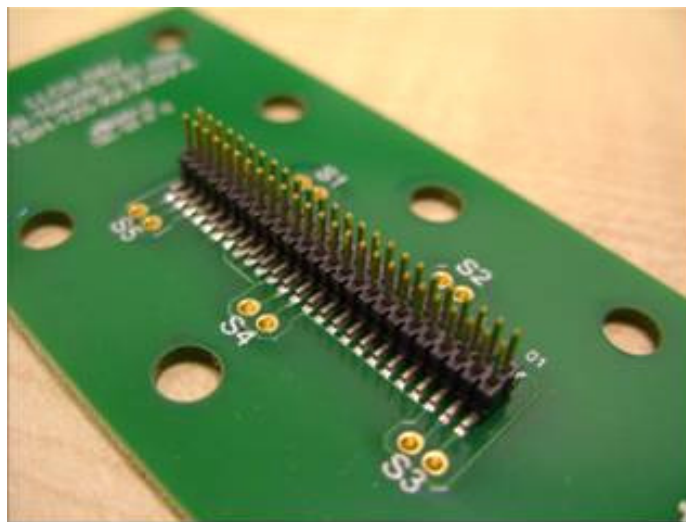
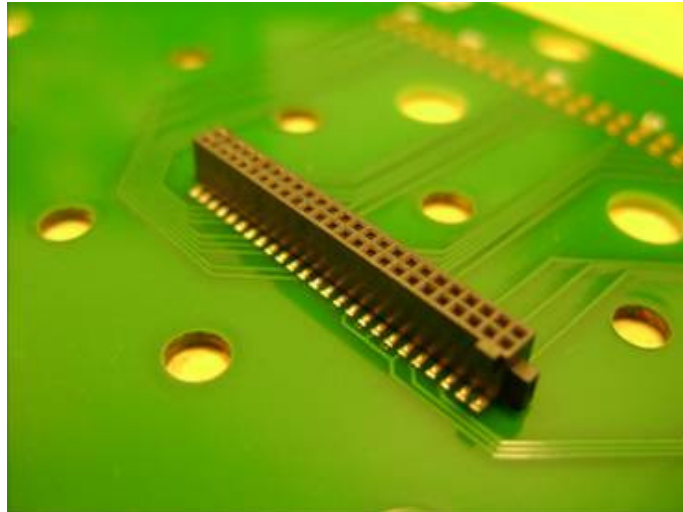




Project Number: Design Qualification Test Report	Tracking Code: 242469_Report_Rev_1
Requested by: Catie Eichhorn	Date: 07/19/2013
Part #: SFM-125-T2-L-D-A/FTSH-125-04-L-DV-A	Tech: Peter Chen
Part description: SFM/FTSH	Qty to test: 65
Test Start: 05/20/2013	Test Completed: 06/27/2013



## DESIGN QUALIFICATION TEST REPORT

**SFM/FTSH**  
**SFM-125-T2-L-D-A/FTSH-125-04-L-DV-A**

Tracking Code: 242469_Report_Rev_1	Part #: SFM-125-T2-L-D-A/FTSH-125-04-L-DV-A
Part description: SFM/FTSH	

**REVISION HISTORY**

<b>DATA</b>	<b>REV.NUM.</b>	<b>DESCRIPTION</b>	<b>ENG</b>
<b>07/9/2013</b>	<b>1</b>	<b>Initial Issue</b>	<b>PC</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.

All contents contained herein are the property of Samtec. No portion of this report, in part or in full shall be reproduced without prior written approval of Samtec.

## SCOPE

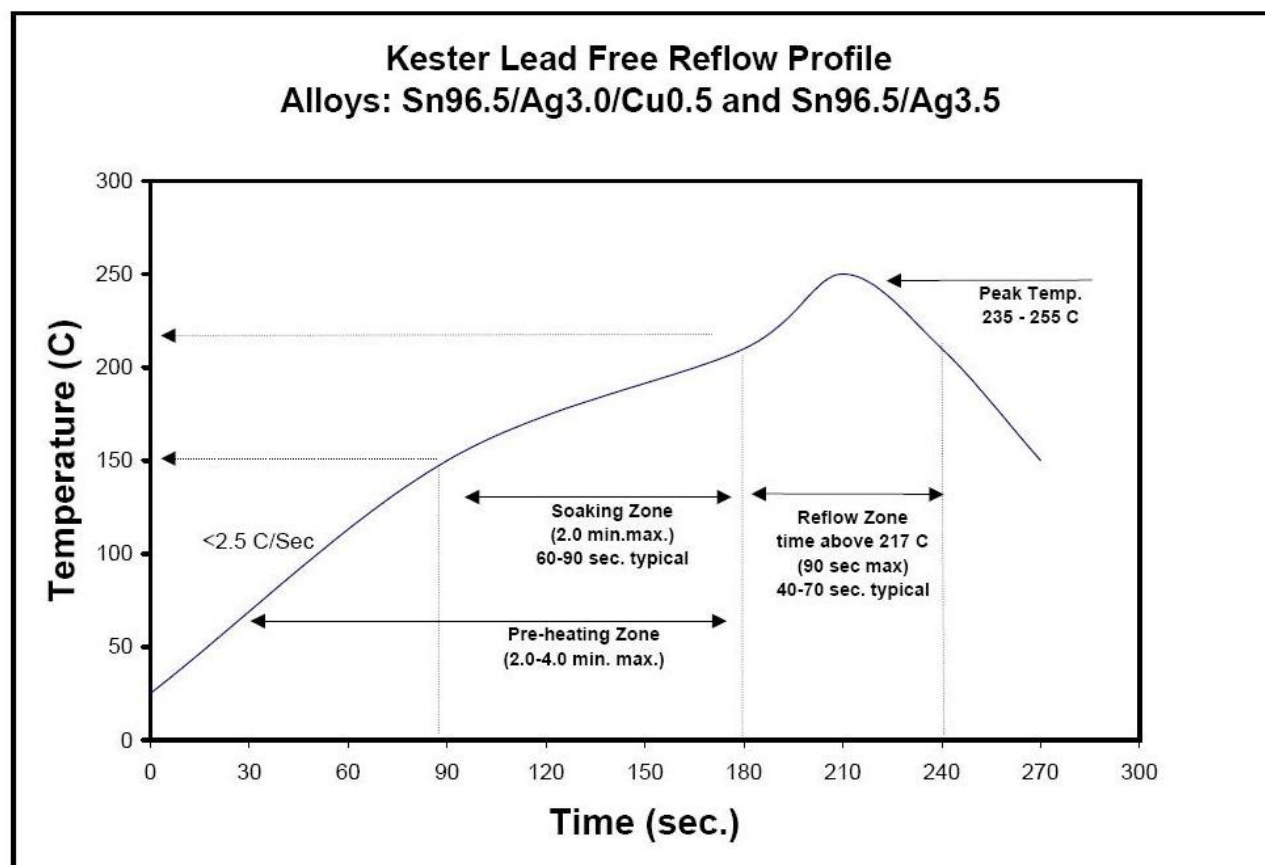
To perform the following tests: Design Qualification test. Please see test plan.

## 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) Re-Flow Time/Temp: See accompanying profile.
- 10) Samtec Test PCBs used: PCB-104288-TST

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

**FLOWCHARTS****Gas Tight**

TEST STEP	GROUP A1 8 Assemblies
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36A

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

**Normal Force**

TEST STEP	GROUP A1 Individual Contacts (8-10 min)	GROUP A2 Individual Contacts (8-10 min)
01	Contact Gaps	Contact Gaps
02	Setup Approved	Thermal Aging (Mated and Undisturbed)
03	Normal Force (in the body and soldered on PCB unless otherwise specified)	Contact Gaps
04		Setup Approved
05		Normal Force (in the body and soldered on PCB unless otherwise specified)

Thermal Aging = EIA-364-17, Test Condition 4 (105°C)

Time Condition 'B' (250 Hours)

Normal Force = EIA-364-04

(Perpendicular) Displacement Force = 12.7 mm/min  $\pm$  6 mm/min

Spec is 50 N @ 1 mm displacement

Contact Gaps / Height - No standard method. Usually measured optically

Gaps to be taken on a minimum of 20% of each part tested

**FLOWCHARTS Continued****Thermal Aging**

TEST STEP	GROUP A1 8 Assemblies Thermal Aging (Mated)
01	Contact Gaps
02	Forces - Mating / Unmating
03	LLCR-1
04	Thermal Aging (Mated and Undisturbed)
05	LLCR-2
06	Forces - Mating / Unmating
07	Contact Gaps

Thermal Aging = EIA-364-17, Test Condition 4 (105°C)

Time Condition 'B' (250 Hours)

Mating / Unmating Forces = EIA-364-13

Contact Gaps / Height - No standard method. Usually measured optically.

