

Data Sheet

Glass Epoxy Multi-layer Materials

**Laminate R-1766(GH)
Prepreg R-1661(GZ)**

Jun. 2017 No.17061646

Partnering to go beyond.

Electronic Materials
Panasonic Corporation

Specification / Laminate R-1766(GH)

Property		Units	Test Method	Condition	Value	
THERMAL	Glass Transition Temp (Tg)	°C	DSC	As received	140	
			TMA	As received	140	
			DMA	As received	150	
	Thermal Decomposition Temp (Td)		°C	TGA	As received	315
	Time to Delam (T288)	Without Cu	Min	IPC TM-650 2.4.24.1	As received	5
		With Cu	Min	IPC TM-650 2.4.24.1	As received	1
	CTE : $\alpha 1$	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	65
CTE : $\alpha 2$	Z - axis	ppm / C	IPC TM-650 2.4.24	> Tg	270	
ELECTRICAL	Volume Resistivity		M Ω - cm	IPC TM-650 2.5.17.1	C-96/35/90	1 x 10 ⁹
	Surface Resistivity		M Ω	IPC TM-650 2.5.17.1	C-96/35/90	1 x 10 ⁸
	Dielectric Constant (Dk)	@1MHz	-	IPC TM-650 2.5.5.9	C-24/23/50	4.6
		@ 1GHz	-	IPC TM-650 2.5.5.9	C-24/23/50	4.3
	Dissipation Factor (Df)	@1MHz	-	IPC TM-650 2.5.5.9	C-24/23/50	0.014
		@ 1GHz	-	IPC TM-650 2.5.5.9	C-24/23/50	0.016
PHYSICAL	Water Absorption		%	IPC TM-650 2.6.2.1	D-24/23	0.14
	Peel Strength	1oz	kN / m	IPC TM-650 2.4.8	As Received	2.0
	Flammability		-	UL	C-48/23/50	94V-0

Sample thickness ; 32 mil (0.8 mm)

*The data above show actual values and are not guaranteed.

Specification / Laminate R-1766(GH)

1MHz - 1GHz ; IPC TM650-2.5.5.9

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	57	1	4.2	3.9	3.9	0.016	0.017	0.018
4	0.1	2116	43	1	4.6	4.3	4.3	0.014	0.015	0.016
6	0.15	1501	42	1	4.6	4.3	4.3	0.014	0.015	0.016
8	0.2	7628	43	1	4.6	4.3	4.3	0.014	0.015	0.016
12	0.3	1501	42	2	4.6	4.3	4.3	0.014	0.015	0.016
16	0.4	7628	43	2	4.6	4.3	4.3	0.014	0.015	0.016
20	0.5	7628 / 2116	43	2 / 1	4.6	4.3	4.3	0.014	0.015	0.016
24	0.6	7628	43	3	4.6	4.3	4.3	0.014	0.015	0.016

2GHz-10GHz : IPC TM650-2.5.5.5

Nominal Thickness		Cloth Style	Typical Resin Content	ply	Typical Dk					Typical Df				
mil	mm				2GHz	4GHz	6GHz	8GHz	10GHz	2GHz	4GHz	6GHz	8GHz	10GHz
2.5	0.06	1080	57	1	3.9	3.9	3.8	3.8	3.8	0.020	0.020	0.020	0.020	0.021
4	0.1	2116	43	1	4.3	4.3	4.2	4.2	4.2	0.018	0.018	0.018	0.018	0.019
6	0.15	1501	42	1	4.3	4.3	4.2	4.2	4.2	0.018	0.018	0.018	0.018	0.019
8	0.2	7628	43	1	4.3	4.3	4.2	4.2	4.2	0.018	0.018	0.018	0.018	0.019
12	0.3	1501	42	2	4.3	4.3	4.2	4.2	4.2	0.018	0.018	0.018	0.018	0.019
16	0.4	7628	43	2	4.3	4.3	4.2	4.2	4.2	0.018	0.018	0.018	0.018	0.019
20	0.5	7628/2116	43	2 / 1	4.3	4.3	4.2	4.2	4.2	0.018	0.018	0.018	0.018	0.019
24	0.6	7628	43	3	4.3	4.3	4.2	4.2	4.2	0.018	0.018	0.018	0.018	0.019

*The data above show actual values and are not guaranteed.

