AMERICAN PHOTONICS

MATERIAL DATASHEET

Silicon (Si)

Lightweight, hard, thermally excellent — the MWIR value material.

PHYSICAL PROPERTIES	
Crystal structure	Cubic diamond
Density	2.33 g/cm^3
Bulk resistivity	10 – 1000 Ω·cm (grade-dependent)
OPTICAL PROPERTIES	
Useful transmission range	1.2 – 7 µm
Refractive index	3.422 @ 5 µm
dn/dT	+160 × 10^{-6}/K
THERMAL PROPERTIES	
Thermal conductivity	148 W/m·K
Specific heat	0.71 J/g·K
Thermal expansion (CTE)	2.55 × 10^{-6}/K
MECHANICAL PROPERTIES	
Young's modulus	131 GPa
Knoop hardness	1150 kgf/mm^2
Poisson's ratio	0.28

Typical Applications

MWIR imaging optics; mirror substrates for high-power beam delivery; lightweight windows for airborne sensors.

Fabrication & Specification Notes

Specify float-zone (FZ) material for demanding transmission applications — Czochralski material shows a 9 µm oxygen absorption band.

American Photonics Inc. · 6621 19th St E Suite #101, Sarasota, FL 34243 USA · (941) 752-5811 · sales@americanphotonics.com · ITAR Registered · ISO 9001:2015 (DEKRA)