Gaps to be taken on a minimum of 20% of each part tested

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

**FLOWCHARTS Continued****Durability/Mating/Unmating/Gaps**

TEST STEP	GROUP B1 8 Boards (largest position submitted)	GROUP B2 8 Boards (middle position submitted)	GROUP B3 8 Boards (smallest position submitted)
01	Contact Gaps	Contact Gaps	Contact Gaps
02	LLCR-1	Forces - Mating / Unmating	Forces - Mating / Unmating
03	Forces - Mating / Unmating	25 Cycles	25 Cycles
04	25 Cycles	Forces - Mating / Unmating	Forces - Mating / Unmating
05	Forces - Mating / Unmating	25 Cycles (50 Total)	25 Cycles (50 Total)
06	25 Cycles (50 Total)	Forces - Mating / Unmating	Forces - Mating / Unmating
07	Forces - Mating / Unmating	25 Cycles (75 Total)	25 Cycles (75 Total)
08	25 Cycles (75 Total)	Forces - Mating / Unmating	Forces - Mating / Unmating
09	Forces - Mating / Unmating	25 Cycles (100 Total)	25 Cycles (100 Total)
10	25 Cycles (100 Total)	Forces - Mating / Unmating	Forces - Mating / Unmating
11	Forces - Mating / Unmating		
12	Clean w/Compressed Air		
13	Contact Gaps		
14	LLCR-2		
15	Thermal Shock (Mated and Undisturbed)		
16	LLCR-3		
17	Cyclic Humidity (Mated and Undisturbed)		
18	LLCR-4		
19	Forces - Mating / Unmating		

**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

**Mating / Unmating Forces = EIA-364-13**

**Contact Gaps / Height - No standard method. Usually measured optically.**

Gaps to be taken on a minimum of 20% of each part tested

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

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

**FLOWCHARTS Continued****IR & DWV**

TEST STEP	GROUP A1 2 Mated Sets  Break Down Pin-to-Pin	GROUP A2 2 Unmated of Part # Being Tested Break Down Pin-to-Pin	GROUP A3 2 Unmated of Mating Part #  Break Down Pin-to-Pin	GROUP B1 2 Mated Sets  Pin-to-Pin
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

TEST STEP	GROUP C1 2 Mated Sets  Break Down Row-to-Row	GROUP C2 2 Unmated of Part # Being Tested Break Down Row-to-Row	GROUP C3 2 Unmated of Mating Part #  Break Down Row-to-Row	GROUP D1 2 Mated Sets  Row-to-Row
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

DWV on Group B1 to be performed at Test Voltage

DWV test voltage is equal to 75% of the lowest break down voltage from Groups A1, A2 or A3

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

IR = EIA-364-21

DWV = EIA-364-20, Test Condition 1



**FLOWCHARTS Continued****Current Carrying Capacity - Double Row**

TEST STEP	GROUP B1 3 Mated Assemblies 2 Contacts Powered	GROUP B2 3 Mated Assemblies 4 Contacts Powered	GROUP B3 3 Mated Assemblies 6 Contacts Powered	GROUP B4 3 Mated Assemblies 8 Contacts Powered	GROUP B5 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC	CCC

(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

CCC, Temp rise = EIA-364-70

**Mechanical Shock / Vibration / LLCR**

TEST STEP	GROUP A1 8 Assemblies
01	LLCR-1
02	Shock
03	Vibration
04	LLCR-2

Mechanical Shock = EIA 364-27 Half Sine,

100 g's, 6 milliSeconds (Condition "C") each axis

Vibration = EIA 364-28, Random Vibration

7.56 g RMS, Condition VB --- 2 hours/axis

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

**Shock / Vibration / nanoSecond Event Detection**

TEST STEP	GROUP A1 60 Points
01	Event Detection, Shock
02	Event Detection, Vibration

Mechanical Shock = EIA 364-27 Half Sine,

100 g's, 6 milliSeconds (Condition "C") each axis

Vibration = EIA 364-28, Random Vibration

7.56 g RMS, Condition VB --- 2 hours/axis

Event detection requirement during Shock / Vibration is 50 nanoseconds minimum

## 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 G<sup>2</sup> / 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.

**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° 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.  $\leq +5.0$  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 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  $50^{\circ}$  C
    - ix. The final LLCR shall be conducted within 1 hour after drying.

**NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):**

- 1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
- 2) The contacts shall be tested in the loose state, *not* inserted in connector housing.
- 3) The contacts shall be prepared to allow access to the spring member at the same attitude and deflection level as would occur in actual use.
- 4) In the event that portions of the contact prevent insertion of the test probe and/or deflection of the spring member under evaluation, said material shall be removed leaving the appropriate contact surfaces exposed.
- 5) In the case of multi-tine contacts, each tine shall be tested independently on separate samples as required.
- 6) The connector housing shall be simulated, if required, in order to provide an accurate representation of the actual contact system performance.
- 7) A holding fixture shall be fashioned to allow the contact to be properly deflected.
- 8) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC<sup>2</sup>, computer controlled test stand with a deflection measurement system accuracy of  $5\text{ }\mu\text{m}$  ( $0.0002''$ ).
- 9) The probe shall be attached to a Dillon P/N 49761-0105, 5 N (1.1 Lb) load cell providing an accuracy of  $\pm 0.2\%$ .

**ATTRIBUTE DEFINITIONS Continued**

The following is a brief, simplified description of attributes

- 10) The nominal deflection rate shall be 5 mm (0.2")/minute.
- 11) Unless otherwise noted a minimum of five contacts shall be tested.
- 12) The force/deflection characteristic to load and unload each contact shall be repeated five times.
- 13) The system shall utilize the TC<sup>2</sup> software in order to acquire and record the test data.
- 14) The permanent set of each contact shall be measured within the TC<sup>2</sup> software.
- 15) 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.

**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 1000 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-----3.1A per contact with 2 adjacent contacts powered
- CCC for a 30°C Temperature Rise-----2.2A per contact with 4 adjacent contacts powered
- CCC for a 30°C Temperature Rise-----1.9A per contact with 6 adjacent contacts powered
- CCC for a 30°C Temperature Rise-----1.6A per contact with 8 adjacent contacts powered
- CCC for a 30°C Temperature Rise-----0.9A per contact with all adjacent contacts powered

**Mating – Unmating Forces**

Thermal Aging Group (SFM-125-T2-L-D-A/FTSH-125-04-L-DV-A)

- Initial
  - Mating
    - Min ----- 9.40 Lbs
    - Max-----11.78 Lbs
  - Unmating
    - Min ----- 8.96 Lbs
    - Max-----10.95 Lbs
- After Thermal
  - Mating
    - Min ----- 6.14 Lbs
    - Max----- 7.66 Lbs
  - Unmating
    - Min ----- 6.42 Lbs
    - Max----- 7.32 Lbs

**RESULTS Continued****Mating – Unmating Forces****Mating-Unmating Durability Gaps Group (SFM-125-T2-L-D-A/FTSH-125-04-L-DV-A)**

- **Initial**
  - **Mating**
    - **Min** ----- 7.63 Lbs
    - **Max** ----- 9.25 Lbs
  - **Unmating**
    - **Min** ----- 7.08 Lbs
    - **Max** ----- 9.35 Lbs
- **After 25 Cycles**
  - **Mating**
    - **Min** ----- 9.13 Lbs
    - **Max** ----- 11.73 Lbs
  - **Unmating**
    - **Min** ----- 8.02 Lbs
    - **Max** ----- 10.58 Lbs
- **After 50 Cycles**
  - **Mating**
    - **Min** ----- 10.02 Lbs
    - **Max** ----- 12.76 Lbs
  - **Unmating**
    - **Min** ----- 8.78 Lbs
    - **Max** ----- 11.40 Lbs
- **After 75 Cycles**
  - **Mating**
    - **Min** ----- 11.03 Lbs
    - **Max** ----- 13.28 Lbs
  - **Unmating**
    - **Min** ----- 9.22 Lbs
    - **Max** ----- 12.05 Lbs
- **After 100 Cycles**
  - **Mating**
    - **Min** ----- 11.58 Lbs
    - **Max** ----- 13.64 Lbs
  - **Unmating**
    - **Min** ----- 10.87 Lbs
    - **Max** ----- 12.48 Lbs
- **Humidity**
  - **Mating**
    - **Min** ----- 7.40 Lbs
    - **Max** ----- 9.75 Lbs
  - **Unmating**
    - **Min** ----- 8.94 Lbs
    - **Max** ----- 11.83 Lbs

**RESULTS Continued****Mating – Unmating Forces****Mating-Unmating Basic (SFM-150-T2-L-D-A/FTSH-150-04-L-DV-A)**

- **Initial**
  - **Mating**
    - **Min** -----16.96 Lbs
    - **Max** -----24.25 Lbs
  - **Unmating**
    - **Min** -----20.33 Lbs
    - **Max** -----30.02 Lbs
- **After 25 Cycles**
  - **Mating**
    - **Min** -----21.17 Lbs
    - **Max** -----27.75 Lbs
  - **Unmating**
    - **Min** -----19.70 Lbs
    - **Max** -----26.13 Lbs
- **After 50 Cycles**
  - **Mating**
    - **Min** -----25.15 Lbs
    - **Max** -----29.12 Lbs
  - **Unmating**
    - **Min** -----23.45 Lbs
    - **Max** -----28.24 Lbs
- **After 75 Cycles**
  - **Mating**
    - **Min** -----26.83 Lbs
    - **Max** -----31.21 Lbs
  - **Unmating**
    - **Min** -----25.12 Lbs
    - **Max** -----29.43 Lbs
- **After 100 Cycles**
  - **Mating**
    - **Min** -----27.79 Lbs
    - **Max** -----33.75 Lbs
  - **Unmating**
    - **Min** -----26.47 Lbs
    - **Max** -----31.56 Lbs



