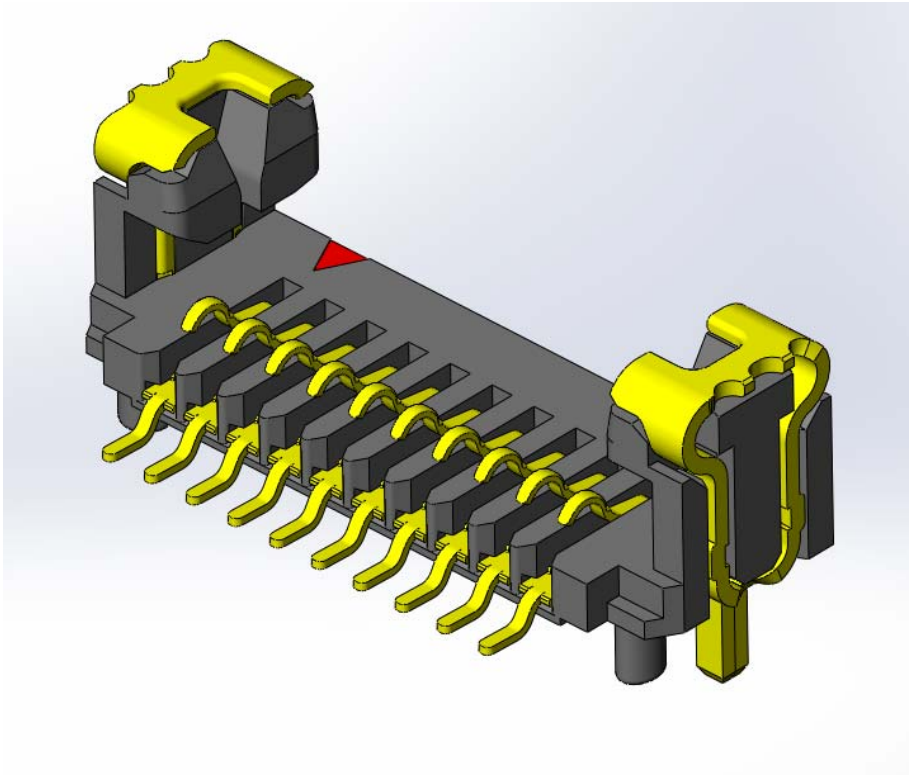
Project Number: Design Qualification Test Report	Tracking Code: 279840_Report_Rev_4
Requested by: Corey Rose	Date: 6/13/2017
Part #: UCC8-010-1-H-S-1-A/PCB	Tech: Aaron McKim
Part description: UCC8/ PCB	Qty to test: 65
Test Start: 11/1/2013	Test Completed: 12/05/2013



DESIGN QUALIFICATION TEST REPORT

UCC8/ PCB
UCC8-010-1-H-S-1-A /PCB-105057-TST
UCC8-010-1-H-S-1-A /PCB-105058-TST

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
2/11/2014	**1**	**Initial Issue**	**PC**
7/3/2014	**2**	**Update P/N from "UCC8-010-01-G-S-TH-A-TR " to "UCC8-010-1-H-S-1-A"**	**VZ**
7/15/2014	**3**	**Update the cover page pictures**	**VZ**
6/13/2017	**4**	**Add the LLCR data for 100 cycles**	**KH**

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

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) After soldering, the parts to be used for LLCR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead free
9) Samtec Test PCBs used: PCB-105057-TST, PCB-105058-TST, PCB-105060-TST.

FLOWCHARTS

Gas Tight

Group 1

UCC8-010-1-H-S-1-A

PCB-105057-TST-XX

8 Assemblies

Min Thick Mating Card 0.785 [0.0309"]

Note: Measure and document PCB thickness prior to performing test

Step	Description
1.	LLCR (2) Max Delta = 15 mOhm
2.	Gas Tight (1)
3.	LLCR (2) Max Delta = 15 mOhm

(1) Gas Tight = EIA-364-36

(2) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

Normal Force

Group 1

UCC8-010-1-H-S-1-A

8 Contacts Minimum

Signal Without Thermals; Max Thick Mating Card 0.959 [0.0378"]

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.025 " Expected Force at Max Deflection = 113 g

Group 2

UCC8-010-1-H-S-1-A

PCB-105058-TST-XX

8 Contacts Minimum

Signal With Thermals; Max Thick Mating Card 0.959 [0.0378"]

Note: Measure and document PCB thickness prior to performing test

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.025 " Expected Force at Max Deflection = 113 g

(1) Normal Force = EIA-364-04

(2) Thermal Age = EIA-364-17
Test Condition = 4 (105°C)
Time Condition = B (250 Hours)

FLOWCHARTS Continued

Thermal Aging

Group 1		Group 2	
UCC8-010-1-H-S-1-A		UCC8-010-1-H-S-1-A	
PCB-105057-TST-XX		PCB-105058-TST-XX	
8 Assemblies		8 Assemblies	
Min Thick Mating Card 0.785 [0.0309"]		Max Thick Mating Card 0.959 [0.0378"]	
Note: Measure and document PCB thickness prior to performing test		*Note: Measure and document PCB thickness prior to performing test*	
Step	**Description**	**Step**	**Description**
1.	Contact Gaps	1.	Contact Gaps
2.	Mating/Unmating Force (2)	2.	Mating/Unmating Force (2)
3.	LLCR (1) Max Delta = 15 mOhm	3.	LLCR (1) Max Delta = 15 mOhm
4.	Thermal Age (3)	4.	Thermal Age (3)
5.	LLCR (1) Max Delta = 15 mOhm	5.	LLCR (1) Max Delta = 15 mOhm
6.	Mating/Unmating Force (2)	6.	Mating/Unmating Force (2)
7.	Contact Gaps	7.	Contact Gaps

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mating/Unmating Force = EIA-364-13

(3) Thermal Age = EIA-364-17
Test Condition = 4 (105°C)
Time Condition = B (250 Hours)

FLOWCHARTS Continued

Mating/Unmating/Durability

Group 1
UCC8-010-1-H-S-1-A
MATING-CARD
8 Assemblies

Step	Description
1.	Contact Gaps
2.	LLCR (2)
3.	Cycles Quantity = 100 Cycles
4.	Contact Gaps
5.	LLCR (2) Max Delta = 15 mOhm
6.	Thermal Shock (3)
7.	LLCR (2) Max Delta = 15 mOhm
8.	Humidity (1)
9.	LLCR (2) Max Delta = 15 mOhm

(1) Humidity = EIA-364-31
Test Condition = B (240 Hours)
Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)
Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(2) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(3) Thermal Shock = EIA-364-32
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = I (-55°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued

IR/DWV

Pin-to-Pin

Group 1 UCC8-010-1-H-S-1-A PCB-105060-TST-XX 2 Assemblies Min Thick Mating Card 0.785 [0.0309"]		Group 2 UCC8-010-1-H-S-1-A 2 Assemblies		Group 3 UCC8-010-1-H-S-1-A PCB-105060-TST-XX 2 Assemblies Min Thick Mating Card 0.785 [0.0309"]	
Step	**Description**	**Step**	**Description**	**Step**	**Description**
1.	DWV Breakdown (2)	1.	DWV Breakdown (2)	1.	IR (4)
				2.	DWV at Test Voltage (1)
				3.	Thermal Shock (5)
				4.	IR (4)
				5.	DWV at Test Voltage (1)
				6.	Humidity (3)
				7.	IR (4)
				8.	DWV at Test Voltage (1)

