

# tec-speed 1 Series

UL Approval: E214381 Version: 2

Data Sheet tec-speed 1.0 = VT-464 (M)  
tec-speed 1.1 = VT-464 (D)

Laminate / Prepreg

## General Information

- Halogen Free & Mid-Tg
- Low Dk & Low Loss
- Excellent Thermal Reliability
- Lead-free
- Ease of Manufacturing

## Application

High Frequency & High Speed, Satellite communication, Navigation, GPS, LTE, Handhelds etc

## Availability

- Core Thickness: .002" (0.05mm) to .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
- Ability of Processing Copper Type: HTE, RTF, LVP & HLVP

## Storage Condition & Shelf Life

		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	24 Months (airproof)

Note: The pre-prep exceeding shelf life should be retested.

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## Properties Sheet

Properties	Test Method	Unit	Specification	Typical Value	
				VT-464 (M)	VT-464 (D)
<b>Thermal Properties</b>					
Tg	IPC-TM-650 2.4.25	°C	150 minimum	160	160
Td @5% weight loss	ASTM D3850	°C	325 minimum	390	400
T260	IPC-TM-650 2.4.24.1	Minute	30 minimum	>60	>60
T288	IPC-TM-650 2.4.24.1	Minute	15 minimum	>30	>30
Thermal Stress @ 288°C	IPC-TM-650 2.4.13.1	Second	Pass 10s	>600	>600
Z-axis CTE					
Before Tg	IPC-TM-650 2.4.24	ppm/°C	60 maximum	40	70
After Tg	IPC-TM-650 2.4.24	ppm/°C	300 maximum	210	280
Total Expansion (50~260°C)	IPC-TM-650 2.4.24	%	3.5 maximum	2.5	3.2
MOT	UL 94	°C	-	130	130
<b>Electrical Properties</b>					
Dielectric Constant @ 1GHz RC 50% RC 75%	IPC-TM-650 2.5.5.9	-	5.4 maximum	4.05 3.40	3.6 3.0
Dissipation Factor @ 1GHz RC 50% RC 75%	IPC-TM-650 2.5.5.9	-	0.035 maximum	0.010 0.012	0.006 0.004
Dielectric Constant @ 10GHz RC 53%	IPC-TM-650 2.5.5.13	Resonator Cavity	-	3.9	3.4
Dissipation Factor @ 10GHz RC 53%	IPC-TM-650 2.5.5.13	Resonator Cavity	-	0.013	0.008
After Moisture Resistance	IPC-TM-650 2.5.17.1	MΩ-cm	10 <sup>4</sup> minimum	5*10 <sup>8</sup>	5*10 <sup>8</sup>
E-24/125	IPC-TM-650 2.5.17.1	MΩ-cm	10 <sup>3</sup> minimum	5*10 <sup>6</sup>	5*10 <sup>6</sup>
Surface Resistivity					
After Moisture Resistance	IPC-TM-650 2.5.17.1	MΩ	10 <sup>4</sup> minimum	5*10 <sup>7</sup>	5*10 <sup>7</sup>
E24/125	IPC-TM-650 2.5.17.1	MΩ	10 <sup>3</sup> minimum	5*10 <sup>6</sup>	5*10 <sup>6</sup>
Electrical Strength	IPC-TM-650 2.5.6.2	Volt/mil (KV/mm)	762 (30) minimum	1200~1400 (54)	1200~1400 (54)
Dielectric Breakdown	IPC-TM-650 2.5.6	KV	40 minimum	60	60
CTI	ASTM D3638	Rating (Volt)	-	Grade 3 (175~250)	Grade 3 (175~250)
Arc Resistance	ASTM D495	Second	60 minimum	195	195
<b>Mechanical Properties</b>					
Peel Strength (1oz)					
As received	IPC-TM-650 2.4.8	lb/in (N/mm)	-	8.0 (1.4)	6.0 (1.1)
After thermal stress	IPC-TM-650 2.4.8	lb/in (N/mm)	6 (1.05) minimum	8.0 (1.4)	6.0 (1.1)
Flexural Strength					
Warp	IPC-TM-650 2.4.4	Kpsi (MPa)	60 (415) minimum	80 (560)	80 (560)
Fill	IPC-TM-650 2.4.4	Kpsi (MPa)	50 (345) minimum	65 (450)	65 (450)
<b>Physical Properties</b>					
Moisture Absorption	IPC-TM-650 2.6.2.1	%	0.80 maximum	0.10	0.10
Flammability	UL-94	Rating	V0 minimum	V0	V0

Note: All test data provided are typical values and not intended to be specification values.