

Data Sheet

Halogen-free Glass Epoxy Multi-layer Materials GX series

Laminate **R-1566(W)(R-1566)**
Prepreg **R-1551(W)(R-1551)**

UL/ANSI	FR-4	
IPC-4101	Primary:/94	
Slash Sheet	Secondary:/95	

Matsushita Electric Works, Ltd.
Electronic & Plastic Materials Business Unit.
Electronic Materials Division.

Core Material Specifications

Nominal Thickness		Laminate Construction	Typical Dk	Typical Df	Typical Resin Content
(mil)	(mm)	-	(@ 1GHz)	(@1GHz)	(%)
2.5	0.06	1-1080	4.4	0.011	58
4	0.1	1-2116	4.6	0.010	47
6	0.15	1-1501	4.7	0.010	44
8	0.2	1-7628	4.6	0.010	46
12	0.3	2-1501	4.7	0.010	44
16	0.4	2-7628	4.6	0.010	46
24	0.6	3-7628	4.6	0.010	46
32	0.8	4-7628	4.6	0.010	46
40	1.0	5-7628	4.6	0.010	46
48	1.2	6-7628	4.6	0.010	46
64	1.6	8-7628	4.6	0.010	46

Standard Availability

Copper Foil Cladding : 0.012, 0.018, 0.035 and 0.070 mm (0.5, 0.7, 1.4 and 2.8 mil)

The above are reference values only.

Laminate Specifications

Property			Units	Test Method	Condition	Value
THERMAL	Glass Transition Temp		°C	DSC	As received	148
				TMA	As received	145
	Thermal Decomposition Temp		°C	TGA	As received	350
	Time to Delam (T260)		min	IPC TM-650 2.4.24.1	As received	110
	Time to Delam (T288)		min	IPC TM-650 2.4.24.1	As received	3
	CTE (α1) z-axis		ppm/°C	IPC TM-650 2.4.24	below Tg	40
ELECTRICAL	Volume Resistivity		MΩ-cm	IPC TM-650 2.5.17.1	C-96/35/90	1x10 ⁹
	Surface Resistivity		MΩ	IPC TM-650 2.5.17.1	C-96/35/90	1x10 ⁸
	Dielectric Constant (Dk)		@ 1GHz	IPC TM-650 2.5.5.9	C-24/23/50	4.6
	Dissipation Factor (Df)		@ 1GHz	IPC TM-650 2.5.5.9	C-40/23/50	0.010
PHYSICAL	Moisture Absorption		%	IPC TM-650 2.6.2.1	D-24/23	0.14
	Peel Strength 1 oz(35 μm)	ST	kN/m	IPC TM-650 2.4.8	As Received	1.8
	Flammability		-	UL	C-48/23/50	94V-0

The above are reference values only.

Prepreg Specifications

Glass Style	Typical Resin Content	Typical Thickness	Typical Dk	Typical Df
-	(%)	(μm)	(@1GHz)	(@1GHz)
1078	65	78	4.2	0.012
	67	84	4.2	0.012
	70	94	4.1	0.012
1080	62	71	4.3	0.011
	65	78	4.2	0.012
	70	94	4.1	0.012
2116	47	102	4.6	0.010
	50	110	4.6	0.010
	54	122	4.5	0.011
1504	46	142	4.6	0.010
	50	157	4.6	0.010
1501	46	159	4.6	0.010
	50	175	4.6	0.010
	54	194	4.5	0.011
7628	47	207	4.6	0.010
	50	223	4.6	0.010
	52	234	4.5	0.010

The above are reference values only.

Line Up/Laminate R-1566(W)

1MHz-1GHz : IPC TM-650 2.5.5.9

Nominal Thickness		Cloth Style	Typical Resin Content	ply	Typical Dk			Typical Df		
mil	mm	-	-	-	1MHz	100MHz	1GHz	1MHz	100MHz	1GHz
2.5	0.06	1080	58	1	4.7	4.5	4.4	0.011	0.011	0.011
4	0.1	2116	47	1	4.9	4.7	4.6	0.010	0.010	0.010
6	0.15	1501	44	1	5.0	4.8	4.7	0.010	0.010	0.010
8	0.2	7628	46	1	4.9	4.7	4.6	0.010	0.010	0.010
12	0.3	1501	44	2	5.0	4.8	4.7	0.010	0.010	0.010
16	0.4	7628	46	2	4.9	4.7	4.6	0.010	0.010	0.010
24	0.6	7628	46	3	4.9	4.7	4.6	0.010	0.010	0.010
32	0.8	7628	46	4	4.9	4.7	4.6	0.010	0.010	0.010
40	1.0	7628	46	5	4.9	4.7	4.6	0.010	0.010	0.010
48	1.2	7628	46	6	4.9	4.7	4.6	0.010	0.010	0.010
64	1.6	7628	46	8	4.9	4.7	4.6	0.010	0.010	0.010

The above are reference values only.

