



# N3535X-FNxx Series High Power Infrared LED

## Introduction

The N3535X-FNxx LED from TSLC brings industry leading technology to the infrared applications market with its high reliability and performance. With a ceramic substrate and a 140/100/65 degree view angle primary lens, the N3535X-FNxx LED is a perfect solution for horticulture, security cameras, surveillance systems, machine vision and general purpose IR applications.



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## Characteristics

### Absolute Maximum Ratings (Tj = 25°C)

| Parameter                 | Rating                                                      |
|---------------------------|-------------------------------------------------------------|
|                           | IR Series                                                   |
| DC Forward Current (mA)   | 1000mA                                                      |
| 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 ( $V_R \leq 5V$ ) |
| Preconditioning           | Acc. to JEDEC Level 1                                       |

### Product Name

N 3535 X - FN    x    x

1        2~5   6        7~8    9        10

Code 1: Substrate composition, C: Ceramic AlN

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

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

Code 7.8: Wavelength Class, FN: IR (720~750nm)

Code 9: Lens type, L: 140 degree, A: 100 degree, F: 65 degree

Code 10: Internal code

## 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 |
|-------------|-------|-----------------------------|-----|-----------------|------------------------------------------|------------------------------------|
|             |       | Min                         | Max |                 | $\Delta V_f / \Delta T_J$                | (°C/W) $RO_{J-L}$                  |
| N3535X-FNLx | Fx0   | 720                         | 750 | 140             | -2~-4                                    | 4.4                                |
| N3535X-FNAX | Fx0   | 720                         | 750 | 100             | -2~-4                                    | 4.4                                |
| N3535X-FNFX | Fx0   | 720                         | 750 | 65              | -2~-4                                    | 4.4                                |

## 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 |                                            |
| N3535X-FNLx<br>(beam angle 140°) | Fx0<br>(720-750nm) | NE1                                 | 400                    | 440 | 1.6 | 3.0 | 540                                        |
|                                  |                    | NE2                                 | 440                    | 480 | 1.6 | 3.0 | 594                                        |
|                                  |                    | NE3                                 | 480                    | 520 | 1.6 | 3.0 | 648                                        |
|                                  |                    | NE4                                 | 520                    | 560 | 1.6 | 3.0 | 702                                        |
|                                  |                    | NE5                                 | 560                    | 600 | 1.6 | 3.0 | 756                                        |
|                                  |                    | NF1                                 | 600                    | 650 | 1.6 | 3.0 | 810                                        |
|                                  |                    | NF2                                 | 650                    | 700 | 1.6 | 3.0 | 878                                        |
|                                  |                    | NF3                                 | 700                    | 750 | 1.6 | 3.0 | 945                                        |
| N3535X-FNAX<br>(beam angle 100°) | Fx0<br>(720-750nm) | NE1                                 | 400                    | 440 | 1.6 | 3.0 | 540                                        |
|                                  |                    | NE2                                 | 440                    | 480 | 1.6 | 3.0 | 594                                        |
|                                  |                    | NE3                                 | 480                    | 520 | 1.6 | 3.0 | 648                                        |
|                                  |                    | NE4                                 | 520                    | 560 | 1.6 | 3.0 | 702                                        |
|                                  |                    | NE5                                 | 560                    | 600 | 1.6 | 3.0 | 756                                        |
|                                  |                    | NF1                                 | 600                    | 650 | 1.6 | 3.0 | 810                                        |
|                                  |                    | NF2                                 | 650                    | 700 | 1.6 | 3.0 | 878                                        |
|                                  |                    | NF3                                 | 700                    | 750 | 1.6 | 3.0 | 945                                        |
| N3535X-FNFX<br>(beam angle 65°)  | Fx0<br>(720-750nm) | NE1                                 | 400                    | 440 | 1.6 | 3.0 | 540                                        |
|                                  |                    | NE2                                 | 440                    | 480 | 1.6 | 3.0 | 594                                        |
|                                  |                    | NE3                                 | 480                    | 520 | 1.6 | 3.0 | 648                                        |
|                                  |                    | NE4                                 | 520                    | 560 | 1.6 | 3.0 | 702                                        |
|                                  |                    | NE5                                 | 560                    | 600 | 1.6 | 3.0 | 756                                        |
|                                  |                    | NF1                                 | 600                    | 650 | 1.6 | 3.0 | 810                                        |
|                                  |                    | NF2                                 | 650                    | 700 | 1.6 | 3.0 | 878                                        |
|                                  |                    | NF3                                 | 700                    | 750 | 1.6 | 3.0 | 945                                        |