**RESULTS Continued****Mating – Unmating Forces****Mating-Unmating Basic (SFM-105-T2-L-D-A/FTSH-105-04-L-DV-A)**

- **Initial**
  - **Mating**
    - Min ----- 1.51 Lbs
    - Max ----- 1.95 Lbs
  - **Unmating**
    - Min ----- 1.19 Lbs
    - Max ----- 2.16 Lbs
- **After 25 Cycles**
  - **Mating**
    - Min ----- 1.67 Lbs
    - Max ----- 2.28 Lbs
  - **Unmating**
    - Min ----- 1.56 Lbs
    - Max ----- 2.31 Lbs
- **After 50 Cycles**
  - **Mating**
    - Min ----- 1.98 Lbs
    - Max ----- 2.45 Lbs
  - **Unmating**
    - Min ----- 1.87 Lbs
    - Max ----- 2.34 Lbs
- **After 75 Cycles**
  - **Mating**
    - Min ----- 2.10 Lbs
    - Max ----- 2.96 Lbs
  - **Unmating**
    - Min ----- 2.03 Lbs
    - Max ----- 2.51 Lbs
- **After 100 Cycles**
  - **Mating**
    - Min ----- 2.10 Lbs
    - Max ----- 2.82 Lbs
  - **Unmating**
    - Min ----- 2.13 Lbs
    - Max ----- 2.67 Lbs

**Normal Force at 0.0042 inch deflection**

- **Initial**
  - Min ----- 79.20 gf      Set ----- 0.0001 in
  - Max ----- 101.70 gf      Set ----- 0.0002 in
- **Thermal**
  - Min ----- 66.40 gf      Set ----- 0.0006 in
  - Max ----- 80.20 gf      Set ----- 0.0019 in

**RESULTS Continued****Insulation Resistance minimums, IR****Pin to Pin**

- **Initial**
  - Mated -----10000Meg  $\Omega$  ----- Passed
  - Unmated -----10000Meg  $\Omega$  ----- Passed
- **Thermal Shock**
  - Mated -----10000Meg  $\Omega$  ----- Passed
  - Unmated -----10000Meg  $\Omega$  ----- Passed
- **Humidity**
  - Mated ----- 7000Meg  $\Omega$  ----- Passed
  - Unmated ----- 9000Meg  $\Omega$  ----- Passed

**Row to Row**

- **Initial**
  - Mated -----10000Meg  $\Omega$  ----- Passed
  - Unmated -----10000Meg  $\Omega$  ----- Passed
- **Thermal Shock**
  - Mated -----10000Meg  $\Omega$  ----- Passed
  - Unmated -----10000Meg  $\Omega$  ----- Passed
- **Humidity**
  - Mated -----10000Meg  $\Omega$  ----- Passed
  - Unmated -----10000Meg  $\Omega$  ----- Passed

**Dielectric Withstanding Voltage minimums, DWV**

- **Minimums**
  - Breakdown Voltage -----875 VAC
  - Test Voltage -----657 VAC
  - Working Voltage -----219 VAC

**Pin to Pin**

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

**Row to Row**

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

**RESULTS Continued****LLCR Thermal Aging Group (192 LLCR test points)**

- Initial ----- 13.06 mOhms Max
- Thermal
  - <= +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

**LLCR Mating/Unmating Durability Group (192 LLCR test points)**

- Initial ----- 12.17 mOhms Max
- Durability, 30 Cycles
  - <= +5.0 mOhms ----- 190 Points ----- Stable
  - +5.1 to +10.0 mOhms ----- 2 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 ----- 188 Points ----- Stable
  - +5.1 to +10.0 mOhms ----- 4 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 ----- 184 Points ----- Stable
  - +5.1 to +10.0 mOhms ----- 8 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 (192 LLCR test points)**

- Initial ----- 12.41 mOhms Max
- Gas-Tight
  - <= +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

**RESULTS Continued**

**LLCR Shock & Vibration Group (192 LLCR test points)**

- Initial ----- 14.30 mOhms Max
- Shock & Vibration
  - <= +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

**Mechanical Shock & Random Vibration:**

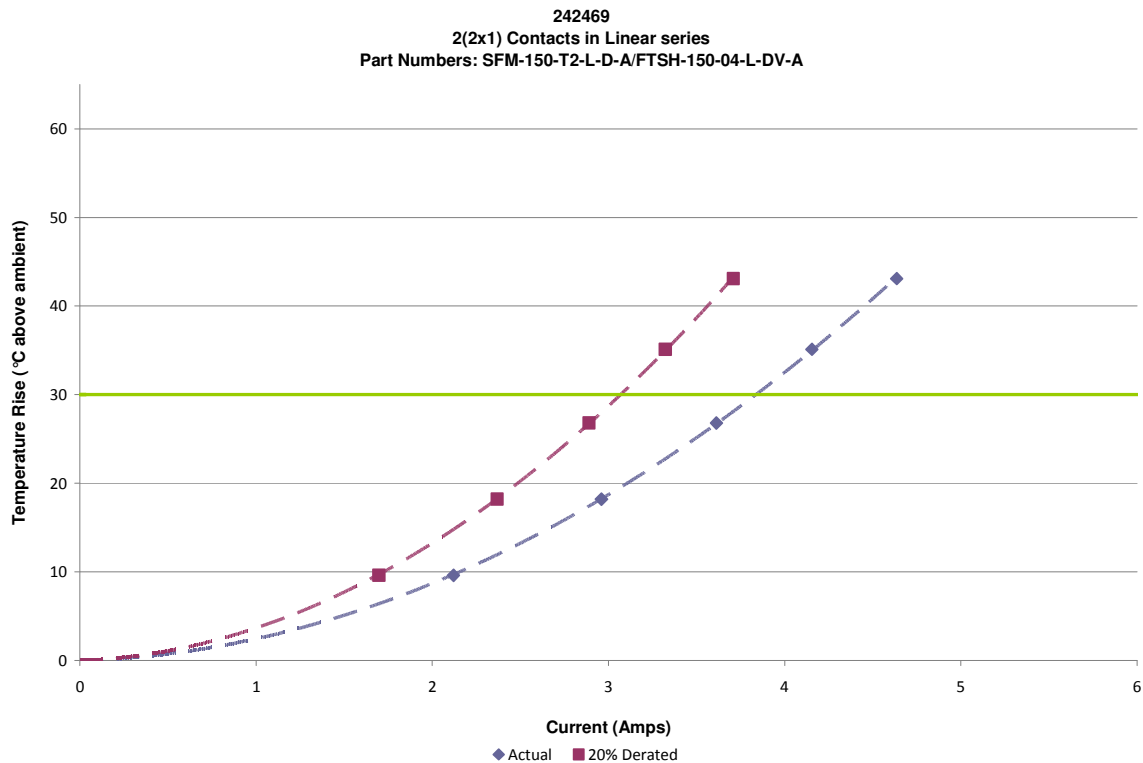
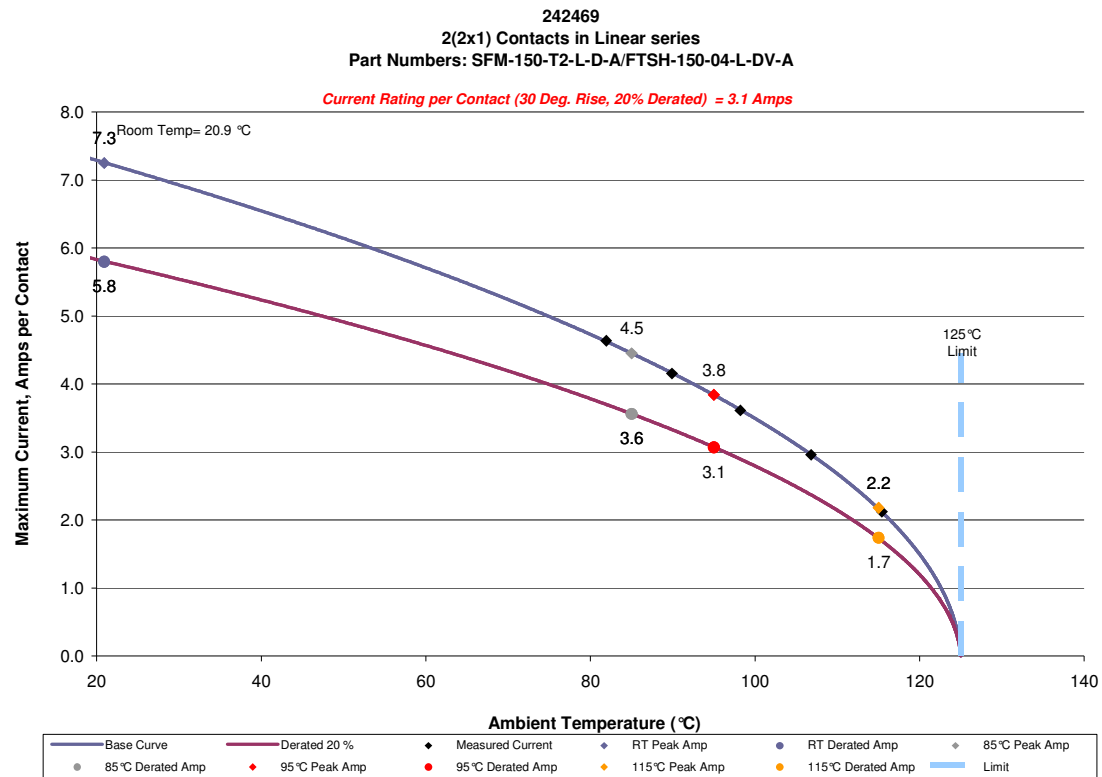
- Shock
  - No Damage----- Pass
  - 50 Nanoseconds----- Pass
- Vibration
  - No Damage----- Pass
  - 50 Nanoseconds----- Pass

