



C3535U-UNxx Series

High Power UV LED

Introduction

The C3535U-UNxx Series LED from TSLC brings industry leading technology to the UV lighting market with its high reliability and performance. With a ceramic substrate and a 125/55 degree viewing angle primary optic, the C3535U-UNxx is ideal for all UV curing and general UV applications.

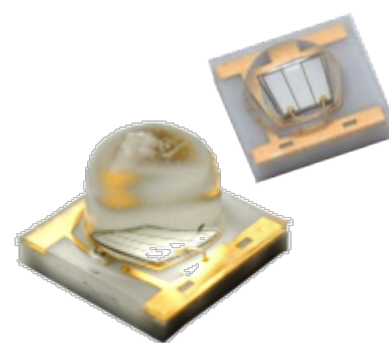


Table of Contents

Characteristics	1
Mechanical Dimensions.....	5
Recommended Solder Pad Design	7
Relative Spectral Power Distribution, $T_j=25^{\circ}\text{C}$	8
Typical Spatial Radiation Pattern.....	8
Typical Forward L-I Characteristics, $T_j=25^{\circ}\text{C}$	9
Typical Forward I-V Characteristics, $T_j=25^{\circ}\text{C}$	9
Typical Light Output vs. T_j Characteristics	10
Recommended Soldering Profile	10
Thermal Design.....	11
Packing Information	12
Accessory	13
About Us	14

Characteristics

Absolute Maximum Ratings (T_j=25°C)

Parameter	Rating
	C3535U-UNxx Series
DC Forward Current (mA)	700mA
LED Junction Temperature	115°C
LED Operating Temperature	-40°C~85°C
Storage Temperature	-40°C~125°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 (V _R ≤ 5V)
Preconditioning	Acc. to JEDEC Level 1

General Characteristics at 500mA

Part number	Color	Peak Wavelength (λ _p)		2θ _{1/2}	Temperature Coefficient of V _f (mV/°C)	Thermal Resistance Junction to Pad (°C/W)
		Min	Max		ΔV _f / ΔT _J	RΘ _{J-L}
C3535U-UNLx	U40	380	390	125	-2~-4	8
	U50	390	400	125	-2~-4	8
	U60	400	410	125	-2~-4	8
	U70	410	420	125	-2~-4	8
	U80	420	430	125	-2~-4	8
C3535U-UNFx	U40	380	390	55	-2~-4	8
	U50	390	400	55	-2~-4	8
	U60	400	410	55	-2~-4	8
	U70	410	420	55	-2~-4	8
	U80	420	430	55	-2~-4	8

Notes:

1. The peak wavelength is measured with an accuracy of ±1nm
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.
4. These devices emit high intensity UV/NUV light. Necessary precautions must be taken during operation. Do not look directly into the light or look through the optical system when in operation. Protective eyewear should be worn at all times during operation.
5. Do not drive at rated current for more than 5 seconds without proper thermal management.
6. Always follow thermal design recommendations in the relevant Application Note.



Caution:

Users are requested to comply with the laws and public regulations concerning safety.

Radiometric Power and Forward Voltage ($T_j=25^{\circ}\text{C}$)

Part number	Color	Performance at Test Current (500mA)					Performance at 700mA
		Group	Radiometric Power (mW)		VF		Calculated Minimum Radiometric Power (mW)
			Min	Max	Min	Max	
C3535U-UNLx (beam angle 125°)	U40 (380-390nm)	NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1380
		NH2	1100	1200	3.0	4.2	1500
	U50 (390-400nm)	NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1380
		NH2	1100	1200	3.0	4.2	1500
	U60 (400-410nm)	NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1380
		NH2	1100	1200	3.0	4.2	1500
	U70 (410-420nm)	NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1380
		NH2	1100	1200	3.0	4.2	1500

	U80 (420-430nm)	NE5	560	600	3.0	4.2	750
		NF1	600	650	3.0	4.2	820
		NF2	650	700	3.0	4.2	885
		NF3	700	750	3.0	4.2	950
		NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1380

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.

Radiometric Power and Forward Voltage ($T_j=25^\circ C$)

Part number	Color	Performance at Test Current (500mA)					Performance at 700Ma
		Group	Radiometric Power (mW)		VF		Calculated Minimum Radiometric Power (mW)
			Min	Max	Min	Max	
C3535U-UNFx (beam angle 55°)	U40 (380-390nm)	NF3	700	750	3.0	4.2	950
		NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1370
	U50 (390-400nm)	NF3	700	750	3.0	4.2	950
		NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1370
	U60 (400-410nm)	NF3	700	750	3.0	4.2	950
		NF4	750	800	3.0	4.2	1020

