



**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.

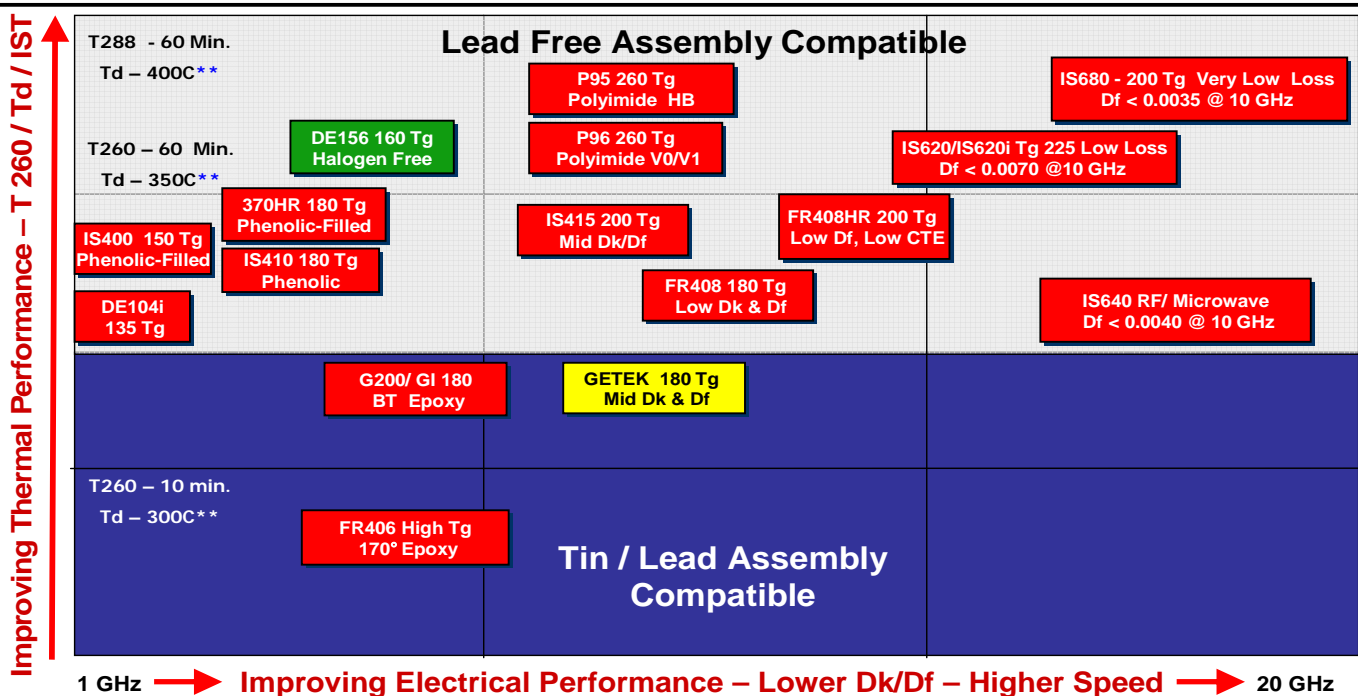
**Industry Approvals**

- IPC-4101C /25
- UL Recognized – FR-4, File Number E41625 (ML200+ and RG200+ listing)
- Qualified to UL's MCIL Program

- 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
- 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



**Isola - Product Position**  
**Thermal Performance vs Signal Integrity**



Speed is a function of design such as line length etc.

\*\* Laminate Data - IST performance is a function of Hole diameter, board thickness, plating parameters and laminate attributes.

