MULTILAYER 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 8-10 metal layers, ground planes, hermetic plugged vias and printed resistors on alumina 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 a higher conductivity of 1-3 mΩ/sq.

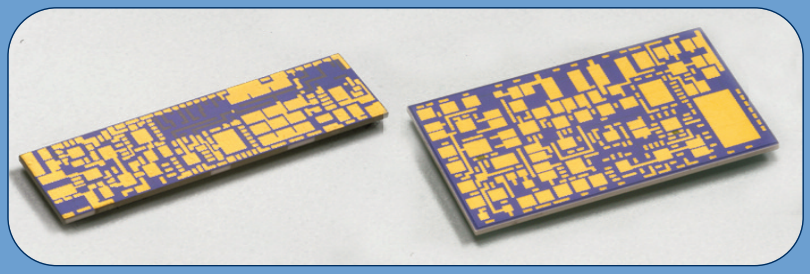
Dielectrics for either gold or silver conductors ensure insulation to 1,000 V. Dielectric constant can be adjusted from 6-12. Printed resistors in mΩ to GΩ range with tolerances of 1-10% are typically protected with overglaze materials.

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.

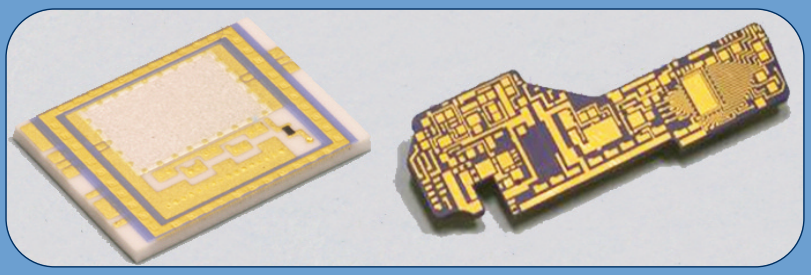
High product quality is based on intensive direct labor training program, vendor evaluation, material analysis and qualification as well as routine process auditing. Manufacturing and quality procedures strictly adhere to the applicable requirements of MIL-STD-883, MIL-I-45208, MIL-M-38510 and MIL-C-45662.

Remtec's sales and application engineering staff provides fast response, quick turnaround and a rapid problem solution to a diverse customer base. Remtec, a RoHS compliant and ISO 9001:2000 registered company, supplies multilayer substrates in low, medium and high volumes for military, avionics, space and industrial applications.

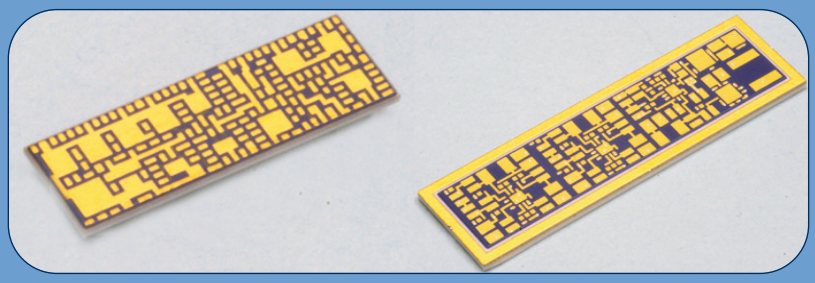
Please send your electronic files in DXF and/or DWG formats to sales@remtec.com. A complete set of design guidelines is available upon request. Additional data is available at www.remtec.com.



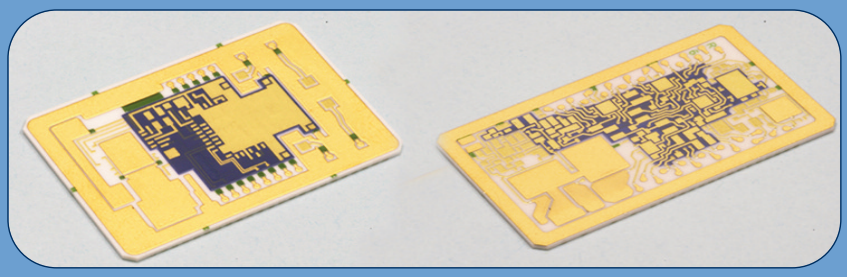
Typical thick film gold multilayer substrates with 6 metal layers and total of thirty interlayers



Typical thick film gold multilayer substrates with 5 metal layers and thick film resistors (10Ω -100K) laser trimmed to ±1% (on the right). A four metal layers thick film gold multilayer circuit on BeO substrate (on the left).



Lower cost thick film multilayer substrates with top gold layer and 5 silver interlayers.



Thick film gold multilayer substrates (3 metal layers) combined with plated copper tracks (.4 mΩ resistivity) , fully hermetic (10^{-8}) solid metal vias and 50 Ω lines. Substrate serves as a base for SMT hermetic package.

REMTEC®

Ceramic Packaging Solutions For Optimum Performance

TECHNICAL DATA

Conductor Properties

	Sheet Resistivity, mohm/sq	Line Width, mil"	Layer to Layer Alignment, mil"	Line to Line Spacing mil"	Via Size, mil"	Vis Pitch mil"
Gold	3-7	5	±2	4	10 5 min	24 12 min
Silver	1-2	7	±2	6	10 5 min	24 12 min

Dielectric Properties

Dielectric Constant	Dissipation Factor	Breakdown Voltage, V/mil	Fired Thickness, mil	Insulation Resistance, ohms
6-12	<0.5%	500	1.5-2	$>10^{11}$ @ 100 V

Sheet Resistivity, Ω/square

	Typical Resistor Characteristics							
	1	10	100	1K	10K	100K	1M	10M
TCR, (ppm/^{0}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 (W/in^2), untrimmed	325	500	500	500	500	250	100	10

Substrate Properties

	96% Al_2O_3	99.5% Al_2O_3	99.5% BeO	AlN
Dielectric Constant (ε) @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	0.0001
Thermal Conductivity (K), W/M-^{0}C	26	35	280	170
Thermal Coefficient of Expansion, ppm/^{0}C	6.4	7.0	7.0	4.6

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