Panasonic
INDUSTRY

Data Sheet

Low Dk Halogen-free Multi-layer Materials

Halogen-free

Laminate R-A555
Prepreg R-A550

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
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General Properties / Laminate R-A555

Items			Units	Test Method	Condition	Typical Values
						R-A555(W)
THERMAL	Glass Transition Temp (Tg)		˚C	TMA	As received	160
				DMA	As received	200
	Thermal Decomposition Temp (Td)		℃	TGA	As received	380
	Time to Delam (T288)	Without Cu	Min	IPC TM-650 2.4.24.1	As received	> 60
		With Cu	Min	IPC TM-650 2.4.24.1	As received	> 60
	CTE : α1	X - axis	ppm / C	IPC TM-650 2.4.24	< Tg	11 – 13
		Y - axis	ppm / C	IPC TM-650 2.4.24	< Tg	13 – 15
		Z - axis	ppm / C	IPC TM-650 2.4.24	< Tg	37
	CTE : α2	Z – axis	ppm / C	IPC TM-650 2.4.24	> Tg	170
ELECTRICAL	Volume Resistivity		MΩ - cm	IPC TM-650 2.5.17.1	C-96/35/90	1×10^{9}
	Surface Resistivity		MΩ	IPC TM-650 2.5.17.1	C-96/35/90	1×10^{8}
	Dielectric Constant (Dk) (RC : 70%)	@ 1GHz	-	IPC TM-650 2.5.5.9	C-24/23/50	3.4
		@ 10GHz	-	IPC TM-650 2.5.5.5	C-24/23/50	3.2
	Dissipation Factor (Df) (RC : 70%)	@ 1GHz	-	IPC TM-650 2.5.5.9	C-24/23/50	0.008
		@ 10GHz	-	IPC TM-650 2.5.5.5	C-24/23/50	0.011
PHYSICAL	Water Absorption		%	IPC TM-650 2.6.2.1	D-24/23	0.07
	Flammability		-	UL 94V	C-48/23/50	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-A555W for the UL recognized grades.
Sample thickness ; 32 mil (0.8 ㎜)

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

Dielectric Properties / Laminate R-A555 Dk, Df

1GHz ; IPC TM650-2.5.5.9 2GHz-10GHz ; IPC TM650-2.5.5.5

Core Type	Actual Thickness		Cloth Style	ply	Typical Resin Content	Typical Dk						Typical Df					
	mil	mm				1GHz	2GHz	4GHz	6GHz	8GHz	10GHz	1GHz	2GHz	4GHz	6GHz	8GHz	10GHz
1.6	1.6	0.040	1037	1	66	3.5	3.5	3.5	3.4	3.4	3.3	0.008	0.010	0.010	0.010	0.010	0.011
2.0	2.0	0.050	1037	1	72	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
2.0	2.0	0.050	106	1	68	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
2.0	2.0	0.052	1067	1	61	3.6	3.6	3.6	3.5	3.5	3.4	0.007	0.009	0.009	0.009	0.009	0.010
2.5	2.4	0.062	1080	1	54	3.8	3.8	3.8	3.7	3.7	3.6	0.007	0.009	0.009	0.009	0.009	0.010
2.3	2.4	0.062	1078	1	54	3.8	3.8	3.8	3.7	3.7	3.6	0.007	0.009	0.009	0.009	0.009	0.010

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Dielectric Properties / Prepreg R-A550 Dk, Df

1GHz ; IPC TM650-2.5.5.9 2GHz-10GHz ; IPC TM650-2.5.5.5

Cloth Style	Resin Content (%)	Typical Thickness (um)	Typical Dk						Typical Df					
			1GHz	2GHz	4GHz	6GHz	8GHz	10GHz	1GHz	2GHz	4GHz	6GHz	8GHz	10GHz
1017	76	33	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
	78	36	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
1027	68	38	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
	70	41	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
	73	46	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
	75	51	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
	77	55	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
1037	67	42	3.5	3.5	3.5	3.4	3.4	3.3	0.008	0.010	0.010	0.010	0.010	0.011
	69	46	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
	72	51	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
	74	56	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
	77	64	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
106	72	54	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
	75	62	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
1067	67	57	3.5	3.5	3.5	3.4	3.4	3.3	0.008	0.010	0.010	0.010	0.010	0.011
	69	61	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
	72	69	3.4	3.4	3.4	3.3	3.3	3.2	0.008	0.010	0.010	0.010	0.010	0.011
	74	75	3.3	3.3	3.3	3.2	3.2	3.1	0.008	0.010	0.010	0.010	0.010	0.011
1078	60	70	3.6	3.6	3.6	3.5	3.5	3.4	0.007	0.009	0.009	0.009	0.009	0.010
	62	75	3.6	3.6	3.6	3.5	3.5	3.4	0.007	0.009	0.009	0.009	0.009	0.010
1080	60	69	3.6	3.6	3.6	3.5	3.5	3.4	0.007	0.009	0.009	0.009	0.009	0.010
	62	73	3.6	3.6	3.6	3.5	3.5	3.4	0.007	0.009	0.009	0.009	0.009	0.010

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