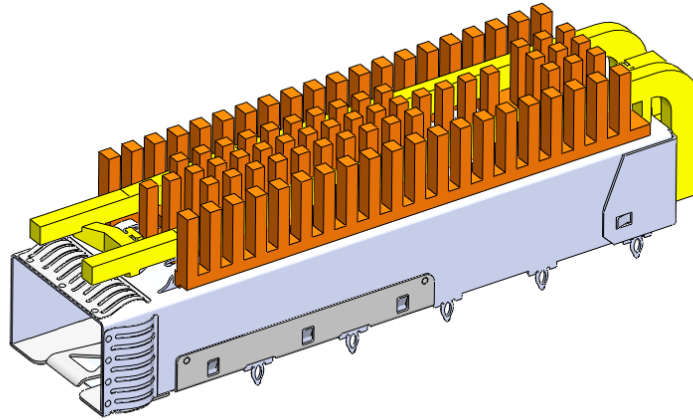
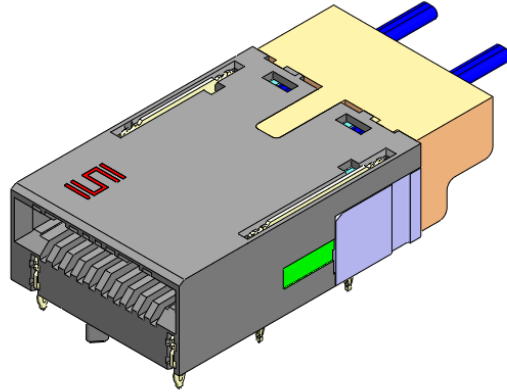


Project Number: Design Qualification Test Report	Tracking Code: CR-1029905_Report_Rev_1
Requested by: Roy Luo	Date: 8/20/2024
Part #: FSFP-01-XX.X-1-BC/SFP112 TEST MODULE	
Part description: FSFP/SFP112 TEST MODULE	Tech: Peter Chen
Test Start: 12/21/2023	Test Completed: 5/20/2024



DESIGN QUALIFICATION TEST REPORT

**FSFP/SFP112 TEST MODULE
FSFP-01-XX.X-1-BC/SFP112 TEST MODULE**

Tracking Code: CR-1029905_Report_Rev_1	Part #: FSFP-01-XX.X-1-BC/SFP112 TEST MODULE
Part description: FSFP/SFP112 TEST MODULE	

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
5/23/2024	1	Initial Issue	PC

CERTIFICATION

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

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SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) After soldering, the parts to be used for LLCR 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-113182-TST/PCB-113183-TST/ PCB-113155-TST.

FLOWCHARTS**Gas Tight**Group 1

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
8 Assemblies
ENIG .0165" PTH

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

Compliant Pin OnlyGroup 2

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
30 Contacts Minimum
ENIG .0165" PTH

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

(1) Gas Tight = EIA-364-36

(2) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(3) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

FLOWCHARTS Continued**Normal Force****IM-C-540-1-S**Group 1

FSFP-01-XX.X-1-BC

8 Contacts Minimum
Signal Pair Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force ⁽¹⁾

Group 2FSFP-01-XX.X-1-BC
SFP112 TEST MODULE8 Contacts Minimum
Signal Pair With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age ⁽²⁾
3.	Contact Gaps
4.	Normal Force ⁽¹⁾

Group 3

FSFP-01-XX.X-1-BC

8 Contacts Minimum
Ground Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force ⁽¹⁾

Group 4FSFP-01-XX.X-1-BC
SFP112 TEST MODULE8 Contacts Minimum
Ground With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age ⁽²⁾
3.	Contact Gaps
4.	Normal Force ⁽¹⁾

C-538-XX-SGroup 5

FSFP-01-XX.X-1-BC

8 Contacts Minimum
Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force ⁽¹⁾

Group 6FSFP-01-XX.X-1-BC
SFP112 TEST MODULE8 Contacts Minimum
With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age ⁽²⁾
3.	Contact Gaps
4.	Normal Force ⁽¹⁾

C-539-XX-SGroup 7

FSFP-01-XX.X-1-BC

8 Contacts Minimum
Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force ⁽¹⁾

Group 8FSFP-01-XX.X-1-BC
SFP112 TEST MODULE8 Contacts Minimum
With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age ⁽²⁾
3.	Contact Gaps
4.	Normal Force ⁽¹⁾

(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

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
8 Assemblies
ENIG .0165" PTH

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

Compliant Pin OnlyGroup 2

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
30 Contacts Minimum
ENIG .0165" PTH

Step	Description
1.	LLCR (1)
2.	Thermal Age (3)
3.	LLCR (1) Max Delta = 1 mOhm

(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

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
8 Assemblies
ENIG .0165" PTH

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) - Non Standard
15.	LLCR (2) Max Delta = 15 mOhm
16.	Humidity (1)
17.	LLCR (2) Max Delta = 15 mOhm
18.	Mating/Unmating Force (3)

Compliant Pin OnlyGroup 2

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
30 Contacts Minimum
ENIG .0165" PTH

Step	Description
1.	LLCR (2)
2.	Thermal Shock (4) - Non Standard
3.	LLCR (2) Max Delta = 1 mOhm
4.	Humidity (1)
5.	LLCR (2) Max Delta = 1 mOhm

- (1) Humidity = EIA-364-31
Test Condition = B (240 Hours)
Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)
Test Exceptions: ambient pre-condition and delete steps 7a and 7b
- (2) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
- (3) Mating/Unmating Force = EIA-364-13
- (4) Thermal Shock = Other
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = (-40°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued**IR/DWV***Note: ENIG .0165" PTH***LS Pin-to-LS Pin**Group 1

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 2

FSFP-01-XX.X-1-BC

2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 3

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

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)

LS Row-to-LS RowGroup 4

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 5

FSFP-01-XX.X-1-BC

2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 6

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

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)

FLOWCHARTS Continued**HS Pin-to-HS Pin**

Group 7
FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

Step	Description
1.	DWV Breakdown ⁽²⁾

Group 8
FSFP-01-XX.X-1-BC

2 Assemblies

Step	Description
1.	DWV Breakdown ⁽²⁾

Group 9
FSFP-01-XX.X-1-BC

2 Assemblies

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⁾

HS Pin-to-Ground

Group 10
FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

Step	Description
1.	DWV Breakdown ⁽²⁾

Group 11
FSFP-01-XX.X-1-BC

2 Assemblies

Step	Description
1.	DWV Breakdown ⁽²⁾

Group 12
FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

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⁾

FLOWCHARTS Continued**Ground to Cage Ground**Group 13

FSFP-01--XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

Step Description

1. DWV Breakdown⁽²⁾

Group 14

FSFP-01--XX.X-1-BC
2 Assemblies

Step Description

1. DWV Breakdown⁽²⁾

Group 15

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Assemblies

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 = (-40°C to +85°C)
Test Duration = A-3 (100 Cycles)
EIA-364-32

FLOWCHARTS Continued**Current Carrying Capacity**Group 1

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
2 Pins Powered
Signal - ENIG .0165" PTH

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

Group 2

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
4 Pins Powered
Signal - ENIG .0165" PTH

