

Data Sheet

**Halogen-free Ultra-low transmission loss
Multi-layer Circuit board materials**

XPEDION 1

**Laminate R-5515
Prepreg R-5410**

博锐电路始终坚持“品质至上，服务根本”的原则。为客户提供高效制造及可靠品质，迅速获得最佳的市场和竞争优势，是我们永恒的目标。
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陈工10年PCB工程经验，专门为电子工程师提供2-36层（HDI任意阶阻抗）叠层阻抗设计 Tel：19195667992 0755-23599845

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Partnering to go beyond.

Electronic Materials
Panasonic Industry

Specification / Laminate R-5515

Property			Units	Test Method	Condition	R-5515 (5mil #1078x1)
						Typical Value
THERMAL	Glass Transition Temperature (Tg)		C	TMA	As received	170
			C	DMA (Tensile)	As received	200
	Thermal Decomposition Temperature (Td)		C	TGA	As received	410
	Time to Delamination (T288)	Without Cu	Min	IPC TM-650 2.4.24.1	As received	> 120 *1
		With Cu	Min	IPC TM-650 2.4.24.1	As received	> 120 *1
	Thermal Stress (288C)	With Cu	Sec	IPC TM-650 2.4.13.1	As received	-
	CTE : $\alpha 1$	X - axis	ppm / C	IPC TM-650 2.4.24	< Tg	19 - 21
		Y - axis	ppm / C	IPC TM-650 2.4.24	< Tg	19 - 21
		Z - axis	ppm / C	IPC TM-650 2.4.24	< Tg	50 *1
	CTE : $\alpha 2$	Z - axis	ppm / C	IPC TM-650 2.4.24	> Tg	300 *1
ELECTRICAL	Dielectric Constant (Dk)	@ 14GHz	-	IEC 63185 (2020) *2	C-24/23/50	3.06
	Dissipation Factor (Df)	@ 14GHz	-	IEC 63185 (2020) *2	C-24/23/50	0.0021
	Volume Resistivity		M Ω m	IPC TM-650 2.5.17.1	C-96/35/90	1 x 10 ⁷
	Surface Resistivity		M Ω	IPC TM-650 2.5.17.1	C-96/35/90	1 x 10 ⁸
PHYSICAL Flammability	Water Absorption		%	IPC TM-650 2.6.2.1	D-24/23	0.19
	Peel Strength	H oz (H-VLP2)	kN / m	IPC TM-650 2.4.8	As Received	0.6
	Flammability		-	UL-94	A&E-168/70	94V-0
	Young's Modulus (X,Y direction)		GPa	ASTM D3039	As received	9.7
	Poisson's Ratio (X,Y direction)		-	JIS K7161-1	As received	0.2

*1 : Sample Thickness ; 20mil = 0.5 mm

*2 : Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

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

Specification / Laminate R-5515 : Low-Dk glass

Test Method ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Core Type (mil)	Actual Thickness		Cloth Style	Ply	Typical Resin Content (%)	Typical Dk				
	mil	mm				14GHz	26GHz	37GHz	48GHz	60GHz
4	4.1	0.105	1067	1	82	3.01	3.00	3.00	3.00	3.00
5	5	0.127	1078	1	78	3.06	3.05	3.05	3.05	3.05
10	10	0.254	1078	2	78	3.06	3.05	3.05	3.05	3.05

Core Type (mil)	Actual Thickness		Cloth Style	Ply	Typical Resin Content (%)	Typical Df				
	mil	mm				14GHz	26GHz	37GHz	48GHz	60GHz
4	4.1	0.105	1067	1	82	0.0023	0.0025	0.0027	0.0029	0.0030
5	5	0.127	1078	1	78	0.0021	0.0024	0.0026	0.0029	0.0031
10	10	0.254	1078	2	78	0.0021	0.0024	0.0026	0.0029	0.0031

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Specification / Laminate R-5410 : Low-Dk glass

Test Method ; Balanced-type Circular Disk Resonance Method [IEC 63185 (2020)]

Cloth Style	Resin Content (%)	Typical Thickness (um)	Typical Dk				
			14GHz	26GHz	37GHz	48GHz	60GHz
1067	82	105	3.01	3.00	3.00	3.00	3.00
1078	78	127	3.06	3.05	3.05	3.05	3.05

Cloth Style	Resin Content (%)	Typical Thickness (um)	Typical Df				
			14GHz	26GHz	37GHz	48GHz	60GHz
1067	82	105	0.0023	0.0025	0.0027	0.0029	0.0030
1078	78	127	0.0021	0.0024	0.0026	0.0029	0.0031

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