

IT-588

Normal Tg, Multifunctional Epoxy Resin with Fillers, Phenolic-Curing, Lead-free Process Compatible

◆ Key Features

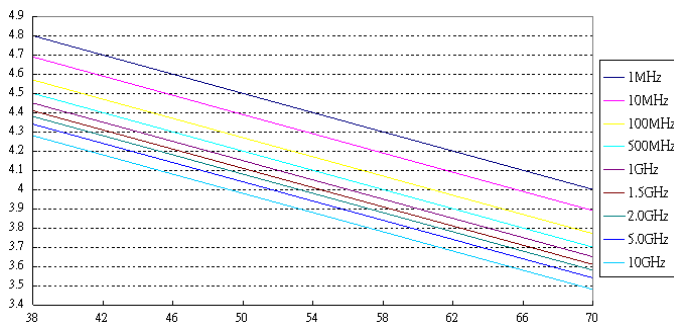
- T_g >135°C (DSC)
- Excellent thermal resistance
- High thermal decomposition temperature (Td)
- Lead-free process compatible
- Extremely robust, good for high reliability board
- Cost effective solution for lead-free processes
- Consistent Dimensional Stability

◆ Applications

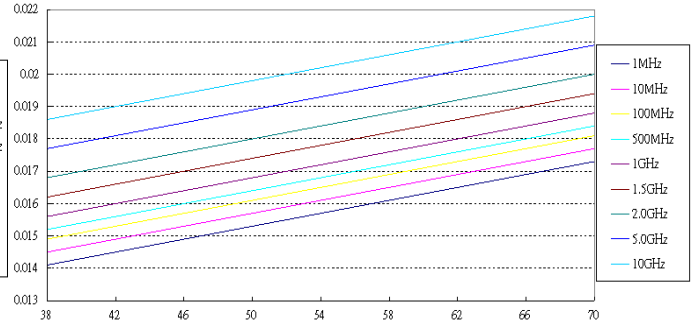
- PC / NB / DDR
- LCD / Mobile Phone
- Automobile
- Game Player / Server
- Network Equipment etc.

◆ Characteristics

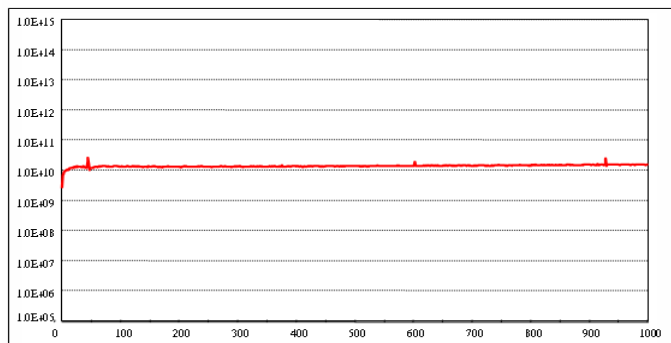
IT-588 Dk Value Vs. Resin Content & Frequency



IT-588 Df Value Vs. Resin Content & Frequency



IT-588 CAF Test Curve



CAF Test Condition

TEST ITEM	TEST CONDITIONS	RESULTS
TH-TH (0.7mm)	85°C /85%R.H. 50volts DC	>1000 hr(Hole size:0.35mm)
PA-PA (0.1/0.1mm)	R>10 ⁷ Ω	>1000 hr
TH-PA (0.3mm)		>1000 hr
LA-LA		>1000 hr

IT-588

Normal Tg, Multifunctional Epoxy Resin with Fillers, Phenolic-Curing, Lead-free Process Compatible

● Specification Sheet

IT-588TC(Laminate) Property	Specification (Typical Value)		Units Metric(English)	Test Method	
	<0.50mm[0.0197in]	≥0.50mm[0.0197in]		IPC-TM-650	Ref. Para.
1. Peel Strength, As received A. 17 micron [1/2 ounce/Ft2] copper and under B. 35 micron [1-ounce/Ft2] copper C. 70micron [2-ounce/Ft2] copper D. 105, 140, 175micron [3,4,5-ounce/Ft2] copper and above	>4.0 >4.5 >5.0 >5.5	>5.0 >6.0 >8.0 >9.0	(lb/inch)	2.4.8 2.4.8.2 2.4.8.3	3.9.1.1 3.9.1.1.1 3.9.1.1.2 3.9.1.1.3
2. Volume Resistivity, minimum A. C-96/35/90 B. After moisture resistance C. At elevated temperature E-24/125	10 ⁶ --- 10 ³	--- 10 ⁴ 10 ³	MΩ-cm	2.5.17.1	3.11.1.3
3. Surface Resistivity, minimum A. C-96/35/90 B. After moisture resistance C. At elevated temperature E-24/125	10 ⁴ --- 10 ³	--- 10 ⁴ 10 ³	MΩ	2.5.17.1	3.11.1.4
4. Moisture Absorption, maximum	-	0.5	%	2.6.2.1	3.12.1.1
5. Dielectric Breakdown, minimum	-	40	kV	2.5.6	3.11.1.6
6. Permittivity at 1 MHz, maximum (Laminate & Prepreg as laminated)	<5.4 (4.7)	<5.4 (4.7)	-	2.5.5.3 2.5.5.5 2.5.5.6	3.11.1.1 3.11.2.1
7. Loss Tangent at 1 MHz ,maximum (Laminate & Prepreg as laminated)	<0.035 (0.018)	<0.035 (0.018)	-	2.5.5.3 2.5.5.3 2.5.5.9	3.11.1.2 3.11.2.2
8. Flexural Strength, minimum A. Length direction B. Cross direction	- -	415(60,190) 345(50,140)	N/mm ² (lb/in ²)	2.4.4	3.9.1.3
9. Flexural Strength at Elevated Temperature , length direction , minimum	-	-	N/mm ² (lb/in ²)	2.4.4.1	3.9.1.4
10. Arc Resistance ,minimum	60	60	s	2.5.1	3.11.1.5
11. Thermal Strss 10 sec at 288°C [550.4F], min A. Unetched B. Etched	Pass Visual Pass Visual	Pass Visual Pass Visual	Rating	2.4.13.1	3.10.1.2
12. Electric Strength ,minimum (Laminate & Prepreg as laminated)	30	-	kV/mm	2.5.6.2	3.11.1.7 3.11.2.3
13.Flammability (Laminate & Prepreg as laminated)	V-0	V-0	Rating	UL94	3.10.2.1 3.10.1.1
14. Glass Transition Temperature	--	>135	°C	2.4.24 2.4.25	3.10.1.6
15. Decomposition Temperature	--	(350)	°C	TBD (5% wt loss)	3.10.1.10
16. Z-Axis CTE A. Alpha 1 B. Alpha 2 C. 50 to 260 Degrees C	-- -- --	(50) (260) (3.8)	PPM/°C PPM/°C %	2.4.24	3.10.1.11
17.Thermal Resistance (Copper removed) A.T260 B.T288 C.T300	-- -- --	(>60) (15) AABUS	Minutes Minutes Minutes	2.4.24.1	3.10.1.12
18.CAF Resistance	--	AABUS	Pass/Fail	2.6.25	3.12.1.4

