

Test Item 測試專案	Unit 單位	Test Method 測試方法 (IPC-TM-650)	NHL-4906 (FR4)				NHL-1008 (FR4)				NHL-9008 (FR4 TGI150)				NHL-7008				NHL-8031				NHL-2907 (CFR)		NHL-2911A (FR)		NHL-5901 (FR)		NHL-3811 (FR)		NHL-1908A (XPC)		PREPREG	
			Standard Value 標準值		Typical Value 典型值		Standard Value 標準值		Typical Value 典型值		Standard Value 標準值		Typical Value 典型值		Standard Value 標準值		Typical Value 典型值		Standard Value 標準值		Typical Value 典型值		Standard Value 標準值	Typical Value 典型值	Standard Value 標準值	Typical Value 典型值	Standard Value 標準值	Typical Value 典型值	Standard Value 標準值	Typical Value 典型值	Standard Value 標準值	Typical Value 典型值		
			< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	< 0.78mm	≥ 0.78mm	≥ 20 (260°C)	48-100 (260°C)	≥ 10 (260°C)	30-56 (260°C)	≥ 10 (260°C)	20-45 (260°C)	≥ 10 (260°C)	32-58 (260°C)	≥ 10 (260°C)	25-38 (260°C)		
Thermal Stress (288°C) 耐焊性(288°C)	Sec/秒	2.4.13	≥20	≥20	136	158	≥20	≥20	185	192	≥20	≥20	285	300	≥20	≥20	138	168	≥20	≥20	178	198	≥20	48-100 (260°C)	≥10 (260°C)	30-56 (260°C)	≥10 (260°C)	20-45 (260°C)	≥10 (260°C)	32-58 (260°C)	≥10 (260°C)	25-38 (260°C)		
Peel Strength 抗撕	Kg/cm	Copper Foil (18 μm) 銅箔(18 μm)	2.4.8	≥0.982	≥0.982	1.52	1.56	≥0.982	≥0.982	1.48	1.55	≥0.982	≥0.982	1.52	1.56	≥0.982	≥0.982	1.45	1.58	≥0.982	≥0.982	1.49	1.55	≥0.982	≥0.982	≥0.982	2.12	≥0.982	1.45	≥0.982	2.12	≥0.982	1.25	
		Copper Foil (35 μm) 銅箔(35 μm)	2.4.8	≥1.339	≥1.339	2.1	2.21	≥1.339	≥1.339	2.02	2.12	≥1.339	≥1.339	2.1	2.21	≥1.339	≥1.339	2.11	2.25	≥1.339	≥1.339	2.01	2.15	≥1.339	≥1.339	≥1.339	2.02	≥1.339	1.98	≥1.339	2.12	≥1.339	1.98	
		Copper Foil (70 μm) 銅箔(70 μm)	2.4.8	≥1.875	≥1.875	2.65	2.86	≥1.875	≥1.875	2.55	2.6	≥1.875	≥1.875	2.65	2.86	≥1.875	≥1.875	2.68	2.89	≥1.875	≥1.875	2.54	2.62	≥1.875	≥1.875	≥1.875	2.12	≥1.875	2.25	≥1.875	2.12	≥1.875	2.25	
Glass Transition 玻璃化轉變溫度	°C	2.4.25	≥125	≥125	130	130	≥130	≥130	138	138	-	≥140	-	150	≥130	≥130	138	138	≥130	≥130	138	138	-	-	-	-	-	-	-	-	-	-		
Decomposition temperature 分解溫度	°C	TBD	-	-	-	-	-	-	-	-	-	-	-	-	≥310	-	350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Z-CTE Z軸膨脹	PPM/°C	Pre-T _g / Post-T _g	2.4.24	-	-	-	-	-	-	-	-	-	-	-	≤60	-	58	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
X,Y-CTE X,Y軸膨脹	PPM/°C	Pre-T _g / Post-T _g	2.4.24	-	-	-	-	-	-	-	-	-	-	-	≤300	-	270	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Thermal Resistance 耐熱性	Min/分	T260 / T288 / T300	2.4.24.1	-	-	-	-	-	-	-	-	-	-	-	≥30	-	69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Bow & Twist 彎曲或扭	%	2.4.22	≤1.50	≤1.00	0.77	0.36	≤1.50	≤1.00	0.68	0.36	≤1.50	≤1.00	0.65	0.36	≤1.50	≤1.00	0.75	0.25	≤1.50	≤1.00	0.65	0.23	≤1.00	0.66	≤1.50	0.8	≤1.50	1.2	≤1.50	0.62	≤1.50	0.86		