		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1370
	U70 (410-420nm)	NF3	700	750	3.0	4.2	950
		NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1370
	U80 (420-430nm)	NE5	560	600	3.0	4.2	750
		NF1	600	650	3.0	4.2	820
		NF2	650	700	3.0	4.2	885
		NF3	700	750	3.0	4.2	950
		NF4	750	800	3.0	4.2	1020
		NF5	800	850	3.0	4.2	1100
		NG1	850	900	3.0	4.2	1170
		NG2	900	950	3.0	4.2	1240
		NG3	950	1000	3.0	4.2	1300
		NH1	1000	1100	3.0	4.2	1380

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

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

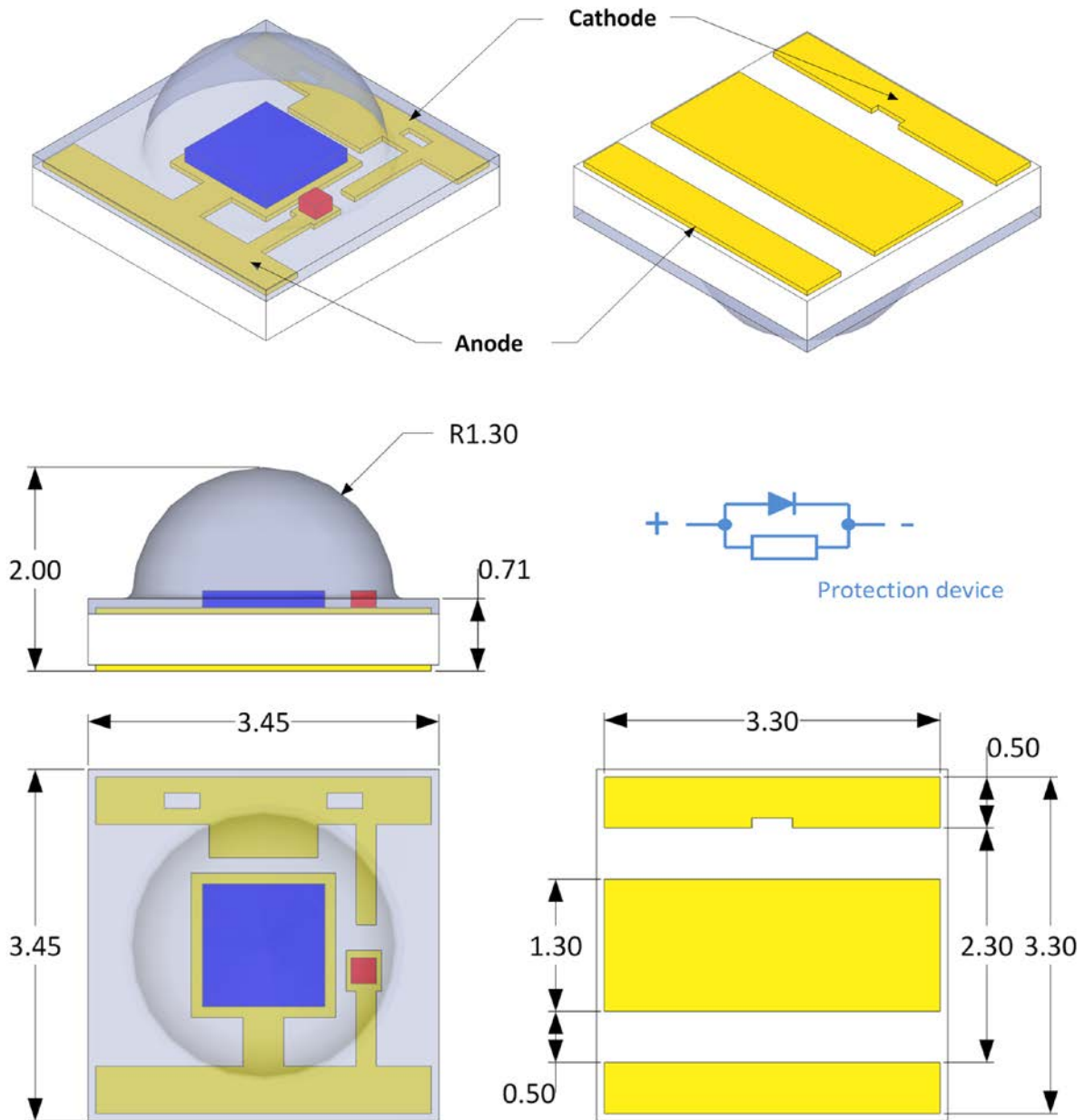
* Calculated values are for reference only.

