Elite Material Co., Ltd.
http://www.emctw.com

Memorandum

Material Type : EM-528

REV. 2018 Dec.

Laminate Thickness		Construction	R/C(%)	Typical Dk									Typical Df								
mil	um			1MHz	1GHz	2GHz	3GHz	4GHz	5GHz	6GHz	10GHz	20GHz	1MHz	1GHz	2GHz	3GHz	4GHz	5GHz	6GHz	10GHz	20GHz
2.0 ± 0.5	51 ± 13	1035 x 1	67.0	3.76	3.67	3.66	3.64	3.62	3.61	3.60	3.55	3.51	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
2.5 ± 0.5	64 ± 13	1078 × 1	59.0	3.94	3.84	3.83	3.81	3.80	3.78	3.77	3.72	3.68	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
3.0 ± 0.5	76 ± 13	1078 x 1	65.0	3.80	3.70	3.69	3.67	3.65	3.64	3.63	3.58	3.55	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
3.0 ± 0.5	76 ± 13	1086 x 1	62.0	3.88	3.79	3.78	3.75	3.74	3.72	3.71	3.66	3.62	0.003	0.005	0.005	0.005	0.005	0.006	0.006	0.006	0.006
3.0 ± 0.5	76 ± 13	1037 x 2	66.0	3.78	3.69	3.68	3.66	3.64	3.63	3.62	3.57	3.53	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
3.5 ± 0.5	89 ± 13	1086 x 1	67.0	3.76	3.67	3.66	3.64	3.62	3.61	3.60	3.55	3.51	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
3.5 ± 0.5	89 ± 13	3313 x 1	52.5	4.10	4.01	4.00	3.97	3.96	3.95	3.94	3.87	3.84	0.003	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.006
3.5 ± 0.5	89 ± 13	1037 x 2	70.5	3.68	3.59	3.58	3.55	3.54	3.52	3.51	3.48	3.43	0.003	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006
4.0 ± 0.5	102 ± 13	3313 x 1	57.5	3.99	3.89	3.88	3.86	3.84	3.83	3.82	3.76	3.72	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
4.0 ± 0.5	102 ± 13	1035 x 2	67.0	3.76	3.67	3.66	3.64	3.62	3.61	3.60	3.55	3.51	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
4.5 ± 0.5	114 ± 13	1035 x 2	70.0	3.69	3.60	3.59	3.57	3.55	3.54	3.52	3.49	3.45	0.003	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006
5.0 ± 0.7	127 ± 18	2116 x 1	57.0	3.99	3.89	3.88	3.86	3.84	3.83	3.82	3.76	3.72	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
5.0 ± 0.7	127 ± 18	1078 x 2	59.0	3.94	3.84	3.83	3.81	3.80	3.78	3.77	3.72	3.68	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
6.0 ± 0.7	152 ± 18	1078 x 2	65.0	3.80	3.70	3.69	3.67	3.65	3.64	3.63	3.58	3.55	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
8.0 ± 1.0	203 ± 25	7628 × 1	47.5	4.22	4.12	4.11	4.09	4.08	4.07	4.06	3.98	3.95	0.003	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.007
8.0 ± 1.0	203 ± 25	3313 × 2	57.5	3.99	3.89	3.88	3.86	3.84	3.83	3.82	3.76	3.72	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
10.0 ± 1.0	254 ± 25	2116 × 2	57.0	3.99	3.89	3.88	3.86	3.84	3.83	3.82	3.76	3.72	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
12.0 ± 1.5	305 ± 38	3313 x 3	57.5	3.99	3.89	3.88	3.86	3.84	3.83	3.82	3.76	3.72	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
14.0 ± 1.5	356 ± 38	7628 x 2	43.5	4.32	4.21	4.20	4.18	4.17	4.16	4.15	4.07	4.04	0.003	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.007
16.0 ± 1.5	406 ± 38	7628 × 2	48.0	4.21	4.11	4.10	4.08	4.07	4.05	4.05	3.97	3.94	0.003	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.007
20.0 ± 2.0	508 ± 51	2116 × 4	57.0	3.99	3.89	3.88	3.86	3.84	3.83	3.82	3.76	3.72	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
21.0 ± 2.0	533 ± 51	7628 × 3	43.5	4.32	4.21	4.20	4.18	4.17	4.16	4.15	4.07	4.04	0.003	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.007
28.0 ± 2.0	711 ± 51	7628 × 4	43.5	4.32	4.21	4.20	4.18	4.17	4.16	4.15	4.07	4.04	0.003	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.007

Test method: JIS C2565

Note1: Df value would be varied by different test method. Generally, JIS C2565 test method would have higher Df value around 20%-30% compared to IPC 2.5.5.5 method.

