

C3535U-UNx1

High Power UV LED

Introduction

The C3535U-UNx1 Series LED from SemiLEDs 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-UNx1 is ideal for all UV curing and general UV applications.

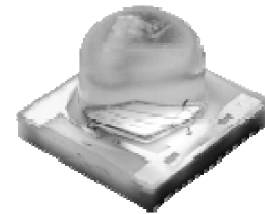


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RoHS Compliant

Characteristics

Absolute Maximum Ratings (T_j=25°C)

| Parameter | Rating |
|---------------------------|---|
| | C3535U-UNx1 Series |
| DC Forward Current (mA) | 800 mA |
| LED Junction Temperature | 150°C |
| 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 (VR ≤ 5V) |
| Preconditioning | Acc. to JEDEC Level 1 |

General Characteristics at 500mA

| Part number | Color | Peak Wavelength λp | | 2θ _{1/2} | Temperature | Thermal Resistance |
|--------------------|-------|--------------------|-----|-------------------|---------------------------|------------------------|
| | | Min | Max | | Coefficient of Vf (mV/°C) | Junction to Pad (°C/W) |
| | | | | | ΔVf / ΔTj | Rθ _{J-L} |
| C3535U-UNL1-A1G11H | 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 |
| C3535U-UNF1-A1G11H | 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 |

Notes: The peak wavelength is measured with an accuracy of ±1nm

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- UNL1-A1G11H (beam angle 125°) | U40 (380-390nm) | NE5 | 560 | 600 | 3.2 | 4.2 | 730 |
| | | NF1 | 600 | 650 | 3.2 | 4.2 | 780 |
| | | NF2 | 650 | 700 | 3.2 | 4.2 | 850 |
| | | NF3 | 700 | 750 | 3.2 | 4.2 | 910 |
| | U50 (390-400nm) | NF2 | 650 | 700 | 3.2 | 4.2 | 850 |
| | | NF3 | 700 | 750 | 3.2 | 4.2 | 910 |
| | | NF4 | 750 | 800 | 3.2 | 4.2 | 980 |
| | | NF5 | 800 | 850 | 3.2 | 4.2 | 1050 |
| | U60 (400-410nm) | NF2 | 650 | 700 | 3.2 | 4.2 | 850 |
| | | NF3 | 700 | 750 | 3.2 | 4.2 | 910 |
| | | NF4 | 750 | 800 | 3.2 | 4.2 | 980 |
| | | NF5 | 800 | 850 | 3.2 | 4.2 | 1050 |
| | U70 (410-420nm) | NF3 | 700 | 750 | 3.2 | 4.2 | 910 |
| | | NF4 | 750 | 800 | 3.2 | 4.2 | 980 |
| | | NF5 | 800 | 850 | 3.2 | 4.2 | 1050 |
| | | NG1 | 850 | 900 | 3.2 | 4.2 | 1100 |

