

## Product Description: Substrate Electrical Specifications

**Materials:** TnM uses a variety of dielectric materials categorized as Class I and Class II dielectrics.

- Our Class I materials have dielectric constants ranging from 3.8 to 93.

Class 1 materials are highly stable and exhibit minimal losses and high Insulation Resistance. Temperature coefficient is linear, and aging is minimal. Typical applications include resonator circuitry and other types of demanding filter circuits.

- Our Class II materials have dielectric constants ranging from 25k to 35k.\*

Class II material is a category of high K dielectrics that present a higher capacitance value as compared to the same size Class I capacitor. These dielectrics exhibit higher losses and have a non-linear Temperature Coefficient. Typical applications include coupling, bypass and DC blocking.

\* Available soon: Our new 4k material has entered the testing phase of development.

### Class I Dielectrics

TnM Material Type	Material	Dielectric Constant (K)	T/C PPM/°C (-55/+125°C)	Dissipation Factor (@ 10 GHz)	Insulation Resistance Meg-Ohms (100VDC @ 25°C)
C20	Quartz	3.8	Negligible	0.0001	10 <sup>6</sup>
C28	ALN	8.7	P120 ±25	0.0001	10 <sup>6</sup>
C30	Alumina 96	9.6	P180 ±50	0.0006	10 <sup>6</sup>
C35	Alumina 99.6	9.8	P180 ±50	0.0006	10 <sup>6</sup>
C37	Titinate	13	0 ±30	0.0001	10 <sup>6</sup>
C52 (50)*	Titinate	40	0 ±30	0.002	10 <sup>6</sup>
C58	Titinate	93	0 ±30	0.005	10 <sup>6</sup>

\* C50 material no longer available; replaced with C52.

### Class II Dielectrics

TnM Material Type	Material	Constant (K)	T/C (%) (-55/+125°C)	Dissipation Factor (@ 1 MHz)	Insulation Resistance (Meg-Ohms @ 25°C)*
C200	Titinate	25k	±15%	0.0035	10 <sup>4</sup>
C400	Titinate	35k	±15%	0.0035	10 <sup>4</sup>

\* Contact the factory for test voltage.

