



High Performance RF Microwave Antenna Materials

RD250 is the PTFE composite reinforced with woven fiberglass cloth with low dielectric constant, very low Loss Tangent, and low cost, etc. The RD250 uses a unique chemical formulation structure and process to improve the dielectric and mechanical properties of the material while reducing costs, and providing microwave RF designers with high frequency microwave materials of superior performance. Compared with existing domestic and foreign similar products and other traditional fluororesin glass cloth materials, RD250 has significant cost performance advantages.

RD250 has low dielectric loss and low PIM and other key features including low water absorption, lowest temperature drift coefficient TCER (-153ppm/°C) and very low x, y, z axis expansion coefficients (14, 21 and 173ppm/°C), high copper foil peel strength and size and thermal stability. Its dielectric constant of 2.50 and smaller dielectric constant tolerance range (± 0.05) can achieve high antenna efficiency and greater bandwidth, also can be used to design miniaturized antennas, and save space for products.

RD250 can follow the standard PTFE circuit board processing process.

Features and Benefits:

- Very Low Loss Tangent (0.0018 10GHZ)
- Low Insertion Loss(S21)
- Excellent PIM Performance
- Excellent Electrical Phase Stability vs. Temperature
- Excellent bond strength of copper to the substrate
- Suitable For Commercial Microwave Radio Frequency Mass Manufacturing Design
- Minimum Dielectric Constant Tolerances For Commercial Substrates, Easy Impedance Control

Typical Applications:

- Base Station Antenna And Distributed Antenna
- Patch Antennas (GNSS, GPS, SDAR etc.)
- Antenna Feed Network
- Digital Audio Broadcasting

Typical Properties:

Property	Units	Value	Test Method
1. Electrical Properties			
PIM(30mil)	dBc	-162	50 ohm microstrip lines
Dielectric Constant			
@ 10 GHz	-	2.50	IPC TM-650 2.5.5.5
Dissipation Factor			
@ 10 GHz	-	0.0018	IPC TM-650 2.5.5.5
Temperature Coefficient of Dielectric			
TC ϵ_r @ 10 GHz (-40-150° C)	ppm/°C	-153	IPC TM-650 2.5.5.5
Volume Resistivity			
C96/35/90	M Ω -cm	2.8×10^9	IPC TM-650 2.5.17.1
E24/125	M Ω -cm	6.2×10^9	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	M Ω	6.8×10^7	IPC TM-650 2.5.17.1
E24/125	M Ω	3.6×10^8	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)		IPC TM-650 2.5.6.2
Dielectric Breakdown	kV	>45	IPC TM-650 2.5.6
Arc Resistance	sec	>180	IPC TM-650 2.5.1
2. Thermal Properties			
Decomposition Temperature (Td)			
Initial	°C	500	IPC TM-650 2.4.24.6
5%	°C	550	IPC TM-650 2.4.24.6
T260	min	>60	IPC TM-650 2.4.24.1
T288	min	>60	IPC TM-650 2.4.24.1
T300	min	>60	IPC TM-650 2.4.24.1
Thermal Expansion, CTE (x,y) 50-150° C	ppm/°C	14, 21	IPC TM-650 2.4.41
Thermal Expansion, CTE (z) 50-150° C	ppm/°C	173	IPC TM-650 2.4.24
% z-axis Expansion (50-260° C)	%		IPC TM-650 2.4.24
3. Physical Properties			
Water Absorption	%	0.03	IPC TM-650 2.6.2.1
Density, ambient 23° C	g/cm ³	2.31	ASTM D792 Method A
Thermal Conductivity	W/mK	0.254	ASTM D5470
Flammability	Class	V0	UL-94
4. Mechanical Properties			
Peel Strength to Copper (1 oz/35			
After Thermal Stress	lb/in (N/mm)	14(2.45)	IPC TM-650 2.4.8
At Elevated Temperatures (150°)	lb/in (N/mm)	14(2.45)	IPC TM-650 2.4.8.2
After Process Solutions	lb/in (N/mm)	14(2.45)	IPC TM-650 2.4.8
Young' s Modulus	kpsi (MPa)	400 (2758)	IPC TM-650 2.4.18.3
Flexural Strength (Machine/Cross)	kpsi (MPa)	10.8/8.9 (74.5/61.4)	IPC TM-650 2.4.4
Tensile Strength (Machine/Cross)	kpsi (MPa)	4.0/3.1 (27.6/21.4)	IPC TM-650 2.4.18.3
Compressive Modulus	kpsi (MPa)	>350 (2413)	ASTM D-3410
Poisson' s Ratio	-	0.26	ASTM D-3039

Results listed above are typical properties, they are not to be used as specification limits. The above information creates no expressed or implied warranties. The properties of Relong laminates may vary depending on the design and application.

