



# Lead-free High Tg Material

## EM-320 / EM-32B

- Tg > 170 °C
- Excellent CAF resistance
- Excellent thermal stability for lead-free process

### **Basic Laminate Property**

Item	IPC-TM-650	Test condition	Unit	Typical Value	
Glass transition temp.	2.4.25	DSC	°C	175	
CTE, X-, Y-axis	2.4.24	Pre-Tg, TMA	ppm/°C	12/15	
CTE, Z-axis	2.4.24	Alpha 1, TMA	ppm/°C	55	
		Alpha 2, TMA	ppm/°C	290	
Z-axis Expansion	2.4.24	50~260°C, TMA	%	3.0	
Decomposition temp.	2.4.24.26	TGA	°C	350	
Thermal stress 10sec 288°C	2.4.13.1	Clad	—	Pass Visual	
		Etched	—	Pass Visual	
Water absorption	2.6.2.1	E-1/105+D-24/23	%	0.14	
Peel strength	0.5 oz	2.4.8	as received	lb/in	6.5
			after thermal stress	lb/in	6.5
	1.0 oz	2.4.8	as received	lb/in	8.5
			after thermal stress	lb/in	8.5
Permittivity (RC 50%)	1 MHz	2.5.5.9	C-24/23/50	—	4.7
	1 GHz			—	4.1
Loss tangent (RC 50%)	1 MHz	2.5.5.9	C-24/23/50	—	0.022
	1 GHz			—	0.023
Volume resistivity	2.5.17.1	C-96/35/90	MΩ-cm	>10 <sup>10</sup>	
Surface resistivity	2.5.17.1	C-96/35/90	MΩ	>10 <sup>9</sup>	
Flexural strength	Warp	2.4.4	as received	MPa	550~600
	Fill		as received	MPa	410~460
Flame resistance	UL-94	A&E-24/125	—	V-0	

Specification Sheet : IPC-4101C / 129