

Manufacture	Product	Type	IPC-4101E	Lead Free Process Compatible	Halogen Free	APCT UL Approved	Flammability UL94	Glass Transition Temp Tg Celcius	Decomposition Temp by TGA Celcius	Dk 1 GHz	Dk 2-3 GHz	Dk 10 GHz	Df 1 GHz	Df 2-3 GHz	Df 10 GHz	Moisture Absorption (%)	CTE Z Axis (ppm/C) Pre Tg	% CTE Z Axis (50-200C)	Highest of CTE X, Y Axis (PPM/C) Pre Tg	Material Considered										
ITEQ	ITEQ180A	High Tg Epoxy	/98 /99 /101 /126	Yes	No	Yes	V-0	180	350		4.30	4.10		0.015	0.016	0.12%				Lead Free FR4										
Isola	370HR	High Tg Epoxy	/98 /99 /101 /126	Yes	No	Yes	V-0	180	340	4.17	4.04	3.92	0.0161	0.021	0.025	0.15%	45	2.8%	14		Lead Free FR4									
Isola	185HR	High Tg Epoxy	/98 /99 /101 /126	Yes	No	Yes	V-0	180	340	4.04	4.01	3.88	0.0192	0.0200	0.0236	0.15%	40	2.7%	14			Lead Free FR4								
Isola	IS415	High Tg Epoxy	/98 /99 /101 /126	Yes	No	Yes	V-0	200	370		3.70	3.68		0.0135	0.0138	0.15%	65	2.8%	13				Lead Free FR4							
Ventec	VT47	High Tg Epoxy	/97 /98 /99 /101 /126	Yes	No	Yes	V-0	180	345	4.3	4.20		0.016	0.017		0.13%	35	3.0%	13					Lead Free FR4						
Grace	GA-170-LL	High Tg Epoxy	/98 /99 /101 /126	Yes	No	Yes	V-0	170	340	4.38			0.0154			0.2%	43	2.7%	16						Lead Free FR4					
Nelco	N4000-29	High Tg Epoxy	/98 /99 /126 /129	Yes	No	Yes	V-0	185	350	4.3		4.00		0.015	0.017	0.15%	55	3.0%	17							Lead Free FR4				
Panasonic	R-1755V / R-1650V	High Tg Epoxy	/97 /98 /99 /101 /126	Yes	No	Yes	V-0	173	350	4.4			0.016			0.12%	44		15								Lead Free FR4			
Nan ya	NP-140TL	Mid Tg Epoxy	/21	Yes	No	Yes	V-0	140	310	3.9			0.013			0.20-0.30%	50-70											Lead Free FR4		
EMC	EM-827	High Tg Epoxy	/98 /99 /101 /126	Yes	No	No	V-0	175	350	4.2			0.019			0.12%	45	2.6%	15										Lead Free FR4	
Kingboard	KB6167	High Tg Epoxy	/126	Yes	No	Yes	V-0	175	350	4.5(1MHz)			0.017(1MHz)			0.080%	49	2.7%	15											Lead Free FR4
Shengyi	S1000-2	High Tg Epoxy	/126	Yes	No	Yes	V-0	170	345	4.8(1MHz)			0.013(1MHz)			0.1%	45	2.8%												
EMC	EM-370(D)	Halogen Free High Tg Epoxy	/127 /128 /130	Yes	Yes	Yes	V-0	175	385	4.1		4.00	0.011		0.015	0.1%	40	2.2%	15	Halogen Free										
Panasonic	R-1566W / R-1551W	Halogen Free High Tg Epoxy	/127 /128	Yes	Yes	Yes	V-0	148	350	4.6			0.010			0.14%	40		15		Halogen Free									
Panasonic	Meg2 (R-1577 / R-1570)	Halogen Free High Tg Epoxy	/127 /128 /130	Yes	Yes	Yes	V-0	170	380	4.1			0.010			0.14%	34		16			Halogen Free								
Nan ya	NPG-150N	Halogen Free Mid Tg Epoxy	/127 /128	Yes	Yes	Yes	V-0	150	310	4.2			0.012			0.05-0.10%	50-70						Halogen Free							
Nan ya	NPG-170N	Halogen Free Mid Tg Epoxy	/127 /128	Yes	Yes	Yes	V-0	170	360	4.2			0.013			0.25%	30-50		13					Halogen Free						
