VT-47

UL Approval:E214381

Datasheets

High Tg Material

VT-47TC/Laminate VT-47PP/Prepreg

General Information

- ***High Tg FR-4(>170℃)***
- Phenolic Cured System
- Excellent Thermal Reliability
- UV Blocking;
- Laser Fluorescing;
- Low CTE

Application

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

Availability

VT-47TC 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. On 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 & Shelf Life

		Prepreg		Laminate
Storage Condition	Temperature	Below 22℃(73℉)	Below 5℃(41℉)	Below 22℃(73℉)
	Relative Humidity	Below 55%RH	/	Below 55%RH
Shelf Life		3 Month	6 Month	12Month(airproof)

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Properties Sheet: *IPC-4101B Specification Sheet(s)/21,24,26, 97, 98, 99, 101, 121,124,126,129*

(Test Sample: .036"1/1)

TEST ITEM		Test Condition (IPC-TM-650 or As Noted)	UNIT	Specification (IPC-4101 B)	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 Receive	2.4.8	1b/in	6.0 min	7~10	8.59
	After Thermal				7~10	8.03
Glass Transition Temp.(Tg),DSC		2.4.25	℃	-	170~185	136~140
Decomposition Temp. (Td) TGA		ASTM D3850	℃	-	345	290~310
X-axis C.T.E.		TMA	in/in/ ℃	-	$11x10^{-6}$	$12\sim15\ x10^{-6}$
Y-axis C.T.E.		TMA	in/in/ ℃	-	$13x10^{-6}$	$12\sim15\ x10^{-6}$
Z-axis C.T.E.	Before Tg	TMA	in/in/ ℃	$\leqslant 60x10^{-6}$	$35x10^{-6}$	$50x10^{-6}$
	After Tg			$\leqslant 300x10^{-6}$	$190x10^{-6}$	$250x10^{-6}$
Z-axis Total Expansion	50→260℃	TMA	%	≤3.5%	3.0%	3.5~4.0%
	50→288℃	TMA	%	-	3.0~3.5%	4.0~5.0%
Moisture Absorption	D-24/23	2.6.21	%	0.35 max	0.10~0.16	0. 28
	After PCT	1atm.,121℃,1hour	%	-	0.20	0.28
Volume Resistance	After Moisture	2.5.17.1	MΩ-㎝	≥106	5×10^{8}	5×10^{8}
	E-24/125			≥103	5×10^{6}	5×10^{6}
Surface Resistance	After Moisture	2.5.17.1	MΩ	≥104	5×10^{7}	5×10^{7}
	E-24/125			≥103	5×10^{6}	5×10^{6}
Electric Strength		2.5.6.2	KV/mm (volt/mil)	≥30	54 (1200~1400)	54
Dielectric Constant (Dk)	1.0 MHz	2.5.3, 2.5.9, 2.5.5	-	5.4 max.	4.2-4.6	4.42
	1.0 GHz				4.1-4.5	4.39
	2.0 GHZ				4.0-4.3	4.38
	2.5 GHZ				N/A	4.36
Dispassion Factor (Df)	1.0 MHz	2.5.3, 2.5.9, 2.5.5	-	0.035 max.	0.015~0.020	0.022
	1.0 GHz				0.015~0.018	0.022
	2.0 GHZ				0.016~0.020	0.021
	2.5 GHZ				0.017~0.022	0.020
Thermal Stress	288°C,Sold Dip	2.4.13.1	Sec.	60 Sec.	>300	90-120
	288°C,Sold Float	2.4.13.1	sec	/	>480	120~200
Pressure Cook Test		Pre-treat15psi/30min; 288°C,10Sec/cycle	Cycle	2 cycles Min.	10~12	6-8
Time to Delamination---T260		2.4.24.1	Min	>30	>60	18
Time to Delamination---T288		2.4.24.1	Min	>5	>10	3
Flame Resistance		UL94	-	V1	V0	V0
Comparative Tracking Index(CTI)		UL-7461 ASTM D3638	Voltage	—	175~250 (Grade 3)	175~250 (Grade 3)

※ *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(Rise of Rate) of material: Programmable Press: 1.5-3.0°C/min (3~5℉/min). Manual Press:3~6℃/min (5~10℉/min)
2. Curing Temperature & Time: >60min at more than 185°C (365℉)[Material Temperature].
3. Full Pressure: ≥250-300psi
4. Vacuuming should be continued until over 140°C (284°F) [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 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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