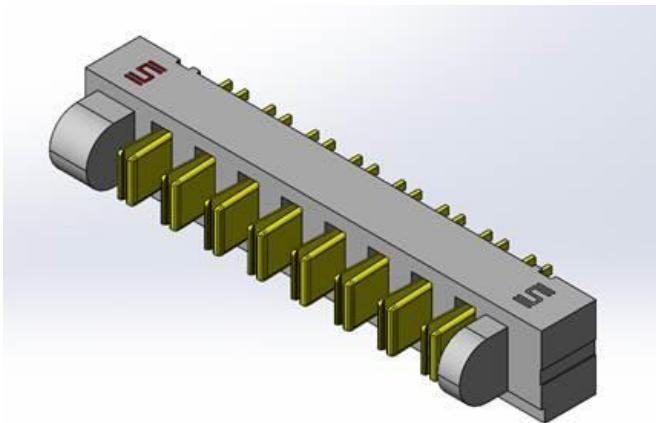
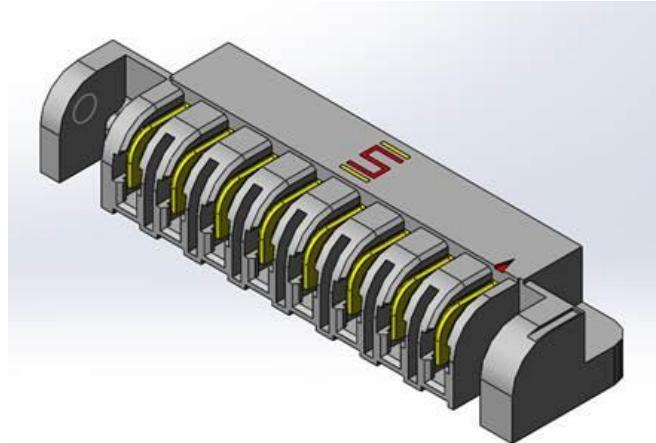


Project Number: Design Qualification Test Report	Tracking Code: 643198_Report_Rev_1
Requested by: Catie Eichhorn	Date: 5/12/2016
Part #: FMPS-08-01-L-S-RA-LC/FMPT-08-01-L-S-V-LC	Tech: Peter Chen
Part description: FMPS/FMPT	Qty to test: 105
Test Start: 10/19/2015	Test Completed: 11/25/2015



DESIGN QUALIFICATION TEST REPORT

FMPS/FMPT
FMPS-08-01-L-S-RA-LC/FMPT-08-01-L-S-V-LC

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
5/12/2016	1	Initial Issue	PC

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) After soldering, the parts to be used for LLCR and DWV/IR 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 and DWV/IR 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-107083-TST-XX/ PCB-107084-TST-XX/ PCB-107085-TST-XX.

FLOWCHARTS

Gas Tight

Group 1
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 8 Assemblies

Step Description

1. LLCR ⁽²⁾
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
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 8 Contacts Minimum
 Signal Without Thermals

Group 2
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 8 Contacts Minimum
 Signal With Thermals

Step Description

1. Contact Gaps
2. Normal Force ⁽¹⁾
Expected Force at Max Deflection = 100
g
Deflection = 0.014 "

Step Description

1. Contact Gaps
2. Thermal Age ⁽²⁾
3. Contact Gaps
4. Normal Force ⁽¹⁾
Expected Force at Max Deflection = 100
g
Deflection = 0.014 "

(1) Normal Force = EIA-364-04

(2) Thermal Age = EIA-364-17

Test Condition = 4 (105°C)

Time Condition = 8 (250 Hours)

FLOWCHARTS Continued**Thermal Aging**

Note: Mating direction is standard RA to Vert.

Group 1

FMPS-08-01-L-S-RA-LC

FMPT-08-01-L-S-V-LC

8 Assemblies

Step Description

1. Contact Gaps
2. Mating/Unmating Force ⁽²⁾
3. LLCR ⁽¹⁾
Max Delta = 15 mOhm
4. Thermal Age ⁽³⁾
5. LLCR ⁽¹⁾
Max Delta = 15 mOhm
6. Mating/Unmating Force ⁽²⁾
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

Note: Mating direction is standard RA to Vert

<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>	
FMPS-08-01-L-S-RA-LC		FMPS-06-01-L-S-RA-LC		FMPS-02-01-L-S-RA-LC	
FMPT-08-01-L-S-V-LC		FMPT-06-01-L-S-V-LC		FMPT-02-01-L-S-V-LC	
8 Assemblies		8 Assemblies		8 Assemblies	
Step	Description	Step	Description	Step	Description
1.	Contact Gaps	1.	Contact Gaps	1.	Contact Gaps
2.	LLCR ⁽²⁾	2.	Mating/Unmating Force ⁽³⁾	2.	Mating/Unmating Force ⁽³⁾
3.	Mating/Unmating Force ⁽³⁾	3.	Cycles	3.	Cycles
4.	Cycles	Quantity = 25 Cycles	4.	Mating/Unmating Force ⁽³⁾	Quantity = 25 Cycles
5.	Mating/Unmating Force ⁽³⁾	5.	Cycles	5.	Mating/Unmating Force ⁽³⁾
6.	Cycles	Quantity = 25 Cycles	6.	Mating/Unmating Force ⁽³⁾	Quantity = 25 Cycles
7.	Mating/Unmating Force ⁽³⁾	7.	Cycles	7.	Cycles
8.	Cycles	Quantity = 25 Cycles	8.	Mating/Unmating Force ⁽³⁾	Quantity = 25 Cycles
9.	Mating/Unmating Force ⁽³⁾	9.	Cycles	9.	Mating/Unmating Force ⁽³⁾
10.	Cycles	Quantity = 25 Cycles	10.	Mating/Unmating Force ⁽³⁾	Quantity = 25 Cycles
11.	Mating/Unmating Force ⁽³⁾				
12.	Contact Gaps				
13.	LLCR ⁽²⁾				
	Max Delta = 15 mOhm				
14.	Thermal Shock ⁽⁴⁾				
15.	LLCR ⁽²⁾				
	Max Delta = 15 mOhm				
16.	Humidity ⁽¹⁾				
17.	LLCR ⁽²⁾				
	Max Delta = 15 mOhm				
18.	Mating/Unmating Force ⁽³⁾				

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

(4) 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

<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>		<u>Group 4</u>	
FMPS-08-01-L-S-RA-LC		FMPS-08-01-L-S-RA-LC		FMPT-08-01-L-S-V-LC		FMPS-08-01-L-S-RA-LC	
FMPT-08-01-L-S-V-LC		2 Assemblies		2 Assemblies		FMPT-08-01-L-S-V-LC	
Step	Description	Step	Description	Step	Description	Step	Description
1.	DWV Breakdown ⁽²⁾	1.	DWV Breakdown ⁽²⁾	1.	DWV Breakdown ⁽²⁾	1.	IR ⁽⁴⁾
							DWV at Test Voltage ⁽¹⁾
							Thermal Shock ⁽⁵⁾
							IR ⁽⁴⁾
							DWV at Test Voltage ⁽¹⁾
							Humidity ⁽³⁾
							IR ⁽⁴⁾
							DWV at Test Voltage ⁽¹⁾

Pin-to-Closest Metallic Hardware

<u>Group 5</u>		<u>Group 6</u>		<u>Group 7</u>		<u>Group 8</u>	
FMPS-08-01-L-S-RA-LC		FMPS-08-01-L-S-RA-LC		FMPT-08-01-L-S-V-LC		FMPS-08-01-L-S-RA-LC	
FMPT-08-01-L-S-V-LC		2 Assemblies		2 Assemblies		FMPT-08-01-L-S-V-LC	
Step	Description	Step	Description	Step	Description	Step	Description
1.	DWV Breakdown ⁽²⁾	1.	DWV Breakdown ⁽²⁾	1.	DWV Breakdown ⁽²⁾	1.	IR ⁽⁴⁾
							DWV at Test Voltage ⁽¹⁾
							Thermal Shock ⁽⁵⁾
							IR ⁽⁴⁾
							DWV at Test Voltage ⁽¹⁾
							Humidity ⁽³⁾
							IR ⁽⁴⁾
							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
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 1 Pins Powered
 Signal

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

Group 2
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 2 Pins Powered
 Signal

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

Group 3
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 3 Pins Powered
 Signal

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

Group 4
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 4 Pins Powered
 Signal

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

Group 5
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 8 Pins Powered
 Signal

Step **Description**
 1. CCC (1)
 Rows = 1
 Number of Positions = 8

(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

FLOWCHARTS Continued**Mechanical Shock/Random Vibration/LLCR**

Group 1
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 8 Assemblies

Step Description

1. LLCR ⁽¹⁾
2. Mechanical Shock ⁽²⁾
3. Random Vibration ⁽³⁾
4. LLCR ⁽¹⁾
 Max Delta = 15 mOhm

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

(2) Mechanical Shock = EIA-364-27
 Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
 Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(3) Random Vibration = EIA-364-28
 Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

Mechanical Shock/Random Vibration/Event Detection

Group 1
 FMPS-08-01-L-S-RA-LC
 FMPT-08-01-L-S-V-LC
 60 Points

Step Description

1. Nanosecond Event Detection
 (Mechanical Shock) ⁽¹⁾
2. Nanosecond Event Detection
 (Random Vibration) ⁽²⁾

(1) Nanosecond Event Detection (Mechanical Shock)
 Use EIA-364-87 for Nanosecond Event Detection:
 Test Condition = F (50 nanoseconds at 10 ohms)
 Use EIA-364-27 for Mechanical Shock:
 Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
 Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(2) Nanosecond Event Detection (Random Vibration)
 Use EIA-364-87 for Nanosecond Event Detection:
 Test Condition = F (50 nanoseconds at 10 ohms)
 Use EIA-364-28 for Random Vibration:
 Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

FLOWCHARTS Continued

Extended Life

Note: This sequence is testing "hinge" design. This is the same sequence per the original qualification. Please see attached videos for description of the mate. These will likely have to be cycled by hand.

