

ITEQ
Your Partner of Advanced Materials & Mass Lam Service

IT-170GRA1

CCL : IT-170GRA1TC
Prepreg: IT-170GRA1BS

High Tg / Halogen Free / Mid-Loss Laminate & Prepreg

- ANSI Type : **FR-4.1**
- Applicable IPC-4101 /127/128/130；IPC-4103 /240/540
- Halogen free, High-Tg (180ºC) / Lower Dk (3.8 @ 10GHz) and low Df (<0.009 @ 10GHz)
- Compatible with High Tg standard FR-4 processes / High thermal & CAF resistance reliability

Laminate properties

Items	IPC TM-650	Typical Value	Unit
Peel Strength, minimum A. Low profile copper foil(35um)	2.4.8	5.0~6.0	lb/inch
Volume Resistivity	2.5.17.1	$1x10^{10}$	MΩ-cm
Surface Resistivity	2.5.17.1	$1x10^{10}$	MΩ
Moisture Absorption, maximum	2.6.2.1	0.10	%
Permittivity (Dk, 50% resin content) A. 1GHz B. 2GHz C. 5GHz D. 10GHz	 2.5.5.9 2.5.5.13 2.5.5.13 2.5.5.13	 3.9 3.8 3.8 3.8	--
Loss Tangent (Df, 50% resin content) A. 1GHz B. 2GHz C. 5GHz D. 10GHz	 2.5.5.9 2.5.5.13 2.5.5.13 2.5.5.13	 0.008 0.008 0.008 0.009	--
Flexural Strength, minimum A. Length direction B. Cross direction	2.4.4	 480-510 400-430	N/mm^2
Young's Modulus A. Warp direction B. Fill direction	ASTM D3039	 18 18	Gpa
Thermal Stress 10 s at 288℃ A. Unetched B. Etched	2.4.13.1	 Pass Pass	Rating
Flammability	UL94	V-0	Rating
Comparative Tracking Index (CTI)	ASTM D3638/ UL 746	CTI 1 (400-599)	Class (Volts)
Maximum Operating Temperature(MOT)	UL 746	130	C
Glass Transition Temperature(DSC)	2.4.25	180	℃
Decomposition Temperature(5% W.L)	2.4.24.6	380	℃
X/Y Axis CTE (40℃ to 125℃)	2.4.41	11/13	ppm/℃
	2.4.24.5	13/13	ppm/℃
Z-Axis CTE A. Alpha 1 B. Alpha 2 C. 50 to 260 Degrees C	2.4.24	 40 240 2.7	 ppm/℃ ppm/℃ %
Thermal Resistance A. T260 B. T288	2.4.24.1	 >60 >60	 Minutes Minutes