Pin-to-Closest Metallic Hardware

Group 4 UCC8-010-1-H-S-1-A PCB-105060-TST-XX 2 Assemblies Min Thick Mating Card 0.785 [0.0309"]		Group 5 UCC8-010-1-H-S-1-A 2 Assemblies		Group 6 UCC8-010-1-H-S-1-A PCB-105060-TST-XX 2 Assemblies Min Thick Mating Card 0.785 [0.0309"]	
Step	**Description**	**Step**	**Description**	**Step**	**Description**
1.	DWV Breakdown (2)	1.	DWV Breakdown (2)	1.	IR (4)
				2.	DWV at Test Voltage (1)
				3.	Thermal Shock (5)
				4.	IR (4)
				5.	DWV at Test Voltage (1)
				6.	Humidity (3)
				7.	IR (4)
				8.	DWV at Test Voltage (1)

(1) DWV at Test Voltage = EIA-364-20
Test Condition = 1 (Sea Level)
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds

(2) DWV Breakdown = EIA-364-20
Test Condition = 1 (Sea Level)
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds

(3) Humidity = EIA-364-31
Test Condition = B (240 Hours)
Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)
Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(4) IR = EIA-364-21
Test Condition = 500 Vdc, 2 Minutes Max

(5) Thermal Shock = EIA-364-32
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = I (-55°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued

Current Carrying Capacity

Group 1
UCC8-010-1-H-S-1-A
PCB-105060-TST-XX
1 Pins Powered
Min Thick Mating Card 0.785 [0.0309"]

Step	Description
1.	CCC (1) Rows = 1 Number of Positions = 1

Group 2
UCC8-010-1-H-S-1-A
PCB-105060-TST-XX
2 Pins Powered
Min Thick Mating Card 0.785 [0.0309"]

Step	Description
1.	CCC (1) Rows = 1 Number of Positions = 2

Group 3
UCC8-010-1-H-S-1-A
PCB-105060-TST-XX
3 Pins Powered
Min Thick Mating Card 0.785 [0.0309"]

Step	Description
1.	CCC (1) Rows = 1 Number of Positions = 3

Group 4
UCC8-010-1-H-S-1-A
PCB-105060-TST-XX
4 Pins Powered
Min Thick Mating Card 0.785 [0.0309"]

Step	Description
1.	CCC (1) Rows = 1 Number of Positions = 4

Group 5
UCC8-010-1-H-S-1-A
PCB-105060-TST-XX
10 Pins Powered
Min Thick Mating Card 0.785 [0.0309"]

Step	Description
1.	CCC (1) Rows = 1 Number of Positions = 10

(1) CCC = EIA-364-70
Method 2, Temperature Rise Versus Current Curve
(TIN PLATING) - Tabulate calculated current at RT, 65°C, 75°C and 95°C after derating 20% and based on 105°C
(GOLD PLATING) - Tabulate calculated current at RT, 85°C, 95°C and 115°C after derating 20% and based on 125°C

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.

THERMAL:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition 4 at 105° C
3) Test Time Condition B for 250 hours.
4) All test samples are pre-conditioned at ambient.
5) 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.

MATING/UNMATING:

1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
2) The contacts shall be tested in the connector housing.
3) If necessary, a "window" shall be made in the connector body to allow a probe to engage and deflect the contact at the same attitude and distance (plus 0.05 mm [0.002"]) as would occur in actual use.
4) The connector housing shall be placed in a holding fixture that does not interfere with or otherwise influence the contact force or deflection.
5) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC^2, computer controlled test stand with a deflection measurement system accuracy of 5.0 µm (0.0002").
6) The nominal deflection rate shall be 5 mm (0.2")/minute.
7) Unless otherwise noted a minimum of five contacts shall be tested.
8) The force/deflection characteristic to load and unload each contact shall be repeated five times.
9) The system shall utilize the TC^2 software in order to acquire and record the test data.
10) The permanent set of each contact shall be measured within the TC^2 software.
11) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

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ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
    a. Self heating (resistive)
    b. Reduction in heat sink capacity affecting the heated contacts
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at three temperature points are reported:
    a. Ambient
    b. 80^{o} C
    c. 95^{o} C
    d. 115^{o} C
8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

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ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

GAS TIGHT:

To provide method for evaluating the ability of the contacting surfaces in preventing penetration of harsh vapors which might lead to oxide formation that may degrade the electrical performance of the contact system.

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. <= +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
4) Procedure:
    a. Reference document: EIA-364-36, *Test Procedure for Determination of Gas-Tight Characteristics for Electrical Connectors, Sockets and/or Contact Systems*.
    b. Test Conditions:
        i. Class II--- Mated pairs of contacts assembled to their plastic housings.
        ii. Reagent grade Nitric Acid shall be used of sufficient volume to saturate the test chamber
        iii. The ratio of the volume of the test chamber to the surface area of the acid shall be 10:1.
        iv. The chamber shall be saturated with the vapor for at least 15 minutes before samples are added.
        v. Exposure time, 55 to 65 minutes.
        vi. The samples shall be no closer to the chamber walls than 1 inches and no closer to the surface of the acid than 3 inches.
        vii. The samples shall be dried after exposure for a minimum of 1 hour.
        viii. Drying temperature 50^{o} C
        ix. The final LLCR shall be conducted within 1 hour after drying.

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. <= +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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

INSULATION RESISTANCE (IR):

To determine the resistance of insulation materials to leakage of current through or on the surface of these materials when a DC potential is applied.

1) PROCEDURE:
    a. Reference document: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. Electrification Time 2.0 minutes
        iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.
2) MEASUREMENTS:
3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 5000 megohms.

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

To determine if the sockets can operate at its rated voltage and withstand momentary over potentials due to switching, surges, and other similar phenomenon. Separate samples are used to evaluate the effect of environmental stresses so not to influence the readings from arcing that occurs during the measurement process.

1) PROCEDURE:
    a. Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. Barometric Test Condition 1
        iii. Rate of Application 500 V/Sec
        iv. Test Voltage (VAC) until breakdown occurs
2) MEASUREMENTS/CALCULATIONS
    a. The breakdown voltage shall be measured and recorded.
    b. The dielectric withstanding voltage shall be recorded as 75% of the minimum breakdown voltage.
    c. The working voltage shall be recorded as one-third (1/3) of the dielectric withstanding voltage (one-fourth of the breakdown voltage).