Group 1		Group 2		Group 3		Group 4	
FMPS-08-01-L-S-RA-LC		FMPS-08-01-L-S-RA-LC		FMPS-08-01-L-S-RA-LC		FMPS-08-01-L-S-RA-LC	
FMPT-08-01-L-S-V-LC		FMPT-08-01-L-S-V-LC		FMPT-08-01-L-S-V-LC		FMPT-08-01-L-S-V-LC	
Step	Description	Step	Description	Step	Description	Step	Description
1.	Plating Thickness Verification (4)						
2.	LLCR (2)						
3.	Cycles Quantity = 100 Cycles						
4.	LLCR (2) Max Delta = 15 mOhm	4.	LLCR (2) Max Delta = 15 mOhm	4.	LLCR (2) Max Delta = 15 mOhm	4.	LLCR (2) Max Delta = 15 mOhm
5.	Thermal Shock (5)						
6.	LLCR (2) Max Delta = 15 mOhm	6.	LLCR (2) Max Delta = 15 mOhm	6.	LLCR (2) Max Delta = 15 mOhm	6.	LLCR (2) Max Delta = 15 mOhm
7.	Humidity (1)						
8.	LLCR (2) Max Delta = 15 mOhm	8.	LLCR (2) Max Delta = 15 mOhm	8.	LLCR (2) Max Delta = 15 mOhm	8.	LLCR (2) Max Delta = 15 mOhm
9.	Photos (3)						

(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) Photos

Attach 2-3 photos of contact area

(4) Plating Thickness Verification

Measure, verify, and document plating thickness on both male and female (one group only)

Plating thickness to be measured on loose pins used during assembly

(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)

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.

MECHANICAL SHOCK (Specified Pulse):

- 1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
- 2) Test Condition C
- 3) Peak Value: 100 G
- 4) Duration: 6 Milliseconds
- 5) Wave Form: Half Sine
- 6) Velocity: 12.3 ft/s
- 7) Number of Shocks: 3 Shocks / Direction, 3 Axis (18 Total)

VIBRATION:

- 1) Reference document: EIA-364-28, *Vibration Test Procedure for Electrical Connectors*
- 2) Test Condition V, Letter B
- 3) Power Spectral Density: 0.04 G² / Hz
- 4) G 'RMS': 7.56
- 5) Frequency: 50 to 2000 Hz
- 6) Duration: 2.0 Hours per axis (3 axis total)

NANOSECOND-EVENT DETECTION:

- 1) Reference document: EIA-364-87, *Nanosecond-Event Detection for Electrical Connectors*
- 2) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
- 3) After characterization it was determined the test samples could be monitored for 50 nanosecond events

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

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.

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 four temperature points are reported:
 - a. Ambient
 - b. 85°C
 - c. 95°C
 - d. 115°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.

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. $\leq +5.0 \text{ mOhms}$:----- Stable
 - b. $+5.1 \text{ to } +10.0 \text{ mOhms}$:----- Minor
 - c. $+10.1 \text{ to } +15.0 \text{ mOhms}$:----- Acceptable
 - d. $+15.1 \text{ to } +50.0 \text{ mOhms}$:----- Marginal
 - e. $+50.1 \text{ to } +2000 \text{ mOhms}$:----- Unstable
 - f. $>+2000 \text{ mOhms}$:----- Open Failure

ATTRIBUTE DEFINITIONS Continued

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. $\leq +5.0$ 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
- 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°C
 - ix. The final LLCR shall be conducted within 1 hour after drying.

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 TC², 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 TC² software in order to acquire and record the test data.
- 10) The permanent set of each contact shall be measured within the TC² 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.

ATTRIBUTE DEFINITIONS Continued

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 withstand 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 withstand voltage (one-fourth of the breakdown voltage).

RESULTS

Temperature Rise, CCC at a 20% de-rating

- CCC for a 30°C Temperature Rise-----31.4 A per contact with 1 contacts (1x1) powered
- CCC for a 30°C Temperature Rise-----28.1 A per contact with 2 contacts (1x2) powered
- CCC for a 30°C Temperature Rise-----25.7 A per contact with 3 contacts (1x3) powered
- CCC for a 30°C Temperature Rise-----23.4 A per contact with 4 contacts (1x4) powered
- CCC for a 30°C Temperature Rise-----20.6 A per contact with 8 contacts (1x8) powered

Mating – Unmating Forces

Thermal Aging Group (FMPS-08-01-L-S-RA-LC/FMPT-08-01-L-S-V-LC)

- Initial
 - Mating
 - Min ----- 4.98 Lbs
 - Max----- 6.02 Lbs
 - Unmating
 - Min ----- 4.25 Lbs
 - Max----- 5.06 Lbs
- After Thermal
 - Mating
 - Min ----- 4.01 Lbs
 - Max----- 5.41 Lbs
 - Unmating
 - Min ----- 3.01 Lbs
 - Max----- 3.84 Lbs

RESULTS Continued

Mating – Unmating Forces

Mating-Unmating Durability Group (FMPS-08-01-L-S-RA-LC/FMPT-08-01-L-S-V-LC)

- Initial
 - Mating
 - Min ----- 4.75 Lbs
 - Max----- 5.79 Lbs
 - Unmating
 - Min ----- 4.44 Lbs
 - Max----- 5.04 Lbs
- After 25 Cycles
 - Mating
 - Min ----- 4.72 Lbs
 - Max----- 6.33 Lbs
 - Unmating
 - Min ----- 4.58 Lbs
 - Max----- 5.35 Lbs
- After 50 Cycles
 - Mating
 - Min ----- 5.19 Lbs
 - Max----- 6.74 Lbs
 - Unmating
 - Min ----- 4.37 Lbs
 - Max----- 5.41 Lbs
- After 75 Cycles
 - Mating
 - Min ----- 5.69 Lbs
 - Max----- 6.98 Lbs
 - Unmating
 - Min ----- 4.50 Lbs
 - Max----- 5.60 Lbs
- After 100 Cycles
 - Mating
 - Min ----- 5.91 Lbs
 - Max----- 7.26 Lbs
 - Unmating
 - Min ----- 4.97 Lbs
 - Max----- 5.81 Lbs
- After Humidity
 - Mating
 - Min ----- 4.07 Lbs
 - Max----- 5.02 Lbs
 - Unmating
 - Min ----- 3.05 Lbs
 - Max----- 3.66 Lbs

RESULTS Continued

Mating – Unmating Forces

Mating-Unmating Basic (FMPS-06-01-L-S-RA-LC/FMPT-06-01-L-S-V-LC)

- **Initial**
 - **Mating**
 - Min ----- 4.77 Lbs
 - Max ----- 6.17 Lbs
 - **Unmating**
 - Min ----- 3.04 Lbs
 - Max ----- 4.22 Lbs
- **After 25 Cycles**
 - **Mating**
 - Min ----- 4.53 Lbs
 - Max ----- 6.77 Lbs
 - **Unmating**
 - Min ----- 3.41 Lbs
 - Max ----- 4.55 Lbs
- **After 50 Cycles**
 - **Mating**
 - Min ----- 5.15 Lbs
 - Max ----- 8.28 Lbs
 - **Unmating**
 - Min ----- 3.62 Lbs
 - Max ----- 5.18 Lbs
- **After 75 Cycles**
 - **Mating**
 - Min ----- 5.48 Lbs
 - Max ----- 8.34 Lbs
 - **Unmating**
 - Min ----- 3.93 Lbs
 - Max ----- 5.37 Lbs
- **After 100 Cycles**
 - **Mating**
 - Min ----- 5.16 Lbs
 - Max ----- 8.21 Lbs
 - **Unmating**
 - Min ----- 4.22 Lbs
 - Max ----- 5.43 Lbs

RESULTS Continued

Mating-Unmating Basic (FMPS-02-01-L-S-RA-LC/FMPT-02-01-L-S-V-LC)

- Initial
 - Mating
 - Min ----- 1.07 Lbs
 - Max ----- 2.04 Lbs
 - Unmating
 - Min ----- 1.06 Lbs
 - Max ----- 1.91 Lbs
- After 25 Cycles
 - Mating
 - Min ----- 1.46 Lbs
 - Max ----- 2.47 Lbs
 - Unmating
 - Min ----- 1.09 Lbs
 - Max ----- 1.85 Lbs
- After 50 Cycles
 - Mating
 - Min ----- 1.75 Lbs
 - Max ----- 2.45 Lbs
 - Unmating
 - Min ----- 1.08 Lbs
 - Max ----- 2.03 Lbs
- After 75 Cycles
 - Mating
 - Min ----- 1.86 Lbs
 - Max ----- 2.76 Lbs
 - Unmating
 - Min ----- 1.23 Lbs
 - Max ----- 2.06 Lbs
- After 100 Cycles
 - Mating
 - Min ----- 1.60 Lbs
 - Max ----- 2.67 Lbs
 - Unmating
 - Min ----- 1.15 Lbs
 - Max ----- 2.10 Lbs