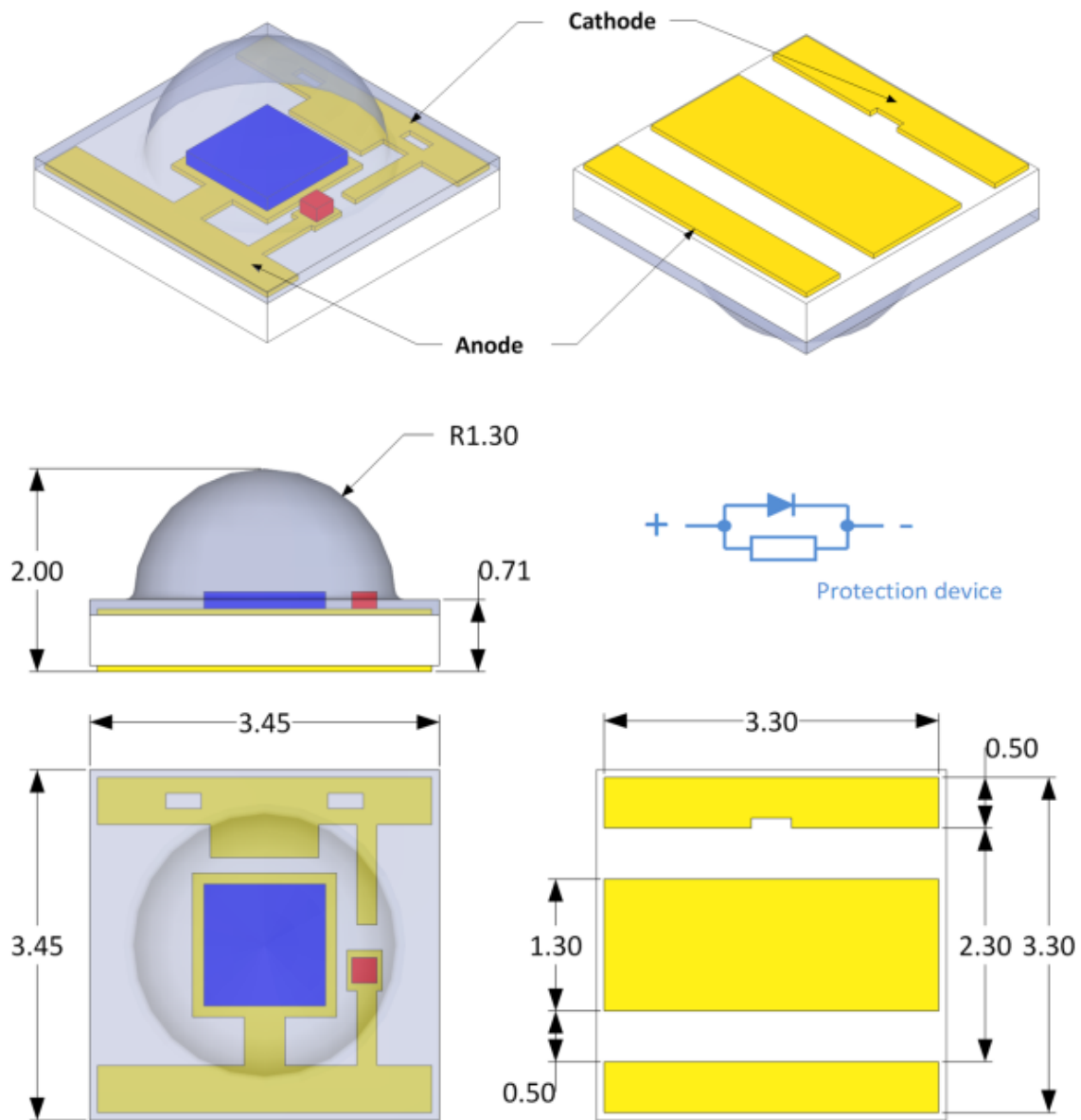
Note: 1. Radiometric power is measured with an accuracy of  $\pm 10\%$

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

\*Calculated values are for reference only.

