



# C3535X-JNxx Series High Power Infrared LED

## Introduction

The C3535X-JNxx LED from TSLC brings industry leading technology to the infrared applications market with its high reliability and performance. With a ceramic substrate and a 140/90/65 degree view angle primary lens, the C3535X-JNxx LED is a perfect solution for security cameras, surveillance systems, machine vision and general purpose IR applications.



## Table of Contents

Characteristics .....	1
Mechanical Dimensions .....	4
Recommended Solder Pad Design.....	7
Relative Spectral Power Distribution.....	8
Typical Spatial Radiation Pattern .....	8
Typical Forward L-I Characteristics .....	9
Typical Forward I-V Characteristics .....	9
Recommended Soldering Profile .....	10
Thermal Design.....	11
Packing information.....	12

## Characteristics

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

Parameter	Rating
	IR Series
DC Forward Current (mA)	1000 mA
LED Junction Temperature	115°C
LED Operating Temperature	-40°C~85°C
Storage Temperature	-40°C~115°C
Soldering Temperature	Max. 260°C / Max. 10sec. (JEDEC 020)
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

### Product Name

**C 3535 X – JN x x**

1      2~5   6      7~8   9   10

Code 1: Substrate composition, C: Ceramic Al<sub>2</sub>O<sub>3</sub>

Code 2.3.4.5: Package size, 3535: 3.5\*3.5mm

Code 6: X: Product Class, IR (>700nm)

Code 7.8: Wavelength Class, JN: IR (925~955nm)

Code 9: Lens type, L: 140 degree, A: 90 degree, F: 65 degree

Code 10: Internal code (may be a digit or letter)

## General Characteristics at 700mA

Part Number	Color	Peak Wavelength $\lambda_p$		$2\theta_{1/2}$	Temperature Coefficient of $V_f$ (mV/°C)	Thermal Resistance Junction to Pad (°C/W)
		Min	Max		$\Delta V_f / \Delta T_J$	$R\theta_{J-L}$
C3535X-JNLx	Jx5	925	955	140	-2~-4	10
C3535X-JNAx	Jx5	925	955	90	-2~-4	10
C3535X-JNFx	Jx5	925	955	65	-2~-4	10

## Notes:

1. The peak wavelength is measured with an accuracy of  $\pm 1\text{nm}$
2. All values stated are subject to the limits and set up of TSLC's testers. All other measurement data are defined as long-term production mean values and are only given for reference.
3. A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system. Life support devices or systems are intended (i) to be implanted in the human body, or (ii) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health of the user may be endangered. Components used as a critical component must be approved in writing by TSLC Corporation.

Radiometric Power and Forward Voltage (T<sub>j</sub> = 25°C)

Part Number	Color	Performance at Test Current (700mA)					Performance at 1000mA
		Group	Radiometric Power (mW)		VF		Calculated Minimum Radiometric Power* (mW)
			Min	Max	Min	Max	
C3535X-JNLx (beam angle 140°)	Jx5 (925-955nm)	NE1	400	440	1.2	2.2	560
		NE2	440	480	1.2	2.2	615
		NE3	480	520	1.2	2.2	670
		NE4	520	560	1.2	2.2	725
C3535X-JNAX (beam angle 90°)	Jx5 (925-955nm)	ND5	360	400	1.2	2.2	500
		NE1	400	440	1.2	2.2	560
		NE2	440	480	1.2	2.2	615
		NE3	480	520	1.2	2.2	670
C3535X-JNFX (beam angle 65°)	Jx5 (925-955nm)	ND5	360	400	1.2	2.2	500
		NE1	400	440	1.2	2.2	560
		NE2	440	480	1.2	2.2	615
		NE3	480	520	1.2	2.2	670