Normal Force at 0.0095 inch deflection

- Initial
 - Min ----- 343.20 gf
 - Max ----- 412.70 gf
- Thermal
 - Min ----- 237.70 gf
 - Max ----- 320.50 gf

<ul style="list-style-type: none"> Set ----- 0.0000 in Set ----- 0.0003 in 	<ul style="list-style-type: none"> Set ----- 0.0026 in Set ----- 0.0034 in
--	--

RESULTS Continued

Insulation Resistance minimums, IR

Pin to Pin

- Initial
 - Mated ----- 10000 Meg Ω ----- Passed
 - Unmated ----- 10000 Meg Ω ----- Passed
- Thermal Shock
 - Mated ----- 6110 Meg Ω ----- Passed
 - Unmated ----- 6750 Meg Ω ----- Passed
- Humidity
 - Mated ----- 5645 Meg Ω ----- Passed
 - Unmated ----- 6125 Meg Ω ----- Passed

Dielectric Withstanding Voltage minimums, DWV

Minumums

- Breakdown Voltage ----- 1650 VAC
- Test Voltage ----- 1240 VAC
- Working Voltage ----- 410 VAC

Pin to Pin

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

RESULTS Continued

LLCR Thermal Aging Group (48 LLCR test points)

- Initial ----- 0.44 mOhms Max
- Thermal
 - <= +5.0 mOhms ----- 48 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 Mating/Unmating Durability Group (48 LLCR test points)

- Initial ----- 0.48 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 48 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 ----- 48 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 ----- 48 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 Gas Tight Group (48 LLCR test points)

- Initial ----- 0.40 mOhms Max
- Gas-Tight
 - <= +5.0 mOhms ----- 48 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 Shock & Vibration Group (48 LLCR test points)

- Initial ----- 0.37 mOhms Max
- Shock & Vibration
 - <= +5.0 mOhms ----- 48 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

Mechanical Shock & Random Vibration:

- Shock
 - No Damage----- Pass
 - 50 Nanoseconds----- Pass
- Vibration
 - No Damage----- Pass
 - 50 Nanoseconds----- Pass

LLCR Extended Life Group (48 LLCR test points)

Group 1 –Straight Mate

- Initial ----- 0.45 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 48 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 ----- 48 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 ----- 48 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

Group 2 -Perpendicular Mate

- Initial ----- 0.52 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 48 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 ----- 48 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 ----- 48 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

Group 3 -45° Up Mate

- Initial ----- 0.37 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 48 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 ----- 48 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 ----- 48 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

Group 4 -45° Down Mate

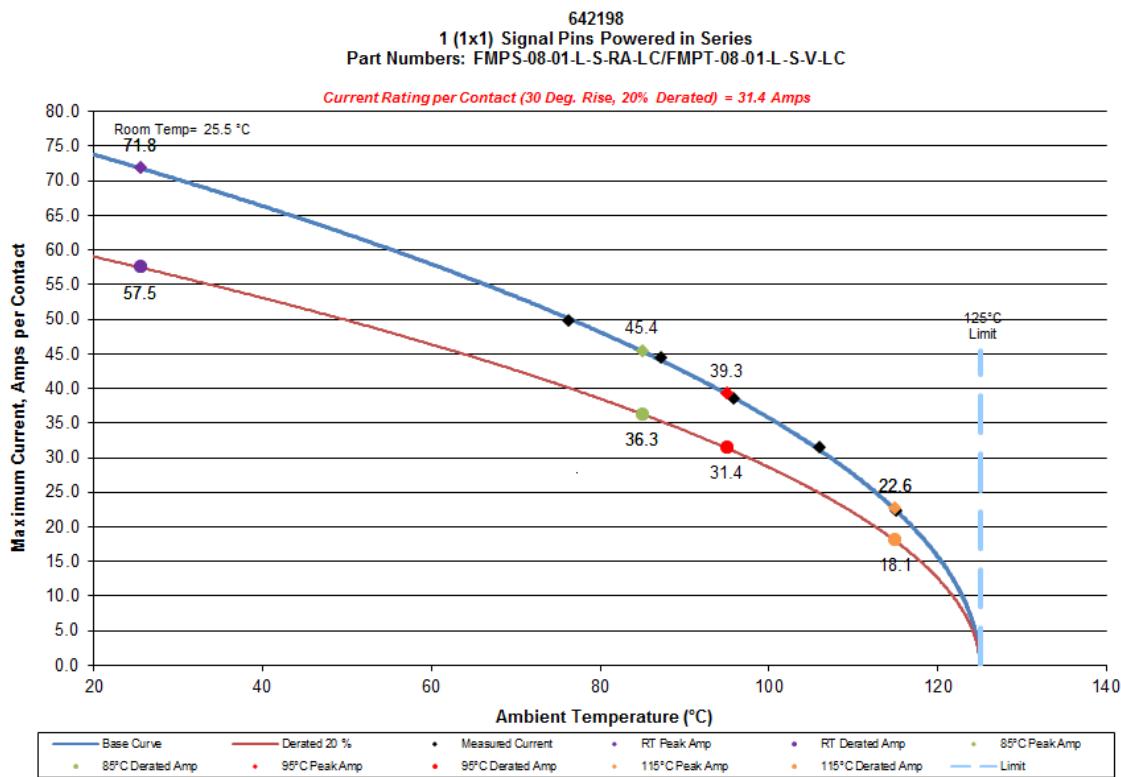
- Initial ----- 0.42 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 48 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Thermal Shock
 - <= +5.0 mOhms ----- 48 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 ----- 48 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

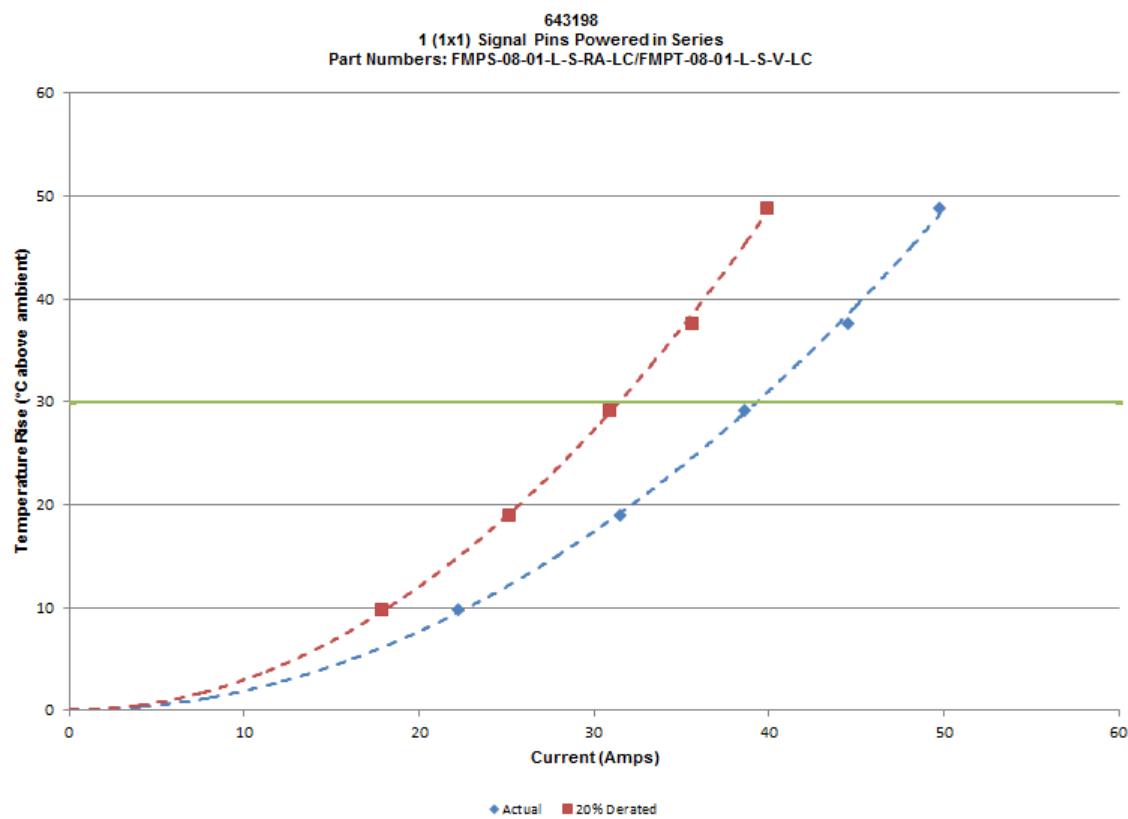
DATA SUMMARIES

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:

