

1-6-4 Temperature Characteristics

Aluminum electrolytic capacitors have liquid electrolyte. This electrolyte has properties (conductivity, viscosity, etc.) that have rather conspicuous temperature characteristics.

Electrical conductivity increases as the temperature increases and reduces as the temperature decreases. Therefore, the electrical characteristics of aluminum electrolytics are affected by temperature more than other types of capacitors. The following section explains the relationship between temperature and capacitance, tangent delta, ESR, impedance and leakage current.

1) Capacitance

The capacitance of aluminum electrolytic capacitors increases as the temperature increases and decreases as the temperature decreases. The relationship between temperature and capacitance is shown in Fig. 1-9.

2) Tanδ, Equivalent Series Resistance (ESR), Impedance

The Tanδ, equivalent series resistance (ESR) and impedance changes with temperature and frequency. An example of the general characteristics is shown in Fig. 1-10 and 1-11.

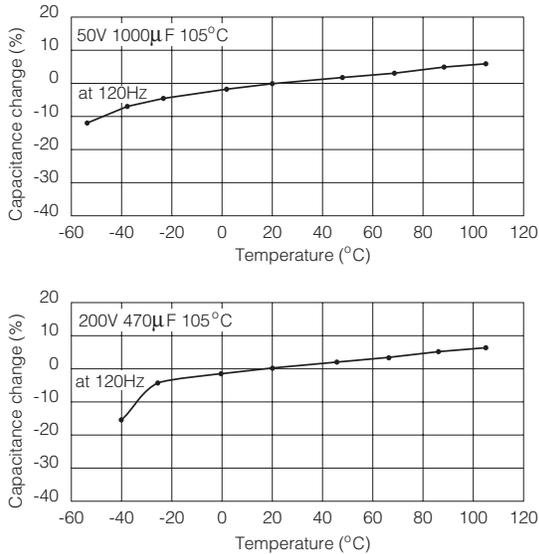


Fig. 1 - 9 Capacitance vs. Temperature Characteristics

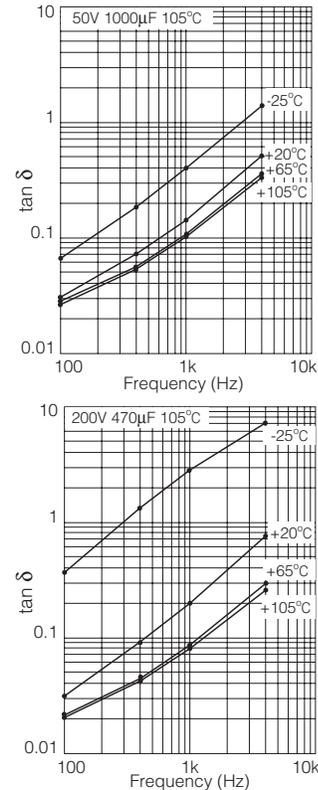


Fig. 1 - 10 Tanδ vs. Frequency Characteristics

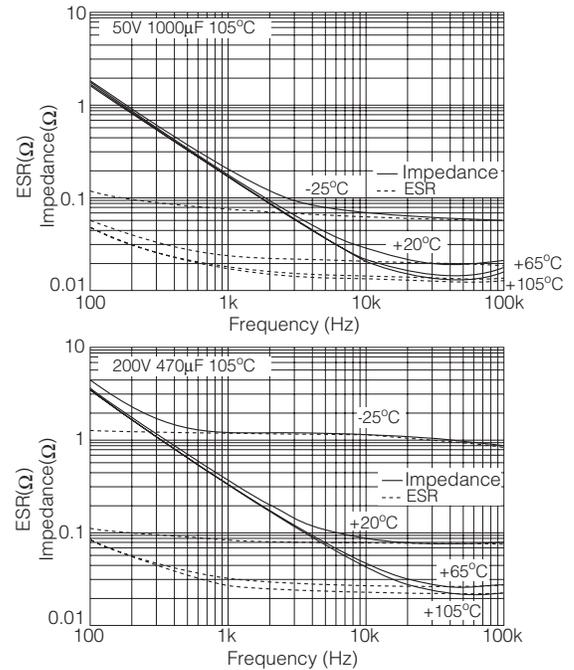


Fig. 1 - 11 Impedance, ESR vs. Frequency Characteristics