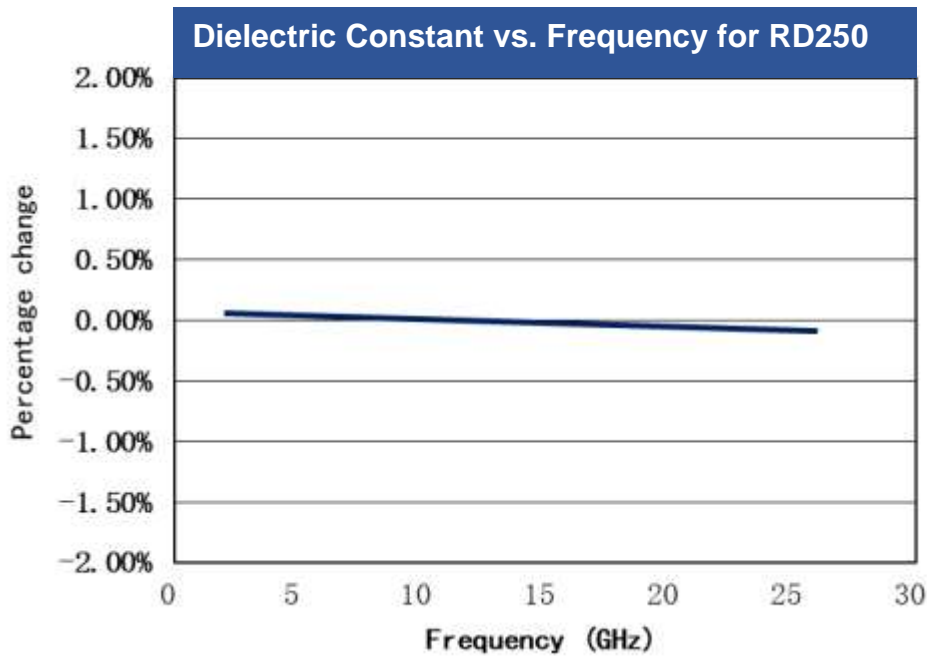


Figure 1
Demonstrates the Stability of Dielectric Constant across Frequency. The stability of the Dielectric Constant of RD250 at different frequencies simplifies design and ensures good transition and scalability of design.

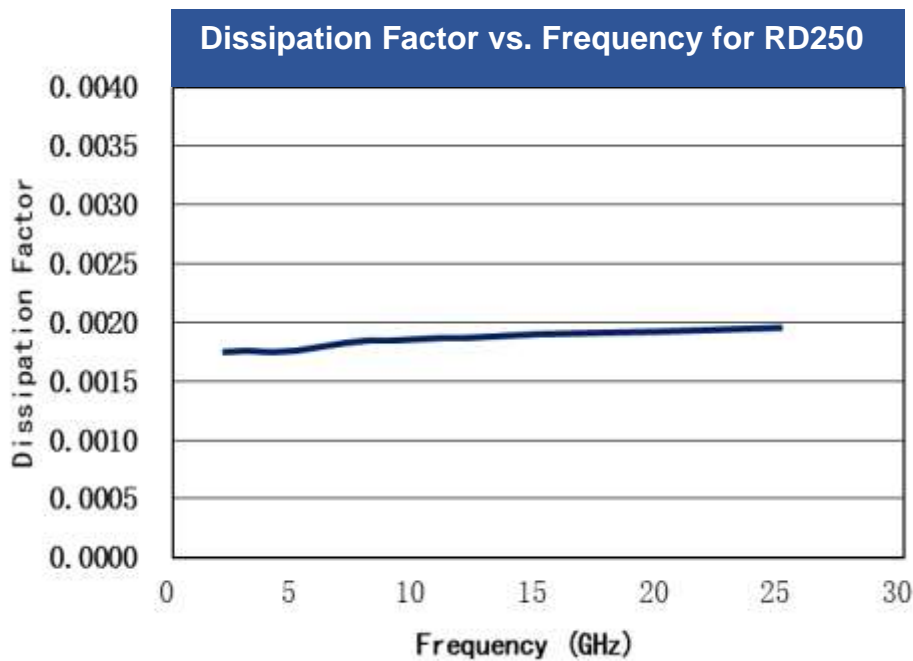


Figure 2
Demonstrates the Stability of Dissipation Factor across Frequency. This characteristic proves the stability of the material across frequency, and provides a stable platform for high frequency applications where signal integrity is critical to the overall performance of the application.

Material Availability:

RD250 laminate is supplied with 0.060", 0.030" thickness now. IF you need the other thickness, please consult the sales or customer service representative. The RD250 laminate offers 1/2oz, 1OZ and 2OZ electrolytic copper on both side. Reverse Treat ED Copper is recommended for Reduced PIM Performance.

RD250 Standard Master Sheets are 54" x 48". Common panel sizes include (not limited) :18"x 12", 18" x 24". when place order, please specify dielectric thickness, cladding type, panel size and any other special considerations.