



Project Number: Design Qualification Test Report	Tracking Code: 230120_Report_Rev_2
Requested by: Matt Graston	Date: 7/2/2013
Part #: MMS-125-02-F-DV-A/TMMH-125-01-F-DV	Tech: Aaron Mckim
Part description: MMS/TMMH	Qty to test: 8
Test Start: 11/27/2012	Test Completed: 12/13/2012



**DESIGN QUALIFICATION TEST REPORT**

**MMS/TMMH  
MMS-125-02-F-DV-A/ TMMH-125-01-F-DV**

**REVISION HISTORY**

<b>DATA</b>	<b>REV.NUM.</b>	<b>DESCRIPTION</b>	<b>ENG</b>
<b>04/19/2013</b>	<b>1</b>	<b>Initial Issue</b>	<b>KH</b>
<b>07/02/2013</b>	<b>2</b>	<b>Update the title page</b>	<b>KH</b>

## CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to ISO 10012-1 and ANSI/NCSL 2540-1, as applicable.

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### SCOPE

To perform the following tests: Design Qualification test. Please see test plan.

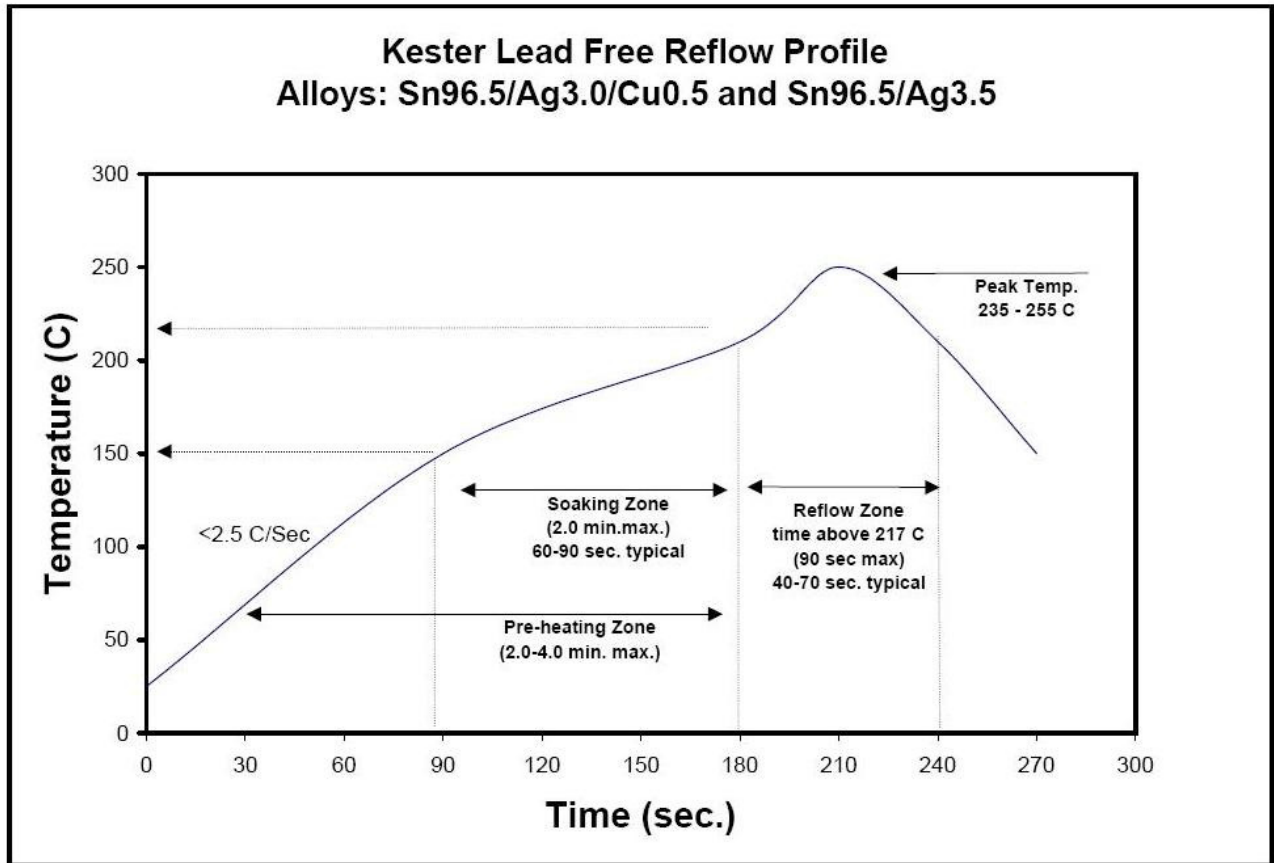
### APPLICABLE DOCUMENTS

Standards: EIA Publication 364

### TEST SAMPLES AND PREPARATION

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) The automated procedure is used with aqueous compatible soldering materials.
- 4) Parts not intended for testing LLCR are visually inspected.
- 5) Any additional preparation will be noted in the individual test sequences.
- 6) Solder Information: Lead Free
- 7) Re-Flow Time/Temp: See accompanying profile.
- 8) Samtec Test PCBs used: PCB-103149-TST

### TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)



**FLOWCHARTS****Durability/LLCR**

<b>TEST STEP</b>	<b>GROUP A1 3u" Gold (-F) 8 Mated Sets</b>
<b>01</b>	LLCR-1
<b>02</b>	<b>10 Cycles</b>
<b>03</b>	LLCR-2
<b>04</b>	Thermal Shock (Mated and Undisturbed)
<b>05</b>	LLCR-3
<b>06</b>	Cyclic Humidity (Mated and Undisturbed)
<b>07</b>	LLCR-4

**Thermal Shock = EIA-364-32, Table II, Test Condition I:**

**-55°C to +85°C 1/2 hour dwell, 100 cycles**

**Humidity = EIA-364-31, Test Condition B (240 Hours)**

**and Method III (+25°C to +65°C @ 90% RH to 98% RH)**

**ambient pre-condition and delete steps 7a and 7b**

**LLCR = EIA-364-23, LLCR**

**20 mV Max, 100 mA Max**

**Use Keithley 580 or 3706 in 4 wire dry circuit mode**

## ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

### THERMAL SHOCK:

- 1) EIA-364-32, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors*.
- 2) Test Condition 1: -55°C to +85°C
- 3) Test Time: ½ hour dwell at each temperature extreme
- 4) Number of Cycles: 100
- 5) All test samples are pre-conditioned at ambient.
- 6) All test samples are exposed to environmental stressing in the mated condition.

### HUMIDITY:

- 1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors*.
- 2) Test Condition B, 240 Hours.
- 3) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
- 4) All samples are pre-conditioned at ambient.
- 5) All test samples are exposed to environmental stressing in the mated condition.

### LLCR:

- 1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
  - a.  $\leq +5.0$  mOhms:----- Stable
  - b. +5.1 to +10.0 mOhms:----- Minor
  - c. +10.1 to +15.0 mOhms:----- Acceptable
  - d. +15.1 to +50.0 mOhms:----- Marginal
  - e. +50.1 to +2000 mOhms:----- Unstable
  - f.  $>+2000$  mOhms:----- Open Failure

**RESULTS****LLCR Durability:**

Initial-----6.54mOhms Max

- **Durability, 10 Cycles**
  - **<= +5.0 mOhms ----- 192 Points ----- Stable**
  - **+5.1 to +10.0 mOhms -----0 Points ----- Minor**
  - **+10.1 to +15.0 mOhms -----0 Points ----- Acceptable**
  - **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
  - **+50.1 to +2000 mOhms-----0 Points ----- Unstable**
  - **>+2000 mOhms -----0 Points ----- Open Failure**
- **Thermal Shock**
  - **<= +5.0 mOhms ----- 192 Points ----- Stable**
  - **+5.1 to +10.0 mOhms -----0 Points ----- Minor**
  - **+10.1 to +15.0 mOhms -----0 Points ----- Acceptable**
  - **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
  - **+50.1 to +2000 mOhms-----0 Points ----- Unstable**
  - **>+2000 mOhms -----0 Points ----- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ----- 192 Points ----- Stable**
  - **+5.1 to +10.0 mOhms -----0 Points ----- Minor**
  - **+10.1 to +15.0 mOhms -----0 Points ----- Acceptable**
  - **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
  - **+50.1 to +2000 mOhms-----0 Points ----- Unstable**
  - **>+2000 mOhms -----0 Points ----- Open Failure**

### DATA SUMMARIES

**LLCR Durability:**

- 1) A total of 192 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
  - a. <= +5.0 mOhms:----- Stable
  - b. +5.1 to +10.0 mOhms:----- Minor
  - c. +10.1 to +15.0 mOhms:----- Acceptable
  - d. +15.1 to +50.0 mOhms:----- Marginal
  - e. +50.1 to +2000 mOhms ----- Unstable
  - f. >+2000 mOhms:----- Open Failure

<b>LLCR Measurement Summaries by Pin Type</b>				
Date	2012-11-27	2012-11-27	2012-12-3	2012-12-13
Room Temp (Deg C)	22	22	22	22
Rel Humidity (%)	32	32	45	31
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
<b>mOhm values</b>	<b>Actual Initial</b>	<b>Delta 10 Cycles</b>	<b>Delta Therm Shck</b>	<b>Delta Humidity</b>
<b>Pin Type 1: Signal</b>				
Average	5.28	0.16	0.24	0.24
St. Dev.	0.28	0.15	0.21	0.21
Min	4.62	0.00	0.00	0.00
Max	6.54	0.98	1.42	1.32
Summary Count	192	192	192	192
Total Count	192	192	192	192

<b>LLCR Delta Count by Category</b>						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
<b>10 Cycles</b>	192	0	0	0	0	0
<b>Therm Shck</b>	192	0	0	0	0	0
<b>Humidity</b>	192	0	0	0	0	0

**EQUIPMENT AND CALIBRATION SCHEDULES****Equipment #:** MO-04**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0798688**Accuracy:** See Manual

... Last Cal: 04/30/2012, Next Cal: 04/30/2013

**Equipment #:** THC-02**Description:** Temperature/Humidity Chamber**Manufacturer:** Thermotron**Model:** SE-1000-6-6**Serial #:** 31808**Accuracy:** See Manual

... Last Cal: 02/16/2012, Next Cal: 02/16/2013

**Equipment #:** TSC-01**Description:** Vertical Thermal Shock Chamber**Manufacturer:** Cincinnatti Sub Zero**Model:** VTS-3-6-6-SC/AC**Serial #:** 10-VT14993**Accuracy:** See Manual

... Last Cal: 05/18/2012, Next Cal: 05/18/2013