

## **F360L-4C-S Side-Emitter Lens for Nichia<sup>1</sup> LEDs**

- **High efficiency**
- **High-temperature material**
- **Easy assembly**

The F360L-4C-S lens is specifically designed for compatibility with Nichia LEDs.

A software-optimized profile provides a 360-degree pattern with high collection efficiency reaching 85% of the total flux emitted from the LED.

The lens flange can be glued to the PCB to provide a secure assembly.

Typical applications are:

360-degree illumination devices, such as:

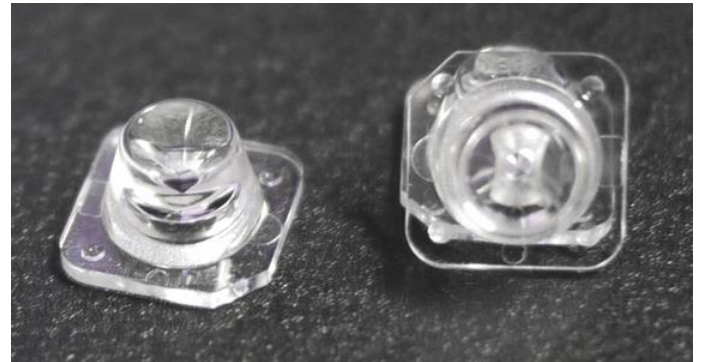
- Beacons
- Navigation lights
- Warning lights
- Electronic flares

Reflector-based systems requiring excellent light control and/or minimal direct light, such as:

- Streetlights
- Flashlights/torches
- Task lights
- Channel-letter signs
- Spot-lights

This datasheet provides F360L-4C-S lens performance information for the following Nichia LEDs:

- 119
- 119C
- 219
- 219C



- (1) For technical specification on Nichia LEDs please refer to the product datasheet or visit <http://www.nichia.co.jp/en/product/led.html>

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<http://www.fraen.com/optics/contact-us/>.



## General Characteristics

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Lens Material	Polycarbonate, UV Stabilized, UL94 V2 rated
Operating Temperature range	-40°C / + 128°C
Storage Temperature range	-40°C / + 128° C

Average transmittance in visible spectrum (400 – 700nm) >85%.

*Please note that flow lines and weld lines on the external surfaces of the lenses are acceptable if the optical performance of the lens is within the specification described in the section "OPTICAL CHARACTERISTICS"*

### **IMPORTANT NOTE – Lens handling and cleaning:**

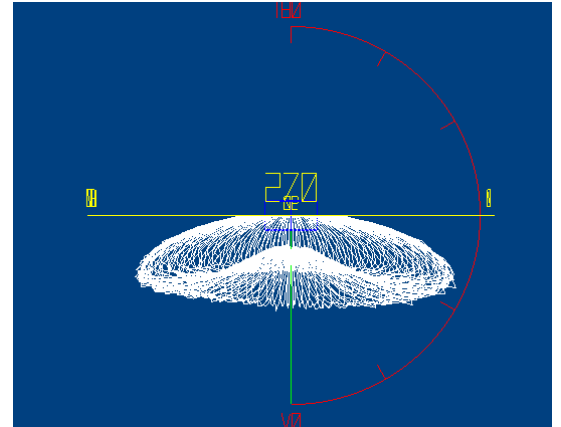
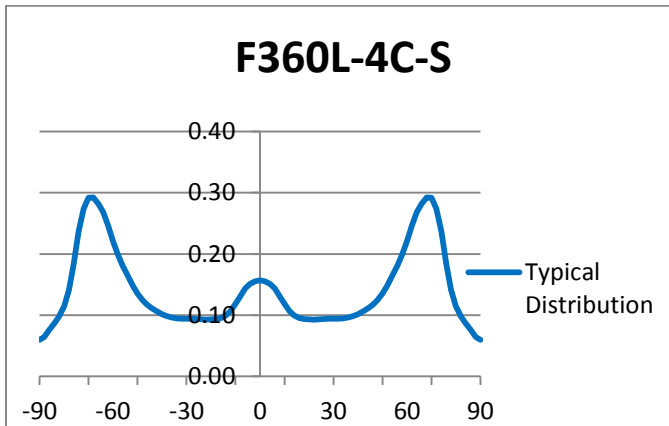
- Handling: Always use gloves to handle lenses and/or handle the lenses only by the flange surface. Never touch the outside surfaces of the lenses with fingers; finger oils and contamination will absorb or refract light.
- Cleaning: Clean lenses only if necessary. Use only soap and water to clean the surfaces. Never expose the lenses to solvents such as alcohol, which can damage the plastic.

## Scope

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This datasheet provides information about the F360L-4C-S lens for Nichia LEDs.

