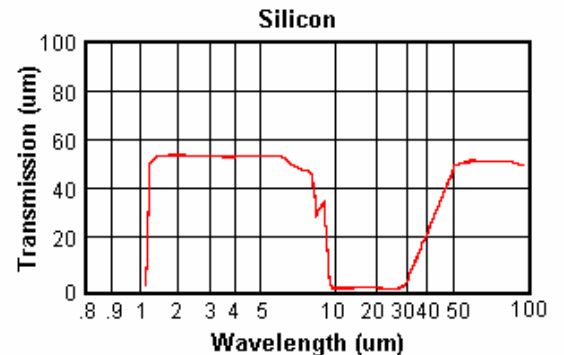


Silicon (Si)

OVERVIEW

Silicon (Si) is grown by Czochralski (CZ) pulling techniques. CZ Silicon is commonly used as substrate material for infrared reflectors and windows in the 1.5 - 8 micron region. The strong absorption band at 9 microns makes it unsuitable for CO₂ laser transmission applications, but it is frequently used for laser mirrors because of its high thermal conductivity and low density. Applications: window, lens in the 1.5 - 8 μm region and mirrors for CO₂ laser and spectrometer applications.



PRODUCTS



CZ, P type doped with Boron, <111> or <100>, Resistivity 5 - 40 ohm cm
 FZ, N type doped with Phosphorus, <111>, Resistivity > 50, preferably > 500 ohm cm, the absorption at 9 microns is absent.

Silicon Mirrors: Diameter Tolerance: +0.0 / -0.10mm, Surface: plano / plano, Centration: <3 arc minutes, Clear Aperture: >85%, Surface Figure: 1/2@632.8nm, Surface Quality: 10-5 scratch and dig, protective bevel

SPECIFICATIONS

Chemical Properties	
Density	2.33g/cm ³
Hardness, Mohs	7
Dielectric Constant for 9.37 x 10 ⁹ Hz	13
Melting point, °C	1414
Thermal Conductivity, W/m·K at 313 K	163
Thermal Expansion, 1/K at 293 K	2.6x10 ⁻⁶
Specific Heat Capacity, J/(kg°C)	712.8
Bandgap, eV	1.1
Knoop Hardness, kg/mm ²	1100
Young's Modulus, Gpa	130.91
Shear Modulus, GPa	79.92
Bulk Modulus, GPa	101.97
Debye Temperature, K	640
Poisson's Ratio	0.28

Wavelength μm	Refractive Index
1.395	3.498
1.661	3.493
1.813	3.461
2.153	3.448
2.325	3.443
3.000	3.432
3.500	3.428
4.000	3.426
4.500	3.424
5.000	3.422
5.500	3.421
6.000	3.420
6.500	3.420
7.000	3.419
7.500	3.419
8.000	3.418
8.500	3.418
10.000	3.418
11.040	3.418