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise----------2.6A per contact with 1 contacts (1x1) powered**
- **CCC for a 30°C Temperature Rise----------2.1A per contact with 2 contacts (1x2) powered**
- **CCC for a 30°C Temperature Rise----------1.7A per contact with 3 contacts (1x3) powered**
- **CCC for a 30°C Temperature Rise----------1.6A per contact with 4 contacts (1x4) powered**
- **CCC for a 30°C Temperature Rise----------1.3A per contact with 10 contacts (1x10) powered**

Mating – Unmating Forces

Thermal Aging Group （UCC8-010-1-H-S-1-A/PCB-105057-TST）

- **Initial**
  - **Mating**
    - **Min ---------- 1.78 Lbs**
    - **Max---------- 1.99 Lbs**
- **After Thermal**
  - **Mating**
    - **Min ---------- 1.78 Lbs**
    - **Max---------- 2.11 Lbs**

Thermal Aging Group （UCC8-010-1-H-S-1-A /PCB-105058-TST）

- **Initial**
  - **Mating**
    - **Min ---------- 1.69 Lbs**
    - **Max---------- 1.92 Lbs**
- **After Thermal**
  - **Mating**
    - **Min ---------- 1.75 Lbs**
    - **Max---------- 2.25 Lbs**

RESULTS Continued

Normal Force at 0.021 inch deflection

- **Initial**
  - **Min----------89.90 gf Set ----- 0.0022 in**
  - **Max ----------97.70 gf Set ----- 0.0029 in**
- **Thermal**
  - **Min----------84.40 gf Set----- 0.0034 in**
  - **Max ----------92.00 gf Set----- 0.0043 in**

Insulation Resistance minimums, IR

Pin to Pin

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Passed**
  - **Unmated ----------45000 Meg Ω ---------- Passed**
- **Thermal Shock**
  - **Mated----------45000 Meg Ω ---------- Passed**
  - **Unmated ----------45000 Meg Ω ---------- Passed**
- **Humidity**
  - **Mated----------45000 Meg Ω ---------- Passed**
  - **Unmated ----------45000 Meg Ω ---------- Passed**

Pin to Closest Metallic Hardware

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Passed**
  - **Unmated ----------45000 Meg Ω ---------- Passed**
- **Thermal Shock**
  - **Mated----------45000 Meg Ω ---------- Passed**
  - **Unmated ----------45000 Meg Ω ---------- Passed**
- **Humidity**
  - **Mated----------45000 Meg Ω ---------- Passed**
  - **Unmated ----------45000 Meg Ω ---------- Passed**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage----------700 VAC**
  - **Test Voltage ----------525 VAC**
  - **Working Voltage ----------175 VAC**

Pin to Pin

- **Initial DWV----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

Pin to Closest Metallic Hardware

- **Initial DWV----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

RESULTS Continued

LLCR Gas Tight Group (80 LLCR test points)

UCC8-010-1-H-S-1-A /PCB-105057-TST

- **Initial ---------- 15.15 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 80 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**

LLCR Thermal Aging Group (80 LLCR test points)

UCC8-010-1-H-S-1-A /PCB-105057-TST

- **Initial ---------- 15.46 mOhms Max**
- **Thermal**
  - **<= +5.0 mOhms ---------- 80 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**

UCC8-010-1-H-S-1-A /PCB-105058-TST

- **Initial ---------- 16.38 mOhms Max**
- **Thermal**
  - **<= +5.0 mOhms ---------- 80 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**

RESULTS Continued

LLCR Mating/Unmating Durability Group (80 LLCR test points)

UCC8-010-1-H-S-1-A/MATING CARD

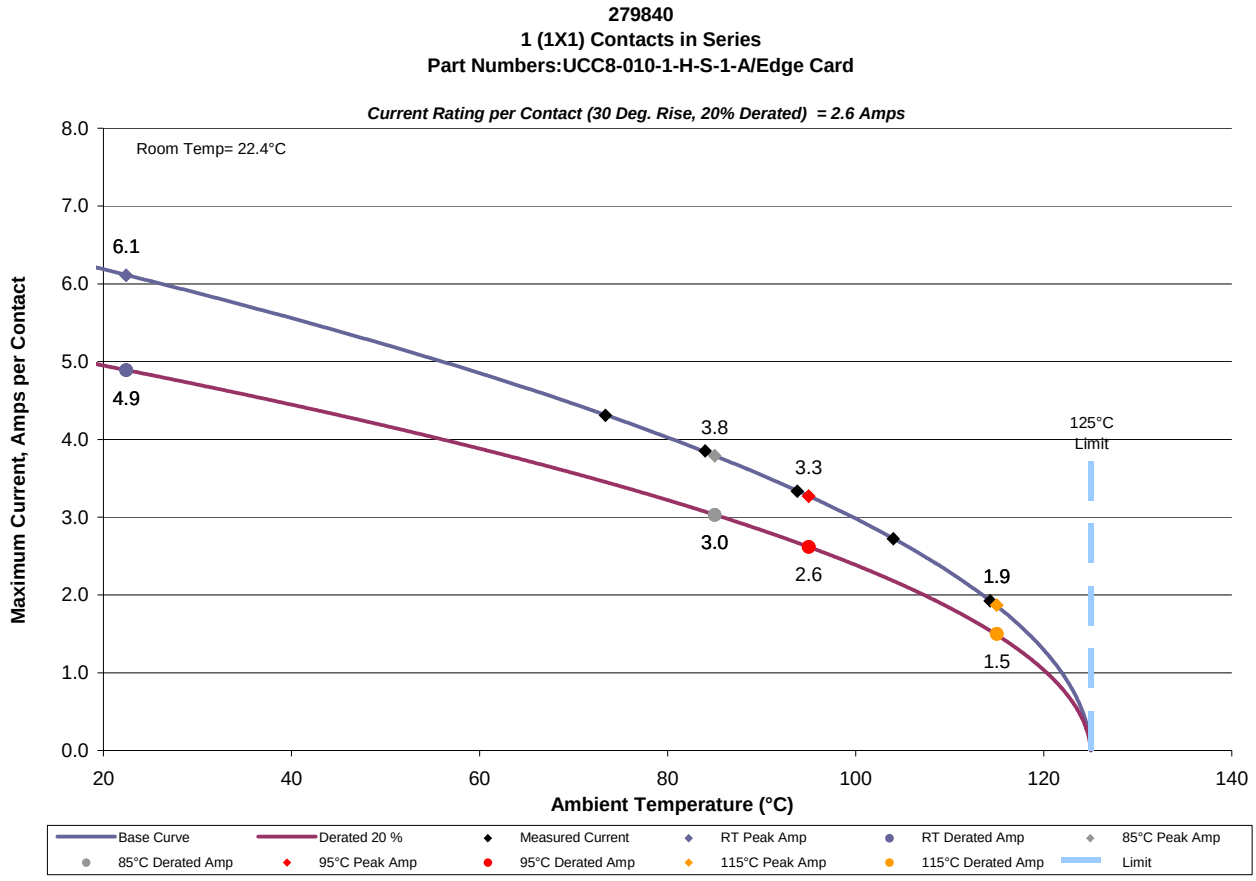
- **Initial ---------- 15.11 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 80 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
- **Thermal Shock**
  - **<= +5.0 mOhms ---------- 80 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 ---------- 80 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

