ROGERS CORPORATION

Advanced Circuit Materials

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Data Sheet
RT/duroid® 5870/5880 Laminates

RT/duroid® 5870 /5880 High Frequency Laminates

Features:

- Lowest electrical loss for reinforced PTFE material
- Low moisture absorption
- Isotropic
- Uniform electrical properties over frequency
- Excellent chemical resistance

Some Typical Applications:

- Commercial Airline Telephones
- Microstrip and Stripline Circuits
- Millimeter Wave Applications
- Military Radar Systems
- Missile Guidance Systems
- Point to Point Digital Radio Antennas

RT/duroid® 5870 and 5880 glass microfiber reinforced PTFE composites are designed for exacting stripline and microstrip circuit applications.

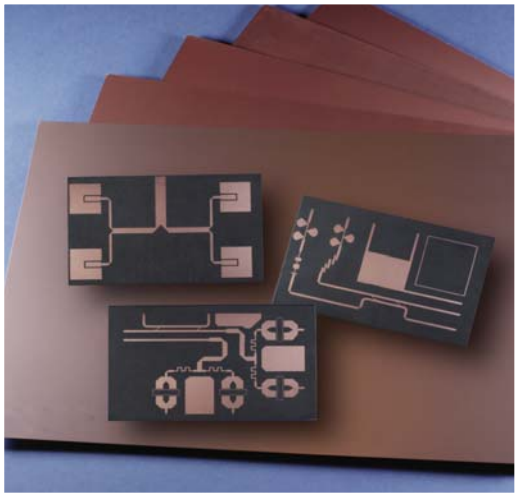
Glass reinforcing microfibers are randomly oriented to maximize benefits of fiber reinforcement in the directions most valuable to circuit producers and in the final circuit application.

The dielectric constant of RT/duroid 5870 and 5880 laminates is uniform from panel to panel and is constant over a wide frequency range. Its low dissipation factor extends the usefulness of RT/duroid 5870 and 5880 laminates to Ku-band and above.

RT/duroid 5870 and 5880 laminates are easily cut, sheared and machined to shape. They are resistant to all solvents and reagents, hot or cold, normally used in etching printed circuits or in plating edges and holes.

Normally supplied as a laminate with electrodeposited copper of ¼ to 2 ounces/ft.^{2} (8 to 70μm) on both sides, RT/duroid 5870 and 5880 composites can also be clad with rolled copper foil for more critical electrical applications. Cladding with aluminum, copper or brass plate may also be specified.

When ordering RT/duroid 5870 and 5880 laminates, it is important to specify dielectric thickness, tolerance, rolled or electrodeposited copper foil, and weight of copper foil required.



