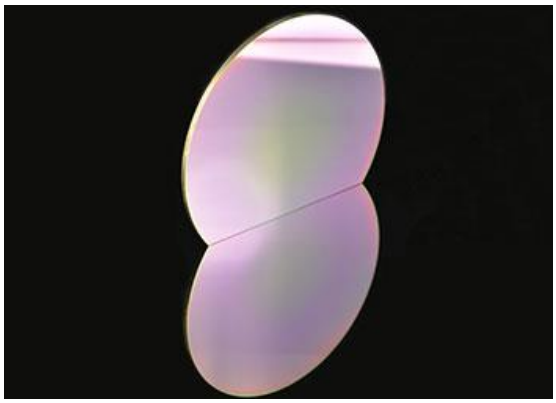
Germanium(Ge) Windows for thermal imaging

- **Wide wavelength range of 2-14 μm**
- **Various types of coating available**

Germanium windows are ideal for IR applications with its broad transmission range and opacity in the visible portion of the spectrum. Germanium is commonly used in IR imaging systems typically operating in the 2 μm to 14 μm spectral range, covers the LWIR (8-12μm) and MWIR (3-5μm) **thermal imaging** wavelength range. Germanium can be AR coated with Diamond producing an extremely tough front optic. Germanium is more rugged than other IR materials, but caution should be taken for high temperature applications where the material will become opaque in the IR realm as the temperature rises.

Features

- Diameter range: ~ 300mm;
- Various types of coating:

AR/AR@7-14um;
DLC (diamond or hard carbon coating)/AR@7-14um;
BBAR/BBAR@3-12um;
Customized coating;

