



High performance RF Antenna material

Relong's RC300E is commercial microwave and RF laminate material designed with low dielectric constant and very low loss characteristics. This ceramic-filled, woven fiberglass reinforced PTFE composite material is use unique chemistry formulation and processing to offer RF and Microwave designers an advantage for improving electrical properties and mechanical performances. RC300E provides a significant improvement in performance stability over the current product line and other traditional fluoropolymer-glass laminates.

RC300E is ideal Base Station Antenna and Base Station Power Amplifiers material for low loss and low PIM (-162 dBc). Other key features include low water absorption, lowest Temperature Coefficient of Dielectric Constant (TCER = -23ppm/°C) and very low CTE_{xyz} (9, 15 and 50ppm/°C), high copper peel strength and good dimensional and thermal stability. It's Dielectric Constant 2.94 and tighter DK tolerance (± 0.05) is desired for achieving high antenna efficiency and large bandwidth, and also provides a small degree of miniaturization that is critical to the size constraints of some antenna designs.

RC300E has very low TCER, which enables the antenna designs to maintain high antenna gain and performance over wider operating temperature ranges by minimizing resonance frequency shift and bandwidth roll off at the temperature swings.

RC300E is compatible with the processing used for standard PTFE based printed circuit board substrates. In addition, the low Z-axis thermal expansion provided by the ceramic loading, will improve plated through-hole (PTH) reliability compared to typical PTFE based laminates.

Features:

- Excellent Thermal Coefficient of Dielectric Constant (TCER = -23ppm/°C)
- Excellent PIM Performance (-162 dBc)
- High Thermal Conductivity ideal for Higher Power Designs.
- Reduced Coefficient of Thermal Expansion in Z-direction (CTE_z)
- Tightest Commercial Laminate DK Tolerance for Impedance Control

Benefits:

- Low Dielectric Loss (Loss Tangent)
- Low Insertion Loss (S₂₁)
- Excellent Electrical Phase Stability vs. Temperature
- Excellent Copper Bond Strength
- Low Water Absorption

Typical Applications:

- Base Station Antennas
- Power Amplifiers (PA), Tower Mounted Amplifiers (TMA) and Tower Mounted Booster Amplifiers (TMB)
- Antenna Feed Networks
- RF Passive Components
- Multimedia Transmission Systems

Typical Properties:

Property	Units	Value	Test Method
1. Electrical Properties			
PIM(30mil)	dBc	-162	50 ohm microstrip lines
Dielectric Constant			
@ 10 GHz	-	2.94	IPC TM-650 2.5.5.5
Dissipation Factor			
@ 10 GHz	-	0.0020	IPC TM-650 2.5.5.5
Temperature Coefficient of Dielectric			
TC ϵ_r @ 10 GHz (-40-150°C)	ppm/°C	-23	IPC TM-650 2.5.5.5
Volume Resistivity			
C96/35/90	M Ω -cm	1.2 x 10 ⁸	IPC TM-650 2.5.17.1
E24/125	M Ω -cm	1.9 x 10 ⁸	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	M Ω	2.5 x 10 ⁸	IPC TM-650 2.5.17.1
E24/125	M Ω	7.7 x 10 ⁸	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)	430 (17)	IPC TM-650 2.5.6.2
Dielectric Breakdown	kV	30	IPC TM-650 2.5.6
Arc Resistance	sec	>180	IPC TM-650 2.5.1
2. Thermal Properties			
Decomposition Temperature (Td)			
初始	°C	500	IPC TM-650 2.4.24.6
5%	°C	555	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	9, 15	IPC TM-650 2.4.41
Thermal Expansion, CTE (z) 50-150°C	ppm/°C	50	IPC TM-650 2.4.24
3. Physical Properties			
Water Absorption	%	0.06	IPC TM-650 2.6.2.1
Density, ambient 23°C	g/cm ³	2.07	ASTM D792 Method A
Thermal Conductivity	W/mK	0.5	ASTM D5470
Flammability	class	V0	UL-94
4. Mechanical Properties			
Peel Strength to Copper (1 oz/35 micron)			
After Thermal Stress	lb/in (N/mm)	>10(1.75)	IPC TM-650 2.4.8
At Elevated Temperatures (150°)	lb/in (N/mm)	>10(1.75)	IPC TM-650 2.4.8.2
After Process Solutions	lb/in (N/mm)	>9(1.58)	IPC TM-650 2.4.8
Young's Modulus	kpsi (MPa)	560 (3861)	IPC TM-650 2.4.18.3
Flexural Strength (Machine/Cross)	kpsi (MPa)	10/13 (69/90)	IPC TM-650 2.4.4
Tensile Strength (Machine/Cross)	kpsi (MPa)	5.9/7.6 (41/52)	IPC TM-650 2.4.18.3
Poisson's Ratio	-	0.25	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.

