

VT-5A2

Laminate/Prepreg

UL Approval: E214381 Version: A1

General Information

Ventec offers a series of Ceramic Filled thermally conductive Laminates and Prepregs for multilayer PCB applications requiring thermal dissipation. Laminates and prepregs provide ease of manufacture during ply-up. The prepreg provides higher thermal conductivity and flowability, which suits high power and heavy copper designs.

- > Thermal conductivity - 2.2W/mK, 8 times that of FR4
- > High Tg & High Td
- > Excellent thermal and insulation performance
- > Best-in-class Thermal Performance with T260 > 60 Minutes, T288 > 30 Minutes and T300 > 15 Minutes
- > MOT up to 150°C for 0.63mm and above
- > Lead-free assembly compatible
- > ROHS & WEEE compliant

Application

- > Power Conversion
- > PDP, LED, Regulator for TV, Monitor Drives
- > Rectifier, Power supply
- > Automotive Electronics
- > Hybrid Multilayer Constructions
- > Other designs with thermal management requirements

Storage Condition

		Prepreg		Laminate
Storage Condition	Temperature	< 23°C [73°F]	< 5°C [41°F]	Room
	Relative humidity	< 55%	/	/

The Prepreg exceeding shelf life should be retested.

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Laminate Properties

Properties	Test Method	Units	Specification	Typical Value
Thermal Properties				
Tg	IPC-TM-650 2.4.25	°C	170 minimum	190
Td	ASTM D3850	°C	340 minimum	375
T260	IPC-TM-650 2.4.24.1	Minute	30 minimum	>60
T288	IPC-TM-650 2.4.24.1	Minute	15 minimum	>30
T300	IPC-TM-650 2.4.24.1	Minute	5 minimum	>15
Thermal Stress @ 288°C	IPC-TM-650 2.4.13.1	Second	10 minimum	>600
Z-axis CTE	Before Tg	IPC-TM-650 2.4.24	ppm/°C	60 maximum
	After Tg	IPC-TM-650 2.4.24	ppm/°C	300 maximum
	Total Expansion (50~260°C)	IPC-TM-650 2.4.24	%	3.0 maximum
X-Y CTE	IPC-TM-650 2.4.24	ppm/°C	–	11~13
MOT	UL 746B	°C	–	130 (Internal test 150)
Electrical Properties				
Dk (RC 90%)	@ 1GHz	IPC-TM-650 2.5.5.9	–	5.2 maximum
Df (RC 90%)	@ 1GHz	IPC-TM-650 2.5.5.9	–	0.035 maximum
Volume Resistivity	After Moisture Resistance	IPC-TM-650 2.5.17.1	MΩ-cm	1.0E+4 minimum
	E-24/125	IPC-TM-650 2.5.17.1	MΩ-cm	1.0E+3 minimum
Surface Resistivity	After Moisture Resistance	IPC-TM-650 2.5.17.1	MΩ	1.0E+4 minimum
	E-24/125	IPC-TM-650 2.5.17.1	MΩ	1.0E+3 minimum
Electrical Strength	IPC-TM-650 2.5.6.2	Volt/mil (KV/mm)	762 (30) minimum	>1000 (40)
Dielectric Breakdown	IPC-TM-650 2.5.6	KV	40 minimum	60
Comparative Tracking Index (CTI)	ASTM D3638	Rating (Volt)	–	Grade 0 (600)
Arc Resistance	ASTM D495	Second	60 minimum	>150
Mechanical Properties				
Peel Strength (1oz)	As received	IPC-TM-650 2.4.8	lb/in (N/mm)	–
	After thermal stress	IPC-TM-650 2.4.8	lb/in (N/mm)	6 (1.05) minimum
Youngs Modulus	IPC-TM-650 2.4.18.3	GPa	–	20
Poisson Ratio	ASTM D638	–	–	0.17
Physical Properties				
Moisture Absorption	IPC-TM-650 2.6.2.1	%	0.5 maximum	0.12
Flammability	UL-94	Rating	–	V-0
Thermal Conductivity	Z-axis	ISO22007-2	W/mK	–
	X-Y axis			–
Specific Heat	ASTM E1269	J/gK	–	0.895
Specific Gravity	ASTM D792 Method A	g/cm3	–	2.2

Note: All test data provided are typical values and not intended to be specification values.

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Availability

Laminate

Item	Availability
Copper Foil	Hoz, 1oz, 2oz, 3oz
Dielectric	.003" (80µm), .004" (100µm), .006" (150µm), .008" (200µm), .012" (300µm)
Standard Size	37"*49", 41"*49", 43"*49", and panels could be cut from above sizes.

Prepreg

Glass Fabric	Press Thickness (µm)
1037	80
106	110
106	130

Inner Layer

Item	Recommendation
Surface Preparation	Chemical treatment preferred
D.E.S.	Standard process
Oxide	Compatible with most oxide chemicals

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Press Condition

Item	Recommendation
1. Heating rate (Rise of Rate) on Product	3-6°C min (5~10°F/min)
2. Full Pressure on Product	≥400psi in 5~10 minutes after pressing starts
3. Curing Temperature & Time	>60min at more than 180°C (356°F) on Product
4. Vacuuming should be continued until over 140°C (284°F) [Material Temperature]	
5. Cold Press condition: Keep Plate cooled by water; Pressure: 100psi; Dwell: 60 minutes	

Machining & Wet Processes

Item	Recommendation
Drilling	Excessive wear of carbide drill bits. Diamond coated drill
Desmearing	Alkaline permanganate or plasma
Metallization	Compatible with direct deposit or electroless copper processes
Surface Finish	Compatible with OSP, HASL, ENIG, etc. Bake prior to HASL.
Punching & Routing	Aggressive wear of machining tools