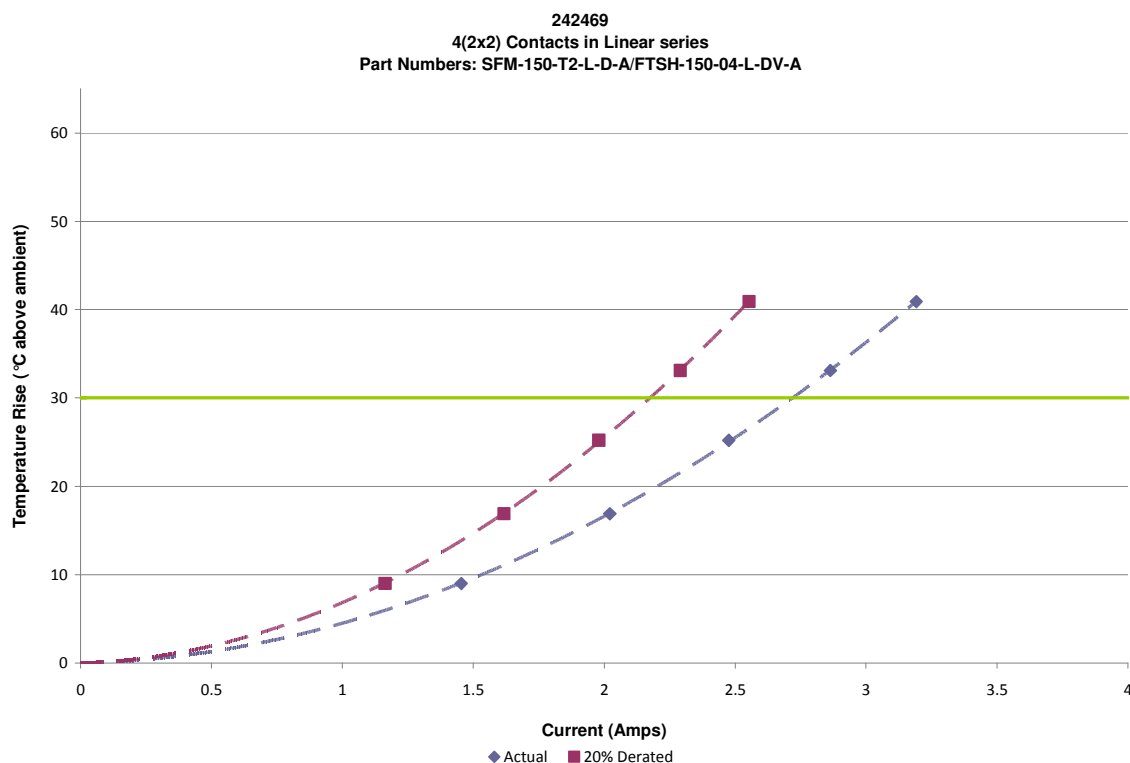
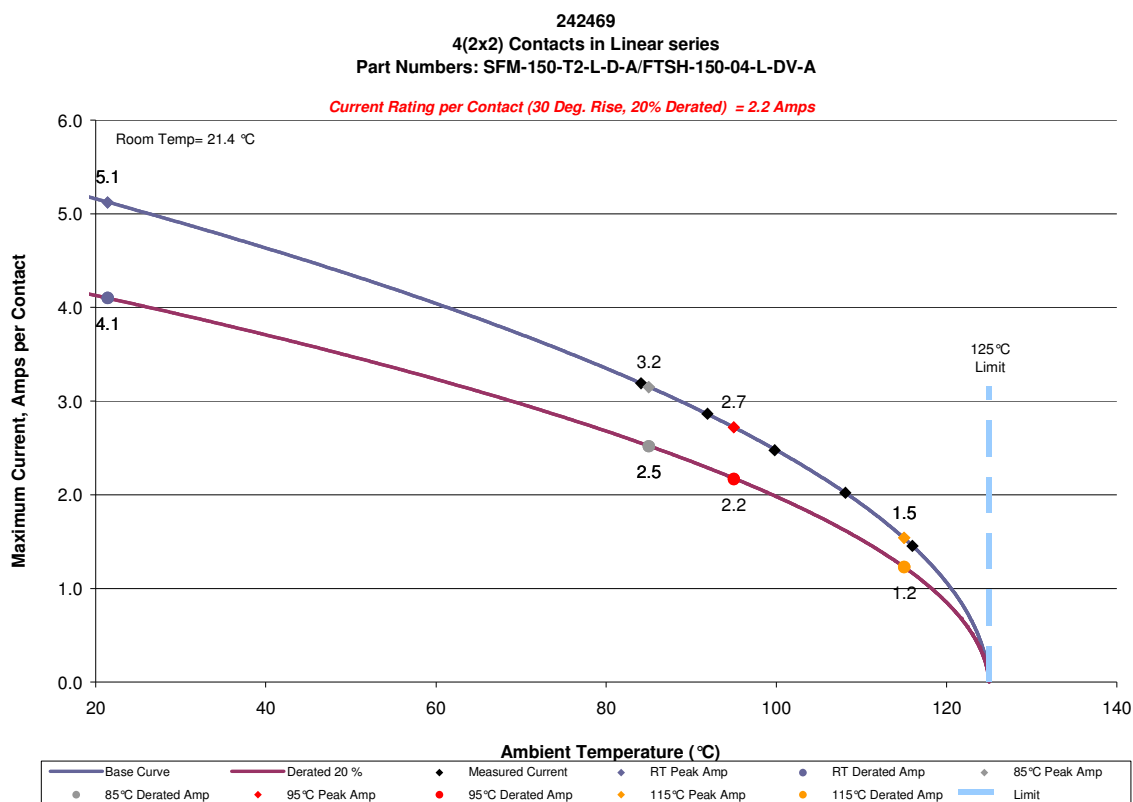
Tracking Code: 242469_Report_Rev_1	Part #: SFM-125-T2-L-D-A/FTSH-125-04-L-DV-A
Part description: SFM/FTSH	