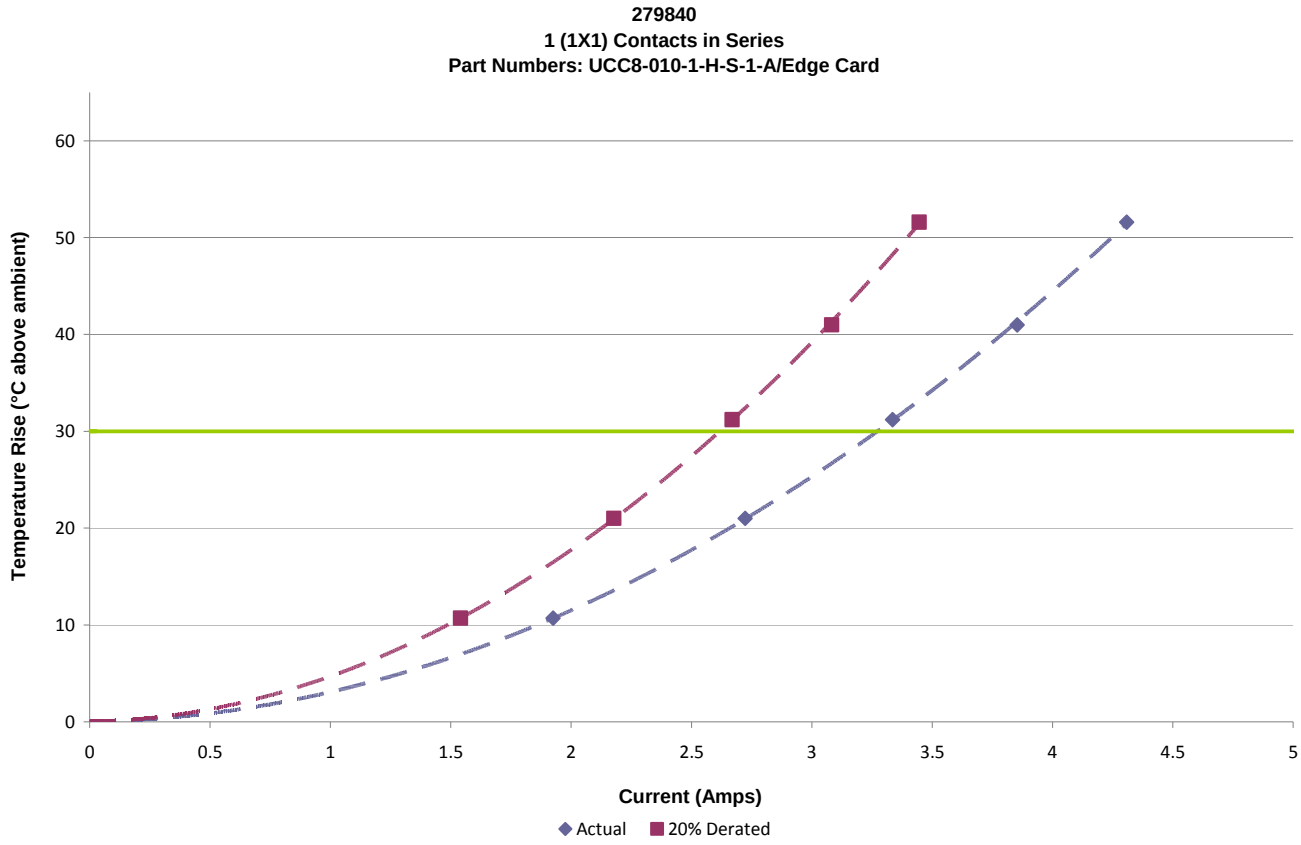
TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes apart, differ less than 1° C (computer controlled data acquisition).
4) Adjacent contacts were powered:

