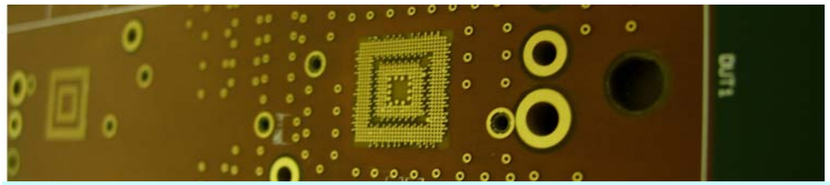

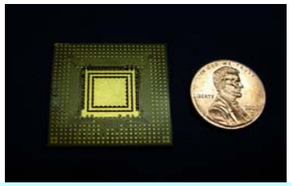

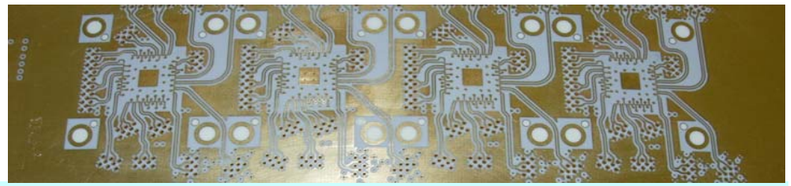

Material Data Sheet

Substrate Manufacturer	IPC4101 Slash No.	IPC4103 Slash No.	Lead Free	CAF Resistant	Tg (Celcius)	Er @ 1MHz (Dielectric Constant)	Er @ 1GHz	Er @ 10GHz	Df @ 1MHz (Loss Tangent)	Df @ 1 GHz	Df @ 10GHz	Volume Restivity (megohms-cm) C-96/35/90	Volume Resistivity E-24/125	Surface Resistivity (megohms) C-96/35/91	Surface Resistivity E-24/125	Arc Resistance (seconds)	Electrical Strength (Volts/mil)	Moisture Absorbtion (%)	CTE X (PPM/C)	CTE Y (PPM/C)	CTE Z (PPM/C)	Applications
Nelco / Neltec																						
N4000-6 Epoxy/Woven Glass	/24				180	4.3	4.2	4	.023			10^{8}	10^{7}	10^{7}	10^{7}	70	1300	.1	12-16	12-16	4.1%	High Performance FR-4
N4000-13 Epoxy/Woven Glass	/29				210		3.8	3.6			.014	10^{8}	10^{7}	10^{7}	10^{7}	123	1200	.1	10-14	10-14	3.5%	High Performance, High Frequency Impedance Control
N4000-13 SI Epoxy/Woven "SI" Glass	/29				210		3.5	3.2			.01	10^{8}	10^{8}	10^{7}	10^{7}	123	1000	.1	9-13	9-13	3.5%	High Performance, High Frequency Impedance Control
N5000 BT/Woven Glass	/30				185		3.8	3.6			.014	10^{7}	10^{7}	10^{6}	10^{7}	118	1200	<.05	10-14	10-14	3.8%	High Performance, BT
N7000-2 Polyimide/Woven Glass	/40				260		3.8	3.5			.015	10^{7}	10^{7}	10^{7}	10^{7}	100	1200	.35	9-12	9-12	<2.5%	High Performance, High Temperature
N8000 Cyanate Ester/Woven Glass	/70				250	3.9	3.7	3.6	.008	0.008		10^{7}	10^{7}	10^{7}	10^{7}	160	1650	<.05	11-13	11-13	2.5%	High Performance, High Temperature
Rogers Corporation																						
RO4003 Hydrocarbon/Ceramic/Woven Glass		/10			280			3.38			.0027	$1.7x10^{10}$		$4.2x10^{9}$				.06	11	14	46	High Frequency RF Circuit Material
RO4350 Hydrocarbon/Ceramic/Woven Glass		/10			280			3.48			.004	$1.2x10^{10}$		$5.7x10^{9}$				.06	14	16	50	High Frequency RF Circuit Material
RO4403 Hydrocarbon/Ceramic/Woven Glass		/10			280			3.17			.005	$3.3x10^{10}$		$5.7x10^{9}$			1000	.05	16	19	80	High Frequency RF Circuit Material
RO4450 Hydrocarbon/Ceramic/Woven Glass		/11			280			3.54			.004	$2.5x10^{10}$		$1.9x10^{8}$			1000	.05	19	17	60	High Frequency RF Circuit Material
Arlon																						
25N Organic/Woven Glass/Ceramic		/10						3.38			.0025	$1.9x10^{9}$		$4.42x10^{8}$				.09	15	15	52	High Frequency RF Circuit Material
25FR Organic/Woven Glass/Ceramic		/11						3.58			.0035	$4.17x10^{8}$		$8.9x10^{8}$				.09	16	18	59	High Frequency RF Circuit Material
45N Epoxy/Woven Glass	/24				175	4.2-4.6			.025				$3.3x10^{7}$		$2.9x10^{7}$	65	1500	.1	14-16	14-16	55	
GE Electromaterials																						
Getek Epoxy/PPO/Woven Glass	/25		Y	N	180	3.8-3.9			.010-.015			>106		>104		122	1100	.12(.028)			3.8%	High Performance, High Frequency Impedance Control
Isola Laminate Systems																						
FR406 Epoxy/Woven Glass	/24			N	175	4.5	4.29		.023	0.014		$9x10^{6}$	$2x10^{6}$	$3x10^{6}$	$8x10^{6}$	75	1000	.20(.028)	14	13	140	High Performance FR4
FR408 Epoxy/Woven Glass	/24			Y	180		3.7		.01			10^{8}	10^{8}	10^{6}	10^{8}	120	1400	.15(.028)	13	13	120	High Performance, High Frequency Impedance Control
P95 Polyimide/Woven Glass	/41			N	250	4.4	4.2		.016	0.014		$4x10^{8}$	$2.4x10^{8}$	$4x10^{8}$	10^{8}	131	1200	.54(.028)	14	17	55	High Performance, High Temperature
FR-370-HR Enhanced Epoxy/Woven Glass	/26			Y	180		3.7			0.026		$3x10^{7}$		$3x10^{6}$		115	1350	.15%	13	13	50	High Performance, Low CTE-Z FR4
PCL-370 Turbo	/24				175		4.1			0.022		$3x10^{7}$		$3x10^{6}$		125	1300	.15%	13	13	50	High Performance FR4
IS410				Y	180			3.96			.027											
IS415				Y																		
IS620																						
W.L Gore & Associates																						
Speedboard C Cyanate Ester/PTFE/Woven Glass					220	2.6	2.6	2.6	.0038-.0044	.0035-.0041	.0028-.0046						>1000		56	56	56	High Performance, Microwave and High Speed Impedance Control