

Data Sheet

**Halogen Free & Ultra-low transmission loss
Multi-layer circuit board materials**

Halogen-free  **MEGTRON6**

**Laminate R-5375
Prepreg R-5370**

Any letters with parentheses () at the end of a part number are for identification code in our company and are not included in the part numbers registered for UL certification.

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Partnering to go beyond.

Electronic Materials
Panasonic Industry

General Properties / Laminate R-5375(E) & R-5375(N)

Items		Units	Test Method	Condition	Typical Values		
					R-5375(E) E-glass	R-5375(N) Low Dk-glass	
THERMAL	Glass Transition Temp (Tg)		C	TMA	As received	210	210
				DMA	As received	250	250
	Thermal Decomposition Temp (Td)		C	TGA	As received	435	435
	Time to Delam (T288)	Without Cu	Min	IPC TM-650 2.4.24.1	As received	> 120	> 120
		With Cu	Min	IPC TM-650 2.4.24.1	As received	> 120	> 120
	CTE : $\alpha 1$	X - axis	ppm / C	IPC TM-650 2.4.24	< Tg	14 - 16	14 - 16
		Y - axis	ppm / C	IPC TM-650 2.4.24	< Tg	14 - 16	14 - 16
		Z - axis	ppm / C	IPC TM-650 2.4.24	< Tg	39	39
CTE : $\alpha 2$	Z - axis	ppm / C	IPC TM-650 2.4.24	> Tg	200	200	
ELECTRICAL	Dielectric Constant (Dk)	@1GHz	-	IPC TM-650 2.5.5.9	C-24/23/50	3.72	3.42
		@ 13GHz	-	*Note 1	C-24/23/50	3.66	3.36
	Dissipation Factor (Df)	@1GHz	-	IPC TM-650 2.5.5.9	C-24/23/50	0.002	0.001
		@ 13GHz	-	*Note 1	C-24/23/50	0.0037	0.0029
PHYSICAL	Water Absorption		%	IPC TM-650 2.6.2.1	D-24/23	0.22	0.23
	Peel Strength	1oz (HVLP2)	kN / m	IPC TM-650 2.4.8	As Received	0.6	0.6
	Flammability		-	UL 94V	C-48/23/50	94V-0+1	94V-0+1

†1 The value represents Panasonic internal test results based on the UL94 test method for flammability and is NOT intended to indicate that the product is UL certified. If UL certification is required, use R-537Y(E) and R-537Y(N) for the UL recognized grades.

Sample thickness ; 29.5 mil = 0.75 mm

Note 1: Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

* The data in the above table represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Laminate R-5375(E) : E glass

1GHz ; IPC TM650-2.5.5.9

13-56GHz ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Core Type	Actual Thickness		Cloth Style	ply	Typical Resin Content (%)	Typical Dk					
	mil	mm				1GHz	13GHz	24GHz	35GHz	46GHz	56GHz
2	2.0	0.050	1035	1	65	3.49	3.40	3.40	3.40	3.40	3.40
2.6	2.6	0.065	1078	1	57	3.64	3.56	3.56	3.56	3.56	3.56
3	3	0.075	1078	1	62	3.55	3.46	3.46	3.46	3.46	3.46
4	3.9	0.100	3313	1	54	3.70	3.63	3.63	3.63	3.63	3.63
4	3.9	0.100	1035	2	65	3.49	3.40	3.40	3.40	3.40	3.40
5	5.0	0.127	1078	2	57	3.64	3.56	3.56	3.56	3.56	3.56
5	4.9	0.125	2116	1	53	3.72	3.66	3.66	3.66	3.66	3.66
6	5.7	0.146	1078	2	62	3.55	3.46	3.46	3.46	3.46	3.46
8	7.9	0.200	3313	2	54	3.70	3.63	3.63	3.63	3.63	3.63
10	9.8	0.250	2116	2	53	3.72	3.66	3.66	3.66	3.66	3.66
12	11.8	0.300	3313	3	54	3.70	3.63	3.63	3.63	3.63	3.63
16	15.7	0.400	3313	4	54	3.70	3.63	3.63	3.63	3.63	3.63
20	19.7	0.500	2116	4	53	3.72	3.66	3.66	3.66	3.66	3.66
25	24.6	0.625	2116	5	53	3.72	3.66	3.66	3.66	3.66	3.66
30	29.5	0.750	2116	6	53	3.72	3.66	3.66	3.66	3.66	3.66