Specification / Prepreg R-1661(GZ)

1MHz-1GHz : IPC TM650-2.5.5.9

Cloth Style	Resin Contents (%)	Typical Thickness (μm)	Typical Dk			Typical Df		
			1MHz	100MHz	1GHz	1MHz	100MHz	1GHz
1080	63	75	4.1	3.8	3.6	0.016	0.017	0.018
	65	81	4.1	3.7	3.6	0.017	0.018	0.019
	70	96	4.0	3.6	3.5	0.017	0.018	0.019
2116	48	109	4.4	4.2	4.2	0.015	0.016	0.017
	52	121	4.3	4.1	4.0	0.015	0.016	0.017
	55	131	4.2	4.0	4.0	0.016	0.017	0.018
1504	44	141	4.5	4.3	4.3	0.015	0.016	0.017
	48	156	4.4	4.2	4.2	0.015	0.016	0.017
1501	44	158	4.5	4.3	4.3	0.015	0.016	0.017
	48	174	4.4	4.2	4.2	0.015	0.016	0.017
	52	193	4.3	4.1	4.0	0.015	0.016	0.017
7628	42	190	4.6	4.3	4.3	0.014	0.015	0.016
	45	204	4.5	4.3	4.2	0.015	0.016	0.017
	48	220	4.4	4.2	4.2	0.015	0.016	0.017
	52	244	4.3	4.1	4.0	0.015	0.016	0.017

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Specification / Prepreg R-1661(GZ)

2GHz-10GHz : IPC TM650-2.5.5.5

Cloth Style	Resin Content (%)	Typical Thickness (μm)	Typical Dk					Typical Df				
			2GHz	4GHz	6GHz	8GHz	10GHz	2GHz	4GHz	6GHz	8GHz	10GHz
1080	63	75	3.6	3.6	3.5	3.5	3.5	0.020	0.020	0.020	0.020	0.021
	65	81	3.5	3.5	3.5	3.5	3.5	0.021	0.021	0.021	0.021	0.022
	70	96	3.4	3.4	3.4	3.4	3.4	0.021	0.021	0.021	0.021	0.022
2116	48	109	4.1	4.1	4.1	4.0	4.0	0.019	0.019	0.019	0.019	0.020
	52	121	4.0	4.0	4.0	3.9	3.9	0.019	0.019	0.019	0.019	0.020
	55	131	3.9	3.9	3.9	3.8	3.8	0.020	0.020	0.020	0.020	0.021
1504	44	141	4.3	4.2	4.2	4.2	4.2	0.019	0.019	0.019	0.019	0.020
	48	156	4.1	4.1	4.1	4.0	4.0	0.019	0.019	0.019	0.019	0.020
1501	44	158	4.3	4.2	4.2	4.2	4.2	0.019	0.019	0.019	0.019	0.020
	48	174	4.1	4.1	4.1	4.0	4.0	0.019	0.019	0.019	0.019	0.020
	52	193	4.0	4.0	4.0	3.9	3.9	0.019	0.019	0.019	0.019	0.020
7628	42	190	4.3	4.3	4.2	4.2	4.2	0.018	0.018	0.018	0.018	0.019
	45	204	4.2	4.2	4.2	4.1	4.1	0.019	0.019	0.019	0.019	0.020
	48	220	4.1	4.1	4.1	4.0	4.0	0.019	0.019	0.019	0.019	0.020
	52	244	4.0	4.0	4.0	3.9	3.9	0.019	0.019	0.019	0.019	0.020

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++ Before purchase ++

【Notes before you use】

- Prior to adoption and use of a product contained in the datasheet, please verify the suitability for your application by your quality testing, evaluation, etc.
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- Please note that specifications and external design are subject to change for product improvement without notice.
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