Isola	I-Speed	Modified Epoxy	/98 /99 /101 /126	Yes	No	Yes	V-0	180	360	3.65	3.64	3.63	0.0058	0.006	0.0071	0.061%	60	2.7%	16	Low Loss										
Isola	FR408HR	Modified Epoxy	/98 /99 /101 /126	Yes	No	Yes	V-0	180	360	3.69	3.68	3.65	0.0091	0.0092	0.0095	0.15%	60	3.5%	14		Low Loss									
Panasonic	Meg4 (R-5725 /R-5620)	Modified Epoxy	/91 /102	Yes	No	Yes	V-0	176	360	3.8			0.005			0.14%	35		15			Low Loss								
EMC	EM-888	Halogen Free Modified Epoxy	/127 /128 /130	Yes	Yes	Yes	V-0	170	380	3.9		3.80	0.006		0.008	0.05%	50	2.6%	15				Low Loss							
EMC	EM-888(S)	Halogen Free Modified Epoxy	/127 /128 /130	Yes	Yes	Yes	V-0	170	380	3.9		3.80	0.006		0.008	0.05%	45	2.4%	15					Low Loss						
EMC	EM-888(K)	Halogen Free Modified Epoxy	/127 /128 /130	Yes	Yes	Yes	V-0	170	380	3.3		3.20	0.005		0.006	0.05%	50	2.6%	15						Low Loss					
Nelco	N4000-13EP	Modified Epoxy	/29	Yes	No	Yes	V-0	210	350	3.7	3.70	3.60		0.009	0.009	0.1%	65	3.4%	14							Low Loss				
Nelco	N4000-13EPSI	Modified Epoxy	/29	Yes	No	Yes	V-0	210	350	3.4	3.20	3.20		0.008	0.008	0.1%	65	3.4%	13								Low Loss			
Isola	I-Tera MT40 / RF	Modified Epoxy	IPC-4103 /17	Yes	No	Yes	V-0	200	360		3.45	3.45	0.0031	0.0031	0.0031	0.1%	55	2.8%	12	High Speed Digital										
Isola	Tachyon-100G	Modified Epoxy	IPC-4103 /17	Yes	No	Yes	V-0	200	380		3.04	3.02		0.0021	0.0021	0.05%	45	2.5%	15		High Speed Digital									
Panasonic	Meg6 (R-5775/R-5670)	Modified Epoxy	/91/102	Yes	No	Yes	V-0	185	410	3.71			0.002		0.004	0.14%	45		16			High Speed Digital								
Rogers	RO4450F	Hydrocarbon/Ceramic	IPC-4103A /11 /240	Yes	No	Yes	V-0	>280				3.52			0.004	0.05%			19				High Speed Digital							
Rogers	RO4350B	Hydrocarbon/Ceramic	IPC-4103A /11 /240	Yes	No	Yes	V-0	280				3.48		0.0031	0.0037	0.05%	35		16					High Speed Digital						
Rogers	RO4360G2	Hydrocarbon/Ceramic	IPC-4103A /11 /240	Yes	No	No	V-0	>280	>350			6.15		0.003	0.0038	0.08%	28		14						High Speed Digital					
Rogers	RO4835	Hydrocarbon/Ceramic	IPC-4103 /11	Yes	No	No	V-0	>280				3.48			0.0037	0.05%	26		11							High Speed Digital				
Rogers	RO4003	Hydrocarbon/Ceramic	IPC-4103 /10	Yes	No	No	V-0	280				3.38			0.0027	0.04%	46		11								High Speed Digital			
Rogers	RO4533	Hydrocarbon/Ceramic		Yes	No	No	V-0	280				3.30		0.0020	0.0025	0.02%												High Speed Digital		
Nelco	N4350-13-RF	Modified Epoxy	/29	Yes	No	No	V-0	210	350			3.50			0.0065	0.1%		3.50%	14										High Speed Digital	
TUC	TU-883	Modified Epoxy		Yes	Yes	No	V-0	170	420	3.6		3.57	0.0030		0.0046	0.08%	35	2.5%												High Speed Digital
TUC	TU-883SP	Modified Epoxy		Yes	Yes	No	V-0	170	420			3.22			0.0029	0.08%	35	2.5%												
Taconic	TLX	PTFE / Glass		Yes	No	No	V-0					2.50		0.0019	0.0019	0.02%				RF										