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

Group 3

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
6 Pins Powered
Signal - ENIG .0165" PTH

Step	Description
1.	CCC ⁽¹⁾ Rows = 1 Number of Positions = 6

Group 4

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
8 Pins Powered
Signal - ENIG .0165" PTH

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

Group 5

FSFP-01-XX.X-1-BC
PCB-XXXXXX-TST-XX
10 Pins Powered
Signal - ENIG .0165" PTH

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

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
8 Assemblies
ENIG .0165" PTH

Step Description

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

Compliant Pin OnlyGroup 2

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
30 Contacts Minimum
ENIG .0165" PTH

Step Description

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

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mechanical Shock = Other

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)

FLOWCHARTS Continued**Mechanical Shock/Random Vibration/Event Detection**Group 1

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
60 Points
ENIG .0165" PTH

Step	Description
1.	Nanosecond Event Detection (Mechanical Shock) ⁽¹⁾ - Non Standard
2.	Nanosecond Event Detection (Random Vibration) ⁽²⁾

-
- (1) Nanosecond Event Detection (Mechanical Shock) = Other
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)

Cable PullGroup 1

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
5 Assemblies
0 Degrees

Step	Description
1.	Cable Pull ⁽¹⁾

Group 2

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
5 Assemblies
90 Degrees Vertical

Step	Description
1.	Cable Pull ⁽¹⁾

Group 3

FSFP-01-XX.X-1-BC
SFP112 TEST MODULE
5 Assemblies
90 Degrees Lateral

Step	Description
1.	Cable Pull ⁽¹⁾

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

FLOWCHARTS Continued**Cable Flex**Group 1

FSFP-01-XX.X-1-BC

SFP112 TEST MODULE

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 ConditioningLow Speed Signal

Group 1 FSFP-01-XX.X-1-BC		Group 2 FSFP-01-XX.X-1-BC		Group 3 FSFP-01-XX.X-1-BC		Group 10 FSFP-01-XX.X-1-BC	
32 Points HASL .0125" PTH (LS Sig)		32 Points HASL .0165" PTH (LS Sig)		32 Points ENIG .0165" PTH (LS Sig)		32 Points HASL .0125" PTH (LS Sig)	
Step	Description	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	1.	LLCR (1) Note: Part 1
2.	Retention Force Rate = 2.54 mm/min Note: Pin 1 Note: EIA 364-29	2.	Retention Force Rate = 2.54 mm/min Note: Pin 1 Note: EIA 364-29	2.	Retention Force Rate = 2.54 mm/min Note: Pin 1 Note: EIA 364-29	2.	Cycles Quantity = 1 Cycles Note: Part 2
3.	Cycles Quantity = 1 Cycles Note: Pin 2	3.	Cycles Quantity = 1 Cycles Note: Pin 2	3.	Cycles Quantity = 1 Cycles Note: Pin 2	3.	LLCR (1) Max Delta = 1 mOhm Note: Part 3
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	4.	Hole Integrity Note: Check for distortion of the PTH according to EIA 364-96
5.	Retention Force Rate = 2.54 mm/min Note: Pin 3 Note: EIA 364-29	5.	Retention Force Rate = 2.54 mm/min Note: Pin 3 Note: EIA 364-29	5.	Retention Force Rate = 2.54 mm/min Note: Pin 3 Note: EIA 364-29		
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		
Group 11 FSFP-01-XX.X-1-BC		Group 12 FSFP-01-XX.X-1-BC					
32 Points HASL .0165" PTH (LS Sig)		32 Points ENIG .0165" PTH (LS Sig)					
Step	Description	Step	Description				
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				
3.	LLCR (1) Max Delta = 1 mOhm Note: Part 3	3.	LLCR (1) Max Delta = 1 mOhm Note: Part 3				
4.	Hole Integrity Note: Check for distortion of the PTH according to EIA 364-96	4.	Hole Integrity Note: Check for distortion of the PTH according to EIA 364-96				

FLOWCHARTS Continued

Ground

<u>Group 4</u> FSFP-01-XX.X-1-BC		<u>Group 5</u> FSFP-01-XX.X-1-BC		<u>Group 6</u> FSFP-01-XX.X-1-BC		<u>Group 13</u> FSFP-01-XX.X-1-BC	
32 Points HASL .0125" PTH (Ground)		32 Points HASL .0165" PTH (Ground)		32 Points ENIG .0165" PTH (Ground)		32 Points HASL .0125" PTH (Ground)	
Step	Description	Step	Description	Step	Description	Step	Description
1.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 1</i>	1.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 1</i>	1.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 1</i>	1.	LLCR ⁽¹⁾ <i>Note: Part 1</i>
2.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA 364-29</i>	2.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA 364-29</i>	2.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA 364-29</i>	2.	Cycles Quantity = 1 Cycles <i>Note: Part 2</i>
3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	3.	LLCR ⁽¹⁾ Max Delta = 1 mOhm <i>Note: Part 3</i>
4.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 3</i>	4.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 3</i>	4.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 3</i>	4.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>
5.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA 364-29</i>	5.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA 364-29</i>	5.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA 364-29</i>		
6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>	6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>	6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>		
<u>Group 14</u> FSFP-01-XX.X-1-BC		<u>Group 15</u> FSFP-01-XX.X-1-BC					
32 Points HASL .0165" PTH (Ground)		32 Points ENIG .0165" PTH (Ground)					
Step	Description	Step	Description				
1.	LLCR ⁽¹⁾ <i>Note: Part 1</i>	1.	LLCR ⁽¹⁾ <i>Note: Part 1</i>				
2.	Cycles Quantity = 1 Cycles <i>Note: Part 2</i>	2.	Cycles Quantity = 1 Cycles <i>Note: Part 2</i>				
3.	LLCR ⁽¹⁾ Max Delta = 1 mOhm <i>Note: Part 3</i>	3.	LLCR ⁽¹⁾ Max Delta = 1 mOhm <i>Note: Part 3</i>				
4.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>	4.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>				

FLOWCHARTS Continued**Cage**

Group 7
FSFP-01-XX.X-1-BC

30 Points
HASL .039" PTH (Cage)

Step	Description
1.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 1</i>
2.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA 364-29</i>
3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>
4.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 3</i>
5.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA 364-29</i>
6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>

Group 8
FSFP-01-XX.X-1- BC

30 Points
HASL .043" PTH (Cage)

Step	Description
1.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 1</i>
2.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA 364-29</i>
3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>
4.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 3</i>
5.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA 364-29</i>
6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>

Group 9
FSFP-01-XX.X-1-BC

30 Points
ENIG .043" PTH (Cage)

Step	Description
1.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 1</i>
2.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 1</i> <i>Note: EIA 364-29</i>
3.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>
4.	Insertion Force Rate = 2.54 mm/min <i>Note: Pin 3</i>
5.	Retention Force Rate = 2.54 mm/min <i>Note: Pin 3</i> <i>Note: EIA 364-29</i>
6.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