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

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

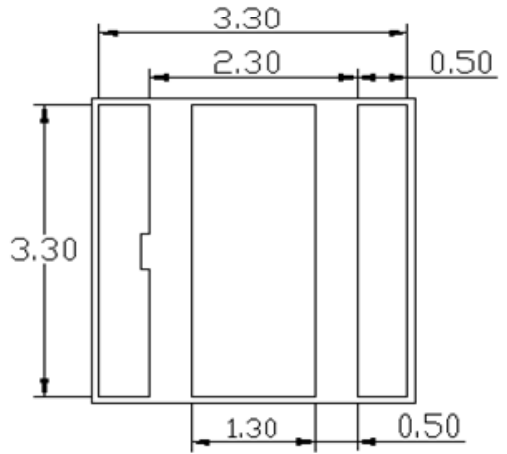
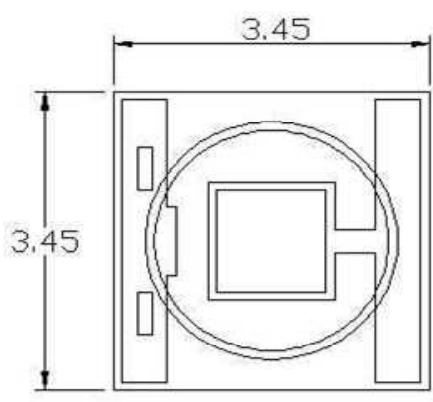
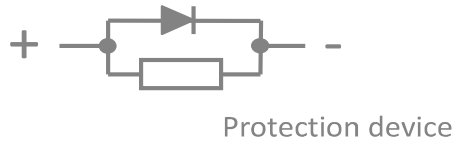
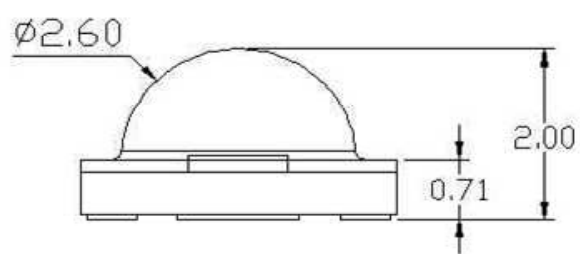
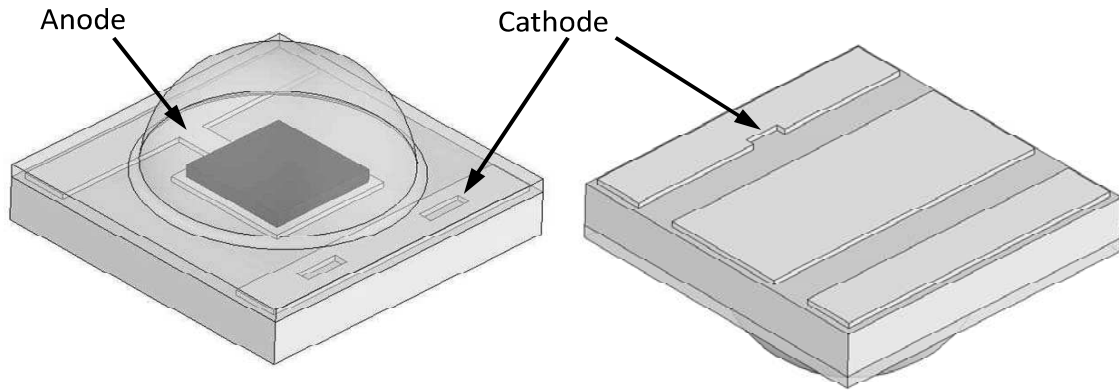
* Calculated values are for reference only.

| 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-UNL1-A1G11H (beam angle 55°) | U40 (380-390nm) | NE5 | 560 | 600 | 3.2 | 4.2 | 730 |
| | | NF1 | 600 | 650 | 3.2 | 4.2 | 780 |
| | | NF2 | 650 | 700 | 3.2 | 4.2 | 850 |
| | U50 (390-400nm) | NF2 | 650 | 700 | 3.2 | 4.2 | 850 |
| | | NF3 | 700 | 750 | 3.2 | 4.2 | 910 |
| | | NF4 | 750 | 800 | 3.2 | 4.2 | 980 |
| | U60 (400-410nm) | NF2 | 650 | 700 | 3.2 | 4.2 | 850 |
| | | NF3 | 700 | 750 | 3.2 | 4.2 | 910 |
| | | NF4 | 750 | 800 | 3.2 | 4.2 | 980 |
| | U70 (410-420nm) | NF3 | 700 | 750 | 3.2 | 4.2 | 910 |
| | | NF4 | 750 | 800 | 3.2 | 4.2 | 980 |
| | | NF5 | 800 | 850 | 3.2 | 4.2 | 1050 |

