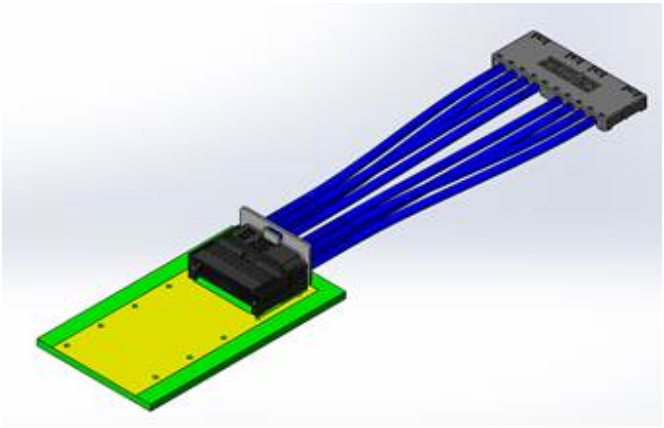
Project Number: Design Qualification Test Report	Tracking Code: 788439_Report_Rev_2
Requested by: Ben Cooper	Date: 4/13/2018
Part #: FQSFP-01-02.36-L-PF-BC/ MATING-CARD	Tech: Tony Wagoner
Part description: FQSFP/CARD	Qty to test: 108
Test Start: 1/23/2017	Test Completed: 2/14/2017



Design Qualification Test Report

FQSFP/CARD
FQSFP-01-02.36-L-PF-BC/ MATING-CARD

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
6/6/2017	**1**	**Initial Issue**	**KH**
4/13/2018	**2**	**Add the cable flex test data**	**KH**

CERTIFICATION

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

SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR 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) Samtec Test PCBs used: PCB-107074-TST-XX, PCB-107075-TST-XX, PCB-107076-TST-XX, PCB-107168-TST-XX, PCB-107929-TST-XX, PCB-107103-TST-XX

FLOWCHARTS

Gas Tight

Group 1
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Assemblies
ENIG .020" PTH
Note: HDR build number: HDR-187370-01

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

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(1) Gas Tight = EIA-364-36

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

FLOWCHARTS Continued

Normal Force

Group 1
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Contacts Minimum
C-416 Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.015 " Expected Force at Max Deflection = 100 g

Group 2
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Contacts Minimum
C-416 With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.015 " Expected Force at Max Deflection = 100 g

Group 3
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Contacts Minimum
C-417 Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.015 " Expected Force at Max Deflection = 100 g

Group 4
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Contacts Minimum
C-417 With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.015 " Expected Force at Max Deflection = 100 g

Group 5
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Contacts Minimum
C-418 Signal Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 83 g

Group 6
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Contacts Minimum
C-418 Signal With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 83 g

Group 7
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Contacts Minimum
C-418 Ground Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 69 g

Group 8
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Contacts Minimum
C-418 Ground With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 69 g

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(1) Normal Force = EIA-364-04

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

FLOWCHARTS Continued

Thermal Aging

Group 1
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Assemblies
ENIG .020" PTH
Note: HDR build number: HDR-187370-01

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force (2)
3.	LLCR (1)
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

Group 1
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Assemblies
ENIG .020" PTH
Note: HDR build number: HDR-187370-01

Step	Description
1.	Contact Gaps
2.	LLCR (2)
3.	Mating/Unmating Force (3)
4.	Cycles Quantity = 25 Cycles
5.	Mating/Unmating Force (3)
6.	Cycles Quantity = 25 Cycles
7.	Mating/Unmating Force (3)
8.	Cycles Quantity = 25 Cycles
9.	Mating/Unmating Force (3)
10.	Cycles 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 = Other
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = (-25°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued

IR/DWV

LS Pin-to-LS Pin

Group 1	Group 2	Group 3
FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC
MATING-CARD		MATING-CARD
2 Assemblies	2 Assemblies	2 Assemblies
ENIG .020" PTH	ENIG .020" PTH	ENIG .020" PTH
Note: HDR build number: HDR-187371-01	*Note: HDR build number: HDR-187371-01*	*Note: HDR build number: HDR-187371-01*
Step **Description**	**Step** **Description**	**Step** **Description**
1. DWV Breakdown (2)	1. DWV Breakdown (2)	1. IR (4)
		2. DWV at Test Voltage (1)
		3. Thermal Shock (5)
		4. IR (4)
		5. DWV at Test Voltage (1)
		6. Humidity (3)
		7. IR (4)
		8. DWV at Test Voltage (1)

LS Row-to-LS Row

Group 4	Group 5	Group 6
FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC
MATING-CARD		MATING-CARD
2 Assemblies	2 Assemblies	2 Assemblies
ENIG .020" PTH	ENIG .020" PTH	ENIG .020" PTH
Note: HDR build number: HDR-187372-01	*Note: HDR build number: HDR-187372-01*	*Note: HDR build number: HDR-187372-01*
Step **Description**	**Step** **Description**	**Step** **Description**
1. DWV Breakdown (2)	1. DWV Breakdown (2)	1. IR (4)
		2. DWV at Test Voltage (1)
		3. Thermal Shock (5)
		4. IR (4)
		5. DWV at Test Voltage (1)
		6. Humidity (3)
		7. IR (4)
		8. DWV at Test Voltage (1)

LS Pin-to-Ground

Group 7	Group 8	Group 9
FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC
MATING-CARD		MATING-CARD
2 Assemblies	2 Assemblies	2 Assemblies
ENIG .020" PTH	ENIG .020" PTH	ENIG .020" PTH
Note: HDR build number: HDR-187790-01	*Note: HDR build number: HDR-187790-01*	*Note: HDR build number: HDR-187790-01*
Step **Description**	**Step** **Description**	**Step** **Description**
1. DWV Breakdown (2)	1. DWV Breakdown (2)	1. IR (4)
		2. DWV at Test Voltage (1)
		3. Thermal Shock (5)
		4. IR (4)
		5. DWV at Test Voltage (1)
		6. Humidity (3)
		7. IR (4)
		8. DWV at Test Voltage (1)

FLOWCHARTS Continued

HS Pin-to-HS Pin

Group 10	Group 11	Group 12
FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC
MATING-CARD		MATING-CARD
2 Assemblies	2 Assemblies	2 Assemblies
ENIG .020" PTH	ENIG .020" PTH	ENIG .020" PTH
Note: HDR build number: HDR-187371-01	*Note: HDR build number: HDR-187371-01*	*Note: HDR build number: HDR-187371-01*
Step **Description**	**Step** **Description**	**Step** **Description**
1. DWV Breakdown (2)	1. DWV Breakdown (2)	1. IR (4)
		2. DWV at Test Voltage (1)
		3. Thermal Shock (5)
		4. IR (4)
		5. DWV at Test Voltage (1)
		6. Humidity (3)
		7. IR (4)
		8. DWV at Test Voltage (1)

HS Row-to-HS Row

Group 13	Group 14	Group 15
FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC	FQSFP-01-02.36-L-PF-BC
MATING-CARD		MATING-CARD
2 Assemblies	2 Assemblies	2 Assemblies
ENIG .020" PTH	ENIG .020" PTH	ENIG .020" PTH
Note: HDR build number: HDR-187372-01	*Note: HDR build number: HDR-187372-01*	*Note: HDR build number: HDR-187372-01*
Step **Description**	**Step** **Description**	**Step** **Description**
1. DWV Breakdown (2)	1. DWV Breakdown (2)	1. IR (4)
		2. DWV at Test Voltage (1)
		3. Thermal Shock (5)
		4. IR (4)
		5. DWV at Test Voltage (1)
		6. Humidity (3)
		7. IR (4)
		8. DWV at Test Voltage (1)

FLOWCHARTS Continued

HS Pin-to-Ground

Group 16
FQSFP-01-02.36-L-PF-BC
MATING-CARD
2 Assemblies
ENIG .020" PTH
Note: HDR build number: HDR-187371-01

Step	Description
1.	DWV Breakdown (2)

Group 17
FQSFP-01-02.36-L-PF-BC
2 Assemblies
ENIG .020" PTH
Note: HDR build number: HDR-187371-01

Step	Description
1.	DWV Breakdown (2)

Group 18
FQSFP-01-02.36-L-PF-BC
MATING-CARD
2 Assemblies
ENIG .020" PTH
Note: HDR build number: HDR-187371-01

Step	Description
1.	IR (4)
2.	DWV at Test Voltage (1)
3.	Thermal Shock (5) - Non Standard
4.	IR (4)
5.	DWV at Test Voltage (1)
6.	Humidity (3)
7.	IR (4)
8.	DWV at Test Voltage (1)

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

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

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

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

(5) Thermal Shock = Other
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = I (-25°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued

Current Carrying Capacity

Group 1
FQSFP-01-02.36-L-PF-BC
MATING-CARD
2 Pins Powered
Signal - ENIG .020" PTH
Note: HDR build number: HDR-187791-01

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

Group 2
FQSFP-01-02.36-L-PF-BC
MATING-CARD
4 Pins Powered
Signal - ENIG .020" PTH
Note: HDR build number: HDR-187791-01

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

Group 3
FQSFP-01-02.36-L-PF-BC
MATING-CARD
6 Pins Powered
Signal - ENIG .020" PTH
Note: HDR build number: HDR-187791-01

Step	Description
1.	CCC (1) Rows = 2 Number of Positions = 3

Group 4
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Pins Powered
Signal - ENIG .020" PTH
Note: HDR build number: HDR-187791-01

Step	Description
1.	CCC (1) Number of Positions = 4 Rows = 2

Group 5
FQSFP-01-02.36-L-PF-BC
MATING-CARD
10 Pins Powered
Signal - ENIG .020" PTH
Note: HDR build number: HDR-187791-01

Step	Description
1.	CCC (1) Rows = 2 Number of Positions = 5

(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
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Assemblies
ENIG .020" PTH
Note: HDR build number: HDR-187792-01

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
FQSFP-01-12.00-L-PF-BC
MATING-CARD
60 Points
ENIG 0.020" PTH
Note: HDR build number: HDR-187793-01

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

Cable Pull

Group 1 FQSFP-01-12.00-L-PF-DE MATING-CARD 5 Assemblies 0 Degrees *Note: HDR build number: HDR-187794-01*		Group 2 FQSFP-01-12.00-L-PF-DE MATING-CARD 5 Assemblies 90 Degrees *Note: HDR build number: HDR-187794-01*	
Step	**Description**	**Step**	**Description**
1.	Cable Pull (1)	1.	Cable Pull (1)

(1) Cable Pull = EIA-364-38
Measure and Record Force Required to Failure
Failure = Discontinuity >1 microsecond at 10 ohms

Cable Flex

Group 1
FQSFP-01-02.36-L-PF-BC
MATING-CARD
8 Assemblies
Flat Cable

Step	Description
1.	IR (3)
2.	DWV at Test Voltage (2)
3.	Cable Flex (1)
4.	Visual Inspection
5.	IR (3)
6.	DWV at Test Voltage (2)

(1) Cable Flex = EIA-364-41
Circular Jacket Cable - to be tested 90° each direction (180° total)
Flat Cable - to be tested 70° each direction (140° total)
Monitor continuity during flex testing
Failure = Discontinuity >1 microsecond at 10 ohms

(2) 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

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

FLOWCHARTS Continued

Insertion/Retention/Hole Conditioning

SIGNAL

Group 1 FQSFP-01-02.36-L-PF-BC 32 Contacts Minimum HASL 0.016" PTH (SIG) *Note: All contacts and lead styles to be tested.*		Group 2 FQSFP-01-02.36-L-PF-BC 32 Contacts Minimum HASL 0.020" PTH (SIG) *Note: All contacts and lead styles to be tested.*		Group 3 FQSFP-01-02.36-L-PF-BC 32 Contacts Minimum ENIG 0.020" PTH (SIG) *Note: All contacts and lead styles to be tested.*	
Step	**Description**	**Step**	**Description**	**Step**	**Description**
1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*	1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*	1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*
2.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 1*	2.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 1*	2.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 1*
3.	Cycles Quantity = 1 Cycles *Note: Pin 2*	3.	Cycles Quantity = 1 Cycles *Note: Pin 2*	3.	Cycles Quantity = 1 Cycles *Note: Pin 2*
4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*	4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*	4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*
5.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 3*	5.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 3*	5.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 3*
6.	Hole Integrity *Note: check for distortion of the PTH according to EIA 364-96*	6.	Hole Integrity *Note: check for distortion of the PTH according to EIA 364-96*	6.	Hole Integrity *Note: check for distortion of the PTH according to EIA 364-96*