## Optical Characteristics



**Figure 1: Typical F360L Light Distribution**

LED	Peak Intensity		Half Peak Intensity	
	Candela / Lumen	Angle (degrees)	Candela / Lumen	Angle (degrees)
119 Warm White	0.22	±69°	0.11	±50° and ±83°
119 White	0.22	±67°	0.11	±51° and ±82°
219 Warm White	0.23	±69°	0.12	±51° and ±82°
219 White	0.23	±69°	0.12	±50° and ±82°
119 Warm White	0.22	±69°	0.11	±50° and ±83°
119C	0.20	±69°	0.10	±48° and ±82°
219C	0.20	±69°	0.10	±48° and ±82°

**Table 1: Performance Data**

## Example Calculations

To calculate the approximate intensity (candela) at a specific angle, read the candela/lumen value from the graph in Figure 1, and multiply this value by the total flux of the LED used. Refer to the LED datasheet for nominal lumens values.

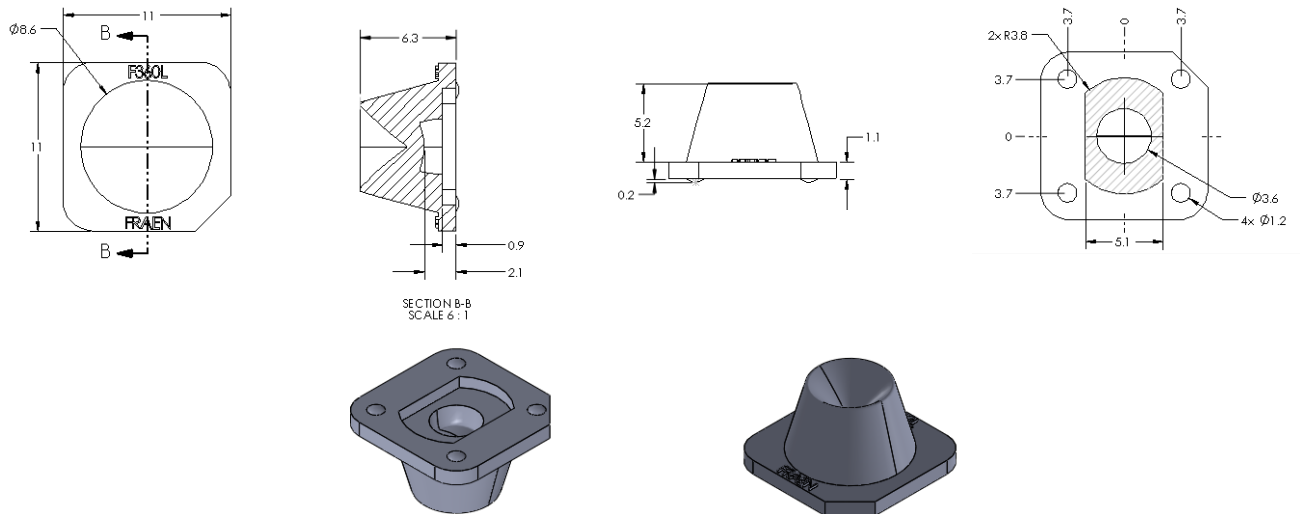
### Example intensity calculation:

If a Fraen lens with a peak intensity of 0.20 candela per lumen (cd/lm) is used with a Nichia 119C LED that produces 214 lumens of flux, the calculations are as follows:

$(0.20 \text{ cd/lm}) \times (214 \text{ lumens}) = 42.8 \text{ candela}$  at  $\pm 69$  degrees for one LED (see Table 1 for data and and Figure 1 for approximate distribution shape)

For the LED, at  $\pm 48^\circ$  and  $\pm 82^\circ$  off-axis, the intensity is  $\frac{1}{2}$  of the peak. This means at  $\pm 48^\circ$  and  $\pm 82^\circ$  off-axis, the intensity should be  $\frac{1}{2}$  of 42.8 candela, or 21.4 candela.