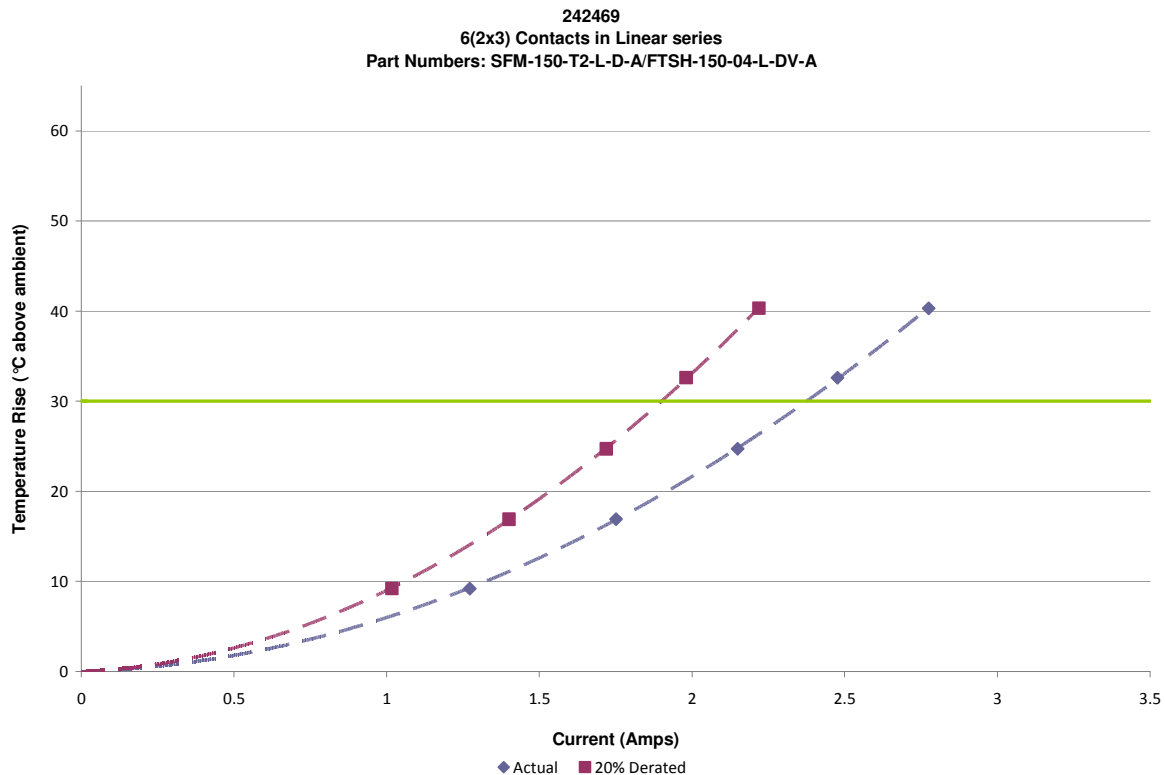
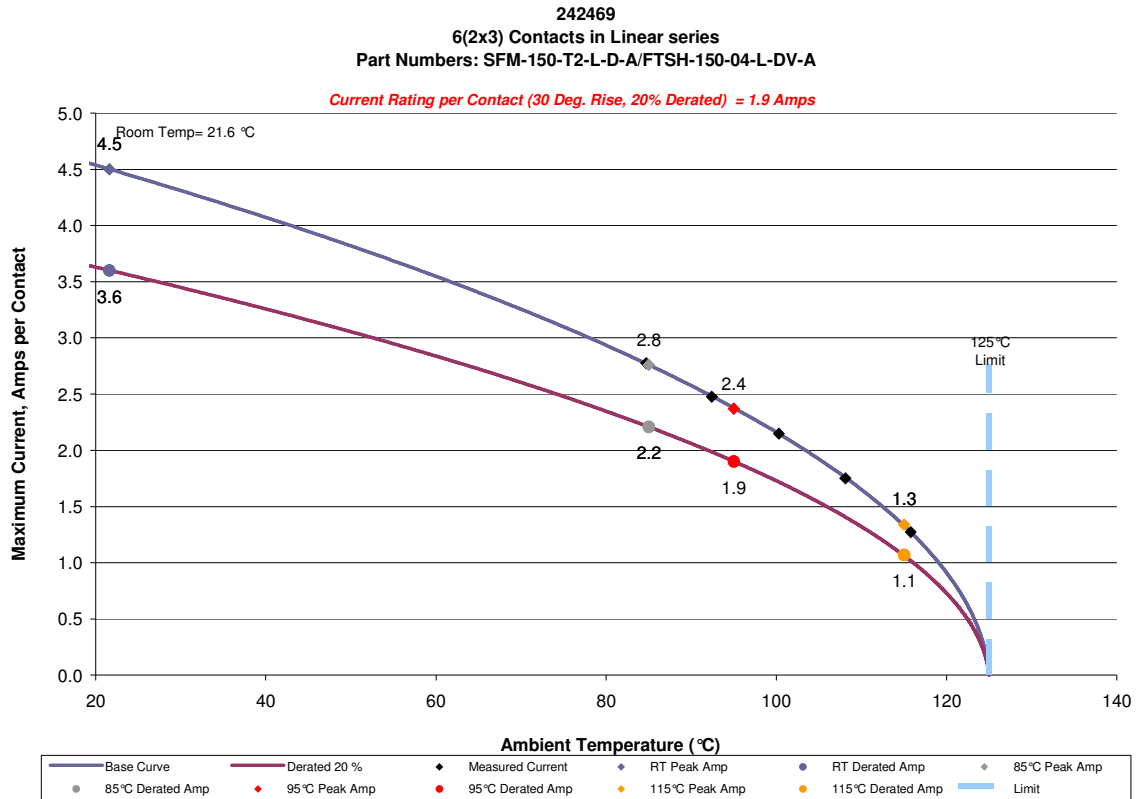
## DATA SUMMARIES

### 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:

**DATA SUMMARIES Continued****a. Linear configuration with 2 adjacent conductors/contacts powered**

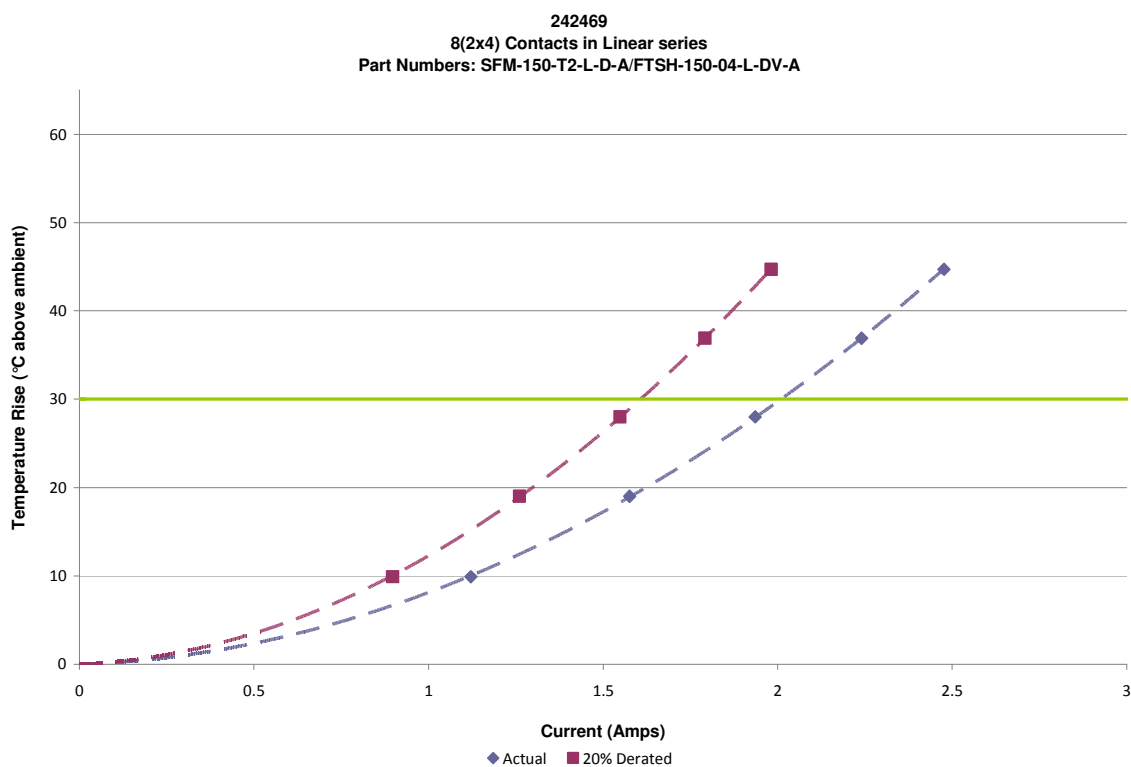
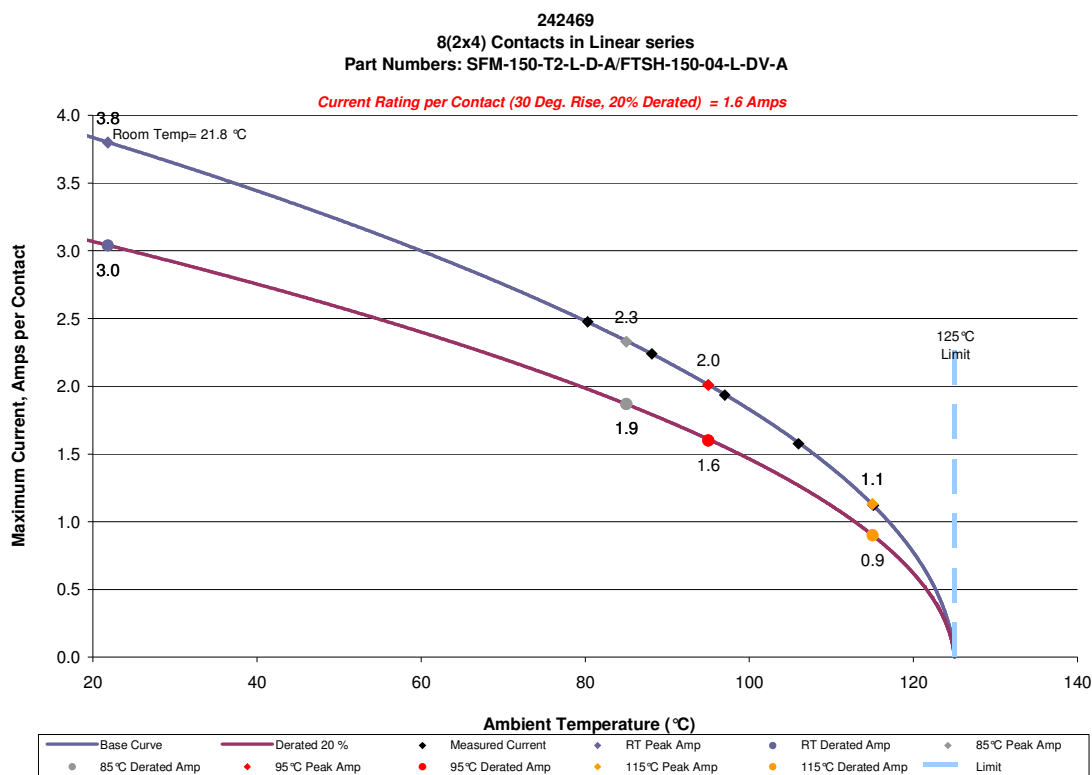
**DATA SUMMARIES Continued****b. Linear configuration with 4 adjacent conductors/contacts powered**

