GÖTTLE
LEITERPLATTENTECHNIK

LAMINATES AND MORE FOR PCB

ILM

FR4-Laminates

ILM-U1 / GF222

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ILM-U1 / GF222 Laminate Property Values:

Test item		test condition	standard value	typical value
1. Peel strength lb/inch, minimum [H OZ]				
Receiving status		A	≥6.0	6.0-8.0
After thermal stress		A	≥6.0	6.0-8.0
high temperature		125℃	≥4.0	5.0
2. min. volume resistance at high temp. [MΩ.CM]		E-24/125	≥10^3	1×10^6
3. min. surface resistance at high temp. [MΩ]		E-24/125	≥10^3	1×10^6
4. Absorption, maximum (%)		E-1/105 + des	≤0.80	0.18-0.35
5. Breakdown voltage, minimum value (KV) step (thickness ≥ 0.50 mm) ≥0.50 mm)		D-48/50 D-0.5/23	≥35	38
6. min. Bending strength [N/mm2] (thickn. ≥ 0.50 mm)				
vertical		A	≥415	490
Zonal		A	≥345	405
7. Arc resistance, minimum, second		D-48/50; D-0.5/23	≥60	75
8. Flame retardancy		A	UL94V0	UL94V0
9. Solderability		A	solderable	solderable
10. Dielectric constant, 1MHz Max, 1MHz		A	≤ 5.4	4.7-4.9
11. Loss tangent, 1MHz Max, 1MHz		A	≤0.045	0.025-0.035
12. Bow and Twist [%]				
Double sides (thickness > 0,78mm; 300x300mm)		A	≤1.0	0.20-0.50
Single sides (thickness > 0.78mm; 300x300mm)		A	≤1.5	0.30-0.70
Double sides (thickness 0.5~0.78 mm; 300×300mm)		A	≤1.5	0.30-0.50
Single sides (thickness 0.5~0.78 mm; 300×300mm)		A	≤2.0	0.35-0.70
13. Thermal stress, 288°C, Tin drift 10 sec. Unetched sample		A	NO DEFECT	55-80 sec.
14. Glass transition temperature, TG [DSC, °C]		A	≥135	140±5
15. Z-axis expansion coefficient CTE	Before Tg (μm/m°C)	TMA	—	50
	After Tg (μm/m°C)	TMA	—	250
	50～260°C [%]	TMA	—	4
17. Process adaptability: The board is slightly harder.				
18. Scope of application: home appliances; industry; computer peripheral products; general electronic products; Not suitable for metering instruments.				
19. Applicable lines: Aperture> 0.3mm, hole wall spacing> 0.5mm, line spacing> 0.1mm Does not apply to laminate core materials.				
20. Applicable board surface: single piece area ≤ 300 × 300mm, aspect ratio ≤ 6				

The data provided are average values of the current production; only the standard values are guaranteed

1: Test conditions: A = normal condition; D [t]/[ϑ] = thermostatic water bath; E[t]/[ϑ] = test at elevated temperature; [t]/[ϑ] = test for a time t [hour] at a temperature ϑ (°C); des = dry sample and cool down to normal temperature.

2: The specification of twist and bow is suitable for CCL only.