

Standard Hybrid DC-DC Converter Derating Criteria

1.0 Scope

This criteria provides design ground rules for MDI standard hybrid DC-DC Converters. It is superseded by specific customer requirements. This document is based on the requirements of MIL-STD-454 requirement 18, MIL-STD-975 and MIL-PRF-38534.

2.0 Capacitors

2.1 Solid Tantalum (CWR or equivalent) shall be derated to 50% of steady state rated voltage as a goal, with an absolute maximum of 70% with design approval. Transient voltages shall not exceed the manufacturer's rated values. Worst case ripple current shall not exceed manufacturer's rating at maximum operating temperature. An impedance of 1 OHM per volt or the equivalent obtained by circuit impedance or rate of voltage rise control shall be provided to limit surge current.

2.2 Ceramic (CDR or equivalent) shall be derated to 60% of steady state rated voltage as a goal, with an absolute maximum of 80% with MDI design approval. Transient voltages shall not exceed the manufacturer's rated transient values. Worst case ripple current shall not exceed manufacturer's rating at maximum operating temperature.

3.0 Microcircuits

The derating of microcircuits shall conform to MIL-STD-975 Revision G, Paragraph 1.2.2.

4.0 Resistors

The derating of printed resistors shall be in accordance with the requirements of MIL-PRF-38534.

The derating of discrete and chip resistors within the hybrid shall conform to MIL-STD-975 Revision G, Paragraph 1.2.3.

5.0 Semiconductors

The derating of semiconductors shall be in accordance with MIL-STD-975 Revision G, Paragraph 1.2.4.

6.0 Magnetic Components

The derating of Magnetic Components shall be in accordance with MIL-STD-975 Revision G, Paragraph 1.2.5 and 1.2.6 except that an operating voltage of 90% of rated is permissible and a temperature relaxation of 20°C is permissible.

7.0 Bond Wires

Bond wire sizing shall be sized in accordance with MIL-H-38534, based on worst case peak currents.

8.0 Conductor Tracks

Printed Conductor tracks shall be sized in accordance with MIL-PRF-38534, based on worst case peak currents.

9.0 Voltage Breakdown Between Insulated Points

The spacing between printed conductors, between bond wires and printed conductors, between package pins and the case, etc., shall be verified by design to permit a 50% derating of DC breakdown voltage at the worst case atmospheric conditions.