FLOWCHARTS Continued**Compliant Pin Buckling**

Group 1
FSFP-01-XX.X-1-BC

20 Assemblies
HASL .0125" PTH

Step	Description
1.	Contact Gaps
2.	Measure PTH Diameter
3.	Press Fit Connectors
4.	Visual Connector Inspection <i>Note: Inspect the connector for buckling. Document findings.</i>
5.	Cross-Section Connectors <i>Note: Inspect the connector for buckling. Document findings.</i> <i>Note: Cross-section 3 connectors</i>

Group 2
SFPC-1-2-S-F

20 Assemblies
HASL .039" PTH

Step	Description
1.	Contact Gaps
2.	Measure PTH Diameter
3.	Press Fit Connectors
4.	Visual Connector Inspection <i>Note: Inspect the connector for buckling. Document findings.</i>
5.	Cross-Section Connectors <i>Note: Inspect the connector for buckling. Document findings.</i> <i>Note: Cross-section 3 connectors</i>

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

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

THERMAL:

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

HUMIDITY:

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

MECHANICAL SHOCK (Specified Pulse):

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

VIBRATION:

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

NANOSECOND-EVENT DETECTION:

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

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

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. 85° C
 - c. 95° C
 - d. 115° C
- 8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
- 9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
- 10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
- 11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
- 12) Hook-up wire length is longer than the minimum specified in the referencing standard.

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 TC², computer controlled test stand with a deflection measurement system accuracy of 5 μm (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 $\pm 0.2\%$.
- 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 TC² software in order to acquire and record the test data.
- 14) The permanent set of each contact shall be measured within the TC² 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.

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. $\leq +5.0$ 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) The following guidelines are used to categorize the changes in LLCR for compliant pin only
 - a. $\leq +0.33$ mOhms: -----Stable
 - b. $+0.33$ to $+0.67$ mOhms: -----Minor
 - c. $+0.67$ to $+1.00$ mOhms: -----Acceptable
 - d. $+1.00$ to $+50.0$ mOhms: -----Marginal
 - e. $+50.1$ to $+1000$ mOhms -----Unstable
 - f. $>+1000$ mOhms:-----Open Failure

GAS TIGHT:

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

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

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

INSULATION RESISTANCE (IR):

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

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

Insertion/Retention force

- 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.

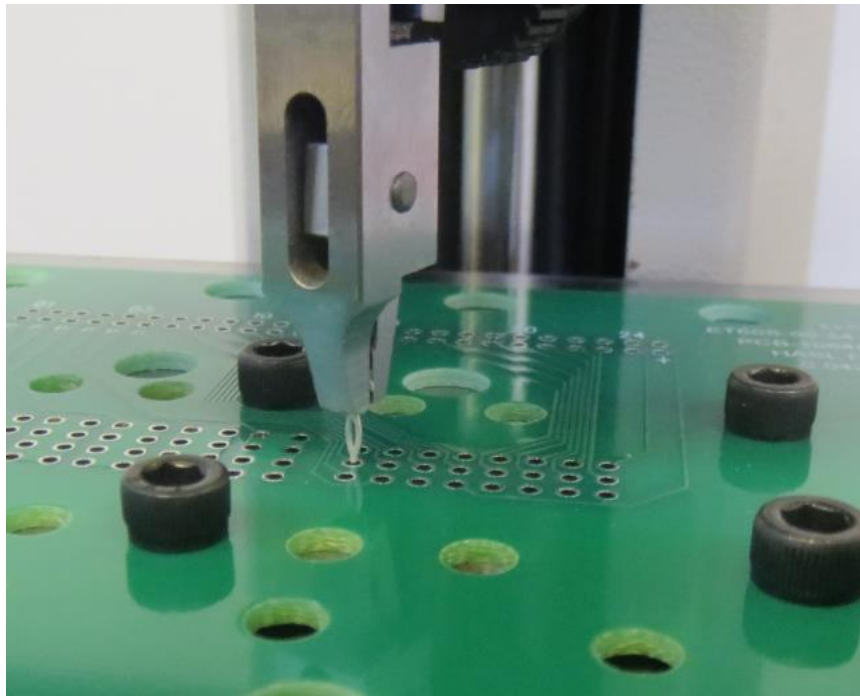


Fig. 1

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 0° , in-line with cable
 - b. At 90° , in-line with cable



Fig. 2
 0° Connector pull

CABLE Flex:

- 1) Oscillate and monitor electrical continuity for open circuit indication.
 - a. $\pm 70^\circ$ Flex Mode, bend up to 500 cycles. load on 1.792 oz.

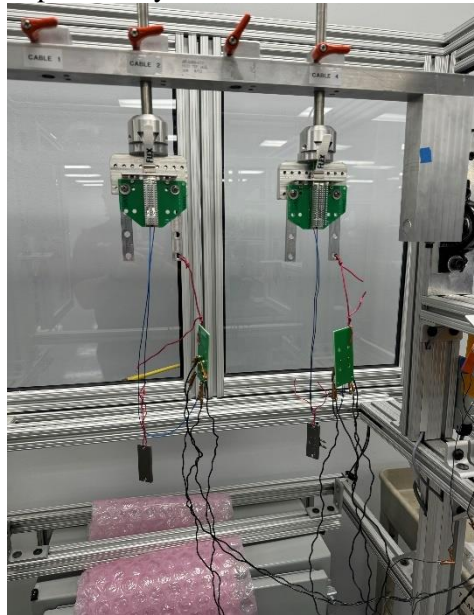


Fig. 3
(Setup picture)