Addr. Room A1031, 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

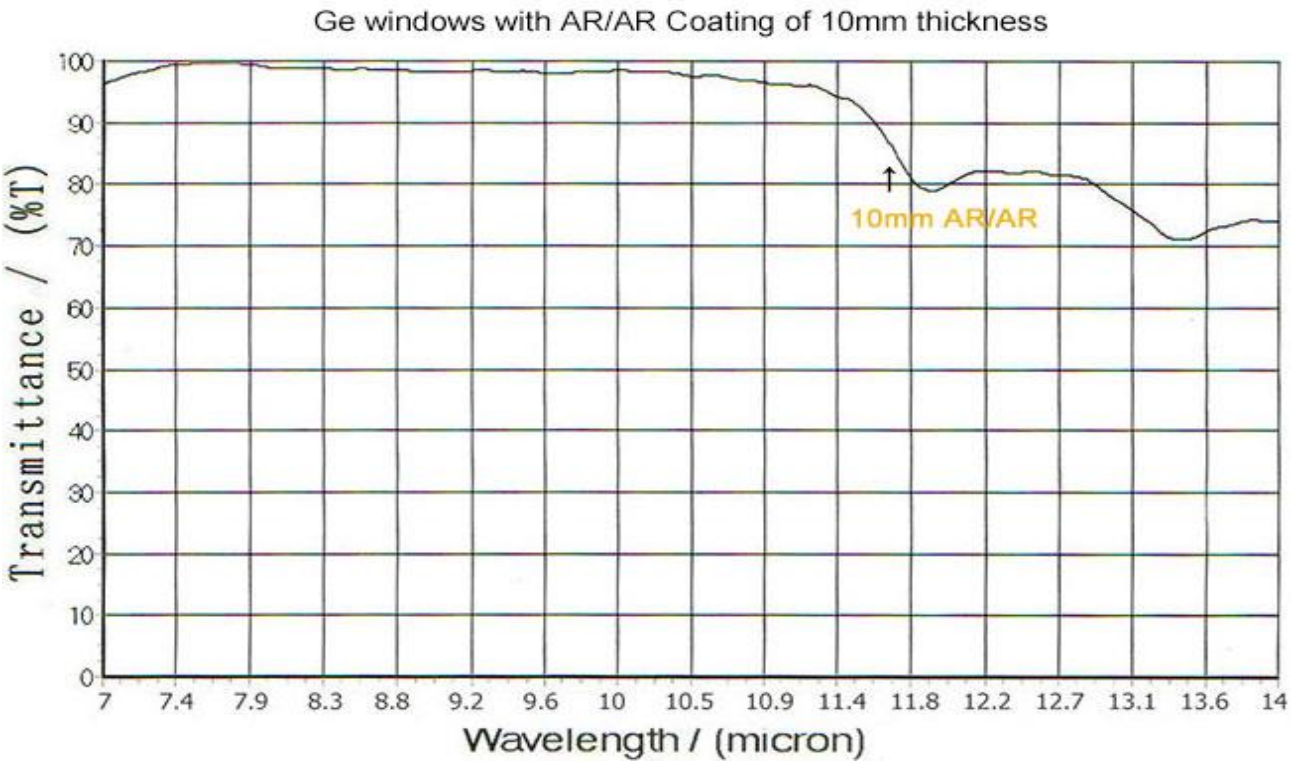
Specifications

Specifications	
Materials	Optical grade germanium single crystals
Aperture	>90%
Dimension Tolerance	+0.0/-0.2mm
Thickness Tolerance	+/-0.2mm
Surface Quality	80/50 S/D
Parallelism	1 arc minute
Chamfer	0.3-0.5mmx45degree
Coating	AR/AR@7-14μm DLC/AR@7-14μm BBAR/BBAR@3-12μm See the curves below

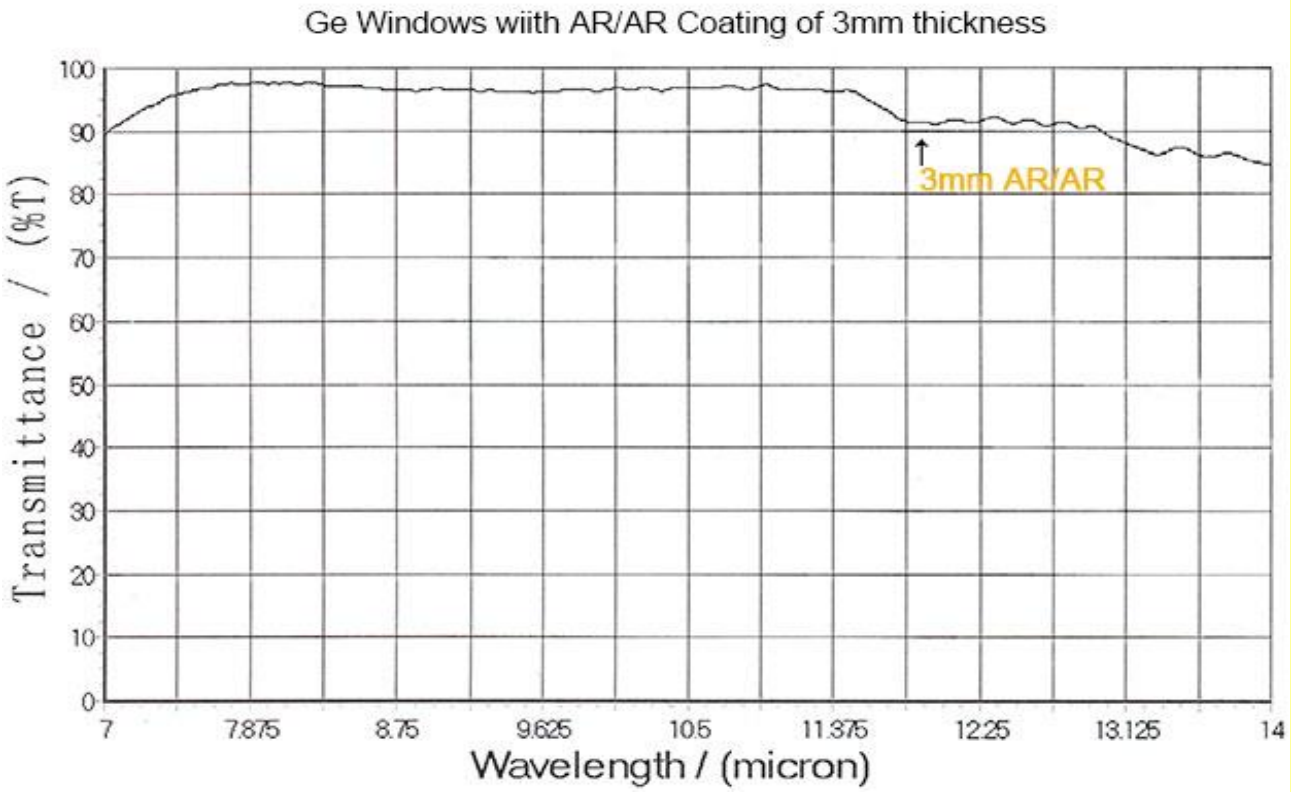
1. Transmission curve 1, transmission of Ge windows with no coating