FLOWCHARTS Continued Continued

GROUND

Group 4 FQSFP-01-02.36-L-PF-BC 30 Contacts Minimum HASL 0.016" PTH (GND)		Group 5 FQSFP-01-02.36-L-PF-BC 30 Contacts Minimum HASL 0.020" PTH (GND)		Group 6 FQSFP-01-02.36-L-PF-BC 30 Contacts Minimum ENIG 0.020" PTH (GND)	
Step	**Description**	**Step**	**Description**	**Step**	**Description**
1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*	1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*	1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*
2.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 1*	2.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 1*	2.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 1*
3.	Cycles Quantity = 1 Cycles *Note: Pin 2*	3.	Cycles Quantity = 1 Cycles *Note: Pin 2*	3.	Cycles Quantity = 1 Cycles *Note: Pin 2*
4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*	4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*	4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*
5.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 3*	5.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 3*	5.	Retention Force Rate = 2.54 mm/min *Note: EIA 364-29* *Note: Pin 3*
6.	Hole Integrity *Note: check for distortion of the PTH according to EIA 364-96*	6.	Hole Integrity *Note: check for distortion of the PTH according to EIA 364-96*	6.	Hole Integrity *Note: check for distortion of the PTH according to EIA 364-96*

SIGNAL & GROUND

Group 7 FQSFP-01-02.36-L-PF-BC 15 Assemblies HASL 0.016" PTH (SIG + GND) *Note: LLCR Data needs to be collected on both pins and grounds. We need the following data points: 15 on pos 17 (ground), 15 on pos 18 (ground), 8 on pos 19 (C-416-01), 8 on pos 20 (C-416-02), 8 on pos 23 (C-417-02), & 8 on pos 24 (C-417-01)*		Group 8 FQSFP-01-02.36-L-PF-BC 15 Assemblies HASL 0.020" PTH (SIG + GND) *Note: LLCR Data needs to be collected on both pins and grounds. We need the following data points: 15 on pos 17 (ground), 15 on pos 18 (ground), 8 on pos 19 (C-416-01), 8 on pos 20 (C-416-02), 8 on pos 23 (C-417-02), & 8 on pos 24 (C-417-01)*		Group 9 FQSFP-01-02.36-L-PF-BC 15 Assemblies ENIG 0.020" PTH (SIG + GND) *Note: LLCR Data needs to be collected on both pins and grounds. We need the following data points: 15 on pos 17 (ground), 15 on pos 18 (ground), 8 on pos 19 (C-416-01), 8 on pos 20 (C-416-02), 8 on pos 23 (C-417-02), & 8 on pos 24 (C-417-01)*	
Step	**Description**	**Step**	**Description**	**Step**	**Description**
1.	LLCR (1) *Note: Part 1*	1.	LLCR (1) *Note: Part 1*	1.	LLCR (1) *Note: Part 1*
2.	Cycles Quantity = 1 Cycles *Note: Part 2*	2.	Cycles Quantity = 1 Cycles *Note: Part 2*	2.	Cycles Quantity = 1 Cycles *Note: Part 2*
3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*	3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*	3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*

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

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 : -25°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 : 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^2 / 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

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.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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

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. Rate of Application 500 V/Sec
        iii. 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).

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 four temperature points are reported:
    c. Ambient
    d. 65^o C
    e. 75^o C
    f. 95^o C
8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

LLCR:

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- Stable
    b. +5.1 to +10.0 mOhms:---------- Minor
    c. +10.1 to +15.0 mOhms: ---------- Acceptable
    d. +15.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure
4) The following guidelines are used to categorize the changes in LLCR for compliant pin only
    a. <= +1.0 mOhms: ---------- Stable
    b. > +1.0 mOhms: ---------- Unstable

GAS TIGHT:

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

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- Stable
    b. +5.1 to +10.0 mOhms:---------- Minor
    c. +10.1 to +15.0 mOhms: ---------- Acceptable
    d. +15.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure
4) Procedure:
    g. Reference document: EIA-364-36, *Test Procedure for Determination of Gas-Tight Characteristics for Electrical Connectors, Sockets and/or Contact Systems*.
    h. Test Conditions:
        i. Class II--- Mated pairs of contacts assembled to their plastic housings.
        ii. Reagent grade Nitric Acid shall be used of sufficient volume to saturate the test chamber
        iii. The ratio of the volume of the test chamber to the surface area of the acid shall be 10:1.
        iv. The chamber shall be saturated with the vapor for at least 15 minutes before samples are added.
        v. Exposure time, 55 to 65 minutes.
        vi. The samples shall be no closer to the chamber walls than 1 inches and no closer to the surface of the acid than 3 inches.
        vii. The samples shall be dried after exposure for a minimum of 1 hour.
        viii. Drying temperature 50^{o} C
        ix. The final LLCR shall be conducted within 1 hour after drying.
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only
    a. <= +1.0 mOhms: ---------- Stable
    b. > +1.0 mOhms: ---------- Unstable

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

CABLE PULL:

1) Secure cable near center and pull on connector
    a. At 90°, right angle to cable
    b. At 0°, in-line with cable

Fig. 1
0° Connector pull, notice the electrical continuity hook-up wires.

CABLE DURABILITY:

1) Oscillate and monitor electrical continuity for open circuit indication.
    a. ± 70° Flex Mode, bend up to 500 cycles. load on cable end.

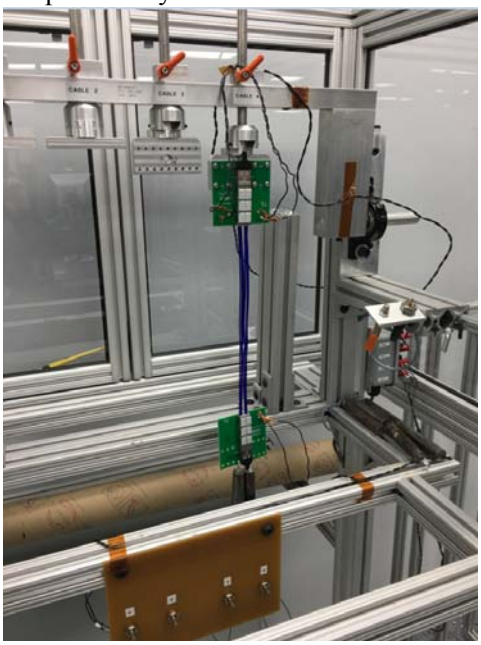


Fig. 2
(Setup picture)

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise----------2.1 A per contact with 2 contacts (2x1) powered**
- **CCC for a 30°C Temperature Rise----------1.4 A per contact with 4 contacts (2x2) powered**
- **CCC for a 30°C Temperature Rise----------1.3 A per contact with 6 contacts (2x3) powered**
- **CCC for a 30°C Temperature Rise----------1.1 A per contact with 8 contacts (2x4) powered**
- **CCC for a 30°C Temperature Rise----------1.1 A per contact with 10 contacts (2x5) powered**

Mating – Unmating Forces

Thermal aging Group

- **Initial**
  - **Mating**
    - **Min ---------- 4.11 lbs**
    - **Max---------- 6.10 lbs**
  - **Unmating**
    - **Min ---------- 1.42 lbs**
    - **Max---------- 2.36 lbs**
- **After Thermal**
  - **Mating**
    - **Min ---------- 2.42 lbs**
    - **Max---------- 4.41 lbs**
  - **Unmating**
    - **Min ---------- 0.75 lbs**
    - **Max---------- 1.33 lbs**

RESULTS Continued

Mating – Unmating Forces

Mating/Unmating Durability Group

- **Initial**
  - **Mating**
    - **Min ---------- 3.84 lbs**
    - **Max---------- 5.49 lbs**
  - **Unmating**
    - **Min ---------- 0.95 lbs**
    - **Max---------- 2.53 lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 4.12 lbs**
    - **Max---------- 6.03 lbs**
  - **Unmating**
    - **Min ---------- 1.29 lbs**
    - **Max---------- 2.71 lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 4.18 lbs**
    - **Max---------- 6.10 lbs**
  - **Unmating**
    - **Min ---------- 1.54 lbs**
    - **Max---------- 2.73 lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 4.31 lbs**
    - **Max---------- 6.25 lbs**
  - **Unmating**
    - **Min ---------- 1.67 lbs**
    - **Max---------- 2.83 lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 4.42 lbs**
    - **Max---------- 6.30 lbs**
  - **Unmating**
    - **Min ---------- 1.82 lbs**
    - **Max---------- 2.91 lbs**
- **Humidity**
  - **Mating**
    - **Min ---------- 2.68 lbs**
    - **Max---------- 4.04 lbs**
  - **Unmating**
    - **Min ---------- 0.91 lbs**
    - **Max---------- 1.23 lbs**

RESULTS Continued

Normal Force at 0.015 inch deflection

C-416

- **Initial**
  - **Min----------86.20 gf Set ----- 0.0011 inch**
  - **Max ----------96.00 gf Set ----- 0.0015 inch**
- **Thermal**
  - **Min----------49.70 gf Set----- 0.0029 inch**
  - **Max ----------76.10 gf Set----- 0.0049 inch**

Normal Force at 0.015 inch deflection

C-417

- **Initial**
  - **Min----------72.00 gf Set ----- 0.0008 inch**
  - **Max ----------85.00 gf Set ----- 0.0011 inch**
- **Thermal**
  - **Min----------62.30 gf Set----- 0.0024 inch**
  - **Max ----------68.90 gf Set----- 0.0038 inch**

Normal Force at 0.016 inch deflection

C-418 Signal

- **Initial**
  - **Min----------41.60 gf Set ----- 0.0004 inch**
  - **Max ----------45.90 gf Set ----- 0.0016 inch**
- **Thermal**
  - **Min----------28.30 gf Set----- 0.0012 inch**
  - **Max ----------36.80 gf Set----- 0.0034 inch**

C-418 Ground

- **Initial**
  - **Min----------34.10 gf Set ----- 0.0003 inch**
  - **Max ----------39.90 gf Set ----- 0.0020 inch**
- **Thermal**
  - **Min----------19.70 gf Set----- 0.0016 inch**
  - **Max ----------31.00 gf Set----- 0.0046 inch**

Cable Pull force

- **0° Pull**
  - **Min----------43.50 lbs**
  - **Max ----------62.00 lbs**
- **90° Pull**
  - **Min---------- 7.50 lbs**
  - **Max ----------11.00 lbs**

RESULTS Continued

Cable Flex:

Insulation Resistance minimums, IR

Pin to Pin

- **Initial**
  - **Mated----------36000 Meg Ω ---------- Passed**
- **After 500 flex cycles**
  - **Mated----------45000 Meg Ω ---------- Passed**

Pin to Ground(LS)

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Passed**
- **After 500 flex cycles**
  - **Mated----------45000 Meg Ω ---------- Passed**

Pin to Ground(HS)

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Passed**
- **After 500 flex cycles**
  - **Mated----------45000 Meg Ω ---------- Passed**

Dielectric Withstanding Voltage minimums, DWV

- **Test Voltage ----------613 VAC**

Pin to Pin

- **Initial DWV ----------Passed**
- **After 100 Flex cycles DWV ----------Passed**

Pin to Ground(LS)

- **Initial DWV ----------Passed**
- **After 100 Flex cycles DWV ----------Passed**

Pin to Ground(HS)

- **Initial DWV ----------Passed**
- **After 100 Flex cycles DWV ----------Passed**

RESULTS Continued

Compliant pin Insertion/Retention Forces

Signal Pin- HASL-0.016"

