

PTFE ceramic composite dielectric substrate TF-1/2

■ Product Introduction

This product is composed of polytetrafluoroethylene resin material with superior microwave resistance and temperature resistance, which is compounded with ceramics. The material does not contain fiberglass cloth, and the dielectric constant is accurately adjusted by adjusting the ratio between ceramics and polytetrafluoroethylene resin; Special production process; It has excellent dielectric properties and high reliability. TF refers to smooth materials without copper coating, TF-1 refers to materials with single copper coating, and TF-2 refers to materials with double copper coating.

■ Product Features:

- ◆ The dielectric constant ranges from 3 to 16 and is stable. Commonly used dielectric constants include 3.0, 6.0, 9.2, 9.6, 10.2, and 16; Low dielectric loss.
- ◆ Used for microwave and millimeter wave printed circuit production.
- ◆ The long-term working temperature is higher than TP material, and can be used for a long time within the range of -80 °C to +200 °C.
- ◆ Choose a thickness between 0.635 and 2.5mm.
- ◆ Anti irradiation, low exhaust.
- ◆ The circuit board is easy to process and can be processed using thermoplastic materials.

Copper foil type: ED copper foil. Copper foil thickness: 0.018mm 0.035mm.							
Available sizes: 150×150mm 250×250mm							
Thickness and tolerance can be provided (the following are conventional thicknesses, please contact our company for customization for unconventional thicknesses): The following thicknesses are the total thickness of copper or the thickness of the medium, which can be produced, Please indicate when placing an order whether it is "total thickness of copper" or "medium thickness".							
Thickness (mm)	0.635	0.8	1.0	1.2	1.5	2.0	2.5
public errand (mm)	±0.04	±0.05	±0.05	±0.05	±0.06	±0.08	±0.01

■ Technical Conditions

	Product technical parameters		Product model/data	
Product characteristics	Test conditions	Unit	TF	TF-1 TF-2
Dielectric constant	When the dielectric constant is ≤ 11 , the test condition is 10GHz When the dielectric constant is greater than 11, the test condition is 5GHz	/	3.0±0.06	4.4±0.09
			6.0±0.12	6.15±0.12
			9.2±0.18	9.6±0.19
			10.2±0.2	16.0±0.4
			The dielectric constant can be customized between 3.0 and 16	



Dielectric constant tolerance	Dielectric constant 3.0~11.0		/	±2%
	Dielectric constant 11.1~16.0		/	±2.5%
Loss factor	Dielectric constant 3.0~9.5	10GHz	/	0.0010
	Dielectric constant 9.6~11.0	10GHz	/	0.0012
	Dielectric constant 11.1~16.0	5GHz	/	0.0014
Dielectric constant temperature coefficient	Dielectric constant 3.0~4.5	-55 °~150°C	PPM/°C	-60
	Dielectric constant 6.0~6.5	-55 °~150°C	PPM/°C	-210
	Dielectric constant 9.0~11.0	-55 °~150°C	PPM/°C	-260
	Dielectric constant 12.0~16.0	-55 °~150°C	PPM/°C	-205
Peeling strength	1 OZ normal		N/mm	>0.6
	1 OZ after alternating dampness and heat		N/mm	>0.4
Volume resistivity	normal behavior 500V		MΩ.cm	>1×10 ⁹
Surface resistance	normal behavior 500V		MΩ	>1×10 ⁷
Coefficient of thermal expansion(X Y Z)	Dielectric constant 3.00~6.15	-55 °~150°C	PPM/°C	60,60,80
	Dielectric constant 6.16~11.0	-55 °~150°C	PPM/°C	50,50,65
	Dielectric constant 11.1~16.0	-55 °~150°C	PPM/°C	40,40,55
Water absorption	20±2°C, 24h		%	≤0.05
Long term use temperature	High and low temperature box		°C	-80~200°C
Material composition				PTFE, ceramic, paired with ED copper foil

The density and thermal conductivity data of materials with different dielectric constants are as follows:

Product characteristics	Unit	Dielectric constant							
		3.0	4.4	6.0	6.15	9.2	9.6	10.2	16.0
Density	g/cm ³	2.41	2.58	2.78	2.79	3.0	3.02	3.07	3.27
thermal conductivity	W/(M.K)	0.30	0.32	0.45	0.46	0.66	0.68	0.7	0.75

1. The dielectric constant (typical value) is tested in the Z direction of the material, and the stripline method (GB/T 12636-1990 or IPC-TM650 2.5.5.5) is used;
2. Other performance tests shall be conducted using or referring to the test methods specified in IPC-TM-650 or GBT4722-2017;
3. All test data are typical measurement data and are intended to assist customers in material selection. It is not intended and does not constitute any express or implied warranty, nor does it guarantee that customers will achieve all the performance specified in the data sheet in specific situations. Customers are responsible for verifying and determining the adaptability of Wangling materials in each application.