RESULTS

Compliant Pin Buckling

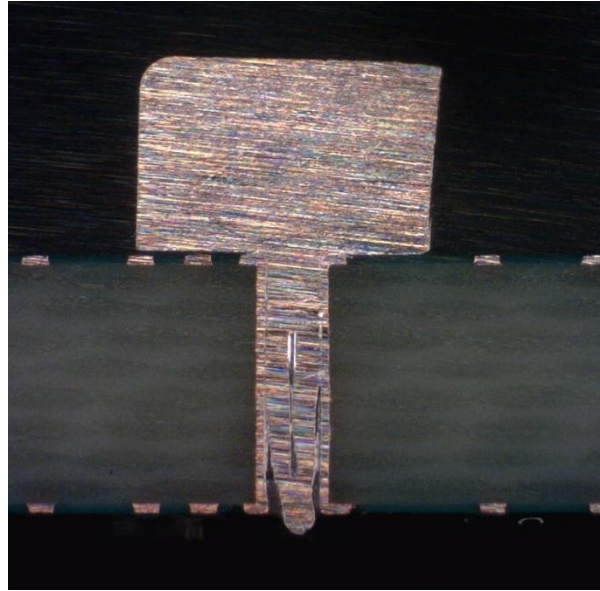


Fig. 4
HASL .0125" PTH

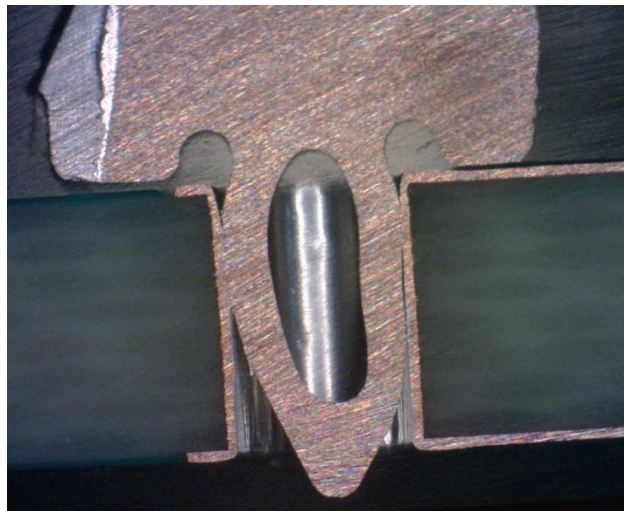


Fig. 5
HASL .039" PTH

RESULTS Continued**Temperature Rise, CCC at a 20% de-rating****Power pin**

- CCC for a 30°C Temperature Rise-----2.6 A per contact with 2 Signal contacts (1x2) powered
- CCC for a 30°C Temperature Rise-----2.1 A per contact with 4 Signal contacts (1x4) powered
- CCC for a 30°C Temperature Rise-----1.8 A per contact with 6 Signal contacts (1x6) powered
- CCC for a 30°C Temperature Rise-----1.7 A per contact with 8 Signal contacts (1x8) powered
- CCC for a 30°C Temperature Rise-----1.6 A per contact with All Signal contacts (2x5) powered

Mating/Unmating Forces:**Thermal Aging Group**

- **Initial**
 - **Mating**
 - Min -----11.05 Lbs
 - Max-----15.00 Lbs
 - **Unmating**
 - Min ----- 8.89 Lbs
 - Max-----10.21 Lbs
- **After Thermal**
 - **Mating**
 - Min ----- 8.50 Lbs
 - Max-----11.08 Lbs
 - **Unmating**
 - Min ----- 6.74 Lbs
 - Max----- 8.07 Lbs

Mating/Unmating Durability Group

- **Initial**
 - **Mating**
 - Min -----10.28 Lbs
 - Max-----15.24 Lbs
 - **Unmating**
 - Min ----- 8.57 Lbs
 - Max-----10.39 Lbs
- **After 25 Cycles**
 - **Mating**
 - Min -----10.75 Lbs
 - Max-----15.87 Lbs
 - **Unmating**
 - Min -----12.18 Lbs
 - Max-----16.93 Lbs
- **After 50 Cycles**
 - **Mating**
 - Min -----10.56 Lbs
 - Max-----17.32 Lbs
 - **Unmating**
 - Min -----13.44 Lbs
 - Max-----18.39 Lbs
- **After 75 Cycles**
 - **Mating**
 - Min -----10.58 Lbs
 - Max-----18.35 Lbs
 - **Unmating**
 - Min -----14.10 Lbs
 - Max-----18.12 Lbs

RESULTS Continued

- **After 100 Cycles**
 - **Mating**
 - **Min** -----12.25 Lbs
 - **Max** -----18.62 Lbs
 - **Unmating**
 - **Min** -----14.50 Lbs
 - **Max** -----18.76 Lbs
- **After Humidity**
 - **Mating**
 - **Min** ----- 6.51 Lbs
 - **Max** ----- 9.84 Lbs
 - **Unmating**
 - **Min** ----- 4.39 Lbs
 - **Max** ----- 7.82 Lbs

Normal Force**IM-C-540-1-S-Signal Pin at 0.0124 inches deflection**

- **Initial**
 - **Min** -----65.60 gf **Set** ---- 0.0004 inch
 - **Max** -----76.50 gf **Set** ---- 0.0015 inch
- **Thermal**
 - **Min** -----34.00 gf **Set** ---- 0.0034 inch
 - **Max** -----47.50 gf **Set** ---- 0.0058 inch

IM-C-540-1-S-Ground Pin at 0.0122 inches deflection

- **Initial**
 - **Min** -----47.40 gf **Set** ---- 0.0000 inch
 - **Max** -----52.40 gf **Set** ---- 0.0007 inch
- **Thermal**
 - **Min** -----27.80 gf **Set** ---- 0.0037 inch
 - **Max** -----35.30 gf **Set** ---- 0.0055 inch

C-538-XX-S at 0.0129 inches deflection

- **Initial**
 - **Min** ----- 102.70 gf **Set** ---- 0.0008 inch
 - **Max** ----- 107.30 gf **Set** ---- 0.0016 inch
- **Thermal**
 - **Min** -----61.00 gf **Set** ---- 0.0044 inch
 - **Max** -----77.40 gf **Set** ---- 0.0063 inch

C-539-XX-S at 0.0127 inches deflection

- **Initial**
 - **Min** -----85.30 gf **Set** ---- 0.0004 inch
 - **Max** -----96.60 gf **Set** ---- 0.0023 inch
- **Thermal**
 - **Min** -----61.80 gf **Set** ---- 0.0034 inch
 - **Max** -----78.20 gf **Set** ---- 0.0053 inch

RESULTS Continued**Cable Pull**

- **0° Pull**
 - **Min** -----15.54 lbs
 - **Max** -----18.19 lbs
- **90° Pull Vertical**
 - **Min** ----- 8.06 lbs
 - **Max** ----- 9.08 lbs
- **90° Pull Lateral**
 - **Min** -----16.46 lbs
 - **Max** -----18.06 lbs

Insertion/Retention/Hole Conditioning**Signal Compliant pin Insertion/Retention force****HASL 0.0125" PTH**

- **1 Cycle**
 - **Insertion**
 - **Min** ----- 1.65 Lbs
 - **Max**----- 2.00 Lbs
 - **Retention**
 - **Min** ----- 1.14 Lbs
 - **Max**----- 1.57 Lbs
- **3 Cycles**
 - **Insertion**
 - **Min** ----- 1.14 Lbs
 - **Max**----- 1.57 Lbs
 - **Retention**
 - **Min** ----- 0.47 Lbs
 - **Max**----- 1.18 Lbs

HASL 0.0165" PTH

- **1 Cycle**
 - **Insertion**
 - **Min** ----- 0.99 Lbs
 - **Max**----- 1.21 Lbs
 - **Retention**
 - **Min** ----- 0.51 Lbs
 - **Max**----- 0.95 Lbs
- **3 Cycles**
 - **Insertion**
 - **Min** ----- 0.76 Lbs
 - **Max**----- 1.10 Lbs
 - **Retention**
 - **Min** ----- 0.31 Lbs
 - **Max**----- 0.90 Lbs

RESULTS Continued**ENIG 0.0165" PTH**

- **1 Cycle**
 - **Insertion**
 - **Min** ----- 1.05 Lbs
 - **Max** ----- 1.23 Lbs
 - **Retention**
 - **Min** ----- 0.41 Lbs
 - **Max** ----- 0.91 Lbs
- **3 Cycles**
 - **Insertion**
 - **Min** ----- 0.80 Lbs
 - **Max** ----- 1.15 Lbs
 - **Retention**
 - **Min** ----- 0.20 Lbs
 - **Max** ----- 0.55 Lbs

Ground Compliant pin Insertion/Retention force**HASL 0.0125" PTH**

- **1 Cycle**
 - **Insertion**
 - **Min** ----- 1.77 Lbs
 - **Max** ----- 2.92 Lbs
 - **Retention**
 - **Min** ----- 0.95 Lbs
 - **Max** ----- 1.72 Lbs
- **3 Cycles**
 - **Insertion**
 - **Min** ----- 1.22 Lbs
 - **Max** ----- 1.73 Lbs
 - **Retention**
 - **Min** ----- 0.59 Lbs
 - **Max** ----- 1.28 Lbs

