

# VT-481

UL Approval: E214381 Version: B5 /97 /98 /99 /101

## Laminate/Prepreg

### General Information

- > Mid-Tg FR4.0
- > Phenolic Cure System & Lead Free Compatible
- > Excellent Thermal Reliability
- > Low Z-CTE
- > CAF Resistance
- > UV Blocking

### Application

Computer, Communication Equipment, Instrumentation, Electronic Game Machine, Automotive, etc

### Availability

- > Core Thickness: 0.002" (0.05mm) to 0.200" (5mm), available in sheet or panel form
- > Copper Foil: 1/4oz to 12oz
- > Prepregs are available in roll or panel form
- > E-Glass styles: 7628, 1506, 1500, 2113, 2313, 3313, 2116, 1080, 1086, 1078, 106 & 1067, etc

**Note:** For cores 0.005", 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.

Properties		Prepreg		Laminate
Storage Condition	Temperature	Below 23°C (73°F)	Below 5°C (41°F)	Room
	Relative humidity	Below 55% RH	/	/
Shelf Life		3 months	6 months	24 months (airproof)

The prepreg exceeding shelf life should be retested.

#### CORPORATE HEADQUARTERS

Ventec Electronics Co. Ltd.  
308 TaiShan Rd,  
New District Suzhou,  
Jiangsu, P.R. China 215129  
T: +86 512-68091810  
Email: sales@ventec.com.cn

#### EMEA REGIONAL HEADQUARTERS

Ventec Europe  
Unit 1 Trojan Business Centre,  
Tachbrook Park Estate,  
Leamington-Spa, CV34 6RH, UK  
T: +44 1926-889822  
Email: sales@ventec-europe.com

#### AMERICAS REGIONAL HEADQUARTERS

Ventec USA  
21 Water Street, Amesbury,  
Massachusetts, MA 01913,  
United States of America  
T: +1 978-5219700  
Email: saleseast@ventec-usa.com

www.ventecclaminates.com

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### Properties Sheet IPC-4101E /97 /98 /99 /101

Properties		Test Method	Units	Specification	Typical Value
<b>Thermal Properties</b>					
Tg	DSC	IPC-TM-650 2.4.25	°C	150 minimum	155
	TMA	IPC-TM-650 2.4.24	°C	–	–
Td		ASTM D3850	°C	325 minimum	345
T260		IPC-TM-650 2.4.24.1	Minute	30 minimum	>60
T288		IPC-TM-650 2.4.24.1	Minute	5 minimum	25
Thermal Stress @ 288°C		IPC-TM-650 2.4.13.1	Second	Pass 10s	>600
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	2.6
X-Y CTE		IPC-TM-650 2.4.24	ppm/°C	–	11~13
MOT		UL 94	°C	–	130
<b>Electrical Properties</b>					
DK @ 1GHz		IPC-TM-650 2.5.5.9	–	5.4 maximum	4.3
DF @ 1GHz		IPC-TM-650 2.5.5.9	–	0.035 minimum	0.015
Volume Resistivity	After Moisture Resistance	IPC-TM-650 2.5.17.1	MΩ-cm	1.0E+4 minimum	5.0E+8
	E-24/125	IPC-TM-650 2.5.17.1	MΩ-cm	1.0E+3 minimum	5.0E+6
Surface Resistivity	After Moisture Resistance	IPC-TM-650 2.5.17.1	MΩ	1.0E+4 minimum	5.0E+7
	E-24/125	IPC-TM-650 2.5.17.1	MΩ	1.0E+3 minimum	5.0E+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		ASTM D495	Second	60 minimum	147
<b>Mechanical Properties</b>					
Peel Strength (1oz)	As received	IPC-TM-650 2.4.8	lb/in (N/mm)	–	7.5~10 (1.3~1.75)
	After thermal stress	IPC-TM-650 2.4.8	lb/in (N/mm)	6 (1.05) minimum	7.5~10 (1.3~1.75)
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)
<b>Physical Properties</b>					
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 not intended to be specification values.

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