   a. Linear configuration with 1 adjacent conductors/contacts powered

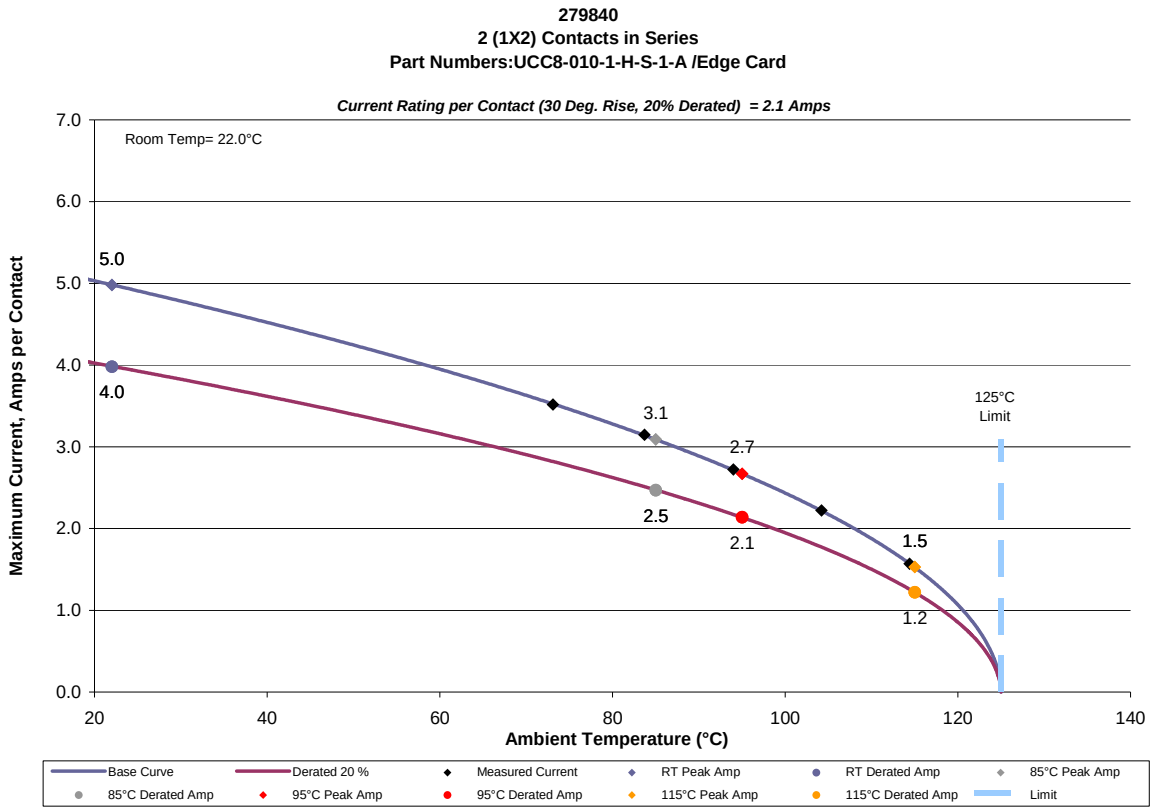


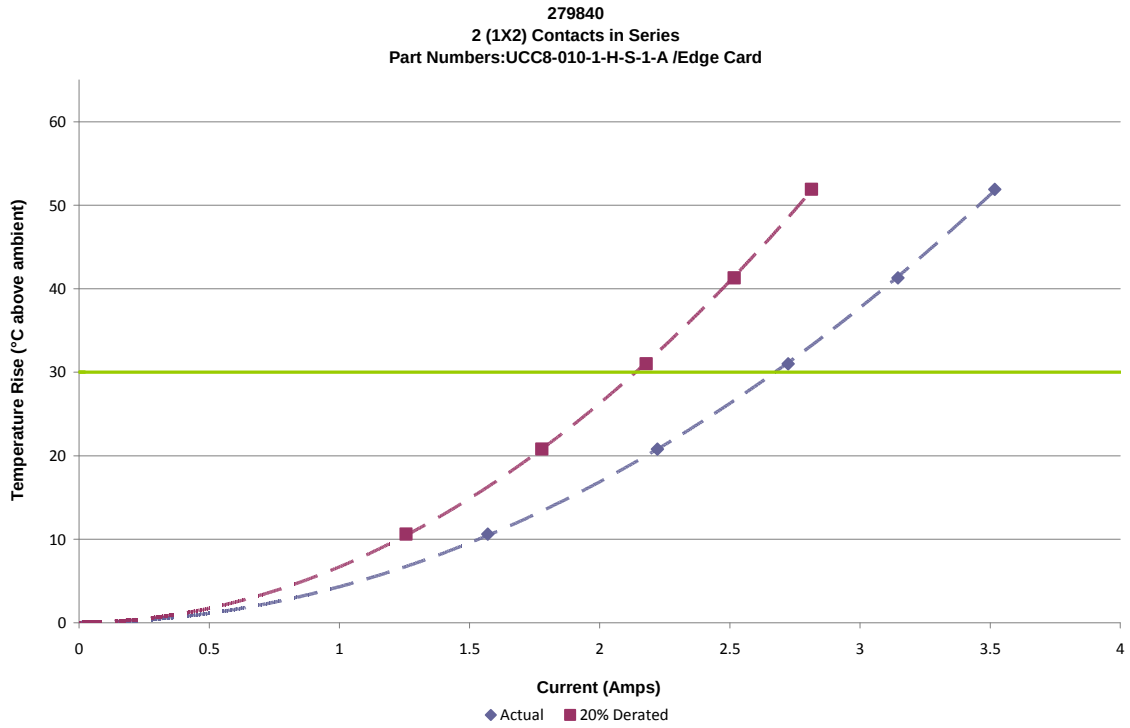
DATA SUMMARIES Continued



DATA SUMMARIES Continued

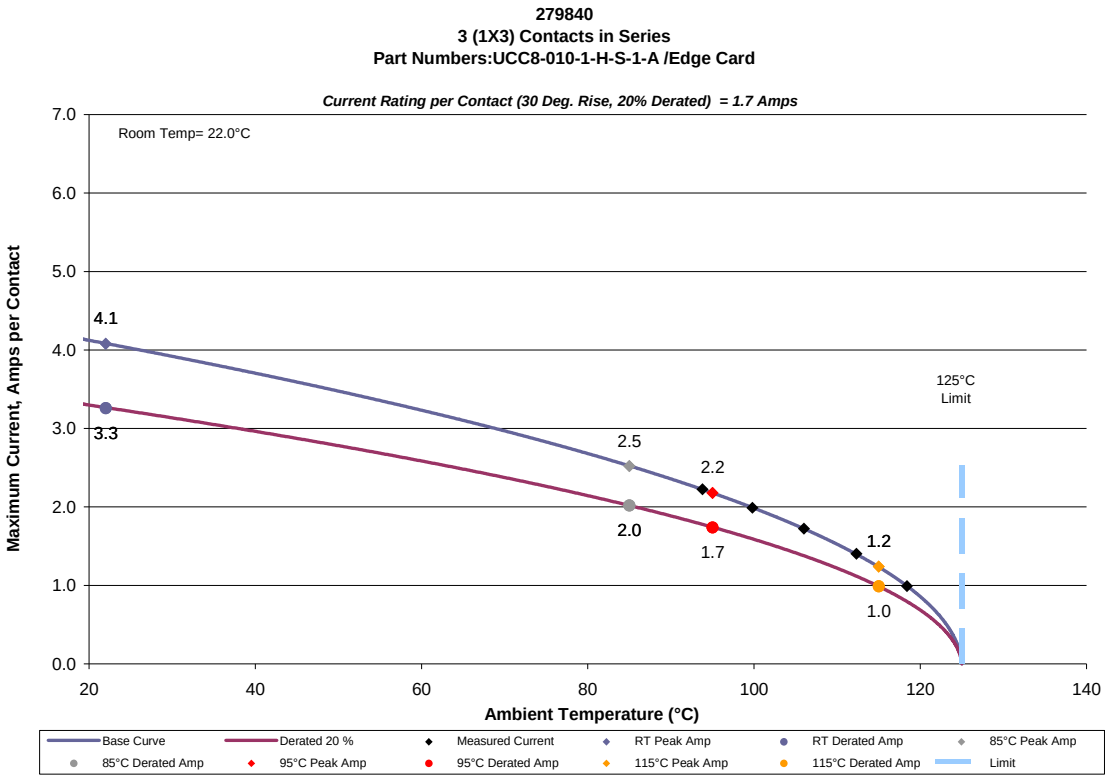
b. Linear configuration with 2 adjacent conductors/contacts powered