HASL 0.0165" PTH

- **1 Cycle**
 - **Insertion**
 - **Min** ----- 1.03 Lbs
 - **Max** ----- 1.34 Lbs
 - **Retention**
 - **Min** ----- 0.59 Lbs
 - **Max** ----- 1.01 Lbs
- **3 Cycles**
 - **Insertion**
 - **Min** ----- 0.86 Lbs
 - **Max** ----- 1.20 Lbs
 - **Retention**
 - **Min** ----- 0.38 Lbs
 - **Max** ----- 0.85 Lbs

RESULTS Continued**ENIG 0.0165" PTH**

- **1 Cycle**
 - **Insertion**
 - **Min** ----- **1.00 Lbs**
 - **Max** ----- **1.38 Lbs**
 - **Retention**
 - **Min** ----- **0.30 Lbs**
 - **Max** ----- **0.87 Lbs**
- **3 Cycles**
 - **Insertion**
 - **Min** ----- **0.96 Lbs**
 - **Max** ----- **1.17Lbs**
 - **Retention**
 - **Min** ----- **0.17 Lbs**
 - **Max** ----- **0.60 Lbs**

RESULTS Continued**Signal Compliant pin Insertion/Retention force****HASL 0.0125" PTH**

- **1 Cycle**
 - **Insertion**
 - **Min** ----- 4.39 Lbs
 - **Max** ----- 6.84 Lbs
 - **Retention**
 - **Min** ----- 1.16 Lbs
 - **Max** ----- 1.78 Lbs
- **3 Cycles**
 - **Insertion**
 - **Min** ----- 3.64 Lbs
 - **Max** ----- 5.26 Lbs
 - **Retention**
 - **Min** ----- 0.89 Lbs
 - **Max** ----- 1.72 Lbs

HASL 0.0165" PTH

- **1 Cycle**
 - **Insertion**
 - **Min** ----- 3.24 Lbs
 - **Max** ----- 5.12 Lbs
 - **Retention**
 - **Min** ----- 0.85 Lbs
 - **Max** ----- 1.72 Lbs
- **3 Cycles**
 - **Insertion**
 - **Min** ----- 2.63 Lbs
 - **Max** ----- 4.26 Lbs
 - **Retention**
 - **Min** ----- 0.86 Lbs
 - **Max** ----- 1.65 Lbs

ENIG 0.0165" PTH

- **1 Cycle**
 - **Insertion**
 - **Min** ----- 3.24 Lbs
 - **Max** ----- 4.88 Lbs
 - **Retention**
 - **Min** ----- 0.53 Lbs
 - **Max** ----- 1.15 Lbs
- **3 Cycles**
 - **Insertion**
 - **Min** ----- 2.68 Lbs
 - **Max** ----- 3.98 Lbs
 - **Retention**
 - **Min** ----- 0.27 Lbs
 - **Max** ----- 0.69 Lbs

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

- **Initial**
 - Mated -----45000Meg Ω ----- Passed
 - Unmated -----45000Meg Ω ----- Passed
- **Thermal**
 - Mated -----45000Meg Ω ----- Passed
 - Unmated -----45000Meg Ω ----- Passed
- **Humidity**
 - Mated ----- 3550Meg Ω ----- Passed
 - Unmated ----- 7550Meg Ω ----- Passed

LS Row-to-LS Row

- **Initial**
 - Mated -----45000Meg Ω ----- Passed
 - Unmated -----45000Meg Ω ----- Passed
- **Thermal**
 - Mated -----45000Meg Ω ----- Passed
 - Unmated -----45000Meg Ω ----- Passed
- **Humidity**
 - Mated ----- 1550Meg Ω ----- Passed
 - Unmated ----- 4550Meg Ω ----- Passed

HS Pin-to-HS Pin

- **Initial**
 - Mated -----45000Meg Ω ----- Passed
 - Unmated -----45000Meg Ω ----- Passed
- **Thermal**
 - Mated -----45000Meg Ω ----- Passed
 - Unmated -----45000Meg Ω ----- Passed
- **Humidity**
 - Mated ----- 3550Meg Ω ----- Passed
 - Unmated ----- 7550Meg Ω ----- Passed

HS Pin-to-HS Ground

- **Initial**
 - Mated -----45000Meg Ω ----- Passed
 - Unmated -----45000Meg Ω ----- Passed
- **Thermal**
 - Mated -----45000Meg Ω ----- Passed
 - Unmated -----45000Meg Ω ----- Passed
- **Humidity**
 - Mated ----- 1550Meg Ω ----- Passed
 - Unmated ----- 4550Meg Ω ----- Passed

Ground-to-Cage Ground

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

RESULTS Continued**Dielectric Withstanding Voltage minimums, DWV**

- **Minimums**
 - **Breakdown Voltage**-----931 VAC
 - **Test Voltage** -----700 VAC
 - **Working Voltage** -----230 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

HS Pin-to-HS Pin

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

HS Pin-to-HS Ground

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

Ground-to-Cage Ground

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

Cable Flex:**Insulation Resistance minimums, IR****Pin-to- Pin**

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

Pin-to- Ground

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

Dielectric Withstanding Voltage minimums, DWV

- **Test Voltage** -----700 VAC

Pin-to- Pin

- **Initial DWV** -----Passed
- **After 500 Flex cycles DWV** -----Passed

Pin-to-Ground

- **Initial DWV** -----Passed
- **After 500 Flex cycles DWV** -----Passed

RESULTS Continued**LLCR Gas Tight (Total 176 LLCR test points)****Signal pin**

- Initial ----- 10.20 mOhms Max

Ground pin

- Initial -----6.84 mOhms Max

Cable

- Initial -----141.37 mOhms Max

GND

- Initial ----- 58.74 mOhms Max

- Gas-Tight

- <= +5.0 mOhms ----- 176 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 +1000 mOhms-----0 Points ----- Unstable
- >+1000 mOhms-----0 Points ----- Open Failure

LLCR Gas Tight Compliant (Total 30 LLCR test points)

- Initial -----0.55 mOhms Max

- Thermal Aging

- <= +0.33 mOhms -----29 Points ----- Stable
- +0.33 to +0.67 mOhms -----1 Points ----- Minor
- +0.67 to +1.00 mOhms -----0 Points ----- Acceptable
- +1.00 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +1000 mOhms-----0 Points ----- Unstable
- >+1000 mOhms-----0 Points ----- Open Failure

LLCR Thermal Aging (Total 176 LLCR test points)**Signal pin**

- Initial ----- 10.19 mOhms Max

Ground pin

- Initial -----6.09 mOhms Max

Cable

- Initial -----139.54 mOhms Max

GND

- Initial ----- 57.96 mOhms Max

- Thermal Aging

- <= +5.0 mOhms ----- 159 Points ----- Stable
- +5.1 to +10.0 mOhms ----- 17 Points ----- Minor
- +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +1000 mOhms-----0 Points ----- Unstable
- >+1000 mOhms-----0 Points ----- Open Failure