- **Initial**
  - **Mating**
    - **Min ---------- 4.06 lbs**
    - **Max---------- 5.18 lbs**
  - **Unmating**
    - **Min ---------- 1.31 lbs**
    - **Max---------- 2.12 lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 3.23 lbs**
    - **Max---------- 4.07 lbs**
  - **Unmating**
    - **Min ---------- 1.51 lbs**
    - **Max---------- 2.39 lbs**

Signal Pin- HASL-0.020"

- **Initial**
  - **Mating**
    - **Min ---------- 1.26 lbs**
    - **Max---------- 2.28 lbs**
  - **Unmating**
    - **Min ---------- 0.94 lbs**
    - **Max---------- 1.44 lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 1.05 lbs**
    - **Max---------- 1.82 lbs**
  - **Unmating**
    - **Min ---------- 0.96 lbs**
    - **Max---------- 1.52 lbs**

Signal Pin- ENIG-0.020"

- **Initial**
  - **Mating**
    - **Min ---------- 1.95 lbs**
    - **Max---------- 2.42 lbs**
  - **Unmating**
    - **Min ---------- 1.06 lbs**
    - **Max---------- 1.58 lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 1.19 lbs**
    - **Max---------- 1.88 lbs**
  - **Unmating**
    - **Min ---------- 0.84 lbs**
    - **Max---------- 1.43 lbs**

RESULTS Continued

Compliant pin Insertion/Retention Forces

Ground Pin- HASL-0.016"

- **Initial**
  - **Mating**
    - **Min ---------- 5.17 lbs**
    - **Max---------- 5.80 lbs**
  - **Unmating**
    - **Min ---------- 1.27 lbs**
    - **Max---------- 2.11 lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 3.83 lbs**
    - **Max---------- 4.31 lbs**
  - **Unmating**
    - **Min ---------- 1.19 lbs**
    - **Max---------- 2.10 lbs**

Ground Pin- HASL-0.020"

- **Initial**
  - **Mating**
    - **Min ---------- 2.34 lbs**
    - **Max---------- 3.61 lbs**
  - **Unmating**
    - **Min ---------- 1.32 lbs**
    - **Max---------- 1.61 lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 2.25 lbs**
    - **Max---------- 3.27 lbs**
  - **Unmating**
    - **Min ---------- 1.37 lbs**
    - **Max---------- 1.83 lbs**

Ground Pin- ENIG-0.020"

- **Initial**
  - **Mating**
    - **Min ---------- 2.49 lbs**
    - **Max---------- 3.17 lbs**
  - **Unmating**
    - **Min ---------- 1.25 lbs**
    - **Max---------- 1.58 lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 1.44 lbs**
    - **Max---------- 2.32 lbs**
  - **Unmating**
    - **Min ---------- 0.81 lbs**
    - **Max---------- 1.70 lbs**

RESULTS Continued

LLCR Durability (128 signal, 16 ground, 24 row1 and 24 row2 LLCR test points)

Signal pin:

- **Initial ---------- 116.60 mOhms Max**
- **After 100 cycles**
  - **<= +5.0 mOhms ---------- 128 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**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 127 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 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**
- **After humidity**
  - **<= +5.0 mOhms ---------- 127 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 1 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**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Ground pin:

- **Initial ---------- 18.88 mOhms Max**
- **After 100 cycles**
  - **<= +5.0 mOhms ---------- 15 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 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**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 15 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 ---------- 1 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **After humidity**
  - **<= +5.0 mOhms ---------- 11 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 5 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**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

RESULTS Continued

Row 1:

- **Initial ---------- 29.75 mOhms Max**
- **After 100 cycles**
  - **<= +5.0 mOhms ---------- 24 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**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 24 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**
- **After humidity**
  - **<= +5.0 mOhms ---------- 24 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**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Row 2:

- **Initial ---------- 34.45 mOhms Max**
- **After 100 cycles**
  - **<= +5.0 mOhms ---------- 24 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**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 24 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**
- **After humidity**
  - **<= +5.0 mOhms ---------- 24 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**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

RESULTS Continued

LLCR Thermal Aging (127 signal, 16 ground, 24 row1 and 24 row2 LLCR test points)

Signal pin:

- **Initial ---------- 115.99 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 126 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 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**

Note: Broken solder joint on cable of the signal group.

Ground Pin:

- **Initial ---------- 25.49 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 13 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 2 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 1 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**

Row 1:

- **Initial ---------- 30.04 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 24 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**

Row 2:

- **Initial ---------- 34.07 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 24 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 Gas Tight (128 cable, 16 ground, 48 signal LLCR test points)

Cable:

- **Initial ---------- 37.44 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 128 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**

Ground Pin:

- **Initial ---------- 15.10 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 16 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**

Signal Pin:

- **Initial ---------- 33.92 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 Vib (128 cable, 16 ground, 48 signal LLCR test points)

Cable:

- **Initial ---------- 123.42 mOhms Max**
- **S&V**
  - **<= +5.0 mOhms ---------- 128 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**

Ground Pin:

- **Initial ---------- 35.46 mOhms Max**
- **S&V**
  - **<= +5.0 mOhms ---------- 9 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 3 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 3 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 1 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Signal pin:

- **Initial ---------- 43.67 mOhms Max**
- **S&V**
  - **<= +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 ---------- ---------- Passed**
  - **50 Nanoseconds ---------- ---------- Passed**
- **Vibration**
  - **No Damage ---------- ---------- Passed**
  - **50 Nanoseconds ---------- ---------- Passed**

RESULTS Continued

LLCR Insertion and Retention Force (32 signal and 30 compliant pin LLCR test points)

Signal Pin- HASL 0.016"

- **Initial ----------0.07 mOhms Max**
- **After 3 cycles**
  - **<= +1.0 mOhms ---------- 32 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- HASL 0.016"

- **Initial ----------0.04 mOhms Max**
- **After 3 cycle**
  - **<= +1.0 mOhms ---------- 30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Signal Pin- HASL 0.020"

- **Initial ----------0.07 mOhms Max**
- **After 3 cycles**
  - **<= +1.0 mOhms ---------- 32 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- HASL 0.020"

- **Initial ----------0.14 mOhms Max**
- **After 3 cycle**
  - **<= +1.0 mOhms ---------- 30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Signal Pin- ENIG 0.020"

- **Initial ----------0.25 mOhms Max**
- **After 3 cycles**
  - **<= +1.0 mOhms ---------- 32 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- ENIG 0.020"

- **Initial ----------0.19 mOhms Max**
- **After 3 cycle**
  - **<= +1.0 mOhms ---------- 30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

RESULTS Continued

Insulation Resistance minimums, IR

LS Pin to LS Pin

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

LS Row to LS Row

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

LS Pin to Ground

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

RESULTS Continued

Insulation Resistance minimums, IR

HS Pin to HS Pin

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

HS Row to HS Row

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

HS Pin to Ground

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

RESULTS Continued

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage----------817 VAC**
  - **Test Voltage----------613 VAC**
  - **Working Voltage----------200 VAC**

LS Pin to LS Pin

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

LS Row to LS Row

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

LS Pin to Ground

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

HS Pin to HS Pin

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

HS Row to HS Row

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

HS Pin to Ground

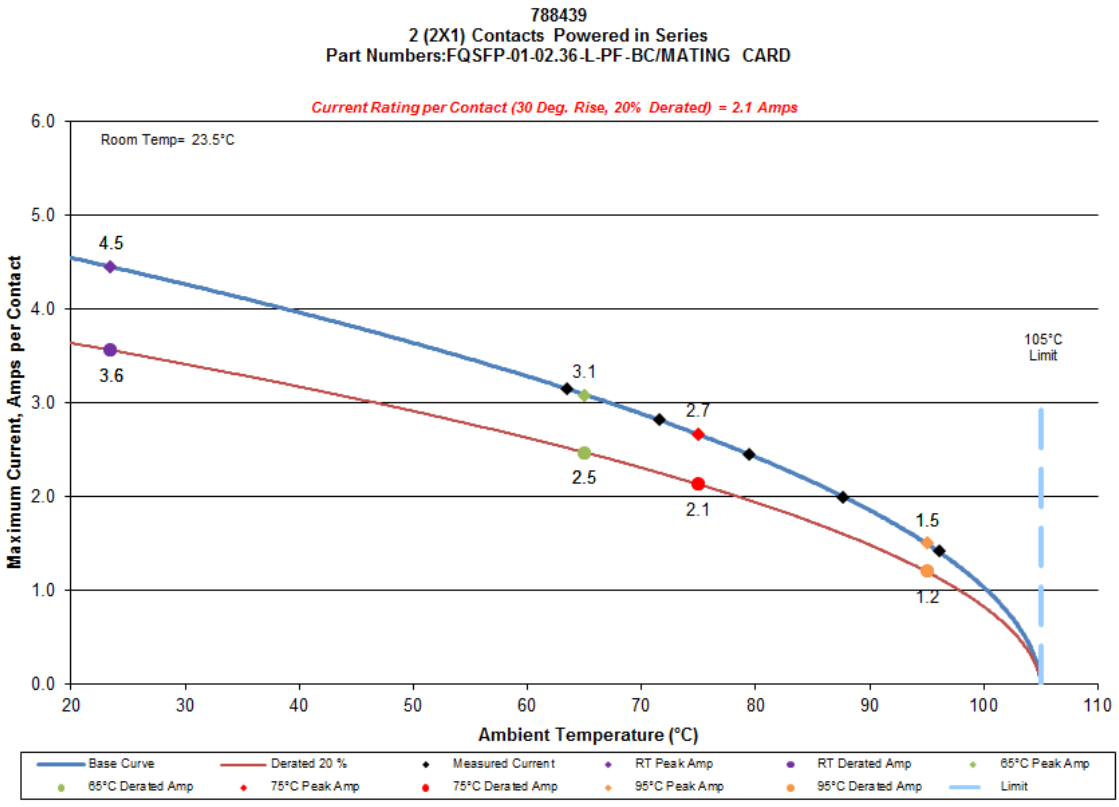
- **Initial DWV----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

DATA SUMMARIES

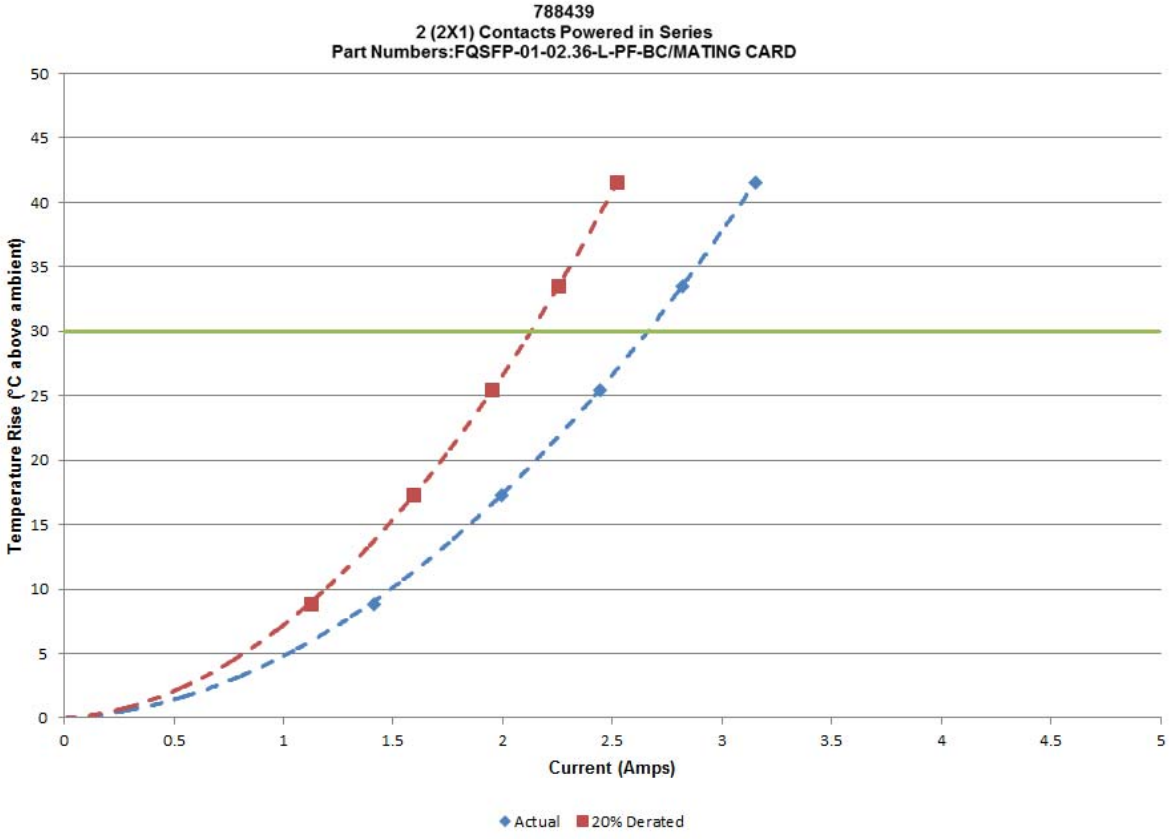
TEMPERATURE RISE (Current Carrying Capacity, CCC):

