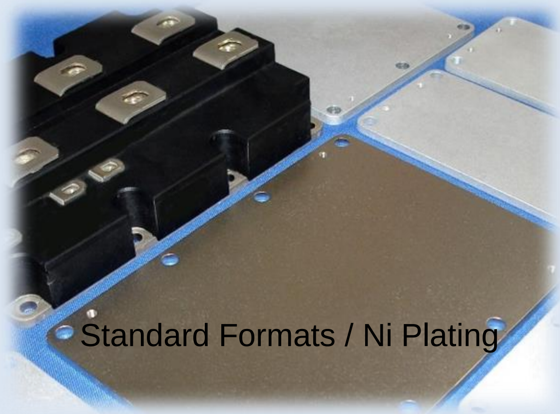
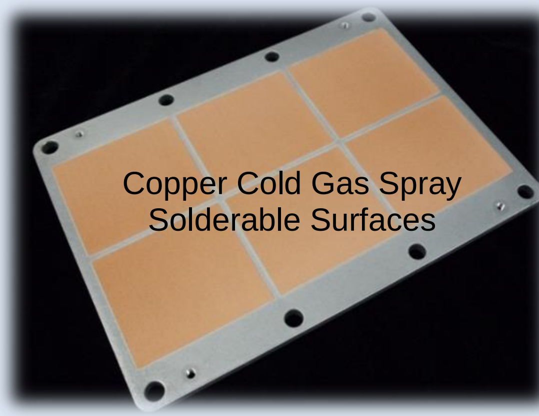
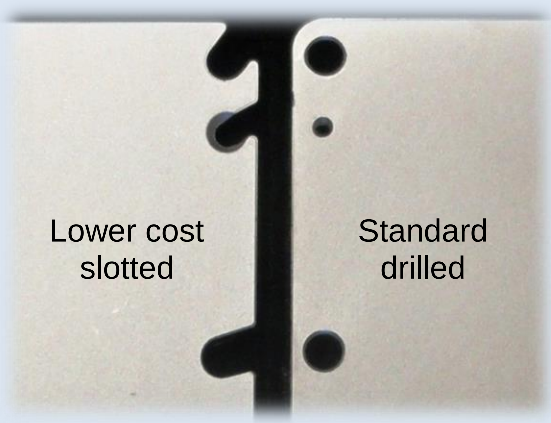
AlSiC IGBT Baseplates

CPS AlSiC IGBT Baseplates

- Substrate compatible thermal expansion
  - Reduced thermally induced mechanical stresses
  - Increased thermal cycling capability (tens of thousands more thermal cycles than copper)
- High thermal conductivity
  - 180 W/mK @ 25°C minimum
- Lightweight
  - 1/3 the weight of copper
  - 3 g/cm^3
- High strength and stiffness
- Engineered bow profile on one surface
  - Reduced substrate attachment interface thickness
  - Positive interface to cooler plate
- Standard formats and custom sizes
- Supports standard solderable plating schemes and Copper Cold Gas Spray







Applications

- High power or high reliability IGBT modules
- Traction, industrial drive motor controllers, hybrid electric and electric vehicles, solar power, and wind power.

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ITAR Compliant International Traffic in Arms Regulations

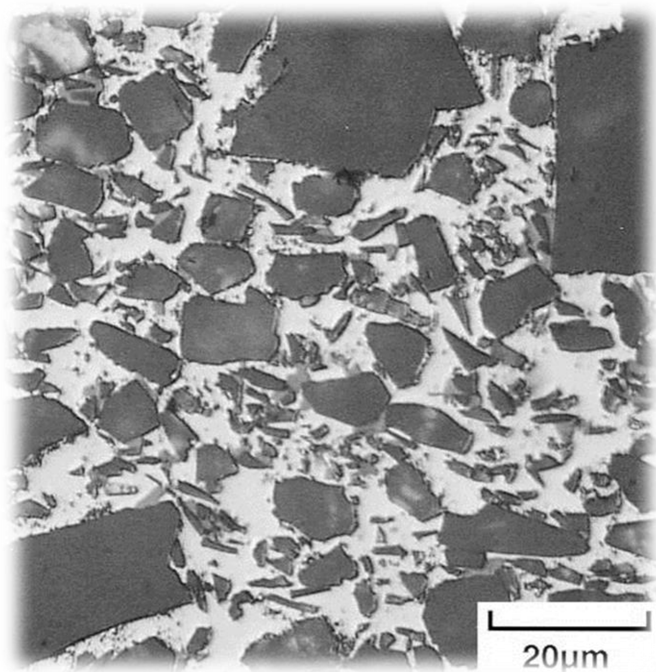
CPS Technologies

AlSiC 9 Material Properties

CPS AlSiC combines aluminum metal and silicon carbide particulates to obtain material properties ideally suited for high power and high reliability IGBT modules for motor controllers, power conversion and hybrid and electric vehicle applications.

The AlSiC material CTE value is compatible with DBC aluminum nitride such that it will withstand many thousands of thermal cycles without delamination (a common failure in copper baseplate equivalents) for long service life and high reliability.

Assembly and performance will be optimized by reducing substrate thickness and decreasing solder layer thickness.   With these optimizations, AlSiC will provide equivalent or improved thermal performance over copper based assemblies.



	AlSiC-9
Aluminum Alloy 356	37 vol%
Silicon Carbide (electronic grade)	63 vol%
Density (g/cm^3)	3.01
Thermal Conductivity (W/mK) @25°C	190 typical (180 W/mK min)
Specific Heat (J/gK) @ 25°C	0.741
Thermal Expansion (CTE) ppm/°C	
30 – 100°C	8.00 σ = 0.26
30 – 150°C	8.37 σ = 0.26
30 – 200°C	8.75 σ = 0.27
Young's Modulus (GPa)	188
Shear Modulus (GPa)	76
Strength (MPa) a-bar 4pt-bend	488
Percent Elongation at Rupture	0.295
Fracture Toughness	11.3
Electrical Resistance (µOhm-cm)	20.7
Hermeticity (atm-cm^3/s He)	$< 10^{-9}$

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