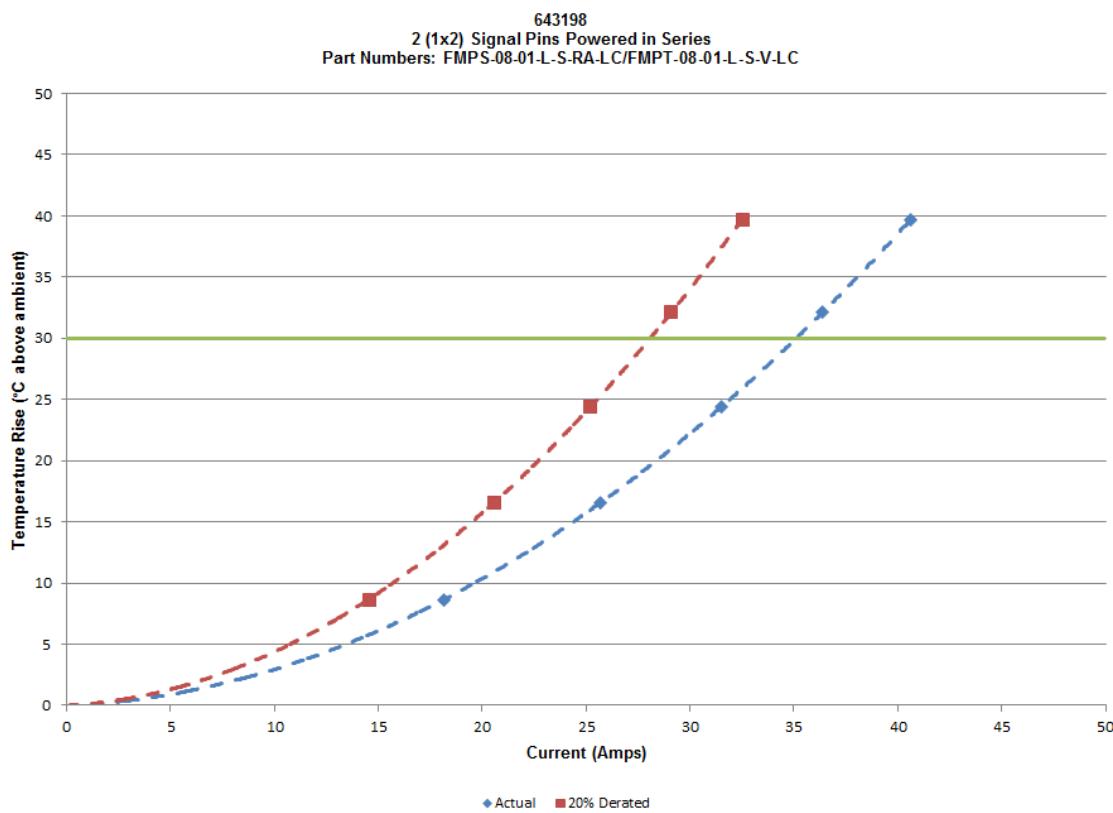
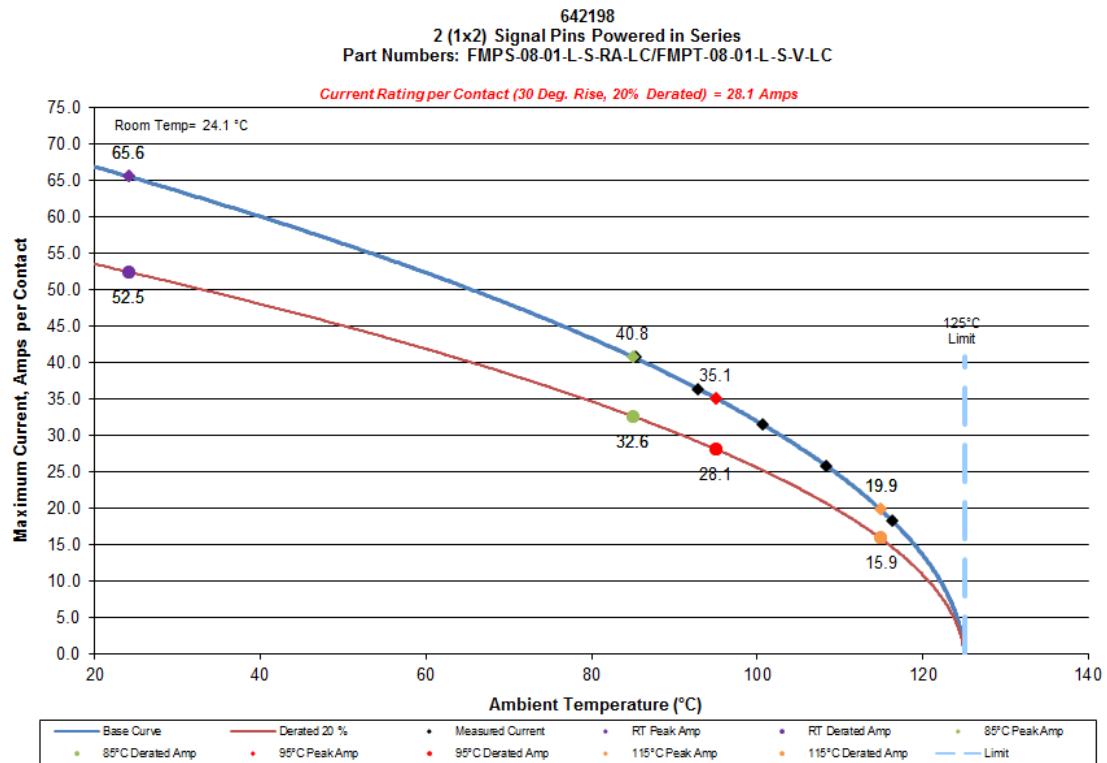
- a. Linear configuration with 1 adjacent conductors/contacts powered



DATA SUMMARIES Continued

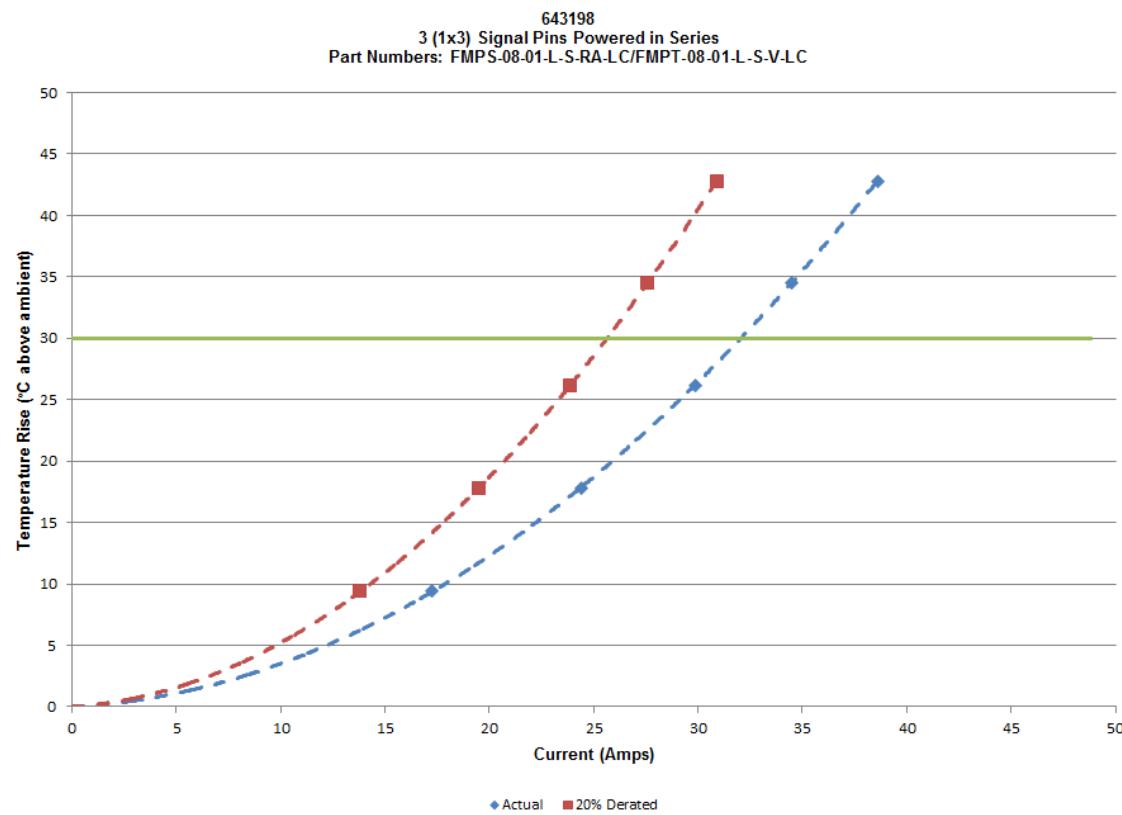
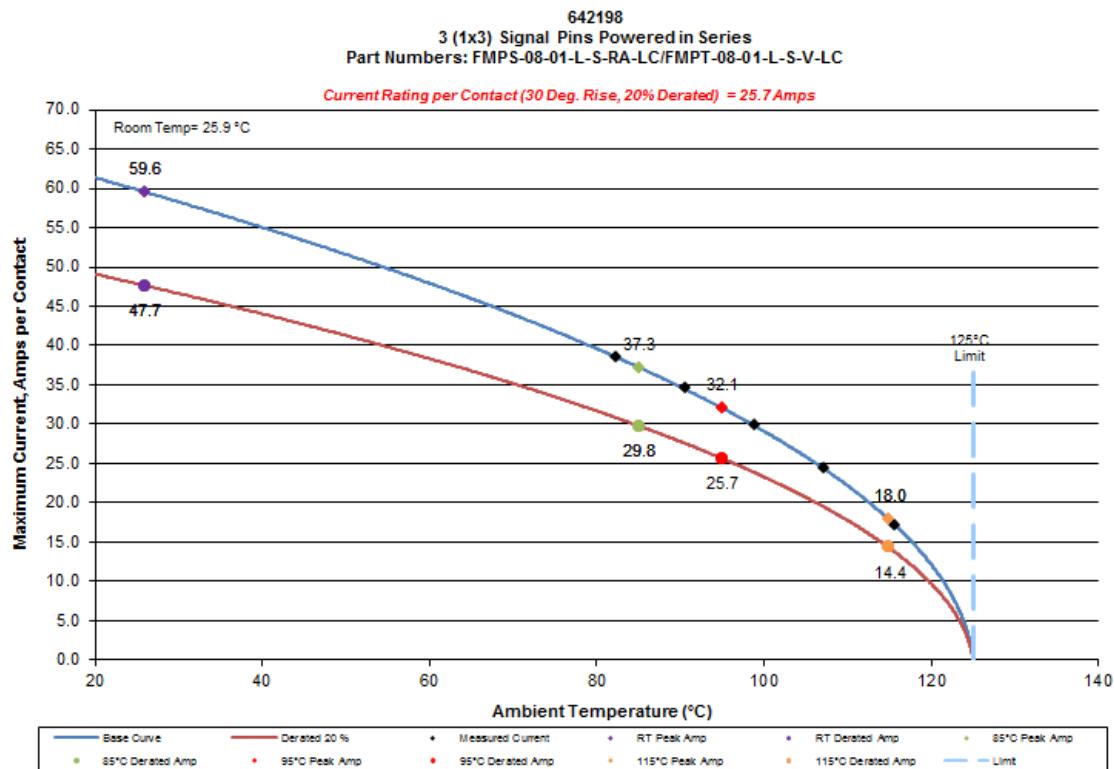
DATA SUMMARIES Continued

