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REFER TO DSCC-VAT (K Bernier/DSN 850-0563/(614)692-0563) 8 October 2008

MEMORANDUM FOR VSS

SUBJECT: Engineering Practices Study concerning a part number conflict between MIL-PRF-39003 table II and the surge current requirement/high temperature solder option for MIL-PRF-39003/6 and /9. Project number 5910-2008-017

The subject engineering practices study is dated 8 October 2008. If you have any questions please contact the project officer Ken Bernier, by email at Kenneth.bernier@dla.mil or by phone at 614-692-0563.

Michael A. Radecki
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ENGINEERING PRACTICE STUDY
TITLE: PART NUMBER CONFLICT BETWEEN MIL-PRF-39003 TABLE II AND THE SURGE CURRENT REQUIREMENT/HIGH TEMPERATURE SOLDER OPTION FOR MIL-PRF-39003/6 AND /9
PROJECT NUMBER 5910-2008-017

8 October 2008
(approval date)

STUDY PROJECT (SEE ENCLOSED)

FINAL REPORT

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EP STUDY: PART NUMBER CONFLICT BETWEEN MIL-PRF-39003 TABLE II AND THE SURGE CURRENT REQUIREMENT/HIGH TEMPERATURE SOLDER OPTION FOR MIL-PRF-39003/6 AND /9 DERATING OF APPLIED VOLTAGE TO TANTALUM CAPACITORS
PROJECT NUMBER 5910-2008-017

OBJECTIVE: The purpose of this study is to resolve a part number conflict between the MIL-PRF-39003 Surge Current Option Table II and the surge current requirement/high temperature solder option in specification sheets /6 and /9.

PROBLEM BACKGROUND:
On 12 December 2005, revision K of MIL-PRF-39003 initiated a table for optional surge current/high temperature solder. This table was added to allow for the selection of various surge current test options and/or high temperature solder requirements. The table provides a code letter for the various options which is required to be included in the part or identifying number (PIN). The table heading states that it applies to specification sheets /1, /2, /3, /4, /6, and /9. Unfortunately, when we created this table II, we overlooked the existing surge current requirement/high temperature solder option in the specification sheets /6 and /9. (Surge current test at +25°C after weibull grading/voltage aging is a standard requirement in the /6 and /9. High temperature solder is an option in the /6 and /9 and is ordered by adding an "H" at the end of the dash number, as directed by the footnote in the /6 and /9 electrical characteristics table.)

The MIL-PRF-39003 surge current option table II includes a footnote (footnote 1/) which states that if a surge current option letter is specified (in the PIN), then the table II requirement takes precedent over the testing called out in the individual specification sheet.

We have now discovered a part numbering conflict between table II in MIL-PRF-39003 (Optional surge current/high temperature solder for slash sheets 1, 2, 3, 4, 6, and 9) and MIL-PRF-39003/6 and /9. The table allows surge current testing options without considering the mandatory surge current requirement/high temperature solder option in the /6 and /9.

The following shows examples of this part number conflict:

1) According to table II of MIL-PRF-39003, PIN M39003/06-2065H is a part with high temperature solder only (no surge current test).
   According to MIL-PRF-39003/6, PIN M39003/06-2065H is a part with +25°C surge current testing after weibull/voltage aging and high temperature solder.

   This example shows that it is possible for a single PIN to describe two entirely different parts. (As /6 and /9 are currently written, it is not possible to order a part with high temperature solder requirement only.)

2) According to table II of MIL-PRF-39003, PIN M39003/06-2065A is a part with +25°C surge current testing after weibull/voltage aging.
   According to MIL-PRF-39003/6, PIN M39003/06-2065 is also a part with +25°C surge current testing after weibull/voltage aging.

   This example shows that it is possible to describe/order a single part with two different PINS.

