NF-30

Ceramic Filled PTFE Composite

AGC
Your Dreams, Our Challenge

Benefits

- Non-reinforced laminate
- Exceptional low electrical loss for microwave applications
- Excellent adhesion to Very Low Profile Copper Foils
- Stable dielectric properties vs. temperature & frequency
- Dimensionally stable for multilayer applications
- Isotropic Benefits
- Well suited for laser based Microvia formation

Applications

- Automotive Radar Sensors
- Aerospace Components
- Global Positioning System Antennas
- Passive Components (Dividers, Filters & Couplers)

NF-30 copper clad, non-reinforced laminates are- ceramic-filled PTFE composites. The ceramic-filled PTFE composite technology offers low dielectric loss and minimal signal distortion in microwave applications.
NF-30 offers very stable performance over a wide frequency range, especially at 77-79 GHz range.

Excellent Electrical Properties

- Low Df electrical performance at higher frequency where skin effect losses play a substantial role

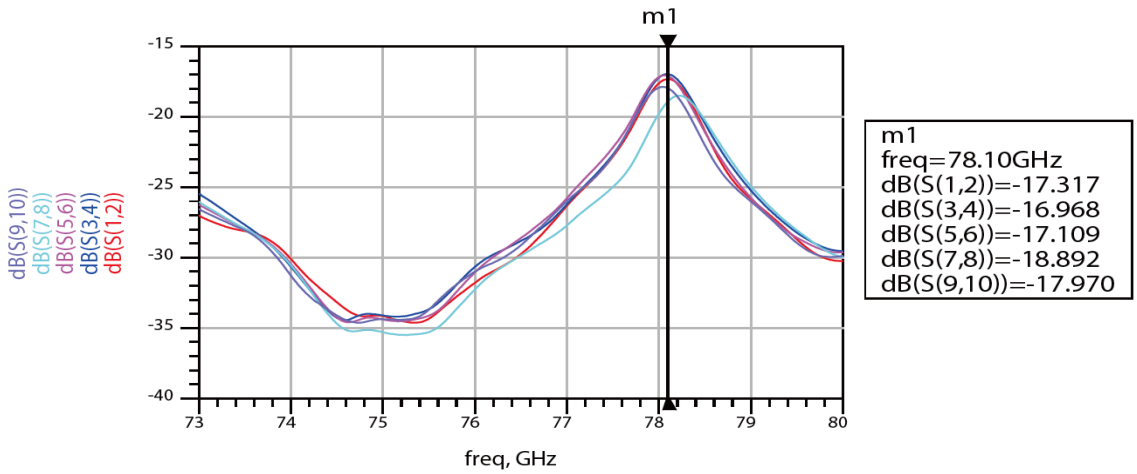
Thermal and Mechanical Properties

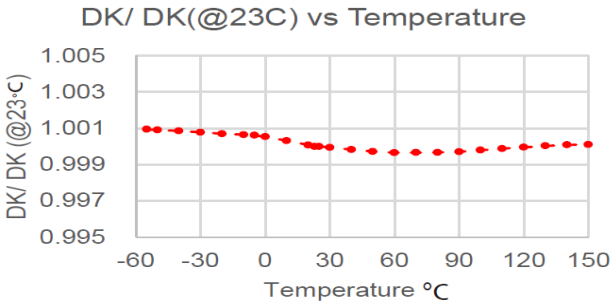
- Excellent dimensional stability from etching or baking
- Low Z-axis expansion in extreme thermal environments or multilayer applications