b. Linear configuration with 2 adjacent conductors/contacts powered



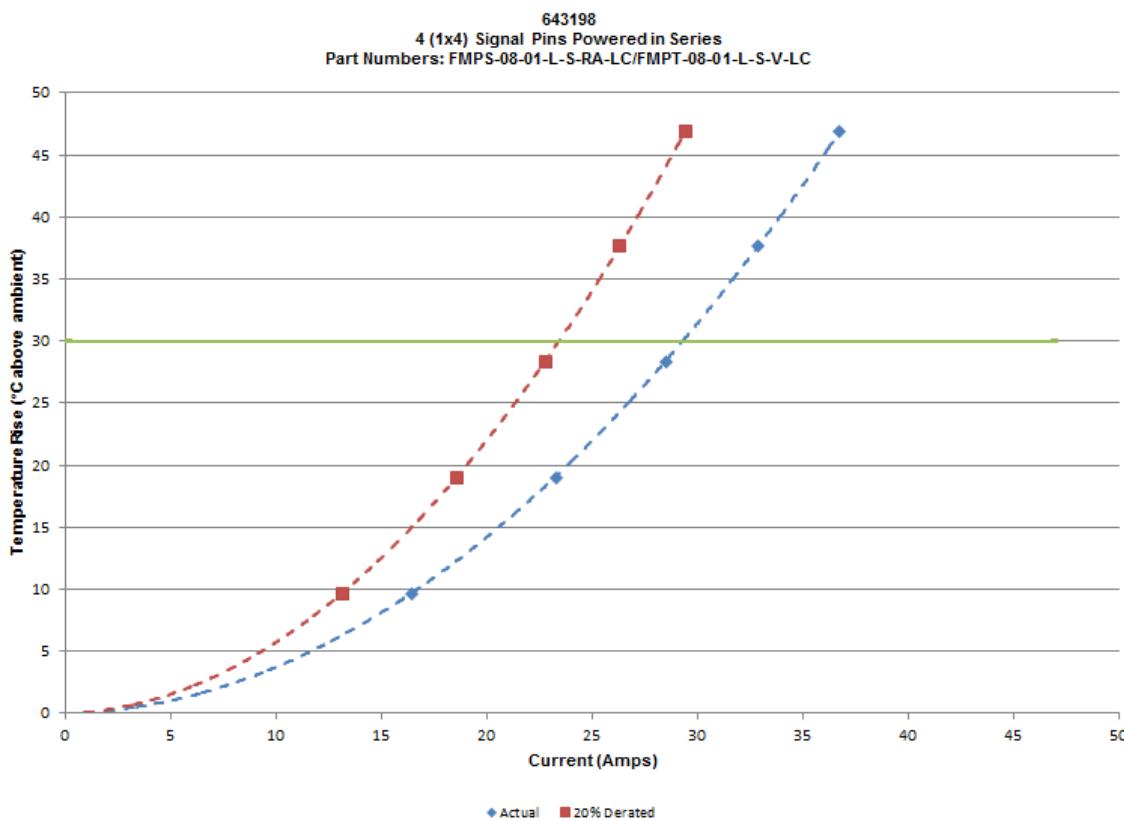
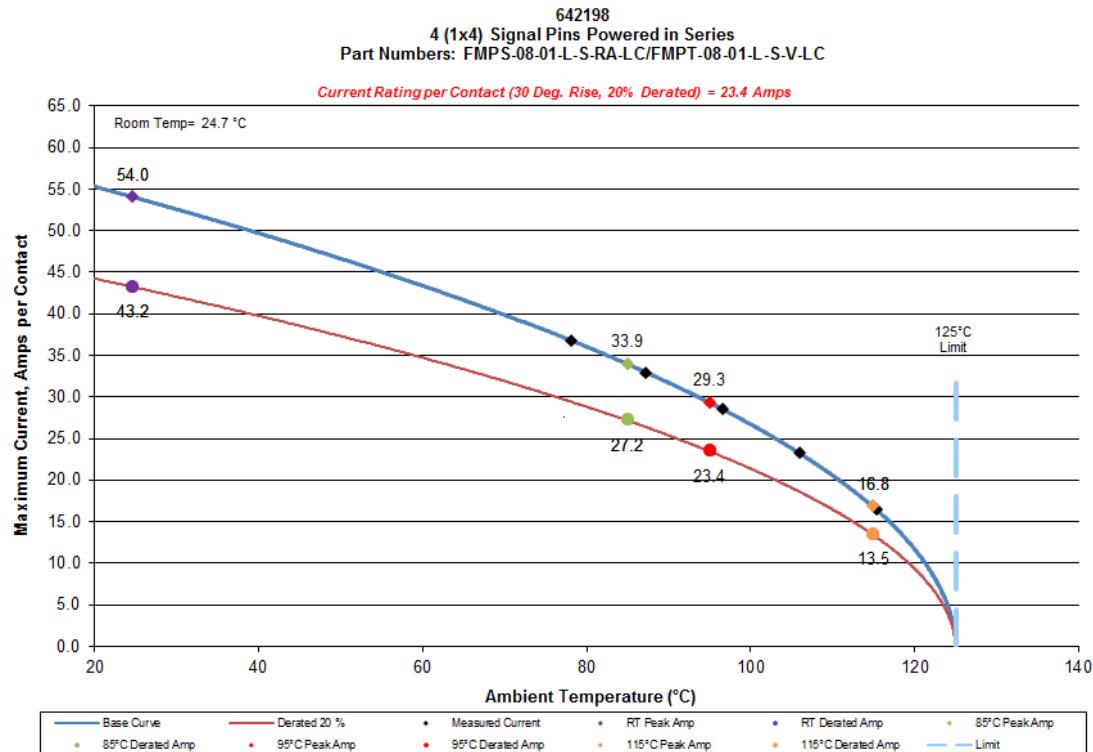
DATA SUMMARIES Continued

