VT-47

UL Approval: E214381

Version : Rev. A1

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

(Test Sample: .036"1/1)

Test Item		Test Condition (IPC-TM-650 or As Noted)	Unit	Specification (IPC-4101C)	Typical Value	
					VT-47	Normal FR-4
Flexural Strength	Warp	2.4.4	MPa	>415	500	600
	Fill			>345	420	500
Peel Strength (1 oz)	As received	2.4.8	Lb/in	6.0 min	7.5~10	10~12
	After thermal stress				7.5~10	9~12
Glass Transition Temp. (Tg)	DSC	2.4.25	℃	–	170~185	136~140
	DMA	2.4.24.4	℃	–	185~195	145~155
Decomposition Temp. (Td) By TGA (@5% weight loss)		ASTM D3850	℃	–	345	290~310
X/Y -axis C.T.E.		TMA	PPM/℃	–	11~13	12~15
Z-axis C.T.E.	Before Tg	TMA	PPM/℃	≤60	35	50
	After Tg			≤300	190	250
Z-axis	50→260℃	TMA	%	≤3.5	3.0	3.5~4.0
Total Expansion	50→288℃	TMA	%	–	3.0~3.5	4.0~5.0
Moisture	D-24/23	2.6.21	%	0.35 max	0.12	0.25
Absorption	After PCT	1atm.,121℃,1hour	%	–	0.20	0.28
Volume Resistivity	After Moisture	2.5.17.1	MΩ-cm	$\geq 10^6$	5×10^8	5×10^8
	E-24/125			$\geq 10^3$	5×10^6	5×10^6
Surface Resistivity	After Moisture	2.5.17.1	MΩ	$\geq 10^4$	5×10^7	5×10^7
	E-24/125			$\geq 10^3$	5×10^6	5×10^6
Electric Strength		2.5.6.2	KV/mm	≥30	54	54
Dielectric Breakdown		2.5.6	KV	≥40	>50	>50
Arc Resistance		2.5.1	Second	≥60	124	65
Dielectric Constant (Dk)	1.0 MHz	2.5.5.3, 2.5.5.9, 2.5.5.5	–	5.4 max.	4.35	4.30
	1.0 GHz				4.30	4.26
	2.0 GHz				4.30	4.22
Dispassion Factor (Df)	1.0 MHz	2.5.5.3, 2.5.5.9, 2.5.5.5	–	0.035 max.	0.014	0.015
	1.0 GHz				0.015	0.015
	2.0 GHz				0.015	0.016
Thermal Stress	288℃ Solder Dip	2.4.13.1	Second	60	>300	90~120
Pressure Cook Test		Pre-treat15psi/30min; 288℃,10Sec/cycle	Cycle	2 Cycles Min.	10~12	6~8
Time to Delamination---T260		2.4.24.1	Minute	≥30	>60	20
Time to Delamination---T288		2.4.24.1	Minute	≥5	>20	3
Flammability		UL94	–	V0	V0	V0
Comparative Tracking Index(CTI)		UL-746A/E ASTM D3638	Volt	–	175~250 (Grade 3)	175~250 (Grade 3)
Anti-CAF		85℃, RH85%; Bias Voltage: 100 V; [IPC-TM-650 2.6.25]	Hour	Insulation Resistance over 100MΩ; Pass 1000Hrs	Pass 1000	–

※ *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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