

# FF-27DN

## Low loss Non-Reinforced flexible Film

FF-27DN are low loss flexible copper clad laminates constructed with non-reinforced High temperature ceramic-filled PTFE composites to provide excellent thermal, mechanical, electrical and moisture resistant properties.

The low dissipation factor, thermal stability and smooth surface profiled copper can minimize insertion loss at higher frequency and temperatures, yielding exceptional low loss circuit performance.

FF-27DN is ideally suited for high frequency, high temperature and harsh environment applications.

### Benefits

- Non-woven glass reinforcement
- No adhesive underneath Cu
- Exceptional low electrical loss for microwave application
- Excellent adhesion to Very Low Profile copper foils
- Enhanced RF performance
- Laser ablated hole
- Stable dielectric properties versus temperature and frequency
- Stable multi-layer performance

### Applications

- Cellular interconnection
- Medical
- Telecommunications
- Military
- Fiber optic modules
- Avionics and Aerospace
- Double sided, multilayer & rigid flex circuits.



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**FF-27DN TYPICAL VALUES**

Property	Test Method	Unit	Value	Unit	Value
Dielectric Constant	IPC-TM 650 2.5.5.5.1 Mod @10GHz	-	2.70±0.05	-	2.70±0.05
	Split Cylinder @ 80 GHz		2.73(2mil) 2.81(4mil)		2.73(2mil) 2.81(4mil)
Dissipation Factor	IPC-TM 650 2.5.5.5.1 Mod@10GHz		0.0012	-	0.0012
	Split Cylinder @ 80 GHz		0.0010(2mil) 0.00096(4mil)		0.0010(2mil) 0.00096(4mil)
Moisture Absorption (2mil)	IPC-TM-650 2.6.2.1	%	0.09	%	0.09
Electrical Strength	IPC-TM-650 2.5.6.2	V/mil	1025	KV/mm	40.35
Flexural Strength (MD)	IPC-TM-650 2.4.4	psi	2106	N/mm <sup>2</sup>	14.7
Flexural Strength (CD)	IPC-TM-650 2.4.4	psi	2076	N/mm <sup>2</sup>	14.5
Tensile Strength (MD)	IPC-TM-650 2.4.19	psi	934	N/mm <sup>2</sup>	6.5
Tensile Strength (CD)	IPC-TM-650 2.4.19	psi	972	N/mm <sup>2</sup>	6.8
Dimensional Stability	IPC-TM-650 2.4.39 (Etch)	% (MD)	-0.03	% (CD)	-0.02
Dimensional Stability	IPC-TM-650 2.4.39 (Bake)	% (MD)	-0.08	% (CD)	-0.07
Dimensional Stability	IPC-TM-650 2.4.39 (Stress)	% (MD)	-0.15	% (CD)	-0.13
Flexural Fatigue at ULPH Cu	IPC-TM-650 2.4.3.1	Cycle	40 (G/G)	Cycle	40 (G/G)
Density	IPC-TM-650 2.3.5	g/cm <sup>3</sup>	1.98	g/cm <sup>3</sup>	1.98
Specific Heat	IPC-TM-650 2.4.50	J/g°C	0.94	J/g°C	0.94
Thermal Conductivity (Unclad)	IPC-TM-650 2.4.50	W/m/K	0.57	W/m/K	0.57
x-y CTE (50 ~ 150°C)	IPC-TM 650 2.4.41	ppm/°C	12-13	ppm/°C	12-13
z CTE (50 ~ 150°C)	IPC-TM 650 2.4.41	ppm/°C	25	ppm/°C	25
Peel Strength (1/2 Oz. HVLP Cu)	IPC-TM 650 2.4.8 (Solder)	lbs. / inch	5	N/mm	0.9
Lead Free Process Compatible	Internal	-	Yes	-	Yes
Flammability	Internal	-	V-0	-	V-0

**Suitability In any given application.**

- ※ Dielectric layer of FF-27DN is on the basis of Ceramic Filled PTFE composition
- ※ Standard FF-27DN series can be manufactured in increments of 2mil. Please call for availability of additional thicknesses.
- ※ Our Standard panel size is 18"\*24" (457mm X 610mm). Please contact our customer service department for availability of other sizes.

**An example of 2mil material with 1/2 oz. Ultra Low Profile Cu on both sides is part# :  
FF-27DN-0020-ULPH/ULPH-18" x 24" (FF-27DN-0020-ULPH/ULPH-457mm x 610mm)**