Addr. Room A1031, 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

2. Transmission curve for Ge windows with coating AR/AR of 10mm thickness

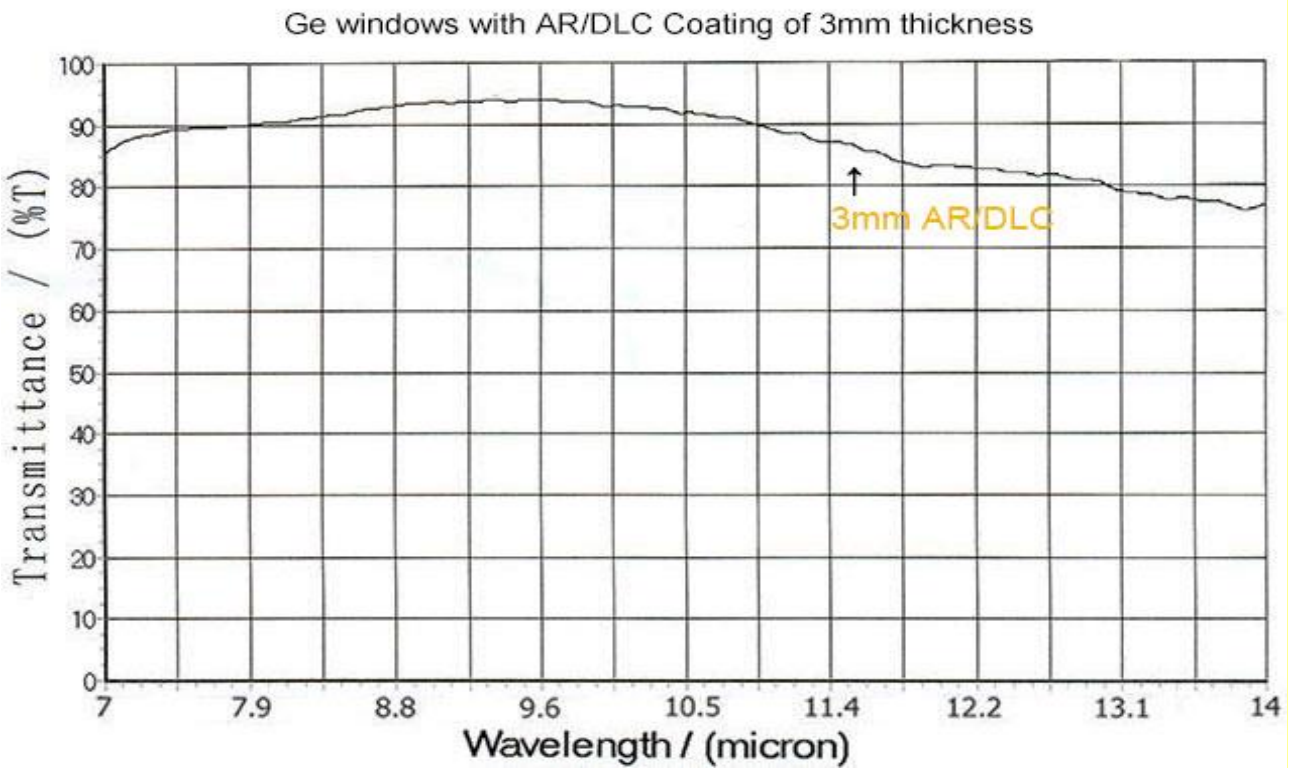


3. Transmission curve for Ge windows with coating AR/AR of 3mm thickness

