

# RF-60TC

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Special Material for RF/MW High Power

High Thermal Conductivity

Exceptionally Low Loss

Enhanced Dimensional stability

Low Z-axis Expansion

Stable DK over Frequency & Temperature

Excellent Mechanical & Thermal Properties

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#### North & South America

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## RF-60TC Base materials for high power RF applications

**RF-60TC** is a PTFE based, ceramic filled fiber-glass substrate for being used as base material for high power RF and microwave applications.

This material is designed to provide lower operating temperatures in high power applications and better gains and efficiencies in miniaturized antenna applications for the 6.15 dielectric constant market through improved dielectric heat dissipation and exceptionally lower dielectric losses.

RF-60TC's enhanced heat transfer capability within the substrate enables to get additional design margin, extend the active components' life time, and improve the long term reliability characteristics

RF-60TC's excellent adhesion to very low profile or reverse treated copper provide the solution for reduced insertion loss and other distortion effects. Additionally, heavy metal backed laminate are also available.

The low CTE and improved dimensional stability of RF-60TC make it possible to achieve high performance multi-layer applications and the improved plated through hole reliability.

Temperature stable DK/Df and lower moisture absorption rate make components possibly be used at the unstable environment.

See "How to Order" on the back page for a complete product listing.

### Features and Benefits :

- **Improved loss tangent**
  - Lower insertion loss
  - Enhanced Ant. Gain/Efficiency
- **High thermal conductivity**
  - Exceptional thermal management
  - Lower operating temperature
  - Higher power application
  - Long term reliability
- **Enhanced dimensional stability**
- **Low Z-Axis CTE**
  - Multi-layer application available
  - Reliable plated through hole
- **Excellent adhesion to metal**
  - Lower profile copper available
  - Heavy metal back available
- **Stable Dielectric over frequency**
- **Stable Dielectric over temp.**
- **Low moisture absorption**

### Applications :

- **High Power Amplifier**
- **Miniaturized Antennas**
  - GPS / Patch / RFID reader
- **Filters / Couplers / Dividers**
- **Satellites**

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# RF-60TC Base materials for high power RF applications

## RF-60TC Typical Values

Property	Test Method	Unit	Value	Unit	Value
Dielectric Constant @ 10 GHz	IPC-650 2.5.5.5.1 (Modified)	-	6.15±0.15	-	6.15±0.15
Dissipation Factor @ 10 GHz	IPC-650 2.5.5.5.1 (Modified)	-	0.0020	-	0.0020
Dielectric Breakdown	IPC-TM-650 2.5.6	KV	55	KV	55
Dielectric Strength	IPC-TM-650 2.5.6.2	V/mil	550	V/mm	21,654
Arc Resistance	IPC-TM-650 2.5.1	sec	>180	sec	>180
Volume Resistivity	IPC-650 2.5.17.1 (Humid. Conditioning)	Mohm-cm	1.0 X 10 <sup>8</sup>	Mohm-cm	1.0 X 10 <sup>8</sup>
Surface Resistivity	IPC-650 2.5.17.1 (Humid. Conditioning)	Mohm	1.0 X 10 <sup>8</sup>	Mohm	1.0 X 10 <sup>8</sup>
Moisture absorption	IPC-TM 650 2.6.2.1	%	0.03	%	0.03
Flexural Strength (MD)	IPC-TM-650 2.4.4	psi	10000	N/mm <sup>2</sup>	69
Flexural Strength (TD)	IPC-TM-650 2.4.4	psi	9000	N/mm <sup>2</sup>	62
Tensile Strength (MD)	IPC-TM-650 2.4.19	psi	9000	N/mm <sup>2</sup>	62
Tensile Strength (TD)	IPC-TM-650 2.4.19	psi	7000	N/mm <sup>2</sup>	48
Dimensional Stability (MD)	IPC-650 2.4.39 Sec. 5.4 (After bake)	mils/inch	0.01	mm/m	0.01
Dimensional Stability (TD)	IPC-650 2.4.39 Sec. 5.4 (After bake)	mils/inch	0.69	mm/m	0.69
Dimensional Stability (MD)	IPC-650 2.4.39 Sec. 5.5 (Thermal stress)	mils/inch	0.06	mm/m	0.06
Dimensional Stability (TD)	IPC-650 2.4.39 Sec. 5.5 (Thermal stress)	mils/inch	0.80	mm/m	0.80
Peel Strength (1 oz. copper)	IPC-TM 650 2.4.8	lbs/inch	8	N/mm	1.43
Density	IPC-TM 650.2.3.5	g/cm <sup>3</sup>	2.84	g/cm <sup>3</sup>	2.84
Specific Heat	IPC-TM-650 2.4.50	J/gK	0.94	J/gK	0.94
Thermal Conductivity (unclad)	IPC-TM-650 2.4.50	W/mK	0.90	W/mK	0.90
Thermal Conductivity (CH/ CH)	IPC-TM-650 2.4.50	W/mK	1.00	W/mK	1.00
Thermal Conductivity (C1/C1)	IPC-TM-650 2.4.50	W/mK	1.05	W/mK	1.05
X, Y CTE (RT~150°C)	IPC-TM 650 2.4.41	ppm/°C	9, 9	ppm/°C	9, 9
Z CTE (RT~150°C)	IPC-TM 650 2.4.41	ppm/°C	40	ppm/°C	40
Td (2% Wt, Loss)	IPC-TM-650 2.4.24.6 / TGA	°F	930	°C	500
Td (5% Wt, Loss)	IPC-TM-650 2.4.24.6 / TGA	°F	960	°C	515

