DOCUMENT CHANGE REQUEST

DCR number 979	Changes required for: General	Originator: Steve Jeffery
Date: 2016/11/14	Date sent: 2016/02/22	Organisation: ESCC Executive
Status: IMPLEMENTED		

Title:	Diodes Microwave Silicon Multiplier Varactor, based on types DH252,256, 267,292, 294		
Number:	5512/016	Issue:	5

Other documents affected:

Page:

Total reformat/re-write of ESCC Detail Specification 5512/016 issue 5 as part of the ongoing conversion of legacy ESA/SCC specifications to the ESCC format, as well as reflecting changes resulting from the conversion of ESCC Generic Specification No. 5010.

The layout, format and general content of 5512/016 issue 6 is based on other converted ESCC Detail Specifications (see attached for proposed 5512/016 issue 6).

The technical content of ESCC 5512/016 issue 6 remains closely based on the original ESCC 5512/016 issue 5 except as detailed herein.

Paragraph:

All.

Original wording:

See ESCC 5512/016 issue 5.

Proposed wording:

Total reformat of this Detail Specification (from the range of various ESCC Detail Specifications, 5xxx/xxx, for microwave discrete semiconductors under Generic Specification No. 5010) as part of the ongoing conversion to the ESCC format.

See below for summary of changes, also see attached proposed 5512/016 issue 6.

Note: known support for active procurement against all these specifications includes the following Manufacturers:
• Cobham Microwave.

Summary of changes to the current format, layout and content of each specification is as follows:
1) General
Rewording and restructure of various sections and paragraphs of the specification, plus other editorial changes including deletion of any redundant paragraphs and information, based on the layout and editorial content of other Detail Specifications already converted to ESCC format.

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Specific amendments include:
2) Para 3: remove symbols (redundant information):
CT = Total Capacitance
L = Minority Carrier Lifetime
tSO = Snap off Time

3) Table 1(a) (= Component Type Variants):
'Figure' column 3 is replaced by new 'Package Type / Description'.
'Output Power' & 'Output Frequency' columns 5 & 6 are deleted (as these parameters are not included during any ESCC procurement testing).
'Body-Lid and Lead Material and Finish' Column 7 is replaced by 'Lead/Terminal Material and Finish' as applied to the anode & cathode terminals (from Para 4.4.2) and associated note added.
Weight is added to Table 1(a) (from Para 4.3.2).
Note 1 is deleted (requirements are moved to be in Table 2 (= Room Temperature Electrical Measurements).
A number of the Total Capacitance values (column 4) are amended (per Cobham Microwave's request).

4) Table 1(b): 'Junction Temperature' rating is added (for consistency purposes).

5) Table 1(b) Note 1 & Figure 1:
Figure 1 is replaced by the equivalent text description (Notes 1 & 2 in Maximum Ratings).
The reference to Tamb in Note 1 & in Figure 1 is corrected to be Tcase.
Reference to '(Infinite Heat Sink)' against Operating Temperature Range is deleted (redundant information).
Figure 1 notes are moved into Table 1(b) (= Thermal Resistance rating in Maximum Ratings).

6) Figures 2(a) to 2(g):
All figures are redrawn including terminal identification details plus Package Type / Description (to match the same requirements as in 5513/031 etc.).
Redundant dimensions are deleted (e.g. in Figure 2(a): dimensions A1, B1, DiaH).

7) Figure 3:
Note 1 is deleted as it is effectively replaced by a new note to each figure 2.

8) Para 4.2.1, 4.2.4 & 4.2.5:
Minority Carrier Lifetime and Snap-off Time test requirements are moved to be 2 new notes to Table 2 (= Room Temperature Electrical Measurements).
Terminal Strength deviation is moved to Terminal Strength.
Special Testing deviation is deleted (redundant information).

9) Para 4.3.2: Weight is moved to Table 1(a) (= Component Type Variants).

10) Para 4.3.3: Variants where terminal strength test shall not be performed are specified (from Paras 4.2.4 & 4.2.5).

11) Para 4.3.4: Bond Strength requirements are moved to Cobham Appendix A as a deviation to the Generic spec 5010.

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12) Para 4.3.5: Para is rewritten to clarify the requirements/test method.

13) Para 4.3.6: HT Stabilisation Bake is deleted (as the latest Generic Spec 5010 already covers this requirement).

14) Para 4.4.1: reference to the metal base and lid is added plus the sentence “The lid shall be welded or preform soldered” is deleted (clarification and removal of irrelevant information).

15) Para 4.4.2: Requirements as applicable to the materials & finish requirements for the anode & cathode terminals are extracted from this Para and moved to Table 1(a) (= Component Type Variants).
Requirements applicable to only ‘body’ & ‘lid’ (i.e. those with leads) are effectively deleted (removal of irrelevant information).

16) Para 4.5.1:
‘Cathode’ Identification bullet is renamed ‘Terminal identification, as specified in Physical Dimensions and Terminal Identification.’
‘The ESCC qualified components symbol’ bullet is added.

17) Para 4.5.3:
Testing Level (‘B’ or ‘C’) is deleted.
Total Dose Irradiation Level letter ‘F’ and the final paragraph are deleted (as radiation testing is not applicable to this spec).

18) Para 4.6.3, 4.7, 4.7.4, 4.9, 4.10 & Figure 5(b): are deleted.

19) Table 2 Breakdown Voltage:
The maximum limit for VBR for Variants 50 to 56 (-70V max) is deleted (as per the specified test method the maximum limit is never tested).