# GETEK Typical Laminate Properties

GETEK					
Property	Typical Values				
	Typical Value	Specification	Units	Test Method	
			Metric (English)	IPC-TM-650 (or as noted)	
Glass Transition Temperature (Tg) by DSC, spec minimum	180	170-200	°C	2.4.25	
Decomposition Temperature (Td) @ 5% wt loss	345	—	°C	ASTM D3850	
CTE, Z-axis	A. Pre-Tg	AABUS	ppm/°C	2.4.24	
	B. Post-Tg	—			
CTE, X-, Y-axes	A. Pre-Tg	AABUS	ppm/°C	2.4.24	
	B. Post-Tg	—			
% Z-Axis Expansion (50-260C)	3.01	—	%	2.4.24	
Thermal Conductivity	0.4	—	W/mK	ASTM D5930	
Thermal Stress 10 Sec @ 288°C (550.4°F), spec min	A. Unetched	pass	Rating	2.4.13.1	
	B. Etched	pass			
Permittivity, spec maximum (Laminate & prepreg as laminated)	A. @ 100 MHz HP4285A	3.81	—	2.5.5.3	
	B. @ 1 GHz HP4291A	3.78		2.5.5.9	
	C. @ 2 GHz Bereskin Stripline	3.60		2.5.5.5	
	D. @ 5 GHz Bereskin Stripline	3.50		2.5.5.5	
	E. @ 10 GHz Bereskin Stripline	3.50		2.5.5.5	
Loss Tangent, spec maximum (Laminate & prepreg as laminated)	A. @ 100 MHz HP4285A	0.0110	—	2.5.5.3	
	B. @ 1 GHz HP4291A	0.0100		2.5.5.9	
	C. @ 2 GHz Bereskin Stripline	0.0090		2.5.5.5	
	D. @ 5 GHz Bereskin Stripline	0.0090		2.5.5.5	
	E. @ 10 GHz Bereskin Stripline	0.0100		2.5.5.5	
Volume Resistivity, spec minimum	A. 96/35/90	—	MΩ -cm	2.5.17.1	
	B. After moisture resistance	3.81x10 <sup>8</sup>			
	C. At elevated temperature	3.9x10 <sup>8</sup>			
Surface Resistivity, spec minimum	A. 96/35/90	—	MΩ	2.5.17.1	
	B. After moisture resistance	2.81x10 <sup>6</sup>			
	C. At elevated temperature	2.64x10 <sup>8</sup>			
Dielectric Breakdown, spec minimum	>50	—	kV	2.5.6	
Arc Resistance, spec minimum	120	60	Seconds	2.5.1	
Electric Strength, spec minimum (Laminate & prepreg as laminated)	48	30	kV/mm	2.5.6.2	
	1200	750	(V/mil)		
Comparative Tracking Index (CTI)	3 (175 - 249)	-	Class (volts)	UL-746A ASTM D3638	
Peel Strength, Spec Minimum	A. Low profile copper foil and very low profile – all copper weights >17 microns	6.5(1.14)	4.0(0.70)	lb/inch(N/mm)	2.4.8
	B. Standard profile copper	—	—	lb/inch(N/mm)	2.4.8.2
	1. After thermal stress	7(1.225)	4.5(0.8)		2.4.8.3
	2. At 125°C (257°F)	6.5(1.14)	4.0(0.70)		
	3. After process solutions	5.1(0.9)	3.0(0.55)		
Flexular Strength, minimum	A. Lengthwise direction	58,000	—	lb/inch <sup>2</sup>	
	B. Crosswise direction	79,000			
Moisture Absorption, spec maximum	0.15	—	%	2.6.2.1	
Flammability (Laminate & prepreg as laminated), spec min	V0	—	Rating	UL-94	
HWI	2	—			
Max Operating Temperature	130 (150)	UL Cert (tested)	Deg C		
DSR	yes	—			
Tensile Strength, minimum	A. Lengthwise direction	50,000	—	lb/inch <sup>2</sup>	
	B. Crosswise direction	37,000			
Poisson's Ratio	A. Lengthwise direction	0.16	—		
	B. Crosswise direction	0.13			
Youngs Modulus	A. Lengthwise direction	3.4	—		
	B. Crosswise direction	3.0			
Taylors Modulus	A. Lengthwise direction	3.7	—		
	B. Crosswise direction	3.0			

The data, 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:

Contact your local sales representative or the Customer Service Department in Chandler, AZ  
 Isola Group 3100 W Ray Road, Chandler, AZ 85226  
 Phone: 480-893-6527  
 For further information visit [www.isola-group.com](http://www.isola-group.com)



Data Sheet IGETEK  
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