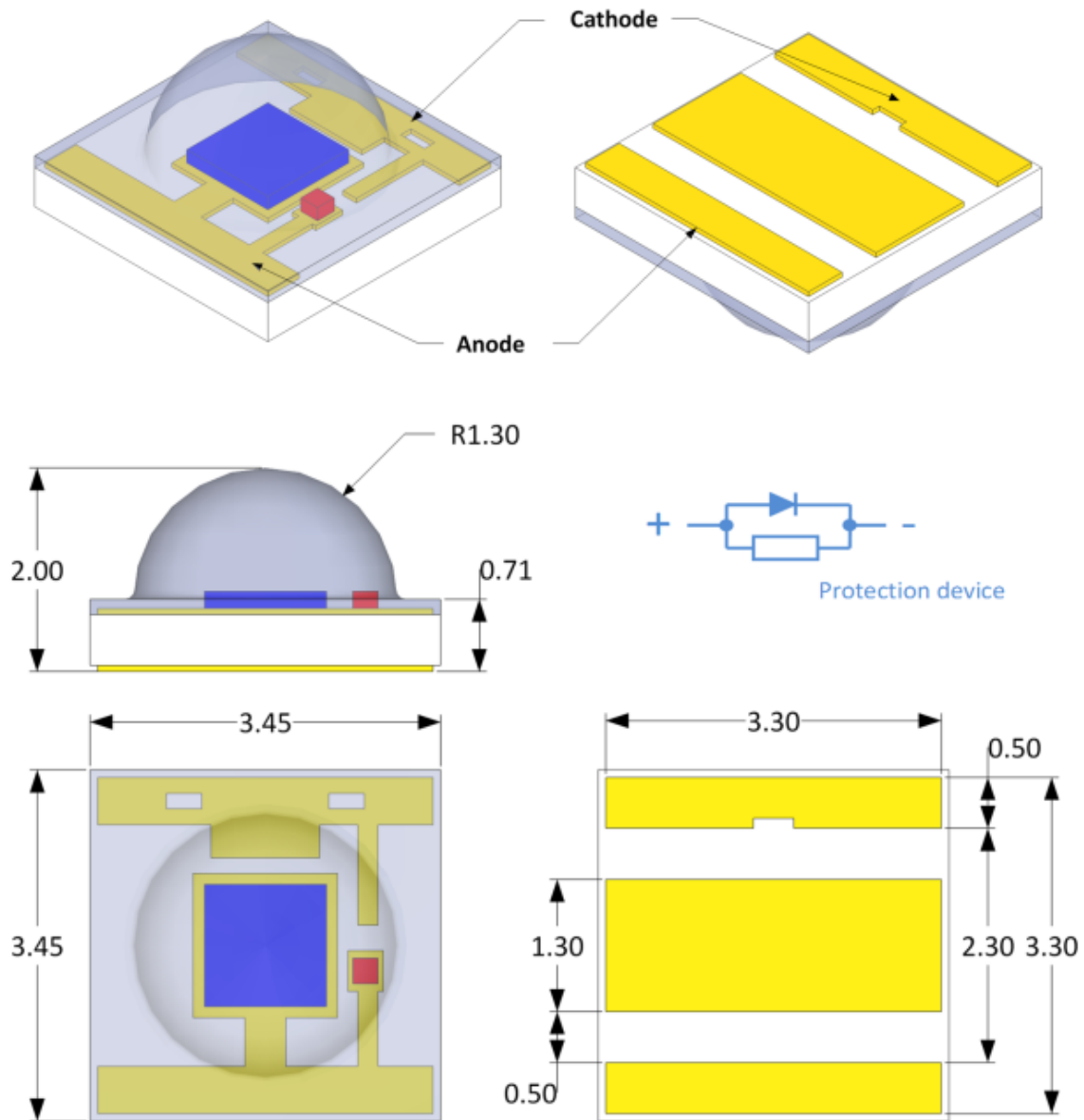
Note: 1. Radiometric power is measured with an accuracy of  $\pm 10\%$

2. The forward voltage is measured with an accuracy of  $\pm 0.2V$

\* Calculated values are for reference only.

## Mechanical Dimensions

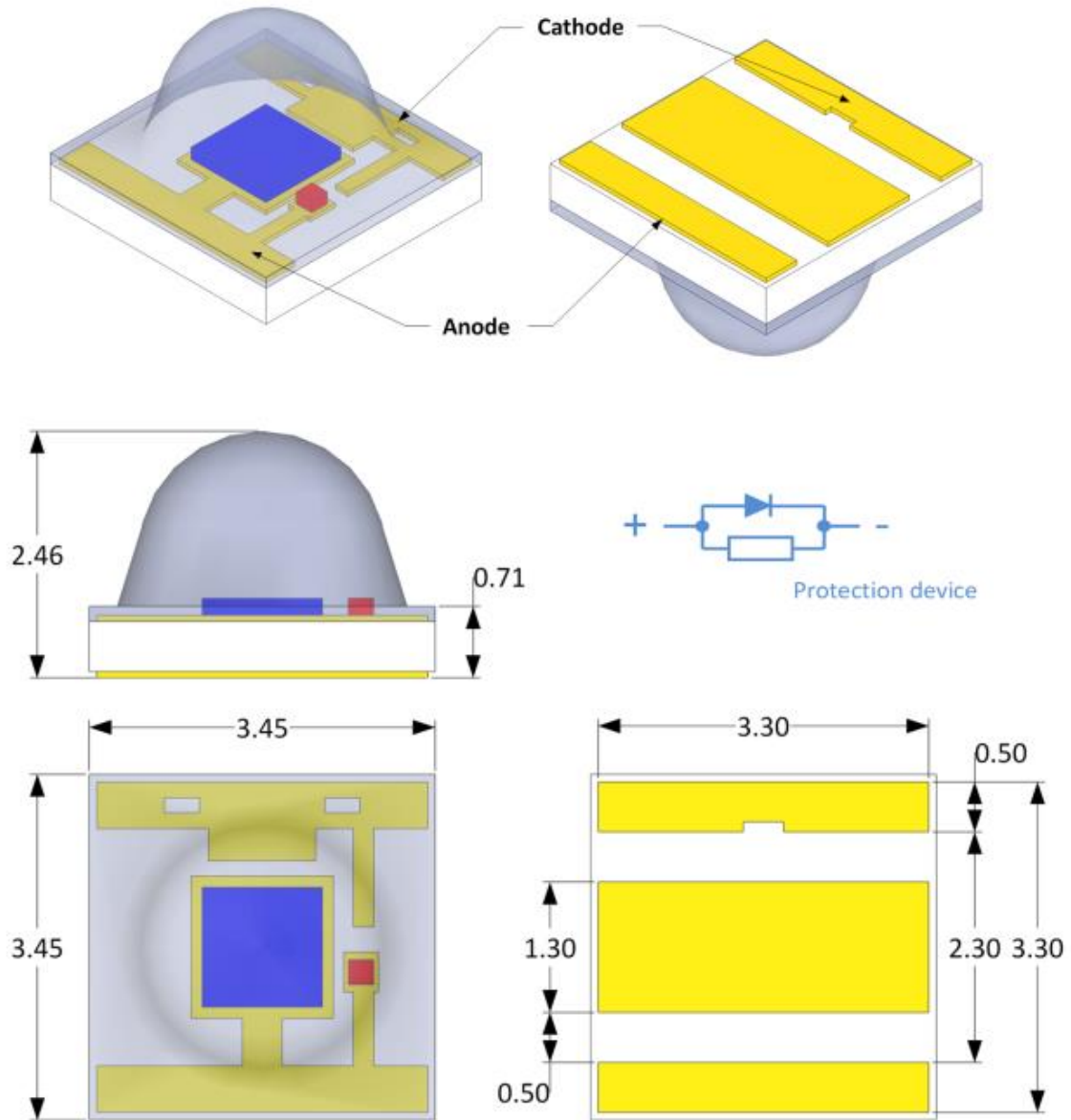
C3535X-JNLx series (beam angle 140°)