* The data in the above table represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Laminate R-5375(E) : E glass

1GHz ; IPC TM650-2.5.5.9

13-56GHz ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Core Type	Actual Thickness		Cloth Style	ply	Typical Resin Content (%)	Typical Df					
	mil	mm				1GHz	13GHz	24GHz	35GHz	46GHz	56GHz
2	2.0	0.050	1035	1	65	0.002	0.0034	0.0037	0.0041	0.0044	0.0047
2.6	2.6	0.065	1078	1	57	0.002	0.0036	0.0040	0.0044	0.0048	0.0051
3	3	0.075	1078	1	62	0.002	0.0035	0.0038	0.0042	0.0046	0.0049
4	3.9	0.100	3313	1	54	0.002	0.0037	0.0041	0.0045	0.0049	0.0053
4	3.9	0.100	1035	2	65	0.002	0.0034	0.0037	0.0041	0.0044	0.0047
5	5.0	0.127	1078	2	57	0.002	0.0036	0.0040	0.0044	0.0048	0.0051
5	4.9	0.125	2116	1	53	0.002	0.0037	0.0041	0.0046	0.0050	0.0053
6	5.7	0.146	1078	2	62	0.002	0.0035	0.0038	0.0042	0.0046	0.0049
8	7.9	0.200	3313	2	54	0.002	0.0037	0.0041	0.0045	0.0049	0.0053
10	9.8	0.250	2116	2	53	0.002	0.0037	0.0041	0.0046	0.0050	0.0053
12	11.8	0.300	3313	3	54	0.002	0.0037	0.0041	0.0045	0.0049	0.0053
16	15.7	0.400	3313	4	54	0.002	0.0037	0.0041	0.0045	0.0049	0.0053
20	19.7	0.500	2116	4	53	0.002	0.0037	0.0041	0.0046	0.0050	0.0053
25	24.6	0.625	2116	5	53	0.002	0.0037	0.0041	0.0046	0.0050	0.0053
30	29.5	0.750	2116	6	53	0.002	0.0037	0.0041	0.0046	0.0050	0.0053

* The data in the above table represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Prepreg R-5370(E) : E glass

1GHz ; IPC TM650-2.5.5.9

13-56GHz ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Cloth Style	Resin Content (%)	Typical Thickness (um)	Typical Dk					
			1GHz	13GHz	24GHz	35GHz	46GHz	56GHz
1027	75	49	3.31	3.22	3.22	3.22	3.22	3.22
1035	70	60	3.40	3.30	3.30	3.30	3.30	3.30
	73	68	3.35	3.25	3.25	3.25	3.25	3.25
	75	74	3.31	3.22	3.22	3.22	3.22	3.22
1080	64	76	3.51	3.42	3.42	3.42	3.42	3.42
	68	87	3.44	3.34	3.34	3.34	3.34	3.34
1078	64	77	3.51	3.42	3.42	3.42	3.42	3.42
	68	89	3.44	3.34	3.34	3.34	3.34	3.34
	72	104	3.36	3.27	3.27	3.27	3.27	3.27
	75	118	3.31	3.22	3.22	3.22	3.22	3.22
3313	54	98	3.70	3.63	3.63	3.63	3.63	3.63
	57	106	3.64	3.56	3.56	3.56	3.56	3.56
2116	56	132	3.66	3.59	3.59	3.59	3.59	3.59

* The data in the above table represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Prepreg R-5370(E) : E glass