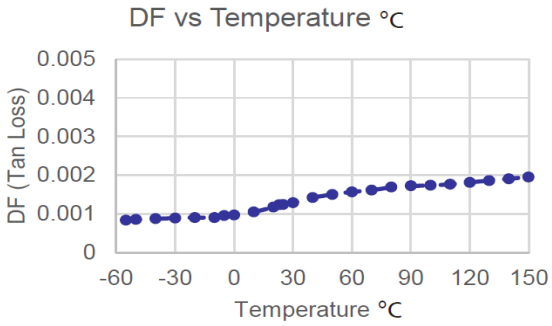
Processing Properties

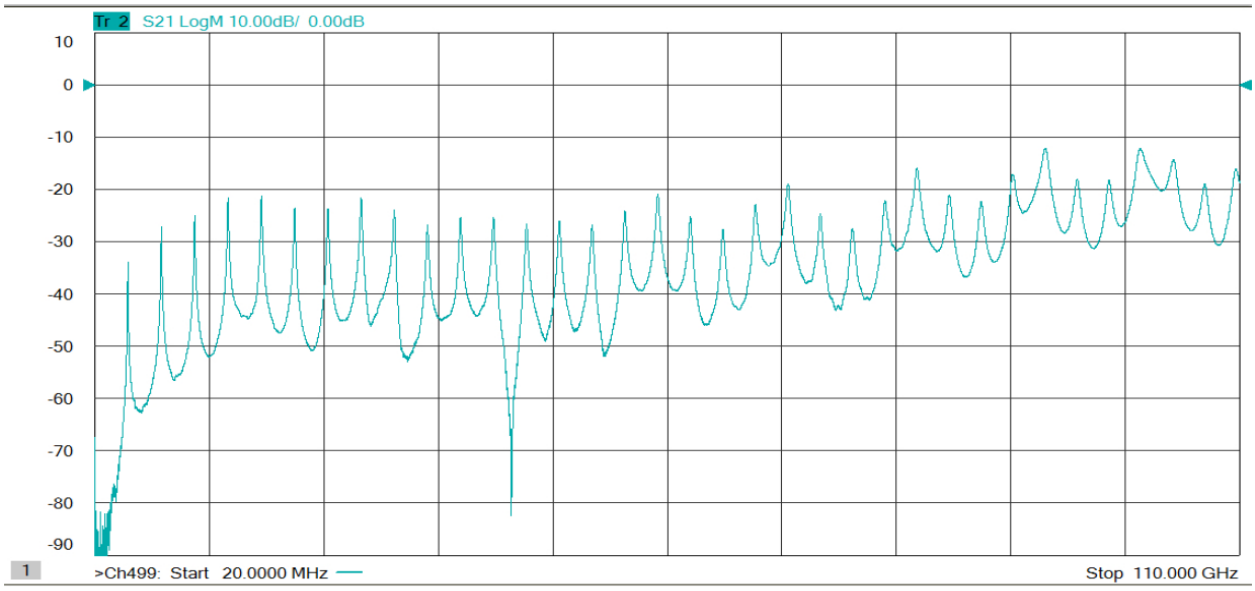
- Can be sheared, drilled, milled and plated
- CO2 laser ablation of NF-30 can make it possible to be used in precise microwave designs with dense PTH connection.

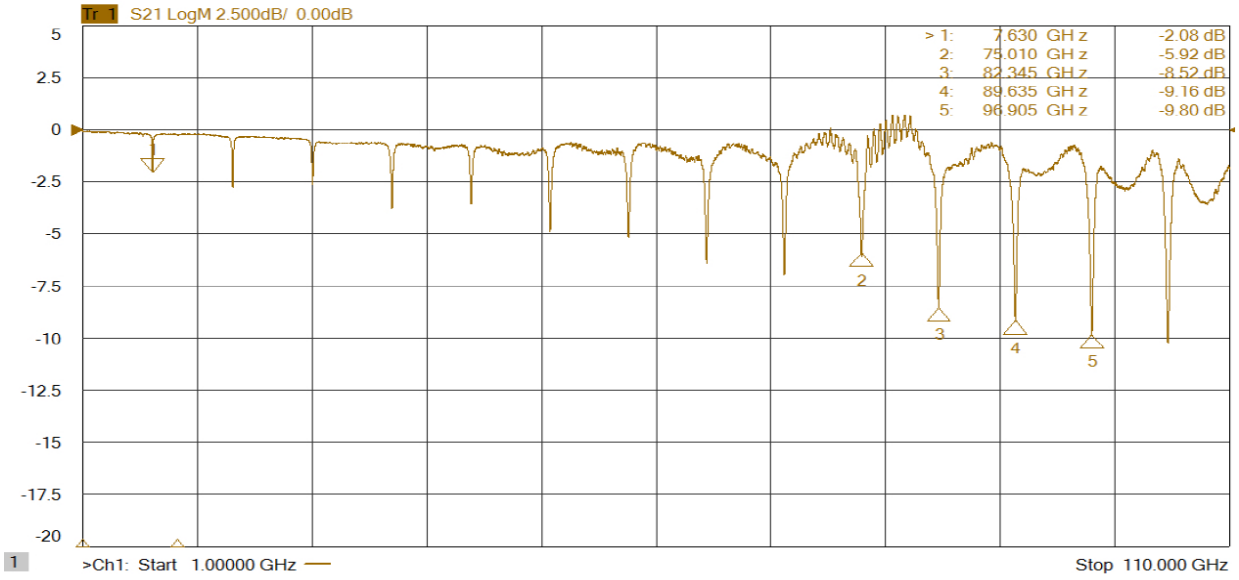
Measured DK 3.0 @78.1 GHz by microstrip ring resonator



