

The following table summarizes the changes for MIL-PRF-38534 Revision M.

REF No.	PARAGRAPH	CHANGE	SOURCE	REASON	PAGE No
1	3.9	Replace paragraph in its entirety. See draft document.	JEDEC JC-13.5	To include update to paragraph 3.9	6
2	6.4.19	Remove definition of "Film microcircuit:	JEDEC JC-13	JC-13.5 decided to remove definition of Film microcircuit. Definition is not needed.	17
3	6.4.21	Replace hybrid microcircuit definition.	JEDEC JC-13	To update and clarify the definition of a hybrid microcircuit.	17
4	6.4.27	Remove Known good die (KGD) definition	DLA Land and Maritime	This term is not used in the specification.	18
5	6.4.28	Replace monolithic microcircuit definition.	JEDEC JC-13	To update and clarify the definition of a microcircuit.	18
6	6.4.29	Replace in its entirety with "6.4.31 Multichip microcircuit or multichip module (MCM). A device consisting of two or more integrated circuits in a single package."	JEDEC JC-13	To update definition of and MCM.	18
7	6.4.36	Replace current definition of Production lot with the following definition: "Production lot. A production lot consists of a single device design-type manufactured from the same elements, materials (excluding consumables) and processes on the same production line, processed under the same manufacturing techniques and controls using the same type of equipment. The production lot is formed at, or prior to, device kit preparation (i.e., release to manufacturing). In addition, for Class K devices, all elements for assembling the production lot will be from the same manufacturing lot or incoming inspection lot for each element (i.e. lot homogeneity). Elements from different lots may be used with approval from the procuring activity. If necessary, rework requirements may be satisfied with materials from a different manufacturing lot or incoming inspection lot."	JEDEC JC-13.5	To clarify lot homogeneity for users and manufacturers.	18
8	6.5	Add MIL-STD-883 test methods in parenthesis after the tests.	JEDEC JC-13.5	Clarification to show the corresponding MIL-STD-883 test method number.	20
9	6.5	Add "Single event effects (SEE)" and remove "Single Event Upset (SEE)."	JEDEC JC-13.5	Clarification. SEE is defined as Singel event effects.	20
10	6.6	Add MIL-STD-883 test methods in parenthesis after tests.	JEDEC JC-13.5	Clarification to show the corresponding MIL-STD-883 test method number.	20
11	6.6	Add "Temperature cycling (method 1010)"	JEDEC JC-13.5	To add test that is considered nondestructive	20

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12	6.6	Add NOTE: Stating "Constant acceleration (method 2001) and Thermal shock (method 1011) may be either destructive or nondestructive depending on the test condition used and the device under test.	DLA Land and Maritime	Clarification for users since Thermal shock and Constant acceleration are not listed as either destructive or nondestructive.	20
13	A.2.3	Remove "ANSI/NCSL Z540.3 - Calibration Laboratories and Measuring and Test Equipment – General Requirements"	DLA Land and Maritime	Z540.3 has been canceled and replaced with ISO/IEC 17025.	23
14	A.2.3	Add "ISO/IEC 17025 - General Requirements for the Competence of Testing and Calibration Laboratories"	DLA Land and Maritime	This document is a replacement for Z540.3.	23
15	A.3.8.3	Change Production lot traceability definition from " <u>Production lot traceability</u> . The manufacturer will maintain production lot traceability. In addition for Class K devices, all materials will be from the same manufacturing lot or incoming inspection lot for each element. If necessary, rework requirements may be satisfied with materials from a different manufacturing lot or incoming inspection lot, and shall be traceable to the device serial number." to " <u>Production lot traceability</u> . The manufacturer shall maintain production lot traceability. In addition for Class K devices, see production lot definition."	JEDEC JC-13.5	To clarify requirements for production lot traceability.	29
16	A.3.11 and A.3.11.1	Replace "ANSI/NCSL Z540.3" with "ISO/IEC 17025"	DLA Land and Maritime	Z540.3 has been canceled and replaced with ISO/IEC 17025.	30
17	C.3.3.3.2	Delete paragraph in its entirety and replace with "C.3.3.3.2 <u>Test sample preparation</u> . All test samples assembled by the hybrid manufacturer may use similar methods and materials (standard evaluation attach material for the element unless otherwise specified, same wire material, similar wire diameters as specified herein) used in the end item application. If the test samples are not being prepared by the hybrid manufacturer, all test samples shall be assembled using the same or similar assembly methods as flowed down by the hybrid manufacturer. If not flowed down, the outside vendor may use their standard practices. The hybrid manufacturer shall review the wire material and diameter upon receipt and as required, shall perform similar wirebond evaluation to meet the end use application (i.e. gold vs aluminum wire material, 0.7 to 1.3 mil gold wire are similar, 2.0 to 3.0 mil gold wire are similar, 0.7 to 1.3 mil aluminum wire are similar, 4.0 and 5.0 aluminum wire are similar, 8.0 and 10.0 aluminum wire are similar, 12.0 and 15.0 aluminum wire are similar)."	JEDEC JC-13.5	To better define and clarify when test samples for active elements are being prepared with similar assembly methods.	38