## Mechanical Dimensions

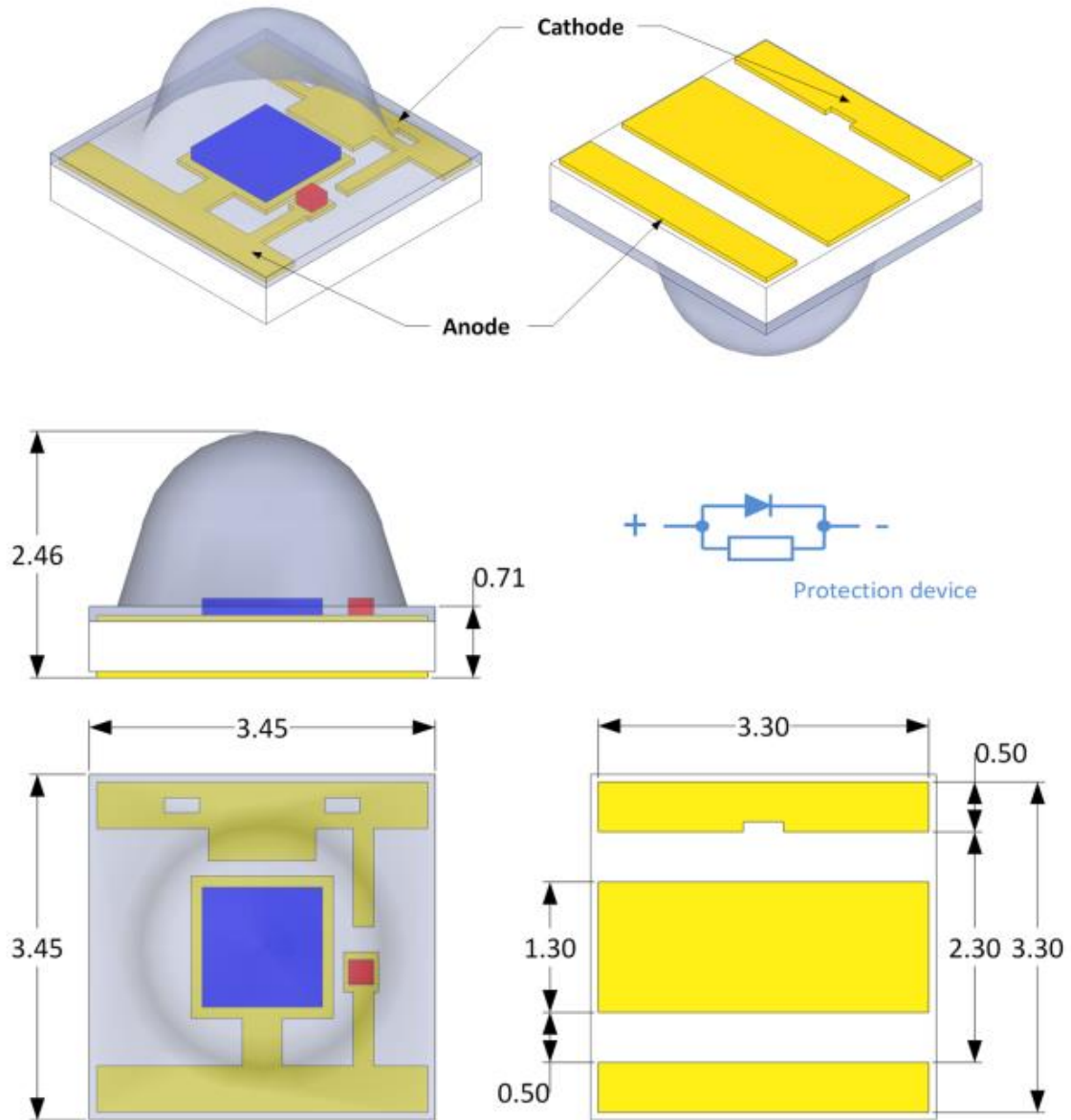
N3535X-FNLx (beam angle 140°)



Notes:

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

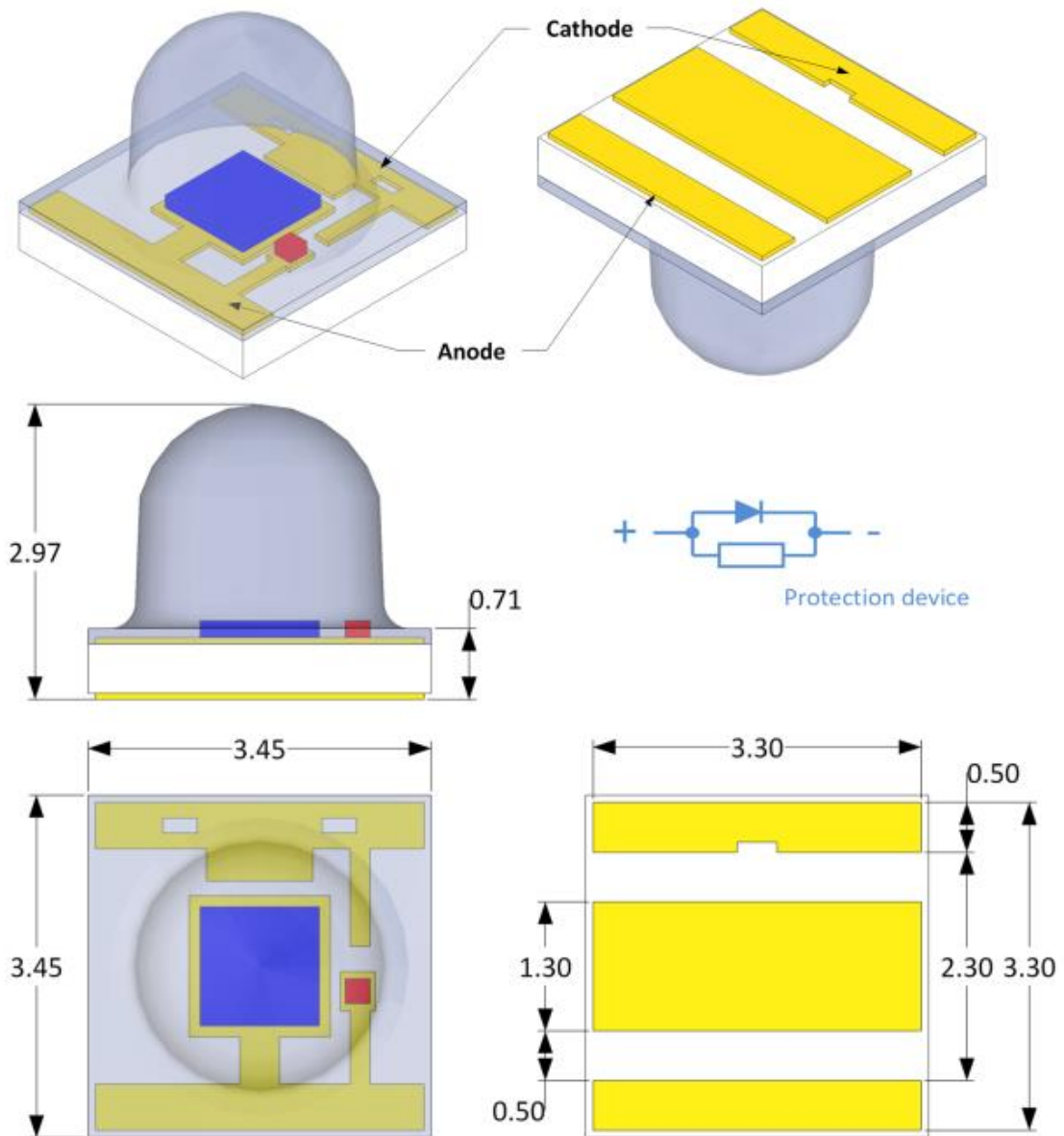
N3535X-FNxx (beam angle 100°)



