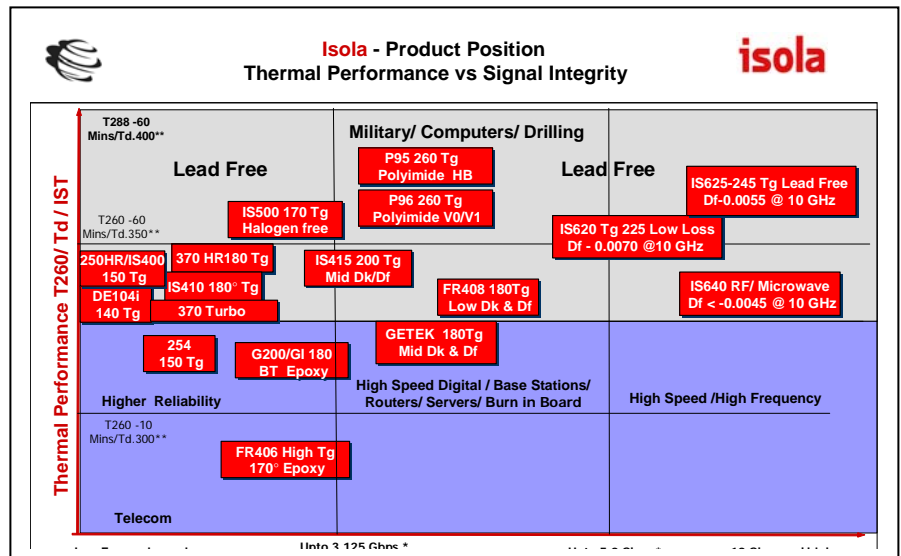


GETEK® Materials

Low Dk/Df Laminate and Prepreg

GETEK® materials provide the low dielectric constant (Dk) and low dissipation factor (Df) performance demanded by high speed, low loss printed wiring board (PWB) designs and applications while providing superior thermal performance and high reliability based on the systems 180°C glass transition temperature (Tg). GETEK® laminate and prepreg products are manufactured using a functionalized, Polyphenylene Oxide/Epoxy resin, reinforced with electrical grade (E-glass) glass fabric. In addition to this superior electrical and thermal performance the mechanical, chemical and low moisture absorption properties all equal or exceed the performance of traditional FR-4 materials. The GETEK® system is also UV blocking and fluorescing.



Performance and Processing Advantages

- **High Thermal Performance**
Tg of 180C (DMA)
Low CTE for reliability
- **Improved Dielectric Properties**
DK <3.8 (50MHz – 1GHz) - Supports increased signal speeds
DF <0.010 (50MHz – 1GHz) – Provides better signal integrity
- **UV Blocking and AOI Fluorescence**
High throughput and accuracy during PCB fabrication and assembly
- **Superior Processing**
Closest to conventional FR-4 processing of all high speed materials

Purchasing Information

- **Industry Approvals**
IPC-4101B /25
UL Recognized – FR-4, File Number E41625 (ML200+ and RG200+ listing)
Qualified to UL's MCIL Program
- **Standard Availability**
Thickness: 0.002 [0.05 mm] to 0.093" [2.4 mm]
Available in sheet or panel form
- **Copper Foil Cladding:** Grade 3 (HTE), ½, 1 and 2 oz.
Foil Options: Reverse treat
- **Prepregs:** Available in roll or panel form
- **Glass Styles:** Standard fabrics

GETEK® Typical Laminate Properties

	English			Metric			Test Method		
	Value	Specification	Units	Value	Specification	Units	IPC-TM-650 (or as noted)		
Glass Transition Temperature (Tg) by DMA, spec minimum	180	150 - 200	°C	175	150 - 200	°C	2.4.25		
Decomposition Temperature (Td) by TGA	@ 5% weight loss	345	—	°C	345	—	°C	ASTM D3850	
T260	Minutes	60		min	10		min	2.4.25	
T288		>20		min	>5		min		
CTE, Z-axis	Pre-Tg	55	AABUS	ppm/°C	55	AABUS	ppm/°C	2.4.24	
	Post-Tg	275	—		275	—			
CTE, X-, Y-axes	Pre-Tg	13	AABUS	ppm/°C	13	AABUS	ppm/°C	2.4.24	
	Post-Tg	14	—		14	—			
Z-Axis Expansion (50 – 260C) %		3.8	AABUS	%	3.8	AABUS	%	2.4.24	
Thermal Stress 10 Sec	Unetched	Pass	Pass Visual	Rating	Pass	Pass Visual	Rating	2.4.13.1	
@ 288°C (550.4°F), spec minimum	Etched	Pass	Pass Visual		Pass	Pass Visual			
Dk (Permittivity, Laminate & prepreg as laminated) Split Post Method	2 Ghz	3.5	5.4	—	3.5	3.4	—	2.5.5.3	
	5 Ghz	3.5	—		3.5	—		2.5.5.9	
	10 Ghz	3.5	—		3.5	—		2.5.5.5	
Df, Loss Tangent, spec maximum (Laminate & prepreg as laminated) Split Post Method	2 Ghz	0.009	0.035	—	0.009	0.035	—	2.5.5.3	
	5 Ghz	0.009	—		0.009	—		2.5.5.9	
	10 Ghz	0.01	—		0.01	—		2.5.5.5	
Volume Resistivity, spec minimum	96/35/90		—			—		2.5.17.1	
	After moisture resistance	5x10 ⁷	1 x 10 ⁴	MΩ -cm	5x10 ⁷	1 x 10 ⁴	MΩ -cm		
	At elevated temperature	1x10 ⁸	1 x 10 ⁴		1x10 ⁸	1 x 10 ⁴			
Surface Resistivity, spec minimum	96/35/90		—			—		2.5.17.1	
	After moisture resistance	5x10 ⁷	104	MΩ	5x10 ⁷	104	MΩ		
	At elevated temperature	3x10 ⁸	103		3x10 ⁸	103			
Thermal Conductivity		.3-.4	—	W/mK	.3-.4	—	W/mK	ASTM D5930	
Dielectric Breakdown, spec minimum		>50	40	kV	>50	40	kV	2.5.6	
Arc Resistance, spec minimum		120	60	Seconds	120	60	Seconds	2.5.1	
Electric Strength, spec minimum (Laminate & prepreg as laminated)		1200	736	V/mil	48000	29000	V/mm	2.5.6.2	
Peel Strength, spec minimum	profile – all copper weights >17 microns Standard profile copper -----1. After thermal stress 2. At 125°C (257°F) 3. After process solutions	>5.5	4	(lb/inch)	>110	70	N/mm	2.4.8	
									2.4.8.2
									2.4.8.3
		7	6		140	105			
		6	4		130	70			
		7	4.5		140	80			
Moisture Absorption, spec maximum		0.15	0.8	%	0.15	0.8	%	2.6.2.1	
CTI		3	175 - 249	volts					
HWI		0							
HAI		2							
Max Operating Temp		130							
DSR		YES							
	Grain		Fill						
Flexural Strength (ksi)		111		78					
Tensile Strength (Ksi)		NA		NA					
Poisson's Ratio		NA		NA					
Youngs Modulus (million psi)		NA		NA					
Taylors Modulus (million psi)		NA		NA					

The data contained in this document, while believed to be accurate and based on analytical methods considered to be reliable, is for information purposes only. Any sales of these products will be governed by the terms and conditions of the agreement under which they are sold.

ORDERING INFORMATION:

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 Isola Group 3100 W Ray Road, Chandler, AZ 85226
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