LLCR Thermal Aging Compliant (30 LLCR test points)

- Initial -----0.59 mOhms Max

- Thermal Aging

- <= +0.33 mOhms -----30 Points ----- Stable
- +0.33 to +0.67 mOhms -----0 Points ----- Minor
- +0.67 to +1.00 mOhms -----0 Points ----- Acceptable
- +1.00 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +1000 mOhms-----0 Points ----- Unstable
- >+1000 mOhms-----0 Points ----- Open Failure

RESULTS Continued**LLCR Durability (Total 176 LLCR test points)****Signal pin**

- Initial ----- 11.72 mOhms Max

Ground pin

- Initial ----- 6.11 mOhms Max

Cable

- Initial ----- 140.52 mOhms Max

GND

- Initial ----- 63.55 mOhms Max

- Durability, 100 Cycles

- <= +5.0 mOhms ----- 174 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 +1000 mOhms ----- 0 Points ----- Unstable
- >+1000 mOhms ----- 0 Points ----- Open Failure

- Thermal

- <= +5.0 mOhms ----- 168 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 +1000 mOhms ----- 0 Points ----- Unstable
- >+1000 mOhms ----- 0 Points ----- Open Failure

- Humidity

- <= +5.0 mOhms ----- 169 Points ----- Stable
- +5.1 to +10.0 mOhms ----- 7 Points ----- Minor
- +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
- +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
- +50.1 to +1000 mOhms ----- 0 Points ----- Unstable
- >+1000 mOhms ----- 0 Points ----- Open Failure

LLCR Durability Compliant (Total 30 LLCR test points)

- Initial ----- 0.65 mOhms Max

- Thermal

- <= +0.33 mOhms ----- 30 Points ----- Stable
- +0.33 to +0.67 mOhms ----- 0 Points ----- Minor
- +0.67 to +1.00 mOhms ----- 0 Points ----- Acceptable
- +1.00 to +50.0 mOhms ----- 0 Points ----- Marginal
- +50.1 to +1000 mOhms ----- 0 Points ----- Unstable
- >+1000 mOhms ----- 0 Points ----- Open Failure

- Humidity

- <= +0.33 mOhms ----- 30 Points ----- Stable
- +0.33 to +0.67 mOhms ----- 0 Points ----- Minor
- +0.67 to +1.00 mOhms ----- 0 Points ----- Acceptable
- +1.00 to +50.0 mOhms ----- 0 Points ----- Marginal
- +50.1 to +1000 mOhms ----- 0 Points ----- Unstable
- >+1000 mOhms ----- 0 Points ----- Open Failure

RESULTS Continued**LLCR Shock & Vibration (Total 176 LLCR test points)**

Signal pin

- Initial ----- 10.25 mOhms Max

Ground pin

- Initial ----- 5.57 mOhms Max

Cable

- Initial ----- 293.55 mOhms Max

GND

- Initial ----- 122.51 mOhms Max

• Shock &Vibration

- <= +5.0 mOhms ----- 172 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 +1000 mOhms ----- 0 Points ----- Unstable
- >+1000 mOhms ----- 0 Points ----- Open Failure

Mechanical Shock & Random Vibration:

○ Shock

- No Damage----- Pass
- 50 Nanoseconds----- Pass

○ Vibration

- No Damage----- Pass
- 50 Nanoseconds----- Pass

LLCR Shock & Vibration (Total 30 LLCR test points)

- Initial ----- 0.34 mOhms Max

• Shock &Vibration

- <= +0.33 mOhms ----- 30 Points ----- Stable
- +0.33 to +0.67 mOhms ----- 0 Points ----- Minor
- +0.67 to +1.00 mOhms ----- 0 Points ----- Acceptable
- +1.00 to +50.0 mOhms ----- 0 Points ----- Marginal
- +50.1 to +1000 mOhms ----- 0 Points ----- Unstable
- >+1000 mOhms ----- 0 Points ----- Open Failure

RESULTS Continued**LLCR Compliant pin Insertion/Retention (Total 30 LLCR test points)****Signal Pin****HASL 0.0125" PTH**

- 1 cycle -----0.20 mOhms Max
- 3 cycles
 - <= +0.33 mOhms -----30 Points ----- Stable
 - +0.33 to +0.67 mOhms -----0 Points ----- Minor
 - +0.67 to +1.00 mOhms -----0 Points ----- Acceptable
 - +1.00 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +1000 mOhms -----0 Points ----- Unstable
 - >+1000 mOhms -----0 Points ----- Open Failure

HASL 0.0165" PTH

- 1 cycle -----0.15 mOhms Max
- 3 cycles
 - <= +0.33 mOhms -----30 Points ----- Stable
 - +0.33 to +0.67 mOhms -----0 Points ----- Minor
 - +0.67 to +1.00 mOhms -----0 Points ----- Acceptable
 - +1.00 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +1000 mOhms -----0 Points ----- Unstable
 - >+1000 mOhms -----0 Points ----- Open Failure

ENIG 0.0165" PTH

- 1 cycle -----0.24 mOhms Max
- 3 cycles
 - <= +0.33 mOhms -----30 Points ----- Stable
 - +0.33 to +0.67 mOhms -----0 Points ----- Minor
 - +0.67 to +1.00 mOhms -----0 Points ----- Acceptable
 - +1.00 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +1000 mOhms -----0 Points ----- Unstable
 - >+1000 mOhms -----0 Points ----- Open Failure

Ground Pin**HASL 0.0125" PTH**

- 1 cycle -----0.20 mOhms Max
- 3 cycles
 - <= +0.33 mOhms -----30 Points ----- Stable
 - +0.33 to +0.67 mOhms -----0 Points ----- Minor
 - +0.67 to +1.00 mOhms -----0 Points ----- Acceptable
 - +1.00 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +1000 mOhms -----0 Points ----- Unstable
 - >+1000 mOhms -----0 Points ----- Open Failure

HASL 0.0165" PTH

- 1 cycle -----0.16 mOhms Max
- 3 cycles
 - <= +0.33 mOhms -----30 Points ----- Stable
 - +0.33 to +0.67 mOhms -----0 Points ----- Minor
 - +0.67 to +1.00 mOhms -----0 Points ----- Acceptable
 - +1.00 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +1000 mOhms -----0 Points ----- Unstable
 - >+1000 mOhms -----0 Points ----- Open Failure