RC300E

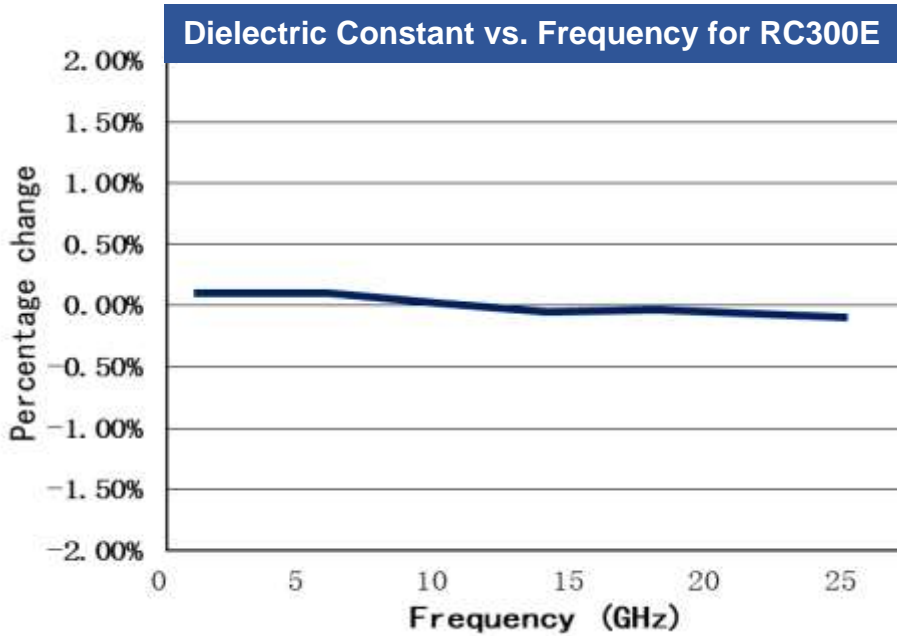


Figure 1

Demonstrates the Stability of Dielectric Constant across Frequency. The stability of the Dielectric Constant of RC300E at different frequencies simplifies design and ensures good transition and scalability of design.

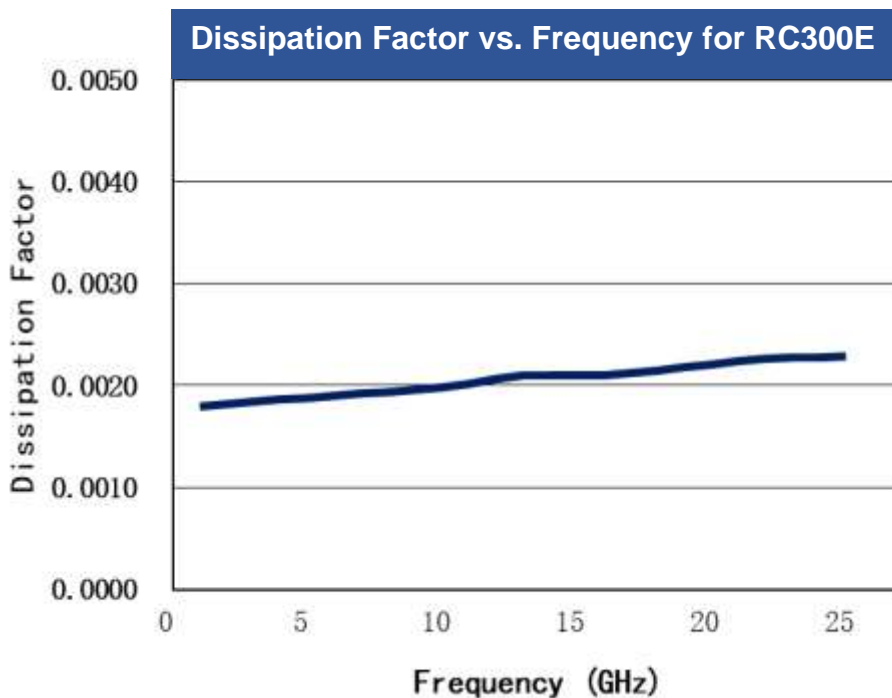


Figure 2

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:

RC300E 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 RC300E laminate offers 1/2OZ, 1OZ and 2OZ electrodeposited copper foil on both sides. Reverse Treat ED Copper is recommended for Reduced PIM Performance.

RC300E Standard Master Sheets are 54" x 48". Common panel sizes include (not limited): 18" x 12" and 18" x 24". When placing an order, please specify dielectric thickness, cladding type, panel size and any other special considerations.