Taconic	TLY-5	PTFE / Glass		Yes	No	No	V-0					2.20			0.0009	0.02%	217				RF									
Taconic	RF35	Ceramic / PTFE		Yes	No	No	V-0				3.50			0.0018		0.02%	64		24			RF								
Taconic	RF35TC	Ceramic / PTFE		Yes	No	No	V-0				3.50			0.0011		0.05%	34		13				RF							
Taconic	TSM-DS3	Ceramic / PTFE		Yes	No	No	V-0		526		3.00				0.0011	0.07%	23		16					RF						
Isola	Astra MT77	Epoxy	IPC-4103 /17	Yes	No	Yes	V-0	190-200	260-288		3.00	3.00		0.0017	0.0017	0.1%	50-70		12						RF					
Isola	Astra MT77 Pre-Preg	Epoxy	IPC-4103 /17	Yes	No	Yes	V-0	190-200	260-288		3.00	3.00		0.0017	0.0017	0.1%	50-70		12							RF				
Rogers	RT/Duroid 5870	PTFE / Glass		Yes	No	No	V-0	500				2.33	0.0005(1MHz)		0.0012	0.02%	173		28								RF			
Rogers	RT/Duroid 5880	PTFE / Glass		Yes	No	No	V-0	500				2.20	0.0004(1MHz)		0.0009	0.02%	237		48									RF		
Rogers	RT/Duroid 6002	Ceramic / PTFE		Yes	No	No	V-0	500				2.94			0.0012	0.02%	24		16										RF	
Rogers	RT/Duroid 6006	Ceramic / PTFE		Yes	No	No	V-0	500				6.15			0.0027	0.05%	117		47											RF
Rogers	RT/Duroid 6010	Ceramic / PTFE		Yes	No	No	V-0	500				10.2			0.0023	0.01%	47		24											
Rogers	RT/Duroid 6202	Ceramic / PTFE		Yes	No	No	V-0	500				2.90			0.0015	0.04%	30		15	RF										
Rogers	RO3203	Ceramic/PTFE		Yes	No	No	V-0	500				3.02			0.0016	<0.1%	58		13		RF									
Rogers	RO3003	Ceramic/PTFE		Yes	No	No	V-0	500				3.00			0.0010	<0.1%	25		17			RF								
Rogers	TMM-3	Ceramic thermoset polymer		Yes	No	No	V-0	425				3.27			0.0020	0.06-0.12%	23		15				RF							
Rogers	TMM-10	Ceramic thermoset polymer		Yes	No	No	V-0	425				9.20			0.0022	0.09-0.20%	20		21					RF						
Isola	P95	Polyimide	/40 /41	Yes	No	No	HB	260	416	3.95	3.76	3.74	0.0180	0.0170		0.5%	55		14						Polyimide					
Isola	P96	Polyimide	/40 /41	Yes	No	Yes	HB	250	382	3.78	3.76	3.73	0.0172	0.0179	0.021	0.5%	55	1.5%	14							Polyimide				
Ventec	VT901	Polyimide	/40 /41	Yes	No	No	V-1	250	390	4.1	4.00		0.017	0.019		0.10-0.16%	50	1.5%	14								Polyimide			
Arlon	85N	Polyimide	/40 /41 /42	Yes	No	No	HB	260		4.39(1MHz)			0.008(1MHz)			0.20%	50		16									Polyimide		
Faradflex	MC12M	Buried Capacitance	IPC-4821	Yes	No	Yes	V-0	185	385/345	3.5	3.50	3.40	0.02	0.02	0.02	1.3%	23		23						Buried Capacitance					
Faradflex	MC24M	Buried Capacitance	IPC-4821	Yes	No	Yes	V-0	185	390/350	3.48	3.48	3.37	0.016	0.017	0.017	1.3%	24		24							Buried Capacitance				
DuPont	HK04J	Buried Capacitance	IPC-4204 /1	Yes	No	Yes	V-0	225/315		3.5(1MHz)			0.005(1MHz)			0.8%	18-21										Buried Capacitance			
DuPont	Pyralux AP	Polyimide Composite	IPC-4204 /11	Yes	No	No	V-0	220		3.4(1MHz)			0.003(1MHz)			0.8%				Flex										