Pass or Fail are determined by Fail Being ≥ 1 decade drop in the sample's initial insulation resistance value.

IT-588BS (Prepreg) Property	Specification	Units	Test Method	Ref. Para
1. Shelf Life, minimum(Condition 1/Condition 2)	180/90	Days	AABUS	3.17
2. Reinforcement	As per IPC-4412 or AABUS			
3. Volatile content maximum	<1.5	%	2.3.19	3.9.2.2.8
4. Prepreg Parameters	-	AABUS	AABUS	1.1.7
5. Flammability (as laminated)	V-0	rating	UL94	3.10.2.1
6. Other	-			

*AABUS = As agreed upon between user and supplier.

IT-588

Normal Tg, Multifunctional Epoxy Resin with Fillers, Phenolic-Curing, Lead-free Process Compatible

● Process Guideline

1. Prepreg Handling & Storage

- (1) Shelf life is at least 3 months when prepreg stored in a cool dry environment (Temperature: <20°C and Humidity: <50%).
- (2) Prepreg exposed to humidity should be resealed to minimize moisture of absorption.
- (3) Prepreg should be stored in controlled environment for 12 hours prior to use.
- (4) Prepreg supplied in rolls or panels should be stored horizontally. To avoid damage, no stacking is recommended.

2. Laminate Handling & Storage

- (1) Laminates should be stored in a dry environment
- (2) Laminate should always be stored flat

3. Inner Layer Process

- (1) First around must be taken and find a suitable parameter (as dimension compensation, etc) before mass production.
- (2) Inner layers should be baked for at least 40 min at 120°C after black or brown oxides treatment.

4. Lamination Overview

- (1) Stacks must be prepared in lay-up room to avoid moisture absorption.
- (2) Stacks with the core and prepreg are recommended to use the vacuum process for 30 minutes before heated. Recommended pressure ranges should be as follows:
 - Hydraulic: 350~400psi
 - Vacuum Hydraulic: 300~400psi
- (3) For Lien Chieh Machinery, heating rate is 1.3~1.8°C/min from 80°C to 140°C, and for Burkle Machinery, the heating rate is 1.5~3.0°C/min from 80°C to 140°C. Cooling rate is below 3°C/min.
- (4) When the board temperature reaches 185°C during the pressing process, hold for at least 45 minutes.

Note: The material temperature is not allowed to >200°C in lamination process if brown oxide treatment.

5. Drilling

Drilling parameters are mainly dependent on hole size, layer thickness, layer number, copper thickness and stack height. The following drilling parameters are reference for you only. Typical drilling parameters for 0.4~1.0mm drills are following:

Spindle speed: 45-105KRPM Feed rate: 50-150IPM
Retract rate: 500-1000IPM Max. hit count: <1000 HITS
Stack height: ≤2pnl (2-6layers), 1pnl (≥8layers) Entry Material: 0.2mm Aluminum
Back-up Material: 1.5mm phenolic laminate Drilling Machine: Hitachi-ND-6L210E
Baking condition: After Drilling: 150°C/2 hours

6. Desmear

The following desmear parameter is reference only:

Horizontal (ATO)
Swell: 60-75°C for 190s Mn+7: 55-65g/l at 85°C for 360s
Horizontal (JETCHEM)
Swell: 75°C for 100s Mn+7: 55-65g/l at 85°C for 180s
Vertical (ROHMHAAS)
Swell: 65°C for 365s Mn+7: 55-65g/l at 75°C for 750s

Normally, the typical parameters used to desmear FR-4 product may not produce optimum hole topography for IT-588, so you should consult with your chemistry to optimize your desmear condition, as desmear time or adjust other parameter, etc.

7. Recommended Press Cycle