c. Linear configuration with 3 adjacent conductors/contacts powered



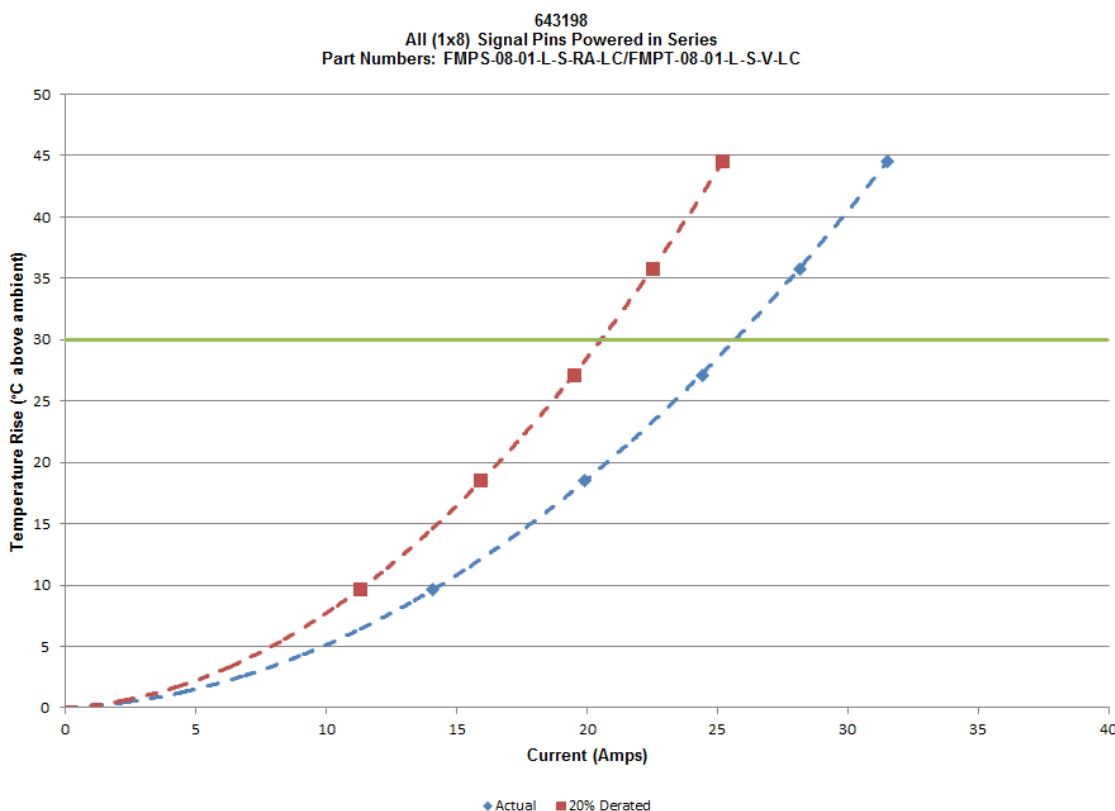
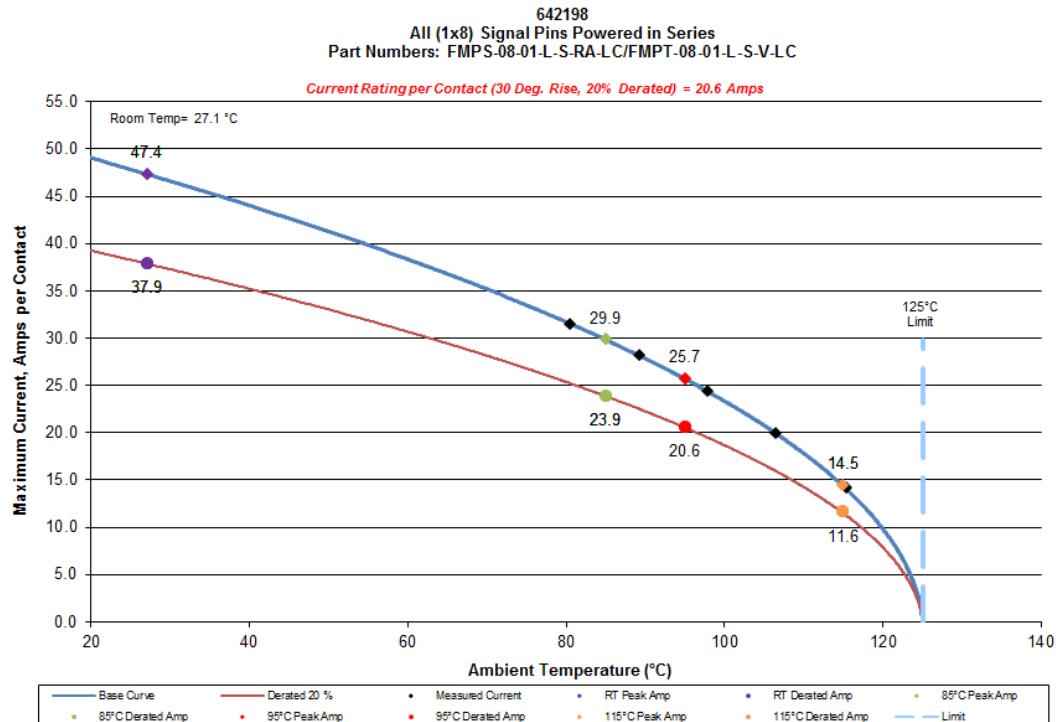
DATA SUMMARIES Continued

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 (FMPS-08-01-L-S-RA-LC/FPMT-08-01-L-S-V-LC)

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	22.15	4.98	18.90	4.25	17.84	4.01	13.39	3.01
Maximum	26.78	6.02	22.51	5.06	24.06	5.41	17.08	3.84
Average	23.42	5.27	20.81	4.68	20.98	4.72	15.65	3.52
St Dev	1.69	0.38	1.29	0.29	2.38	0.54	1.27	0.29
Count	8	8	8	8	8	8	8	8

Mating-Unmating Durability Group (FMPS-08-01-L-S-RA-LC/FPMT-08-01-L-S-V-LC)

	Initial				After 25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	21.13	4.75	19.75	4.44	20.99	4.72	20.37	4.58
Maximum	25.75	5.79	22.42	5.04	28.16	6.33	23.80	5.35
Average	22.96	5.16	21.28	4.79	24.19	5.44	21.97	4.94
St Dev	1.60	0.36	0.98	0.22	2.30	0.52	1.09	0.25
Count	8	8	8	8	8	8	8	8
	After 50 Cycles				After 75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	23.09	5.19	19.44	4.37	25.31	5.69	20.02	4.50
Maximum	29.98	6.74	24.06	5.41	31.05	6.98	24.91	5.60
Average	26.10	5.87	22.37	5.03	27.11	6.10	22.42	5.04
St Dev	2.31	0.52	1.64	0.37	2.04	0.46	1.79	0.40
Count	8	8	8	8	8	8	8	8
	After 100 Cycles				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	26.29	5.91	22.11	4.97	18.10	4.07	13.57	3.05
Maximum	32.29	7.26	25.84	5.81	22.33	5.02	16.28	3.66
Average	28.52	6.41	23.34	5.25	19.90	4.47	15.29	3.44
St Dev	2.02	0.46	1.40	0.31	1.49	0.34	0.98	0.22
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

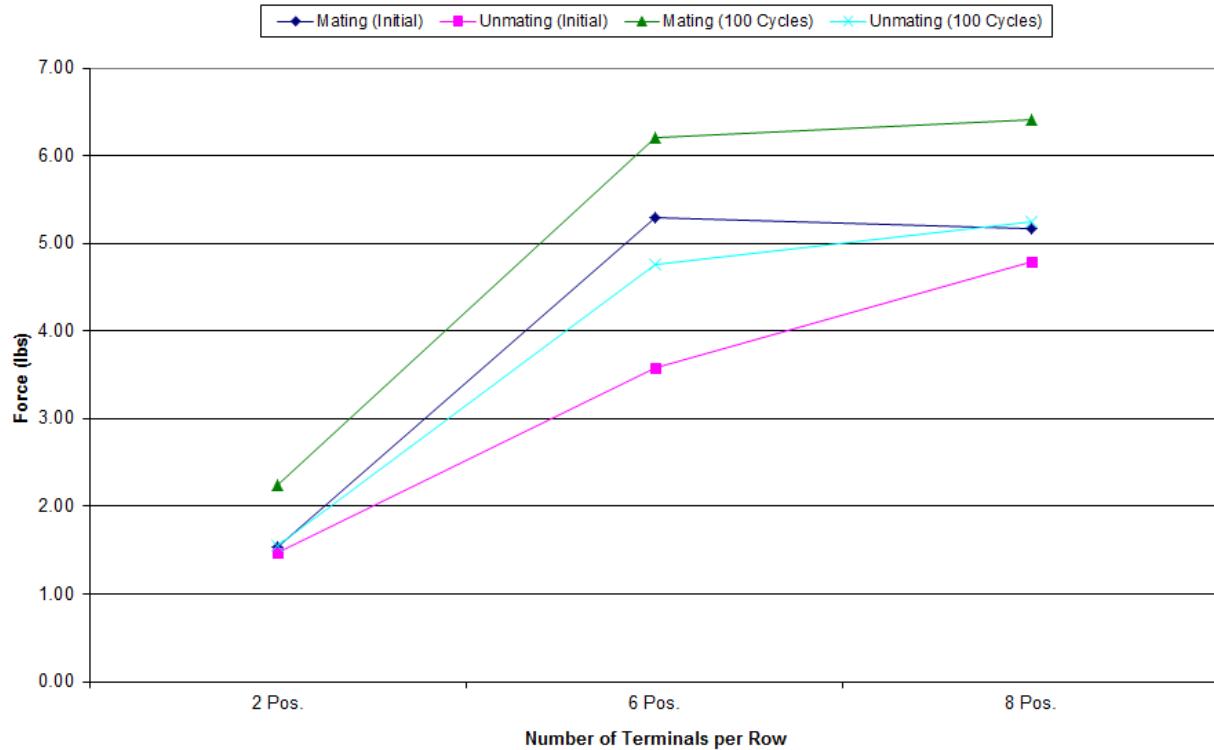
Mating-Unmating Basic (FMPS-06-01-L-S-RA-LC/FMPT-06-01-L-S-V-LC)