Electrical Characteristics

Part number	Performance at Test Current (500mA)		
	Vf Group	Minimum (V)	Maximum (V)
C3535U-UNLx (beam angle 125°) C3535U-UNFx (beam angle 55°)	V30	3.0	3.2
	V32	3.2	3.4
	V34	3.4	3.6
	V36	3.6	3.8
	V38	3.8	4.0
	V40	4.0	4.2

Mechanical Dimensions

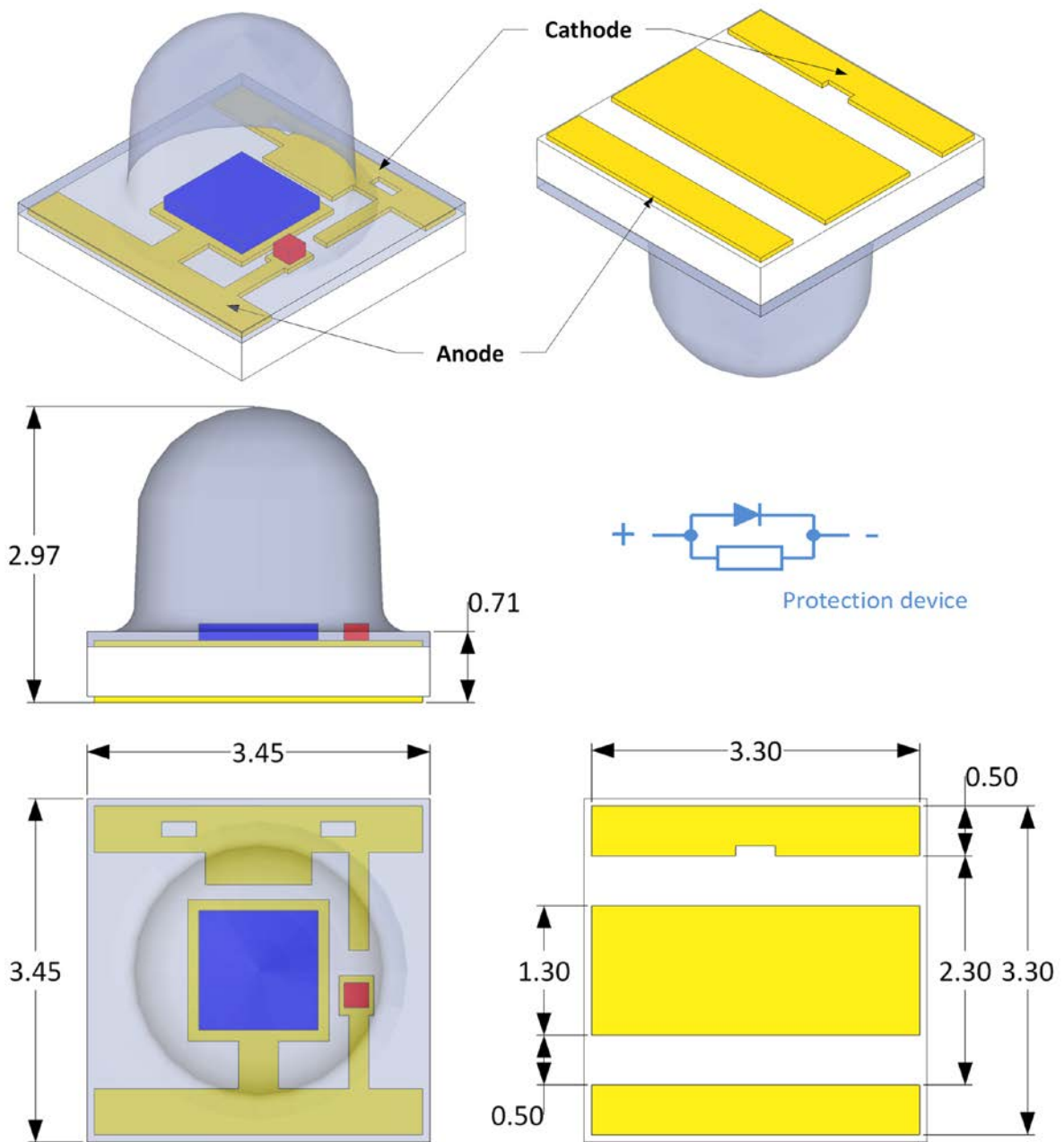
C3535U-UNLx (beam angle 125°)



Notes :

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

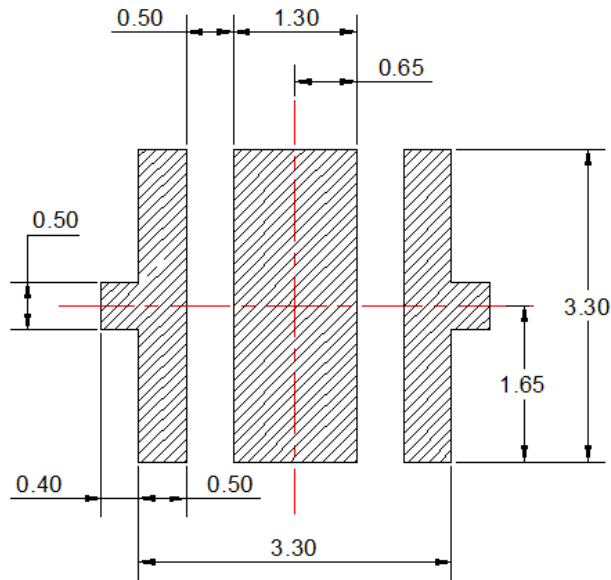
C3535U-UNFx (beam angle 55°)



