
MÉ MORANDUM

À : PSWG CHAIRMAN
DE : PSWG ADHOC WG FOR REVIEW OF CERAMIC CAPACITORS GENERIC SPECIFICATIONS
OBJET : DRAFT J FOR ISSUE 2 OF ESCC 3009
DATE : 15/12/2014
CC : ADHOC WG, QUALIFIED MANUFACTURERS

CHANGES TO DCR 695 (ESCC 3009 DRAFT H FOR ISSUE 2)

The adhoc WG set up by PSWG in order to review DCR 695 to ESCC 3009 proposes the following changes which have been reviewed with ESCC qualified manufacturers for Ceramic Capacitors :

- Paragraph 5.2.2 : Low voltage steady state humidity test is proposed to be deleted from Special In-Process Controls since data generated so far on ceramic chips did not show any failure and NASA study shows that samples sizes and duration are not stringent enough to identify weaker lots. (Note: Low voltage steady state humidity test is transferred to Lot Validation Test with higher sample size and longer duration),
- Paragraph 8.2 : Low Voltage Humidity test is extended to 1 000 hours, measurements are no longer performed on a go – no go basis and Capacitance drift is measured together with Tangent of Loss Angle and Insulation Resistance. The Note stating that the test is not applicable to capacitors with Rated Voltage > 500V is proposed to be deleted since it is already stated in Chart F4, agreed to be a better place to find the statement which is not related to the test method itself,
- Paragraph 8.3.1.4 : Manufacturers pointed out that the voltage application time should rather be 5s than 1 minute,
- Paragraph 8.4 : Minimum duration for burn-in has been reduced to 96 hours, in line with both manufacturers data and MIL-PRF-55681 requirement (commonly used for procurement of chip ceramic capacitors in European space programs),
- Paragraph 8.8 : Climatic test sequence is removed from ESCC requirements for chip ceramic capacitors as it is not showing any efficiency,
- Paragraph 8.10 : Damp heat steady state is also removed from ESCC requirements for chip ceramic capacitors as it is not showing any efficiency,

Note: both above tests are replaced in Chart F4 with Low voltage steady state humidity per paragraph 8.2, performed on 20 parts,

- Paragraph 8.11 : Operating Life is proposed to have two potential durations, 1 000 hours or 2 000 hours. For 2 000 hours operating life, 1 000 hours intermediate measurements may be omitted, at the manufacturer' option.
- Paragraph 8.13 : Solderability test reference for chip capacitors is 60068-2-58. Wording is modified to better fit to the method, immersion is $5\pm 0.5s$ instead of $4\pm 1s$,
- Paragraph 9.1.1 : Qualification and qualification maintenance, in both occasions delivery by the manufacturer of a micro section report (based on in-process inspection) is added to documentation to overcome the absence of systematic DPA during qualification or its maintenance,
- Chart F2 – Production Control : Low voltage Steady State Humidity and its relevant note are removed from this chart,
- Chart F4 – Qualification and Periodic tests :

Environmental / mechanical subgroup (Group 1) is limited to a Mounting / RCT 10 cycles / Low Voltage Humidity 1 000H performed on 20 parts (note that 20 parts remains the minimum quantity per test vehicle for this test when multiple test vehicles are distributed within the chart).

Endurance / electrical subgroup is composed of :

- Group 2A: a 2 000H / 40 parts (qualification) or 1 000H / 20 parts (periodic testing) minimum requirement (10 parts is the minimum quantity per test vehicle when multiple test vehicles are distributed within the chart). The rationale for this selection is the acknowledgement of a sufficient reliability information with 1 000H performed at 2Un during procurement while standard qualification requirement could not be de-graded compared to existing Chart IV due to the good performance under voltage of this technology and the requirements implemented in other systems (for example MIL-PRF-123 now requires 4 000 hours),
- Group 2B: capacitance temperature characteristic (mounting at the manufacturer' option) followed with robustness of terminations performed on 6 parts (3 parts is the minimum quantity per test vehicle when multiple test vehicles are distributed within the chart),

Both subgroups are performed on a 24 months basis due to the minimum quantities selected per test vehicle and the nature of chip ceramic capacitors families where multiple test vehicles are required to cover the various sizes, voltages ...

Assembly Capability subgroup (Groupe 3) is composed of solderability and permanence of marking performed on 6 parts (3 parts is the minimum quantity per test vehicle when multiple test vehicles are distributed within the chart) every 12 months.

The corresponding detail specifications will follow after review with the qualified manufacturers.

Representing the PSWG AdHoc WG and Qualified Manufacturers,

Jean-Paul Bussenot (CNES)