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 2 adjacent power conductors/contacts powered

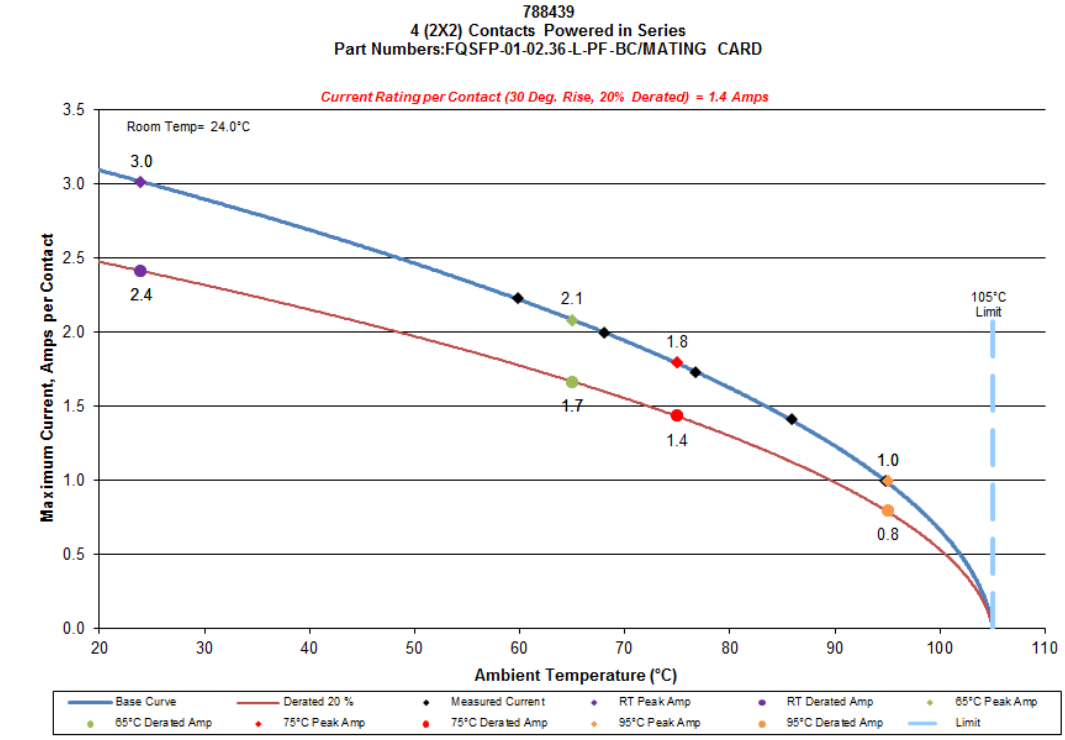


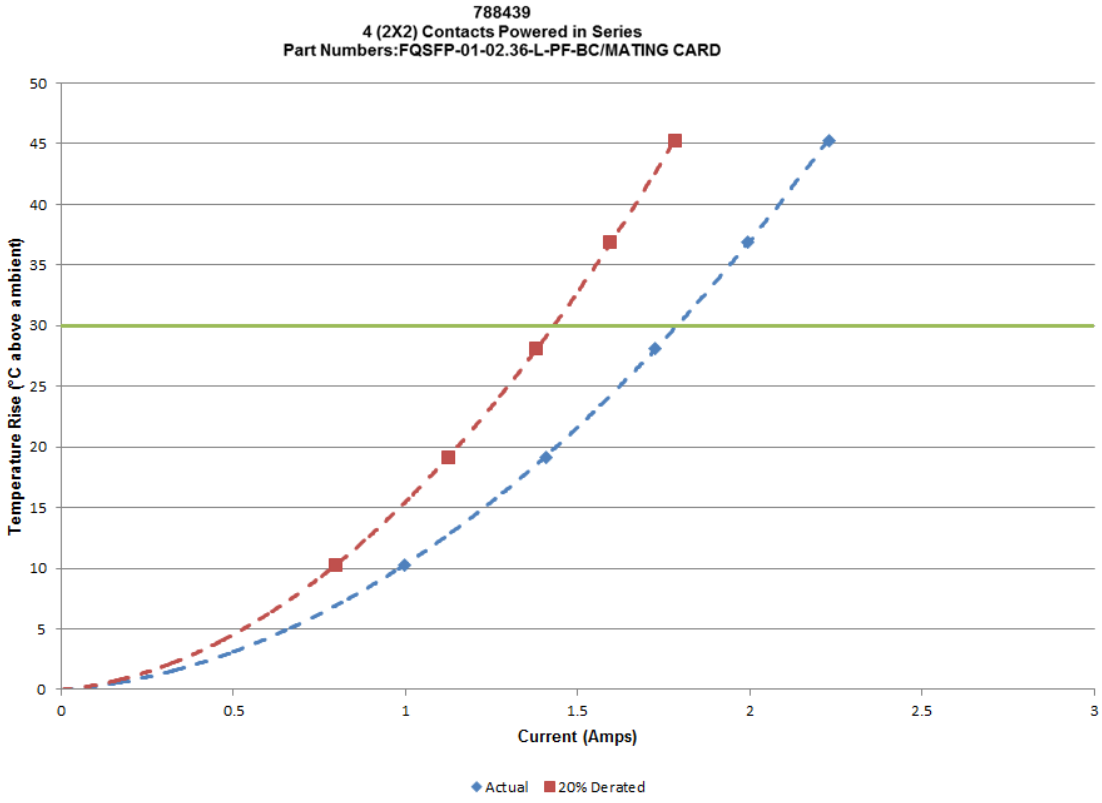
DATA SUMMARIES



DATA SUMMARIES

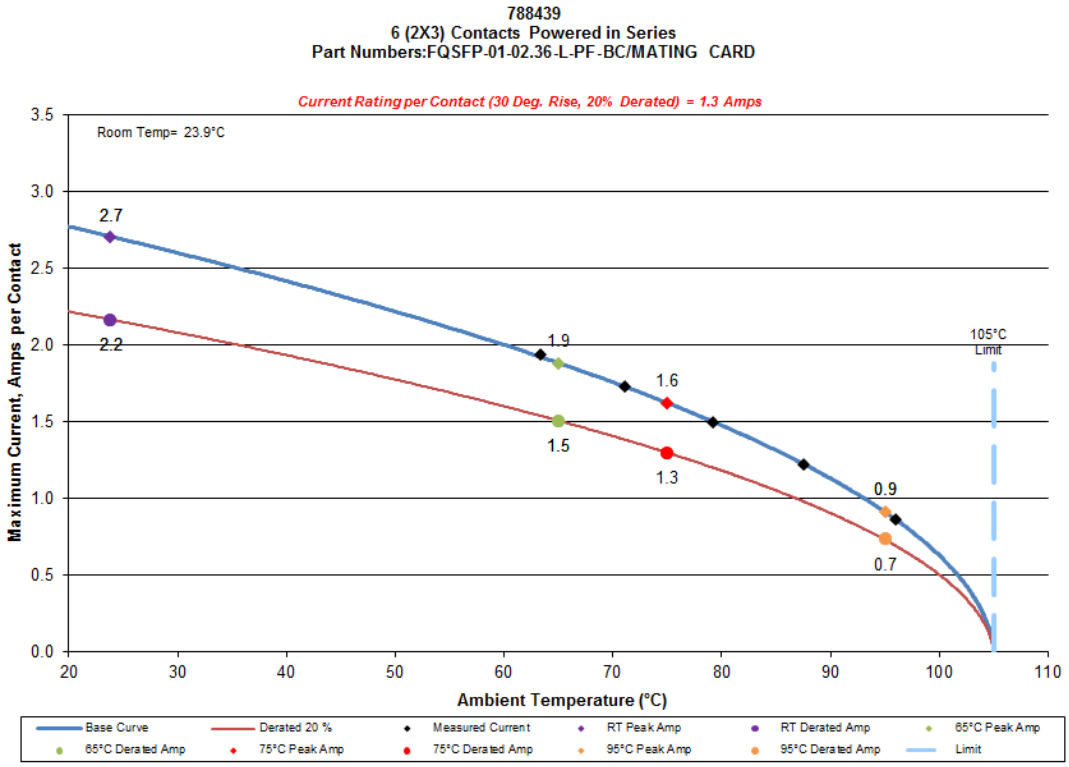
b. Linear configuration with 4 adjacent power conductors/contacts powered