Notes:

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

N3535X-FNxx (beam angle 65°)

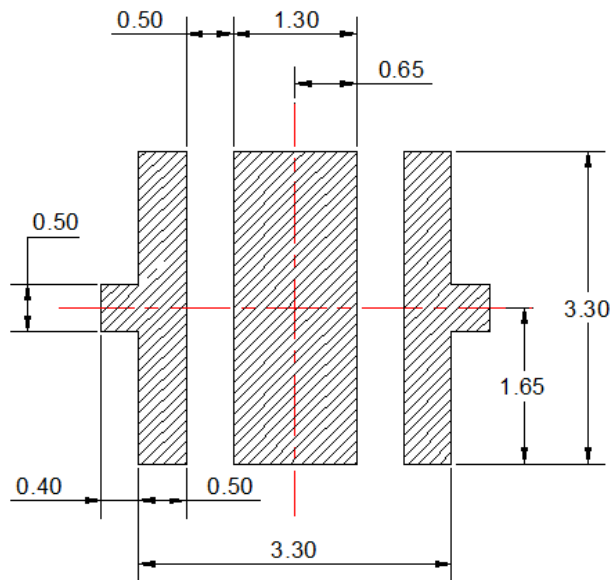


Notes:

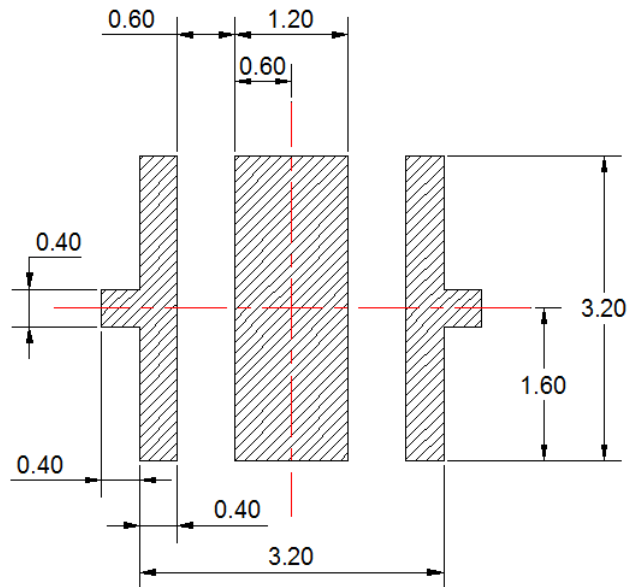
1. Drawing is not to scale
2. All dimensions are in millimeter
3. Dimensions are  $\pm 0.13\text{mm}$  unless otherwise indicated

## Recommended Solder Pad Design

## Recommended Soldering Pad Design



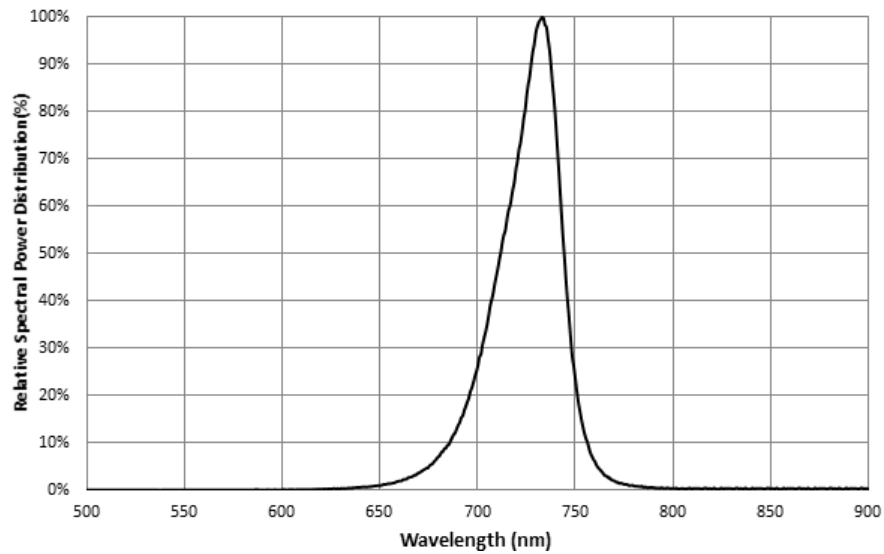
### Recommended Stencil Pattern Design (Marked Area is Opening)