All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability In any given application.

# RF-60TC Base materials for high power RF applications

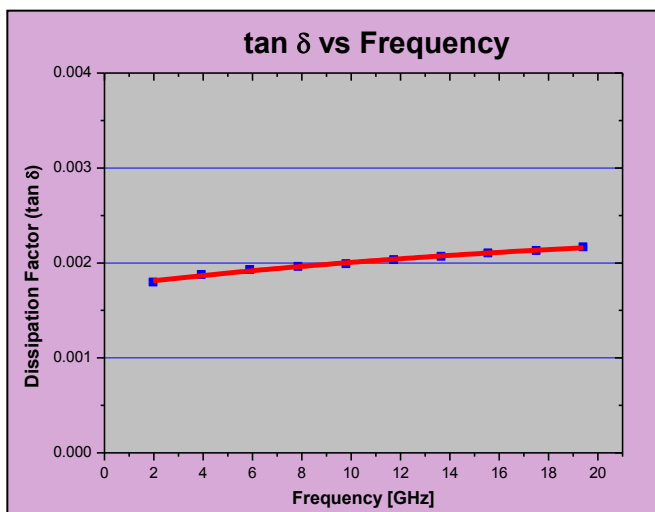
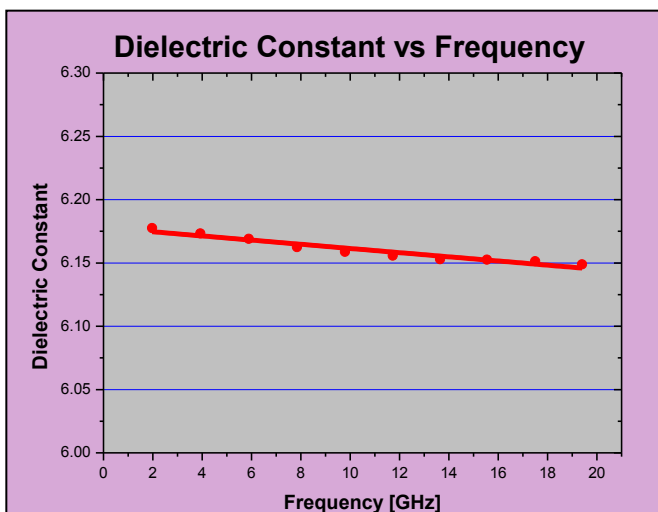
Designation	Dielectric Constant	Typical Thickness <sup>1</sup>		Typical Panel Sizes <sup>2</sup>	
		Inches	mm		
RF-60TC	6.15+/- .15	0.0050"	0.13	12"x18"	305mmx457mm
		0.0100"	0.25	16"x18"	406mmx457mm
		0.0200"	0.51	18"x24"	457mmx610mm
		0.0250"	0.64	16"x36"	406mmx914mm
		0.0300"	0.76	24"x36"	610mmx914mm
		0.0600"	1.52		

<sup>1</sup> RF-60TC can be manufactured in increments of 0.0050". Please call for availability of additional thicknesses.

<sup>2</sup> Our Standard sheet size is 36"\*48"(914mm X 1220mm). Please contact our customer service department for availability of other size.

Available Copper Cladding						
Designation	Weight	Copper Thickness		R <sub>ms</sub> Treated Side		Description
CLH	½ oz./sq. ft.	~ .0007"	~ 18µm	13µin	0.3µm	Reverse treated / Electrodeposited
CL1	1 oz./sq. ft.	~ .0014"	~ 35µm	13µin	0.3µm	Reverse treated / Electrodeposited
CVH (CH)	½ oz./sq. ft.	~ .0007"	~ 18µm	27µin	0.7µm	Very low profile / Electrodeposited
CV1 (C1)	1 oz./sq. ft.	~ .0014"	~ 35µm	25µin	0.6µm	Very low profile / Electrodeposited
C2	2 oz./sq. ft.	~ .0028"	~ 70µm	77µin	2.0µm	Electrodeposited

※ Heavy metal claddings (Aluminum, Brass, Copper) may also be available upon request. Please call for information.



An example of our part # is : RF-60TC-0250-C1/C1 – 18"\*24" (457mm X 610mm )