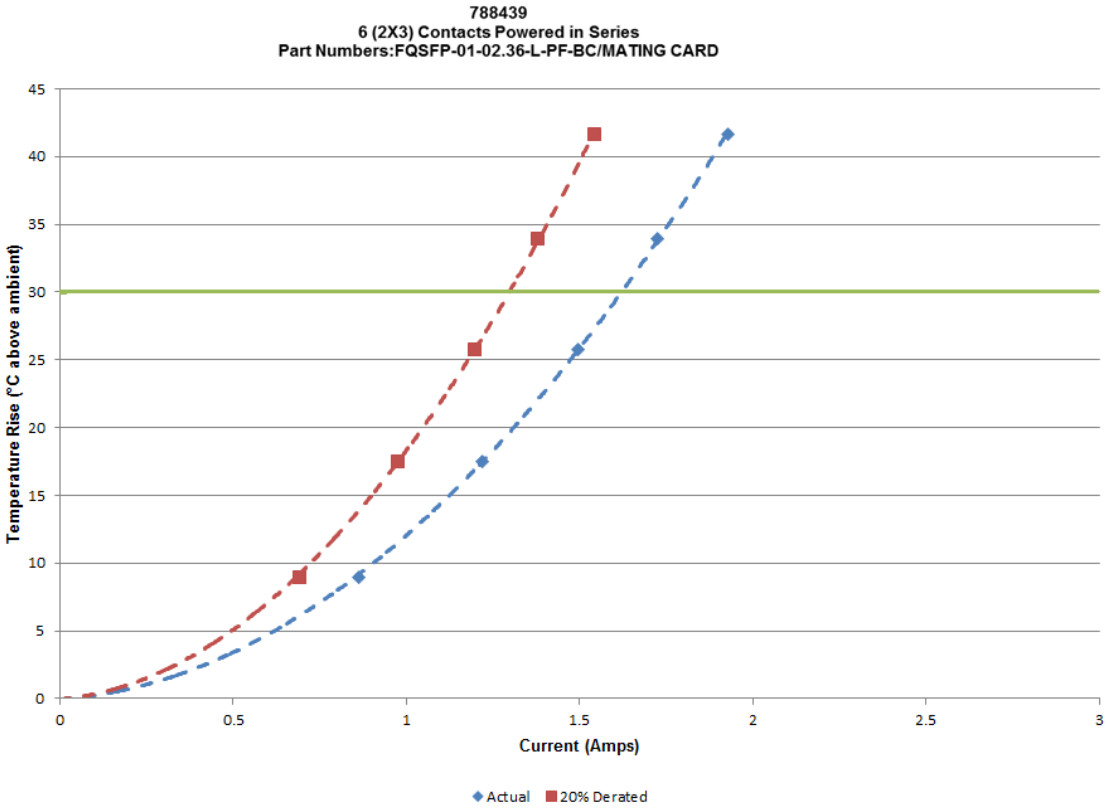




DATA SUMMARIES

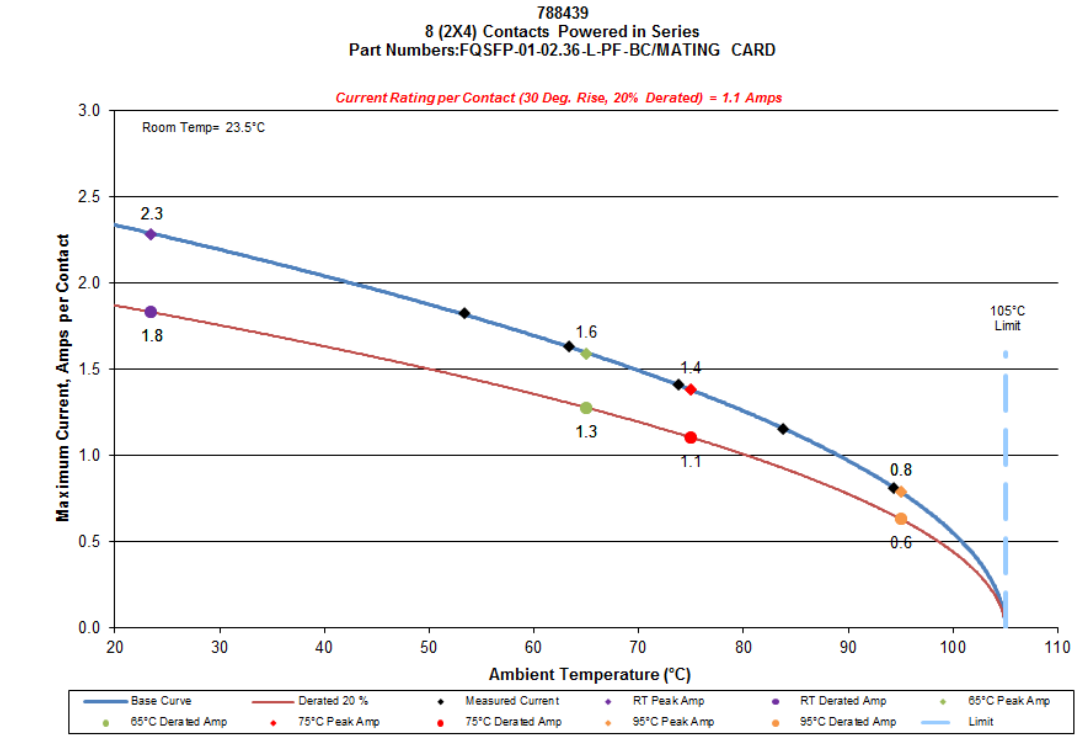
c. Linear configuration with 6 adjacent power conductors/contacts powered

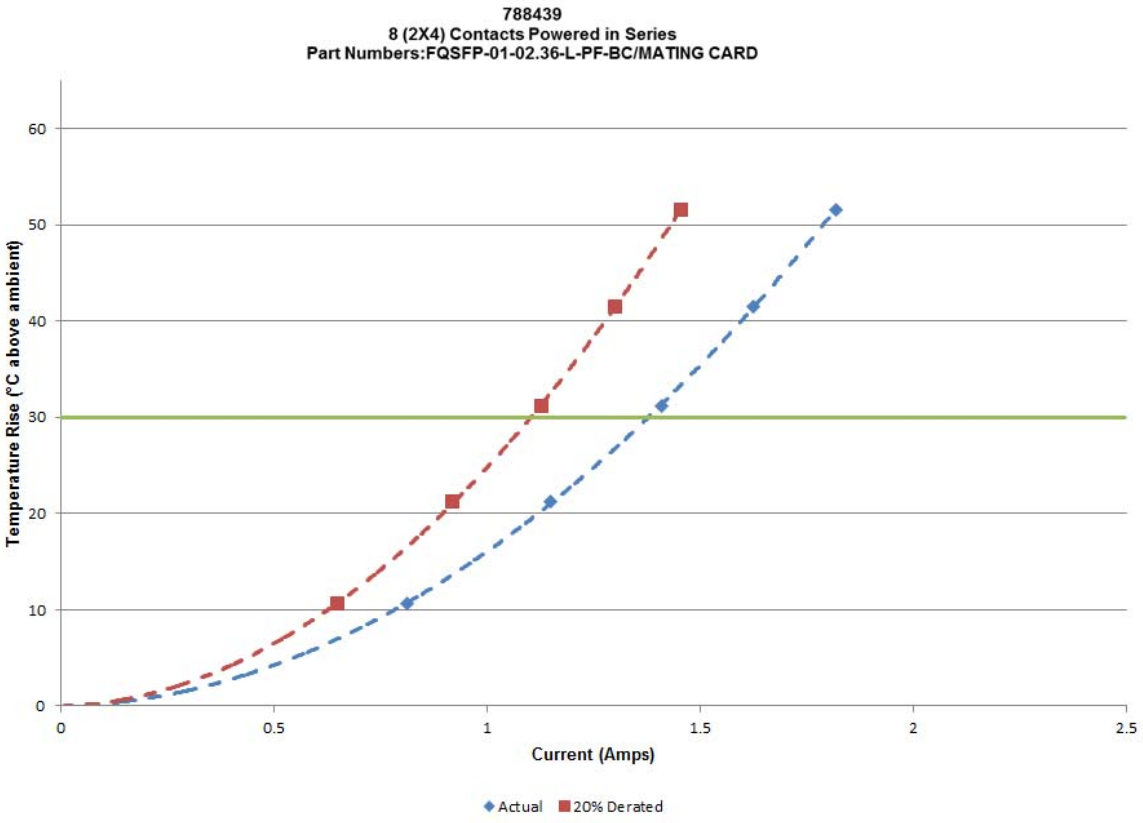




DATA SUMMARIES

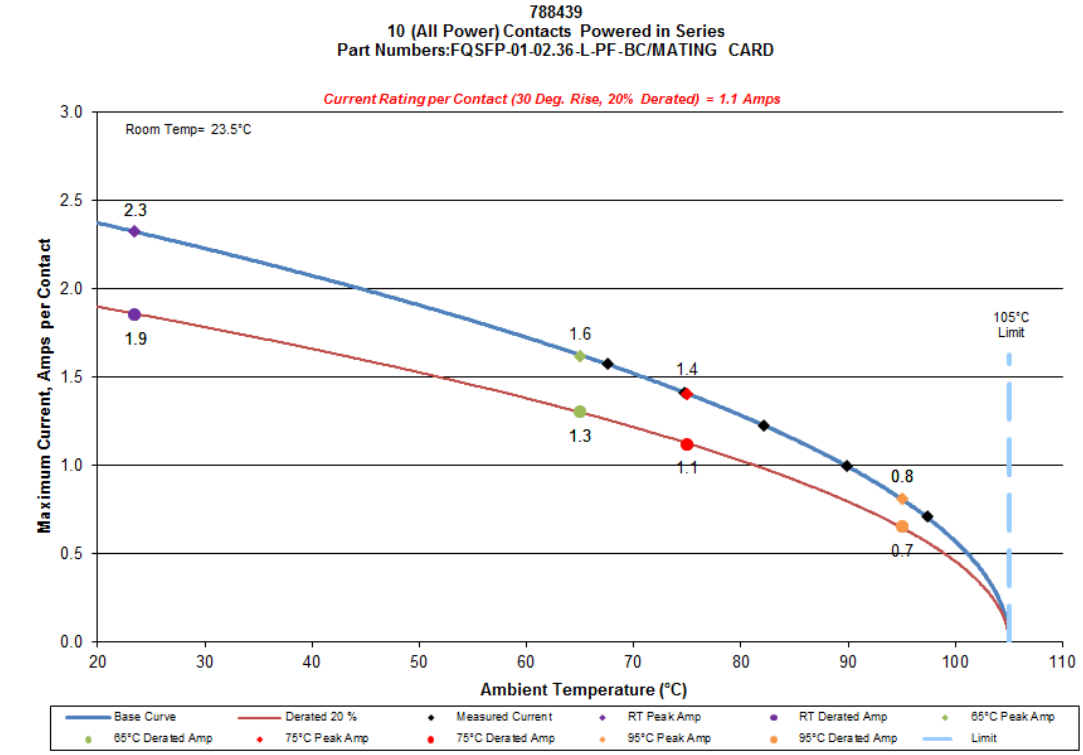
d. Linear configuration with 8 adjacent power conductors/contacts powered

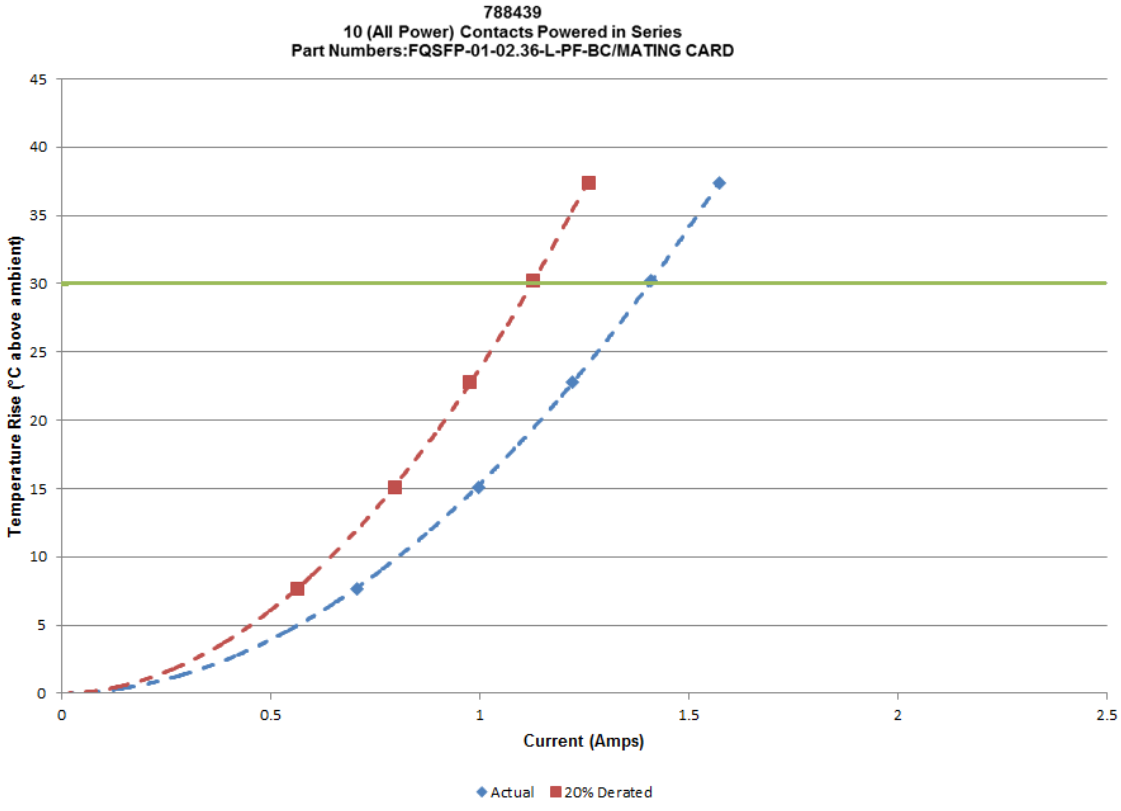




DATA SUMMARIES

e. Linear configuration with 10 adjacent power conductors/contacts powered





DATA SUMMARIES

MATING/UNMATING:

Thermal Aging Group

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	18.26	4.11	6.30	1.42	10.77	2.42	3.34	0.75
Maximum	27.13	6.10	10.52	2.36	19.63	4.41	5.90	1.33
Average	22.85	**5.14**	8.18	**1.84**	15.70	**3.53**	4.67	**1.05**
St Dev	3.05	0.69	1.69	0.38	3.16	0.71	1.00	0.23
Count	8	8	8	8	8	8	8	8