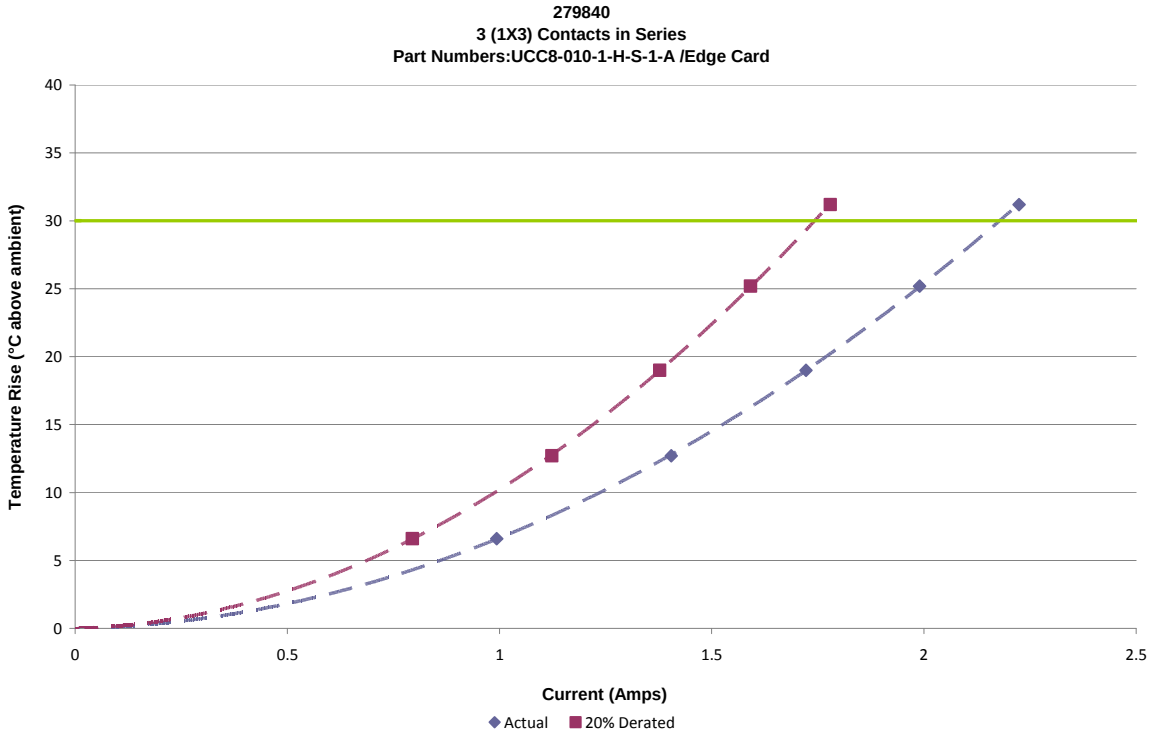




DATA SUMMARIES Continued

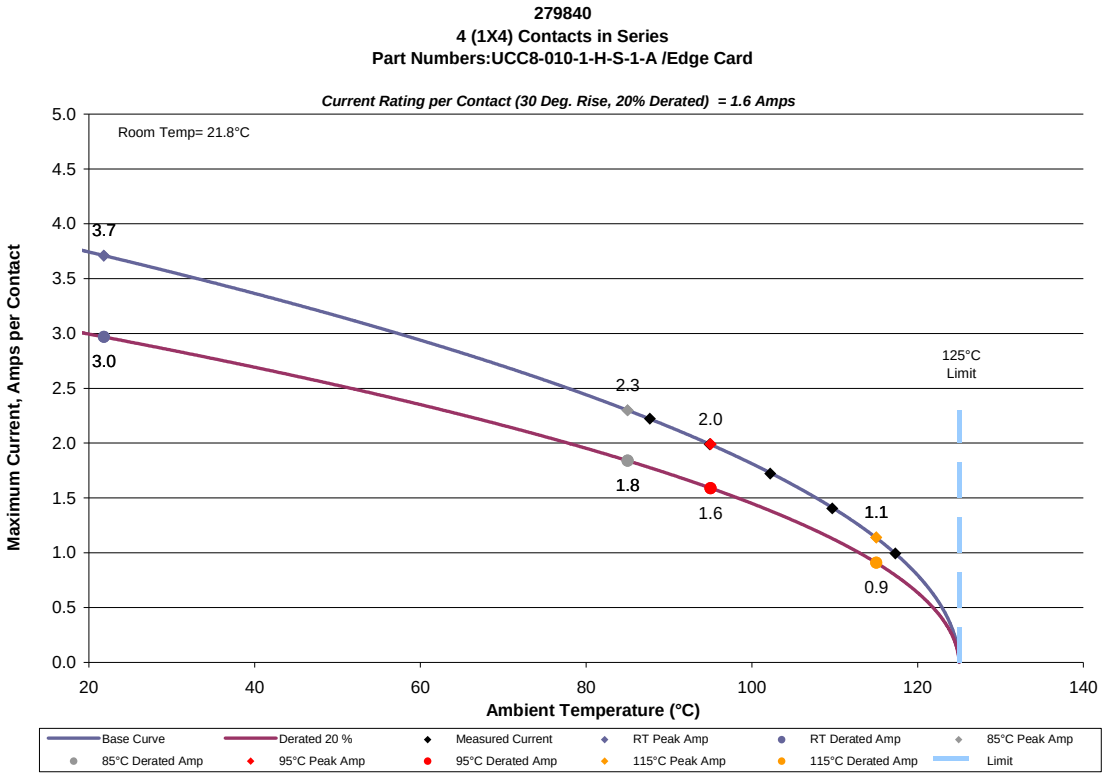
c. Linear configuration with 3 adjacent conductors/contacts powered

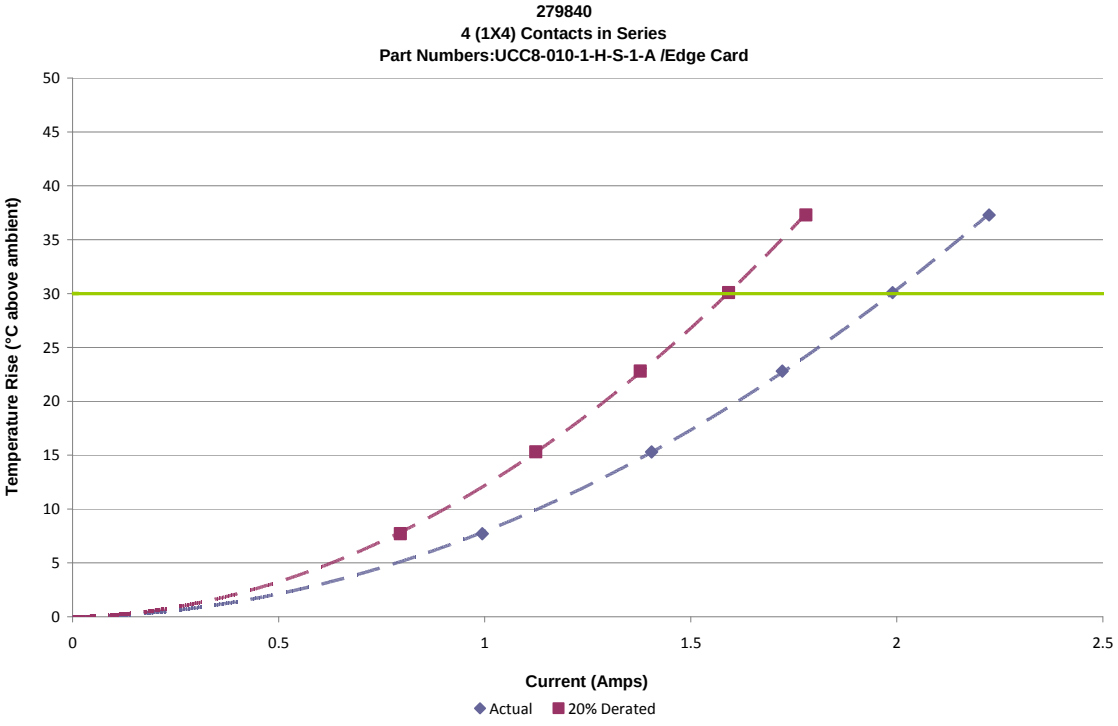




DATA SUMMARIES Continued

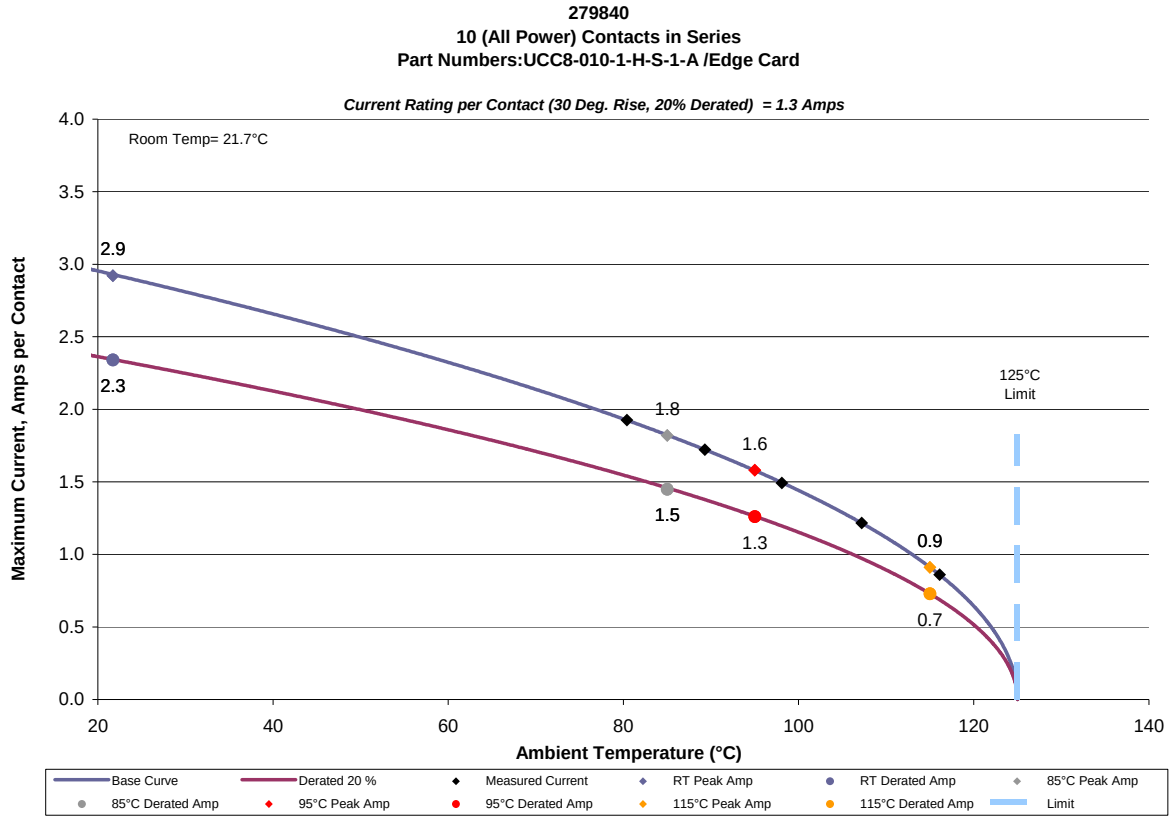
d. Linear configuration with 4 adjacent conductors/contacts powered