REF No.	PARAGRAPH	CHANGE	SOURCE	REASON	PAGE No
18	Table C-II	Subgroup 4 Interim electrical test. Remove "C.3.3.4.3" from the reference paragraph column.	JEDEC JC-13.5	Paragraph C.3.3.4.3 requires 25°C, maximum and minimum temperature test. Only 25°C test is required.	40
19	Table C-II-1	For Temperature Cycle test, remove second "X" in class K column.	DLA Land and Maritime	Correction. Only one of either the MIL-STD-883 or the MIL-STD-750 method is required.	42
20	Table C-II-1	For Temperature Cycle test, remove dividing line and second row of Xs.	DLA Land and maritime	To correct formatting error in table.	42
21	Table C-II-1	For Surge test, remove second "X" in class K column.	DLA Land and Maritime	Correction. Only one of either the MIL-STD-883 or the MIL-STD-750 method is required	42
22	Table C-II-1	For Mechanical Stress test, remove dividing line between MIL-STD-883 and MIL-STD-750 test references.	DLA Land and maritime	To correct formatting error in table.	43
23	Table C-II-1	Subgroup 4 Interim electrical test. Remove "C.3.3.4.3" from the reference paragraph column.	JEDEC JC-13.5	Paragraph C.3.3.4.3 requires 25°C, maximum and minimum temperature test. Only 25°C test is required.	44
24	Table C-II-1	Correct footnote <u>2</u> / from " <u>2</u> / Either test method is applicable." To: " <u>2</u> / Either the MIL-STD-750 or the MIL-STD-883 test method can be used."	DLA Land and Maritime	Clarification. Only one test method is required.	46
25	Table C-II-1	Add new footnote <u>3</u> / to state " <u>3</u> / Only one of either constant acceleration or mechanical shock is required for mechanical stress test."	DLA Land and Maritime	Clarification. Only one test is required for mechanical stress.	46
26	Table C-II-1	Renumber subsequent footnotes and update footnote references in table.	DLA Land and Maritime	Update footnotes accordingly.	43-45
27	Table C-II-1	Add reference to footnote <u>3</u> / next to mechanical stress test in subgroup 4.	DLA Land and Maritime	Clarification. To add applicable reference.	43

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28	C.3.4.3 a.	Delete in its entirety and replace with: “a. All test samples assembled by the hybrid manufacturer may use similar methods and materials (standard evaluation attach material for the element unless otherwise specified, same wire material, similar wire diameters as specified herein) used in the end item application. If the test samples are not being prepared by the hybrid manufacturer, all test samples shall be assembled using the same or similar assembly methods as flowed down by the hybrid manufacturer. If not flowed down, the outside vendor may use their standard practices. The hybrid manufacture shall review the wire material and diameter upon receipt and as required, shall perform similar wirebond evaluation to meet the end use application (i.e. gold vs aluminum wire material, 0.7 to 1.3 mil gold wire are similar, 2.0 to 3.0 mil gold wire are similar, 0.7 to 1.3 mil aluminum wire are similar). Electrical probe testing may be performed in lieu of assembly when applicable (e.g. wrap around resistor, top terminated resistor, end terminated capacitors).”	JEDEC JC-13.5	To better define and clarify when test samples for passive elements are being prepared with similar assembly methods.	47
29	Table C-III footnote 3/, Table C-III-1 footnote 4/, and Table C-III-3 footnote 2/.	Add the following statement to the end of the footnotes “When using elements with other termination finishes (e.g. gold, Pd/Ag, etc.) the manufacturer shall also have a method approved by the qualifying activity to verify these finishes do not contain Tin (Sn).”	DLA Land and Maritime	To formally require that verification is done so that no elements with pure tin finishes are used in the hybrid.	52, 58, and 61
30	Table C-III-1	Add hot Insulation Resistance (IR) test after voltage conditioning.	DLA Land and Maritime	The order of hot IR test is being changed so that it can be performed after voltage conditioning while the device is still heated.	54
31	Table C-III-1	Subgroup 3 Insulation Resistance for +25°C: Correct “Room” to “+25°C” for both Class H and K.	DLA Land and Maritime	To define actual temperature.	55
32	Table C-III-1	Remove the hot Insulation Resistance (IR) test that is currently after room temperature IR test.	DLA Land and Maritime	The hot IR test was moved to be performed after voltage conditioning	55