Mating/Unmating Durability Group

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	17.07	3.84	4.22	0.95	18.32	4.12	5.75	1.29
Maximum	24.42	5.49	11.24	2.53	26.83	6.03	12.04	2.71
Average	20.77	**4.67**	6.77	**1.52**	22.12	**4.97**	8.80	**1.98**
St Dev	2.87	0.64	2.24	0.50	2.95	0.66	2.03	0.46
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	18.58	4.18	6.84	1.54	19.16	4.31	7.42	1.67
Maximum	27.15	6.10	12.15	2.73	27.81	6.25	12.61	2.83
Average	22.74	**5.11**	9.20	**2.07**	23.52	**5.29**	9.75	**2.19**
St Dev	2.90	0.65	1.68	0.38	3.04	0.68	1.61	0.36
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	19.67	4.42	8.08	1.82	11.90	2.68	4.03	0.91
Maximum	28.01	6.30	12.94	2.91	17.98	4.04	5.47	1.23
Average	23.73	**5.33**	10.11	**2.27**	14.97	**3.37**	4.64	**1.04**
St Dev	2.98	0.67	1.55	0.35	2.23	0.50	0.52	0.12
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

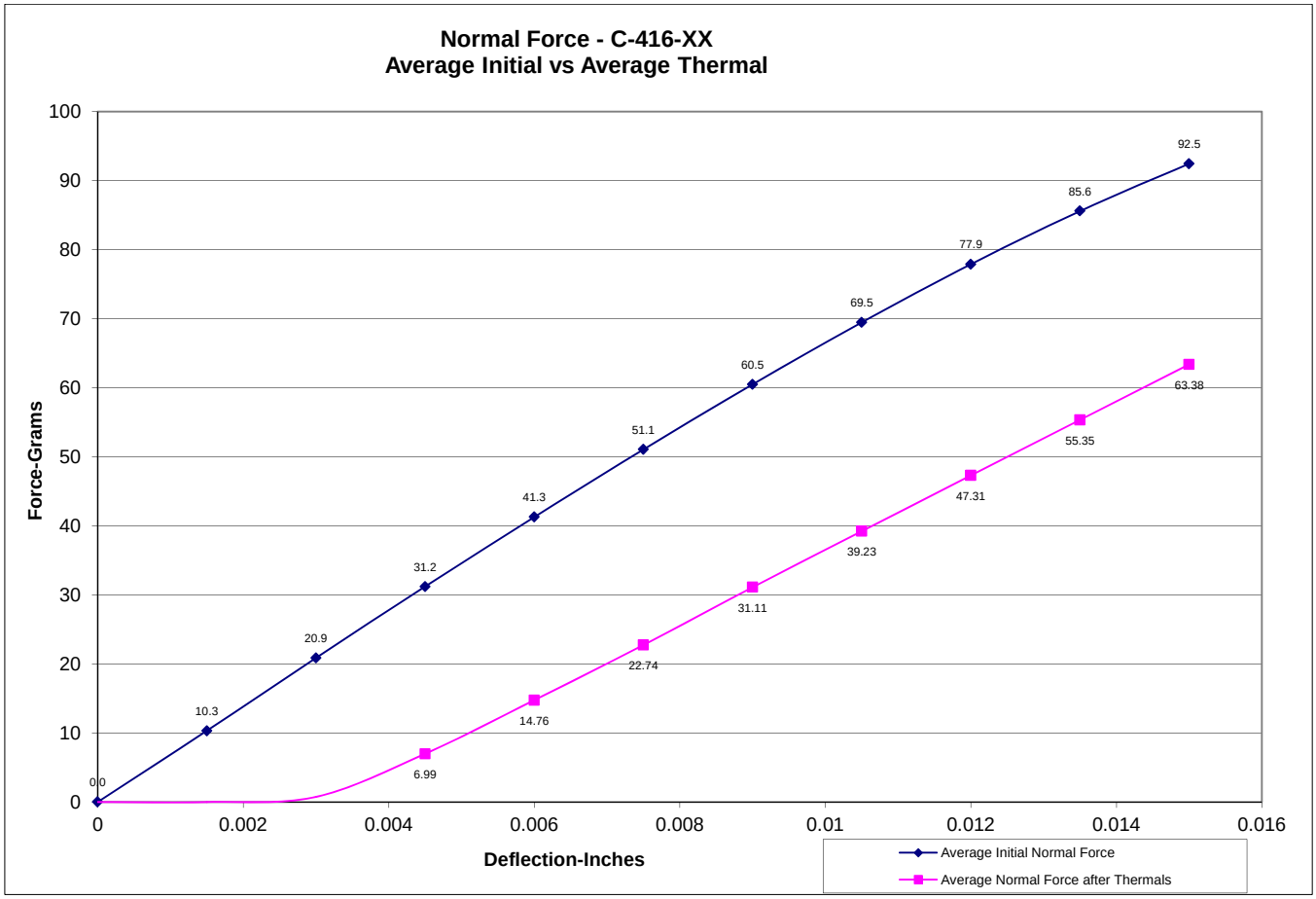
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

C-416

Initial	Deflections in inches Forces in Grams										
	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0135	0.0150	*SET*
Averages	**10.31**	**20.87**	**31.21**	**41.27**	**51.07**	**60.49**	**69.47**	**77.89**	**85.60**	**92.46**	**0.0014**
Min	9.30	18.60	27.60	35.90	44.30	53.00	61.80	70.60	78.80	86.20	0.0011
Max	11.20	22.20	32.70	43.50	53.50	63.40	72.70	81.40	89.10	96.00	0.0015
St. Dev	0.584	0.931	1.367	2.068	2.637	2.954	3.171	3.118	3.101	3.020	0.0001
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermal	Deflections in inches Forces in Grams										
	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0135	0.0150	*SET*
Averages	**0.00**	**0.75**	**6.99**	**14.76**	**22.74**	**31.11**	**39.23**	**47.31**	**55.35**	**63.38**	**0.0039**
Min	0.00	0.00	1.50	6.40	12.30	19.40	26.90	34.70	42.00	49.70	0.0029
Max	0.00	2.90	9.90	19.90	29.30	38.90	48.80	58.10	67.10	76.10	0.0049
St. Dev	0.000	1.174	2.690	4.544	5.963	7.118	7.770	8.159	8.647	9.187	0.0008
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

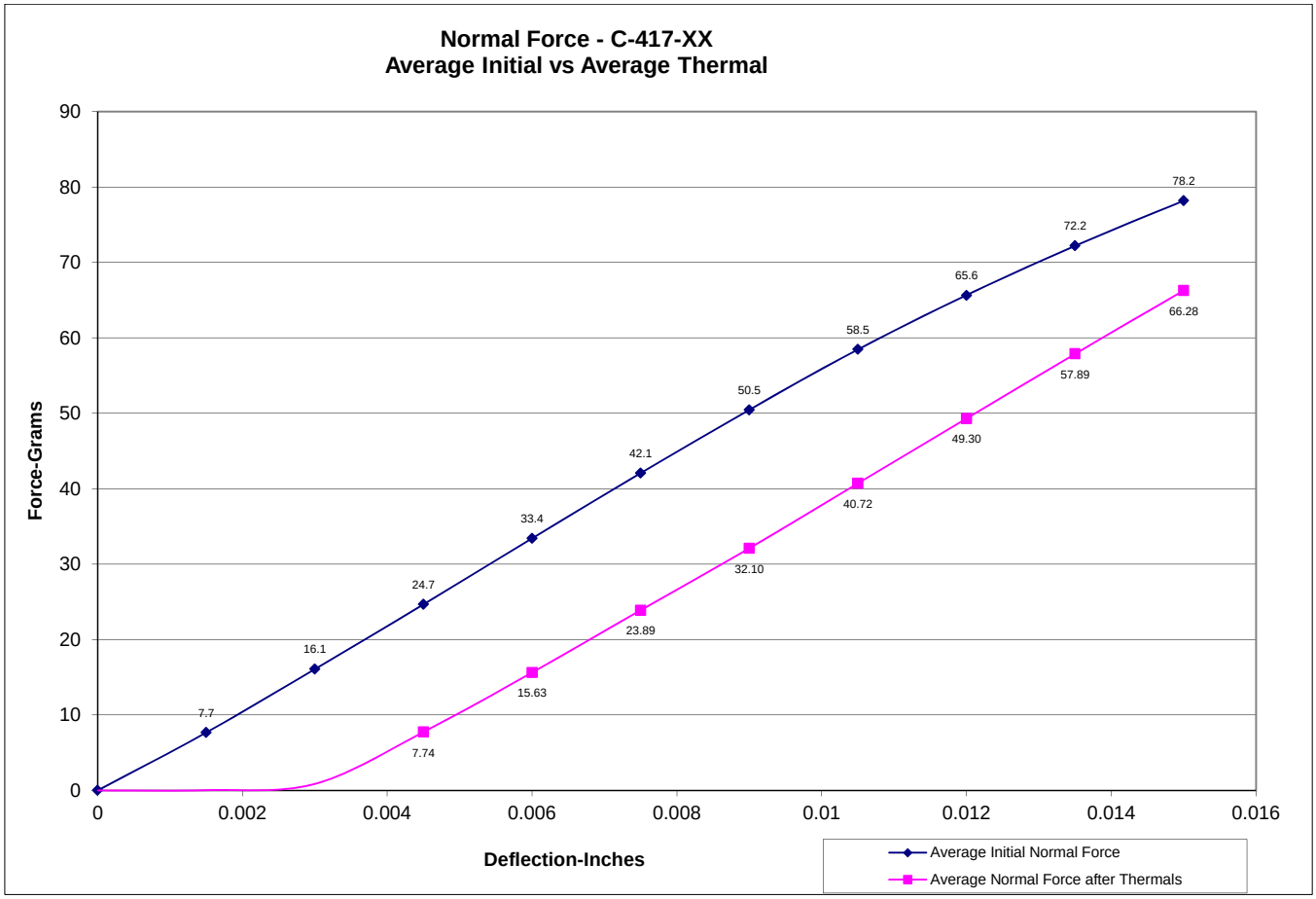
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

C-417

Initial	Deflections in inches Forces in Grams										
	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0135	0.0150	*SET*
Averages	**7.67**	**16.08**	**24.66**	**33.43**	**42.07**	**50.45**	**58.49**	**65.64**	**72.22**	**78.19**	**0.0010**
Min	6.10	13.50	21.60	29.70	37.90	46.00	54.30	60.20	66.40	72.00	0.0008
Max	9.20	18.90	28.60	37.90	46.90	55.60	63.70	71.50	78.70	85.00	0.0011
St. Dev	0.984	1.812	2.461	3.010	3.360	3.650	3.548	3.783	4.028	4.133	0.0001
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermal	Deflections in inches Forces in Grams										
	0.0015	0.0030	0.0045	0.0060	0.0075	0.0090	0.0105	0.0120	0.0135	0.0150	*SET*
Averages	**0.03**	**0.87**	**7.74**	**15.63**	**23.89**	**32.10**	**40.72**	**49.30**	**57.89**	**66.28**	**0.0030**
Min	0.00	0.00	4.10	12.00	21.40	29.70	38.20	46.30	54.20	62.30	0.0024
Max	0.30	2.80	10.80	18.50	26.20	34.00	42.40	51.00	59.70	68.90	0.0038
St. Dev	0.100	1.217	2.324	2.185	1.693	1.587	1.452	1.462	1.686	1.867	0.0005
Count	9	9	9	9	9	9	9	9	9	9	9



