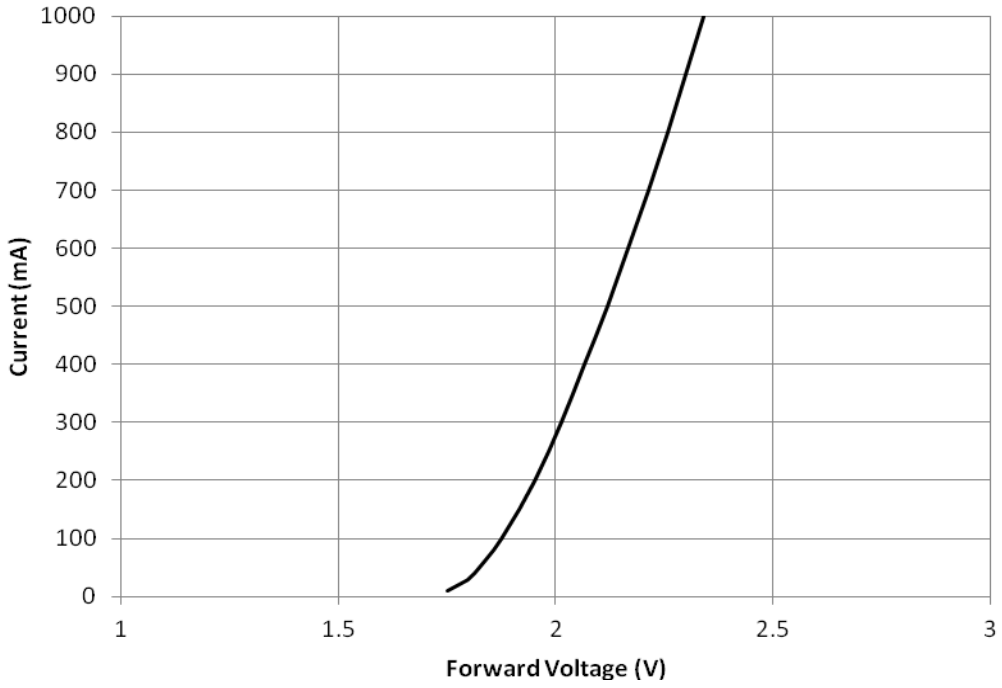


Typical Forward I-V Characteristics

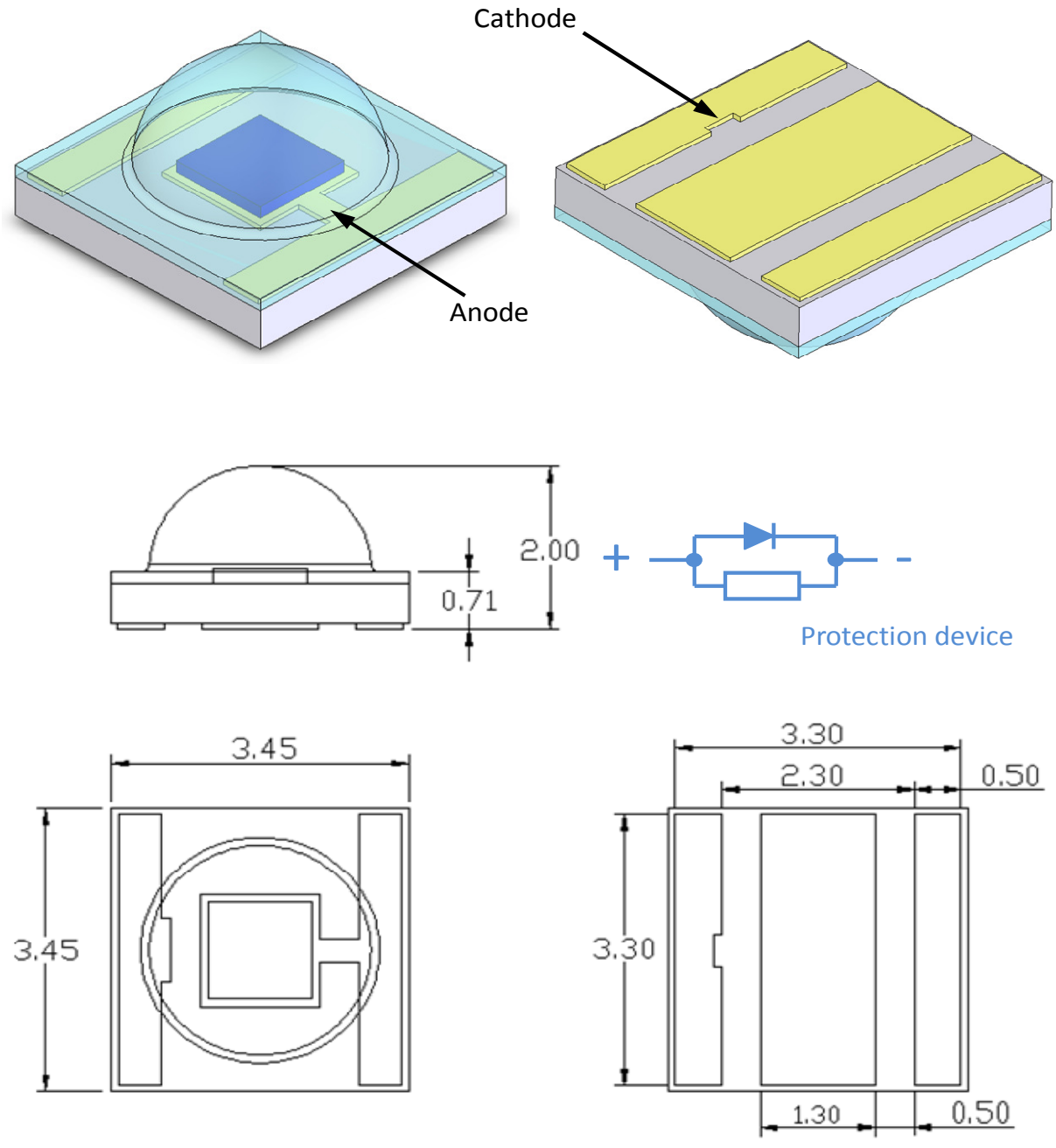
Blue / Royal Blue / Green / Cyan



Amber / Red



Mechanical Dimensions

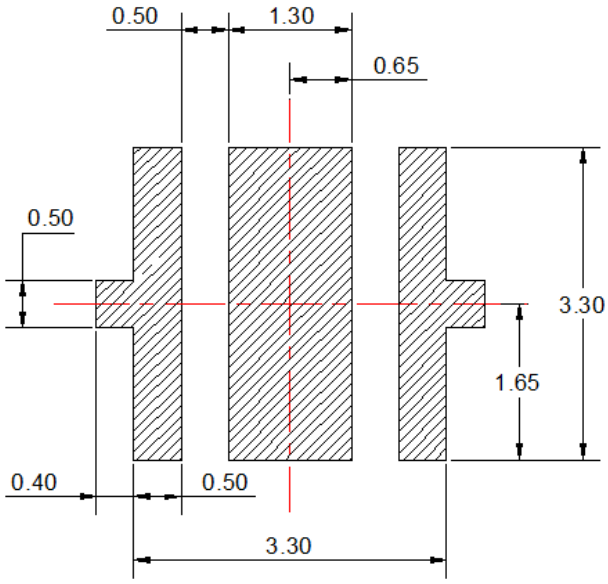


Notes :