1GHz ; IPC TM650-2.5.5.9

13-56GHz ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Cloth Style	Resin Content (%)	Typical Thickness (um)	Typical Df					
			1GHz	13GHz	24GHz	35GHz	46GHz	56GHz
1027	75	49	0.002	0.0032	0.0034	0.0037	0.0040	0.0043
1035	70	60	0.002	0.0033	0.0036	0.0039	0.0042	0.0045
	73	68	0.002	0.0032	0.0035	0.0038	0.0041	0.0044
	75	74	0.002	0.0032	0.0034	0.0037	0.0040	0.0043
1080	64	76	0.002	0.0034	0.0038	0.0041	0.0045	0.0048
	68	87	0.002	0.0033	0.0036	0.0040	0.0043	0.0046
1078	64	77	0.002	0.0034	0.0038	0.0041	0.0045	0.0048
	68	89	0.002	0.0033	0.0036	0.0040	0.0043	0.0046
	72	104	0.002	0.0032	0.0035	0.0038	0.0042	0.0044
	75	118	0.002	0.0032	0.0034	0.0037	0.0040	0.0043
3313	54	98	0.002	0.0037	0.0041	0.0045	0.0049	0.0053
	57	106	0.002	0.0036	0.0040	0.0044	0.0048	0.0051
2116	56	132	0.002	0.0036	0.0040	0.0044	0.0048	0.0052

* The data in the above table represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Laminate R-5375(N) : Low-Dk glass

1GHz ; IPC TM650-2.5.5.9

13-58GHz ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Core Type	Actual Thickness		Cloth Style	ply	Typical Resin Content (%)	Typical Dk					
	mil	mm				1GHz	13GHz	24GHz	36GHz	47GHz	58GHz
2	2.0	0.050	1035	1	67	3.27	3.20	3.20	3.20	3.20	3.20
2.6	2.6	0.065	1078	1	59	3.37	3.30	3.30	3.30	3.30	3.30
3	3	0.075	1078	1	64	3.31	3.24	3.24	3.24	3.24	3.24
4	3.9	0.100	2013	1	56	3.41	3.34	3.34	3.34	3.34	3.34
4	3.9	0.100	1035	2	67	3.27	3.20	3.20	3.20	3.20	3.20
5	5.0	0.127	1078	2	59	3.37	3.30	3.30	3.30	3.30	3.30
5	4.9	0.125	2116	1	55	3.42	3.36	3.36	3.36	3.36	3.36
6	5.7	0.146	1078	2	64	3.31	3.24	3.24	3.24	3.24	3.24
8	7.9	0.200	2013	2	56	3.41	3.34	3.34	3.34	3.34	3.34
10	9.8	0.250	2116	2	55	3.42	3.36	3.36	3.36	3.36	3.36
12	11.8	0.300	2013	3	56	3.41	3.34	3.34	3.34	3.34	3.34
16	15.7	0.400	2013	4	56	3.41	3.34	3.34	3.34	3.34	3.34
20	19.7	0.500	2116	4	55	3.42	3.36	3.36	3.36	3.36	3.36
25	24.6	0.625	2116	5	55	3.42	3.36	3.36	3.36	3.36	3.36
30	29.5	0.750	2116	6	55	3.42	3.36	3.36	3.36	3.36	3.36

* The data in the above table represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Laminate R-5375(N) : Low-Dk glass