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33	Table C-III-1	For subgroup 5: Add reference to footnote <u>3/</u> to “Humidity, steady state, low voltage” test and “Moisture Resistance (85C/85%RH)” test.	DLA Land and Maritime	Clarification. Only one test is required. If MIL-PRF-123 is being used for other tests then “Humidity, steady state, low voltage” is required or if MIL-PRF-49470 is being used for other tests then “Moisture Resistance (85C/85%RH)” is required. The same specification should be consistent throughout the table.	57
34	Table C-III-1	Correct footnote <u>1/</u> from “ <u>1/</u> Base Metal Electrode (BME) Capacitors used in Class H hybrid devices shall be evaluated in accordance with MIL-PRF-32535. BME capacitors used in Class K hybrid devices shall be evaluated in accordance with MIL-PRF-32535 product level T.” To: “ <u>1/</u> Base Metal Electrode (BME) Capacitors used in Class H hybrid devices shall be evaluated in accordance with MIL-PRF-32535 product level M or T. BME capacitors used in Class K hybrid devices shall be evaluated in accordance with MIL-PRF-32535 product level T.”	DLA Land and Maritime	Clarification. To state that product level M or T capacitors can be used in Class H devices.	58
35	Table C-III-1	Correct footnote <u>2/</u> from “ <u>2/</u> Evaluation in accordance with this table is not required for elements procured as MIL-PRF-123, MIL-PRF-32535 product level T, MIL-PRF-49470 product level T, or MIL-PRF-55681 with Established Reliability failure rate S.” To: “ <u>2/</u> Evaluation in accordance with this table is not required for elements procured as MIL-PRF-123, MIL-PRF-32535 product level T or M for Class H devices and MIL-PRF-32535 product level T for Class K devices, MIL-PRF-49470 product level T, or MIL-PRF-55681 with Established Reliability failure rate S.”	DLA Land and Maritime	Clarification. To state that product level M capacitors do not require evaluation when used in Class H devices.	58
36	Table C-III-2 footnote <u>2/</u> and Table C-III-3 footnote <u>2/</u>	Add the following after the first sentence of the footnote. “When using elements with other termination finishes (e.g. gold, Pd/Ag, etc.) the manufacturer shall also have a method approved by the qualifying activity to verify these finishes do not contain Tin (Sn).”	DLA Land and Maritime	To formally require verification that other finishes besides Tin (Sn) lead (Pb) do not contain tin.	60 and 61
37	Table C-VI footnote <u>2/</u> and Table C-VII footnote <u>2/</u> .	Add the following after the first sentence of the footnote. “When using elements with other termination finishes (e.g. gold, Pd/Ag, etc.) the manufacturer shall also have a method approved by the qualifying activity to verify these finishes do not contain Tin (Sn).”	DLA Land and Maritime	To formally require verification that other finishes besides Tin (Sn) lead (Pb) do not contain tin.	68 and 70
38	Table C-VI footnote <u>2/</u> and Table C-VII footnote <u>2/</u> .	Remove “Not required on packages with gold plated bodies and pins.”	DLA Land and Maritime	To remove conflict with the added requirement that other termination finishes besides Tin (Sn) lead (Pb) do not contain tin.	68 and 70