Notes :

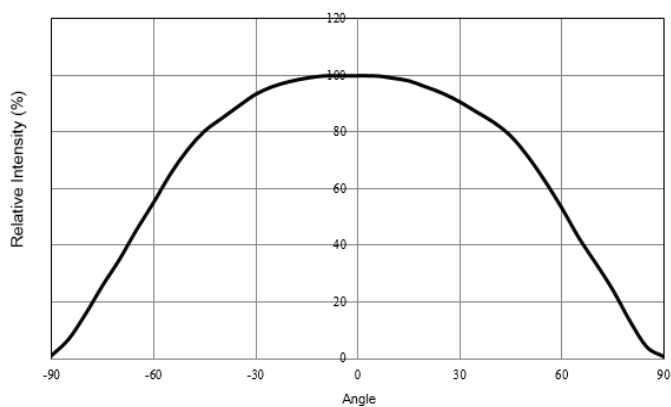
1. Drawing is not to scale
2. All dimensions are in millimeter

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

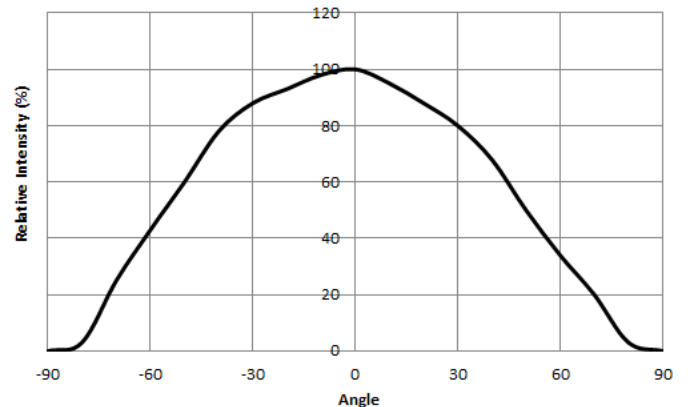


## Typical Spatial Radiation Pattern

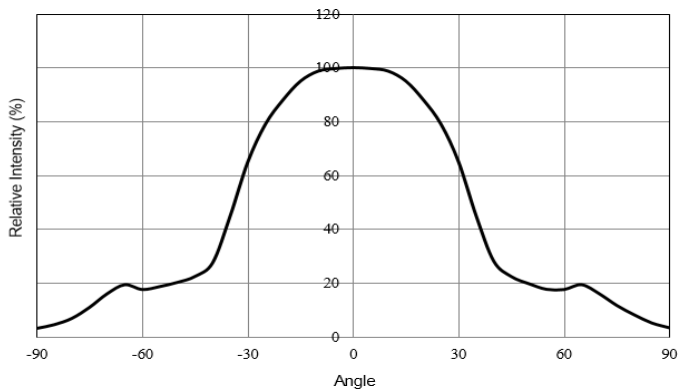
**N3535X-FNLx (beam angle  $140^{\circ}$ )**



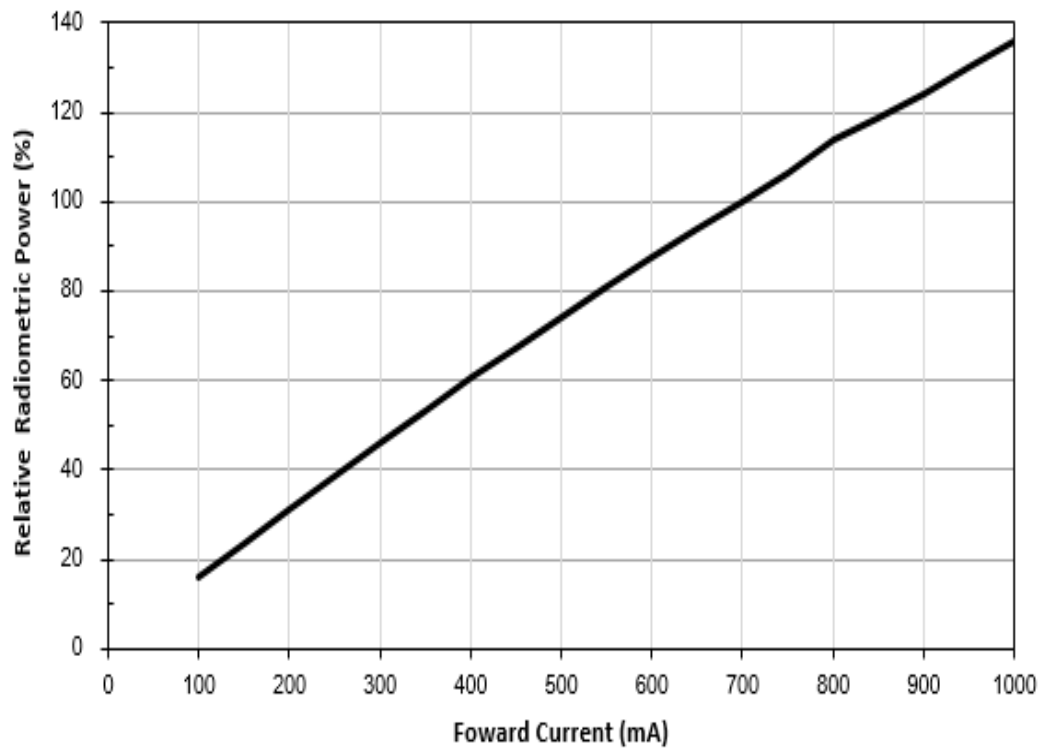
**N3535X-FNAX (beam angle  $100^{\circ}$ )**