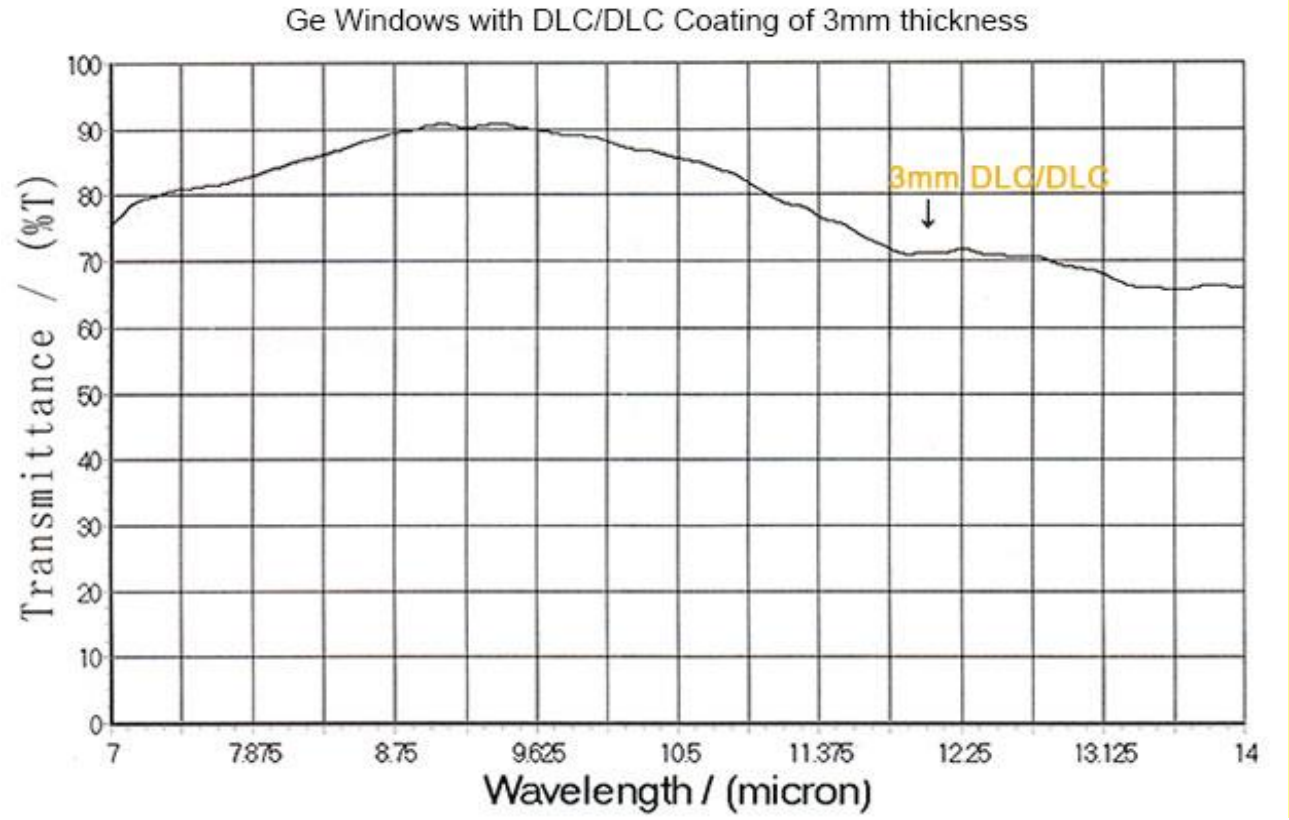


Addr. Room A1031, Boke Mansion, No.9 Xiyuan Road, Xihu District, Hangzhou 310030, China.
Tel:+86-571-87920630 Fax:+86-571-87603342 E-mail:sales@shalomeo.com Home:www.shalomeo.com

