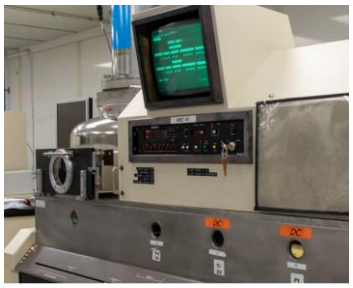
Thin Film Products

Custom Design



Our advanced manufacturing methods ensure sheet uniformity, metallization adhesion, and thickness control allowing PPI to meet or exceed custom requirements from simple patterned submounts to highly complex boards that include: Transmission Lines Combiners & Splitters, Interposers, Inductors, Filters, Direct Patterns, and Integrated tight tolerance resistors.

- Full In-House Design Capabilities
- Low NRE
- 100% Visual and DC Electrical Inspection
- Element Evaluation & Test Capabilities per MIL-PRF-55342 and MIL-STD-883

Design Characteristics

Resistance Tolerance	±0.01% to ±20%
Resistance Ratio	0.01% available
TCR Tracking	±2 ppm/°C
Termination Material	Gold (Standard)
Wafer: Size **Thickness Tolerances**	Up to 4 in x 4 in As low as ±.5 mils for height matching applications
Line Width Definition (Resistor)	0.1 mils
Line Width Definition (Conductor)	0.2 mils
Metals Available	Gold, Nickel, NiChrome, Palladium, Platinum, Tantalum, Tantalum Nitride, Titanium, Titanium Tungsten (TiW), Silver
Specialty Materials	Metallization available on 1 - 6 sides Through-holes (vias), edge wraps, and custom laser cutouts
Patterning Processes	Full Photolithography capabilities and Lift-off patterning available
100% Electrical	Laser test and trim with full mapping (read and record data)
Photolithography	Patterning, wet and dry etching
Electroplating	Nickel and Gold
Wafer Dicing	Silicon, Alumina, Quartz, Beryllium Oxide, Aluminum Nitride, and custom substrates
RF & DC Sputtering	Supporting Au, Pt, Ag, Ni, Pd, Ta, TiW, Ti, Tan, NiCr, and SiO_2. Custom plating stacks available
Repackaging	Tape and Reel, waffle pack, gel pak, and film frame
Other Capabilities	Gold filled Vias, Gold Bumping

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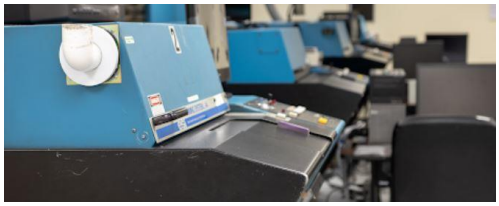

Resistive Material Characteristics

Code	Resistive Material	Sheet Resistivity	Passivation	Standard TCR	Optional TCR
T	Tantalum Nitride	5 Ω/sq - 300 Ω/sq	Ta_2O_5 (self-Passivating)	± 150 ppm/°C	± 50 ppm/°C
N	NiChrome	5 Ω/sq - 250 Ω/sq	SiO_2	± 25 ppm/°C	± 5 ppm/°C

Standard Substrate Characteristics

Code	Substrate Material	Available Thickness (standard)	Dielectric Constant (@ 1MHz)	Thermal Conductivity ($W \times m^{-1} \times K^{-1}$)
20	Quartz	0.005 in - 0.010 in	3.8	1.38
22	Silicon	0.005 in - 0.010 in	N/A (SiO_2 K = 3.8)	149 (SiO_2 1.38)
25	Beryllium Oxide (BeO)	0.005 in - 0.025 in	6.6	285
28	Aluminum Nitride (AlN)	0.005 in - 0.025 in	8.7	170
35	Alumina (Al_20_3)	0.005 in - 0.025 in	9.8	26.9

Testing

Testing Performed	Specification / Standard
Visual Inspection	MIL-PRF-55342 MIL-STD-883
Mechanical Inspection	MIL-PRF-55342
DC Resistance	MIL-PRF-55342 MIL-STD-202
High Temperature Exposure	MIL-PRF-55342
Thermal Shock	MIL-PRF-55342 MIL-STD-202
Resistance to Bonding Exposure	MIL-PRF-55342
Wire Bonding Integrity	MIL-PRF-55342
Life Test	MIL-PRF-55342 MIL-STD-202

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