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39	C.4.2.1 b.	Delete "not to exceed 4 hours" and replace with "not to exceed half a shift (4 to 6 hour half shift period, not to exceed 6 hours).	JEDEC JC-13.5	To allow for machine/operator evaluation to be done periodically for shifts up to 12 hours.	73
40	C.4.2.6.2	Change first sentence from "...nondestructively tested in accordance....." to "...nondestructively tested (e.g. random during both half shifts, random during first half shift and random/last device during the second half shift) in accordance..."	JEDEC JC-13.5	To better define how nondestructive samples will be chosen.	73
41	C.4.2.6.2 a.	Change from ".....period not to exceed 4 hours." to "...period not to exceed half a shift (4 to 6 hour half shift period, not to exceed 6 hours)."	JEDEC JC-13.5	To allow for machine/operator evaluation to be done periodically for shifts up to 12 hours.	73
42	C.4.5	Change paragraph from "C.4.5 <u>Testing for pure tin finishes.</u> The manufacturer will develop a test plan that will assure no parts used in the hybrid have a pure tin finish." to "C.4.5 <u>Testing for pure tin finishes.</u> The manufacturer will develop a test plan that will assure no parts used in the hybrid have a pure tin finish and all parts meet all of the requirements of E.4.2.7.1."	DLA Land and Maritime	Clarification, no changes are being made to the current requirements.	74
43	C.7.1	Add the following wording to end of paragraph . "Unless otherwise waived by the qualifying activity, the manufacturer shall submit a test plan using DLA Land and Maritime form 19H. The test plan shall be approved by the qualifying activity prior to the manufacturer submitting a qualification report."	DLA Land and Maritime	Clarification. This is the current requirement. Wording is being added to the specification to formally define the requirement.	90
44	C.7.5.2	Add the following wording to the end of paragraph "Particle and moisture getter material shall not be permitted in test samples that are submitted for initial qualification. These getters can mask processing defects, e.g., weld splash, solder balls, silicon fragments, foreign material, outgassing, etc., that would otherwise be detected during qualification testing. Other getters that are required for operation of the hybrid/MCM shall be approved by the qualifying activity prior to qualification testing. Getters, meeting the requirements of MIL-STD-883, Test Method 5011, may be used post-qualification as a part of normal production processing to assure continued reliability."	DLA Land and Maritime	To add the requirement stating that getter material cannot be used in samples that are used for initial qualification.	91

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45	C.7.5.2.5	Delete in its entirety and replace with "C.7.5.2.5 Disposition of samples. Samples destructively tested during qualification testing will be submitted to the qualifying activity with the qualification test report. Sample devices that passed MIL-STD-883-1, test method 1005 "Steady State Life Test" shall require approval by the procuring activity prior to shipment unless otherwise allowed by the purchase order. Lifetime analysis calculations can be used to aid in the determination of remaining life. Traceability shall be in accordance with section A.3.8. Either the Certificate of Conformance, group traveler, packing list, or purchase order shall serve to identify destructive or life test samples within a shipment by quantity and serial number (if applicable). Each group of sample devices shall be separately packaged by subgroup test and labelled with the applicable subgroup test number and device serial number(s) if applicable."	JEDEC JC-13.5	To add requirements for the shipment of devices that have been through Steady-state life test.	91
46	D.2.3	Correct "GEIA STANDARDS" to "SAE International"	DLA Land and Maritime	SSB-1 is now published by SAE International.	97
47	D.2.3	Correct URL for SSB-1 from " https://www.techamerica.org/ " to " https://www.sae.org/ ".	DLA Land and Maritime	Techamerica no longer exists. SSB-1 is now an SAE International document.	97

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48	E.4.2.9	Delete in its entirety and replace with "E.4.2.9 Electrical circuit design. Worst case circuit analysis shall be performed in accordance with the manufacturer's internal procedure to compute and validate the nominal performance and predict whether circuits will meet requirements given all the deviations from nominal values that the internal elements exhibit. Analysis shall include the following evaluations as a minimum (applicable to the design): a. Initial tolerance, temperature dependence, and radiation effects (as applicable - refer to appendix G). b. Electrical element stress over the specified operating temperature range will be within the specified derating criteria under worst case temperature (Tc, Ta or Tj) conditions. c. Evaluated to meet the Group A CI test limits at worst case operating temperature (Tc, Ta or Tj) conditions, as applicable. NOTE: Hybrid microcircuits qualified prior to the implementation date of (revision M) this specification are permitted and shall follow the design guideline requirements in MIL-PRF-38534 at the time of the initial design release. As applicable, changes to existing designs require a revision of the Worst Case Analysis to be compliant to the current standard."	JEDEC JC-13.5 TG	To define the requirements for Worst Case Circuit Analysis for MIL-PRF-38534 devices.	146
49	E.4.2.9	Add second note after E.4.2.9 to state "Note: MCMs with only microcircuit die elements are exempt from this circuit design analysis requirement due to no die-to-die interaction."	JEDEC JC-13.5 TG	To give exception to circuit design analysis for MCMs that only have microcircuit die elements.	146
50	E.5.2 k.	Delete in its entirety and replace with "k. Change of baseline wire bond method (e.g. ultrasonic versus thermal compression or thermosonic) or wire/ribbon size changes greater than 1.0 mil for small diameter wire (e.g. 0.7 to 5 mil), 10% cross sectional area change for ribbon wire and 3.5 mils for large diameter aluminum wire (e.g. 8 to 20 mil)."	JEDEC JC-13.5 TG	To better define change of baseline wire bond method.	147