1GHz ; IPC TM650-2.5.5.9

13-58GHz ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Core Type	Actual Thickness		Cloth Style	ply	Typical Resin Content (%)	Typical Df					
	mil	mm				1GHz	13GHz	24GHz	36GHz	47GHz	58GHz
2	2.0	0.050	1035	1	67	0.001	0.0028	0.0030	0.0033	0.0035	0.0038
2.6	2.6	0.065	1078	1	59	0.001	0.0028	0.0031	0.0034	0.0036	0.0039
3	3	0.075	1078	1	64	0.001	0.0028	0.0031	0.0033	0.0036	0.0038
4	3.9	0.100	2013	1	56	0.001	0.0029	0.0031	0.0034	0.0036	0.0039
4	3.9	0.100	1035	2	67	0.001	0.0028	0.0030	0.0033	0.0035	0.0038
5	5.0	0.127	1078	2	59	0.001	0.0028	0.0031	0.0034	0.0036	0.0039
5	4.9	0.125	2116	1	55	0.001	0.0029	0.0031	0.0034	0.0037	0.0039
6	5.7	0.146	1078	2	64	0.001	0.0028	0.0031	0.0033	0.0036	0.0038
8	7.9	0.200	2013	2	56	0.001	0.0029	0.0031	0.0034	0.0036	0.0039
10	9.8	0.250	2116	2	55	0.001	0.0029	0.0031	0.0034	0.0037	0.0039
12	11.8	0.300	2013	3	56	0.001	0.0029	0.0031	0.0034	0.0036	0.0039
16	15.7	0.400	2013	4	56	0.001	0.0029	0.0031	0.0034	0.0036	0.0039
20	19.7	0.500	2116	4	55	0.001	0.0029	0.0031	0.0034	0.0037	0.0039
25	24.6	0.625	2116	5	55	0.001	0.0029	0.0031	0.0034	0.0037	0.0039
30	29.5	0.750	2116	6	55	0.001	0.0029	0.0031	0.0034	0.0037	0.0039

* The data in the above table represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Prepreg R-5370(N) : Low-Dk glass

1GHz ; IPC TM650-2.5.5.9

13-58GHz ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Cloth Style	Resin Content (%)	Typical Thickness (um)	Typical Dk					
			1GHz	13GHz	24GHz	36GHz	47GHz	58GHz
1027	77	49	3.15	3.09	3.09	3.09	3.09	3.09
1035	72	60	3.21	3.14	3.14	3.14	3.14	3.14
	75	68	3.18	3.11	3.11	3.11	3.11	3.11
	77	74	3.15	3.09	3.09	3.09	3.09	3.09
1080	66	76	3.29	3.21	3.21	3.21	3.21	3.21
	70	87	3.24	3.16	3.16	3.16	3.16	3.16
1078	66	77	3.29	3.21	3.21	3.21	3.21	3.21
	70	89	3.24	3.16	3.16	3.16	3.16	3.16
	74	104	3.19	3.12	3.12	3.12	3.12	3.12
	77	118	3.15	3.09	3.09	3.09	3.09	3.09
2013	56	98	3.41	3.34	3.34	3.34	3.34	3.34
	59	106	3.37	3.30	3.30	3.30	3.30	3.30
2116	58	132	3.38	3.32	3.32	3.32	3.32	3.32

* The data in the above table represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Prepreg R-5370(N) : Low-Dk glass

1GHz ; IPC TM650-2.5.5.9

13-58GHz ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Cloth Style	Resin Content (%)	Typical Thickness (um)	Typical Df					
			1GHz	13GHz	24GHz	36GHz	47GHz	58GHz
1027	77	49	0.001	0.0027	0.0030	0.0032	0.0034	0.0036
1035	72	60	0.001	0.0028	0.0030	0.0032	0.0035	0.0037
	75	68	0.001	0.0027	0.0030	0.0032	0.0034	0.0037
	77	74	0.001	0.0027	0.0030	0.0032	0.0034	0.0036
1080	66	76	0.001	0.0028	0.0030	0.0033	0.0035	0.0038
	70	87	0.001	0.0028	0.0030	0.0033	0.0035	0.0037
1078	66	77	0.001	0.0028	0.0030	0.0033	0.0035	0.0038
	70	89	0.001	0.0028	0.0030	0.0033	0.0035	0.0037
	74	104	0.001	0.0028	0.0030	0.0032	0.0035	0.0037
	77	118	0.001	0.0027	0.0030	0.0032	0.0034	0.0036
2013	56	98	0.001	0.0029	0.0031	0.0034	0.0036	0.0039
	59	106	0.001	0.0028	0.0031	0.0034	0.0036	0.0039
2116	58	132	0.001	0.0028	0.0031	0.0034	0.0036	0.0039

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