High Frequency
Circuit Materials

Rogers Corporation
Microwave Materials Division
100 S. Roosevelt Avenue
Chandler, AZ 85226 U.S.A.
Tel: 480 961-1382
Fax: 480 961-4533
Website: http://www.rogers-corp.com/mwu/
litmwu@rogers-corp.com

ROGERS 3001 BONDING FILM

Rogers 3001 bonding film is a thermoplastic choloflu-orocopolymer. It is recommended for bonding low dielectric constant PTFE (TEFLON® fluorocarbon polymer) microwave stripline packages and other multilayer circuits. It may also be used to bond metal ground planes, or other structural and electrical components, to the dielectric.

Rogers 3001 bonding film features a low dielectric constant and low loss tangent at microwave frequencies, ensuring minimum interference with the electrical function of bonded stripline and other multilayer constructions. It is compatible with Rogers RT/duroid® low dielectric constant laminates, ULTRALAM® woven glass/PTFE microwave circuit laminates, RT/duroid® 6002 ceramic filled circuit material, and other PTFE-based low dielectric constant substrates.

Its high temperature resistance and chemical inertness ensure that assemblies bonded with 3001 bonding film will meet or exceed the most stringent process and environmental specifications.

Reliable bonds can be achieved with ROGERS 3001 bonding film using equipment readily available in the printed circuit fabrication industry. Laminating techniques are familiar to most primed circuit fabrication shops. Special treatments or surface priming are not necessary when bonding circuit boards from which electrodeposited copper has been etched. The film is easily cut to size, and accurate relief holes for tooling slots and surface mounted launchers may be punched.

Rogers 3001 bonding film is available in a thickness of 0.0015", in continuous 12" wide rolls, on standard 3" ID cores. Properly designed packaging and plastic cores ensure freedom from airborne contamination, and paper of cardboard "lint".

(See reverse for product data.)

PROPERTY		TYPICAL VALUE	DIRECTION	UNITS	CONDITION	TEST METHOD
Dielectric Constant		2.28	Z	-	X-band [1]	ASTM D3380
Dissipation Factor		0.003	Z	-	X-band	ASTM D3380
Volume Resistivity		10^{11}	-	Mohm/cm	25 C	ASTM D257
Surface Resistivity		10^{9}	X,Y	Mohm	25 C	ASTM D257
Dielectric Strength		2500	Z	V/mil		ASTM D149
Thickness		0.0015	Z	inch		Micrometer
Water Absorption		0.05		%	24 hrs/23 C	ASTM D570
Bond Strength		1400	Z	psi	A	[2]
Tensile Strength	MD CMD	7.5 5.5	X Y	kpsi kpsi		ASTM D882 ASTM D882
Elongation	MD CMD	115 200	X Y	% %		ASTM D882 ASTM D882
Youngs Modulus	MD CMD	140 150	X Y	kpsi kpsi		ASTM D882 ASTM D882
Thermal Conductivity		0.22	Z	W/m/K		
Maximum Use Temperature		280		C		
Crystaline Melt					10K/min	DSC[3]
	Onset	168		C		
	Nominal	186		C		
	Peak	197		C		
	Endotherm	12		J/g		

Chemical Resistance - 2 weeks/ambient						
	Weight Increase (%)	**Visual Effect**		**Weight Increase** (%)	**Visual Effect**	
Acetone	5.17	Cloudy, Very Flexible	Methyl Ethyl Ketone	5.9	Very Flexible	
Ammonium Hydroxide	None	None	Nitric Acid - 70%	None	None	
Carbon Tetrachloride	4.1	Flexible	Sodium Hydroxide - 50%	None	None	
Ethanol	None	None	Sulfuric Acid - 30%	None	None	
Hydrochloric Acid - 36%	None	None	Toluene	2.8	Flexible	
Hydrofluoric Acid - 60%	None	None	Trichloroethlene	10.9	Cloudy, Very Flexible	
Methanol	0.1	None	Trichlorofluoroethane	-	Cloudy, Very Flexible	

Notes:
(1) Updating of ASTM D3390 is in progress, and the updated apparatus and procedure covered in IPC-TM-650, method 2.5.5.5, stripline resonant cavity at X-Band are used. Two stacks of 40 piles of film are used.
[2] A specimen of two 0.062" thick pieces of RT/duroid®5880 microwave circuit laminate is machined with 0.500" diameter groove cut just through the bond line on one side and concentric with a 0.375" diameter hole just through the bond line from the other side. Breaking force to pull apart the isolated bond area of 0.375" ID/0.500" OD (0.86 $in.^2$) is measured at 0.050 in/min. cross head speed.
[3] Differential scanning calorimetry test is on a 8 mg specimen which was melted by heating to 240°C followed by slow cooling to 40°C before a second heating for the measurement.

ROGERS
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Website: http://www.rogers-corp.com/mwu/
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