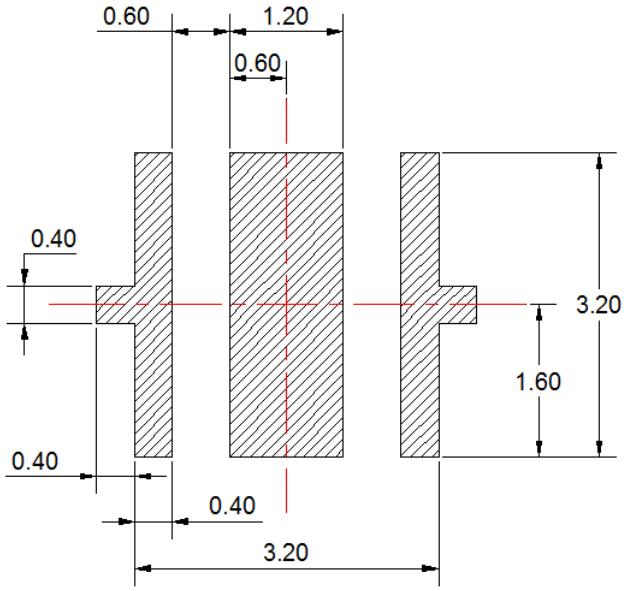
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are ±0.13mm unless otherwise indicated

Recommended Solder Pad Design

Recommended Soldering Pad Design



Recommended Stencil Pattern Design (Mark Area is Opening)

