

PROCEEDINGS

Finite Element Simulation of Heat Dissipation Performance of Aluminum Electrolytic Capacitor

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ABSTRACT

The working temperature of aluminum electrolytic capacitor seriously affects its life and performance, especially when the core temperature is too high, its service life will be greatly reduced. At present, the detection of the center temperature of aluminum electrolytic capacitor needs to open a hole on the top of the aluminum electrolytic capacitor, place a thermocouple and run for a long time to reach a stable state, so as to obtain a more accurate core working temperature. According to the heating mechanism of aluminum electrolytic capacitor, the ripple current and surface temperature rise of aluminum electrolytic capacitor were tested as an example, and the finite element model of thermal simulation of aluminum electrolytic capacitor was built using COMSOL, and the core temperature of the capacitor under different working conditions was obtained quantitatively. The simulation results show that the finite element model of aluminum electrolytic capacitor with correct size and parameters can accurately simulate the global temperature rise process and stable state of the capacitor, and can effectively explain various thermodynamic phenomena during the operation of the capacitor. The simulation results of the model are consistent with the test results, and the rapid and nondestructive measurement of the temperature rise of the capacitor surface and core is realized.

KEYWORDS

Aluminum electrolytic capacitor; thermal simulation; finite element simulation

Funding Statement: This study was financially supported by the Natural Science Foundation of China (12202140).

Conflicts of Interest: The authors declare no conflicts of interest to report regarding the present study.

