VT-47

UL Approval: E214381

Version : Rev. A2

Datasheets

High Tg Material

VT-47 CCL/Laminate ***VT-47 PP/Prepreg*** *(UL family with VT-481)*

General Information

- ***High Tg FR-4 (Tg 180℃)***
- Phenolic Cured System
- Excellent Thermal Reliability
- CAF Resistance
- UV Blocking
- Laser Fluorescing
- Low CTE

Application

For Single Side\Double Side\ Multilayer PWB & *Lead Free Assembly Applications*;

Availability

VT-47 Laminates are available in thickness from .002"to .200" and with the copper foil from 1/4oz to 12oz; Ventec can supply either reverse treated (RT) or double side treated copper foil. For cores ≤ .005", it is recommended to use the reverse treated copper due to the low profile. The peel strength for RT foil is ≈1-2lbs/in (0.35Kg/m) less than Standard foil.

VT-47PP pre-pregs are available in many E-Glass styles, such as 7628, 7629, 1506, 1500, 2113, 2313, 3313, 2116, 1080, 1086, 1078, 106 & 1067.

Storage Condition & Retest Time

		Prepreg		Laminate
Storage Condition	Temperature	Below 23℃(73℉)	Below 5℃(41℉)	Room
	Relative Humidity	Below 55%RH	/	/
Shelf Time*		3 Months	6 Months	12 Months(airproof)

** The pre-preg exceeding shelf time should be retested.*

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Properties Sheet: IPC-4101C Slash Sheet(s)/126(most compliant), /97, /98, /99, /101

Properties	Test Method	Units	Specification	Typical Value
Thermal Properties				
Glass Transition Temp. (Tg)				
DSC	IPC-TM-650 2.4.25	℃	-	-
TMA	IPC-TM-650 2.4.24	℃	170 minimum	180
Decomposition Temp. (Td) By TGA (@5% weight loss)	ASTM D3850	℃	340 minimum	345
Time to Delamination---T260	IPC-TM-650 2.4.24.1	Minute	30 minimum	>60
Time to Delamination---T288	IPC-TM-650 2.4.24.1	Minute	15 minimum	>30
Z-axis CTE				
Before Tg	IPC-TM-650 2.4.24	ppm/℃	60 maximum	45
After Tg	IPC-TM-650 2.4.24	ppm/℃	300 maximum	200
Total Expansion (50~260℃)	IPC-TM-650 2.4.24	%	3.0 maximum	2.6
Thermal Stress @ 288℃	IPC-TM-650 2.4.13.1	Second	Pass 10s	>600
Electrical Properties				
Dielectric Constant @ 1GHz	IPC-TM-650 5.5.5.9	-	5.2 maximum	4.3
Dissipation Factor @ 1GHz	IPC-TM-650 5.5.5.9	-	0.035 maximum	0.015
Volume Resistivity				
After Moisture Resistance	IPC-TM-650 2.5.17.1	MΩ-cm	10^4 minimum	$5*10^8$
E-24/125	IPC-TM-650 2.5.17.1	MΩ-cm	10^3 minimum	$5*10^6$
Surface Resistivity				
After Moisture Resistance	IPC-TM-650 2.5.17.1	MΩ	10^4 minimum	$5*10^7$
E24/125	IPC-TM-650 2.5.17.1	MΩ	10^3 minimum	$5*10^6$
Electrical Strength	IPC-TM-650 2.5.6.2	Volt/mil (KV/mm)	762 (30) minimum	1200~1400 (54)
Dielectric Breakdown	IPC-TM-650 2.5.6	KV	40 minimum	60
Comparative Tracking Index (CTI)	ASTM D3638	Rating (Volt)	-	Grade 3 (175~250)
Arc Resistance	IPC-TM-650 2.5.1	Second	60 minimum	124
Mechanical Properties				
Peel Strength (1oz)				
As received	IPC-TM-650 2.4.8	lb/in (N/mm)	-	7.5~10 (1.3~1.75)
After thermal stress	IPC-TM-650 2.4.8	lb/in (N/mm)	6 (1.05) minimum	7.5~10 (1.3~1.75)
Flexuraul Strength				
Warp	IPC-TM-650 2.4.4	Kpsi (MPa)	60 (415) minimum	72 (500)
Fill	IPC-TM-650 2.4.4	Kpsi (MPa)	50 (345) minimum	61 (420)
Physical Properties				
Moisture Absorption	IPC-TM-650 2.6.2.1	%	0.80 maximum	0.12
Flammability	UL-94	Rating	V0 minimum	V0

※ *All test data provided are typical values and are not intended to be specification values.*

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Process Guideline

Press Condition
1. Heating rate(Rate of Rise) of material: Programmable Press: 1.5-3.0℃/min (3~5℉/min) Manual Press:3~6℃/min (5~10℉/min)
2. Curing Temperature & Time: >60min at more than 185℃(365℉) [Material Temperature]
3. Full Pressure: ≥300psi
4. Vacuuming should be continued until over 140℃ (284℉) [Material Temperature]

Typical Drilling Parameters (φ0.3-1.0 mm)		
1. Spindle Speed:	120-180	KRPM
2. Feed Rate:	120-220	Inch / min
3. Retract Rate:	596-1000	Inch / min
4. Chip Load:	0.6~2.0	mil / Rev.

The use of undercut drill bits has yielded better quality on smaller holes. Check with your drill supplier for more information.

Desmearing Process
Desmear rate of VT-47 is less than that of the conventional FR-4; Minor adjustments to the desmear process may be necessary for the higher Tg materials; Check with your chemical supplier for recommendations.

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