Notes:

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

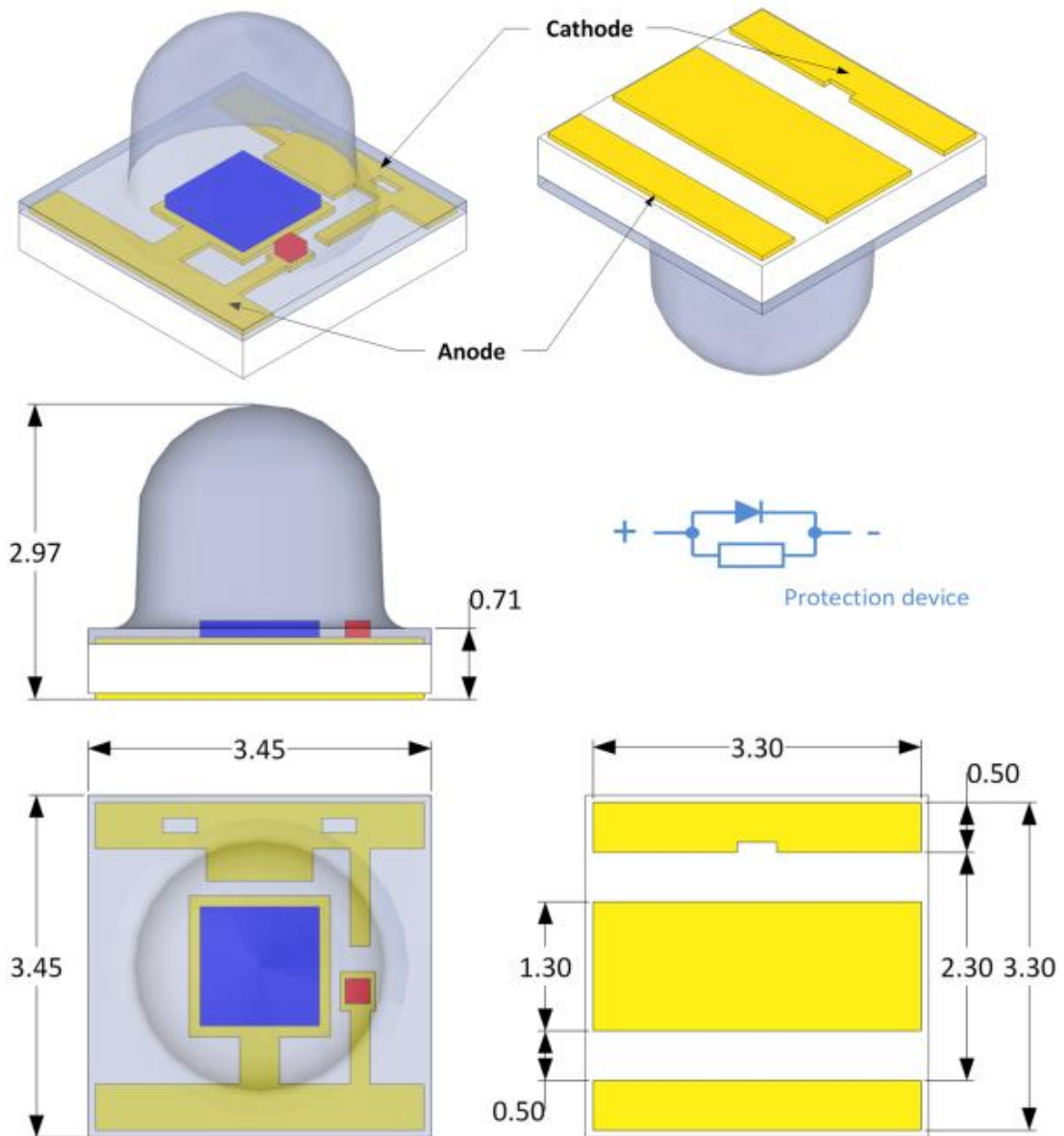
## C3535X-JNxx series (beam angle 90°)