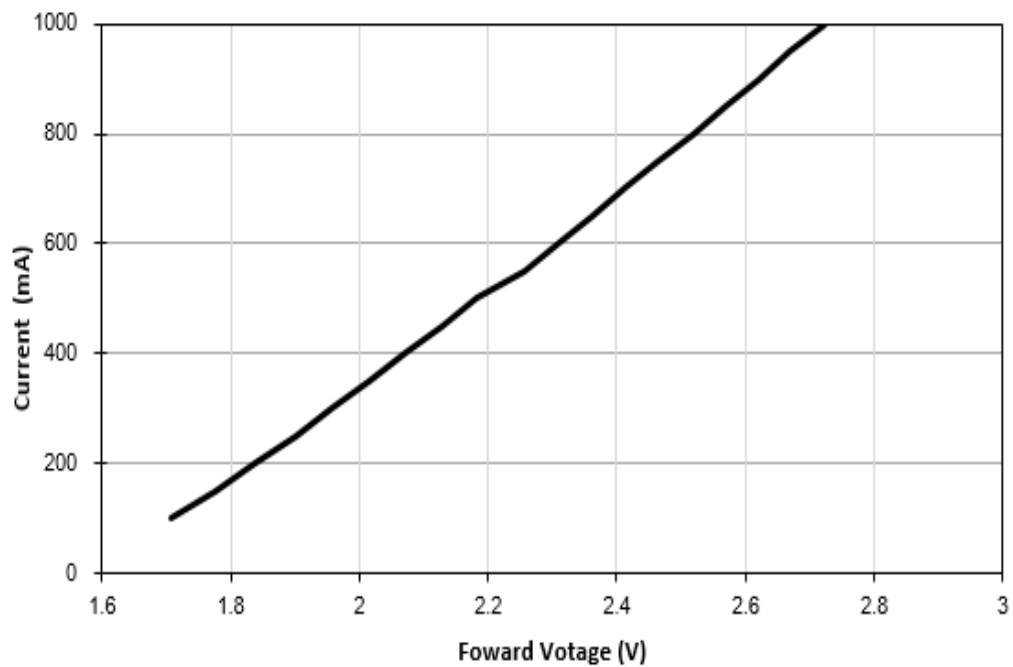
**N3535X-FNFx (beam angle  $65^{\circ}$ )**