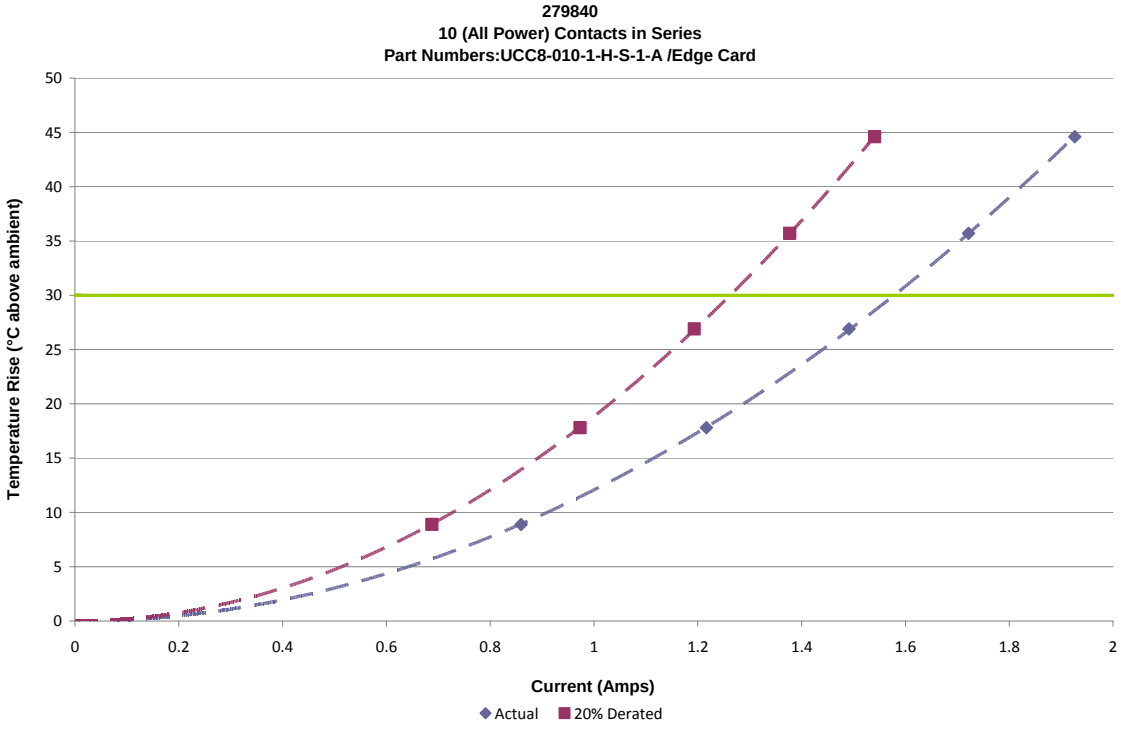




DATA SUMMARIES Continued

e. Linear configuration with all adjacent conductors/contacts powered





DATA SUMMARIES Continued

MATING-UNMATING FORCE:

Thermal Aging Group（UCC8-010-1-H-S-1-A /PCB-105057-TST）

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	7.92	1.78	/	/	7.92	1.78	/	/
Maximum	8.85	1.99	/	/	9.39	2.11	/	/
Average	8.21	**1.85**	/	**/**	8.44	**1.90**	/	**/**
St Dev	0.33	0.07	/	/	0.49	0.11	/	/
Count	8	8	/	/	8	8	/	/

Thermal Aging Group（UCC8-010-1-H-S-1-A /PCB-105058-TST）

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	7.52	1.69	/	/	7.78	1.75	/	/
Maximum	8.54	1.92	/	/	9.99	2.25	/	/
Average	8.15	**1.83**	/	**/**	8.57	**1.93**	/	**/**
St Dev	0.38	0.08	/	/	0.66	0.15	/	/
Count	8	8	/	/	8	8	/	/

