

HF-350FTC Thermally Enhanced Thermoset Composite

HF-350FTC is a flame retardant copper clad dielectric substrate based on ceramic filled hydrocarbon and reinforced woven fiberglass. The ceramic based composite has been optimized for low signal loss at high frequency and high thermal conductivity.

The higher thermal conductivity of HF-350FTC can help both efficiently radiate the heat and carry thermal energy away from localized hot spots. The lower dielectric dissipation factor helps reduce heat generated along the transmission line from the dielectric material. These factors provide a higher power handling capability resulting in lower operating temperatures and possibly lower warranty costs. The additional design margin in thermal management might also lead to improved reliability at soldered connections.

Traditional thermosetting substrates can be prone to oxidation with time and temperature. Oxidation of the dielectric material can result in changes in color, increased dissipation factor and a shift higher in dielectric constant. HF-350FTC has been designed and optimized for resistance to oxidation.

HF-350FTC can be fabricated using standard FR-4 processes without special via hole preparation. The thermal and mechanical properties of HF-350FTC yield robust and reliable hybrid multilayer constructions in increasingly higher frequency, higher density emerging RF/digital applications.

Benefits & Applications:

- Enhanced Power Handling Capability with Good Thermal Conductivity (0.8 W/M*K)
 - Low Electrical/Insertion Loss for Microwave Applications
 - Better Oxidation Resistance
 - Stable Dielectric Properties vs. Temperature & Frequency
 - Controllable DK and Impedance
 - Dimensionally Stable
 - Thermoset Resin
 - Flame Retardant
 - Excellent Reliability
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- Power Amplifier
 - Power Divider/Filter/Coupler
 - Broadcast/Satellite
 - Aerospace Components

Standard Dielectric Thickness (mil)	Standard Copper
10, 20, 30, 60 (available in 5 mil increments)	1 oz. Standard ED Copper Foil

An example of 20 mil material with 1 oz. RCC Cu on both sides is part# :
HF-350FTC-0200-R-C1/C1 - 18" x 24" (HF-350FTC-0200-R-C1/C1 - 457mm x 610mm)

HF-350FTC Typical Values					
Property	Test Method	Unit	Value	Unit	Value
Dk @ 10 GHz	IPC-650 2.5.5.5.1 Mod.		3.55		3.55
Designed DK (20 mil)	MS Differential Phase Length		3.64		3.64
Df @ 10 GHz	IPC-650 2.5.5.5.1 Mod.		0.0029		0.0029
TcK (-50 to 150 °C)	IPC-650 2.5.5.5	ppm/°C	55	ppm/°C	55
Moisture Absorption	IPC-650 2.6.2.1	%	0.08	%	0.08
Peel Strength (1 oz. RCC Copper)	IPC-650 2.4.8 (Solder)	lbs/in	7	N/mm	1.2
Volume Resistivity	IPC-650 2.5.17.1	Mohm/cm	2.2 x 10 ¹⁰	Mohm/cm	2.2 x 10 ¹⁰
Surface Resistivity	IPC-650 2.5.17.1	Mohm	1.7 x 10 ¹⁰	Mohm	1.7 x 10 ¹⁰
Dimensional Stability	IPC-650 2.4.39 (After Etch)	% (MD)	-0.010	% (CD)	-0.009
Dimensional Stability	IPC-650 2.4.39 (After Bake)	% (MD)	-0.057	% (CD)	-0.055
Dimensional Stability	IPC-650 2.4.39 (After Stress)	% (MD)	-0.062	% (CD)	-0.063
Flexural Strength	IPC-650 2.4.4	psi (MD)	20,000	psi (CD)	16,000
Tensile Strength	IPC-650 2.4.18.3	psi (MD)	16,000	psi (CD)	13,000
Density (Specific Gravity)	IPC-650 2.3.5	g/cm ³	1.91	g/cm ³	1.91
Specific Heat	IPC-650 2.4.50	J/g°C	0.84	J/g°C	0.84
Thermal Conductivity (Unclad)	IPC-650 2.4.50	W/M*K	0.80	W/M*K	0.80
T _d (2% wt. loss)	IPC-650 2.4.24.6/TGA	°F	702	°C	372
T _d (5% wt. loss)	IPC-650 2.4.24.6/TGA	°F	727	°C	386
CTE (X -Y axis) (50 to 150 °C)	IPC-650 2.4.41	ppm/°C	14-16	ppm/°C	14-16
CTE (Z axis) (50 to 150 °C)	IPC-650 2.4.41	ppm/°C	70	ppm/°C	70
T _g	IPC-650 2.4.24	°F	>536	°C	>280
Flammability	Internal		V-0		V-0

All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.