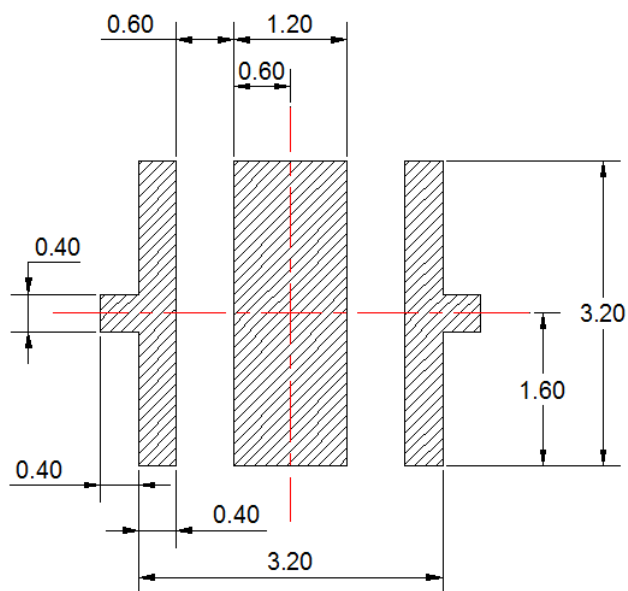
Notes :

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

Recommended Solder Pad Design



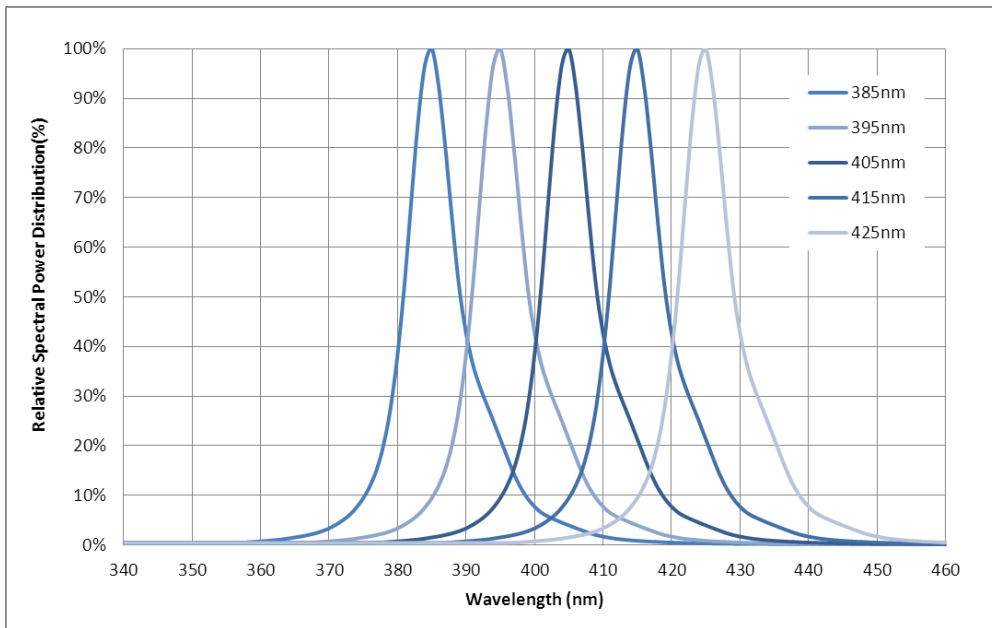
Recommended Stencil Pattern Design (Marked Area is Opening)



Notes :

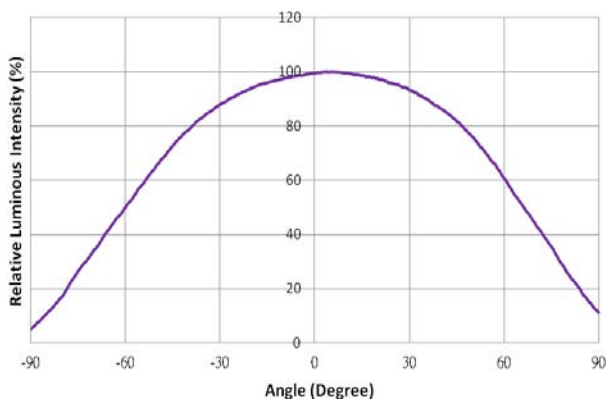
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are $\pm 0.13\text{mm}$ unless otherwise indicated