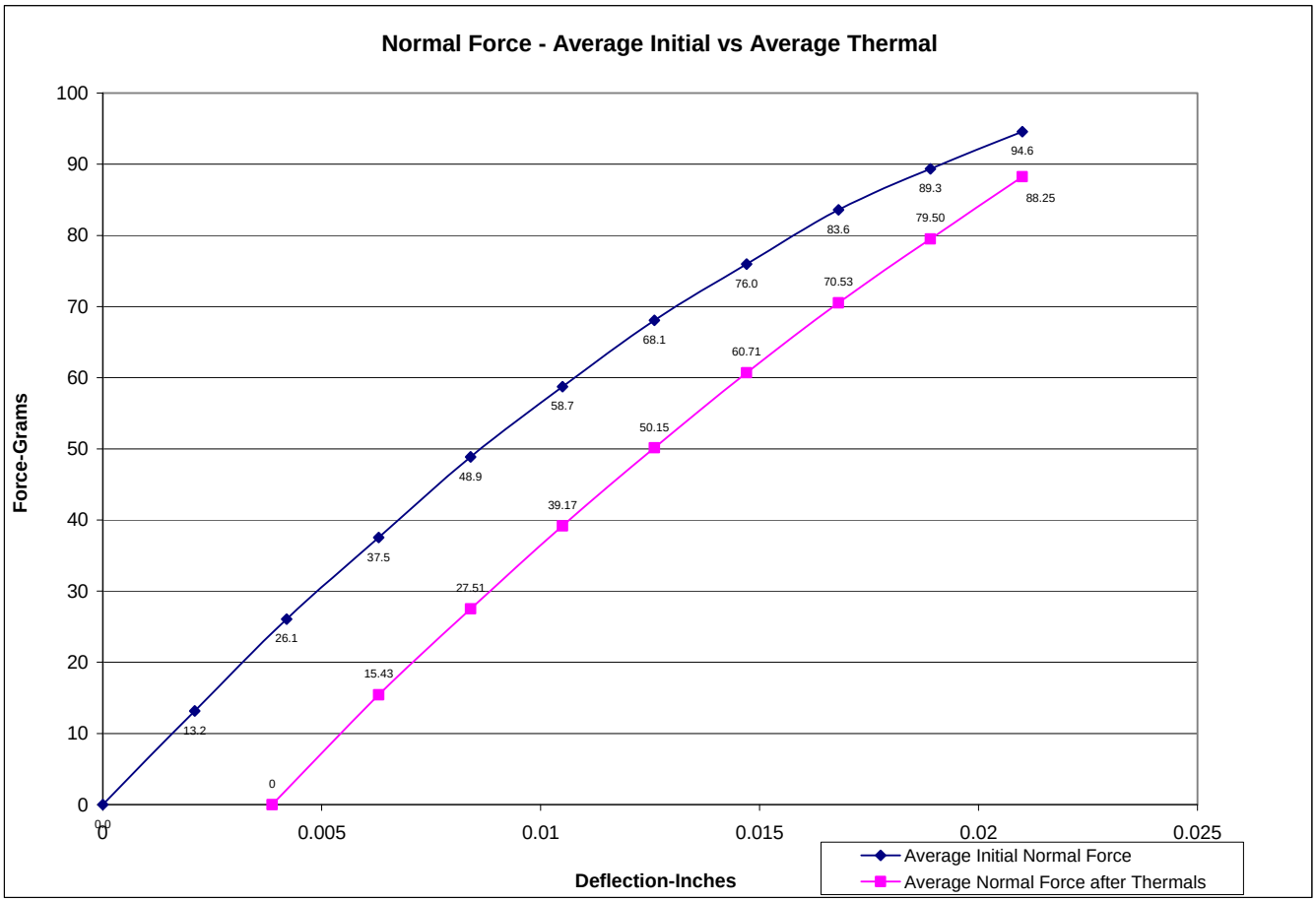
DATA SUMMARIES Continued

NORMAL FORCE (FOR CONTACTS TESTED OUT THE HOUSING):

1) Calibrated force gauges are used along with computer controlled positioning equipment.
2) For Normal force 8-10 measurements are taken and the averages reported.

Initial	Deflections in inches Forces in Grams										
	0.0021	**0.0042**	**0.0063**	**0.0084**	**0.0105**	**0.0126**	**0.0147**	**0.0168**	**0.0189**	**0.0210**	***SET***
Averages	13.18	26.06	37.54	48.87	58.73	68.07	75.95	83.58	89.34	94.56	0.0025
Min	12.20	25.10	36.00	45.50	54.80	64.60	72.80	81.30	85.00	89.90	0.0022
Max	14.30	27.70	39.60	51.70	62.00	72.10	80.00	86.70	92.50	97.70	0.0029
St. Dev	0.587	0.743	1.384	1.860	2.077	2.407	2.291	1.759	2.370	2.380	0.0002
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	0.0021	**0.0042**	**0.0063**	**0.0084**	**0.0105**	**0.0126**	**0.0147**	**0.0168**	**0.0189**	**0.0210**	***SET***
Averages	0.01	2.90	15.43	27.51	39.17	50.15	60.71	70.53	79.50	88.25	0.0038
Min	-0.10	0.00	11.90	24.50	36.30	46.40	57.00	67.00	75.40	84.40	0.0034
Max	0.10	5.70	17.80	30.00	42.80	53.80	64.30	74.10	83.10	92.00	0.0043
St. Dev	0.088	1.478	1.587	1.582	1.818	2.126	2.102	2.115	2.194	2.217	0.0002
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	**UCC8/PCB**	**UCC8**	**PCB**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	45000	45000	Not Tested

	Pin to Closest Metallic Hardware		
	Mated	Unmated	Unmated
Minimum	**UCC8/PCB**	**UCC8**	**PCB**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	45000	45000	Not Tested

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**UCC8/PCB**
Break Down Voltage	700
Test Voltage	525
Working Voltage	175

Pin to Pin	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Pin to Closest Metallic Hardware	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

DATA SUMMARIES Continued

LLCR Thermal Aging Group

1) A total of 80 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

UCC8-010-1-H-S-1-A /PCB-105057-TST

	LLCR Measurement Summaries by Pin Type			
Date	11/22/2013	12/6/2013		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	34	38		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	13.22	0.94		
St. Dev.	0.79	0.35		
Min	11.86	0.27		
Max	15.46	2.00		
Summary Count	80	80		
Total Count	80	80		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal	**80**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

UCC8-010-1-H-S-1-A /PCB-105058-TST

	LLCR Measurement Summaries by Pin Type			
Date	11/4/2013	11/21/2013		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	45	39		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	13.07	0.79		
St. Dev.	1.06	0.53		
Min	11.27	0.02		
Max	16.38	2.63		
Summary Count	80	70		
Total Count	80	80		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal	**80**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Mating/Unmating Durability Group

1). A total of 80 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

UCC8-010-1-H-S-1-A/MATING CARD

	LLCR Measurement Summaries by Pin Type			
Date	5/15/2017	5/15/2017	5/23/2017	6/6/2017
Room Temp (Deg C)	22	22	21	22
Rel Humidity (%)	41	41	38	45
Technician	Tony Wagoner	Tony Wagoner	Tony Wagoner	Tony Wagoner
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	12.88	0.94	0.71	0.88
St. Dev.	0.83	0.71	0.52	0.77
Min	11.48	0.02	0.00	0.01
Max	15.11	3.25	2.36	4.27
Summary Count	80	80	80	80
Total Count	80	80	80	80

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
100 Cycles	**80**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**80**	**0**	**0**	**0**	**0**	**0**
Humidity	**80**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Gas Tight Group

1) A total of 80 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

LLCR Measurement Summaries by Pin Type				
Date	10/21/2013	10/22/2013		
Room Temp (Deg C)	22	21		
Rel Humidity (%)	39	47		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	12.83	0.24		
St. Dev.	0.79	0.25		
Min	11.52	0.00		
Max	15.15	1.50		
Summary Count	80	80		
Total Count	80	80		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**80**	**0**	**0**	**0**	**0**	**0**

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: THC-02
Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SE-1000-6-6
Serial #: 31808
Accuracy: See Manual
… Last Cal: 02/16/2013, Next Cal: 02/16/2014

Equipment #: OV-05
Description: Forced Air Oven, 5 Cu. Ft., 120 V (Chamber Room)
Manufacturer: Sheldon Mfg.
Model: CE5F
Serial #: 02008008
Accuracy: +/- 5 deg. C
… Last Cal: 02/03/2013, Next Cal: 02/03/2014

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 05/24/2013, Next Cal: 08/24/2014

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: 05/18/2013, Next Cal: 05/18/2014

Equipment #: MO-11
Description: Switch/Multimeter
Manufacturer: Keithley
Model: 3706
Serial #: 0 120169
Accuracy: See Manual
… Last Cal: 08/21/2013, Next Cal: 08/21/2014

EQUIPMENT AND CALIBRATION SCHEDULES Continued

Equipment #: TCT-01
Description: Test Stand
Manufacturer: Chatillon
Model: TCD-1000
Serial #: 05 23 00 02
Accuracy: Speed Accuracy: +/-5% of max speed; Displacement: +/-.5% or +/-.005, whichever is greater.
… Last Cal: 08/24/2013, Next Cal: 08/24/2014

Equipment #: PS-01
Description: Power Supply
Manufacturer: Agilent
Model: AT-6032A
Serial #: MY41001186
Accuracy: Last Cal: 06/12/2013, Next Cal: 046/12/2014

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 03/27/2013, Next Cal: 03/27/2014