- 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

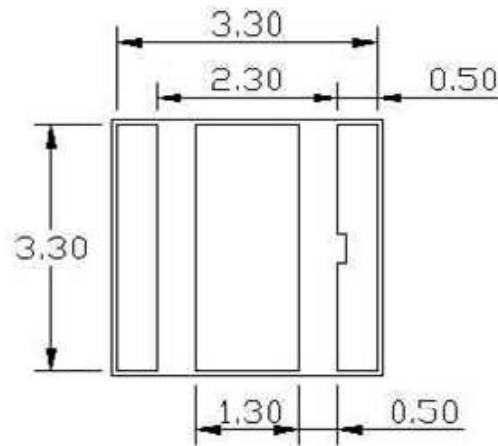
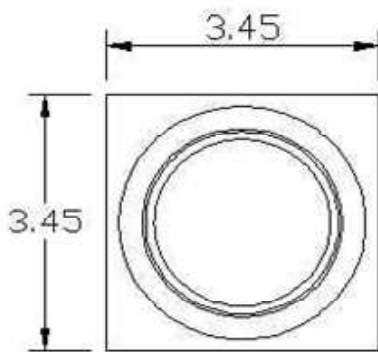
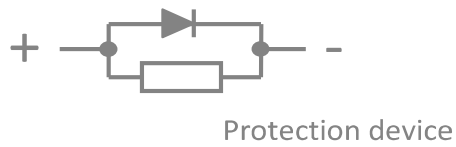
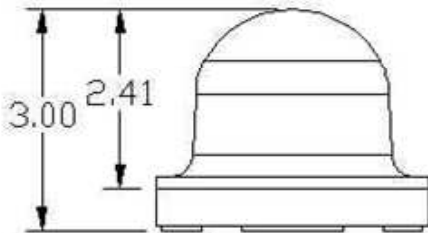
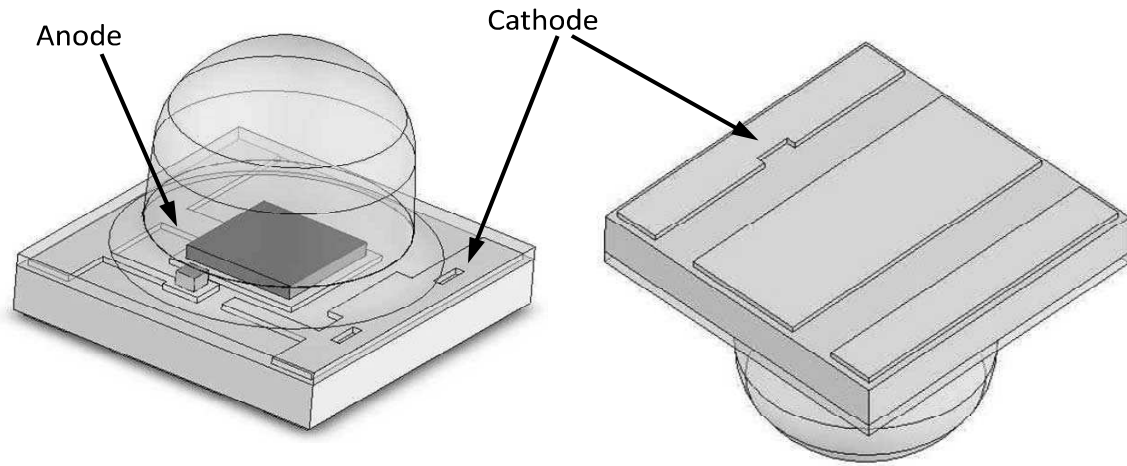
C3535U-UNL1-A1G11H (beam angle 125°)



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-UNF1-A1G11H (beam angle 55°)

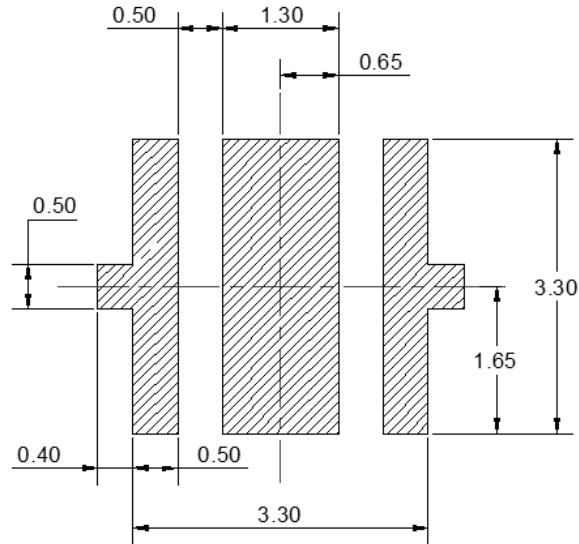


Notes :

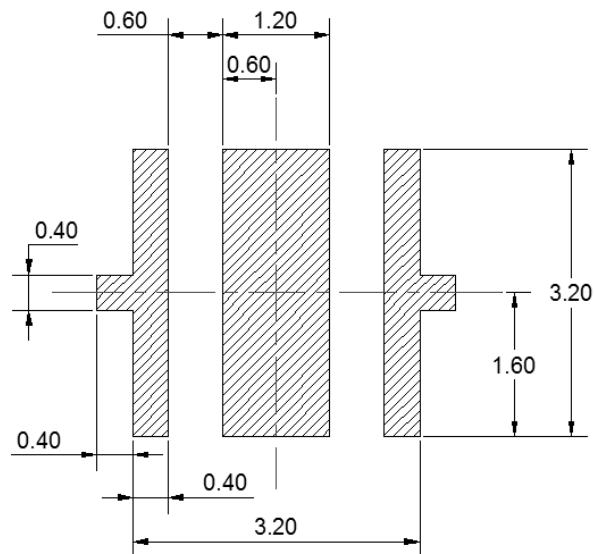
1. Drawing is not to scale
2. All dimensions are in millimetre
3. Dimensions are $\pm 0.13\text{mm}$ unless otherwise indicated