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

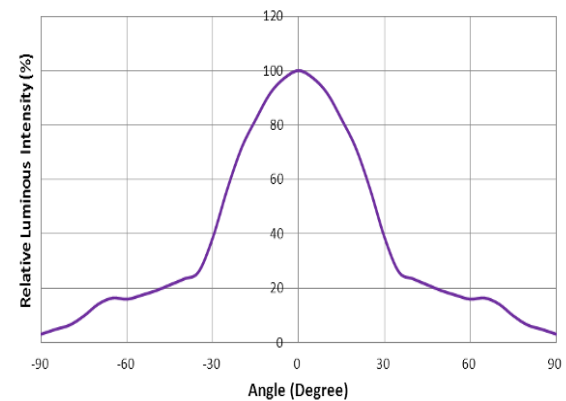


Typical Spatial Radiation Pattern

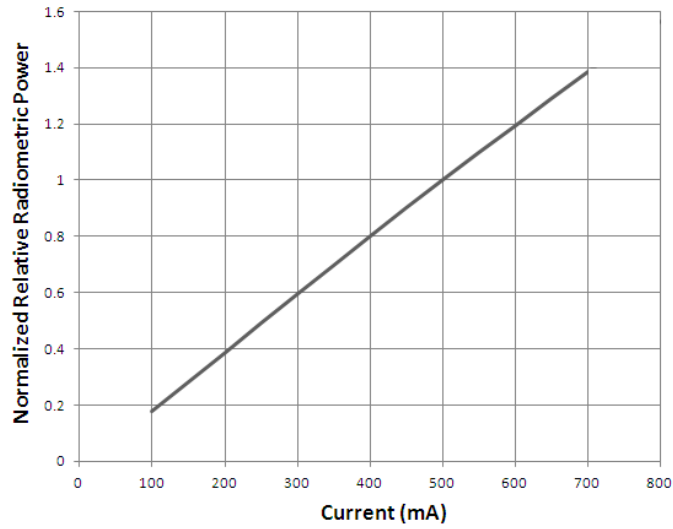
C3535U-UNLx (beam angle 125°)



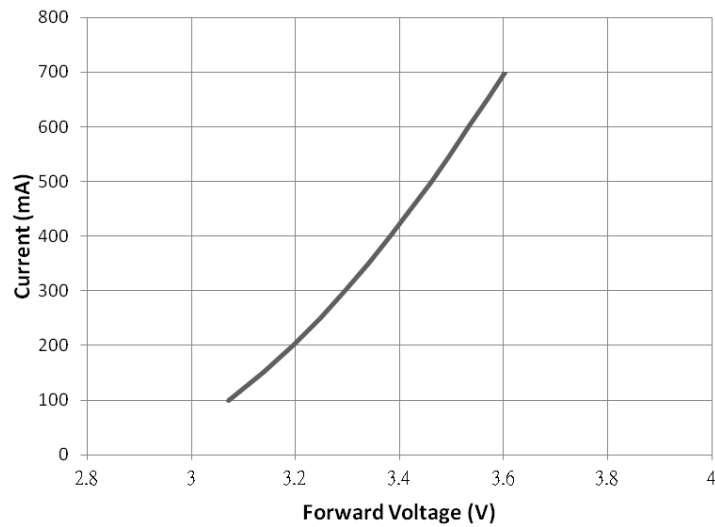
C3535U-UNFx (beam angle 55°)



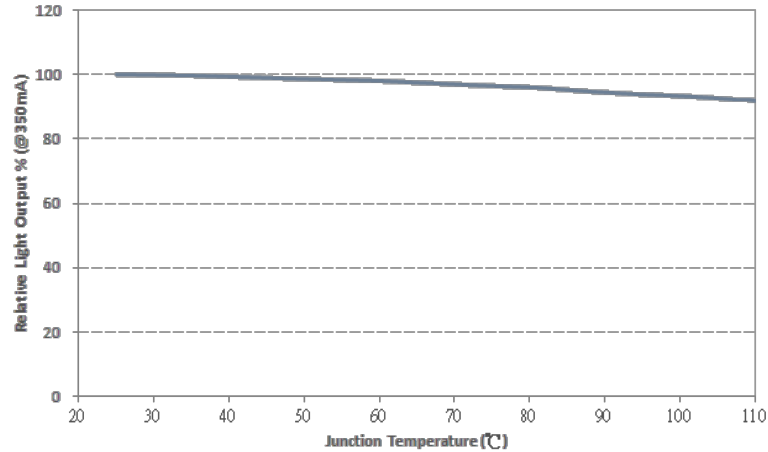
Typical Forward L-I Characteristics, $T_j=25^{\circ}\text{C}$



