

Gallium Arsenide (GaAs)

MATERIALS DATA

Gallium Arsenide is produced by Czochralski or horizontal Bridgeman crystal growth techniques. As it is arsenic bearing, precautions in handling and working should be observed.

APPLICATIONS: Gallium Arsenide has specialist applications in far IR optics and lens systems.

Transmission Range	0.9 to 16 μ m (1)
Refractive Index	3.2727 @ 10.33 μ m (1)
Reflection Loss	44% @ 10.33 μ m
Absorption Coefficient	0.01 cm ⁻¹
Reststrahlen Peak	n/a
dn/dT	147 x 10 ⁻⁶ K ⁻¹ @ 10 μ m (4)
dn/d μ = 0	6.3 μ m
Density	5.315 g/cc
Melting Point	1511°C
Thermal Conductivity	48 W m ⁻¹ K ⁻¹ @ 273K (2)
Thermal Expansion	5.7 x 10 ⁻⁶ /°C at 300K (3)
Hardness	Knoop 750
Specific Heat Capacity	360 J Kg ⁻¹ K ⁻¹
Dielectric Constant	12.91 at low frequencies
Youngs Modulus (E)	84.8 GPa
Shear Modulus (G)	n/a
Bulk Modulus (K)	75.5 GPa
Elastic Coefficients	n/a
Apparent Elastic Limit	71.9 MPa
Poisson Ratio	0.31
Solubility	Insoluble in water
Molecular Weight	144.64
Class/Structure	Cubic ZnS, F43m, (100) cleavage

(1) Handbook Optical Constants, ed Palik, V1, ISBN 0-12-544420-6

(2) Deutch, J. Electron. Mater. V4 p679

(3) Sze, Physics of Semiconductor Devices, Wiley 1981

(4) M.Cardona, Proc. Int. Conf. Semicond. Phys., Prague 1960 p.388.



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μm	No	μm	No	μm	No
1.033	3.492	1.550	3.3737	2.066	3.338
2.480	3.324	3.100	3.3125	4.133	3.3027
4.959	3.2978	6.199	3.2921	7.293	3.2874
8.266	3.2831	9.537	3.2769	10.33	3.2727
11.27	3.2671	12.40	3.2597	13.78	3.2493
15.50	3.2336	17.71	3.2081	19.07	3.1866