Recommended Solder Pad Design

Recommended Soldering Pad Design



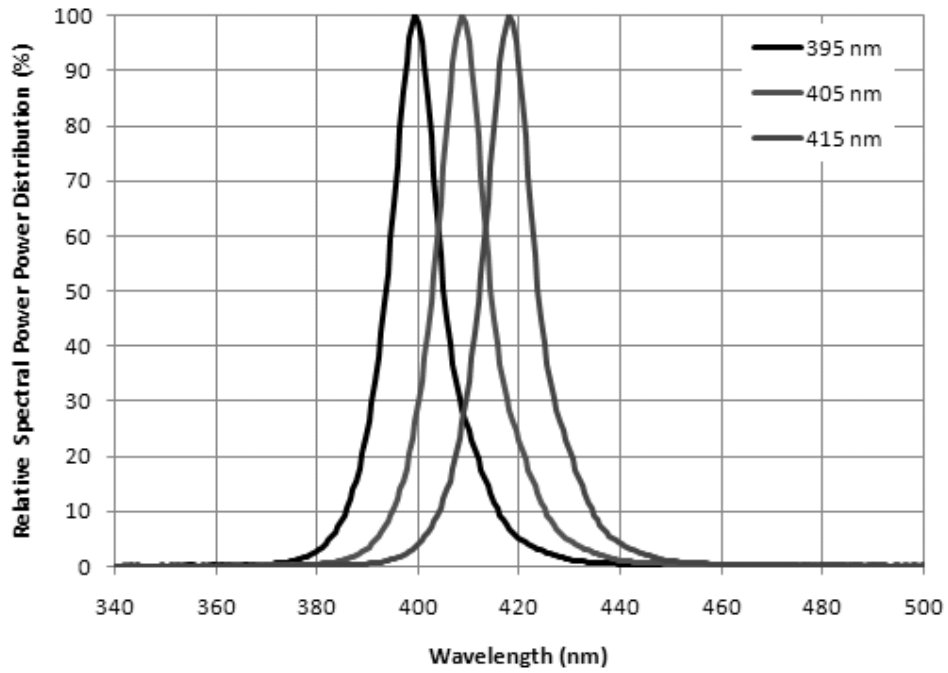
Recommended Stencil Pattern Design (Marked Area is Opening)



Notes :

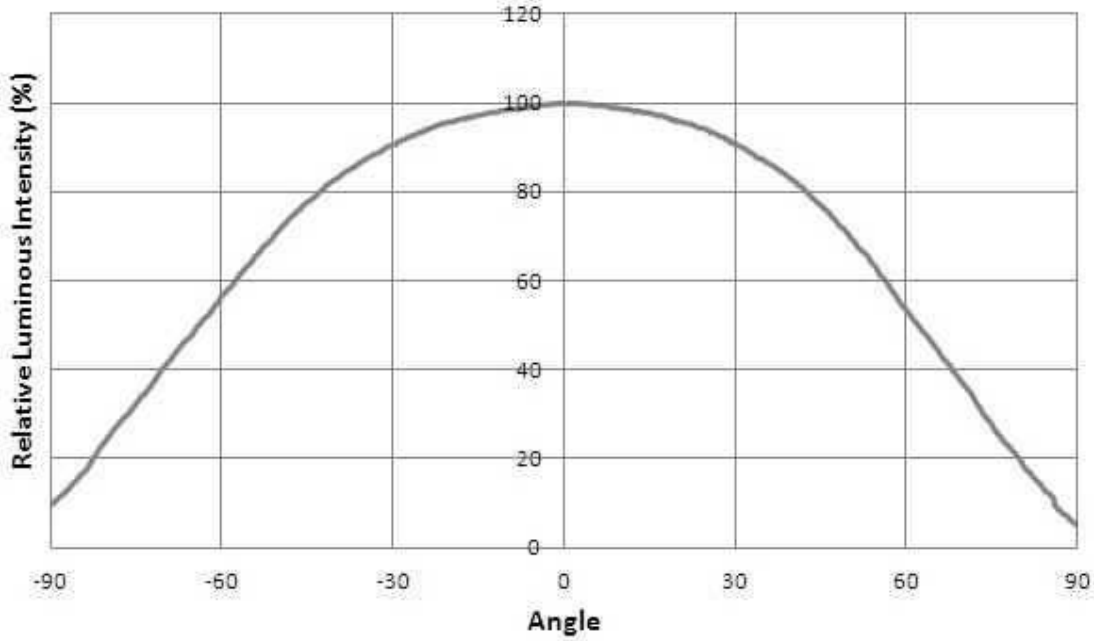
1. Drawing is not to scale
2. All dimensions are in millimeter

