

VT-481

UL Approval: E214381 Version: Rev. 9

DATASHEETS - MID-TG MATERIAL

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

General Information

- Phenolic Cured System
- Middle Tg (150°C) FR-4
- Excellent Thermal Reliability
- Low CTE
- CAF Resistance
- UV Blocking
- Laser Fluorescing

Application

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

Availability

VT-481 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 $\leq .005$ ", 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-481PP 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°C (73°F)	Below 5°C (41°F)	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 SHEETS

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

Properties	Test Method	Units	Specification	Typical Value
Thermal Properties				
Glass Transition Temp. (Tg)				
DSC	IPC-TM-650 2.4.25	°C	145 minimum	150
TMA	IPC-TM-650 2.4.24	°C	–	–
Decomposition Temp. (Td) By TGA (at 5% weight loss)	ASTM D3850	°C	325 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	5 minimum	25
Z-axis CTE				
Before Tg	IPC-TM-650 2.4.24	ppm/°C	60 maximum	45
After Tg	IPC-TM-650 2.4.24	ppm/°C	300 maximum	220
Total Expansion (50~260°C)	IPC-TM-650 2.4.24	%	3.5 maximum	3
Thermal Stress @ 288°C	IPC-TM-650 2.4.13.1	Second	Pass 10s	>600
Electrical Properties				
Dielectric Constant @ 1GHz	IPC-TM-650 5.5.5.9	–	5.4 maximum	4.3
Dissipation Factor @ 1GHz	IPC-TM-650 5.5.5.9	–	0.035 minimum	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)	–	7.8 (1.37)
After thermal stress	IPC-TM-650 2.4.8	lb/in (N/mm)	6 (1.05) minimum	7.7 (1.35)
Flexural Strength				
Warp	IPC-TM-650 2.4.4	Kpsi (MPa)	60 (415) minimum	80 (560)
Fill	IPC-TM-650 2.4.4	Kpsi (MPa)	50 (345) minimum	65 (450)
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 (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 180°C (365°F) [Material Temperature]
3. Full Pressure: ≥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-481** 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.