

Project Summary:

Initial Reliability Assessment of Temperature Controller

A major controls manufacturer asked DfR Solutions to perform an initial reliability assessment of a new temperature controller. The use environment was defined to be between 70°C to 90°C (due to proximity to heater) and possibly subject to humidity. With this in mind, the components, printed board, and interconnects were analyzed to determine possible areas of concern. DfR Solutions recommended step stress testing, replacing existing electrolytic capacitors with ones rated for higher temperatures, and using tin plated copper wire. With these changes, the temperature controller will very likely meet its 10-year lifetime reliability goal.

Keywords: electrolytic capacitor, lifetime, warranty period, operating temperatures, life ratings, ceramic capacitors, assembly process, no-clean flux, chloride levels, corrosion, crimp connection, tin plated copper wire, circuit card assembly, surface mount, through-hole, eutectic solder, RoHS, reliability specifications, field environment, humidity, chemical vapors, input voltage, actives, passives, thin film resistors, power components, IGBT, buck converter, insulated-gate bipolar transistor, equivalence series resistance, ESR, flex cracking, thermal shock cracking, depaneling, touch up, dielectric classification, rated current capacity, plated through hole fatigue, PTH, conductive anodic filament, CAF, electrochemical migration, ECM, aqueous flux, bromide, step stress testing