**DATA SUMMARIES Continued****c. Linear configuration with 6 adjacent conductors/contacts powered**



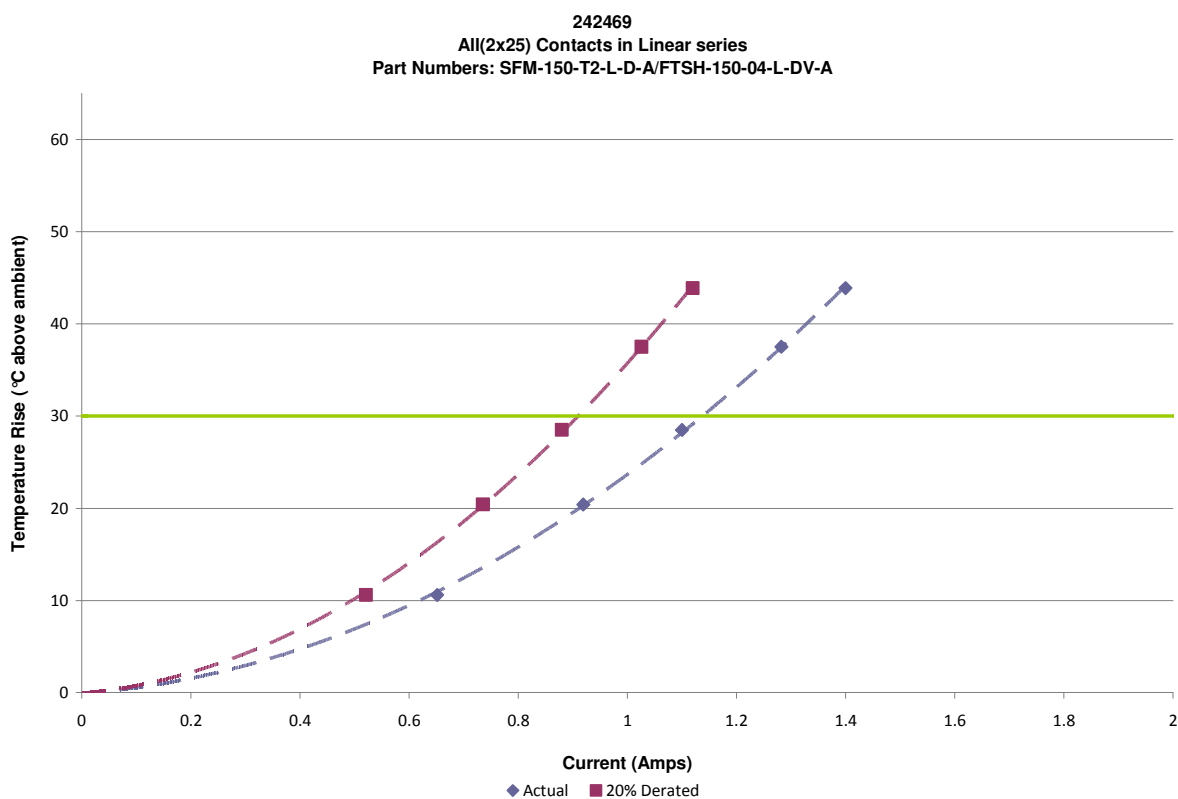
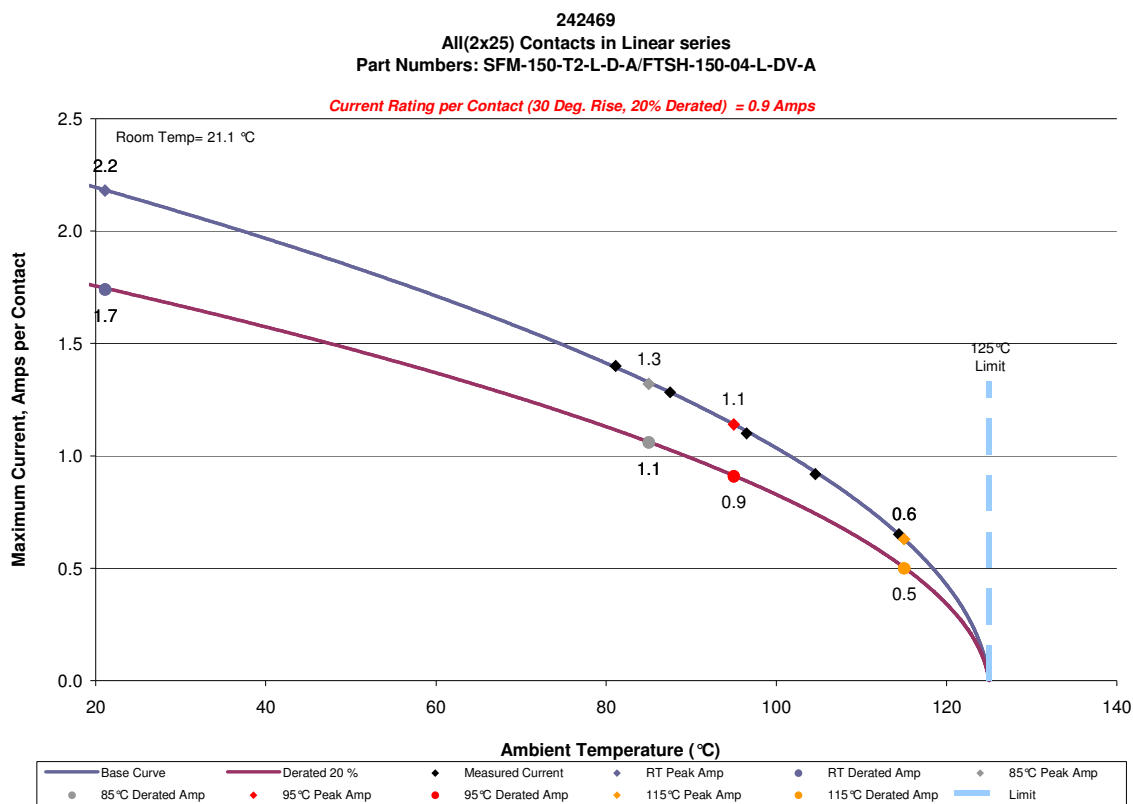
## DATA SUMMARIES Continued

d. Linear configuration with 8 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 (SFM-125-T2-L-D-A/FTSH-125-04-L-DV-A)**

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	41.81	9.40	39.85	8.96	27.31	6.14	28.56	6.42
Maximum	52.40	11.78	48.71	10.95	34.07	7.66	32.56	7.32
<b>Average</b>	46.24	<b>10.40</b>	46.37	<b>10.43</b>	30.59	<b>6.88</b>	30.82	<b>6.93</b>
St Dev	3.30	0.74	3.27	0.74	2.12	0.48	1.34	0.30
Count	8	8	8	8	8	8	8	8

**Mating-Unmating Durability Gaps Group (SFM-125-T2-L-D-A/FTSH-125-04-L-DV-A)**

	Initial				After 25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	33.94	7.63	31.49	7.08	40.61	9.13	35.67	8.02
Maximum	41.14	9.25	41.59	9.35	52.18	11.73	47.06	10.58
<b>Average</b>	37.84	<b>8.51</b>	36.64	<b>8.24</b>	47.82	<b>10.75</b>	42.37	<b>9.53</b>
St Dev	2.98	0.67	3.51	0.79	3.63	0.82	3.77	0.85
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	44.57	10.02	39.05	8.78	49.06	11.03	41.01	9.22
Maximum	56.76	12.76	50.71	11.40	59.07	13.28	53.60	12.05
<b>Average</b>	52.51	<b>11.81</b>	45.83	<b>10.30</b>	55.76	<b>12.54</b>	48.69	<b>10.95</b>
St Dev	3.71	0.83	3.74	0.84	3.37	0.76	3.73	0.84
Count	8	8	8	8	8	8	8	8