3) According to table II of MIL-PRF-39003, PIN M39003/06-2065D is a part with +25°C surge current testing after weibull/voltage aging and high temperature solder.
   According to MIL-PRF-39003/6, PIN 39003/06-2065H is also a part with +25°C surge current testing after weibull/voltage aging and high temperature solder.

   This example also shows that it is possible to describe/order a single part with two different PINS.

Possible solutions

Looking closely at the table II in MIL-PRF-39003, it almost works. We could incorporate additional footnotes to the table which would take care of the problem which exists in examples 2) and 3) above. However, we don't believe there is anything we can do with table II to fix the problem shown in example 1). Even if we added footnotes to accommodate examples 2) and 3), we feel that it would not alleviate the confusion that exists between this table II and the /6 and /9 mandatory surge current requirement.

Another option is to change the part numbers in /6 and /9 to agree with the MIL-PRF-39003 table II. Changing part numbers would affect current NSN numbers as well as user drawings with part number lists. For these reasons, this is NOT a viable option.

Preferred option

We believe that the preferred solution would be to retain the MIL-PRF-39003 table II and change its heading to apply to specifications sheets /1, /2, /3, and /4, and to add a second table (table III) which would provide the options and codes available for the specification sheets /6 and /9.

These tables would appear as shown below:

Table II. Optional surge current/High temperature solder for specification sheets /1, /2, /3, and /4.

		Weibull/ Exponential		
Option letter 1/	Temperatures 2/	Before Weibull Grading/Voltage Aging (Life accelerated FR)	After Weibull Grading/Voltage Aging (Life accelerated FR)	High temperature Solder 3/
A	+25°C	N/A	X	N/A
B	(-55°C and +85°C)	N/A	X	N/A
C	(-55°C and +85°C)	X	N/A	N/A
D 4/	+25°C	N/A	X	X
E 4/	(-55°C and +85°C)	N/A	X	X
F 4/	(-55°C and +85°C)	X	N/A	X
H 4/	High temperature solder only	N/A	N/A	X
Leave blank No option letter		N/A	N/A	N/A

1/ If the PIN contains no surge current/high temperature solder option letter, no surge current test or high temperature solder is required . If an option letter is included in the PIN, the requirement of this table takes precedence.
2/ Temperature tolerances are -5°C, +0°C for -55°C; ±5°C for +25°C; and -0°C, +5°C for +85°C.
3/ High temperature solder indicates an internal solder with a minimum melting point of 221°C.
4/ Not applicable to specification sheet /4.

Table III. **Optional surge current/High temperature solder for specification sheets /6 and /9.**

		Weibull/ Exponential		
Option letter	Temperatures 1/	Before Weibull Grading/Voltage Aging (Life accelerated FR)	After Weibull Grading/Voltage Aging (Life accelerated FR)	High temperature solder 2/
Leave blank No option letter	+25°C	N/A	X	N/A
B	(-55°C and +85°C)	N/A	X	N/A
C	(-55°C and +85°C)	X	N/A	N/A
E	(-55°C and +85°C)	N/A	X	X
F	(-55°C and +85°C)	X	N/A	X
H	+25°C	N/A	X	X

1/ Temperature tolerances are -5°C, +0°C for -55°C; ±5°C for +25°C; and -0°C, +5°C for +85°C.
2/ High temperature solder indicates an internal construction solder with a minimum melting point of 221°C.

Other changes:

Add to slash sheets 1, 2, 3, and 4: The option letters in Table II of MIL-PRF-39003 defines the optional surge current/high temperature solder selections available.

Add to slash sheets 6 and 9: The option letters in Table III of MIL-PRF-39003 defines the optional surge current /high temperature solder selections available.

Remove from slash sheets 6 and 9 the sentence requiring surge current. This requirement is covered in the basic.

CONCLUSION:

An error was identified with the current revision of this document for the selection of surge current with or without high temperature solder.
Slash sheets 6 and 9 have a requirement for surge current that will be removed.

RECOMMENDATION:

Comments received agree with the proposed changes and these changes will be made in the near future.