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

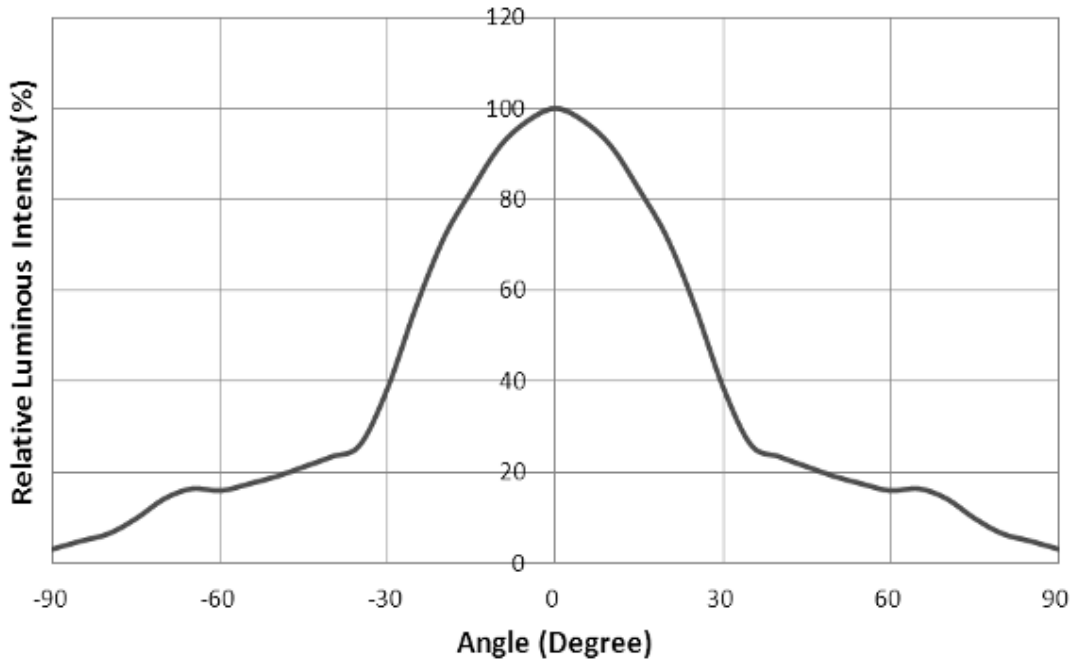


Typical Spatial Radiation Pattern

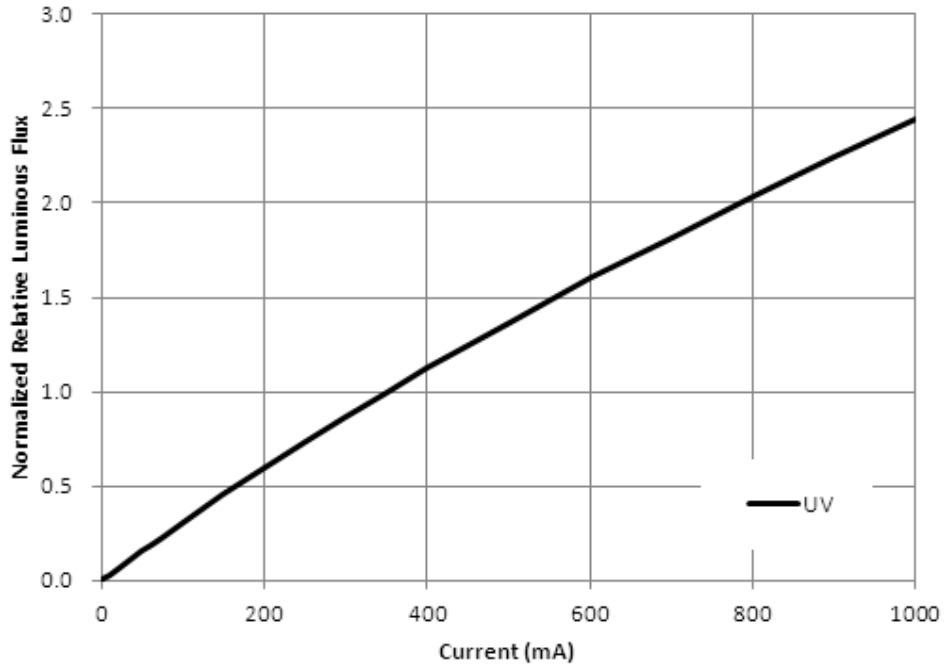
C3535U-UNL1-A1G11H (beam angle 125°)