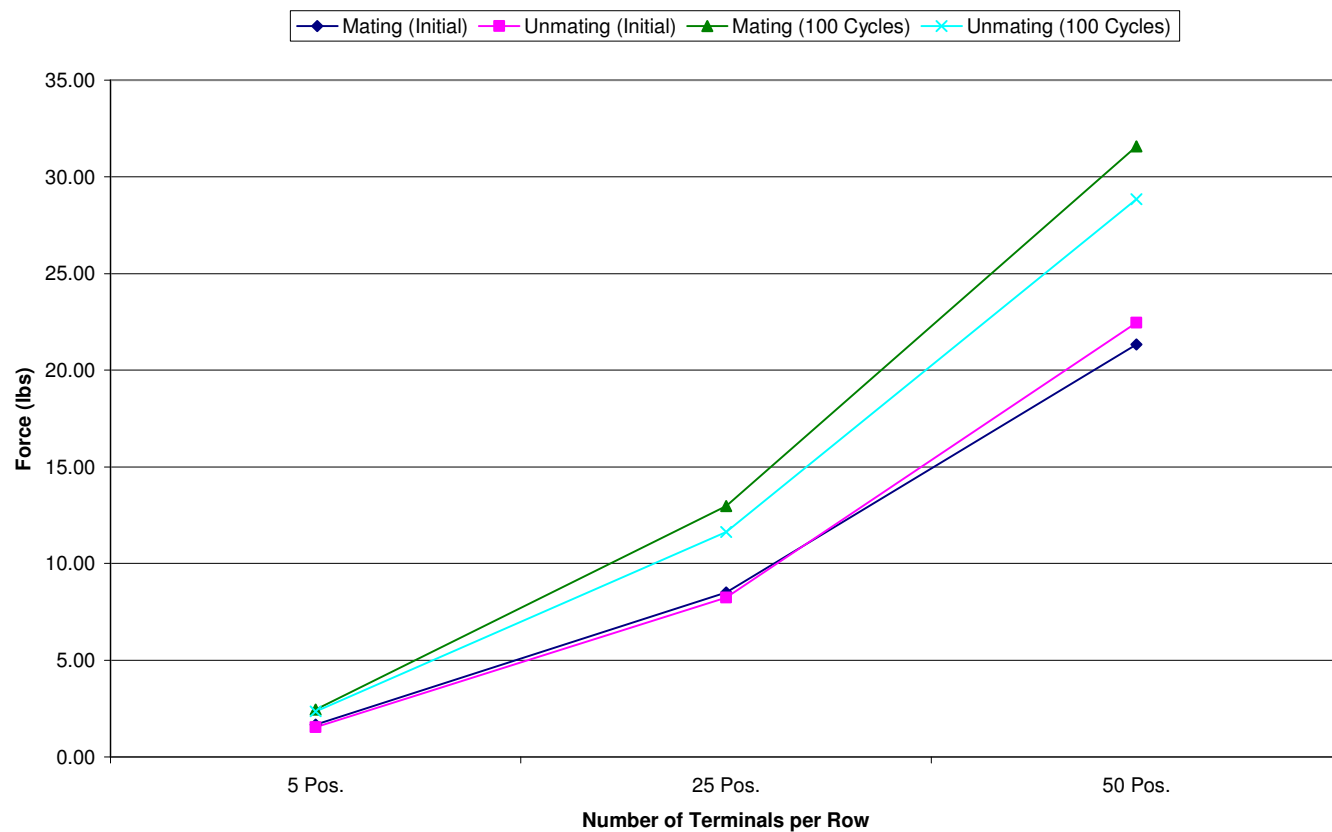
	After 100 Cycles				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	51.51	11.58	48.35	10.87	32.92	7.40	39.77	8.94
Maximum	60.67	13.64	55.51	12.48	43.37	9.75	52.62	11.83
<b>Average</b>	57.67	<b>12.97</b>	51.79	<b>11.64</b>	37.11	<b>8.34</b>	44.50	<b>10.01</b>
St Dev	3.00	0.67	2.14	0.48	3.48	0.78	4.51	1.01
Count	8	8	8	8	8	8	8	8

**DATA SUMMARIES Continued****Mating-Unmating Basic (SFM-150-T2-L-D-A/FTSH-150-04-L-DV-A)**

	Initial				After 25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	75.44	16.96	90.43	20.33	94.16	21.17	87.63	19.70
Maximum	107.86	24.25	133.53	30.02	123.43	27.75	116.23	26.13
<b>Average</b>	<b>94.93</b>	<b>21.34</b>	<b>99.91</b>	<b>22.46</b>	<b>108.59</b>	<b>24.41</b>	<b>103.04</b>	<b>23.17</b>
St Dev	11.57	2.60	14.35	3.23	9.46	2.13	8.49	1.91
Count	8	8	8	8	8	8	8	8
	After 50 Cycles				After 75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	111.87	25.15	104.31	23.45	119.34	26.83	111.73	25.12
Maximum	129.53	29.12	125.61	28.24	138.82	31.21	130.90	29.43
<b>Average</b>	<b>120.46</b>	<b>27.08</b>	<b>114.59</b>	<b>25.76</b>	<b>130.39</b>	<b>29.31</b>	<b>122.00</b>	<b>27.43</b>
St Dev	5.65	1.27	8.56	1.92	8.14	1.83	7.84	1.76
Count	8	8	8	8	8	8	8	8
	After 100 Cycles							
	Mating		Unmating					
	Newtons	Force (Lbs)	Newtons	Force (Lbs)				
Minimum	123.61	27.79	117.74	26.47				
Maximum	150.12	33.75	140.38	31.56				
<b>Average</b>	<b>140.45</b>	<b>31.58</b>	<b>128.29</b>	<b>28.84</b>				
St Dev	10.59	2.38	8.90	2.00				
Count	8	8	8	8				

**DATA SUMMARIES Continued****Mating-Unmating Basic (SFM-105-T2-L-D-A/FTSH-105-04-L-DV-A)**

	Initial				After 25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	6.72	1.51	5.29	1.19	7.43	1.67	6.94	1.56
Maximum	8.67	1.95	9.61	2.16	10.14	2.28	10.27	2.31
<b>Average</b>	<b>7.46</b>	<b>1.68</b>	<b>6.83</b>	<b>1.54</b>	<b>8.80</b>	<b>1.98</b>	<b>8.21</b>	<b>1.85</b>
St Dev	0.72	0.16	1.30	0.29	0.97	0.22	1.10	0.25
Count	8	8	8	8	8	8	8	8
	After 50 Cycles				After 75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	8.81	1.98	8.32	1.87	9.34	2.10	9.03	2.03
Maximum	10.90	2.45	10.41	2.34	13.17	2.96	11.16	2.51
<b>Average</b>	<b>9.75</b>	<b>2.19</b>	<b>9.18</b>	<b>2.06</b>	<b>10.84</b>	<b>2.44</b>	<b>9.99</b>	<b>2.25</b>
St Dev	0.71	0.16	0.80	0.18	1.31	0.30	0.87	0.20
Count	8	8	8	8	8	8	8	8
	After 100 Cycles							
	Mating		Unmating					
	Newtons	Force (Lbs)	Newtons	Force (Lbs)				
Minimum	9.34	2.10	9.47	2.13				
Maximum	12.54	2.82	11.88	2.67				
<b>Average</b>	<b>10.85</b>	<b>2.44</b>	<b>10.47</b>	<b>2.35</b>				
St Dev	1.08	0.24	0.95	0.21				
Count	8	8	8	8				

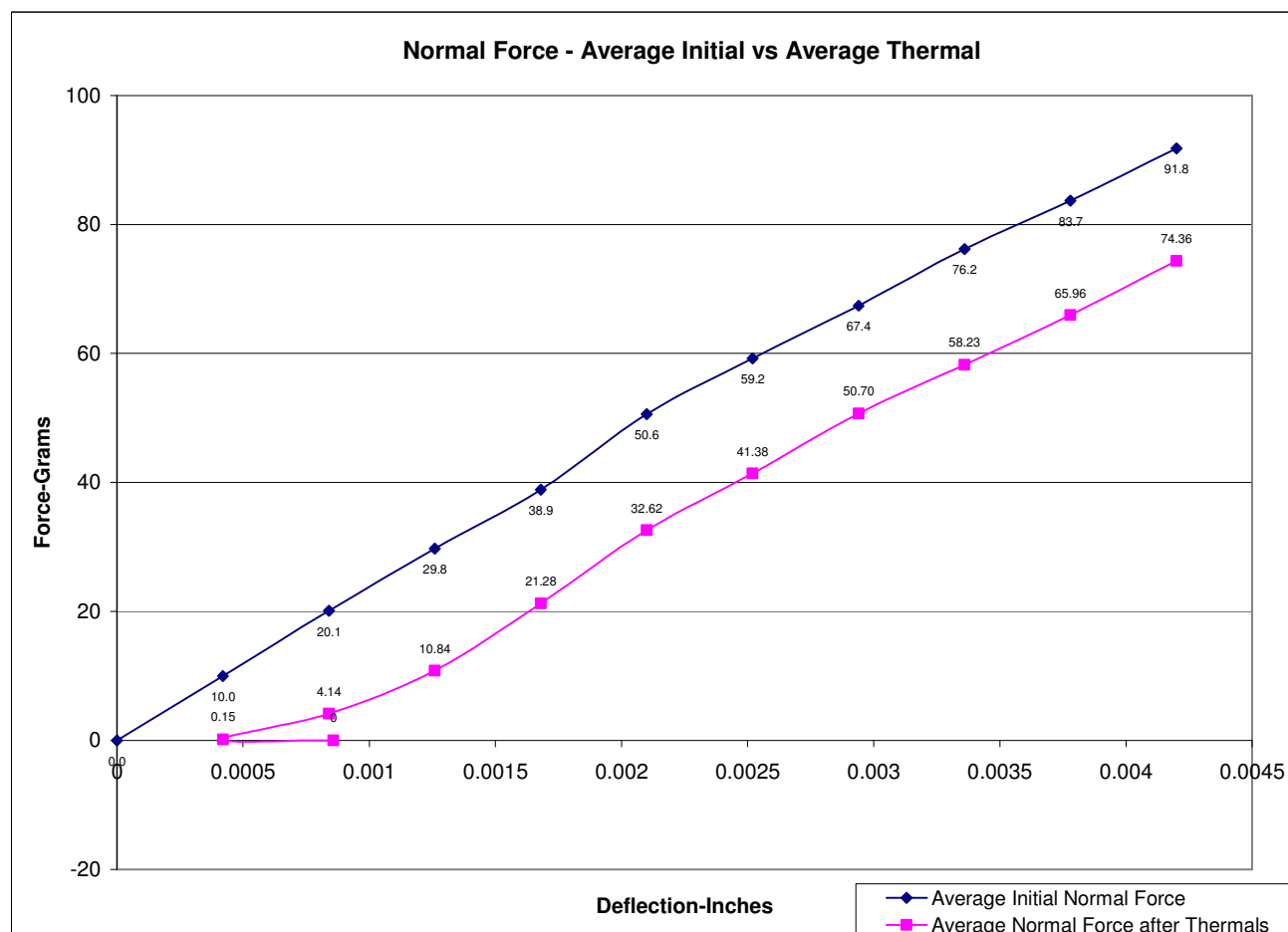
**DATA SUMMARIES Continued****Mating\Unmating Force Comparison****Mating/Unmating Data for 5, 25 and 50 Position SFM/FTSH**

