

Bismuth Germanate ($\text{Bi}_{12}\text{GeO}_{20}$)

Surface Acoustic Wave (SAW) Devices
Bulk Acoustic Wave (BAW) Devices
Holographic Memory
Electro-optic Devices

Crystal Properties	Crystal Class	Cubic
	Point Group	23
	Space Group	$I2_13$
	Lattice Parameter	a 1.10146 nm
	Melting Point	930 °C
	Density	9.2 g/cm ³
	Hardness	4.5 Mohs
	Dielectric Constant	$\epsilon_{11}^S/\epsilon_0$ 39.4, $\epsilon_{33}^T/\epsilon_0$ 43.4
	Elastic Stiffness Coefficient	C_{11}^E 1.29, C_{44}^E 0.26 x 10 ¹¹ N/m ²
	Piezoelectric Strain Constant	e_{14} 0.89 C/m ²
	Transparency Range	470 ~ 7500 nm
	Electro-optic Coefficient	r_{41} 3.4 x 10 ⁻¹² m/V
	Refractive Index	2.55 (632.8 nm)
	Gradient of Refractive Index	$\leq 5 \times 10^{-5}$ /cm
	Optic Activity	Left 20° mm ⁻¹ (632.8 nm)
Transmittivity	67% (632.8 nm)	

Typical SAW Properties		V_s (m/s)	K_s^2 (%)	TCV (10 ⁻⁶ / °C)	TCD (10 ⁻⁶ / °C)
	[110] - [001]	1624	0.70	-105	128
	[001] - [110]	1680	1.30	-117	140

Specifications	Boules	Section Size	45x45 [100], 45x50 [110]
		Typical Length	100 ~ 200 mm
		Typical Orientation	[100] [110]
	Wafers	Typical Size	(20 ~ 40) x (100 ~ 200) mm
		Typical Thickness	2.0 mm
		Typical Orientation	[110] [001]
		Front Side Polish	0.25 ~ 0.016 μm
		Back Side Lapping	10 ~ 15 or G120 μm
		Flatness	$\leq 30 \mu\text{m}$
		Bow	$\leq 30 \mu\text{m}$

