

Data Sheet

# Glass Epoxy Multi-layer Materials

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

July 2022 No.22070146

Partnering to go beyond.

Electronic Materials  
Panasonic Industry

# Specification / Laminate R-1766(GH)

Property		Units	Test Method	Condition	Typical 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 $\Omega$ - cm	IPC TM-650 2.5.17.1	C-96/35/90	1 x 10 <sup>9</sup>
	Surface Resistivity		M $\Omega$	IPC TM-650 2.5.17.1	C-96/35/90	1 x 10 <sup>8</sup>
	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 in the above table are not guaranteed values.

# 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 in the above table are not guaranteed values.

# Specification / Prepreg R-1661(GZ)

1MHz-1GHz : IPC TM650-2.5.5.9

Cloth Style	Resin Content (%)	Typical Thickness (um)	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

\* The data in the above table are not guaranteed values.

# Specification / Prepreg R-1661(GZ)

2GHz-10GHz : IPC TM650-2.5.5.5

Cloth Style	Resin Content (%)	Typical Thickness (um)	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

\* The data in the above table are not guaranteed values.

## ++ Before purchase ++

### 【Notes before you use】

- Please verify the suitability and fitness for intended application by quality testing, evaluation or other means at your own option before any adoption, use or change of use conditions of a product listed in the datasheet.
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