## Notes:

4. Drawing is not to scale
5. All dimensions are in millimeter
6. Dimensions are  $\pm 0.13\text{mm}$  unless otherwise indicated

## C3535X-JNFx series (beam angle 65°)

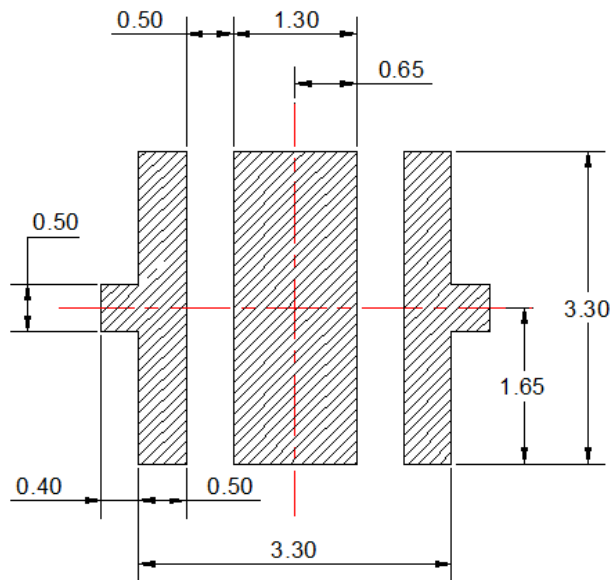


## Notes:

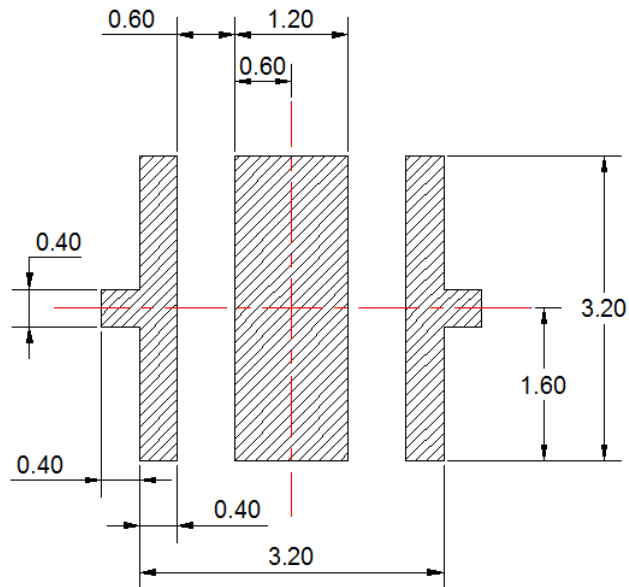
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are  $\pm 0.13\text{mm}$  unless otherwise indicated

