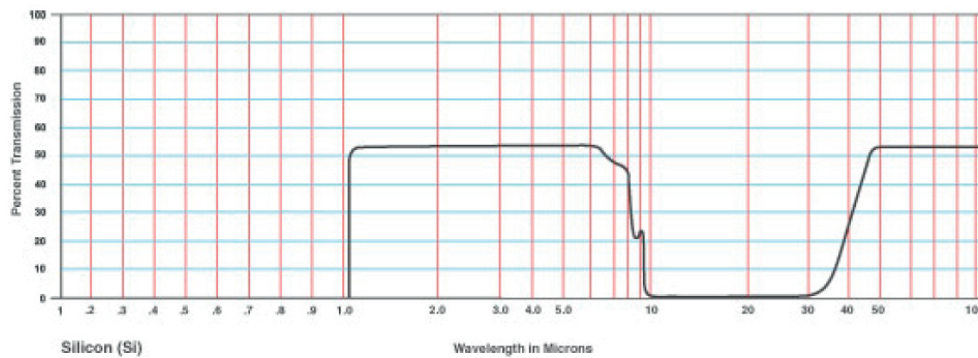


## Optical material / crystals (Infrared)

**Material / Specification:** Silicon for 1.25µm to 11µm transmission  
**Range / Description:** OPMI-SILICON

Silicon is used as an optical window primarily in the 3 to 5 micron band.

### Internal Transmittance



Refractive Index $n$ vs. Wavelength $\lambda$ $n_o$ = ordinary $n_e$ = extraordinary																
$\mu\text{m}$	1.35	1.50	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	---	---	---	---
$n_o$	3.49	3.48	3.45	3.43	3.42	3.42	3.42	3.42	3.42	3.42	3.41	3.41	---	---	---	---

Optical Properties	
Transmission Range	1.2 to 15 $\mu\text{m}$
Refractive Index	3.4223 @ 5 $\mu\text{m}$
Refractive Loss	46.2% at 5 $\mu\text{m}$
Crystal/Class Structure	Cubic diamond, Fd3m
Cleavage Plane	n/a

Thermal Properties	
Thermal Expansion	$4.15 \times 10^{-6} / ^\circ\text{C}$
Thermal Conductivity	$163.3 \text{ W m}^{-1} \text{ K}^{-1}$ at 273 K
Melting Point	1420 $^\circ\text{C}$
Specific Heat Capacity	$703 \text{ J Kg}^{-1} \text{ K}^{-1}$

Mechanical Properties	
Density	2.33 g/cc
Hardness (Knoop)	1150
Youngs Modulus	131 GPa
Shear Modulus	79.9 GPa
Bulk Modulus	102 GPa
Poisson Ratio	0.25
Elastic Limit	124.1MPa (18000 psi)
Molecular Weight	28.09

Chemical Properties	
Solubility	Insoluble in Water