

I. LINEAR DIELECTRICS

Dielectrics which are non-ferroelectric show a linear relationship of polarization to voltage (Figure H-1) and are formulated to have a linear temperature coefficient. These materials consist primarily of TiO_2 and therefore exhibit lower dielectric constant (<150) but more importantly, also lower dielectric loss and no aging of capacitance with time. These properties, along with negligible dependence of capacitance with voltage or frequency, make these dielectrics useful in capacitor applications where close tolerance and stability are required.

Linear dielectrics are also referred to as Temperature Compensating, as the temperature coefficient can be modified to give predictable slopes of the temperature coefficient (T.C.) over the standard -55°C to 125°C range. These slopes vary from approximately a positive of 100 parts per million per degree C (ppm/ $^\circ\text{C}$) to a slope of typically negative 750ppm/ $^\circ\text{C}$. These values are reported as P100 or N750 respectively. A flat slope, which is neither positive nor negative is a negative-positive-zero (NPO or COG) and is one of the most common of all dielectric characteristics.

A series of linear dielectrics known as the extended T.C. type, range from N750 to as negative as N5600. These values are obtained by using dielectrics with the Curie Point well below the -55°C lower limit of the MIL Specifications, such that the T.C. portion between -55°C to 125°C is approximately linear.