## Recommended Solder Pad Design

### Recommended Soldering Pad Design



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

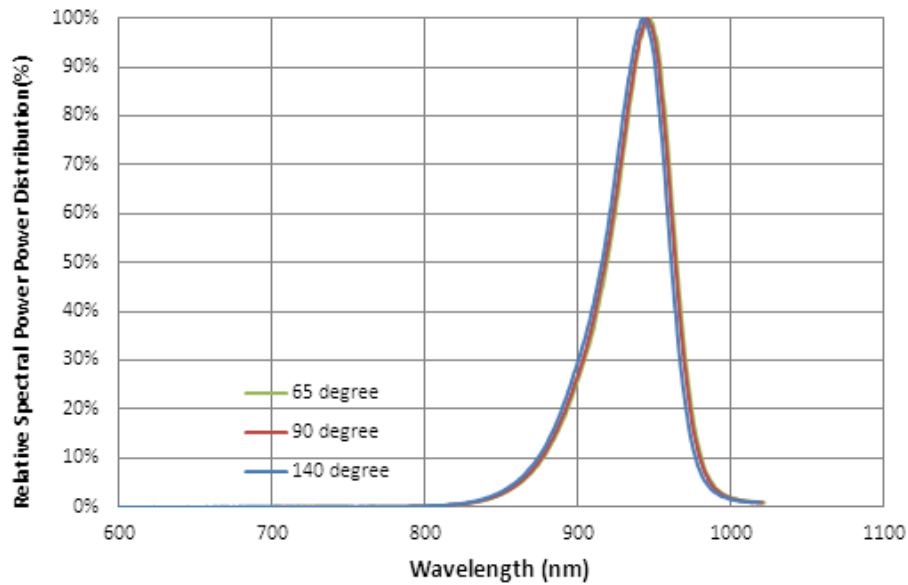


#### Notes:

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

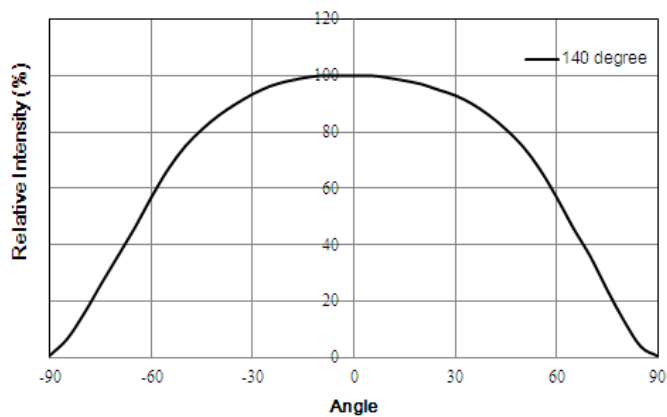


## Relative Spectral Power Distribution, $T_j=25\text{ }^{\circ}\text{C}$

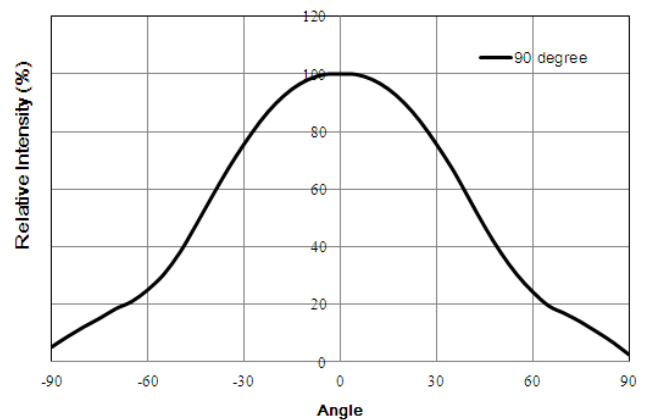


## Typical Spatial Radiation Pattern, $T_j=25\text{ }^{\circ}\text{C}$

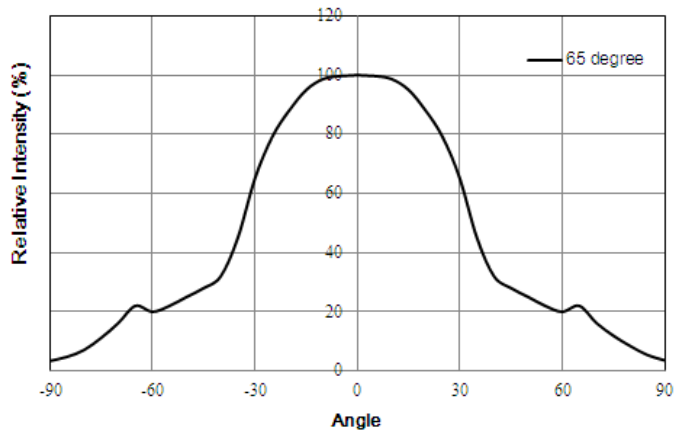
C3535X-JNLx series (beam angle 140°)



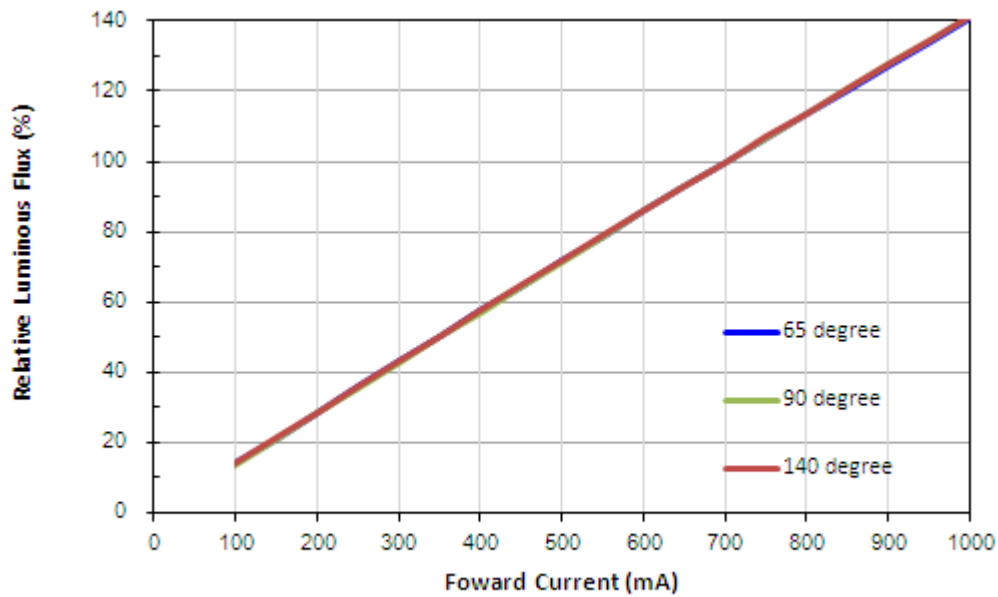
C3535X-JNAx series (beam angle 90°)