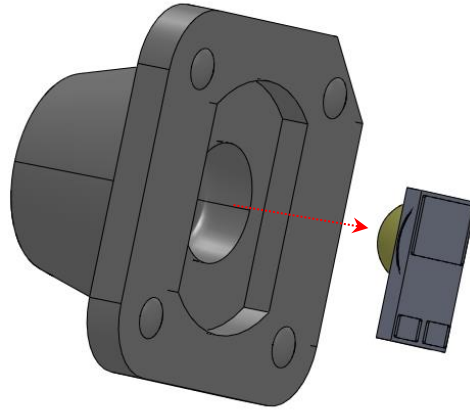
## Mechanical Characteristics\*



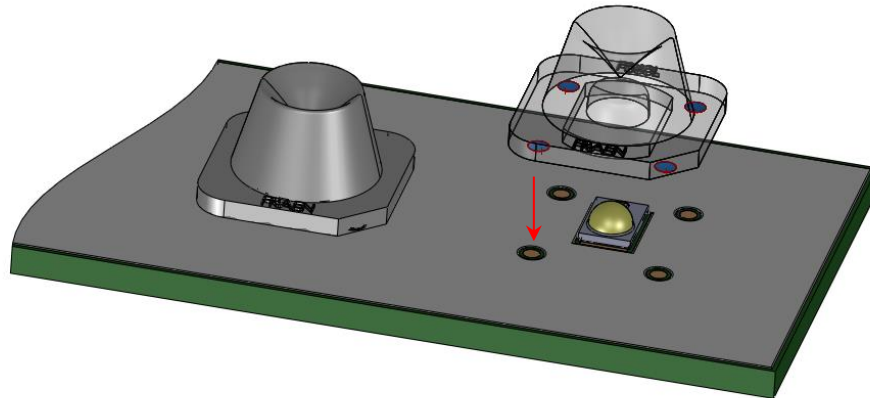
**Figure 2: Dimensions of the F360L-4C-S lens**

**All dimensions in mm. tolerance is  $\pm 0.1$  mm**

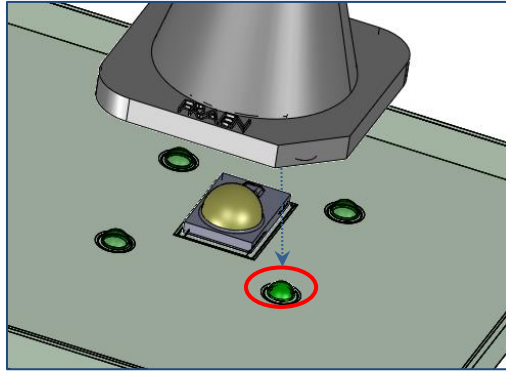
\*Drawings in this datasheet show a rectangular package, dome top LED. The optic can be used with a variety of LED packages. The mechanical mounting and alignment considerations are the same regardless of LED package: the optic should be mounted to the PCB with recesses on the PCB aligning with the bumps on the optic holder flange, and with the LED light emitting surface centered or concentric with the center of the lens. This is the alignment for all data shown in the section titled "OPTICAL CHARACTERISTICS".



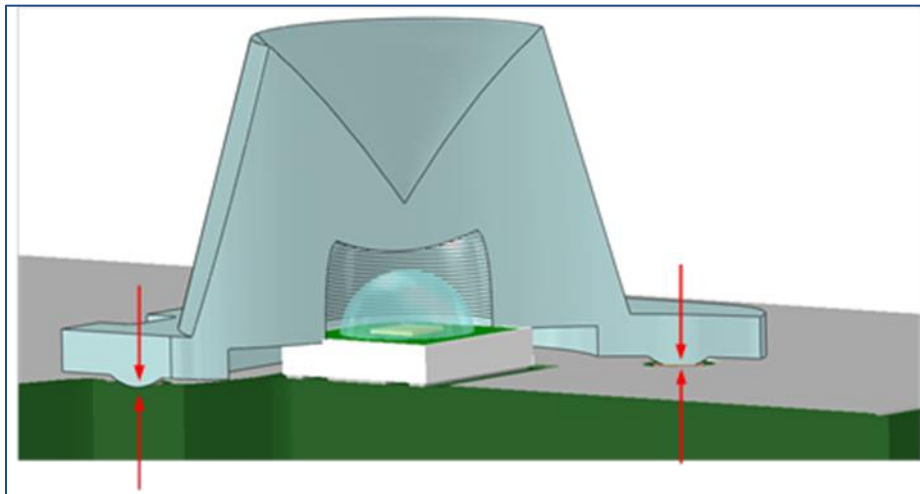
**Figure 3:** The center of the F360L-4C-S lens should be aligned with the center of the LED dome lens or light emitting surface. There is sufficient clearance in the bottom of the F360L-4C-S lens to accept the LED packages listed in table 1.



**Figure 4:** The square flange of the F360L-4C-S lens has 4 bumps, which are intended to fit four corresponding recesses in the PCB solder-mask.  
See *Figures 2 and 7* for locating pin layout and dimensions.

