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PRODUCT BULLETIN

Low Expansion Components for Thermal Management in Device Packaging

Target Applications: RF, MMICS, MEMS and MOEMS

Custom Solutions

SMI is a manufacturer of components for thermal management made from our low expansion materials (LEC). We offer controlled low expansion tungsten- and molybdenum-based materials ranging from 80 to 95 percent tungsten or molybdenum content. The result is a pore free, machinable material with unique properties.

Typical Material Properties

Material Composition (weight %)	**WC10** 90/10 W/Cu	**MC15** 85/15 Mo/Cu	**WHA95** 95/3.5/1.5 W/Ni/Cu
Thermal Expansion ($x10^{-6}$/K)	6.4	6.9	5.2
Thermal Conductivity (W/m•K) 25°C	201	154	74
Density (g/cc)	17.2	10.0	18.2

Typical properties are believed to be accurate and reliable, but are presented without guarantee or warranty.

These materials and resulting components are primarily used in applications where the thermal expansion of the package or substrate needs to closely match silicon, III-V semiconductor materials, and/or certain optical glasses (e.g., Corning 7059). For MEMS or MOEMS substrate applications, excellent match of thermal expansion reduces thermal stress. The reduction of thermal stress can increase reliability, improve signal-to-noise ratio, simplify signal processing, and reduce component count by eliminating the need for thermal compensation. SMI's LEC precision components help the designer achieve demanding specifications.

The tungsten- or molybdenum-based materials have vastly better thermal conductivity than Kovar, which results in more uniform device temperatures in power-dissipating applications. We will tailor the composition to meet your thermal expansion matching requirements. All of these materials are plated to facilitate high temperature soldering and brazing and to allow the assembly to meet Telcordia environmental requirements.

For additional information, applications or pricing, please contact:

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