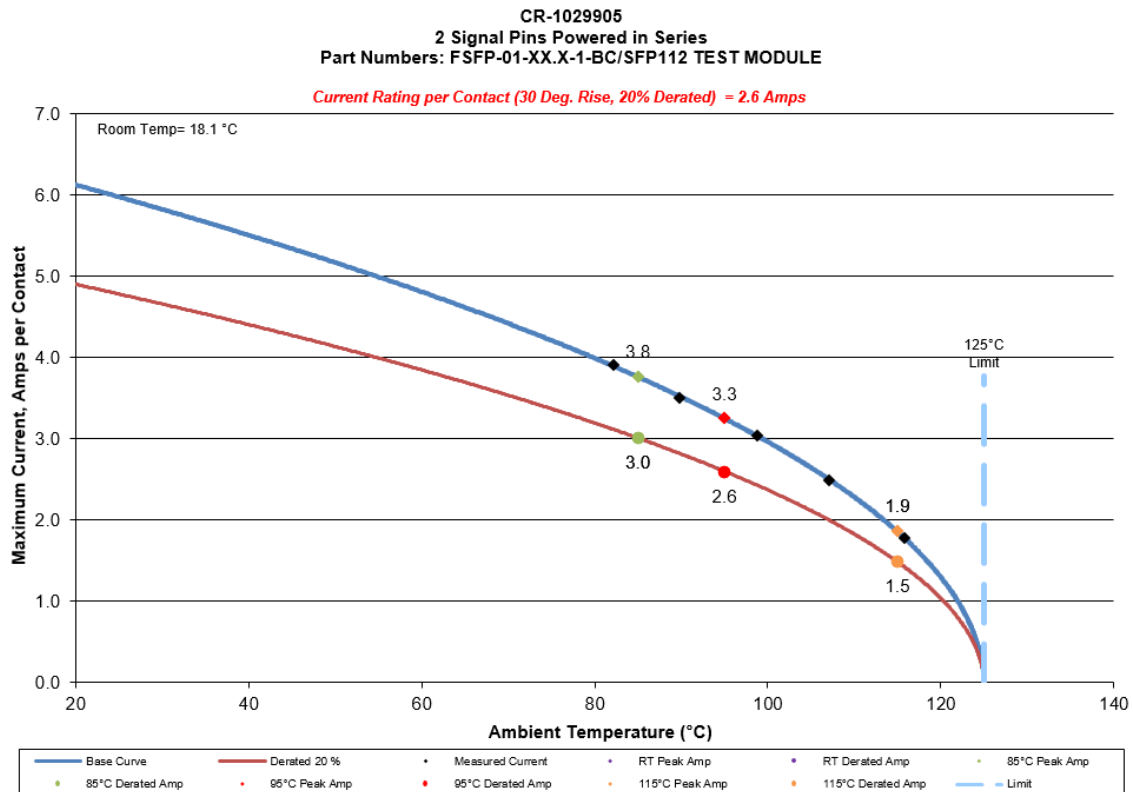
RESULTS Continued**ENIG 0.0165" PTH**

- 1 cycle -----0.18 mOhms Max
- 3 cycles
 - $\leq +0.33$ mOhms -----30 Points ----- Stable
 - $+0.33$ to $+0.67$ mOhms -----0 Points ----- Minor
 - $+0.67$ to $+1.00$ mOhms -----0 Points ----- Acceptable
 - $+1.00$ to $+50.0$ mOhms -----0 Points ----- Marginal
 - $+50.1$ to $+1000$ mOhms-----0 Points ----- Unstable
 - $>+1000$ mOhms-----0 Points ----- Open Failure

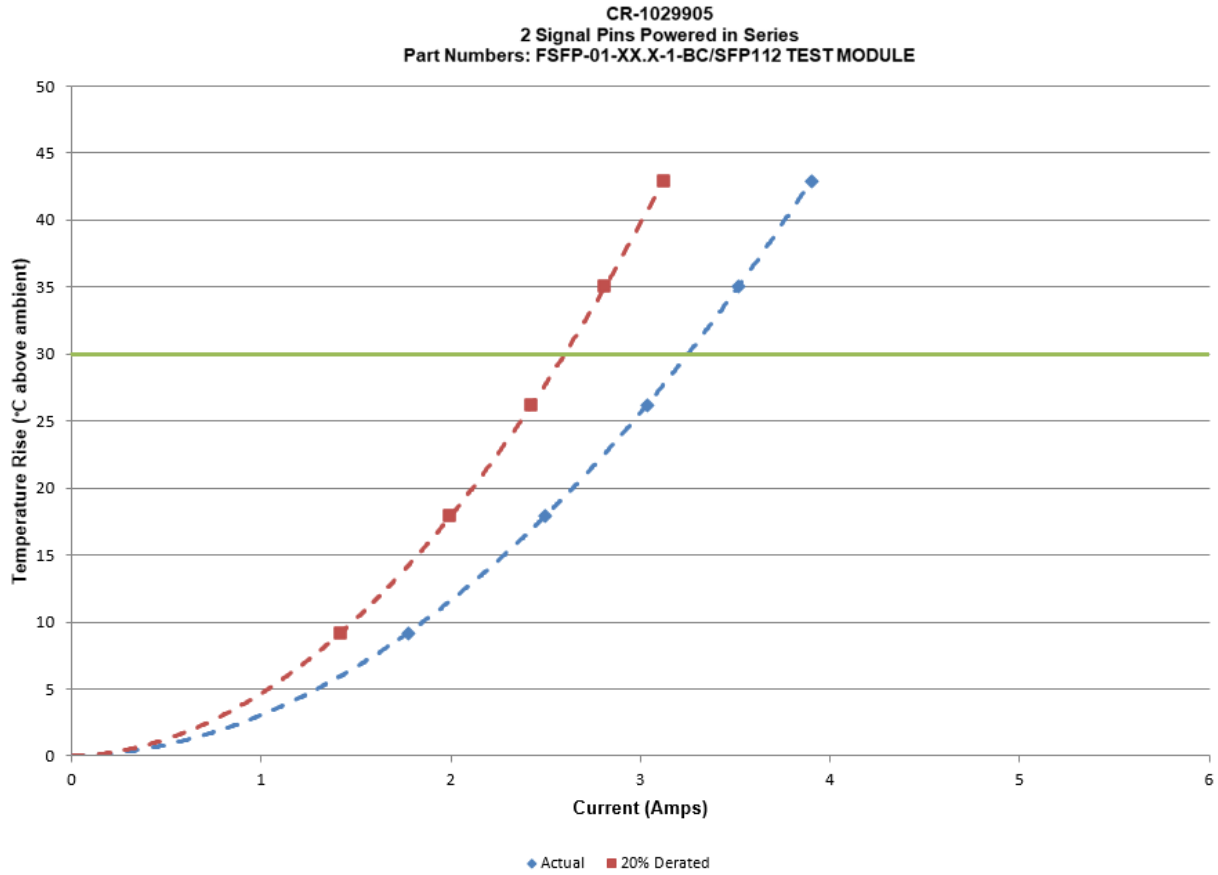
DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

