



Film Capacitors

Short definition of terms

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Short definition of terms

Symbol	Term	Short definition	Reference chapter "General technical information"
Climatic category		A numerical code that specifies the limits of the category temperature range and the duration of a specified humidity test.	4.1
C_R	Rated capacitance	Capacitance measured at 1 kHz in standard ambient conditions; normally marked on the product.	2.2.1
ΔC_R	Capacitance tolerance	Permissible relative deviation of capacitance from the rated value; expressed in percent.	2.2.1
dV/dt	Rate of voltage rise	The maximum admissible dV/dt defines the capability of a capacitor to withstand high current peaks due to fast voltage changes; expressed in $V/\mu s$.	3.3.1
ESR	Equivalent series resistance	Ohmic part of the equivalent series circuit of a capacitor. It represents the losses associated with a capacitor due to metallic contacts, polarization, leakage currents, etc; expressed in milliohms ($m\Omega$).	2.3
i_p	Peak current	The product of the capacitance and the dV/dt . $i_p(A) = C(\mu F) \cdot \frac{dV}{dt} (V/\mu s)$	3.3.1
k_0	Pulse characteristic	Characteristic factor of a pulse waveform, indicating its energy content. The maximum admissible k_0 defines the capability of a capacitor to withstand pulses of several current peaks; expressed in $V^2/\mu s$. $k_0 = 2 \cdot \int_0^T \left(\frac{dV}{dt} \right)^2 \cdot dt$	3.3.2
R_{ins}	Insulation resistance	Ratio between an applied DC voltage and the resulting leakage current after a specified time; expressed in megohms ($M\Omega$).	2.4
Self-healing		The process by which the electrical properties of a metallized capacitor before a local breakdown are rapidly and essentially restored after the breakdown.	6.1
$\tan \delta$	Dissipation factor Loss factor	Ratio between effective power (power dissipation) and reactive power for a sinewave load of specified frequency.	2.3
τ	Time constant	Time in seconds during which the voltage across the wires of a charged capacitor decreases to 37% due to self-discharging. It is the product of nominal capacitance and insulation resistance: $\tau (s) = R_{ins} (M\Omega) \cdot C_R (\mu F)$	2.4
T_A	Ambient temperature	The temperature of the air surrounding the component.	3.1.3, 3.2.3

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T_{\min} – T_{\max}	Category temperature range	The range of ambient temperatures at which a capacitor can operate continuously. The limit temperatures T_{\max} and T_{\min} (upper and lower category temperatures, respectively), are defined in the climatic category.	3.1.3, 4.1
T_{op}	Operating temperature	The temperature of a component in steady-state operation is the sum of the ambient temperature and the self-heating due to its operation. $T_{\text{op}} = T_A + \Delta T$	3.2.3
T_R	Rated temperature	Maximum ambient temperature or hottest contact point at which the rated voltage can be applied continuously. For higher temperatures (up to the upper category temperature) a derating of voltage needs to be applied.	3.1.3
ΔT	Self-heating	When a capacitor is used in AC applications, associated self-heating will increase its surface temperature above the ambient temperature. It is essential to take this into account in order not to exceed the upper category temperature. A temperature check should be performed on a capacitor in case of doubt.	3.2.2, 3.2.3, 4.1
V_C	Category voltage	The maximum voltage (expressed as a fraction of the rated voltage) that may be continuously applied to a capacitor at any working temperature inside the category temperature range.	3.1.3
V_R	Rated voltage	The maximum voltage that may be continuously applied to a capacitor at any ambient temperature below rated temperature.	3.1.1
V_{RMS}	Rated AC voltage	The maximum RMS voltage at the specified frequency (usually 50 Hz) that may be applied continuously to the terminals of a capacitor at any temperature between the lower category temperature T_{\min} and rated temperature T_R .	3.2.1