



Commercial Microwave and RF Multilayer Materials

RA300L high frequency circuit materials are ceramic-filled PTFE composites intended for use in commercial microwave and RF applications. This product was designed to offer exceptional electrical and mechanical stability at competitive price.

RA300L materials exhibit a coefficient of thermal expansion (CTE) in the X and Y axis of 8 ppm/°C, The Z-axis CTE is 20 ppm/ °C, which provides exceptional plated through-hole reliability, even in severe thermal environments.

RA300L laminates can be fabricated into printed circuit boards using standard PTFE circuit board processing techniques.

RA300L laminates are frequently used in Automotive Radar , Global Positioning Satellite Antennas, Cellular Telecommunications Systems—Power Amplifiers and Antennas, Patch Antenna for Wireless Communications, Direct Broadcast Satellites and Datalink on Cable Systems.

Features and Benefits:

- Low Dielectric Loss(0.0013 @10GHz)
- Excellent Mechanical Properties vs. Temperature
- Reliable Strip Line and Multi-layer Board Constructions
- Suitable for Use with Epoxy Glass Multilayer Board Hybrid Designs
- Stable Dielectric Constant vs. Temperature and Frequency
- Suitable for Applications Sensitive to Temperature Change
- Excellent Dimensional Stability

Typical Applications:

- Automotive Radar Applications
- Global Positioning Satellite Antennas
- Cellular Telecommunications Systems - Power Amplifiers and Antennas
- Patch Antenna for Wireless Communications
- Direct Broadcast Satellites
- Datalink on Cable Systems

Typical Properties:

Property	Units	Value	Test Method
1. Electrical Properties			
Dielectric Constant			
@ 10 GHz	-	2.95	IPC TM-650 2.5.5.5
Dissipation Factor			
@ 10 GHz	-	0.0013	IPC TM-650 2.5.5.5
Temperature Coefficient of Dielectric			
TC ϵ_r @ 10 GHz (-40-150° C)	ppm/° C	-10	IPC TM-650 2.5.5.5
Volume Resistivity			
C96/35/90	M Ω -cm	1.34 x 10 ⁹	IPC TM-650 2.5.17.1
E24/125	M Ω -cm	3.69 x 10 ⁹	IPC TM-650 2.5.17.1
Surface Resistivity			
C96/35/90	M Ω	4.75x10 ⁷	IPC TM-650 2.5.17.1
E24/125	M Ω	3.08x10 ⁸	IPC TM-650 2.5.17.1
Electrical Strength	Volts/mil (kV/mm)		IPC TM-650 2.5.6.2
Dielectric Breakdown	kV	>50	IPC TM-650 2.5.6
Arc Resistance	sec	>180	IPC TM-650 2.5.1
2. Thermal Properties			
Decomposition Temperature (Td)			
Initial	° C	492	IPC TM-650 2.4.24.6
5%	° C	535	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	8, 8	IPC TM-650 2.4.41
Thermal Expansion, CTE (z) 50-150° C	ppm/° C	20	IPC TM-650 2.4.24
% z-axis Expansion (50-260° C)	%	1.5	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	2.03	ASTM D792 Method A
Thermal Conductivity	W/mK	0.62	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)	8(1.4)	IPC TM-650 2.4.8
At Elevated Temperatures (150°)	lb/in (N/mm)	10.0(1.75)	IPC TM-650 2.4.8.2
After Process Solutions	lb/in (N/mm)	8(1.4)	IPC TM-650 2.4.8
Young' s Modulus	kpsi (MPa)	260 (1790)	IPC TM-650 2.4.18.3
Flexural Strength (Machine/Cross)	kpsi (MPa)	14.6/7.8 (101/54)	IPC TM-650 2.4.4
Tensile Strength (Machine/Cross)	kpsi (MPa)	7.0/4.4 (48/30)	IPC TM-650 2.4.18.3
Compressive Modulus	kpsi (MPa)	>244 (1682)	ASTM D-3410
Poisson' s Ratio	-	0.18	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.