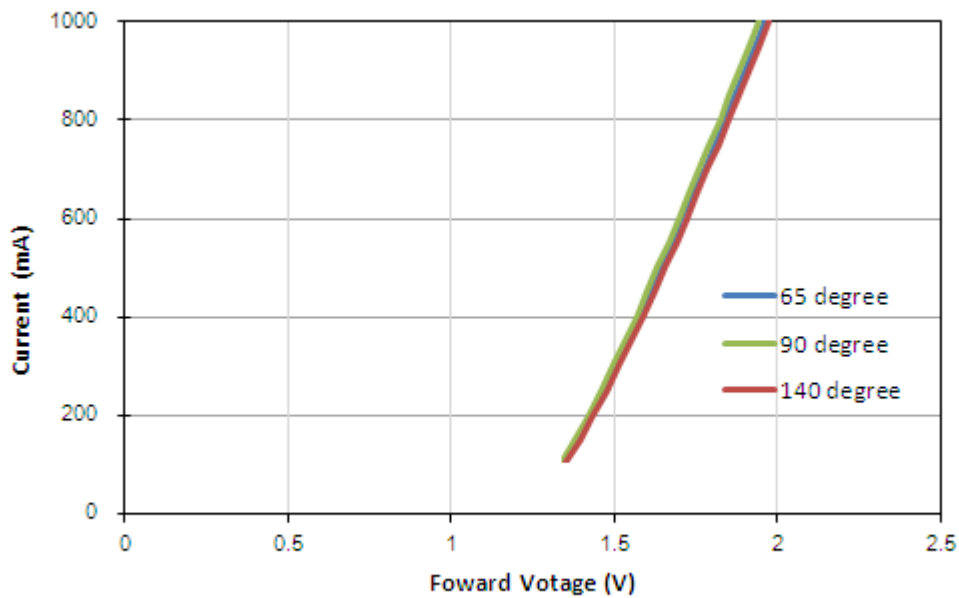
C3535X-JNFx series (beam angle 65°)



