ROGERS CORPORATION
Advanced Circuit Materials

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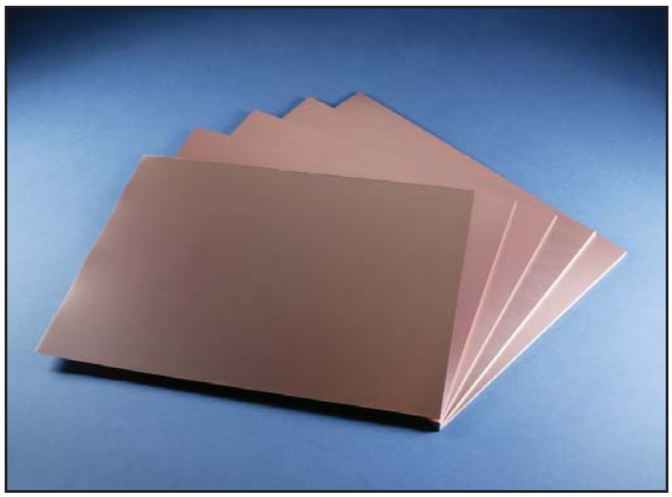
Data Sheet
1.6002

RT/duroid®6002 High Frequency Laminates

Features:
• Low loss for excellent high frequency performance.
• Tight ε_r and thickness control.
• Excellent electrical and mechanical properties.
• Extremely low thermal coefficient of dielectric constant.
• In-plane expansion coefficient matched to copper.
• Low Z-axis expansion
• Low outgassing; Ideal for space applications.

Some Typical Applications:
• Phase Array Antennas
• Ground Based and Airborne Radar Systems
• Global Positioning System Antennas
• Power Backplanes
• High Reliability Complex Multilayer Circuits
• Commercial Airline Collision Avoidance Systems
• Beam Forming Networks



RT/duroid® 6002 microwave material is the first low loss and low dielectric constant laminate to offer superior electrical and mechanical properties essential in designing complex microwave structures which are mechanically reliable and electrically stable.

The thermal coefficient of dielectric constant is extremely low from -55°C to+150°C (-67°F to 302°F) which provides the designers of filters, oscillators and delay lines the electrical stability needed in today's demanding applications.

A low Z axis coefficient of thermal expansion (CTE) ensures excellent reliability of plated through-holes. RT/duroid 6002 materials have been successfully temperature cycled (-55°C to 125°C [-67°F to 257°F]) for over 5000 cycles without a single via failure.

Excellent dimensional stability (0.2 to 0.5 mils/inch) is achieved by matching the X and Y coefficient of expansion to copper. This often eliminates double etching to achieve tight positional tolerances.

The low tensile modulus (X,Y) greatly reduces the stress applied to solder joints and allows the expansion of the laminate to be constrained by a minimum amount of low CTE metal, (6 ppm/°C) further increasing surface mount reliability.

¼ oz. to 2 oz./ft.^{2} electrodeposited copper, or ½ oz. to 2 oz/ ft.^{2} rolled copper foil may be specified as cladding on dielectric thicknesses from 0.005" to 0.120" (0.13 to 3.05mm). RT/duroid 6002 laminate is also available clad with aluminum, brass, or copper plates.

Applications particularly suited to the unique properties of RT/duroid 6002 material include flat and non-planar structures such as antennas, complex multilayer circuits with interlayer connections, and microwave circuits for aerospace designs in hostile environments. RT/duroid 6002 laminates have Underwriters Laboratories recognition under classification 94V-0 (Vertical Flammability Test).

Property	Typical Value	Direction	Units [1]	Conditions	Test Method
Dielectric Constant, εr Process	2.94 ± 0.04	Z	-	10GHz/23°C	IPC-TM-650, 2.5.5.5
Dielectric Constant, εr Design	2.94			8GHz-40GHz	Differential Phase Length Method
Dissipation Factor, TAN δ	0.0012	Z	-	10 GHz/23°C	IPC-TM-650, 2.5.5.5
Thermal Coefficient of ε_r	+12	Z	ppm/°C	10 GHz 0-100°C	IPC-TM-650, 2.5.5.5
Volume Resistivity	10^6	Z	Mohm cm	A	ASTM D257
Surface Resistivity	10^7	Z	Mohm	A	ASTM D257
Tensile Modulus	828 (120)	X,Y	MPa (kpsi)	23°C	ASTM D638
Ultimate Stress	6.9 (1.0)	X,Y	MPa (kpsi)		
Ultimate Strain	7.3	X,Y	%		
Compressive Modulus	2482 (360)	Z	MPa (kpsi)		ASTM D638
Moisture Absorption	0.02	-	%	D48/50	IPC-TM-650, 2.6.2.1 ASTM D570
Thermal Conductivity	0.60	-	W/m/K	80°C	ASTM C518
Coefficient of Thermal Expansion	16 16 24	X Y Z	ppm/°C	(10K/min) TMA	ASTM D3386 IPC-TM-650 2.4.41
Td	500		°C TGA		ASTM D3850
Density	2.1		gm/cm3		ASTM D792
Specific Heat	0.93 (0.22)	-	J/g/K (BTU/lb/°F)	-	Calculated
Copper Peel	8.9 (1.6)		lbs/in (N/mm)		IPC-TM-650 2.4.8
Flammability	V-O				UL94
Lead-Free Process Compatible	YES				

Typical value are a representation of an average value of the population of the property. For specification values contact Rogers Corporation.
[1] S1 units given first, with other frequenlty used units in parentheses
[2] References: internal TRs 3824, 5016, 5017, 5035. Test were at 23°C unless otherwise noted.

STANDARD THICKNESS:	STANDARD PANEL SIZE:	STANDARD COPPER CLADDING:
0.005" (0.127mm) 0.010" (0.254mm) 0.020" (0.508mm) 0.030" (0.762mm) 0.060" (1.524mm) 0.120" (3.048mm)	18" X 12" (457 X 305mm) 18" X 24" (457 X 610mm)	¼ oz. (8.5 μm) electrodeposited copper foil. ½ oz. (17μm), 1 oz. (35μm), 2 oz. (70μm) electrodeposited and rolled copper foil. Unclad material 0.020" or greater is available. Thick metal claddings are available. Additional claddings and panel sizes are available. Contact customer service for more information.

The information in this data sheet is intended to assist you in designing with Rogers' circuit material laminates. It is not intended to and does not create any warranties express or implied, including any warranty of merchantability or fitness for a particular purpose or that the results shown on this data sheet will be achieved by a user for a particular purpose. The user should determine the suitability of Rogers' circuit material laminates for each application.

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