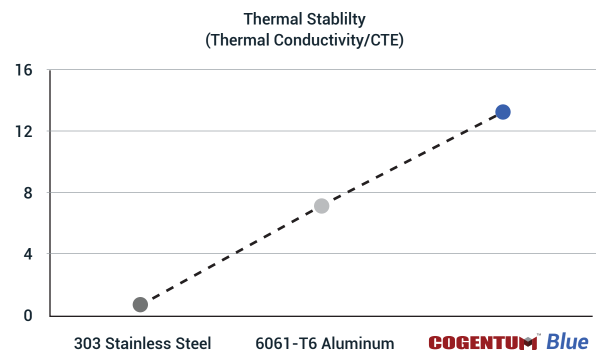
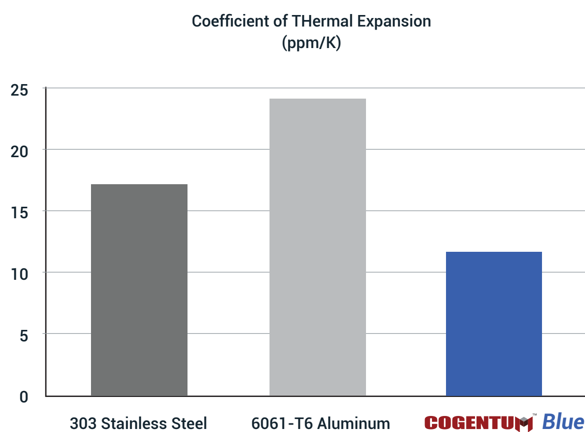
ENABLING TECHNOLOGY FOR THERMAL MANAGEMENT IN HIGH PERFORMANCE SYSTEMS

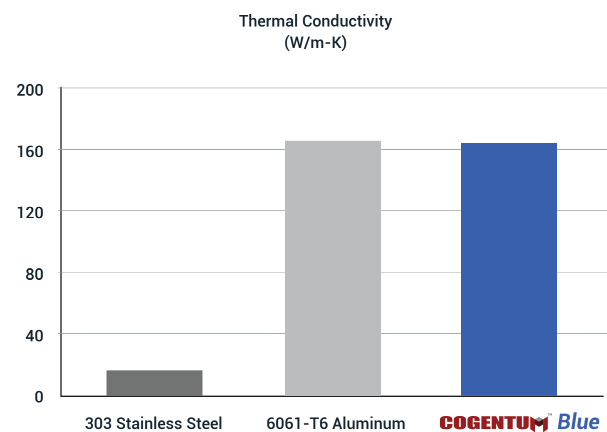
Manufacturers of advanced back end semiconductor processing equipment are focused on providing their customers with innovative, high performance and cost effective solutions to maintain leading edge and competitive market positions. Advanced high performance machines are typically subject to local thermal loads caused by high speed linear motors and various processing conditions such as wire, flip chip and thermo compression bonding. The stability of components and sub-systems adjacent to these heat sources can be negatively affected by thermal loads resulting in an overall loss in system performance.

The **COGENTUM**™ Product line of advanced materials provides designers with expanded flexibility to manage thermal effects on critical components and structures. This is a critical aspect of advanced machine design when dimensional stability is key to Accurate, High Throughput high performance systems.

Thermal stability is a critical parameter used to select materials when designing for maximum Stability in advanced high performance systems. CTE is a measure of a material's dimensional change or distortion as a function of temperature. Thermal conductivity is a measure of heat conductance. Materials with a combination of low CTE and high thermal conductivity provide the best Thermal Management solution for advanced machine design.







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Sales Inquiries: mcubed.sales@ii-vi.com
Phone (203) 304-2940, Fax (203) 426-0880

THE CLEAR MATERIAL CHOICE FOR ADVANCED MACHINE DESIGN

Material Property	COGENTUM Black	COGENTUM Blue	COGENTUM Gold
Density (g/cc) [ρ]	2.78	2.80	2.96
Poisson's Ratio	0.29	0.29	0.25
Young's Modulus - GPa (E)	125	143	200
CTE avg 20-100°C(ppm/k) [α]	15	12	11
Thermal Conductivity (W/mK) [k]	160	164	160
Specific Heat(J/kg-K)	820	800	730
Ultimate Tensile Strength (MPa)	370	320	340
Fracture Toughness (MPa-$m^{1/2}$)	15	13	13
Damping Factor(% Zeta)	0.26	0.26	0.58
Specific Stiffness(E/ρ)	45	51	68
Thermal Stability(k/α)	11	14	14

SEMICONDUCTOR BACK END OF LINE PRODUCT EXAMPLES

STAGE STRUCTURES & ASSEMBLIES

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