

RF-10 Low Loss, High DK Material

RF-10 copper clad laminates are composites of ceramic filled PTFE and woven fiberglass. RF-10 has the advantage of high dielectric constant and low dissipation factor. Thin woven fiberglass reinforcement is used to offer both low dielectric loss and improved rigidity for ease of handling and improved dimensional stability for multilayer circuits.

RF-10 laminates are engineered to provide a cost effective substrate with industry acceptable delivery times. RF-10 responds to a need in RF applications for size reduction.

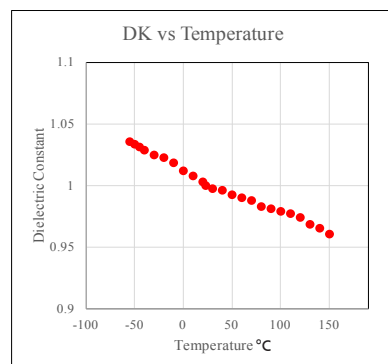
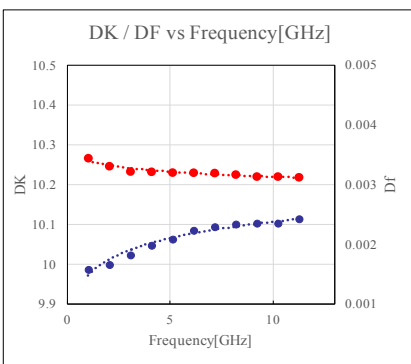
RF-10 bonds well to smooth low profile copper. The low dissipation of RF-10 combined with the use of very smooth copper results in optimal insertion losses at higher frequency where skin effect losses play a substantial role.

RF-10 can be sheared, drilled, milled and plated using standard PTFE circuit board processing techniques.

RF-10 laminates have low X, Y and Z thermal coefficients of expansion for exceptional plated through hole reliability and reduced scaling factors for artwork compensation.

Benefits & Applications:

- High DK for RF circuit size reduction
- Excellent dimensional stability
- Tight DK tolerance (10.2 +/- 0.3)
- Low 0.0025 loss tangent (@ 10 GHz)
- High thermal conductivity for enhanced thermal management
- Excellent adhesion to smooth coppers
- Low X, Y, Z expansion
- Excellent price/performance ratio



- Microstrip Patch Antennas
- GPS Antennas
- Passive Components (filters, couplers, power dividers)
- Aircraft Collision Avoidance Systems
- Satellite components

RF-10 Typical Values					
Property	Test Method	Unit	Value	Unit	Value
Dk @ 10 GHz	IPC-650 2.5.5.5.1 Mod.		10.2 +/- 0.3		10.2 +/- 0.3
Df @ 10 GHz	IPC-650 2.5.5.5.1 Mod.		0.0025		0.0025
TcK [†] (-55 to 150 °C)	IPC-650 2.5.5.6	ppm/°C	-370	ppm/°C	-370
Moisture Absorption	IPC-650 2.6.2.1	%	0.08	%	0.08
Peel Strength (1 oz. RT copper)	IPC-650 2.4.8 (solder)	lbs/in	10	N/mm	1.7
Volume Resistivity	IPC-650 2.5.17.1	Mohm/cm	6.0 x 10 ⁷	Mohm/cm	6.0 x 10 ⁷
Surface Resistivity	IPC-650 2.5.17.1	Mohm	1.0 x 10 ⁸	Mohm	1.0x 10 ⁸
Flexural Strength (MD)	IPC - 650 - 2.4.4	psi	14,000	N/mm ²	96.53
Flexural Strength (CD)	IPC - 650 - 2.4.4	psi	10,000	N/mm ²	68.95
Tensile Strength (MD)	IPC - 650 - 2.4.19	psi	8,900	N/mm ²	62.57
Tensile Strength (CD)	IPC - 650 - 2.4.19	psi	5,300	N/mm ²	37.26
Dimensional Stability	IPC-650 2.4.39 (After Etch)	% (25 mil-MD)	-0.0032	% (25 mil-CD)	-0.0239
Dimensional Stability	IPC-650 2.4.39 (After Bake)	% (25 mil-MD)	-0.0215	% (25 mil-CD)	-0.0529
Dimensional Stability	IPC-650 2.4.39 (After Stress)	% (25 mil-MD)	-0.0301	% (25 mil-CD)	-0.0653
Dimensional Stability	IPC-650 2.4.39 (After Etch)	% (60 mil-MD)	-0.0027	% (60 mil-CD)	-0.0142
Dimensional Stability	IPC-650 2.4.39 (After Bake)	% (60 mil-MD)	-0.1500	% (60 mil-CD)	-0.0326
Dimensional Stability	IPC-650 2.4.39 (After Stress)	% (60 mil-MD)	-0.0167	% (60 mil-CD)	-0.0377
Density (Specific Gravity)	IPC-650-2.3.5	g/cm ³	2.77	g/cm ³	2.77
Specific Heat	IPC-650-2.4.50	J/g°C	0.9	J/g°C	0.9
Thermal Conductivity (Unclad)	IPC-650-2.4.50	W/M*K	0.85	W/M*K	0.85
CTE (X -Y axis) (50 to 150 °C)	IPC-650 2.4.41	ppm/°C	16-20	ppm/°C	16-20
CTE (Z axis) (50 to 150 °C)	IPC-650 2.4.41	ppm/°C	25	ppm/°C	25
Flammability Rating	Internal		V-0		V-0

† TcK = Thermal Coefficient of DK

All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.

Designation	Dk	Typical Thicknesses ¹		Available Sheet Sizes ²	
		Inches	mm	Inches	mm
RF-10	10.2 +/- 0.3	0.010	0.25	12 x 18	305 x 457
		0.020	0.51	16 x 18	406 x 457
		0.025	0.64	18 x 24	457 x 610
		0.060	1.52	36 x 48	914 x 1220
		0.125	3.18		

¹ Standard RF-10 series can be manufactured in increments of 0.005". Please call for availability of additional thicknesses.
² Standard sheet size is 36" x 48" (914 mm x 1220 mm). Please call for availability of other sizes.
³ Heavy metal (copper or aluminium) backed laminates are also available upon request. Please contact AGC for availability.

Please see our Product Selector Guide for information on available copper cladding.

An example of our part number is: **RF-10-0600-C1/C1 - 18" x 24" (457 mm x 610 mm)**