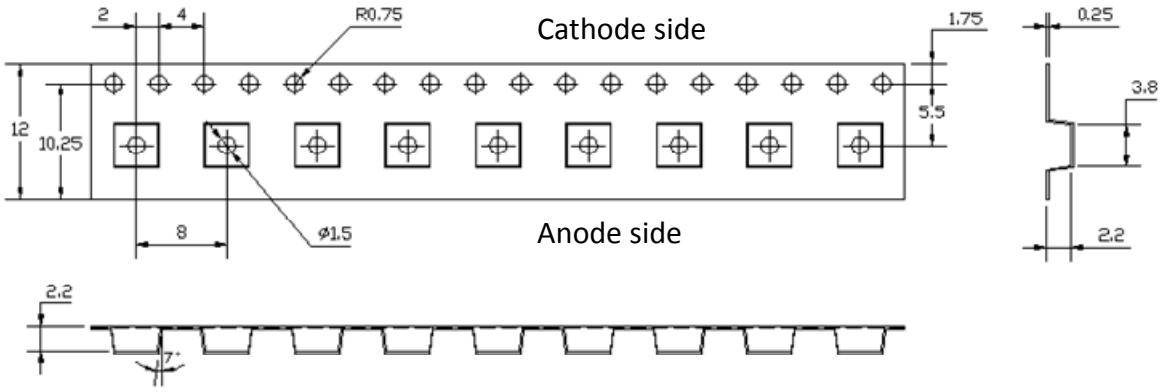


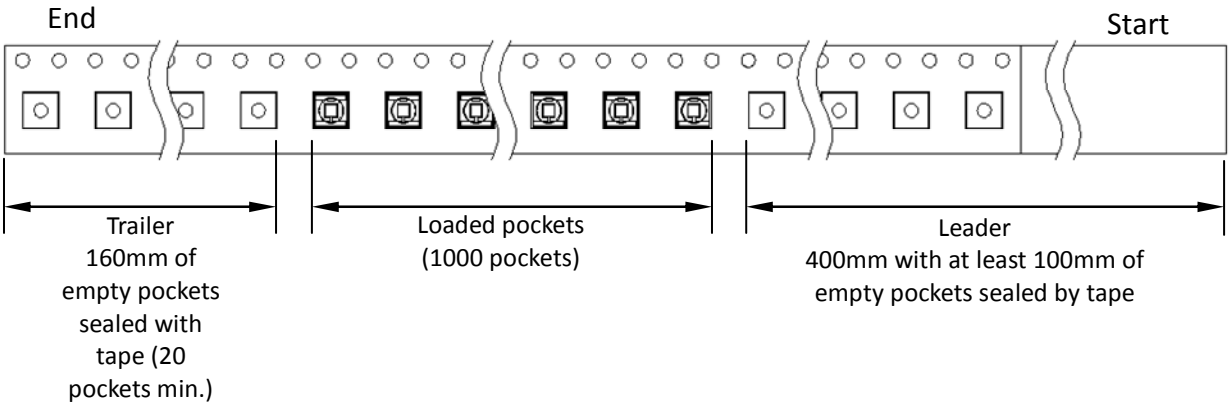
Notes :

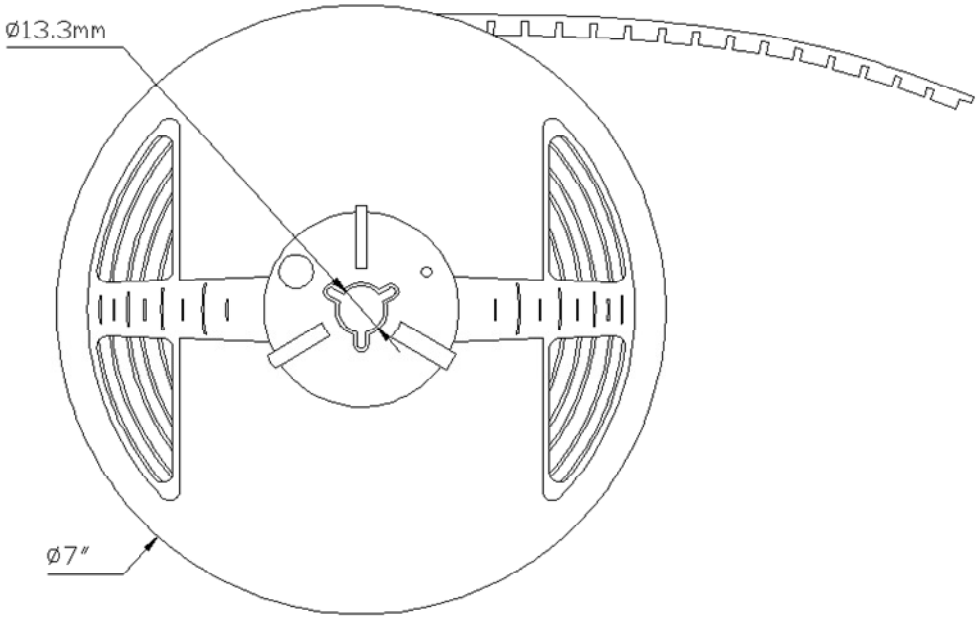
1. Drawing is not to scale
2. All dimensions are in millimeter

Packing Information

The carrier tape conform to EIA-481D.