PROPERTY	TYPICAL VALUE [2]				DIRECTION	UNITS[3]	CONDITION	TEST METHOD
	RT/duroid 5870		RT/duroid 5880					
[1]Dielectric Constant, ε_r *Process*	2.33 2.33 ± 0.02 spec.		2.20 2.20 ± 0.02 spec.		Z Z		C24/23/50 C24/23/50	1 MHz IPC-TM-650 2.5.5.3 10 GHz IPC-TM 2.5.5.5
[5] Dielectric Constant, ε_r *Design*	2.33		2.20		Z		8 GHz - 40 GHz	Differential Phase Length Method
Dissipation Factor, tan δ	0.0005 0.0012		0.0004 0.0009		Z Z		C24/23/50 C24/23/50	1 MHz IPC-TM-650, 2.5.5.3 10 GHz IPC-TM-2.5.5.5
Thermal Coefficient of ε_r	-115		-125			ppm/°C	-50 - 150°C	IPC-TM-650, 2.5.5.5
Volume Resistivity	2 X 10^7		2 X 10^7		Z	Mohm cm	C96/35/90	ASTM D257
Surface Resistivity	2 X 10^7		3 X 10^7		Z	Mohm	C/96/35/90	ASTM D257
Tensile Modulus	Test at 23°C	Test at 100°C	Test at 23°C	Test at 100°C		MPa (kpsi)	A	ASTM D638
	1300 (189)	490 (71)	1070 (156)	450 (65)	X			
	1280 (185	430 (63)	860 (125)	380 (55)	Y			
ultimate stress	50 (7.3)	34 (4.8)	29 (4.2)	20 (2.9)	X			
	42 (6.1)	34 (4.8)	27 (3.9)	18 (2.6)	Y			
ultimate strain	9.8	8.7	6.0	7.2	X	%		
	9.8	8.6	4.9	5.8	Y			
Compressive Modulus	1210 (176)	680 (99)	710 (103)	500 (73)	X	MPa (kpsi)	A	ASTM D695
	1360 (198)	860 (125)	710 (103)	500 (73)	Y			
	803 (120)	520 (76)	940 (136)	670 (97)	Z			
ultimate stress	30 (4.4)	23 (3.4)	27 (3.9)	22 (3.2)	X			
	37 (5.3)	25 (3.7)	29 (5.3)	21 (3.1)	Y			
	54 (7.8)	37 (5.3)	52 (7.5)	43 (6.3)	Z			
ultimate strain	4.0	4.3	8.5	8.4	X	%		
	3.3	3.3	7.7	7.8	Y			
	8.7	8.5	12.5	17.6	Z			
Deformation Under Load, Test at 150°C			1.0		Z	%	24hr/14 MPa (2 Kpsi)	ASTM D621
Heat Distortion Temperature	>260 (>500)		>260 (>500)		X,Y	°C (°F)	1.82 MPa (264 psi)	ASTM D648
Specific Heat	0.96 (0.23)		0.96 (0.23)			J/g/K (cal/g/C)		Calculated
Moisture Absorption	0.02		0.02			%	.062" (1.6mm) D48/50	ASTM D570
Thermal Conductivity	0.22		0.20		Z	W/m/K	80°C	ASTM C518
Coefficient of Thermal Expansion	22 28 173		31 48 237		X Y Z	ppm/°C	0-100°C	IPC-TM-650, 2.4.41
Td	500		500			°C TGA		ASTM D3850
Density	2.2		2.2			gm/cm^3		ASTM D792
Copper Peel	27.2 (4.8)		31.2 (5.5)			pli (N/mm)	1 oz (35μm) EDC foil after solder float	IPC-TM-650 2.4.8
Flammability	V-0		V-0					UL94
Lead-Free Process Compatible	Yes		Yes					

[1] Specification values are measured per IPC-TM-650, method 2.5.5.5 @ ~10GHz, 23°C. Testing based on 1 oz. electrodeposited copper foil. ε_r values and tolerance reported by IPC-TM-650 method 2.5.5.5 are the basis for quality acceptance, but for some products these values may be incorrect for design purposes, especially microstrip designs. We recommend that prototype boards for new designs be verified for desired electrical performance.
[2] Typical values should not be used for specification limits, except where noted.
[3] SI unit given first with other frequently used units in parentheses.
[4] References: Internal TR's 1430, 2224, 2854. Test were at 23°C unless otherwise noted.
[5] The design Dk is an average number from several different tested lots of material and on the most common thickness/s. If more detailed information is required, please contact Rogers Corporation. Refer to Rogers' technical paper "Dielectric Properties of High Frequency Materials" available at http://www.rogerscorp.com/acm.

STANDARD THICKNESS	STANDARD PANEL SIZE	STANDARD COPPER CLADDING
0.005" (0.127mm), 0.031" (0.787mm) 0.010" (0.254mm), 0.062" (1.575mm) 0.015" (0.381mm), 0.125" (3.175mm) 0.020" (0.508mm),	18" X 12" (457 X 305mm) 18" X 24" (457 X 610mm) 18" X 36" (457 X 915mm) 18" X 48" (457 X 1.224m)	¼ oz. (9 μm) electrodeposited copper foil. ½ oz. (17μm), 1 oz. (35μm), 2 oz. (70μm) electrodeposited and rolled copper foil. Thick metal cladding are also available. Contact customer service for available claddings and panel sizes.

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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