

## Silicon Plano Convex Lens | SLSI

RoHS Catalog Code W3192

Application Systems

Optics &amp; Optical Coatings

Opto-Mechanics

Bases

Manual Stages

Actuators &amp; Adjusters

Motorized Stages

Light Sources &amp; Laser Safety

Index

Guide

Mirrors

Beamsplitters

Polarizers

Lenses

Multi-Element Optics

Filters

Prisms

Substrates/Windows

Optical Data

Maintenance

Selection Guide

Plano Convex Lenses

Plano Concave Lenses

Biconvex Lenses

Biconcave Lenses

Kit

Reasonable Lens

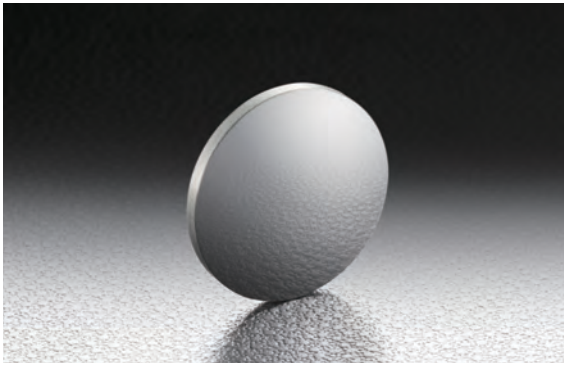
Cylindrical

Others

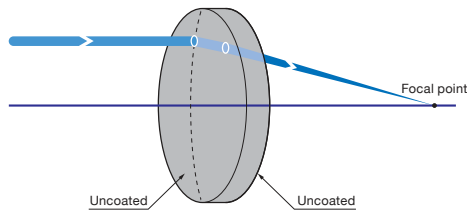
The single crystal of silicon used in semiconductor has low absorption in the infrared wavelength of 1.2 - 6 $\mu$ m and it can be used as an optical element for infrared light. It is a spherical plano convex lens that was made with the silicon single crystal.

It is used as a lens for receiving infrared light and in infrared sensors.

- Even though it looks like the light does not transmit because of its metallic luster, it is transmitting through a wide infrared range of 1.2 - 6 $\mu$ m.
- The wavelength of 1.2 $\mu$ m or less does not transmit, so it also provides the effect of an infrared transmission filter.
- Since the silicon lens has a refractive index of 3 or more, the lens curvature is slower than when made from standard glass.

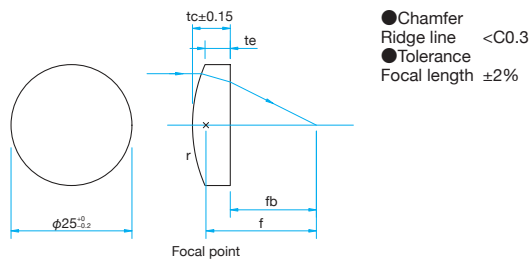


## Schematic



## Outline Drawing

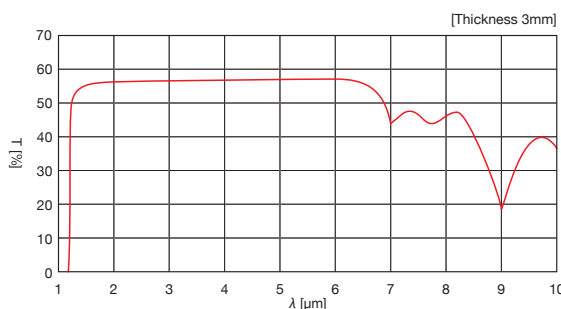
(in mm)



## Specifications

Part Number	Focal length f [mm]	Back focal length f <sub>b</sub> [mm]	Edge thickness t <sub>e</sub> [mm]	Center thickness t <sub>c</sub> [mm]
SLSI-25-25P	25	23	2.0	3.3
SLSI-25-50P	50	48	2.0	2.6
SLSI-25-100P	100	98	2.0	2.3

## Typical Transmittance Data T: Transmission



## Specifications

Material	Silicon (Si)
Design Wavelength	5 $\mu$ m
Coating	Uncoated
Surface Reflectance	30% (per side)
Shape	Spherical Plano Convex Polished Both Surfaces
Centration	<math>< 3'</math>
Clear Aperture	90% of diameter
Surface Quality (Scratch-Dig)	60-40

## Guide

- ▶ It is available with an AR coating to reduce the transmission loss by reflection at the requested wavelength.

## Attention

- ▶ Silicon lens has metallic luster so that visible light is reflected and absorbed. Because of this, no transmittance occurs.
- ▶ Silicon lens without an anti-reflection coating has a loss due to surface reflection and results in transmittance of about 50%.

## Physics

Wavelength [nm]	Refractive Index
1.2	3.519
1.3	3.503
1.4	3.494
1.5	3.483
1.6	3.473
1.8	3.462
2.0	3.454
2.2	3.449
2.4	3.445
2.6	3.441
2.8	3.437
3.0	3.435
3.4	3.433
3.6	3.431
3.8	3.431
4.0	3.430
4.5	3.428
5.0	3.426
5.5	3.425
6.0	3.424
Density	2.33g/cm <sup>3</sup>
Thermal Conductivity	129W·m <sup>-1</sup> ·K <sup>-1</sup> (40°C)
Thermal Expansion Coefficient	4.2×10 <sup>-6</sup> /°C (25°C)