RA300L

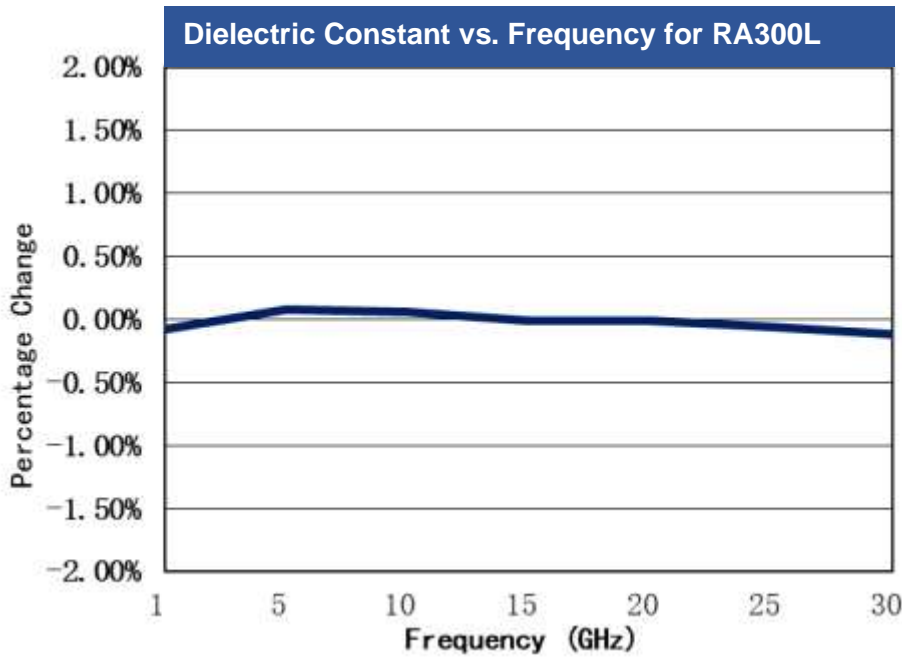


Figure 1

Demonstrates the Stability of Dielectric Constant across Frequency. The stability of the Dielectric Constant of RA300L at different frequencies simplifies design and ensures good transition and scalability of design.

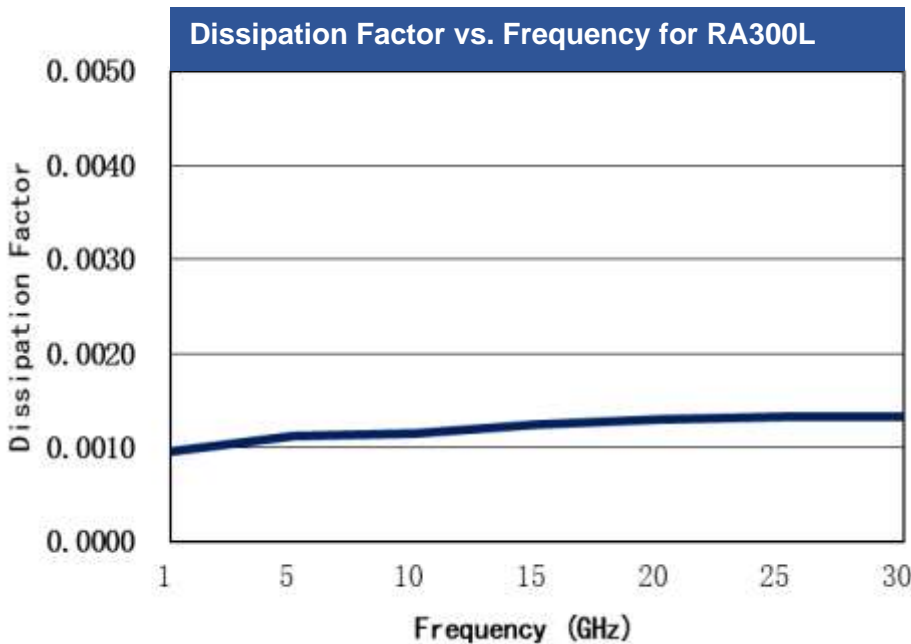


Figure 2

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:

RA300L laminate is supplied with 0.060", 0.040", 0.030", 0.020", 0.015", 0.010", 0.005" thickness now. If you need the other thickness, please consult the sales or customer service representative. The RA300L laminate offers 1/2oz, 1OZ and 2OZ electrolytic copper or reverse treat copper on both side.

RA300L Standard Master Sheets are 54" x 48". Common panel sizes include (not limited) : 18" x 12" and 18" x 24". when place order, please specify dielectric thickness, cladding type.