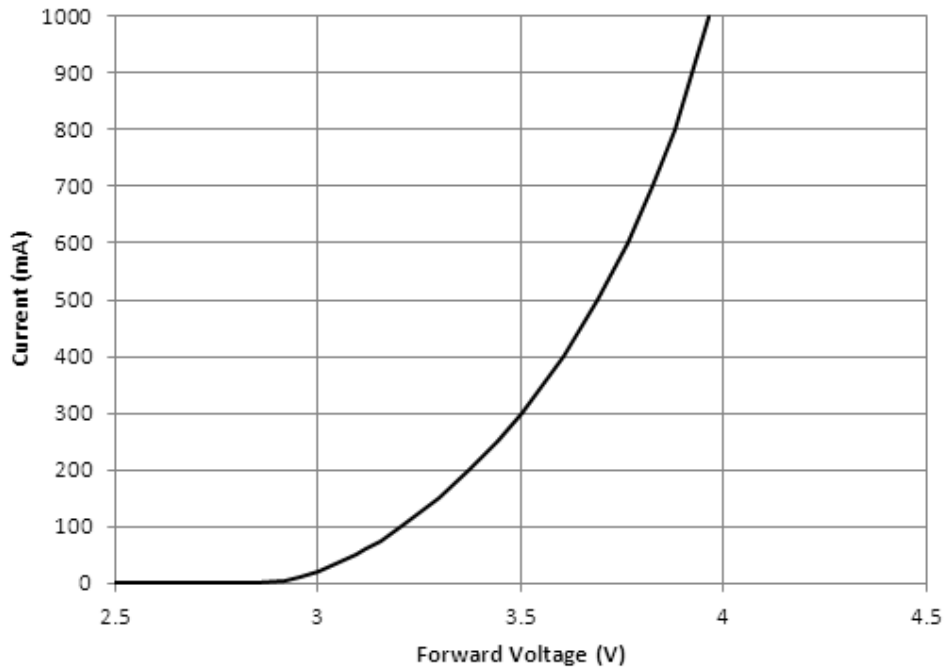
C3535U-UNF1-A1G11H (beam angle 55°)



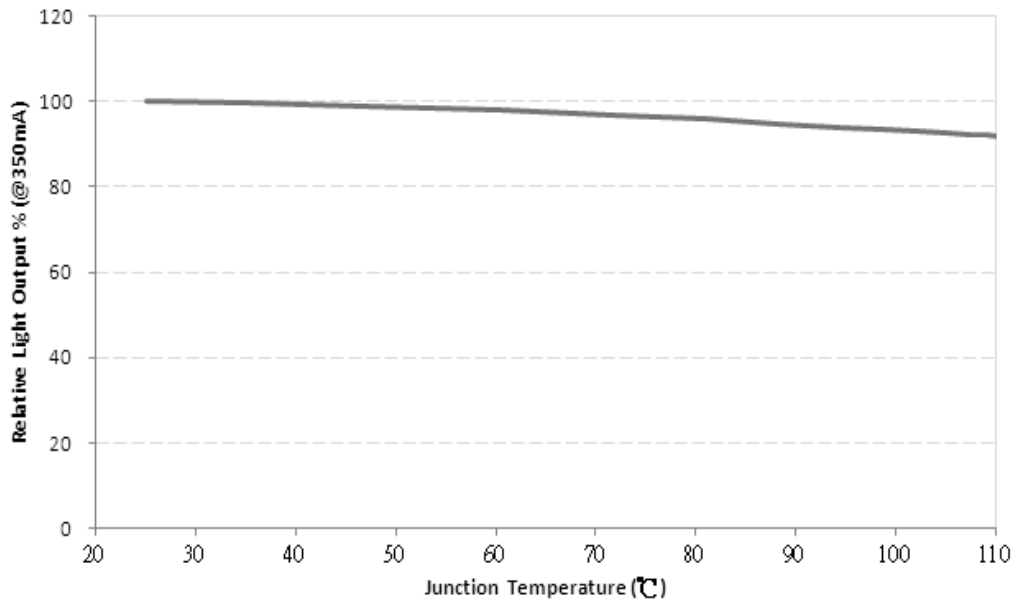
Typical Forward L-I Characteristics, $T_j=25^\circ\text{C}$



