SMI PRODUCT BULLETIN

Controlled Expansion Composite Wafers

Target Application: Wafer Level Packaging

Spectra-Mat now offers tungsten-copper wafers to 150 mm diameter. Wafers can be supplied bare or metallized to allow direct solder attach of other substrates or semiconductor wafer materials. All composite wafers are high temperature annealed to maintain flatness during subsequent temperature processing by the end user.

The Advantage

Significant packaging cost savings can be realized for products that require an expansion matched heat sink. High power RF, Laser Diode, and Optoelectronic applications utilize expansion matched heat sink submounts attached after the device has been diced. Integrating this heat sink at the wafer level reduces unit heat sink costs and end user processing.

Typical Material Properties				
Compositions* (W/Cu weight %)	**90/10**	**85/15**	**80/20**	**75/25**
Thermal Expansion ($x10^{-6}/K$) 25°C - 400°C	6.4	7.0	7.6	8.1
Thermal Conductivity (W/m•K) @ 25°C	201	210	219	228
Density	17.2	16.6	16.2	15.7

Manufacturing Capabilities[†]		
Surface Finish		
	Mirror	0.05 micron Ra
	Matte	0.40 micron Ra
Dimensional		
	Wafer Diameters	25, 50, 76.2, 100, 125, 150 mm
	Min. thickness	254 micron
	Max Warp	15 micron
	Max Bow	20 micron
	Max TTV	5 micron
Metallization		
	Electrolytic	Ni, Ni/Au, Ni/Cu
	Electroless	Ni, Ni/Au
	Physical Vapor Deposition	Pt, Au, Au/Sn, Indium

SMI also offers molybdenum/copper composites for weight sensitive applications, and pure tungsten wafers for CTE match to aluminum nitride or indium phosphide.

For additional information, applications, or pricing, please contact:

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