

## Project Summary:

### Reliability Review of Residential Climate Control

A major electronic motor manufacturer requested DfR to provide a comprehensive reliability review of its high-end climate controller. With specific reliability goals in mind, the client was most concerned with electronic packaging, thermal mitigation, and preventing moisture driven failures due to the compact and highly integrated design. DfR's recommendations included testing-to-failure to ensure a sufficient lifetime for bus capacitors, temperature step stress testing, and assessment of the effects of localized heating on capacitors and wiring. With these recommendations, DfR was able to provide the manufacturer with a basis on which to ensure the reliability of this new product.

Keywords: test to failure, insulation jacket, conformal coating, eliminate metal exposure, flex cracking, ceramic disk capacitor, avoid MELF packaging, step stress testing, virtual qualification, board layout review, transition to Pb-free, heating and cooling system, potting compound, integration with motor housing, indoor, outdoor, heat pump, furnace, ripple current, thermistor, localized heating, convective heating, wire shorting, vented, header solder joints, coefficient of thermal expansion, CTE, silicone, urethane, spacer, reliability goal, use environment, design for manufacture, accelerated life testing, temperature humidity bias, THB, supplier control plan, failure analysis on line and field returns, warranty, lifetime, critical to quality parameters, CTQ, transformer, aluminum electrolytic capacitors, ion chromatography