

HIGH DENSITY THICK FILM SUBSTRATES

Remtec offers an optimal combination of economy, performance and reliability meeting the challenges of demanding electronic applications.

Remtec manufactures cost effective, high performance thick film multilayer ceramic circuits with 6-8 conductor layers, ground planes, hermetic plugged vias and printed resistors on alumina, aluminum nitride and beryllia ceramics. Products include both traditional gold multilayer thick films with excellent wire bondability, solderability and conductor adhesion and lower cost multilayer circuits utilizing silver interlayer conductors with higher conductivity of 1-3 m Ω /sq.

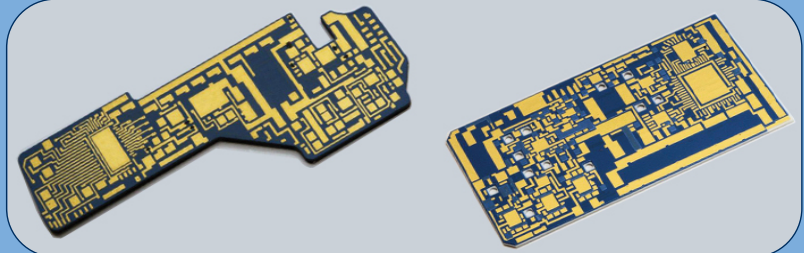
Optional Ni-Au plating on a top conductor layer of a multilayer pattern results in enhanced reliability circuits with a high leach resistance, fully compatible with high temperature RoHS compliant SAC solders. Also available are etched thick films with 0.002" minimum line/space and ± 0.00025 " line/gap tolerance.

Dielectrics for either gold or silver conductors ensure insulation to 1,000 V. Dielectric constant can be adjusted from 6-12. Printed resistors in m Ω to G Ω range with tolerances of 1-10% are typically protected with overglaze materials.

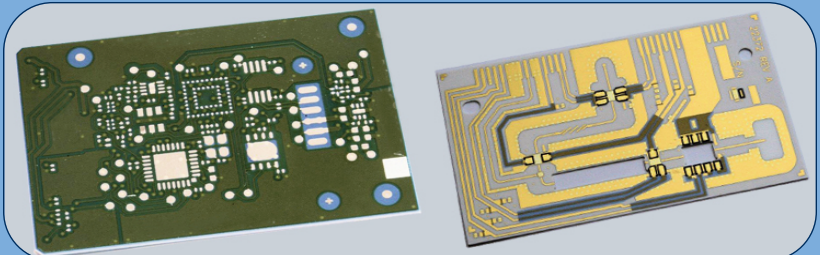
Product integrity, reliability and repeatability is a result of using state-of-the-art equipment and processes including automated cassette-to-cassette screen printing and firing, high speed step-and-repeat laser trim, photolithography and dicing.

High product quality is based on intensive direct labor training program, supplier evaluation, material analysis, wide use of SPC methodology and product/process qualifications as well as routine process auditing. Lot acceptance and test procedures strictly adhere to applicable requirements of MIL-STD-883, MIL-STD-202, MIL-PRF-38534 and detailed internal specifications.

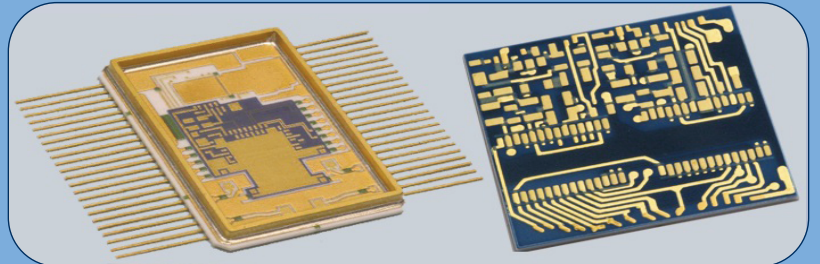
The sales and applications engineering team at Remtec is staffed to provide a diverse customer base with rapid response, short lead time and problem solving support. Remtec, a RoHS compliant, ISO 9001:2008 certified and ITAR compliant company, supplies multilayer substrates in low, medium and high volumes for military, avionics, space and industrial applications.



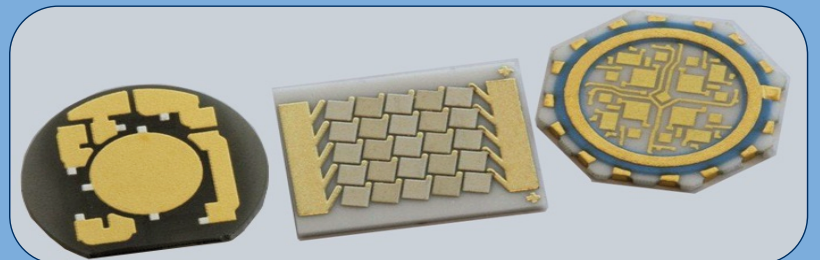
Typical thick film multilayer substrate with 6 gold layers. A five metal layer substrate with silver inter-layers and precise $\pm 1\%$ resistors 10 Ω -100K Ω (on right).



High density multilayer substrate for flip chip/BGA interconnects (on left.) 0.002" line/space etched thick film substrate with resistors and multilayer circuitry on the back for high frequency application.



Integrated substrate package combining three-layer circuit pattern with plated copper, hermetic (to 10⁻⁸ atm cc/s) vias and 50 Ω lines (on left.) Multilayer substrate, ENIG plated top silver conductor with high leach resistance: compatible with high temperature, RoHS compliant SAC solders.



LED submounts and substrates on alumina, AlN and BeO with Ni-Au plated thick films.

Please send electronic files in DXF and/or DWG formats to sales@remtec.com. A complete set of design guidelines is available at www.remtec.com.

TECHNICAL DATA

Conductor Properties

	Sheet Resistivity, mohm/sq	Line Width Printed	Line Width Etched	Layer to Layer Alignment	Line to Line Pacing	Via Size	Via Pitch
Gold	3-7	.005"	.002"	±.002"	.004"	.010" .005" min	.024" .012" min
Silver	1-2	.005"	.002"	±.002"	.006"	.010" .005" min	.024" .012" min

Dielectric Properties

Dielectric Constant	Dissipation Factor	Breakdown Voltage, V/mil	Fired Thickness,	Insulation Resistance, ohms
6-12	<0.5%	500	.0015"-.002"	>10 ¹¹ @ 100 V

Sheet Resistivity, Ω/square

	Typical Resistor Characteristics							
	1Ω	10Ω	100Ω	1KΩ	10KΩ	100KΩ	1MΩ	10MΩ
TCR, (ppm/°C) Max	300	300	300	300	300	300	300	300
Typical	150	100	100	100	100	100	100	100
Available	-	50	50	50	50	50	50	50
Standard Working Voltage (V/mil)	0.02	0.07	0.2	0.7	2.0	2.0	4.0	10.0
Maximum Rated Power Dissipation (mW/mm ²)	3230	470	697	781	244	177	14	0.1

Substrate Properties

	96% Al ₂ O ₃	99.5% Al ₂ O ₃	99.5% BeO	AlN
Dielectric Constant @ 1MHz	9.5	9.9	6.5	8.6
Dielectric Strength, V/mil	300	300	300	300
Dissipation Factor @1MHz	0.0004	0.0001	0.0004	0.0008
Thermal Conductivity, W/M-°C	26	35	280	170
Thermal Coefficient of Expansion, ppm/°C	6.4	7.0	7.0	4.6