

# EM-890 / EM-89B

## High Tg / Ultra Low Loss / Halogen Free

- Applications include: high-speed Ethernet, network, 5G and antenna.
- Designed for high thermal reliability with excellent CAF resistance.
- Outstanding multiple lamination capability.
- Fabrication friendly resin can be combined with mid-loss resins for "hybrid" designs.
- RoHS Compliant
- UL File: E150504
- Applicable IPC Slash Sheets: IPC-4101 /134; IPC-4103 /240, /540

### Basic Laminate Property

Property	Item	Typical Value	Unit	Test Condition	IPC-TM-650	
Thermal	Tg	N/A	°C	DSC	2.4.25	
		170	°C	TMA	2.4.24	
		205	°C	DMA	2.4.24.4	
	CTE, X/Y-axis	12/13	ppm/°C	< Tg, TMA	2.4.24.5	
	CTE, Z-axis	45~50	ppm/°C	< Tg, TMA	2.4.24	
		185~205	ppm/°C	> Tg, TMA		
	Z-axis Expansion	2.2	%	50~260 °C	2.4.24	
	Td	430	°C	TGA (5% W.L)	2.4.24.6	
	T288	>60	min.	Clad	2.4.24.1	
		>60	min.	Etched		
Thermal Conductivity	0.50	W/m.K	-	ASTM D5470		
Electrical	Dk (R/C: 55/70%)	1 GHz	3.5/3.1	-	C-24/23/50	2.5.5.9
		10 GHz	3.4/3.0	-		Cavity Resonator
			3.4/3.0	-		SPC method
	Df (R/C: 55/70%)	1 GHz	0.0033/0.0027	-	C-24/23/50	2.5.5.9
		10 GHz	0.0043/0.0036	-		Cavity Resonator
			0.0032/0.0026	-		SPC method
	Volume Resistivity	>10 <sup>10</sup>	MΩ-cm	C-96/35/90	2.5.17.1	
Surface Resistivity	>10 <sup>9</sup>	MΩ	C-96/35/90	2.5.17.1		
Physical	Water Absorption		0.07	%	E-1/105+D-24/23	2.6.2.1
	Peel Strength (HVLP)	H oz	4.5	lb/in	As Received	2.4.8
	Flexural Strength	Warp	430~470	MPa	As Received	2.4.4
		Fill	410~450	MPa		
Flame Resistance		V-0	-	A & E-24/125	UL-94	

Above typical values are tested under specified constructions and not intended for specification.