**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										
	<u>0.0004</u>	<u>0.0008</u>	<u>0.0013</u>	<u>0.0017</u>	<u>0.0021</u>	<u>0.0025</u>	<u>0.0029</u>	<u>0.0034</u>	<u>0.0038</u>	<u>0.0042</u>	<u>SET</u>
Averages	9.98	20.09	29.76	38.86	50.58	59.23	67.39	76.20	83.66	91.78	0.0005
Min	7.60	15.80	22.90	31.10	43.90	51.20	59.70	67.60	74.00	79.20	0.0002
Max	15.60	27.60	38.30	47.90	59.90	68.30	76.30	84.30	93.00	101.70	0.0011
St. Dev	2.671	3.695	5.471	5.758	5.994	6.145	5.915	6.501	6.375	6.878	0.0003
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflections in inches Forces in Grams										
	<u>0.0004</u>	<u>0.0008</u>	<u>0.0013</u>	<u>0.0017</u>	<u>0.0021</u>	<u>0.0025</u>	<u>0.0029</u>	<u>0.0034</u>	<u>0.0038</u>	<u>0.0042</u>	<u>SET</u>
Averages	0.15	4.14	10.84	21.28	32.62	41.38	50.70	58.23	65.96	74.36	0.0014
Min	-0.10	-0.10	-0.10	8.70	22.30	30.40	41.30	48.30	57.20	66.40	0.0006
Max	1.10	13.90	24.60	36.30	47.00	55.30	63.10	68.30	75.80	80.20	0.0019
St. Dev	0.332	5.065	8.810	8.381	7.949	7.425	6.970	6.547	6.018	4.266	0.0004
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	SFM/FTSH	SFM	FTSH
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	7000	9000	10000

	Row to Row		
	Mated	Unmated	Unmated
Minimum	SFM/FTSH	SFM	FTSH
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

**DIELECTRIC WITHSTANDING VOLTAGE (DWV):**

Voltage Rating Summary	
Minimum	SFM/FTSH
Break Down Voltage	875
Test Voltage	657
Working Voltage	219

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

Row to Row	
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 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.  $\leq +5.0$  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

<b>LLCR Measurement Summaries by Pin Type</b>				
Date	5/23/2013	6/4/2013		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	56	56		
Technician	Peter Chen	Peter Chen		
mOhm values	<b>Actual Initial</b>	<b>Delta Thermal</b>	<b>Delta</b>	<b>Delta</b>
<b>Pin Type 1: Signal</b>				
Average	10.81	0.33		
St. Dev.	0.56	0.38		
Min	9.61	0.00		
Max	13.06	2.49		
Summary Count	192	192		
Total Count	192	192		

<b>LLCR Delta Count by Category</b>						
	<b>Stable</b>	<b>Minor</b>	<b>Acceptable</b>	<b>Marginal</b>	<b>Unstable</b>	<b>Open</b>
mOhms	$\leq 5$	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	$>1000$
Thermal	192	0	0	0	0	0

**DATA SUMMARIES Continued****LLCR Mating/Unmating Durability Group**

- 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.  $\leq +5.0$  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

<b>LLCR Measurement Summaries by Pin Type</b>				
Date	5/22/2013	5/29/2013	6/6/2013	6/25/2013
Room Temp (Deg C)	23	23	23	23
Rel Humidity (%)	56	60	58	56
Technician	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	<b>Actual Initial</b>	<b>Delta 100 Cycles</b>	<b>Delta Therm Shck</b>	<b>Delta Humidity</b>
<b>Pin Type 1: Signal</b>				
Average	9.94	1.35	1.31	1.45
St. Dev.	0.74	1.38	1.41	1.51
Min	7.52	0.01	0.01	0.00
Max	12.17	5.10	5.96	5.84
Summary Count	192	192	192	192
Total Count	192	192	192	192

<b>LLCR Delta Count by Category</b>						
	<b>Stable</b>	<b>Minor</b>	<b>Acceptable</b>	<b>Marginal</b>	<b>Unstable</b>	<b>Open</b>
mOhms	$\leq 5$	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	$>1000$
<b>100 Cycles</b>	190	2	0	0	0	0
<b>Therm Shck</b>	188	4	0	0	0	0
<b>Humidity</b>	184	8	0	0	0	0

**DATA SUMMARIES Continued****LLCR Gas Tight Group**

- 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.  $\leq +5.0$  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

<b>LLCR Measurement Summaries by Pin Type</b>				
Date	5/22/2013	5/25/2013		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	68	56		
Technician	Peter Chen	Peter Chen		
mOhm values	<b>Actual Initial</b>	<b>Delta Acid Vapor</b>	<b>Delta</b>	<b>Delta</b>
<b>Pin Type 1: Signal</b>				
Average	9.96	1.50		
St. Dev.	0.71	1.43		
Min	8.56	0.01		
Max	12.41	4.58		
Summary Count	192	192		
Total Count	192	192		

<b>LLCR Delta Count by Category</b>						
	<b>Stable</b>	<b>Minor</b>	<b>Acceptable</b>	<b>Marginal</b>	<b>Unstable</b>	<b>Open</b>
mOhms	$\leq 5$	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	$>1000$
<b>Acid Vapor</b>	192	0	0	0	0	0

**DATA SUMMARIES Continued****LLCR Shock & Vibration Group**

- 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.  $\leq +5.0$  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

<b>LLCR Measurement Summaries by Pin Type</b>				
Date	6/12/2013	6/19/2013		
Room Temp (Deg C)	21	21		
Rel Humidity (%)	43	53		
Technician	Troy Cook	Troy Cook		
mOhm values	<b>Actual</b>	<b>Delta</b>	<b>Delta</b>	<b>Delta</b>
	<b>Initial</b>	<b>Shock-Vib</b>		
<b>Pin Type 1: Signal</b>				
Average	11.26	0.66		
St. Dev.	1.03	0.70		
Min	9.31	0.00		
Max	14.30	3.69		
Summary Count	192	192		
Total Count	192	192		

<b>LLCR Delta Count by Category</b>						
	<b>Stable</b>	<b>Minor</b>	<b>Acceptable</b>	<b>Marginal</b>	<b>Unstable</b>	<b>Open</b>
mOhms	$\leq 5$	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	$>1000$
<b>Shock-Vib</b>	192	0	0	0	0	0

**Nanosecond Event Detection:**

<b>Shock and Vibration Event Detection Summary</b>	
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

**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: 4/26/2013, Next Cal: 4/25/2014**Equipment #:** HZ-OV-01**Description:** Oven**Manufacturer:** Huida**Model:** CS101-1E**Serial #:** CS101-1E-B**Accuracy:** Last Cal: 12/13/2012, Next Cal: 12/12/2013**Equipment #:** HZ-THC-01**Description:** Humidity transmitter**Manufacturer:** Thermtron**Model:** SM-8-8200**Serial #:** 38846**Accuracy:** Last Cal: 2/28/2013, Next Cal: 2/27/2014**Equipment #:** HZ-HPM-01**Description:** NA9636H**Manufacturer:** Ainuo**Model:** 6031A**Serial #:** 089601091**Accuracy:** Last Cal: 3/7/2013, Next Cal: 3/6/2014**Equipment #:** HZ-MO-05**Description:** Micro-ohmmeter**Manufacturer:** Keithley**Model:** 3706**Serial #:** 1285188**Accuracy:** Last Cal: 11/15/2012, Next Cal: 11/14/2013**Equipment #:** HZ-TSC-01**Description:** Vertical Thermal Shock Chamber**Manufacturer:** Cincinnatti Sub Zero**Model:** VTS-3-6-6-SC/AC**Serial #:** 10-VT14994**Accuracy:** See Manual

... Last Cal: 06/28/2013, Next Cal: 06/27/2014

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

... Last Cal: 04/30/2013, Next Cal: 04/30/2014

**Equipment #:** HZ-MO-01**Description:** Micro-ohmmeter**Manufacturer:** Keithley**Model:** 2700**Serial #:** 1199807**Accuracy:** Last Cal: 04/28/2013, Next Cal: 04/28/2014**Equipment #:** HZ-PS-01**Description:** Power Supply**Manufacturer:** Agilent**Model:** 6031A**Serial #:** MY41000982**Accuracy:** Last Cal: 04/28/2013, Next Cal: 04/28/2014**Equipment #:** SVC-01**Description:** Shock & Vibration Table**Manufacturer:** Data Physics**Model:** LE-DSA-10-20K**Serial #:** 10037**Accuracy:** See Manual

... Last Cal: 11/31/2012, Next Cal: 11/31/2013

**Equipment #:** ACLM-01**Description:** Accelerometer**Manufacturer:** PCB Piezotronics**Model:** 352C03**Serial #:** 115819**Accuracy:** See Manual

... Last Cal: 07/09/2013, Next Cal: 07/09/2014

**Equipment #:** ED-03**Description:** Event Detector**Manufacturer:** Analysis Tech**Model:** 32EHD**Serial #:** 1100604**Accuracy:** See Manual

... Last Cal: 06/04/2013, Next Cal: 06/04/2014