

Data Sheet

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

XPEDION 1 Laminate R-5515X
Prepreg R-5410X

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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General Properties / Laminate R-5515X

Items		Units	Test Method	Condition	Typical Values	
					R-5515X (5mil #1078x1)	
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 94V	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 represents typical values for your reference and are not guaranteed values.

Dielectric Properties / Laminate R-5515X : 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

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

Dielectric Properties / Laminate R-5410X : 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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