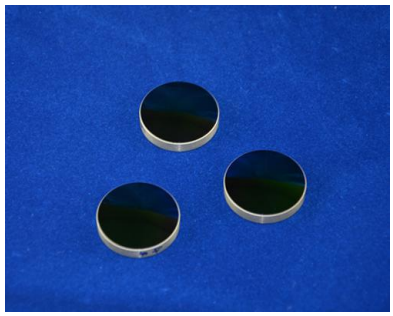
Silicon Lenses



Features:

- Transmits wavelength range 1.2-7 μm
- Ideal for weight sensitive applications
- Cheaper than germanium and ZnSe

Descriptions:

Silicon (Si) lenses manufactured from optical grade silicon are popular for the 1.2 - 7μm spectral region due to their low cost and low density. Due to its low density (half that of germanium or zinc selenide), silicon is ideal for weight sensitive applications, especially those in the MWIR thermal imaging 3 - 5μm region. Density is 2.329 g/cm^3 and Knoop Hardness is 1150, making it harder and less brittle than germanium.

Specifications:

Materials	Silicon crystals	Diameter Range	~300mm
Diameter Tolerance	-0.01/-0.03mm	Thickness Tolerance	+/-0.03mm
Surface Quality	60/40 S/D	Frings (N)	3
Irregularity (delta N)	1	Centration	3'
Chamfer	0.1-0.3mmx45 degree	Coatings	AR/AR@3-5micro DLC/AR@3-5micro

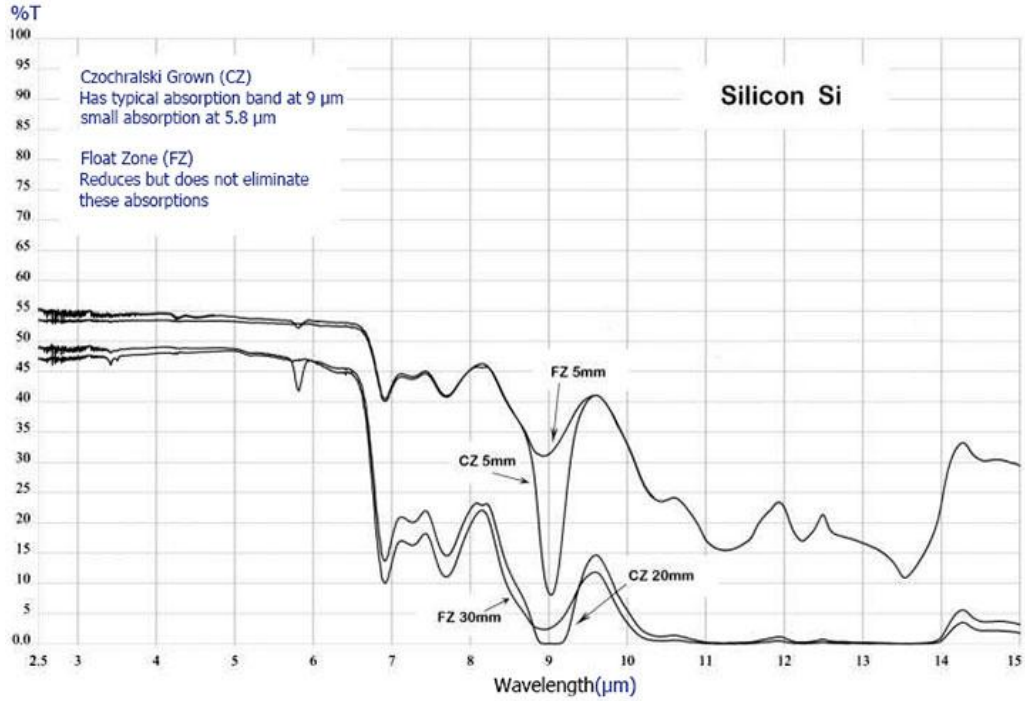
Physical and Optical Properties:

Transmission Range	1.2 to 15 μm (1)	Refractive Index	3.4223 @ 5 μm (1) (2)
Reflection Loss	46.2% at 5 μm (2 surfaces)	Absorption Coefficient	0.01 cm-1 at 3 μm
Reststrahlen Peak	n/a	dn/dT	160 x 10^{-6} /°C (3)
dn/dμ = 0	10.4 μm	Density	2.33 g/cc
Melting Point	1420 °C	Thermal Conductivity	163.3 W m-1 K-1 at 273 K
Thermal Expansion	2.6 x 10^{-6} / at 20°C	Hardness	Knoop 1150
Specific Heat Capacity	703 J Kg-1 K-1	Dielectric Constant	13 at 10 GHz
Youngs Modulus (E)	131 GPa (4)	Shear Modulus (G)	79.9 GPa (4)
Bulk Modulus (K)	102 GPa	Elastic Coefficients	C11=167; C12=65; C44=80 (4)
Apparent Elastic Limit	124.1MPa (18000 psi)	Poisson Ratio	0.266 (4)
Solubility	Insoluble in Water	Molecular Weight	28.09
Class/Structure	Cubic diamond, Fd3m		

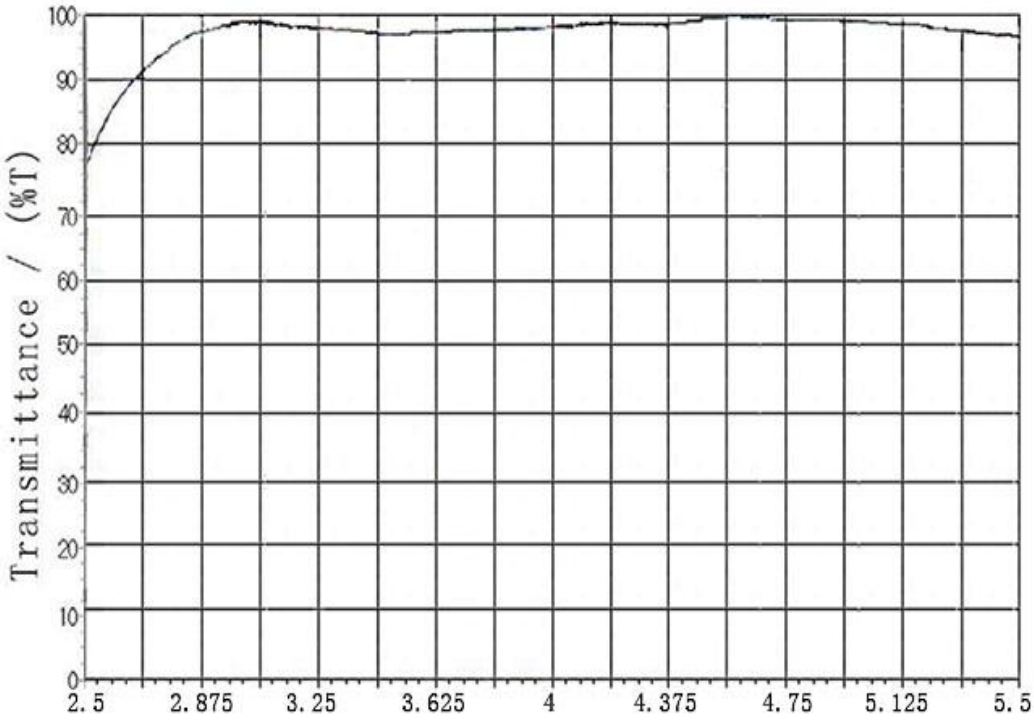
Addr. Room A635, Boke Mansion, No.9 Xiyuan Road, Xihu District, Hangzhou 310030, China.
Tel:+86-571-87920630 Fax:+86-571-87603342 E-mail:sales@shalomeo.com Home:www.shalomeo.com

Technical images:

1. Transmission curve of the Silicon windows (no coating)



2. Transmission curve of the Silicon windows with AR/AR coating at 3-5μm



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