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

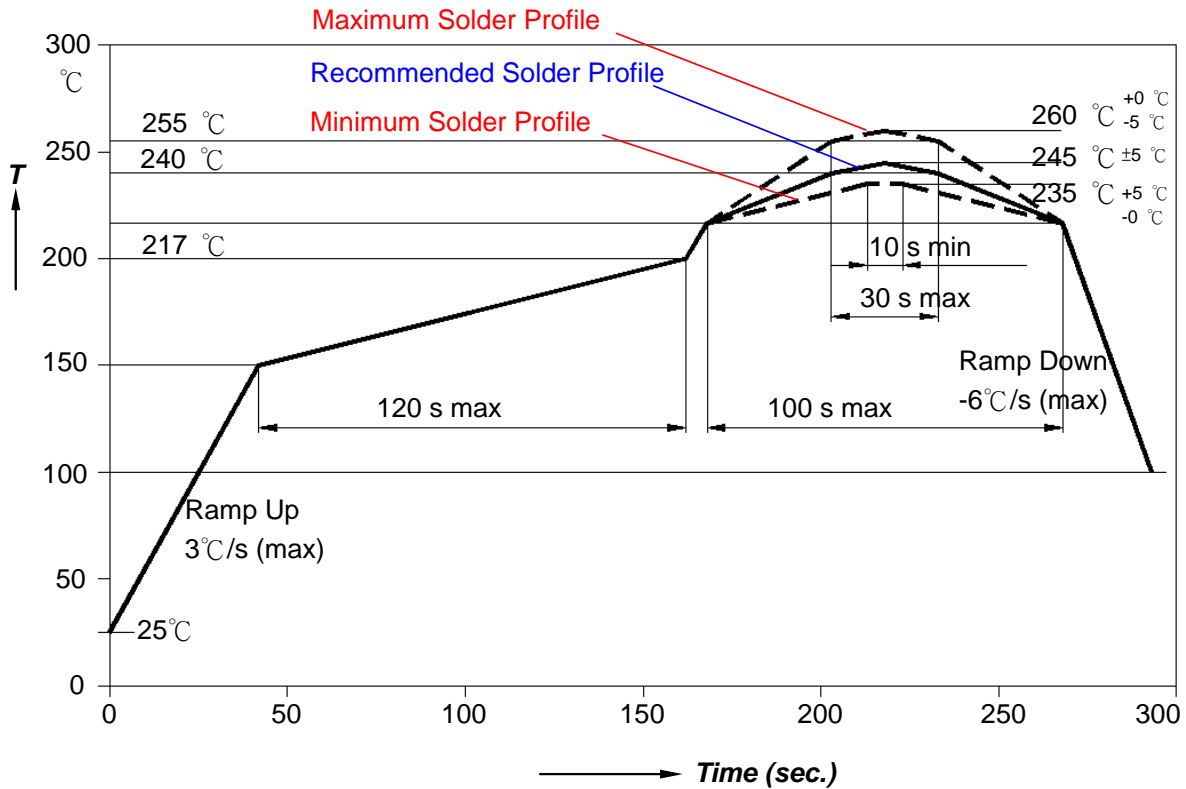


## Typical Forward I-V Characteristics, $T_j=25\text{ }^{\circ}\text{C}$



## Recommended Soldering Profile

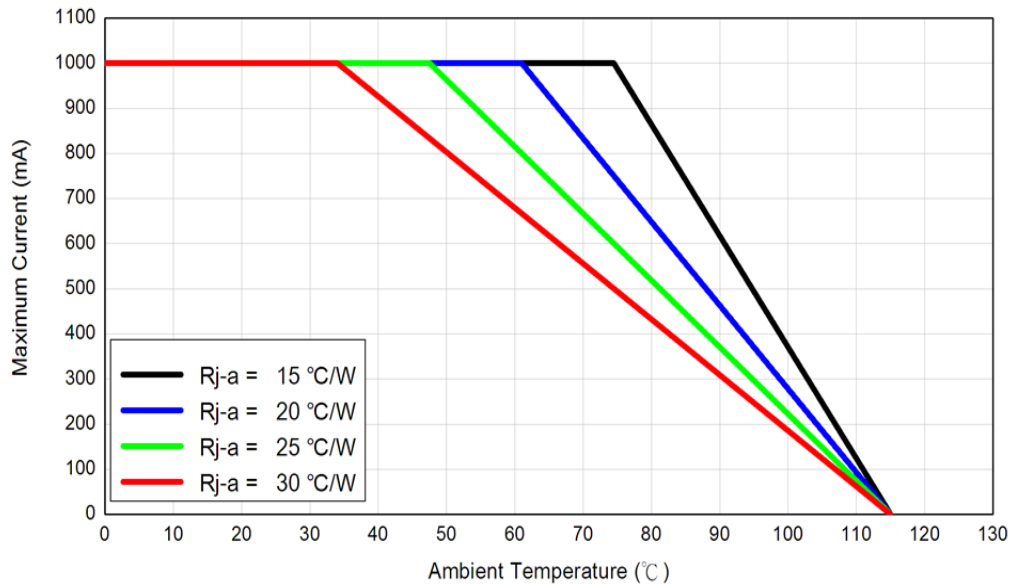
The LEDs can be soldered using the parameters listed below. As a general guideline, the users are suggested to follow the recommended soldering profile provided by the manufacturer of the solder paste. Although the recommended soldering conditions are specified in the list, reflow soldering at the lowest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



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate (Ts <sub>max</sub> to Tp)	3°C/second max.	3°C/second max.
Preheat		
- Temperature Min(Ts <sub>min</sub> )	100°C	150°C
- Temperature Max(Ts <sub>max</sub> )	150°C	200°C
- Time(ts <sub>min</sub> to ts <sub>max</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(Tp)	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.

$$T_j = T_a + R_{ja} \cdot W$$

$T_j$ : LED junction temperature

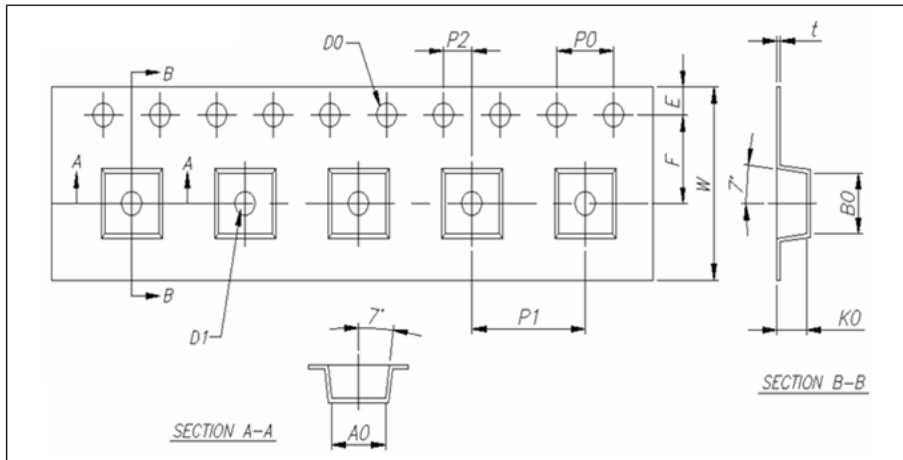
$T_a$ : Ambient temperature

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

$W$ : Input power ( $I_F \cdot V_F$ )

## Packing Information

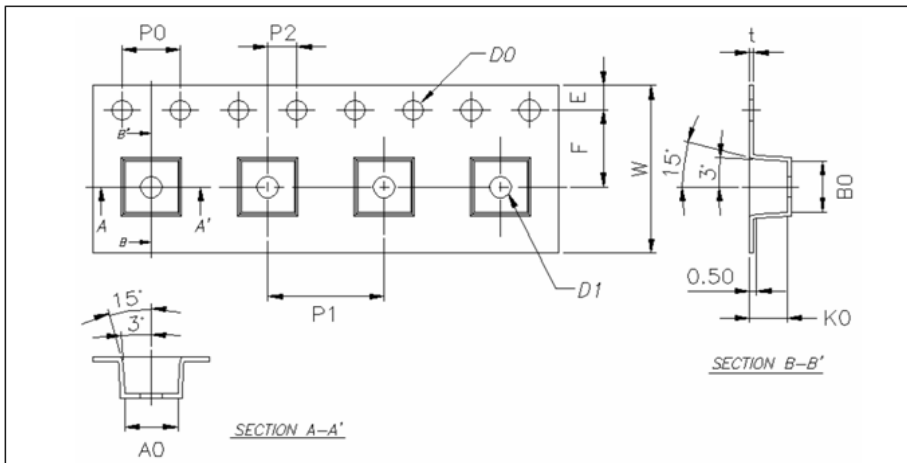
C3535X-JNLx series (beam angle 140°), Max QTY: 1000ea / roll



Item	Specification	Tol.(+/-)
W	12.00	±0.20
E	1.75	±0.10
F	5.50	±0.05
D0	1.50	+0.10, -0
D1	1.50	±0.10
P0	4.00	±0.10
P1	8.00	±0.10
P2	2.00	±0.10
P0X10	40.00	±0.20