DATA SUMMARIES Continued

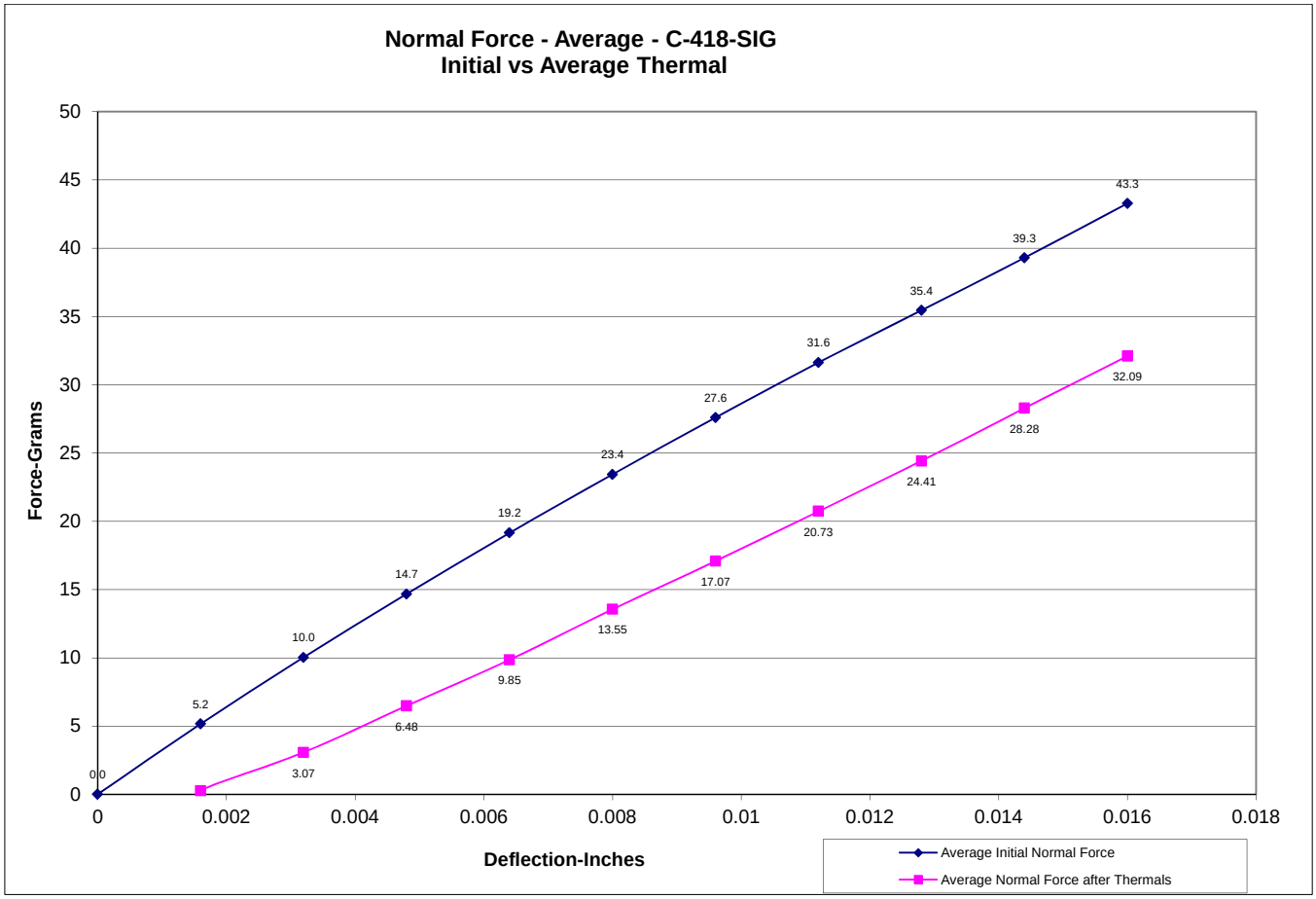
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

C-418 Signal

Initial	Deflections in inches Forces in Grams										
	0.0016	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0144	0.0160	*SET*
Averages	**5.16**	**10.02**	**14.67**	**19.15**	**23.43**	**27.59**	**31.62**	**35.44**	**39.29**	**43.27**	**0.0011**
Min	4.40	9.00	13.50	17.60	21.80	26.00	29.60	33.50	37.60	41.60	0.0004
Max	7.20	12.30	17.40	22.00	26.40	30.60	34.50	38.40	42.40	45.90	0.0016
St. Dev	0.958	1.116	1.306	1.450	1.498	1.557	1.613	1.626	1.656	1.489	0.0003
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermal	Deflections in inches Forces in Grams										
	0.0016	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0144	0.0160	*SET*
Averages	**0.25**	**3.07**	**6.48**	**9.85**	**13.55**	**17.07**	**20.73**	**24.41**	**28.28**	**32.09**	**0.0027**
Min	0.00	0.30	4.50	7.40	10.80	14.20	17.70	21.40	25.00	28.30	0.0012
Max	1.70	5.70	9.60	13.40	17.70	21.70	25.60	29.40	33.00	36.80	0.0034
St. Dev	0.538	1.462	1.685	2.033	2.367	2.654	2.788	2.919	2.916	2.954	0.0006
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

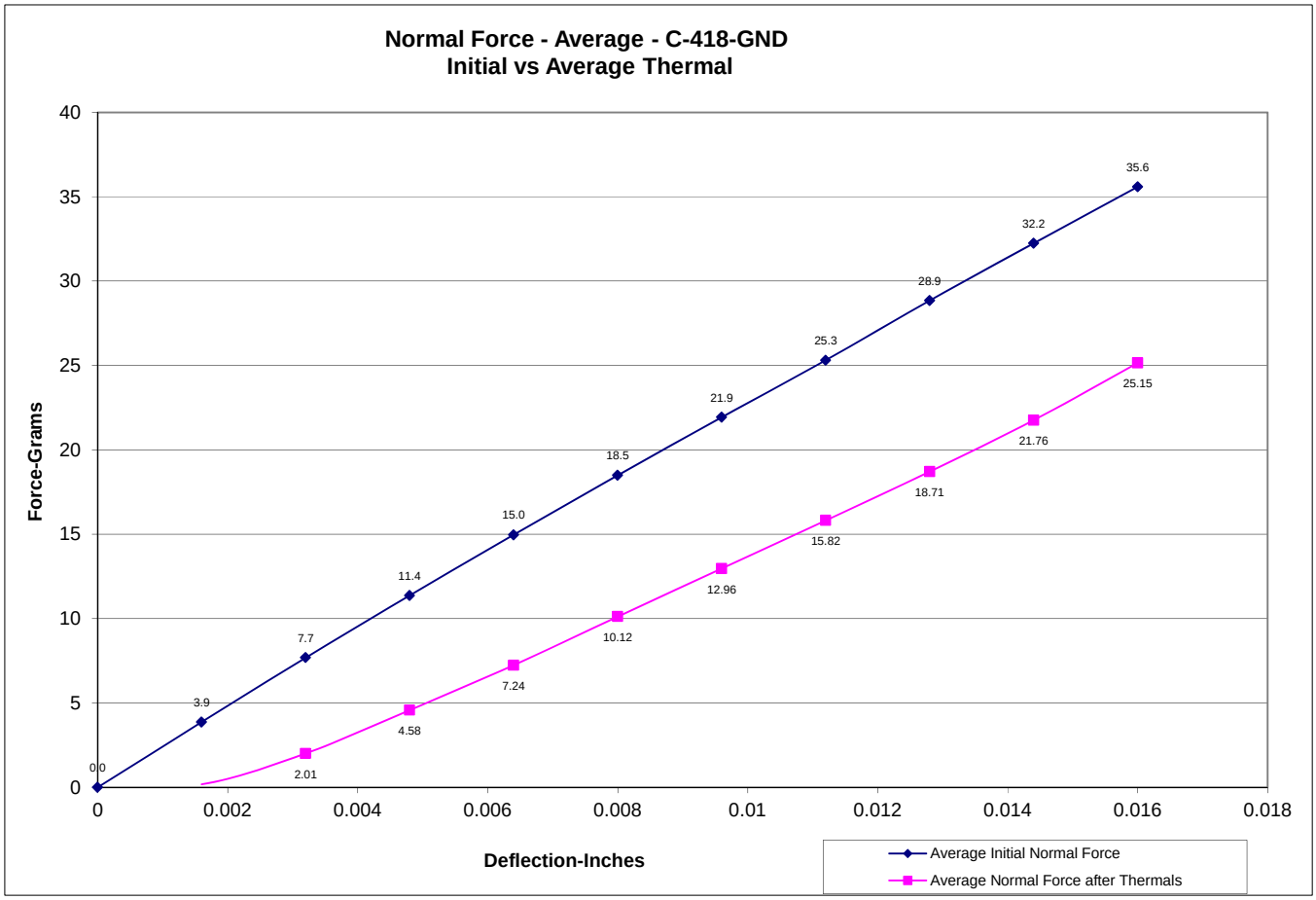
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

C-418 Ground

Initial	Deflections in inches Forces in Grams										
	0.0016	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0144	0.0160	*SET*
Averages	**3.86**	**7.69**	**11.37**	**14.96**	**18.50**	**21.93**	**25.31**	**28.85**	**32.24**	**35.59**	**0.0010**
Min	3.70	7.20	10.60	13.70	16.80	19.80	22.80	27.00	30.90	34.10	0.0003
Max	4.10	8.00	11.90	15.70	19.30	23.00	27.50	31.70	35.70	39.90	0.0020
St. Dev	0.135	0.251	0.450	0.665	0.856	1.072	1.344	1.322	1.349	1.659	0.0005
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermal	Deflections in inches Forces in Grams										
	0.0016	0.0032	0.0048	0.0064	0.0080	0.0096	0.0112	0.0128	0.0144	0.0160	*SET*
Averages	**0.18**	**2.01**	**4.58**	**7.24**	**10.12**	**12.96**	**15.82**	**18.71**	**21.76**	**25.15**	**0.0030**
Min	0.00	0.00	2.40	3.90	6.30	8.70	11.30	13.80	16.70	19.70	0.0016
Max	0.90	4.50	8.00	11.50	15.00	18.30	21.50	24.60	27.80	31.00	0.0046
St. Dev	0.322	1.306	1.640	2.016	2.371	2.633	2.811	3.032	3.229	3.446	0.0010
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

Cable Pull Force:

0° Pull

	Force (lbs)
Minimum	**43.50**
Maximum	62.00
Average	55.80

90° Pull

	Force (lbs)
Minimum	**7.50**
Maximum	11.00
Average	9.00

DATA SUMMARIES Continued

Cable Flex:

Insulation Resistance minimums, IR

Pin to Pin	
Mated	
Minimum	
Initial	36000
After 500 Flex Cycles	45000
Pin to Ground#1 (S1)	
Mated	
Minimum	
Initial	45000
After 500 Flex Cycles	45000
Pin to Ground#2 (S2)	
Mated	
Minimum	
Initial	45000
After 500 Flex Cycles	45000

Dielectric Withstanding Voltage minimums, DWV

Voltage Rating Summary	
Minimum	
Break Down Voltage	817
Test Voltage	613
Working Voltage	204

Pin to Pin	
Initial Test Voltage	Passed
After 500 Flex Cycles Test Voltage	Passed

Pin to Ground#1 (S1)	
Initial Test Voltage	Passed
After 500 Flex Cycles Test Voltage	Passed

Pin to Ground#2 (S2)	
Initial Test Voltage	Passed
After 500 Flex Cycles Test Voltage	Passed

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	LS Pin to LS Pin		
	Mated	Unmated	Unmated
Minimum	**FQSFP/CARD**	**FQSFP**	**CARD**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	45000	45000	Not Tested

	LS Row to LS Row		
	Mated	Unmated	Unmated
Minimum	**FQSFP/CARD**	**FQSFP**	**CARD**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	45000	45000	Not Tested

	LS Pin to Ground		
	Mated	Unmated	Unmated
Minimum	**FQSFP/CARD**	**FQSFP**	**CARD**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	45000	45000	Not Tested

	HS Pin to HS Pin		
	Mated	Unmated	Unmated
Minimum	**FQSFP/CARD**	**FQSFP**	**CARD**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	45000	45000	Not Tested

	HS Row to HS Row		
	Mated	Unmated	Unmated
Minimum	**FQSFP/CARD**	**FQSFP**	**CARD**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	45000	45000	Not Tested

	HS Pin to Ground		
	Mated	Unmated	Unmated
Minimum	**FQSFP/CARD**	**FQSFP**	**CARD**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	45000	45000	Not Tested

DATA SUMMARIES Continued

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**FQSFP/CARD**
Break Down Voltage	817
Test Voltage	610
Working Voltage	200