	Initial				After 25 Cycles				
	Mating		Unmating		Mating		Unmating		
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	
Minimum	21.22	4.77	13.52	3.04	20.15	4.53	15.17	3.41	
Maximum	27.44	6.17	18.77	4.22	30.11	6.77	20.24	4.55	
Average	23.52	5.29	15.89	3.57	24.75	5.57	18.50	4.16	
St Dev	2.29	0.52	1.86	0.42	3.53	0.79	1.85	0.42	
Count	8	8	8	8	8	8	8	8	
After 50 Cycles				After 75 Cycles					
	Mating		Unmating		Mating		Unmating		
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	
	Minimum	22.91	5.15	16.10	3.62	24.38	5.48	17.48	3.93
Maximum	36.83	8.28	23.04	5.18	37.10	8.34	23.89	5.37	
Average	27.85	6.26	19.52	4.39	27.53	6.19	20.07	4.51	
St Dev	4.22	0.95	2.08	0.47	4.16	0.94	2.01	0.45	
Count	8	8	8	8	8	8	8	8	
After 100 Cycles									
	Mating		Unmating						
	Newton	Force (Lbs)	Newton	Force (Lbs)					
	Minimum	22.95	5.16	18.77	4.22				
Maximum	36.52	8.21	24.15	5.43					
Average	27.61	6.21	21.16	4.76					
St Dev	4.44	1.00	1.82	0.41					
Count	8	8	8	8					

DATA SUMMARIES Continued

Mating-Unmating Basic (FMPS-02-01-L-S-RA-LC/FMPT-02-01-L-S-V-LC)

	Initial				After 25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	4.76	1.07	4.71	1.06	6.49	1.46	4.85	1.09
Maximum	9.07	2.04	8.50	1.91	10.99	2.47	8.23	1.85
Average	6.83	1.54	6.54	1.47	9.08	2.04	6.68	1.50
St Dev	1.48	0.33	1.43	0.32	1.54	0.35	1.21	0.27
Count	8	8	8	8	8	8	8	8
	After 50 Cycles				After 75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	7.78	1.75	4.80	1.08	8.27	1.86	5.47	1.23
Maximum	10.90	2.45	9.03	2.03	12.28	2.76	9.16	2.06
Average	9.45	2.13	7.29	1.64	9.80	2.20	7.19	1.62
St Dev	1.16	0.26	1.36	0.31	1.36	0.30	1.23	0.28
Count	8	8	8	8	8	8	8	8
	After 100 Cycles							
	Mating		Unmating					
	Newton	Force (Lbs)	Newton	Force (Lbs)				
Minimum	7.12	1.60	5.12	1.15				
Maximum	11.88	2.67	9.34	2.10				
Average	9.99	2.25	6.92	1.56				
St Dev	1.56	0.35	1.33	0.30				
Count	8	8	8	8				

DATA SUMMARIES Continued**Mating\Unmating Force Comparison****Mating/Unmating Data for 2, 6 and 8 Position FMPS/FMPT**

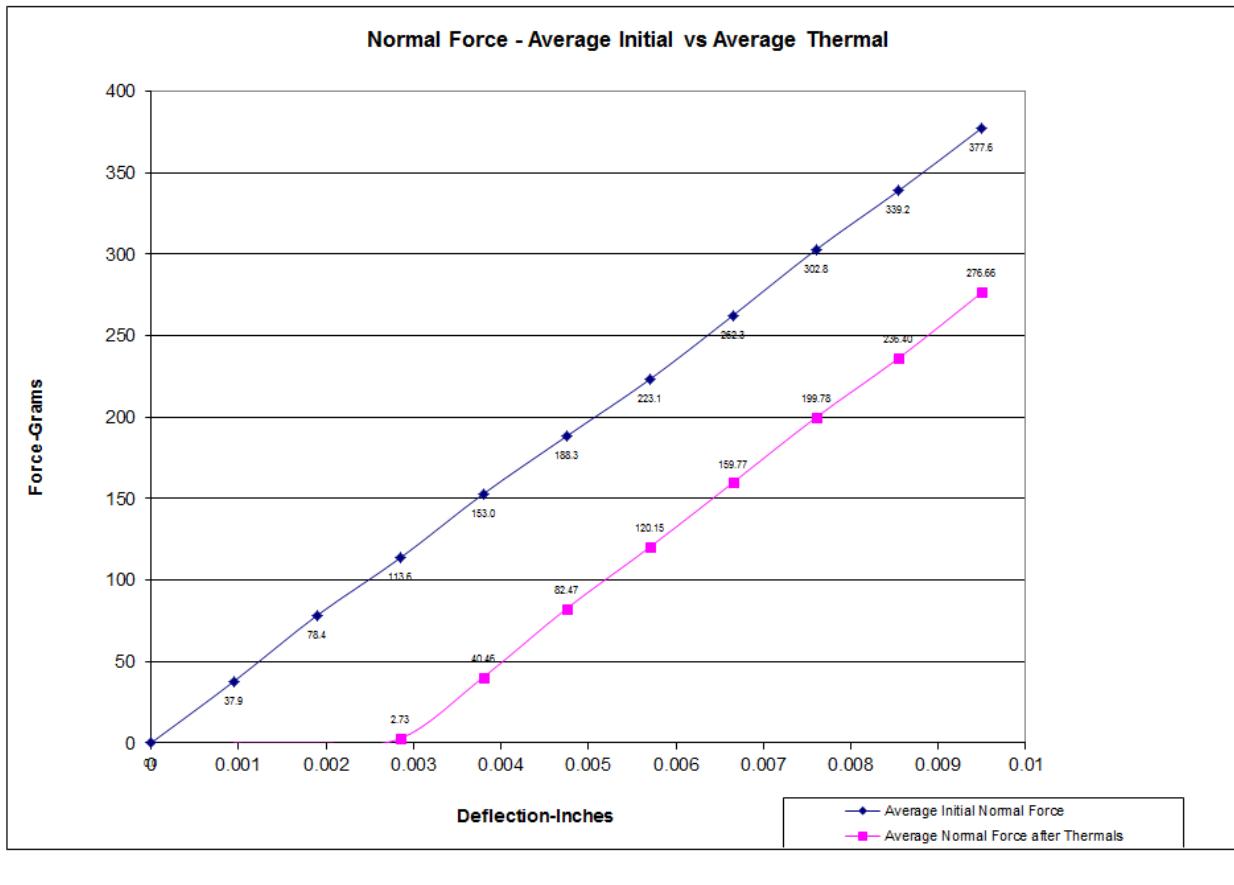
DATA SUMMARIES Continued

NORMAL FORCE (FOR CONTACTS TESTED IN 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										
	0.0010	0.0019	0.0029	0.0038	0.0048	0.0057	0.0067	0.0076	0.0086	0.0095	SET
Averages	37.93	78.35	113.63	152.97	188.27	223.13	262.33	302.75	339.20	377.58	0.0001
Min	32.80	71.00	99.90	133.90	164.00	192.10	229.70	265.40	303.90	343.20	0.0000
Max	50.60	95.60	135.30	177.00	214.80	257.60	296.60	335.80	373.60	412.70	0.0003
St. Dev	4.896	6.285	8.735	11.418	13.716	16.379	17.656	18.458	17.876	19.070	0.0001
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflections in inches Forces in Grams										
	0.0010	0.0019	0.0029	0.0038	0.0048	0.0057	0.0067	0.0076	0.0086	0.0095	SET
Averages	-0.08	-0.08	2.73	40.46	82.47	120.15	159.77	199.78	236.40	276.66	0.0031
Min	-1.30	-1.20	-1.20	25.30	61.30	89.40	123.90	163.80	201.10	237.70	0.0026
Max	0.40	0.40	12.10	65.90	108.20	147.60	187.70	230.30	275.00	320.50	0.0034
St. Dev	0.439	0.413	4.716	13.041	15.079	16.653	18.418	19.786	22.162	24.325	0.0002
Count	12	12	12	12	12	12	12	12	12	12	12



DATA SUMMARIES Continued**INSULATION RESISTANCE (IR):**

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	FMPS/FMPT	FMPS	FMPT
Initial	10000	10000	10000
Thermal	6110	6750	10000
Humidity	5645	6125	10000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	FMPS/FMPT
Break Down Voltage	1650
Test Voltage	1240
Working Voltage	410

Pin to Pin	
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 48 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. $\leq +5.0$ 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

LLCR Measurement Summaries by Pin Type						
mOhm values Technician Rel Humidity (%) Room Temp (Deg C) Date	10/20/2015	10/30/2015				
	23	23				
	54	54				
	Peter Chen	Peter Chen				
	Actual Initial	Delta Thermal	Delta	Delta		
	Pin Type 1: Signal					
	0.32	0.08				
	0.04	0.08				
	0.27	0.00				
	0.44	0.34				
Summary Count	48	48				
Total Count	48	48				

LLCR Delta Count by Category						
mOhms Thermal	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$>5 \text{ & } \leq 10$	$>10 \text{ & } \leq 15$	$>15 \text{ & } \leq 50$	$>50 \text{ & } \leq 1000$	>1000
48	0	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Mating/Unmating Durability Group

- 1). A total of 48 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. $\leq +5.0$ 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

LLCR Measurement Summaries by Pin Type				
Date	10/19/2015	10/21/2015	10/26/2015	11/7/2015
	23	23	23	23
Room Temp (Deg C)	54	54	54	55
Rel Humidity (%)	Peter Chen	Peter Chen	Peter Chen	Peter Chen
Technician	Actual	Delta	Delta Therm Shck	Delta
mOhm values	Initial	100 Cycles		Humidity
Pin Type 1: Signal				
Average	0.34	0.05	0.05	0.05
St. Dev.	0.05	0.04	0.04	0.04
Min	0.28	0.00	0.00	0.00
Max	0.48	0.18	0.18	0.20
Summary Count	48	48	48	48
Total Count	48	48	48	48