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

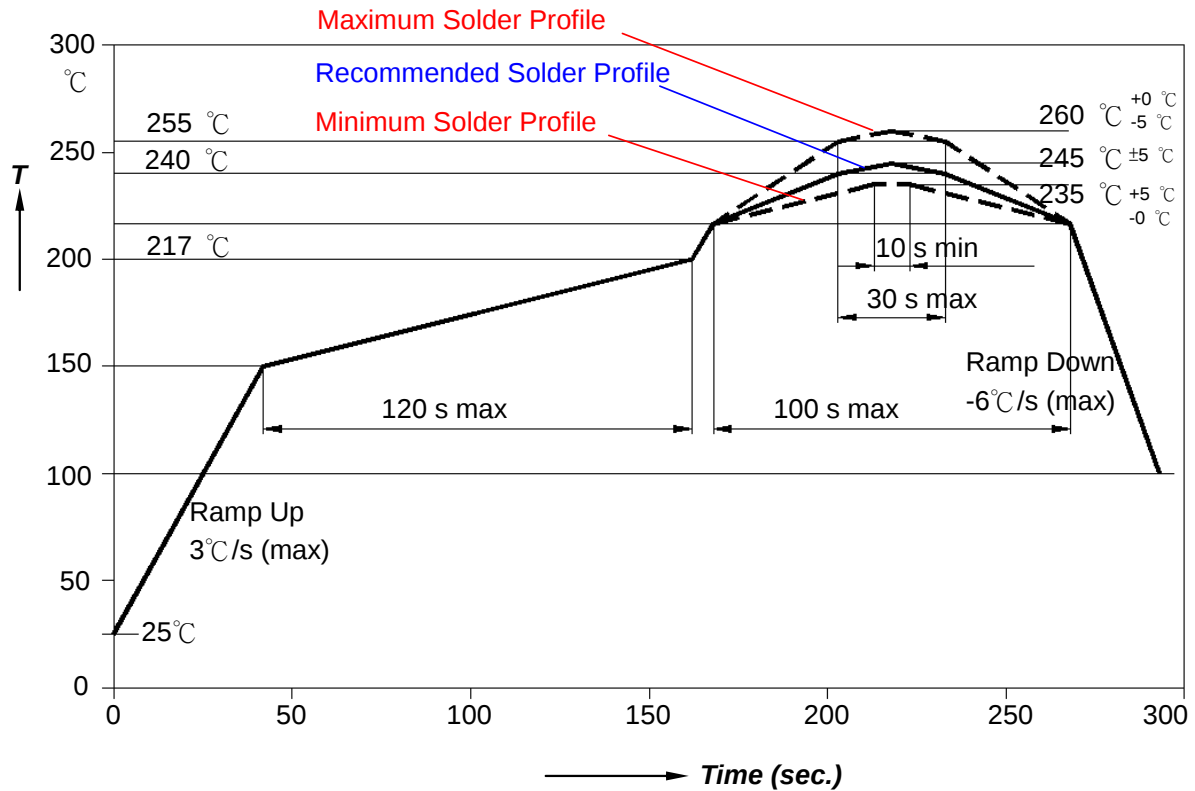


### Typical Forward I-V Characteristics, $T_j=25^\circ\text{C}$



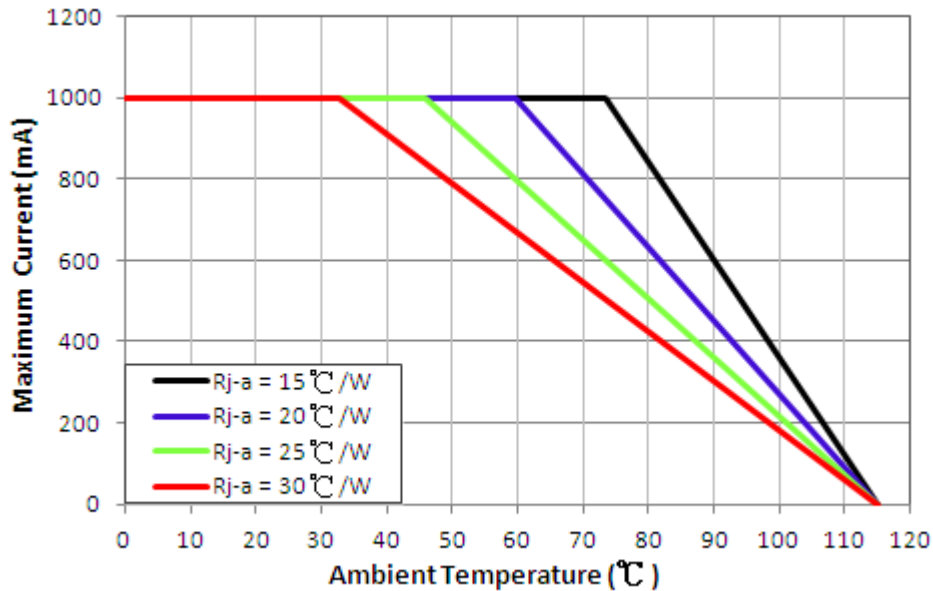
## Recommended Soldering Profile

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.



