



VT-46

Datasheets

Low Dk Material

VT-46TC/Laminate VT-46PP/Prepreg

General Information

- **Low Dk & Low Transmission Loss**
- **High Tg (190 °C) &** Phenolic Cured System
- Excellent Thermal Reliability
- UV Blocking;
- Laser Fluorescing;
- Low CTE

Application

For Single Side\Double Side\ Multilayer PWB - **High Speed Products** & Lead Free Assembly Applications;

Availability

VT-46TC 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 $\leq .005$ ", it is recommended to use the reverse treated copper due to the low profile. The peel strength for RT foil is $\approx 1-2$ lbs/in (0.35Kg/m) less than Standard foil.

VT-46PP 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
Retest Time*		3 Month	6 Month	12Month(airproof)

* The pre-preg exceeding retest time should be retested. If the Gel Time and Resin Flow is not out of the low limit of the specification(see C.O.C.), the pre-preg still can be use, but please modify the press condition with a higher rise of rate(Heat Ratio) and higher pressure.

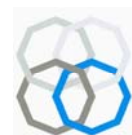


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Properties Sheet: IPC-4101B Specification Sheet(s)/121,124,129

TEST ITEM		Test Condition (IPC-TM-650 or As Noted)	UNIT	Specification (IPC-4101 B)	Typical Value	
					VT-46	Normal FR-4
Flexural Strength	Warp	2.4.4	MPa	>415	560	600
	Fill			>345	450	500
Peel Strength (1 oz)	As Receive	2.4.8	1b/in	8.0 min	7.28	8.59
	After Thermal				6.92	8.03
Glass Transition Temp.(Tg),	TMA	2.4.24C	°C	-	185~195	125~135
	DMA	2.4.25	°C	-	200~210	145~155
Decomposition Temp. (TD) TGA		ASTM D3850	°C	-	350	290~310
Z-axis C.T.E.	Before Tg	TMA	in/in/ °C	60x10 ⁻⁶	43x10 ⁻⁶	50x10 ⁻⁶
	After Tg			300x10 ⁻⁶	220x10 ⁻⁶	250x10 ⁻⁶
Moisture Absorption	D-24/23	2.6.21	%	0.35 max	0.12	0.28
	After PCT	1atm.,121°C, 1hour	%	-	0.20	0.28
Volume Resistance	After Moisture	2.5.17.1	MΩ-cm	≥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	≥30	54	54
Dielectric Constant	250 MHz	2.5.3,2.5.9,2.5.5	-	5.4 max	3.96	4.39
Dispersion Factor	250 MHz	2.5.3,2.5.9,2.5.5	-	0.035 max	0.013	0.019
Thermal Stress	288°C,Sold Dip	2.4.13.1	Sec.	60 Sec.	>300	90-120
Pressure Cook Test		15psi/30min/ 288°C/10Sec.	Cycle	2 cycles min	14~18	6-8
Time to Delamination---T260		2.4.24.1	Min	>30	>60	18
Time to Delamination---T288		2.4.24.1	Min	>5	>30	-
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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Properties Sheet: Dielectric Characteristics

TEST ITEM	CONDITION	UNIT	Low Loss Material			
			VT-46	N4000-13	IS-408	PCL-LD-621
Tg	TMA	°C	190	200	170	180
Decomposition	ASTM D3850	°C	350	365	350	400
Thermal Stress	Sold Dip@288 °C	sec	>300	/	>300	>300
T288	TMA	minutes	20	/	/	15
Peel Strength	As Received(1oz)	Lb/in	6~7	7.5	7	7.2
Z-CTE	50-260 °C	%	3.5%	3.5%	3.50%	3~3.5%
X,Y-CTE	Before Tg	ppm/°C	11	11	12	12

Test Item	Test Condition	Sample Construction	Dielectric Constant			
			VT-46	N4000-13	IS-408	PCL-LD-621
250MHz	C24/23/50	2116 RC53% x 1	3.82			3.60
1.0 GHz			3.66	3.70		3.50
2.0 GHz			3.56	3.70	3.65	3.50
5.0 GHz			3.50	3.60	3.60	3.50
10.0 GHz			3.40	3.50	3.60	3.50

Test Item	Test Condition	Sample Construction	Dispersion Factor			
			VT-46	N4000-13	IS-408	PCL-LD-621
250MHz	C24/23/50	2116 RC53% x 1	0.011			0.004
1.0 GHz			0.009			0.005
2.0 GHz			0.008	0.008	0.012	0.006
5.0 GHz			0.007	0.008	0.013	0.007
10.0 GHz			0.005	0.007	0.013	0.008



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Process Guideline

Press Condition

1. Heating rate(Rise of Rate) of material [Material Temperature]:
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.

Desmearing Process

- Desmear rate of **VT-46** 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.