Dimensional Stability 尺寸穩定性	%	2.4.39	≤0.05	≤0.05	0.04	0.03	≤0.05	≤0.05	0.03	0.03	≤0.05	≤0.05	0.02	0.02	≤0.05	≤0.05	0.03	0.02	≤0.05	≤0.05	0.02	0.02	-	-	-	-	-	-	-	-	-	-		
Flammability Class 耐燃等級	-	UL94	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	V-0	94-HB	94-HB
Water Absorption 吸水性	%	2.6.2.1	≤0.80	≤0.35	0.21	0.15	≤0.80	≤0.35	0.2	0.14	≤0.80	≤0.35	0.21	0.14	≤0.80	≤0.35	0.22	0.18	≤0.80	≤0.35	0.2	0.13	≤0.50	0.2	≤5.6	0.58-1.12	≤5.6	0.56-1.09	≤1.3	0.65-1.10	≤1.3	0.80-1.10		
Surface Resistivity 表面電阻	MΩ-cm	2.5.17.1	≥10 ⁴	≥10 ⁴	8.2×10 ⁶	8.6×10 ⁶	≥10 ⁴	≥10 ⁴	4.2×10 ⁶	3.6×10 ⁶	≥10 ⁴	≥10 ⁴	2.5×10 ⁶	3.0×10 ⁶	≥10 ⁴	≥10 ⁴	8.1×10 ⁶	8.7×10 ⁶	≥10 ⁴	≥10 ⁴	4.5×10 ⁶	4.0×10 ⁶	≥10 ⁴	4.3×10 ⁶	≥10 ⁴	4.4×10 ⁶	≥10 ⁴	4.4×10 ⁶	≥10 ⁴	4.6×10 ⁶	≥10 ⁴	3.6×10 ⁶		
Volume Resistivity 體積電阻率	MΩ-cm	2.5.17.1	≥10 ⁶	≥10 ⁶	9.0×10 ⁸	9.6×10 ⁸	≥10 ⁶	≥10 ⁶	5.8×10 ⁸	7.2×10 ⁸	≥10 ⁶	≥10 ⁶	3.5×10 ⁸	4.0×10 ⁸	≥10 ⁶	≥10 ⁶	9.2×10 ⁸	9.6×10 ⁸	≥10 ⁶	≥10 ⁶	5.5×10 ⁸	8.5×10 ⁸	≥10 ⁶	6.2×10 ⁸	≥10 ⁶	3.8×10 ⁸	≥10 ⁶	3.9×10 ⁸	≥10 ⁶	2.8×10 ⁸	≥10 ⁶	5.8×10 ⁸		
Dielectric Constant (1MHz) 介電常數(1MHz)	-	2.5.5.3	≤5.40	≤5.40	4.5	4.45	≤5.40	≤5.40	4.52	4.48	≤5.40	≤5.40	4.7	4.6	≤5.40	≤5.40	4.5	4.45	≤5.40	≤5.40	4.45	4.49	≤5.40	4.65	≤6.0	4.45	≤6.0	4.05	≤5.0	4.4	≤5.6	4.85		
Dispersion Factor (1MHz) 介電損耗(1MHz)	-	2.5.5.3	≤0.035	≤0.035	0.032	0.031	≤0.035	≤0.035	0.032	0.031	≤0.035	≤0.035	0.018	0.017	≤0.035	≤0.035	0.032	0.031	≤0.035	≤0.035	0.032	0.032	≤0.035	0.032	≤0.035	0.032	≤0.035	0.032	≤0.045	0.04	≤0.07	0.058		
Dielectric 击穿电压	KV	2.5.6	-	≥40	-	45	-	≥40	-	50	-	≥40	-	60	-	≥40	-	45	-	≥40	-	50	≥40	43	≥5.0	18	≥5.0	18	≥15	18	≥15	16		
Arc Resistance 耐电弧	Sec/秒	2.5.1	≥60	≥60	83	93	≥60	≥60	85	95	≥60	≥60	98	105	≥60	≥60	80	90	≥60	≥60	81	91	≥60	90	≥20	48	≥20	52	≥20	51	-	-		
Comparative 相比漏电流值	V	UL-746	-	175	-	150	-	100-175	-	200	-	175-225	-	205	-	100-175	-	150	-	100-175	-	200	400	350	175	175	100-175	175	225	175	400	300		
Chemical Resistance (Dip in 3% NaOH 3min) 耐化學藥性	-	2.3.4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	No remarkable change 無明顯變化	No remarkable change 無明顯變化	No remarkable change 無明顯變化	No remarkable change 無明顯變化	No remarkable change 無明顯變化	No remarkable change 無明顯變化	No remarkable change 無明顯變化	No remarkable change 無明顯變化	No remarkable change 無明顯變化		

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