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

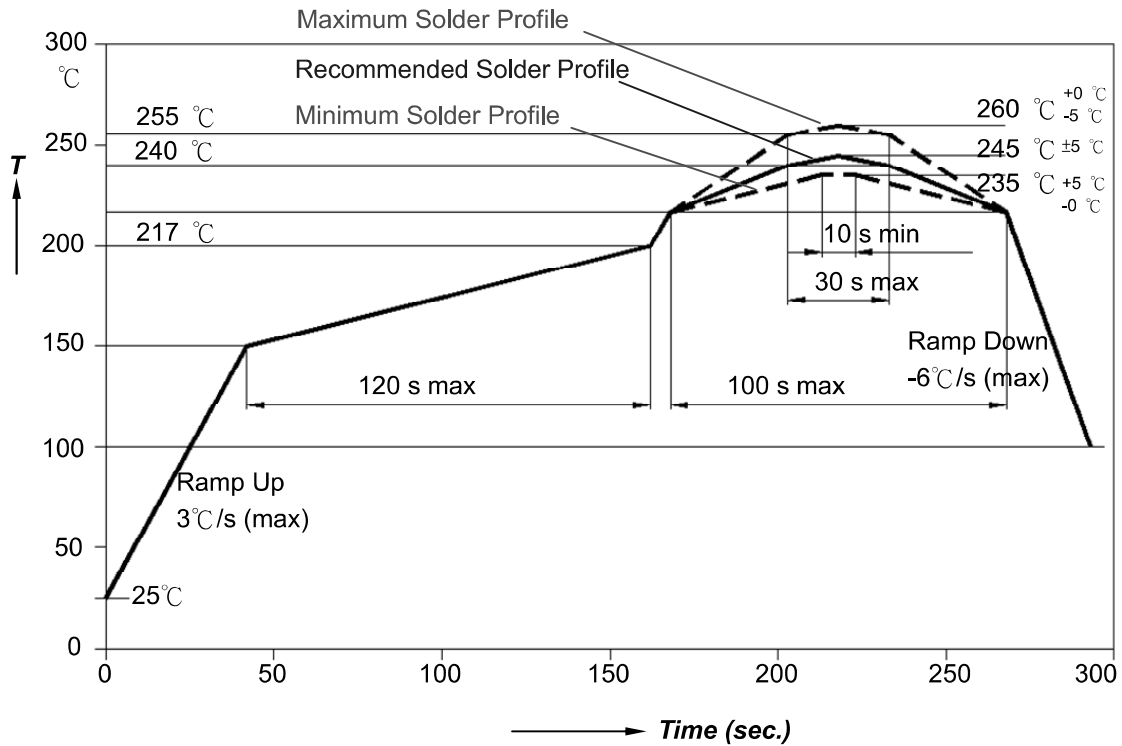


Typical Light Output vs. T_j Characteristics



Recommended Soldering Profile

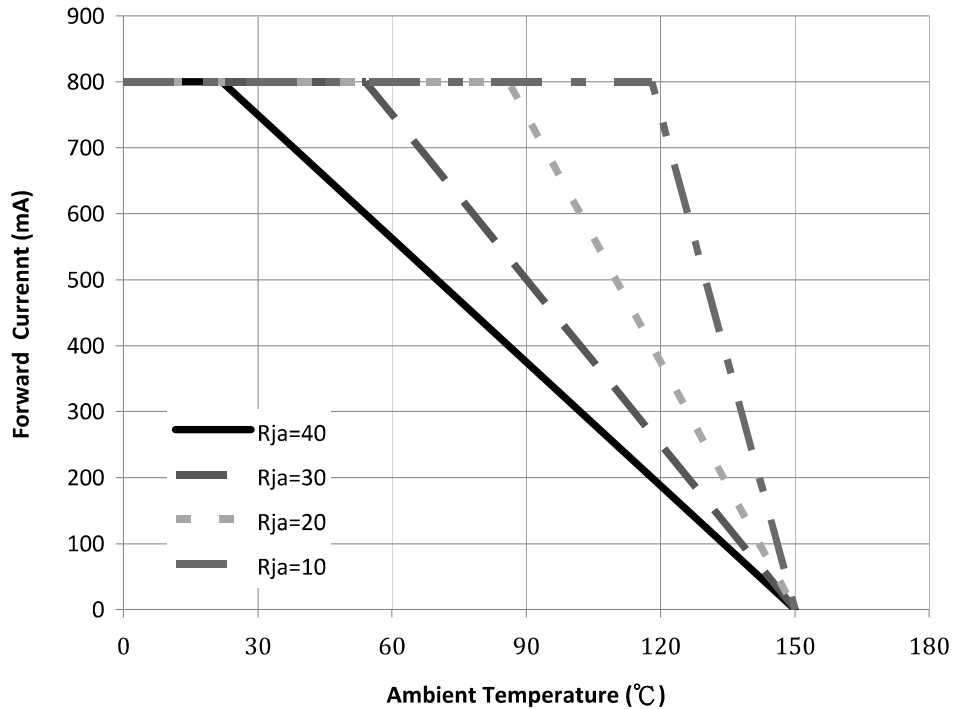
The LEDs can be soldered using the parameters listed below. As a general guideline, the users are suggested to follow the recommended soldering profile provided by the manufacturer of the solder paste. Although the recommended soldering conditions are specified in the list, reflow soldering at the lowest 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 (R_{ja}) by the following equation.