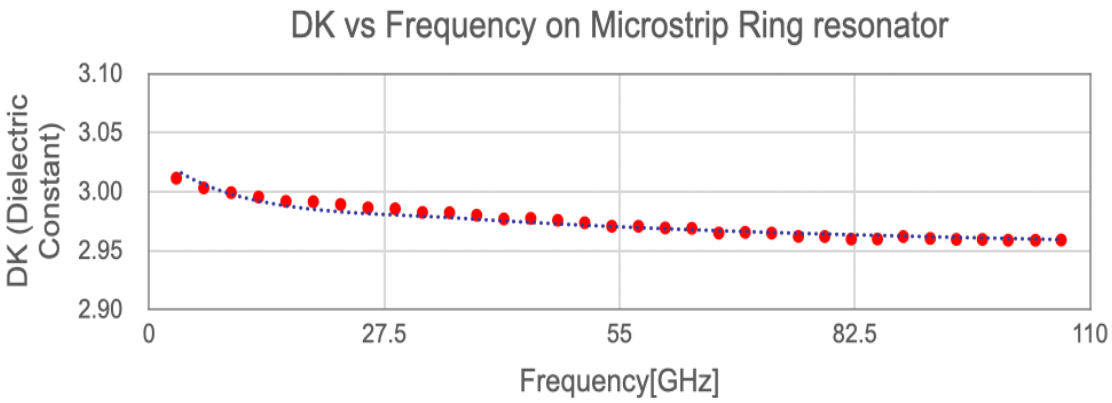




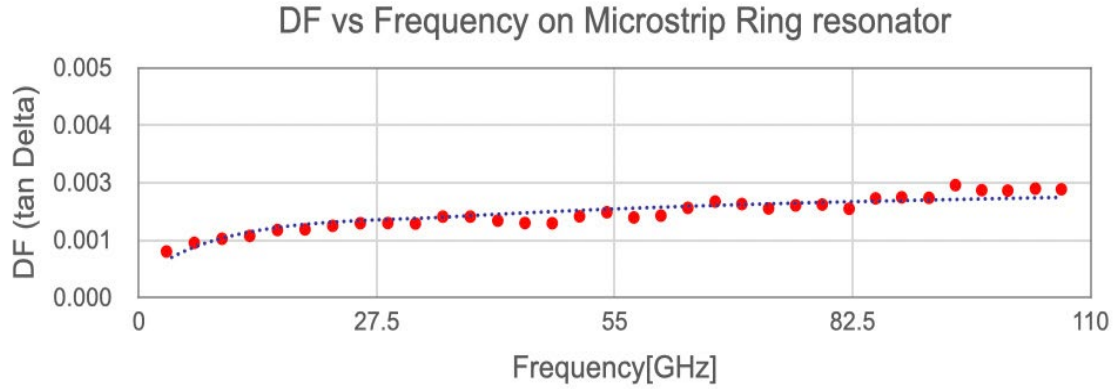




Microstrip Reverse Ring Resonator using NF-30-0050-ULPH/ULPH response to 110GHz.

