METEORWAVE® 4000

Ultra Low Loss Materials
Laminate & Prepreg

AGC
Your Dreams, Our Challenge

Benefits

- Excellent Electrical Properties
- Stable dielectric performance over a wide frequency range
- High Conductive Anodic Filament (CAF) resistance
- Available in a variety of constructions

Applications

- 25 GHz and above, Infrastructure
- Automotive Radar
- High Speed Switches

Meteorwave® 4000 high speed / ultra low loss materials offer advanced electric performance and high reliability for use in next generation core routers, high speed switches, supercomputers and applications where low signal attenuation, high reliability and high data transfer rates are critical. Meteorwave products are designed to facilitate high temperature lead-free assemblies and high layer count printed circuit board designs that require high reliability, CAF resistance and low Z-axis expansion..

Excellent Electrical Properties

- Ultra low loss
- Stable Dk/Df versus frequency when tested over various environmental conditions
- Low DK

Thermal and Mechanical Properties

- Very low Z-axis expansion for high reliability
- Lead-free assembly compatibility
- Good Peel Strength
- Excellent IST performance

Excellent CAF Performance

- CAF resistant materials after high temperature reflow

High-Tg FR-4 Processing

- Processes similar to other high-Tg materials
- 90 minutes cure at 216°C and 400-500 psi

Meets UL 94V-0 and IPC4101 /102 specifications
UL file number: E36295

Properties	Conditions	Typical Value	Unit	Test Method
Electrical Properties				
Dielectric Constant	@ 2 GHz	3.4		IPC-TM-650.2.5.5.5
	@ 10 GHz	3.3		
Dissipation Factor	@ 2 GHz	0.0019		
	@ 10 GHz	0.0024		
Volume Resistivity	C - 96 / 35 / 90	4.70×10^6	MΩ - cm	IPC-TM-650.2.5.17.1
	E – 24 / 125	5.20×10^8		
Surface Resistivity	C - 96 / 35 / 90	1.30×10^6	MΩ	IPC-TM-650.2.5.17.1
	E - 24 / 125	7.40×10^7		
Electric Strength		4.6×10^4 (1800)	V/mm (V/mil)	IPC-TM-650.2.5.6.2
Thermal Properties				
*Glass Transition Temperature (Tg)	DMA(°C) (Tan d Peak)	200	°C	IPC-TM-650.2.4.24.3
Degradation Temperature (TGA)	Degradation Temp (TGA) (5% wt. loss)	390	°C	IPC-TM-650.2.3.40
T-300	Time to delamination @ 300°C	>120	minutes	IPC-TM-650.2.4.24.1
Thermal Conductivity		0.45	W/mK	ASTM E1461
Mechanical Properties				
Peel Strength	1 oz (35µ) Cu	1.02 (5.8)	N/mm (lbf/inch)	IPC-TM-650.2.4.8
	After Solder Float	1.00 (5.5)	N/mm (lbf/inch)	IPC-TM-650.2.4.8
X / Y CTE	-40°C to + 125°C	10 /14	ppm/°C	IPC-TM-650.2.4.41
Z Axis CTE Alpha 1 / Alpha 2 (55% RC)	50°C to Tg / Tg to 260°C	55 / 260	ppm/°C	IPC-TM-650.2.4.24
Z Axis Expansion (43% RC)	50°C to 260°C	2.1	%	IPC-TM-650.2.4.24
Young's Modulus (X / Y)		18.6 / 17.9 (2.7 / 2.6)	GN/m^2 ($psi \times 10^6$)	ASTM D3039
Poisson's Ratios (X / Y)		0.170 / 0.163		
Flexural Strength (W / F)	@ 125°C	356 / 328 (51.7 / 47.6)	GN/m^2 ($psi \times 10^6$)	
	@ 150°C	346 / 305 (50.2 / 44.3)	GN/m^2 ($psi \times 10^6$)	
Chemical / Physical Properties				
Moisture Absorption		0.08	wt. %	IPC-TM-650.2.6.2.1

* DMA is the preferred method for measuring Tg - other methods may be less accurate.

- 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
- Meteorwave® 4000 series can be manufactured in laminate thickness from 2 mil (0.050 mm) and up.
- Meteorwave® 4000 series is available in most common panel sizes.
- Please contact AGC for availability of any other constructions, copper weights and glass styles including ultra-low profile copper and RTFOIL®

agc-ml.multimaterial@agc.com