4. Transmission curve for Ge windows with coating AR/DLC of 3mm thickness

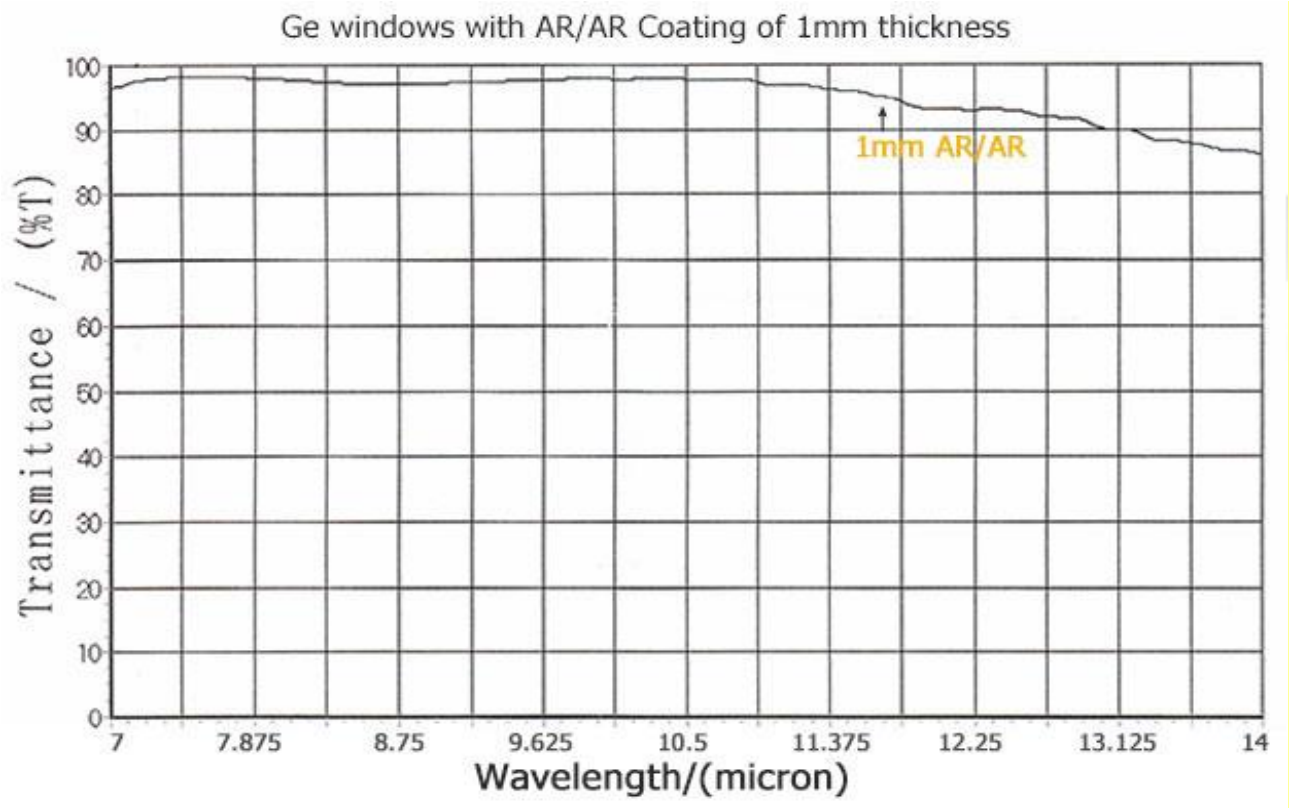


5. Transmission curve for Ge windows with coating DLC/DLC of 3mm thickness



Addr. Room A1031, 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

6. Transmission curve for Ge windows with coating AR/AR of 1mm thicknes



(More information on the page below)

Addr. Room A1031, 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

Basic Properties

Physical and optical properties	
Transmission Range	1.8 to 23 μm (1)
Refractive Index	4.0026 at 11 μm (1)(2)
Reflection Loss	53% at 11 μm (Two surfaces)
Absorption Coefficient	<0.027 cm-1 @ 10.6 μm
Reststrahlen Peak	n/a
dn/dT	396 x 10-6 /°C (2)(6)
dn/dμ = 0	Almost constant
Density	5.33 g/cc
Melting Point	936 °C (3)
Thermal Conductivity	58.61 W m-1 K-1 at 293K (6)
Thermal Expansion	6.1 x 10-6/°C at 298K (3)(4)(6)
Hardness	Knoop 780
Specific Heat Capacity	310 J Kg-1 K-1 (3)
Dielectric Constant	16.6 at 9.37 GHz at 300K
Youngs Modulus (E)	102.7 GPa (4) (5)
Shear Modulus (G)	67 GPa (4) (5)
Bulk Modulus (K)	77.2 GPa (4)
Elastic Coefficients	C11=129; C12=48.3; C44=67.1 (5)
Apparent Elastic Limit	89.6 MPa (13000 psi)
Poisson Ratio	0.28 (4) (5)
Solubility	Insoluble in water
Molecular Weight	72.59
Class/Structure	Cubic Diamond, Fd3m

Addr. Room A1031, 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