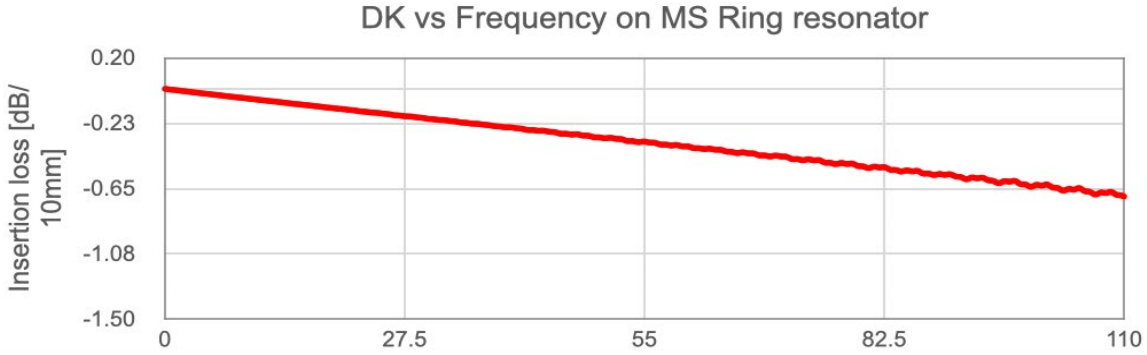


DK vs Frequency on Microstrip forward Ring resonator using NF-30-0050-ULPH/ULPH



DF vs Frequency on Microstrip forward Ring resonator using NF-30-0050-ULPH/ULPH

Insertion Loss vs Frequency on Microstrip-line using NF-30-0050-ULPH/ULPH



Properties	Conditions	Typical Value	Unit	Test Method
Electrical Properties				
Dielectric Constant	@ 10 GHz	3.00±0.04		IPC-650 2.5.5.5.1(Mod.)
	@ 77 GHz	2.98		Microstrip Resonator
Dissipation Factor	@ 10 GHz	0.0013		IPC-650 2.5.5.5.1(Mod.)
Thermal Coefficient of Dk	-55 -150 °C	-4.07	ppm/ °C	IPC-650 2.5.5.5
Volume Resistivity		107	Mohms/cm	IPC-650 2.5.17.1
Surface Resistivity		107	Mohm	IPC-650 2.5.17.1
Thermal Properties				
Td	2% wt. loss	959 (515)	°F / °C	IPC-650 2.4.24.6/TGA
	5% wt. loss	986 (530)	°F / °C	
Thermal Conductivity(Unclad)		0.5	W/M*K	IPC-650 2.4.50
CTE (50-150°C)	X	11~15	ppm/°C	IPC-650 2.4.4
	Y	11~15		
	Z	30		
Mechanical Properties				
Peel Strength	½ oz. ULPH Cu	0.7 (4)	N/mm (lbs/in)	IPC-650 2.4.8
	½ oz. RTF Cu	1.4 (8)	N/mm (lbs/in)	
Flexural Strength	MD	19 (2756)	N/mm^2 (psi)	IPC-650 2.4.8
	CD	18 (2611)	N/mm^2 (psi)	
Flexural Modulus	MD	1010 (146,488)	N/mm^2 (psi)	IPC-650 2.4.39
	CD	960 (139,236)	N/mm^2 (psi)	
Tensile Strength	MD	6.5 (943)	N/mm^2 (psi)	IPC-650 2.4.4
	CD	6.2 (900)	N/mm^2 (psi)	
Young's Modulus	MD	720 (104,427)	N/mm^2 (psi)	IPC-650 2.4.19
	CD	700 (101,527)	N/mm^2 (psi)	
Time to Delamination	T288	>120		
	T300	40		
Chemical / Physical Properties				
Moisture Absorption		0.05	wt. %	IPC-TM-650.2.6.2.1
Methylene Chloride Resistance		0.21	% wt. chg.	IPC-TM-650.2.3.4.3
Lead Free Process Compatible		Yes		Internal
Flammability		V-0		UL-94

* All test data provided are typical values and not intended to be specification values. For review of critical specification tolerances, please contact a company representative directly.
* NF-30 series can be manufactured in increments of 0.005"(0.125mm).
* Standard panel size is 18" x 24" (457 mm x 610 mm).
* Please contact AGC for availability of additional thicknesses, other sizes & any other type of cladding.

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