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$> 5 \text{ & } \leq 10$	$> 10 \text{ & } \leq 15$	$> 15 \text{ & } \leq 50$	$> 50 \text{ & } \leq 1000$	> 1000
100 Cycles	48	0	0	0	0	0
Therm Shck	48	0	0	0	0	0
Humidity	48	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Gas Tight Group

- 1) A total of 48 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. $\leq +5.0$ 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

		LLCR Measurement Summaries by Pin Type		
mOhm values	Date	10/16/2015	10/23/2015	
	Room Temp (Deg C)	23	23	
	Rel Humidity (%)	54	54	
	Technician	Peter Chen	Peter Chen	
	Actual	Delta		Delta
	Initial	Acid Vapor		Delta
	Pin Type 1: Signal			
	Average	0.29	0.05	
	St. Dev.	0.03	0.04	
	Min	0.25	0.00	
	Max	0.40	0.19	
	Summary Count	48	48	
	Total Count	48	48	

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$>5 \text{ & } \leq 10$	$>10 \text{ & } \leq 15$	$>15 \text{ & } \leq 50$	$>50 \text{ & } \leq 1000$	>1000
Acid Vapor	48	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Shock & Vibration Group

- 1) A total of 48 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. $\leq +5.0$ 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

LLCR Measurement Summaries by Pin Type						
Date	1/29/2016		3/21/2016		Delta	Delta
	Room Temp (Deg C)	23	Rel Humidity (%)	32		
Technician	Aaron McKim	Aaron McKim				
mOhm values	Actual Initial	Delta Shock-Vib			Delta	Delta
Pin Type 1: Signal						
Average	0.31	0.11				
St. Dev.	0.03	0.13				
Min	0.26	0.00				
Max	0.37	0.64				
Summary Count	48	48				
Total Count	48	48				

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$>5 \text{ & } \leq 10$	$>10 \text{ & } \leq 15$	$>15 \text{ & } \leq 50$	$>50 \text{ & } \leq 1000$	>1000
Shock-Vib	48	0	0	0	0	0

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	60
Test Condition	C, 100g's, 6ms, Half-Sine
Shock Events	0
Test Condition	V-B, 7.56 rms g
Vibration Events	0
Total Events	0

DATA SUMMARIES Continued

LLCR Extended Life Group

- 1). A total of 48 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. $\leq +5.0$ 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

Group 1-Straight Mate

		LLCR Measurement Summaries by Pin Type			
		11/2/2015	11/3/2015	11/10/2015	11/20/2015
Date	Room Temp (Deg C)	23	23	23	23
	Rel Humidity (%)	54	54	56	56
Technician	mOhm values	Peter Chen	Peter Chen	Peter Chen	Peter Chen
	Actual	Delta 100 Cycles	Delta Therm Shck	Delta Humidity	
Average	Initial	0.32	0.06	0.04	0.06
	St. Dev.	0.04	0.04	0.04	0.05
Min	Min	0.25	0.01	0.00	0.00
	Max	0.45	0.15	0.22	0.19
Summary	Count	48	48	48	48
	Total Count	48	48	48	48

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$>5 \text{ & } \leq 10$	$>10 \text{ & } \leq 15$	$>15 \text{ & } \leq 50$	$>50 \text{ & } \leq 1000$	>1000
100 Cycles	48	0	0	0	0	0
Therm Shck	48	0	0	0	0	0
Humidity	48	0	0	0	0	0

DATA SUMMARIES Continued

Group 2-Perpendicular Mate

		LLCR Measurement Summaries by Pin Type			
		11/2/2015	11/3/2015	11/10/2015	11/20/2015
Date	Room Temp (Deg C)	23	23	23	23
	Rel Humidity (%)	54	54	56	56
	Technician	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	Actual	Delta		Delta	
	Initial	100 Cycles		Therm Shck	
Pin Type 1: Signal					
Average		0.37	0.09	0.06	0.08
St. Dev.		0.06	0.06	0.05	0.06
Min		0.29	0.00	0.00	0.01
Max		0.52	0.25	0.22	0.27
Summary Count		48	48	48	48
Total Count		48	48	48	48

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
100 Cycles	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
100 Cycles	48	0	0	0	0	0
Therm Shck	48	0	0	0	0	0
Humidity	48	0	0	0	0	0

Group 3-45° Up Mate

		LLCR Measurement Summaries by Pin Type			
		11/6/2015	11/9/2015	11/16/2015	11/25/2015
Date	Room Temp (Deg C)	23	23	23	23
	Rel Humidity (%)	54	56	56	54
	Technician	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	Actual	Delta		Delta	
	Initial	100 Cycles		Therm Shck	
Pin Type 1: Signal					
Average		0.30	0.04	0.03	0.13
St. Dev.		0.02	0.03	0.03	0.36
Min		0.26	0.00	0.00	0.00
Max		0.37	0.10	0.11	2.41
Summary Count		48	48	48	48
Total Count		48	48	48	48

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
100 Cycles	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
100 Cycles	48	0	0	0	0	0
Therm Shck	48	0	0	0	0	0
Humidity	48	0	0	0	0	0

DATA SUMMARIES Continued

Group 4-45° Down Mate

		LLCR Measurement Summaries by Pin Type			
		11/6/2015	11/9/2015	11/16/2015	11/25/2015
Date	Room Temp (Deg C)	23	23	23	23
Rel Humidity (%)		54	56	56	54
Technician	Peter Chen	Peter Chen	Peter Chen	Peter Chen	
mOhm values	Actual Initial	Delta 100 Cycles	Delta Therm Shck	Delta Humidity	
Pin Type 1: Signal					
Average	0.34	0.06	0.07	0.05	
St. Dev.	0.04	0.04	0.05	0.05	
Min	0.27	0.00	0.00	0.00	
Max	0.42	0.14	0.20	0.21	
Summary Count	48	48	48	48	
Total Count	48	48	48	48	

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
100 Cycles	48	0	0	0	0	0
Therm Shck	48	0	0	0	0	0
Humidity	48	0	0	0	0	0

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-TCT-01

Description: Normal force analyzer

Manufacturer: Mecmesin Multitester

Model: Mecmesin Multitester 2.5-i

Serial #: 08-1049-04

Accuracy: Last Cal: 4/26/2016, Next Cal: 4/25/2017

Equipment #: HZ-OV-01

Description: Oven

Manufacturer: Huida

Model: CS101-1E

Serial #: CS101-1E-B

Accuracy: Last Cal: 12/13/2015, Next Cal: 12/12/2016

Equipment #: HZ-THC-01

Description: Humidity transmitter

Manufacturer: Thermtron

Model: SM-8-8200

Serial #: 38846

Accuracy: Last Cal: 2/28/2016, Next Cal: 2/27/2017

Equipment #: HZ-TSC-01

Description: Vertical Thermal Shock Chamber

Manufacturer: Cincinnati Sub Zero

Model: VTS-3-6-6-SC/AC

Serial #: 10-VT14994

Accuracy: See Manual

... Last Cal: 06/28/2015, Next Cal: 06/27/2016

Equipment #: HZ-HPM-01

Description: NA9636H

Manufacturer: Ainuo

Model: 6031A

Serial #: 089601091

Accuracy: Last Cal: 3/7/2016, Next Cal: 3/6/2017

Equipment #: HZ-MO-05

Description: Micro-ohmmeter

Manufacturer: Keithley

Model: 3706

Serial #: 1285188

Accuracy: Last Cal: 11/15/2015, Next Cal: 11/14/2016

EQUIPMENT AND CALIBRATION SCHEDULES Continued

Equipment #: MO-04

Description: Multimeter /Data Acquisition System

Manufacturer: Keithley

Model: 2700

Serial #: 0798688

Accuracy: See Manual

... Last Cal: 04/30/2016, Next Cal: 04/30/2017

Equipment #: HZ-MO-01

Description: Micro-ohmmeter

Manufacturer: Keithley

Model: 2700

Serial #: 1199807

Accuracy: Last Cal: 04/28/2016, Next Cal: 04/28/2017

Equipment #: HZ-PS-01

Description: Power Supply

Manufacturer: Agilent

Model: 6031A

Serial #: MY41000982

Accuracy: Last Cal: 04/28/2016, Next Cal: 04/28/2017

Equipment #: SVC-01

Description: Shock & Vibration Table

Manufacturer: Data Physics

Model: LE-DSA-10-20K

Serial #: 10037

Accuracy: See Manual

... Last Cal: 11/31/2015, Next Cal: 11/31/2016

Equipment #: ACLM-01

Description: Accelerometer

Manufacturer: PCB Piezotronics

Model: 352C03

Serial #: 115819

Accuracy: See Manual

... Last Cal: 07/09/2015, Next Cal: 07/09/2016

Equipment #: ED-03

Description: Event Detector

Manufacturer: Analysis Tech

Model: 32EHD

Serial #: 1100604

Accuracy: See Manual

... Last Cal: 06/04/2015, Next Cal: 06/04/2016