



## Tachyon™ Very Low-loss Laminate Material

**Tachyon™** laminate materials are designed for very high-speed digital applications up to and beyond speeds of 100 Gb/s. Tachyon materials exhibit exceptional electrical properties that are very stable over a broad frequency and temperature range. Tachyon is suitable for scaling current products to their next generation through design of new backplanes and daughter cards, enabling almost 10x improvements from 10 Gb/s data rates.

Tachyon products use spread glass and reduced profile copper to mitigate skew and improve rise times, reduce jitter, increase eye width and height. Use of ultra smooth copper is enabled by very high adhesive bond between the resin and the metal. Tachyon has a nominal dielectric constant (Dk) of 3.02 that is stable between -55°C and +125°C up to 40 GHz. In addition, Tachyon offers a very low nominal dissipation factor (Df) of 0.0021.

Tachyon laminate materials are available in optimized laminate and prepreg forms in typical thicknesses and standard panel sizes to provide a complete material solution for high-speed digital multilayer backplanes and daughter cards.

[www.isola-group.com/products/Tachyon](http://www.isola-group.com/products/Tachyon)

### ORDERING INFORMATION:

Contact your local sales representative or visit [www.isola-group.com](http://www.isola-group.com) for further information.

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## High Performance

# Tachyon™ Data Sheet

Tg 200, Td 380  
Dk 3.02, Df 0.0021  
/17

## Features

- High Thermal Performance
  - ▶ Tg: 200°C (DSC)
  - ▶ Td: 380°C (TGA @ 5% wt loss)
  - ▶ Low CTE in the Z-axis – 2.8% (50-260°C)
- T260: >60 minutes
- T288: >60 minutes
- T300: >20 minutes
- RoHS Compliant
- Electrical Properties
  - ▶ Dk: 3.02
  - ▶ Df: 0.0021
  - ▶ Typical electrical properties over a broad frequency and temperature range per IPC-TM-650-2.5.5.5
- Core Material Standard Availability
  - ▶ Thickness: 0.002" to 0.018" (0.6 mm to 0.05 mm)
  - ▶ Available in full size sheet or panel form
- Prepreg Standard Availability
  - ▶ Roll or panel form
  - ▶ Tooling of prepreg panels available
- Copper Foil Type Standard Availability
  - ▶ VLP-2 (2 micron)
  - ▶ Standard HTE Grade 3 available upon request
  - ▶ RTF (Reverse Treat Foil) available upon request
- Copper Weights
  - ▶ ½, 1 and 2 oz (18, 38 and 70 µm) available
  - ▶ Heavier copper available upon request
  - ▶ Thinner copper foil available upon request
- Glass Fabric Standard Availability
  - ▶ Square weave glass fabric
  - ▶ Spread glass fabric
- Industry Approvals
  - ▶ UL 94 V-0
  - ▶ UL Qualified - 130 MOT mechanical, electrical 0.8 mm -120
  - ▶ Non-ANSI
  - ▶ IPC-4103 /17

Property		Typical Values			
		Typical Value	Specification	Units	Test Method
				Metric (English)	IPC-TM-650 (or as noted)
<b>Glass Transition Temperature (Tg) by DMA</b>		220	>195	°C	2.4.25
<b>Glass Transition Temperature (Tg) by DSC</b>		200	>185	°C	–
<b>Glass Transition Temperature (Tg) by TMA</b>		192	>175	°C	–
<b>T260</b>		>60	–	Minutes	2.4.25
<b>T288</b>		>60	–	Minutes	2.4.25
<b>T300</b>		>20	–	Minutes	2.4.25
<b>CTE, Z-axis</b>	A. Pre-Tg	55	AABUS	ppm/°C	2.4.24
	B. Post-Tg	250	–		
<b>CTE, X-, Y-axes</b>	A. Pre-Tg	15	AABUS	ppm/°C	2.4.24
	B. Post-Tg	16	–		
<b>Z-axis Expansion (50-260°C)</b>		2.8	–	%	2.4.41
<b>Thermal Conductivity (-100-250°C)</b>		0.42	–	W/mK	ASTM D5930
<b>Thermal Stress 10 sec @ 288°C (550.4°F)</b>	A. Unetched	Pass	Pass Visual	Rating	2.4.13.1
	B. Etched				
<b>Dk, Permittivity (Laminate &amp; prepreg as laminated) Tested at 56% resin</b>	A. @ 2 GHz	3.04	±0.05	–	2.5.5.5
	B. @ 5 GHz	3.02			2.5.5.5
	C. @ 10 GHz	3.02			2.5.5.5
<b>Df, Loss Tangent (Laminate &amp; prepreg as laminated) Tested at 56% resin</b>	A. @ 2 GHz (Bereskin Stripline)	0.0021	Nominal ±0.0005	–	2.5.5.5
	B. @ 5 GHz (Bereskin Stripline)	0.0021			2.5.5.5
	C. @ 10 GHz (Bereskin Stripline)	0.0021			2.5.5.5
<b>Volume Resistivity</b>	96/35/90	TBD	1.0x10 <sup>6</sup>	MΩ-cm	2.5.17.1
<b>Surface Resistivity</b>	96/35/90	TBD	1.0x10 <sup>4</sup>	MΩ	2.5.17.1
<b>Dielectric Breakdown</b>		60	–	kV	2.5.6
<b>Arc Resistance</b>		125	60	Seconds	2.5.1
<b>Electric Strength (Laminate &amp; prepreg as laminated)</b>		(1500)	30 (750)	kV/mm (V/mil)	2.5.6.2
<b>Comparative Tracking Index (CTI)</b>		2	–	Class (Volts)	UL-746A ASTM D3638
<b>Peel Strength</b>	A. Low-profile copper foil & very low profile - all copper	4.5	0.53 (3.0)	N/mm (lb/inch)	2.4.8.3
	B. Standard-profile copper 1. After thermal stress 2. At 125°C (257°F) 3. After process solutions	5.5			
<b>Flexural Strength</b>	A. Lengthwise direction	53,100	–	lb/inch <sup>2</sup>	2.4.4
	B. Crosswise direction	41,600			
<b>Tensile Strength</b>	A. Lengthwise direction	TBD	–	lb/inch <sup>2</sup>	–
	B. Crosswise direction	TBD			
<b>Young's Modulus</b>	A. Grain direction	TBD	–	ksi	–
	B. Fill direction				
<b>Poisson's Ratio</b>	A. Grain direction	TBD	–	–	–
	B. Fill direction				
<b>Moisture Absorption</b>		0.05	–	%	2.6.2.1
<b>Flammability (Laminate &amp; prepreg as laminated)</b>		V-0	–	Rating	UL 94
<b>Max Operating Temperature</b>		130	UL Cert	°C	–

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.