



IS680-338 Very Low-loss Laminate Material

IS680 laminate materials exhibit exceptional electrical properties which are very stable over a broad frequency and temperature range. IS680 is suitable for many of today's commercial RF/microwave printed circuit designs. It features a dielectric constant (Dk) that is stable between -55°C and +125°C at up to 20 GHz. In addition, IS680 offers a lower dissipation factor (Df) of 0.0035 making it a cost-effective alternative to PTFE and other commercial microwave laminate materials.

www.isola-group.com/products/IS680-338

ORDERING INFORMATION:

Contact your local sales representative or visit www.isola-group.com for further information.

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RF/Microwave

IS680-338

Data Sheet

Tg 200, Td 360
Dk 3.38, Df 0.0035

Features

- High Thermal Performance
 - ▶ Tg: 200°C (DSC)
 - ▶ Td: 360°C (TGA @ 5% wt loss)
 - ▶ Low CTE in the Z-axis – 2.9% (-55-288°C)
- T260: 60+ minutes
- T288: 60+ minutes
- RoHS Compliant
- Electrical Properties
 - ▶ Dk: 3.38 ±0.05
 - ▶ Df: 0.0035 ±0.0005
 - ▶ Exceptional dielectric properties over a broad frequency and temperature range per IPC-TM-650-2.5.5.5
- Core Material Standard Availability
 - ▶ Thickness: 0.020", 0.030" & 0.060" (0.05 mm, 0.76 mm & 1.52 mm)
 - ▶ Available in full size sheet or panel form
- Copper Foil Type Availability
 - ▶ Standard HTE Grade 3
 - ▶ RTF (Reverse Treat Foil)
 - ▶ VLP-2 (2 micron)
- Copper Weights
 - ▶ ½, 1 and 2 oz (18, 38 and 70 µm) available
 - ▶ Heavier copper available upon request
 - ▶ Thinner copper foil available upon request
- Glass Fabric Availability
 - ▶ Standard E-glass
- Industry Approvals
 - ▶ UL – File Number E41625
 - ▶ UL-94 V-0

IS680-338 Specifications

Property	Typical Values				
			Units	Test Method	
	Typical Value	Specification	Metric (English)	IPC-TM-650 (or as noted)	
Glass Transition Temperature (Tg) by DSC	200	170-200	°C	2.4.24	
Decomposition Temperature (Td) by TGA @ 5% weight loss	360	–	°C	ASTM D3850	
T260	60+	–	Minutes	–	
T288	60+	–	Minutes	–	
CTE, Z-axis	A. Pre-Tg B. Post-Tg	AABUS –	ppm/°C	2.4.41	
CTE, X-, Y-axes	A. Pre-Tg B. Post-Tg	AABUS –	ppm/°C	2.4.41	
Z-axis Expansion (-55-260°C)	2.9	–	%	2.4.41	
Thermal Conductivity (-100-250°C)	0.32	–	W/mK	ASTM F433	
Thermal Stress 10 sec @ 288°C (550.4°F)	A. Unetched B. Etched	Pass	Pass Visual	Rating	2.4.13.1
Dk, Permittivity (Laminate & prepreg as laminated)	A. @ 2 GHz B. @ 5 GHz	3.38 3.38	±0.05 –	–	2.5.5.3 2.5.5.9
Df, Loss Tangent (Laminate & prepreg as laminated)	A. @ 2 GHz B. @ 5 GHz C. @ 10 GHz	0.0035 0.0035 0.0035	Nominal ±0.05 – –	–	2.5.5.3 2.5.5.9 2.5.5.5
Volume Resistivity	96/35/90	1.33x10 ⁷	1.0x10 ⁶	MΩ-cm	2.5.17.1
Surface Resistivity	96/35/90	1.33x10 ⁵	1.0x10 ⁴	MΩ	2.5.17.1
Dielectric Breakdown (.060)	45.4	–	kV	–	2.5.6
Arc Resistance	139	60	Seconds	–	2.5.1
Electric Strength (Laminate & prepreg as laminated)	45 (1133)	30 (750)	kV/mm (V/mil)	–	2.5.6.2
Comparative Tracking Index (CTI)	2	–	Class (Volts)	–	UL-746A ASTM D3638
Peel Strength	1 oz. EDC foil	0.70 (4.01)	0.53 (3.0)	N/mm (lb/inch)	2.4.8.3
Flexural Strength	A. Lengthwise direction B. Crosswise direction	37,500 28,500	–	lb/inch ²	2.4.4 –
Tensile Strength	A. Lengthwise direction B. Crosswise direction	28,000 26,000	–	lb/inch ²	ASTM D638 –
Young's Modulus	A. Grain direction B. Fill direction	2559 2366	–	ksi	ww
Poisson's Ratio	A. Grain direction B. Fill direction	0.122 0.120	–	–	xx
Moisture Absorption	0.1	–	%	–	2.6.2.1
Flammability (Laminate & prepreg as laminated)	V-0	V-0	Rating	–	UL 94
Max Operating Temperature (130°C in testing)	110	UL Cert	°C	–	–

The data, while believed to be accurate and based on analytical methods considered to be reliable, is for information purposes only. Any sales of these products will be governed by the terms and conditions of the agreement under which they are sold.

Isola utilizes the IPC-TM650-2.5.5.5 Stripline Resonator to test material with thickness of .030 and above as a means of determining a nominal value for dielectric constant and loss tangent test frequency is set at 10 GHz. Please note that for laminate dielectric thickness below .030 the test method that is utilized to determine the Dk and Df values is referred to as the Bereskin Stripline Resonator method. The Bereskin Stripline Resonator test method lends itself to the test and measurement of Dk and Df values of thinner dielectric laminate materials as those that would fall below .030. In the event we are requested to test the Dk and Df of a dielectric laminate that is below .030 per the IPC-TM650-2.5.5.5 test method we would employ a building block stack method to construct the test specimens in order to arrive at a laminate dielectric thickness that would be sufficient for the test to be conducted accurately. The effect of air gaps between the dielectric test specimens would then be back calculated out of the equation to provide for a more accurate result. Departure from these test methods and/or frequency may produce different values. Isola ensures the consistency and repeatability of the property sets in the product that we produce, however we encourage prospective users to conduct a thorough evaluation with appropriate modeling software during the design process to determine the value sets that are best suited for their application.

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