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

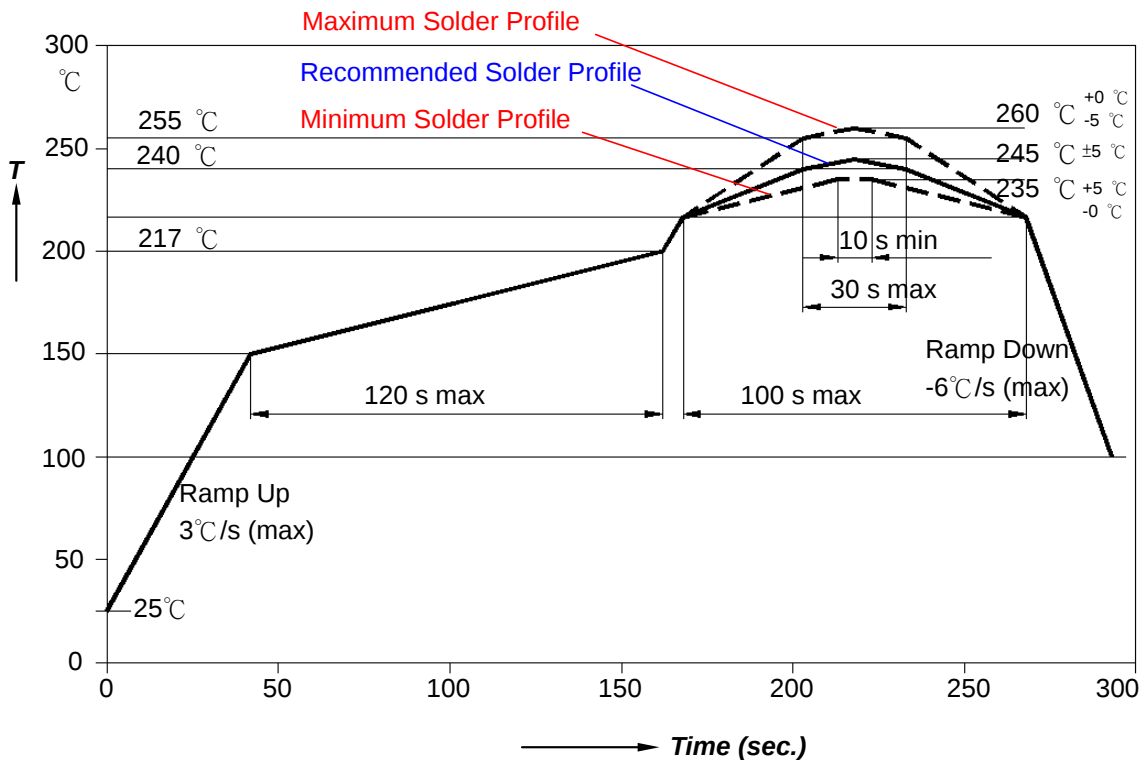


Typical Light Output vs. T_j Characteristics



Recommended Soldering Profile

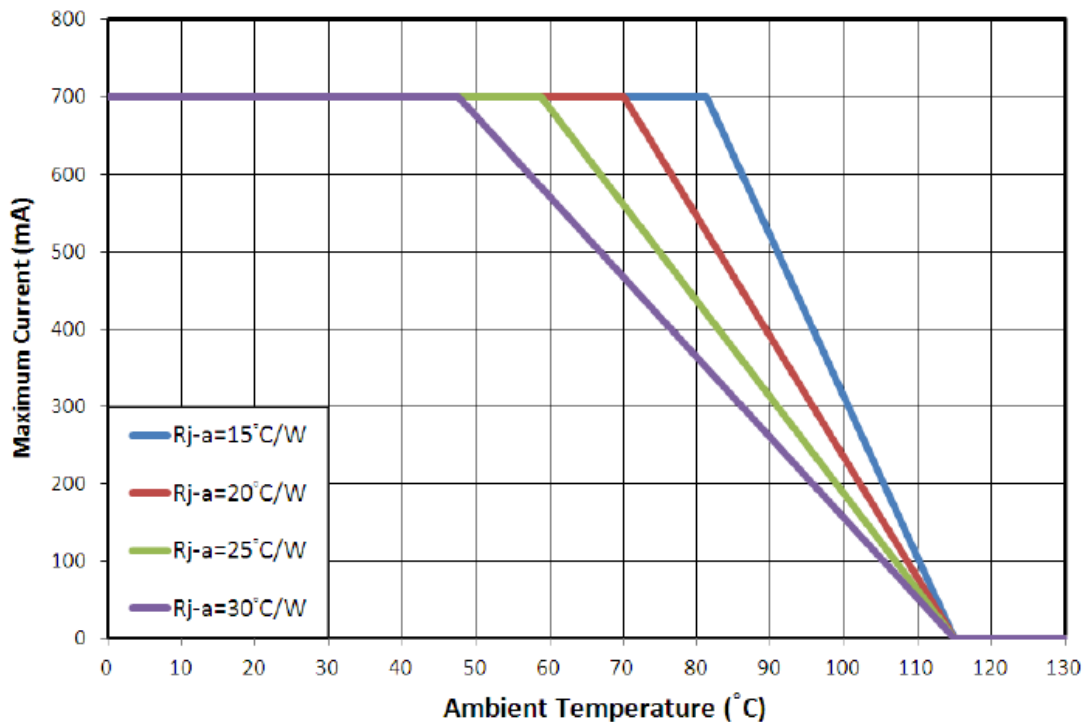
The LEDs can be soldered using the parameters listed below. As a general guideline, the users are suggested to follow the recommended soldering profile provided by the manufacturer of the solder paste. Although the recommended soldering conditions are specified in the list, reflow soldering at the lowest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



Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-up Rate ($T_{s_{max}}$ to T_p)	3°C/second max.	3°C/second max.
Preheat		
- Temperature Min($T_{s_{min}}$)	100°C	150°C
- Temperature Max($T_{s_{max}}$)	150°C	200°C
- Time($t_{s_{min}}$ to $t_{s_{max}}$)	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(t_p)	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 (Rja) by the following equation.

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

Tj: LED junction temperature

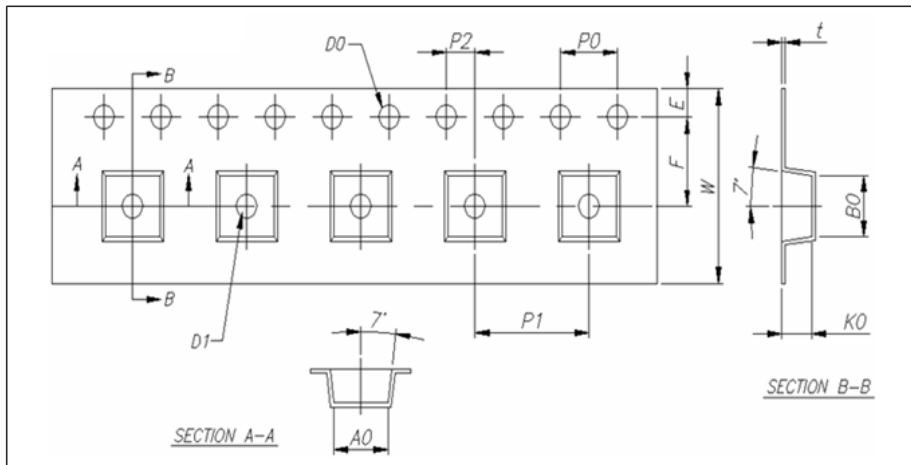
Ta: Ambient temperature

Rja: Thermal resistance between the junction and ambient

W: Input power ($I_F * V_F$)

Packing Information

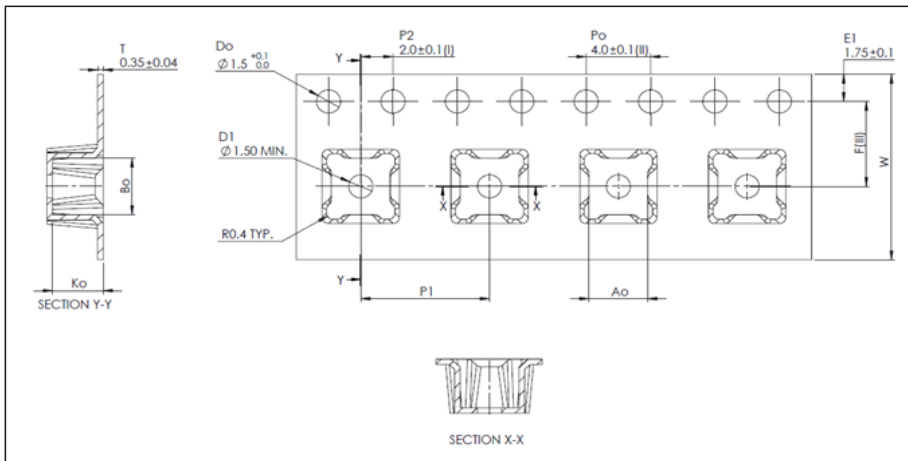
C3535U-UNLx series (beam angle 125°), Max QTY: 1000ea / roll