Line Up/Laminate R-1566(W)

2GHz-10GHz : IPC TM-650 2.5.5.5

Nominal Thickness		Cloth Style	Typical Resin Content	ply	Typical Dk					Typical Df				
mil	mm	-	-	-	2GHz	4GHz	6GHz	8GHz	10GHz	2GHz	4GHz	6GHz	8GHz	10GHz
2	0.06	1080	58	1	4.4	4.4	4.3	4.3	4.3	0.013	0.013	0.013	0.014	0.017
4	0.1	2116	47	1	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
6	0.15	1501	44	1	4.7	4.7	4.7	4.7	4.7	0.012	0.012	0.012	0.013	0.015
8	0.2	7628	46	1	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
12	0.3	1501	44	2	4.7	4.7	4.7	4.7	4.7	0.012	0.012	0.012	0.013	0.015
16	0.4	7628	46	2	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
24	0.6	7628	46	3	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
32	0.8	7628	49	4	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
40	1.0	7628	49	5	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
48	1.2	7628	49	6	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
64	1.6	7628	49	8	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016

The above are reference values only.

Line Up/Prepreg R-1551(W)

1MHz-1GHz ; IPC TM-650 2.5.5.9

Cloth	Resin Content	Typical Thickness	TypicalDk			TypicalDf		
Style	(%)	(μm)	1MHz	100MHz	1GHz	1MHz	100MHz z	1GHz
1078	65	78	4.5	4.3	4.2	0.012	0.012	0.012
	67	84	4.5	4.3	4.2	0.012	0.012	0.012
	70	94	4.4	4.2	4.1	0.012	0.012	0.012
1080	62	71	4.6	4.4	4.3	0.011	0.011	0.011
	65	78	4.5	4.3	4.2	0.012	0.012	0.012
	70	94	4.4	4.2	4.1	0.012	0.012	0.012
2116	47	102	4.9	4.7	4.6	0.010	0.010	0.010
	50	110	4.8	4.7	4.6	0.010	0.010	0.010
	54	122	4.7	4.6	4.5	0.011	0.011	0.011
1504	46	142	4.9	4.7	4.6	0.010	0.010	0.010
	50	157	4.8	4.7	4.6	0.010	0.010	0.010
1501	46	159	4.9	4.7	4.6	0.010	0.010	0.010
	50	175	4.8	4.7	4.6	0.010	0.010	0.010
	54	194	4.7	4.6	4.5	0.011	0.011	0.011
7628	47	207	4.9	4.7	4.6	0.010	0.010	0.010
	50	223	4.8	4.7	4.6	0.010	0.010	0.010
	52	234	4.8	4.6	4.5	0.010	0.010	0.010

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Line Up/Prepreg R-1551(W)

2GHz-10GHz ; IPC TM-650 2.5.5.5

Cloth	Resin Content	Typical Thickness	TypicalDk					TypicalDf				
Style	(%)	(μm)	2GHz	4GHz	6GHz	8GHz	10GHz	2GHz	4GHz	6GHz	8GHz	10GHz
1078	65	78	4.2	4.2	4.2	4.2	4.2	0.014	0.014	0.014	0.015	0.018
	67	84	4.2	4.2	4.1	4.1	4.1	0.014	0.014	0.014	0.015	0.018
	70	94	4.1	4.1	4.1	4.1	4.1	0.014	0.014	0.014	0.015	0.018
1080	62	71	4.3	4.3	4.3	4.3	4.3	0.013	0.013	0.013	0.014	0.017
	65	78	4.2	4.2	4.2	4.2	4.2	0.014	0.014	0.014	0.015	0.018
	70	94	4.1	4.1	4.1	4.1	4.1	0.014	0.014	0.014	0.015	0.018
2116	47	102	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
	50	110	4.5	4.5	4.5	4.5	4.5	0.012	0.012	0.012	0.013	0.016
	54	122	4.5	4.5	4.4	4.4	4.4	0.013	0.013	0.013	0.014	0.017
1504	46	142	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
	50	157	4.5	4.5	4.5	4.5	4.5	0.012	0.012	0.012	0.013	0.016
1501	46	159	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
	50	175	4.5	4.5	4.5	4.5	4.5	0.012	0.012	0.012	0.013	0.016
	54	194	4.5	4.5	4.4	4.4	4.4	0.013	0.013	0.013	0.014	0.017
7628	47	207	4.6	4.6	4.6	4.6	4.6	0.012	0.012	0.012	0.013	0.016
	50	223	4.5	4.5	4.5	4.5	4.5	0.012	0.012	0.012	0.013	0.016
	52	234	4.5	4.5	4.5	4.5	4.5	0.012	0.012	0.012	0.013	0.016

++Safety precautions++

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