Item	Specification	Tol.(+/-)
t	0.25	±0.05
A0	3.80	±0.10
B0	3.80	±0.10
K0	2.20	±0.10

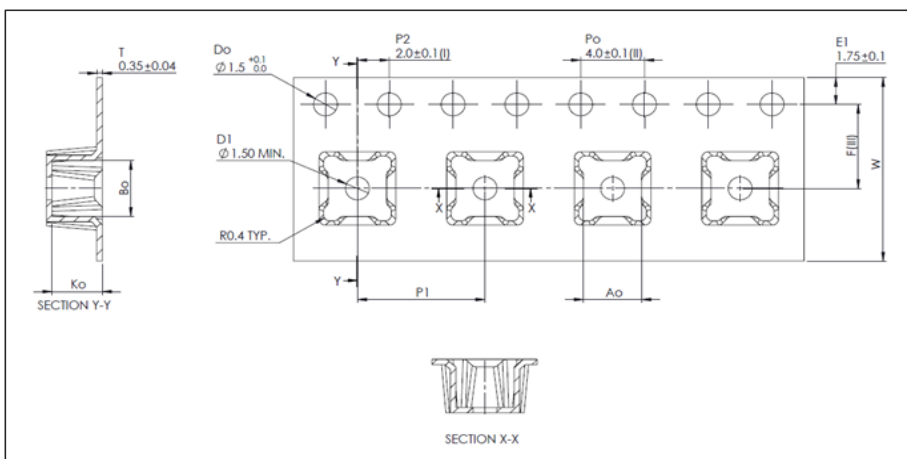
C3535X-JNAX series (beam angle 90°) Max QTY: 500ea / roll



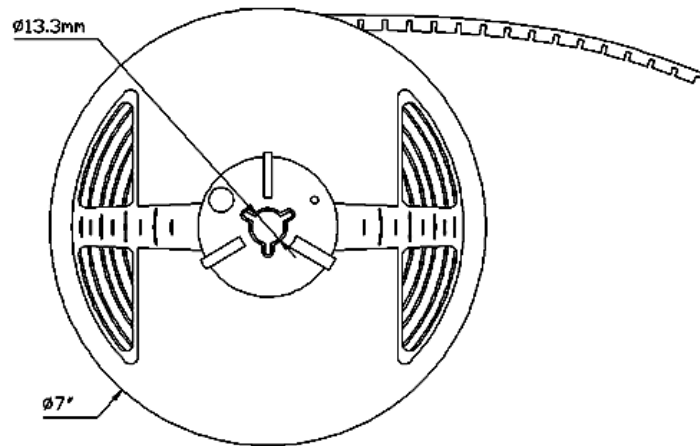
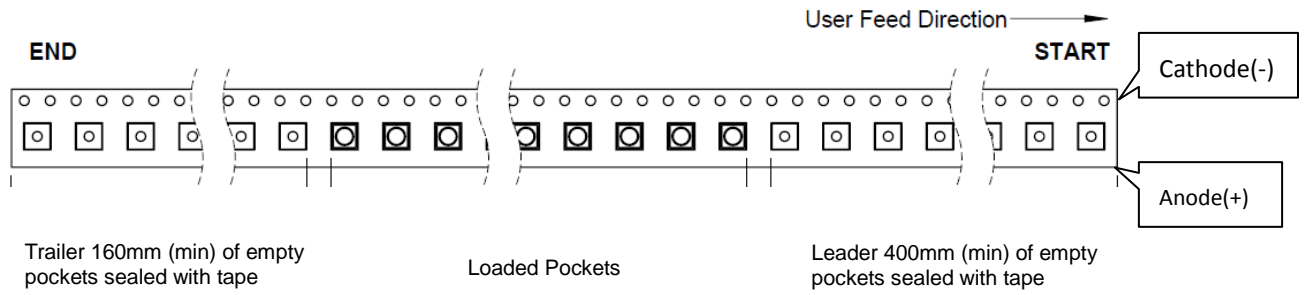
Item	Specification	Tol.(+/-)
W	12.00	±0.30
E	1.75	±0.10
F	5.50	±0.05
D0	1.50	+0.10, -0
D1	1.50	+0.10, -0
P0	4.00	±0.10
P1	8.00	±0.10
P2	2.00	±0.05
P0X10	40.00	±0.20

Item	Specification	Tol.(+/-)
t	0.30	±0.05
A0	3.65	±0.10
B0	3.65	±0.10
K0	2.56	±0.10

C3535X-JNFX series (beam angle 65°), Max QTY: 500ea / roll



Item	Specification	Tol.(+/-)
A0	3.65	±0.10
B0	3.65	±0.10
K0	3.15	±0.10
F	5.50	±0.10
P1	8.00	±0.10
W	12.00	±0.30



Note:

All dimensions are in millimeter.

## About Us

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

**TSLC Corporation** 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, TSLC is always there for your lighting needs.

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



[www.tslc.com.tw](http://www.tslc.com.tw)

### ASIA PACIFIC

1F, No. 11, Ke Jung Rd.

Chu-Nan Site

Hsinchu Science Park

Chu-Nan 350, Miao-Li City

Taiwan, ROC

Tel: +886-37-587098

Fax: +886-37-587099

[sales@tslc.com.tw](mailto:sales@tslc.com.tw)