20) Table 2 Minority Carrier Lifetime (& Note 2), & Figure 4(a):
Test method reference to MIL-STD-750 Method ‘4031’ is added to Table 2 to replace Figure 4(a) which is deleted.
Sampling requirements (from Para 4.2.1(a)) are clarified in new note 4: 0 failures are allowed otherwise a 100% inspection shall be performed.

21) Table 2 Snap-off Time (& Note 2), & Figure 4(b):
Test method reference to MIL-STD-750 Method ‘4031’ plus new note 4 are added to Table 2 to replace Figure 4(b) which is deleted.
Sampling requirements (from Para 4.2.1(a)) are clarified in new note 3: 0 failures are allowed or else the wafer shall be rejected (for Packaged Test Sublot samples for Naked Die Components), or a 100% inspection shall be performed during Room Temperature Electrical Measurements in Chart F3 (for Packaged Components).

22) Table 3: New note 1 added to clarify sampling per the Generic spec 5010 applies to High and Low Temperatures Electrical Measurements.

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23) Table 4:
Absolute limits from Table 2 are added (for clarification purposes).

24) Figure 5(a):
Figure is deleted.
Note 1 is moved to be new note in Table 5(a) (= Burn-in 1 Conditions).

25) Appendix A for Cobham:
Para 4.2.1: SEM deviation is reworded (to be consistent with wording in 5513/031 etc.).
Para 4.2.2 & 4.2.3: Deviations to the test position of Radiographic Inspection is deleted (as the latest Generic Spec 5010 already covers this requirement).
Deviations to Bond Strength are moved from the main body of the spec into the appendix.
Deviation to Radiographic Inspection is added (to be consistent with wording in 5513/031 etc.: “Radiographic Inspection shall be performed the in X and Z axes only”).
A deviation requested by Cobham Microwave regarding the performance of Radiographic Inspection is added.
A deviation requested by Cobham Microwave is added such that Internal Visual Inspection, Bond Strength and Die Shear during the De-encapsulation Subgroups in Charts F4A and F4B may be replaced by die solder integrity and wire integrity tests (specifically Thermal Impedance per MIL-STD-750 Test Method 3101 and Forward Voltage per MIL-STD-750 Test Method 4011).

In addition to the formatting and technical changes summarised above, various changes are also proposed to introduce five new Naked Die Components (as requested by manufacturer Cobham Microwave):

26) Front sheet: based on types is amended to include Naked Die Component Types, i.e. DH252, EH252, DH256, EH256,... (etc.).

27) A new table of Component Type Variants – Naked Die Components is added for EH252, EH256, EH267, EH292 and EH294 (Variant Numbers 17, 27, 37, 47 and 57), which includes Junction Capacitance values and an explanatory note (Note 2).

28) The Naked Die Component Type Variant Numbers are added to:
- Maximum Ratings table
- Note 3 of Maximum Ratings
- Terminal Strength Para.
- Room Temperature Electrical Measurements table
- Notes 1 & 5 of Room Temperature Electrical Measurements
- Note 3 of Parameter Drift Values
- Note 2 of Intermediate and End-Point Electrical Measurements
- Burn-in 1 Conditions table
- Burn-in 2 Conditions table
- Note 1 of Burn-in 2 Conditions

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29) The Physical Dimensions and Terminal Identification information for the Naked Die Components is added.

30) Details of the Materials and Finishes of the Naked Die Components are added.

31) A Junction Capacitance characteristic, with associated note (Note 2) is added to Room Temperature Electrical Measurements.

32) Appendix A: A Deviation to Radiographic Inspection is added such that Cobham Microwave need not perform Radiographic Inspection on Packaged Test Sublot samples for Naked Die Components.

Justification:

• Part of the ongoing conversion of legacy ESA/SCC specifications to the ESCC format. Amendments are made to the format and presentation to be consistent with the various other ESCC Detail Specifications, already converted to ESCC format, as well as the current issue of ESCC Generic Specification No. 5010.
• Addition of naked die versions to the current range of packaged components.

See also change details above for justification for specific items.

Attachments:

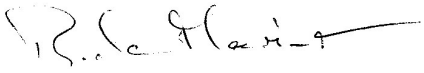
5512016_draft_6e_for_dcr_979_changes_to_draft_6d_shown.docx, 5512016_draft_6e_for_dcr_979.docx, 5512016_draft_6c.docx

Modifications:

As per 5512/016 Issue 6e
Table 1(a) (= Component Type Variants) is amended to fully clarify those test limits which apply to Naked Die Components when they have been assembled into the “default” Ceramic Pill G package for the purposes of Packaged Test Sublot testing (improvement of the content, layout and wording of the proposed table of Naked Die Components and associated Note 2 plus new Note 3).
Table 1(b) (= Maximum Ratings), Thermal Resistance: a new explanatory Note is added (as this rating applies to Naked Die Components when they are assembled in the “default” Ceramic Pill G package for the purposes of Packaged Test Sublot testing).
Table 2 (= Room Temperature Electrical Measurements) is amended in order that, for each Variant, the applicability of the performance of each Characteristic w.r.t. Charts F2 and F3 of the Generic Spec is specified.
Table 3 (= High and Low Temperatures Electrical Measurements) is amended in order that, for each Variant, the applicability of the performance of Reverse Current 2 w.r.t. Charts F2 and F3 of the Generic Spec is specified.
Ref. Change Item 24 above (Appendix A - deviation for Charts F4A and F4B, Internal Visual Inspection, Bond Strength and Die Shear), the Power Dissipation condition of the Thermal Impedance test is amended (as agreed by Cobham)

The above changes shall bring the content of ESCC Detail Spec 5512/016 Issue 6 into line with a number of converted ESCC Detail Specs for similar components which have the same ESA-Qualified Manufacturer (Cobham Microwave).

Approval signature:



Date signed:
2016-11-14