## 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

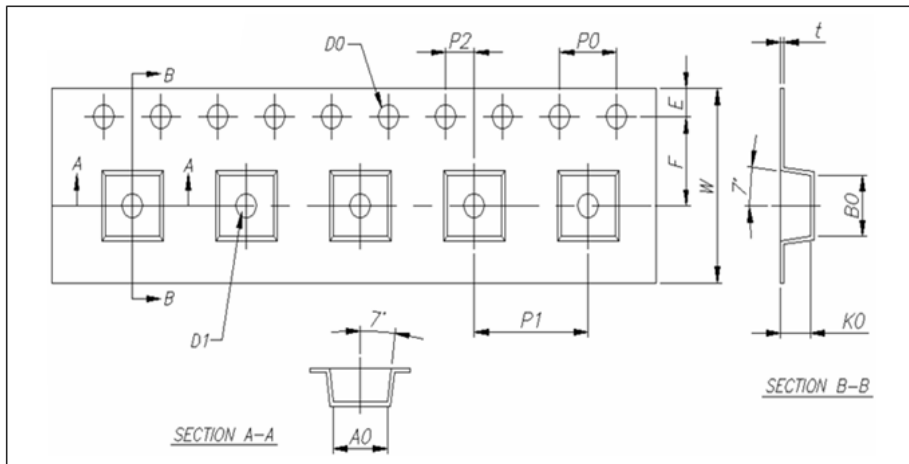
$T_a$ : Ambient temperature

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

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

## Packing Information

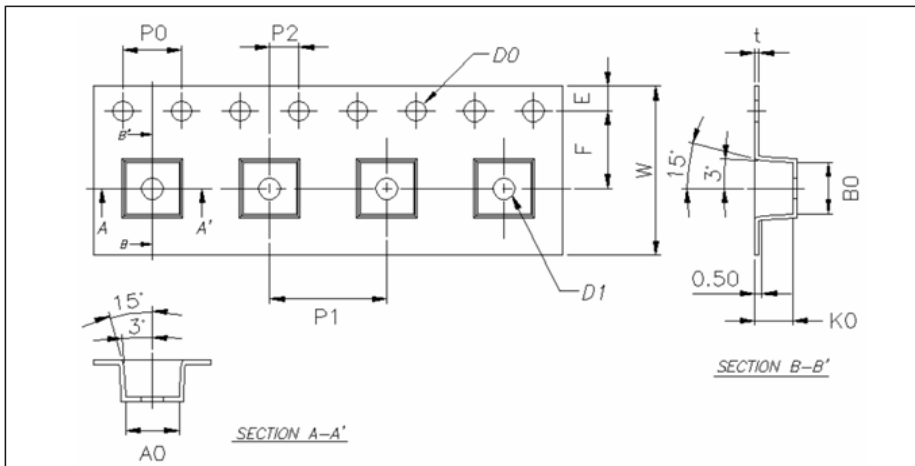
N3535X-FNLx series, Max QTY: 1000ea / roll



| 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     |

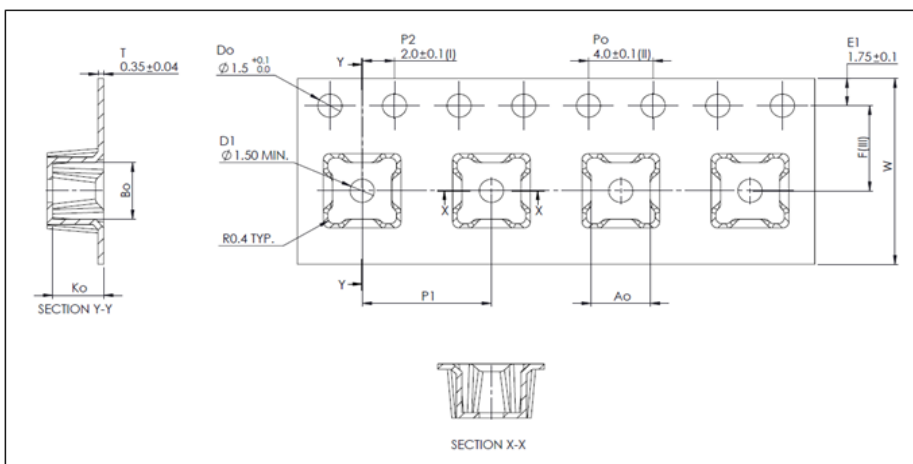
N3535X-FNAX series, Max QTY: 500ea / roll



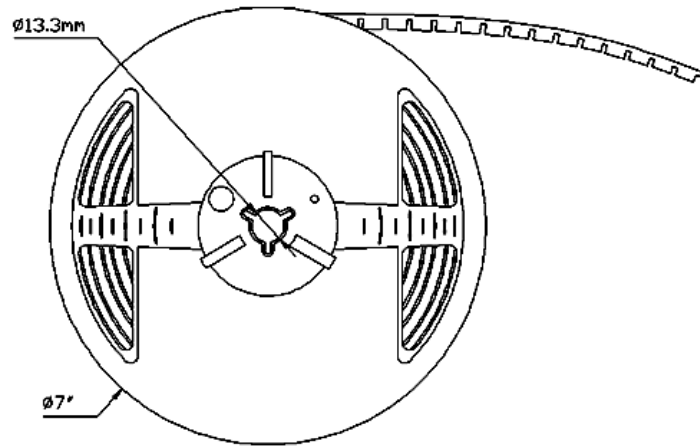
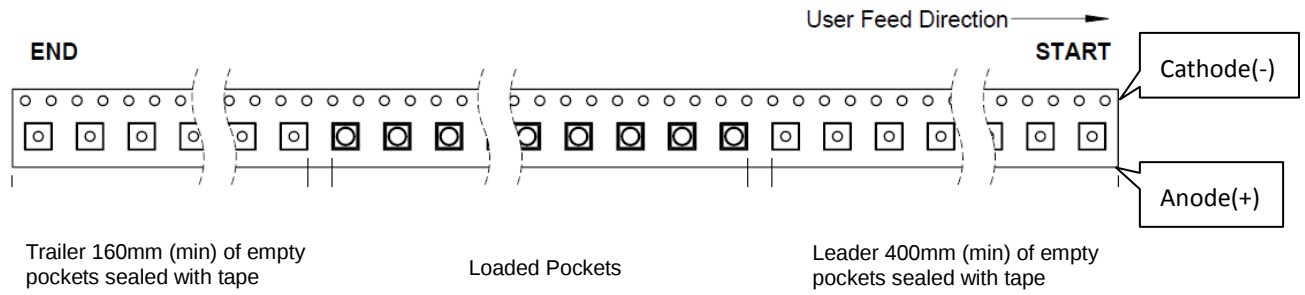
| Item  | Specification | Tol.(+/-) |
|-------|---------------|-----------|
| W     | 12.00         | ±0.30     |
| E     | 1.75          | ±0.10     |
| F     | 5.50          | ±0.05     |
| D0    | 1.50          | +0.10, -0 |
| D1    | 1.50          | +0.10, -0 |
| P0    | 4.00          | ±0.10     |
| 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     |

N3535X-FNFx series, 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).



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