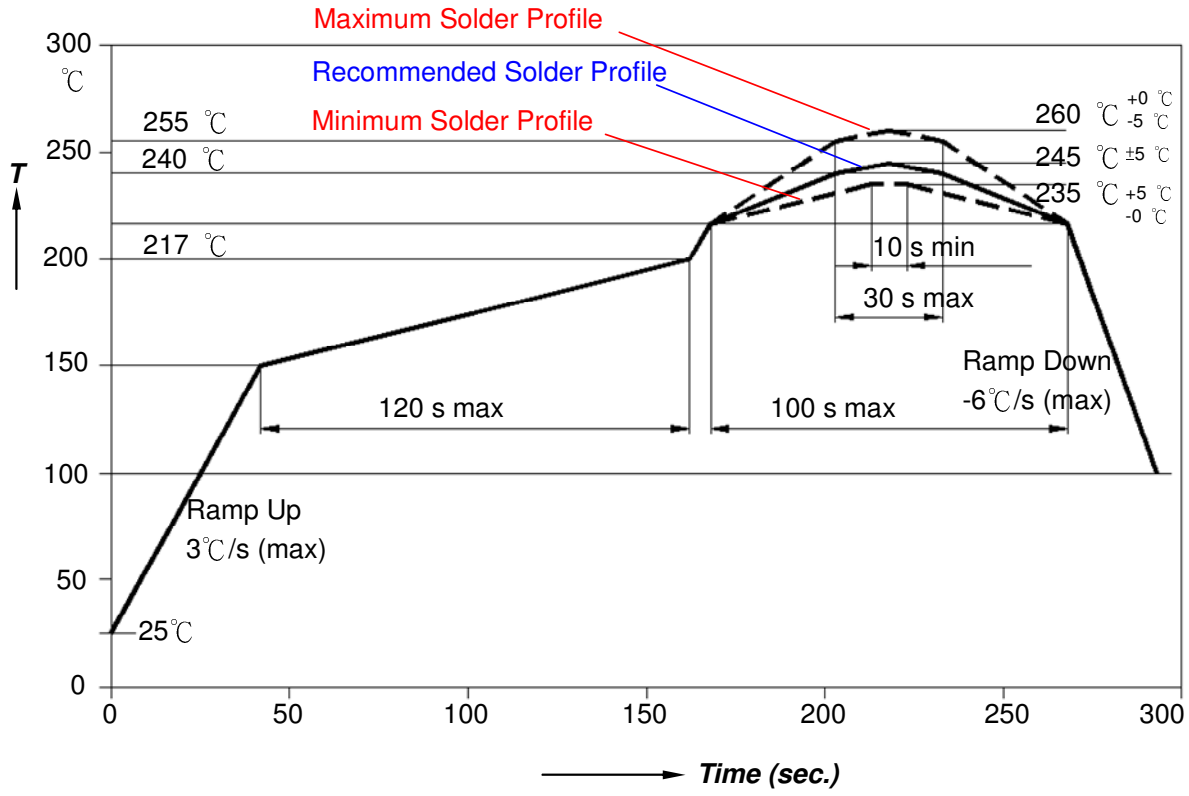


Note:

1. 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 advised for the LEDs.



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate (Ts_{max} 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.

Reliability Information

Stress Test	Stress Condition	Stress Duration
Room Temperature Operating Life (RTOL)	Tb=25℃, If=700mA	1000 hours
High Temperature Operating Life (HTOL)	Tb=85℃, If=700mA	1000 hours
Wet High Temperature Operating Life (WHTOL)	Ta=85℃, RH=85%, If=700mA	1000 hours
Temperature Cycles (TMCL)	-40℃/125℃, 15min dwell, 5min transfer	200 cycles
High Temperature Storage Life (HTSL)	Ta=110℃, non-operating	1000 hours
Low Temperature Storage Life (LTOL)	Ta=-40℃ non-operating	1000 hours
Solder Heat Resistance (SHR)	260℃, 10 sec	

Failure Criteria:

1. Brightness attenuate difference <10%
2. Forward voltage difference: ±20%

Note:

1. Tb: board temperature
2. Ta: ambient temperature

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.**

For further company or product information, please visit us at **www.semileds.com** or please contact **sales@ semileds.com.**

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