



**Glass cloth and glass mat base epoxy resin  
 flame retardant copper clad laminate**

# CEM-3-09

**■ FEATURES**

- Excellent in thermal conductivity and anti-tracking property
- The CTE of X and Y-axis before Tg under 20 ppm
- Electrical property as well as chemical resistance are the same as those FR-4
- Through-hole reliability and warpage have been improved in order to replace some portions of the FR-4 market.
- IPC-4101C Specification is applicable.

**■ PERFORMANCE LIST**

Characteristics	Unit	Conditioning	Typical Values	SPEC	Test Method	
Volume resistivity	MΩ-cm	C-96/35/90	5.0 x 10 <sup>8</sup>	10 <sup>6</sup> ↑	2.5.17	
Surface resistivity	MΩ	C-96/35/90	5.0 x 10 <sup>7</sup>	10 <sup>4</sup> ↑	2.5.17	
Permittivity 1MHZ	-	C-24/23/50	5.1	5.4 ↓	2.5.5.2	
Loss tangent 1MHZ	-	C-24/23/50	0.020	0.035 ↓	2.5.5.2	
Dielectric breakdown	KV	D-48/50	60 ↑	40 ↑	2.5.6	
Moisture absorption	%	D-24/23	0.09	0.50 ↓	2.6.2.1	
Flammability	-	C-48/23/50	94V0	94V0	UL94	
Peel strength H oz	lb/in	288°C x 10" solder floating	8-10	6 ↑	2.4.8	
Thermal stress	SEC	260°C dipping	200 ↑	40 ↑	2.4.13.1	
Flexural strength	LW	N/mm <sup>2</sup>	A	300-400	276 ↑	2.4.4
	CW	N/mm <sup>2</sup>	A	200-300	186 ↑	2.4.4
Dimensional stability X-Y axis	%	E 0.5/170	<0.065	0.11 Max	2.4.39	
Coefficient of thermal expansion Z-axis before Tg Z-axis after Tg X-axis before Tg Y-axis before Tg	ppm/°C ppm/°C ppm/°C ppm/°C	TMA TMA TMA TMA	30-50 160-260 16-18 17-19	N/A	2.4.24	
Glass transition temp	°C	DSC	135 ± 5	N/A	2.4.25	
Thermal Conductivity	W/mK	A	1.0	N/A	ASTM D-5470	
		A	2.0	N/A	ASTM E-1461	
Punchability	Kg/cm <sup>2</sup>	Shear strength ASTM D-732	1150	N/A	ASTM D-732	
Comparative Tracking Index	V	Etched	600 ↑	N/A	ASTM-D3638	
Decomposition Temperature (Td 5% W/L)	°C	TGA	310	N/A	2.4.24.6	

Data shown are nominal values for reference only.

**NOTE:**

The average value in the table refers to samples of .062" 1/1.  
 Test method per IPC-TM-650

**■ CERTIFICATION UL**

- UL File No. : E98983
- ANSI TYPE:CEM-3