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

T_j : LED junction temperature

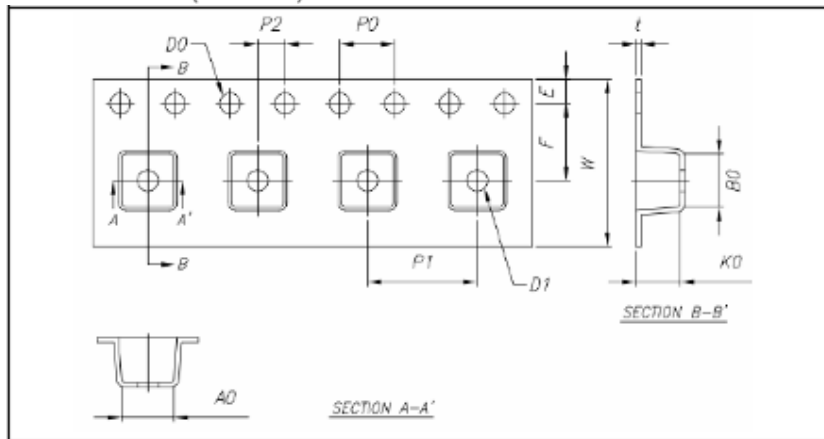
T_a : Ambient temperature

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

W : Input power ($I_F * V_F$)

Packing Information

Dimensions. (Unit: mm)



Common dimensions

| Item | Specification | Tol. (+/-) |
|--------|---------------|------------|
| W | 12.00 | ± 0.30 |
| E | 1.75 | ± 0.10 |
| F | 5.50 | ± 0.10 |
| 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 | ± 0.10 |
| P0 x10 | 40.00 | ± 0.20 |

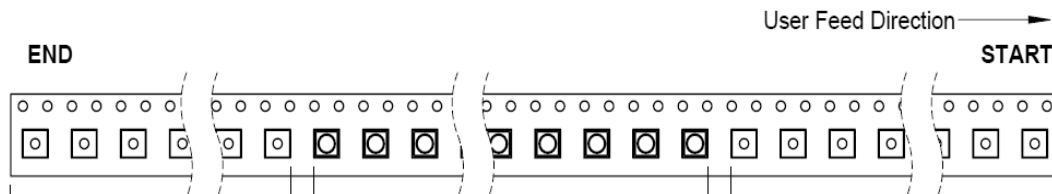
Pocket & other dimensions

C3535U-UNL1 series

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

C3535U-UNF1 series

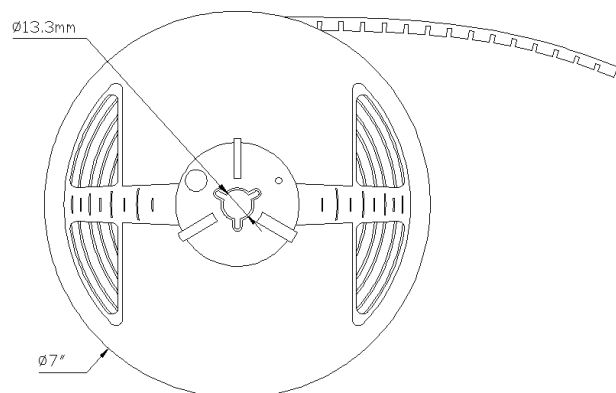
| Item | Specification | Tol. (+/-) |
|------|---------------|------------|
| t | 0.35 | ±0.05 |
| A0 | 3.80 | ±0.10 |
| B0 | 3.80 | ±0.10 |
| K0 | 3.20 | ±0.10 |



Trailer 160mm (min) of empty pockets sealed with tape

Loaded Pockets

Leader 400mm (min) of empty pockets sealed with tape



About Us

SemiLEDs is an innovative manufacturer of chip-level and packaged LEDs that enable today's advanced solid state lighting solutions. Fully ISO9001 certified, with state of the art fabrication facilities in Hsinchu Science Park, Taiwan, the company employs patented and proprietary technologies that deliver high performance with increased color stability and lumen maintenance. SemiLEDs visible- and ultraviolet-LEDs are found in a wide variety of general lighting applications, including street lights and commercial, industrial and residential architectural lighting, along with specialty industrial applications such as UV curing, medical/cosmetic, counterfeit detection, and horticulture.

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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