

# HF-300F

## Flame Retardant High Performance Thermoset

### Benefits

- Stable frequency response over 77GHz application
- Excellent PIMD performance\* (measured at -165 dBc)
- Low DF / Insertion loss
- 25% lower weight than comparable materials
- Well Suited for Hybrid Multilayers
- Stable Dielectric Properties over Temperature and Frequency
- Low CTE for Multilayer Applications
- Dimensionally Stable
- High Performance / Price Ratio

### Applications

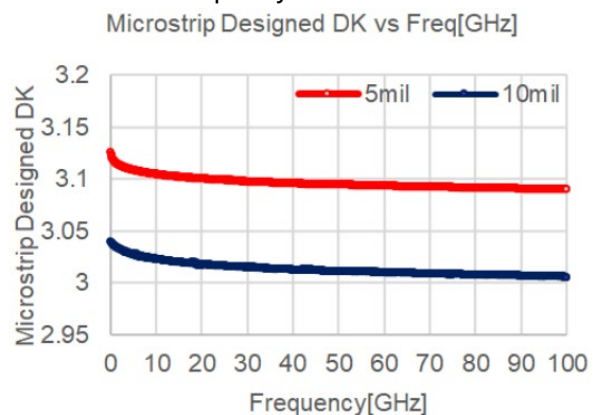
- Automotive Radar sensor
- Base Station Antenna
- Passive Components - Filters, Combiners, Dividers
- Aerospace



HF-300F is a flame retardant, ceramic-filled hydrocarbon-based copper clad laminate reinforced with woven fiberglass. The special ceramic-filled hydrocarbon composite offers low signal loss and superior, stable PIMD performance of -165 dBc in microwave antenna applications.

HF-300F is well suited for hybrid multilayer applications. Emerging multilayer telecom applications put new demands on RF materials. HF-300F is dimensionally stable, has a low CTE, and is lightweight. HF300F is based on a rigid thermoset resin system and offers advantages in PCB fabrication for large format, multilayer applications. HF-300F has all of the characteristics of materials normally used for high speed digital with the added features that thicker dielectrics can be manufactured with tightly controlled RF properties. Traditional thermoset laminates can degrade by oxidation with time and elevated temperatures. Oxidation is permanent and leads to a shift toward a higher dielectric constant, elevated loss values, and changing color. The impact of shifting dielectric properties depends on circuit design, operating power, and use temperature. HF-300F has been developed with much better resistance to oxidation. HF300F also has low moisture absorption. The combination of low moisture absorption and stable dielectric properties over time, temperature, and frequency, make HF-300F very attractive for RF antenna applications in demanding environments. HF-300F can be fabricated using standard FR-4 PCB fabrication without special hole wall preparation. The low CTE values enable reliable hybrid multilayer constructions. HF-300F is a highly engineered composite designed to meet the demands of high volume RF / microwave applications.

HF-300F Offers Superior RF Performance Over Frequency

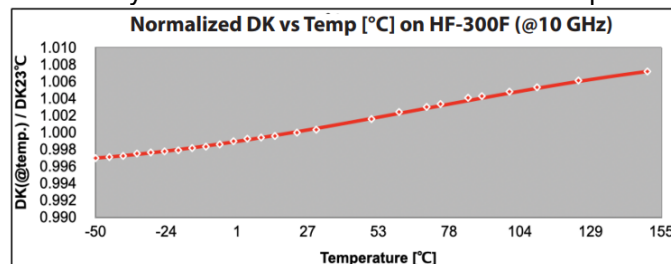


½ oz. RTF copper has been used for insertion loss measurement.  
Designed DK measured by Micro-strip Differential Phase Length.

\*Measurement using manufactured PCB coupon with 20 watts per channel @ 800 and 1800MHz.

Properties	Conditions	Typical Value	Unit	Test Method
<b>Electrical Properties</b>				
Dielectric Constant	@ 10 GHz	3.00 ± 0.05		IPC-650 2.5.5.5.1 Mod.
Designed DK(30 mil)	@ 10 GHz	2.98		MS Differential Phase Length
Dissipation Factor	@ 10 GHz	0.0029		IPC-650 2.5.5.5.1 Mod.
<b>Thermal Properties</b>				
Thermal Conductivity	Unclad	0.45	W/M*K	IPC-650 2.4.50
CTE (50 to 150 °C)	X	12	ppm/°C	IPC-650 2.4.41
	Y	18		
	Z	65		
TcK (-50 to 150 °C)		+51	ppm/°C	IPC-650 2.5.5.5
<b>Mechanical Properties</b>				
Flexural Strength	MD	23,000	psi	IPC-650 2.4.4
	CD	25,000	psi	
Tensile Strength	MD	22,000	psi	IPC-650 2.4.18.3
	CD	18,000	psi	
Peel Strength	1 oz. RTF copper	0.08	N/mm (lbs/in)	IPC-650 2.4.8(Solder)
	1 oz. RCC	0.6	N/mm (lbs/in)	
Dimensional Stability	MD	-0.015	%	IPC-650 2.4.39(After Etch)
	CD	-0.011	%	
	MD	-0.047	%	IPC-650 2.4.39(After Bake)
	CD	-0.047	%	
	MD	-0.054	%	IPC-650 2.4.39(After Stress)
	CD	-0.051	%	
<b>Chemical / Physical Properties</b>				
Moisture Absorption		0.08	%	IPC-650 2.6.2.1
Density	Specific Gravity	1.50	g/cm <sup>3</sup>	IPC-650 2.3.5
Specific Heat		0.95	J/g°C	IPC-650 2.4.50
Flammability Rating		V-0		UL 94

HF-300F Offers Very Stable Performance Over a Wide Temperature Range.



**Typical Thicknesses**

Standard Dielectric Thickness (mil)	Standard Panel Size	Standard Copper
5, 10, 20, 30, 60 (available in 5 mil increments)	12" x 18", 18" x 24" 12" x 48", 36" x 48"	½ oz. Reverse Treated ED Foil 1 oz. Reverse Treated ED Foil

- \* 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.
- \* HF-300F 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.