Note2. The thickness which is 31mil and below does not include copper.

Note3: The data above show actual values and are not guaranteed.

www.ritpcb.com

Material Type : EM-528B

REV. 2018 Dec.

PP Type	R/C (%)	100% Cu Pressed		Typical Dk									Typical Df								
		mil	um	1MHz	1GHz	2GHz	3GHz	4GHz	5GHz	6GHz	10GHz	20GHz	1MHz	1GHz	2GHz	3GHz	4GHz	5GHz	6GHz	10GHz	20GHz
1017	77.0	1.1	28	3.52	3.44	3.43	3.40	3.38	3.37	3.36	3.33	3.29	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
1027	69.0	1.4	36	3.71	3.62	3.61	3.59	3.57	3.56	3.55	3.51	3.47	0.003	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006
	73.0	1.6	41	3.62	3.53	3.52	3.50	3.48	3.46	3.45	3.42	3.38	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
1037	73.0	1.8	46	3.62	3.53	3.52	3.50	3.48	3.46	3.45	3.42	3.38	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
	75.0	2.0	51	3.57	3.48	3.48	3.45	3.43	3.42	3.41	3.38	3.33	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
1035	73.0	2.4	61	3.62	3.53	3.52	3.50	3.48	3.46	3.45	3.42	3.38	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
	75.0	2.6	66	3.57	3.48	3.48	3.45	3.43	3.42	3.41	3.38	3.33	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
106	73.0	2.0	51	3.62	3.53	3.52	3.50	3.48	3.46	3.45	3.42	3.38	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
	77.0	2.4	61	3.52	3.44	3.43	3.40	3.38	3.37	3.36	3.33	3.29	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
1067	69.0	2.1	53	3.71	3.62	3.61	3.59	3.57	3.56	3.55	3.51	3.47	0.003	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006
	73.0	2.4	61	3.62	3.53	3.52	3.50	3.48	3.46	3.45	3.42	3.38	0.003	0.004	0.005	0.005	0.005	0.005	0.005	0.006	0.006
1078	65.0	2.9	74	3.81	3.72	3.71	3.68	3.67	3.65	3.64	3.60	3.56	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
	67.0	3.1	79	3.76	3.67	3.66	3.64	3.62	3.61	3.60	3.55	3.51	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
	69.0	3.3	84	3.71	3.62	3.61	3.59	3.57	3.56	3.55	3.51	3.47	0.003	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006
	71.0	3.6	91	3.67	3.58	3.57	3.54	3.53	3.51	3.50	3.47	3.42	0.003	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006
1080	65.0	2.9	74	3.81	3.72	3.71	3.68	3.67	3.65	3.64	3.60	3.56	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
	67.0	3.1	79	3.76	3.67	3.66	3.64	3.62	3.61	3.60	3.55	3.51	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
	69.0	3.3	84	3.71	3.62	3.61	3.59	3.57	3.56	3.55	3.51	3.47	0.003	0.004	0.005	0.005	0.005	0.005	0.006	0.006	0.006
3313	59.0	4.0	102	3.95	3.85	3.85	3.82	3.81	3.79	3.78	3.73	3.69	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
	61.0	4.3	109	3.90	3.81	3.80	3.78	3.76	3.75	3.74	3.68	3.65	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
	63.0	4.6	117	3.85	3.76	3.75	3.73	3.71	3.70	3.69	3.64	3.60	0.003	0.004	0.005	0.005	0.005	0.006	0.006	0.006	0.006
2116	57.0	4.9	124	4.00	3.90	3.89	3.87	3.85	3.84	3.83	3.77	3.74	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
	59.0	5.2	132	3.95	3.85	3.85	3.82	3.81	3.79	3.78	3.73	3.69	0.003	0.005	0.005	0.005	0.006	0.006	0.006	0.006	0.006
7628	45.0	7.4	188	4.28	4.18	4.17	4.15	4.14	4.13	4.12	4.03	4.00	0.003	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.007
	47.0	7.9	201	4.23	4.13	4.12	4.10	4.09	4.08	4.07	3.99	3.96	0.003	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.007

Test method: JIS C2565

Note1: Df value would be varied by different test method. Generally, JIS C2565 test method would have higher Df value around 20%-30% compared to IPC 2.5.5.5 method.

Note2: The data above show actual values and are not guaranteed.

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