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

LS Row to LS Row	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

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

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

HS Row to HS Row	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

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

DATA SUMMARIES Continued

Compliant pin Insertion/Retention force:

FQSFP-01-02.36-L-PF-BC--HASL 0.016" PTH (SIG)

	.016 Signal PTH (HASL)			
	1st CYCLE		3rd CYCLE	
	Insertion Force (lbs.)	Withdrawal Force (lbs.)	Insertion Force (lbs.)	Withdrawal Force (lbs.)
Min. (lbs.)	4.06	1.31	3.23	1.51
Max. (lbs.)	5.18	2.12	4.07	2.39
Ave. (lbs.)	**4.35**	**1.72**	**3.71**	**1.88**

FQSFP-01-02.36-L-PF-BC--HASL 0.016" PTH (GND)

	.016 Ground PTH (HASL)			
	1st CYCLE		3rd CYCLE	
	Insertion Force (lbs.)	Withdrawal Force (lbs.)	Insertion Force (lbs.)	Withdrawal Force (lbs.)
Min. (lbs.)	5.17	1.27	3.83	1.19
Max. (lbs.)	5.80	2.11	4.31	2.10
Ave. (lbs.)	**5.41**	**1.55**	**4.07**	**1.62**

FQSFP-01-02.36-L-PF-BC--HASL 0.020" PTH (SIG)

	.020 Signal PTH (HASL)			
	1st CYCLE		3rd CYCLE	
	Insertion Force (lbs.)	Withdrawal Force (lbs.)	Insertion Force (lbs.)	Withdrawal Force (lbs.)
Min. (lbs.)	1.26	0.94	1.05	0.96
Max. (lbs.)	2.28	1.44	1.82	1.52
Ave. (lbs.)	**1.68**	**1.19**	**1.48**	**1.25**

FQSFP-01-02.36-L-PF-BC--HASL 0.020" PTH (GND)

	.020 Ground PTH (HASL)			
	1st CYCLE		3rd CYCLE	
	Insertion Force (lbs.)	Withdrawal Force (lbs.)	Insertion Force (lbs.)	Withdrawal Force (lbs.)
Min. (lbs.)	2.34	1.32	2.25	1.37
Max. (lbs.)	3.61	1.61	3.27	1.83
Ave. (lbs.)	**2.86**	**1.47**	**2.86**	**1.61**

DATA SUMMARIES Continued

Compliant pin Insertion/Retention force:

FQSFP-01-02.36-L-PF-BC--ENIG 0.020" PTH (SIG)

	.020 Signal PTH (ENIG)			
	1st CYCLE		3rd CYCLE	
	Insertion Force (lbs.)	Withdrawal Force (lbs.)	Insertion Force (lbs.)	Withdrawal Force (lbs.)
Min. (lbs.)	1.95	1.06	1.19	0.84
Max. (lbs.)	2.42	1.58	1.88	1.43
Ave. (lbs.)	**2.26**	**1.34**	**1.65**	**1.21**

FQSFP-01-02.36-L-PF-BC--ENIG 0.020" PTH (GND)

	.020 Ground PTH (ENIG)			
	1st CYCLE		3rd CYCLE	
	Insertion Force (lbs.)	Withdrawal Force (lbs.)	Insertion Force (lbs.)	Withdrawal Force (lbs.)
Min. (lbs.)	2.49	1.25	1.44	0.81
Max. (lbs.)	3.17	1.58	2.32	1.70
Ave. (lbs.)	**2.83**	**1.44**	**1.91**	**1.29**

DATA SUMMARIES Continued

LLCR Durabiltiy:

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

	LLCR Measurement Summaries by Pin Type			
Date	1/23/2017	1/26/2017	2/1/2017	2/14/2017
Room Temp (Deg C)	22	22	23	22
Rel Humidity (%)	36	35	35	35
Technician	Troy Cook	Troy Cook	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	109.50	0.98	1.08	1.58
St. Dev.	3.15	0.88	1.13	1.59
Min	105.24	0.01	0.02	0.00
Max	116.60	4.05	6.28	10.25
Summary Count	128	128	128	128
Total Count	128	128	128	128
	Pin Type 2: Ground			
Average	13.64	1.52	3.61	3.03
St. Dev.	3.59	1.52	4.46	1.86
Min	8.86	0.03	0.00	0.41
Max	18.88	5.77	19.68	9.39
Summary Count	16	16	16	16
Total Count	16	16	16	16
	Pin Type 3: Row 1			
Average	26.60	1.27	1.83	1.75
St. Dev.	1.29	1.13	1.07	0.82
Min	24.05	0.02	0.27	0.55
Max	29.75	4.43	3.55	3.53
Summary Count	24	24	24	24
Total Count	24	24	24	24
	Pin Type 4: Row 2			
Average	32.08	0.96	1.56	1.78
St. Dev.	0.99	0.77	1.10	1.10
Min	30.02	0.03	0.28	0.33
Max	34.45	2.67	3.95	4.50
Summary Count	24	24	24	24
Total Count	24	24	24	24

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
100 Cycles	**191**	**1**	**0**	**0**	**0**	**0**
Therm Shck	**190**	**1**	**0**	**1**	**0**	**0**
Humidity	**186**	**5**	**1**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Thermal aging

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

	LLCR Measurement Summaries by Pin Type			
Date	1/24/2017	2/10/2017		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	35	32		
Technician	Troy Cook	Troy Cook		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	109.51	1.19		
St. Dev.	3.10	1.21		
Min	104.85	0.03		
Max	115.99	5.45		
Summary Count	128	127		
Total Count	128	127		
	Pin Type 2: Ground			
Average	15.18	3.46		
St. Dev.	4.98	4.85		
Min	9.52	0.61		
Max	25.49	20.22		
Summary Count	16	16		
Total Count	16	16		
	Pin Type 3: Row 1			
Average	26.14	1.25		
St. Dev.	1.77	1.24		
Min	23.42	0.02		
Max	30.04	3.45		
Summary Count	24	24		
Total Count	24	24		
	Pin Type 4: Row 2			
Average	31.44	1.41		
St. Dev.	1.56	1.42		
Min	29.24	0.04		
Max	34.07	4.22		
Summary Count	24	24		
Total Count	24	24		

Note: Broken solder joint on cable of the signal group.

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal	**187**	**3**	**0**	**1**	**0**	**0**

DATA SUMMARIES Continued

LLCR GAS TIGHT:

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

	LLCR Measurement Summaries by Pin Type			
Date	2/10/2016	2/11/2016		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	31	35		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Cable			
Average	33.61	0.61		
St. Dev.	2.39	0.56		
Min	29.49	0.00		
Max	37.44	2.66		
Summary Count	128	128		
Total Count	128	128		
	Pin Type 2: Ground			
Average	11.87	0.07		
St. Dev.	2.36	0.05		
Min	9.00	0.00		
Max	15.10	0.19		
Summary Count	16	16		
Total Count	16	16		
	Pin Type 3: Signal			
Average	30.29	0.39		
St. Dev.	2.63	0.26		
Min	25.67	0.03		
Max	33.92	1.12		
Summary Count	48	48		
Total Count	48	48		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**192**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock Vib:

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

LLCR Measurement Summaries by Pin Type				
Date	3/1/2016	3/10/2016		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	32	42		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Cable			
Average	113.39	1.72		
St. Dev.	4.49	1.05		
Min	107.00	0.03		
Max	123.42	4.88		
Summary Count	128	128		
Total Count	128	128		
	Pin Type 2: Ground			
Average	19.69	7.24		
St. Dev.	6.72	7.15		
Min	9.31	0.18		
Max	35.46	28.70		
Summary Count	16	16		
Total Count	16	16		
	Pin Type 3: Signal			
Average	32.18	1.55		
St. Dev.	5.92	1.15		
Min	22.18	0.06		
Max	43.67	3.50		
Summary Count	48	48		
Total Count	48	48		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**185**	**3**	**3**	**1**	**0**	**0**

DATA SUMMARIES Continued

Shock Vibration 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 Insertion/Retention force:

1) The following guidelines are used to categorize the changes in LLCR for compliant pin only. Total 32 signal and 30 ground points were measured.
   a. <= +1.0 mOhms: ---------- Stable
   b. > +1.0 mOhms: ---------- Unstable

HASL 0.016"

	LLCR Measurement Summaries by Pin Type			
Date	2/10/2016	2/12/2016		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	33	31		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta 3 Cycles**	**Delta**	**Delta**
HASL .016	**Pin Type 1: Signal**			
Average	0.04	0.03		
St. Dev.	0.01	0.02		
Min	0.03	0.00		
Max	0.07	0.08		
Summary Count	32	32		
Total Count	32	32		
	Pin Type 2: Ground			
Average	0.03	0.12		
St. Dev.	0.01	0.05		
Min	0.02	0.01		
Max	0.04	0.18		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**.67& <=1**	**>15 & <=50**	**>50 & <=1000**	**>1000**
3 Cycles	**62**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

HASL 0.020"

	LLCR Measurement Summaries by Pin Type			
Date	2/10/2016	2/12/2016		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	34	31		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta 3 Cycles**	**Delta**	**Delta**
HASL .020	**Pin Type 1: Signal**			
Average	0.04	0.03		
St. Dev.	0.01	0.02		
Min	0.02	0.00		
Max	0.07	0.09		
Summary Count	32	32		
Total Count	32	32		
	Pin Type 2: Ground			
Average	0.07	0.03		
St. Dev.	0.03	0.02		
Min	0.04	0.00		
Max	0.14	0.09		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**.67 & <=1**	**>15 & <=50**	**>50 & <=1000**	**>1000**
3 Cycles	**62**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

ENIG 0.020"

	LLCR Measurement Summaries by Pin Type			
Date	2/10/2016	2/12/2016		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	32	33		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta 3 Cycles**	**Delta**	**Delta**
ENIG .020	**Pin Type 1: Signal**			
Average	0.17	0.03		
St. Dev.	0.04	0.03		
Min	0.11	0.00		
Max	0.25	0.12		
Summary Count	32	32		
Total Count	32	32		
	Pin Type 2: Ground			
Average	0.09	0.04		
St. Dev.	0.03	0.03		
Min	0.03	0.00		
Max	0.19	0.14		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>15 & <=50**	**>50 & <=1000**	**>1000**
3 Cycles	**62**	**0**	**0**	**0**	**0**	**0**

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 05/24/2016, Next Cal: 08/24/2017

Equipment #: TCT-06
Description: Test Resources test stand
Manufacturer: Test Resources
Model: 100R250-12
Serial #: 0710016-01
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Displacement: +/- 5 micrometers.
… Last Cal: 05/03/2016, Next Cal: 05/03/2017

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 #: OV-05
Description: Forced Air Oven, 5 Cu. Ft., 120 V (Chamber Room)
Manufacturer: Sheldon Mfg.
Model: CE5F
Serial #: 02008008
Accuracy: +/- 5 deg. C
… Last Cal: 02/18/2016, Next Cal: 02/18/2017

Equipment #: THC-01
Description: Temperature/Humidity Chamber (Chamber Room)
Manufacturer: Thermotron
Model: SM-8-7800
Serial #: 30676
Accuracy: See Manual
… Last Cal: 10/24/2016, Next Cal: 10/24/2017

Equipment #: TSC-01
Description: Vertical Thermal Shock Chamber
Manufacturer: Cincinnati Sub Zero
Model: VTS-3-6-6-SC/AC
Serial #: 10-VT14993
Accuracy: See Manual
… Last Cal: 06/30/2016, Next Cal: 06/30/2017

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-02
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0780546
Accuracy: Last Cal: 6/16/2016, Next Cal: 6/16/2017

Equipment #: PS-01
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 3329A-07330
Accuracy: Last Cal: 6/12/2016, Next Cal: 6/12/2017

Equipment #: PS-02
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 2847A-04167
Accuracy: Last Cal: 6/12/2016, Next Cal: 6/12/2017

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 11/30/2016, Next Cal: 11/30/2017

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 7/9/2016, Next Cal: 7/9/2017

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 6/4/2016, Next Cal: 6/4/2017