

# VT-47

## High Tg Material

### Datasheets

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

#### General Information

- High Tg FR-4(>170 °C)
- 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	Temperature	Below 22°C(73°F)	Below 5°C(41°F)	Below 22°C(73°F)
Condition	Relative Humidity	Below 55%RH	/	Below 55%RH
Shelf Life		3 Month	6 Month	12Month(airproof)

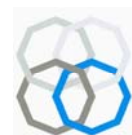


# VT-47

**Properties Sheet: IPC-4101B Specification Sheet(s)/26, 97, 98, 99, 101, 126** (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	°C	-	170~185	136~140
Decomposition Temp. (Td) TGA		ASTM D3850	°C	-	345	290~310
X-axis C.T.E.		TMA	in/in/ °C	-	11x10 <sup>-6</sup>	12~15 x10 <sup>-6</sup>
Y-axis C.T.E.		TMA	in/in/ °C	-	13x10 <sup>-6</sup>	12~15 x10 <sup>-6</sup>
Z-axis C.T.E.	Before Tg	TMA	in/in/ °C	≤60x10 <sup>-6</sup>	35x10 <sup>-6</sup>	50x10 <sup>-6</sup>
	After Tg			≤300x10 <sup>-6</sup>	190x10 <sup>-6</sup>	250x10 <sup>-6</sup>
Z-axis Total Expansion	50→260°C	TMA	%	≤3.5%	3.0%	3.5~4.0%
	50→288°C	TMA	%	-	3.0~3.5%	4.0~5.0%
Moisture Absorption	D-24/23 After PCT	2.6.21 1atm.,121°C,1hour	%	0.35 max -	0.10~0.16 0.20	0.28 0.28
Volume Resistance	After Moisture	2.5.17.1	MΩ-cm	≥106	5×10 <sup>8</sup>	5×10 <sup>8</sup>
	E-24/125			≥103	5×10 <sup>6</sup>	5×10 <sup>6</sup>
Surface Resistance	After Moisture	2.5.17.1	MΩ	≥104	5×10 <sup>7</sup>	5×10 <sup>7</sup>
	E-24/125			≥103	5×10 <sup>6</sup>	5×10 <sup>6</sup>
Electric Strength		2.5.6.2	KV/mm (volt/mil)	≥30	54 (1200~1400)	54
Dielectric Constant (Dk)	1.0 MHz	2.5.3,	-	5.4 max.	4.2-4.6	4.42
	1.0 GHz				4.1-4.5	4.39
	2.0 GHZ	2.5.9,			4.0-4.3	4.38
	2.5 GHZ	2.5.5			N/A	4.36
Dispersion Factor (Df)	1.0 MHz	2.5.3,	-	0.035 max.	0.015~0.020	0.022
	1.0 GHz				0.015~0.018	0.022
	2.0 GHZ	2.5.9,			0.016~0.020	0.021
	2.5 GHZ	2.5.5			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°F/min). Manual Press:3~6°C/min (5~10°F/min)

2. Curing Temperature & Time: >60min at more than 185°C (365°F)[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.