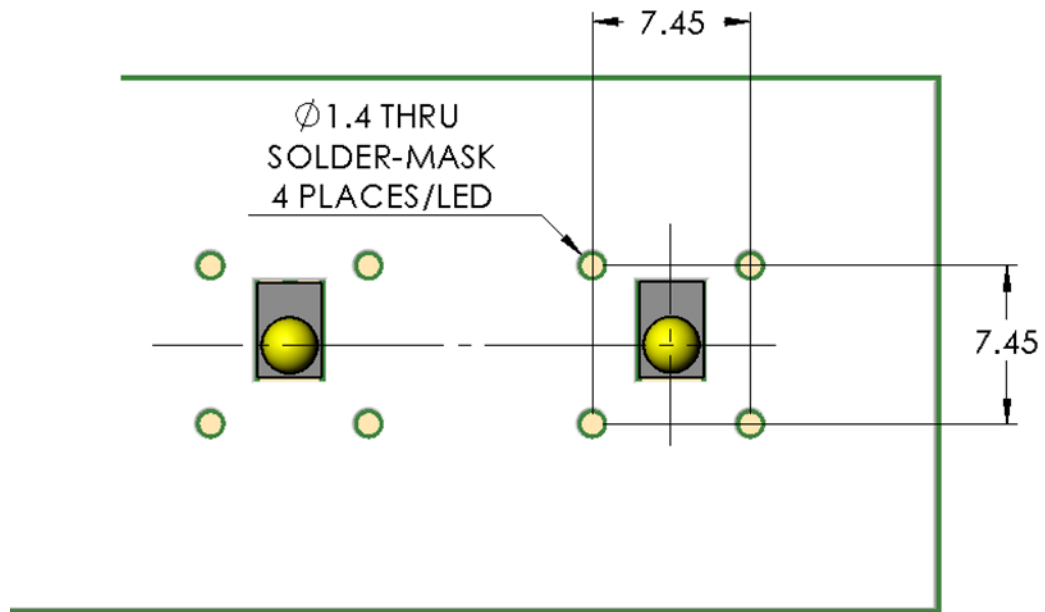


**Figure 5:** A small droplet of glue is placed at each of the 4 solder-mask recess locations, to bond the 4 lens “bumps” to the PCB. A fixture or automated placement machine will be required to assure proper lens location (to center the lens to the LED die).



**Figure 6:** The correct height is achieved when the lens bumps touch the PCB copper (same plane as LED solder).

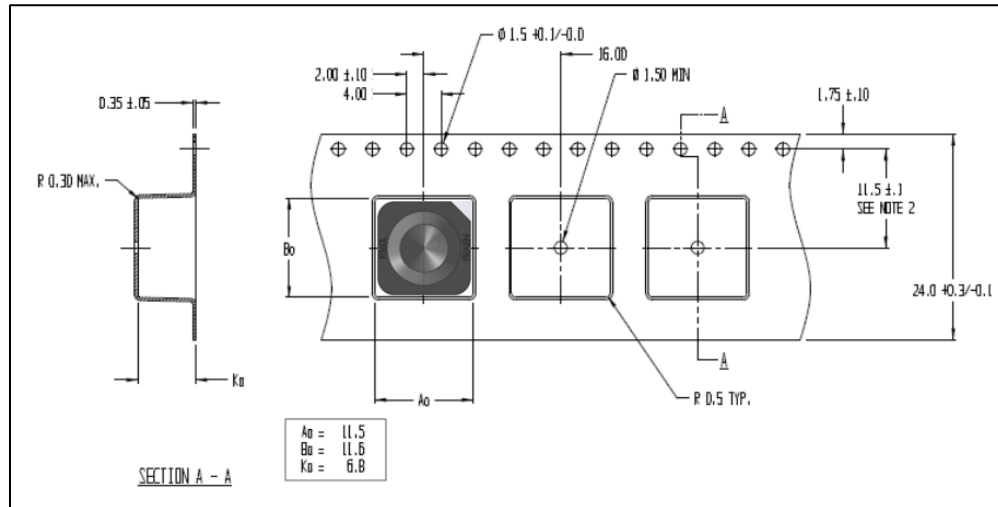
**DESIGN NOTE:** Proper lens to LED alignment requires that the PCB have recesses to accommodate the locating pins on the lens



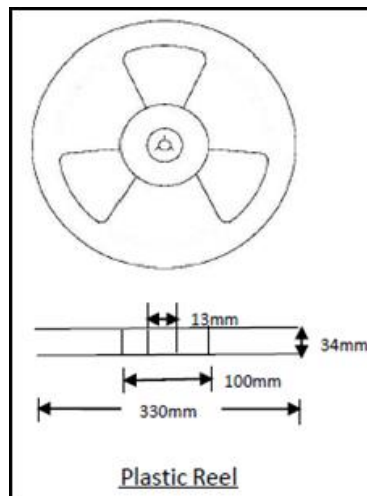
**Figure 7: Dimensions and layout of the PCB location recesses used to align the lens to the LED. (All dimensions in millimeters)**

## Packaging Information – Tape & Reel

The F360L-4C-S lens is available only in Tape & Reel packaging. Reel capacity: 500 lenses in pockets with a ten pocket (empty) leader and a five-pocket trailer.



**Figure 8: Tape dimensions, layout and lens orientation**  
(All dimensions in millimeters)



**Figure 9: Reel dimensions**

## Ordering part number

### F360L-4C-S

For assistance, please contact Fraen <http://www.fraen.com/optics/contact-us/>.

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