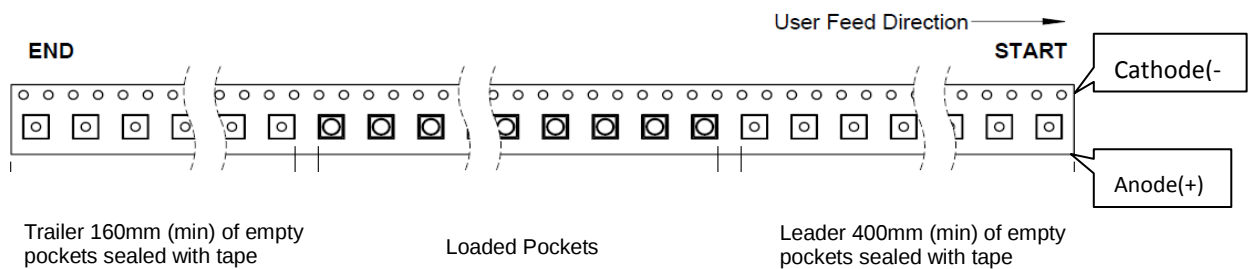
Item	Specification	Tol.(+/-)
W	12.00	±0.20
E	1.75	±0.10
F	5.50	±0.05
D0	1.50	+0.10, -0
D1	1.50	±0.10
P0	4.00	±0.10
P1	8.00	±0.10
P2	2.00	±0.10
P0X10	40.00	±0.20

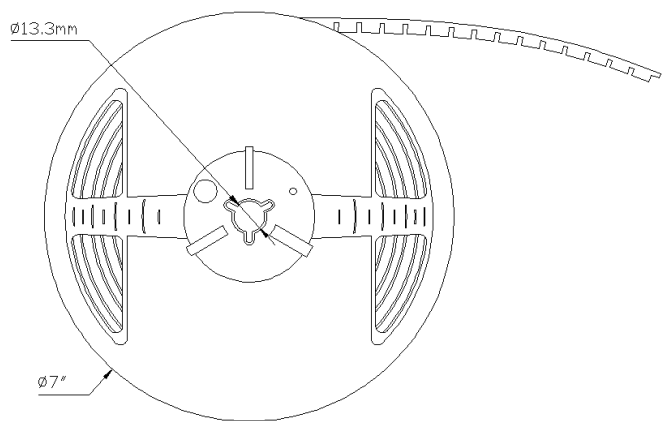
Item	Specification	Tol.(+/-)
t	0.25	±0.05
A0	3.80	±0.10
B0	3.80	±0.10
K0	2.20	±0.10

C3535U-UNFx series (beam angle 55°), 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



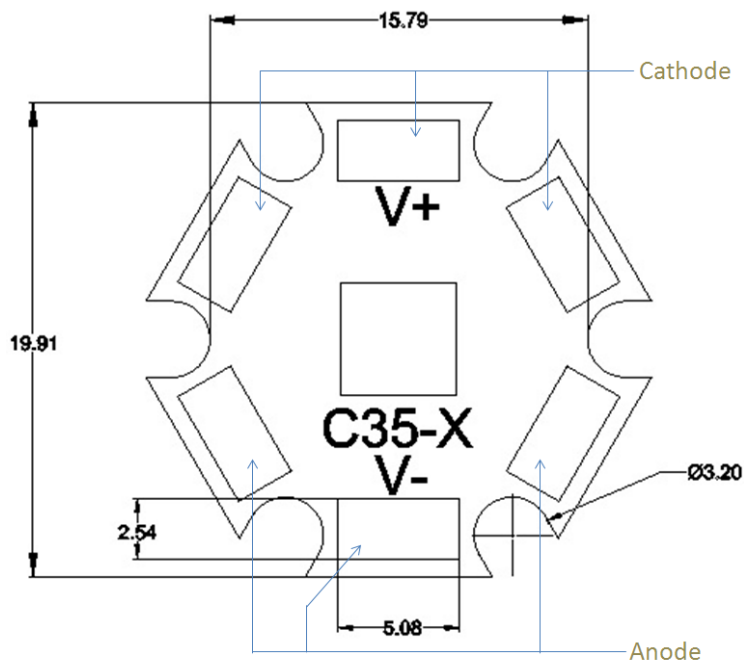


Note:
All dimensions are in millimeter.

Accessory

TSLC provides soldering service to mount C3535U-UNxx series onto Aluminum Metal-Core Printed Circuit board (MCPCB).

MCPCB Dimension



Other Characteristics

Material	Aluminum
Thickness	1.5mm
Trace Metal	Copper (1.0oz)

- The MCPCB is RoHS compliant.

Order Code

To order, add "ES202-" as the prefix of the part number of interest. For example:

Product of Interest: C3535U-UNL9
Part Number with MCPCB: ES202-C3535U-UNL9

If you have any question, please consult your sales contact at TSLC.



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** or please contact **sales@tslc.com.tw**.



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

