PHOTONIC SENSE

Germanium data sheet

Application as window, lens, beamsplitter, ATR prism or filter in spectrometers and in thermal imaging.

We are able to meet standard or unique product requirements for commercial or military applications.

Crystal Growth
Germanium crystals are pulled with our vertical Cz crystal puller. It is used to grow both monocrystalline and polycrystalline ingots.

Orientation
The majority of Ge for infrared optics is grown on the <111> crystal axis. Other orientations are available upon request including <100> and <110>.

Resistivity
5-40 ohm.cm is typical for standard optics. Tighter ranges are available.

Dopant
Both P and N type dopants are available. Industry standard is N type, Antimony (Sb). Gallium (Ga) and Gold (Au) are also available.

Diameter
We pull crystals up to 350 mm diameter in polycrystalline form, and 300 mm diameter in monocrystalline.

Dimensional Tolerances
Diameter, Length, Width and thickness ± 0.05 mm (± 0.002"). Parallelism and Flatness ± 0.025 mm (± 0.001"). Edge chamfers and edge finishes available per customer request. All dimensional tolerances can be made tighter upon request.

Polishing
Scratch/Dig of 60/40 is routine. 10/5 is available according to MIL Std. 0-13830 A*. Flatness 1/2 to 1/10 λ at 633 nm*. Parallelism 10-20 arc minute and 2 arc second*.

Configurations
Beamsplitters, Evaporation Grade Granules & Powders, Filters, Lenses, Prisms, Rods, Sputtering Targets, Wedges and Windows. Other shapes available upon request.

Surface Finish
Cut and cleaned, ground, pre-generated, one side polish, and two side polish.

*Can vary depending on size, material, and polishing technique.

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Physical Properties

Density	5.323 g/cm^3
Melting Point	938.25° C
Linear Thermal Expansion Coefficient	5.7 x 10^{-6}/°K
Specific Heat	0.074 Cal/g °K
Youngs Modulus Elasticity for <111>	155.6 GPa.

Optical Properties

Absorption Coefficients

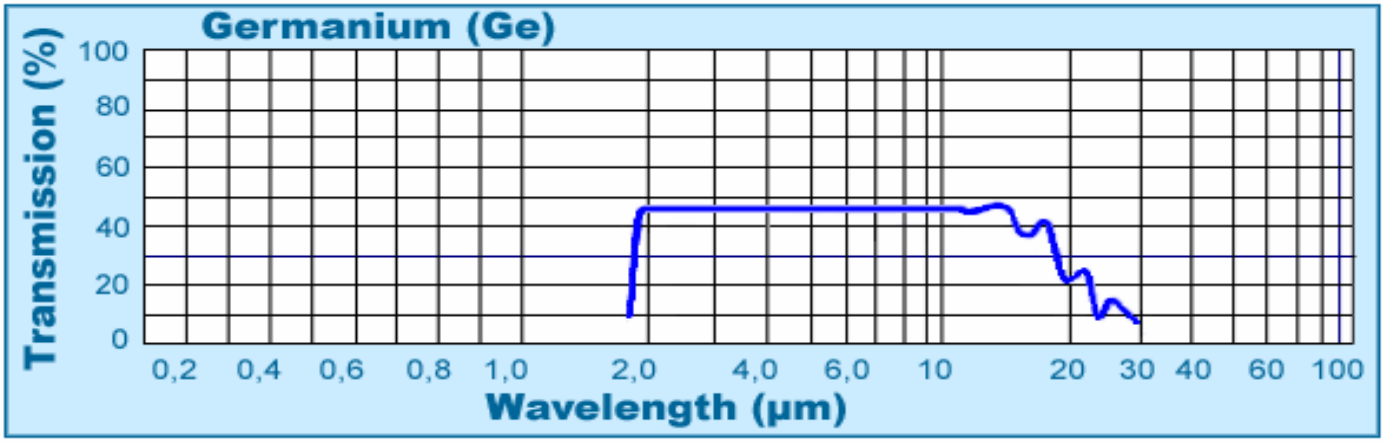
2.5 µm	0.010/cm
7.0 µm	0.017/cm
9.0 µm	0.025/cm
10.6 µm	0.035/cm

dn/dT

3.39 µm	3.5 to 4 x 10^{-4}/°K
10.6 µm	5.7 x 10 10^{-4}/°K

Refractive Index

2.3126 µm	4.0786
2.7144 µm	4.0562
3.033 µm	4.0369
4.866 µm	4.0170
6.238 µm	4.0094
9.270 µm	4.0034
11.04 µm	4.0026
13.02 µm	4.0021



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