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

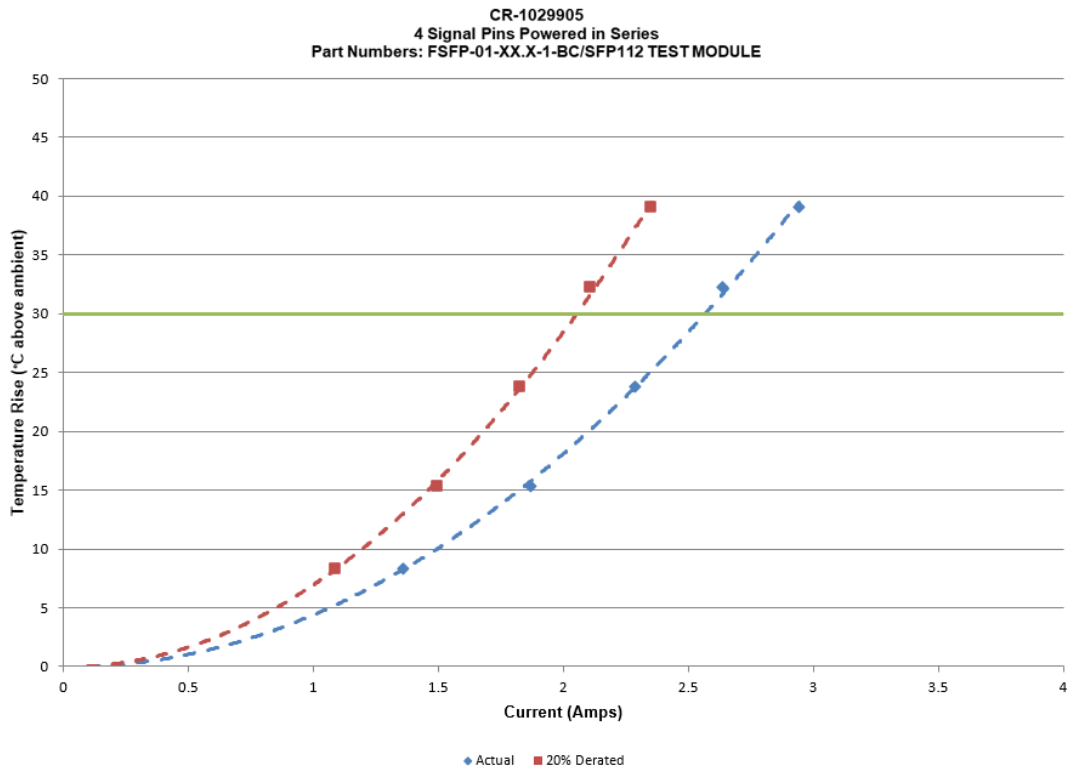
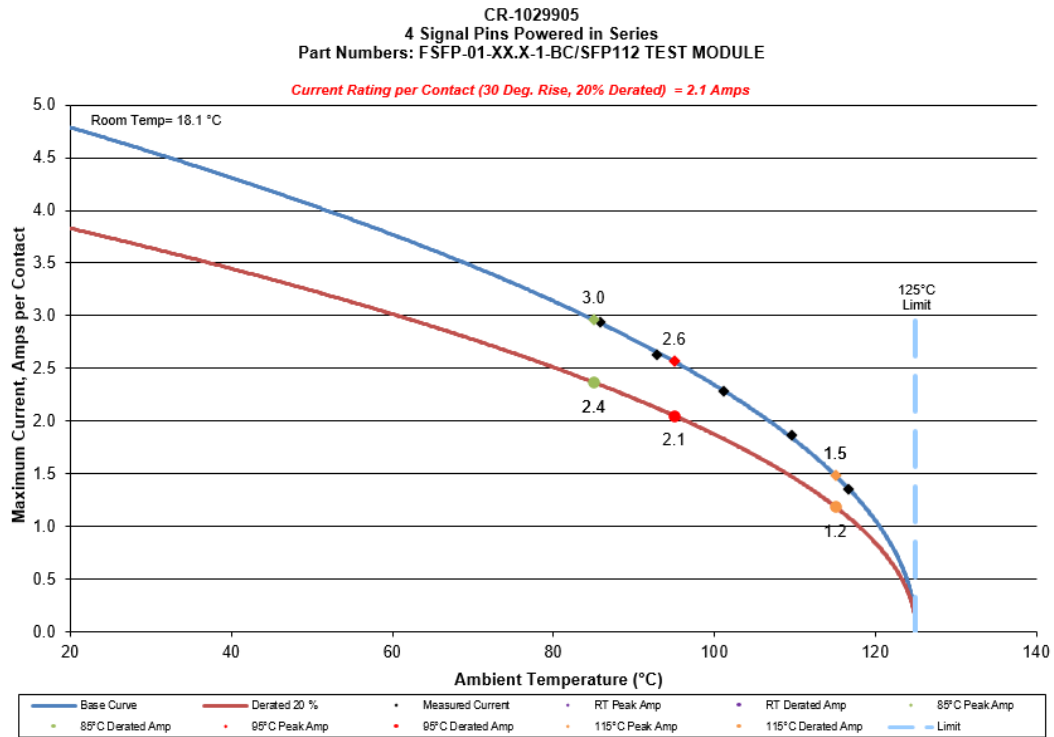


DATA SUMMARIES Continued



DATA SUMMARIES Continued

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

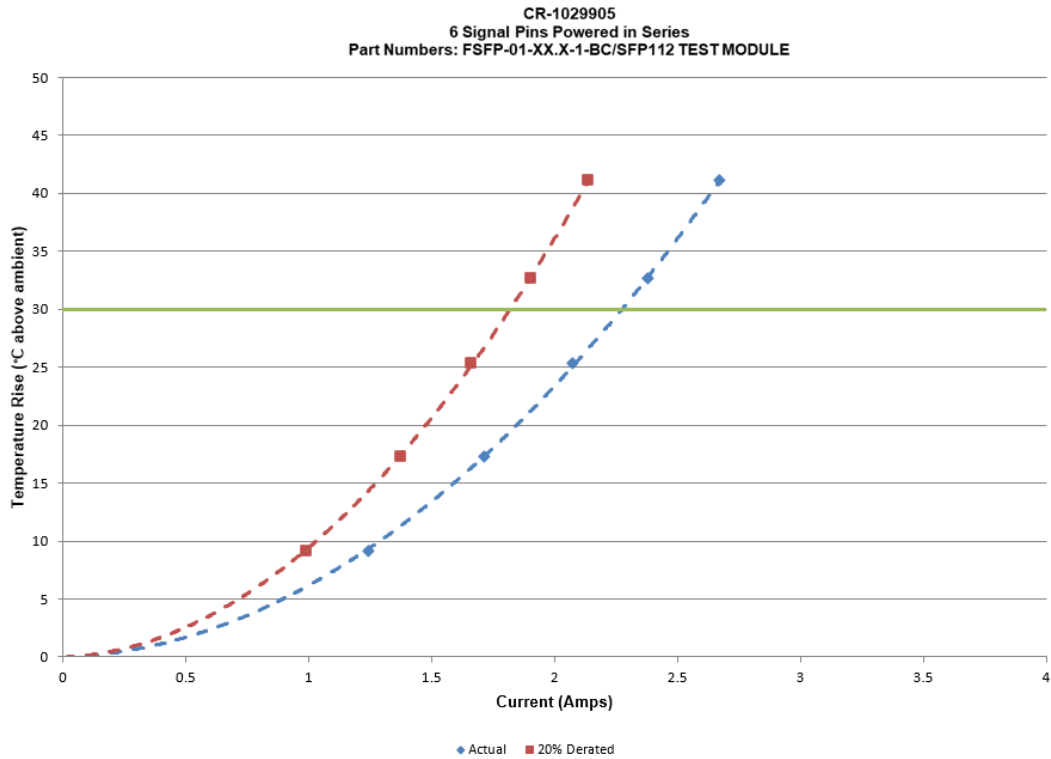
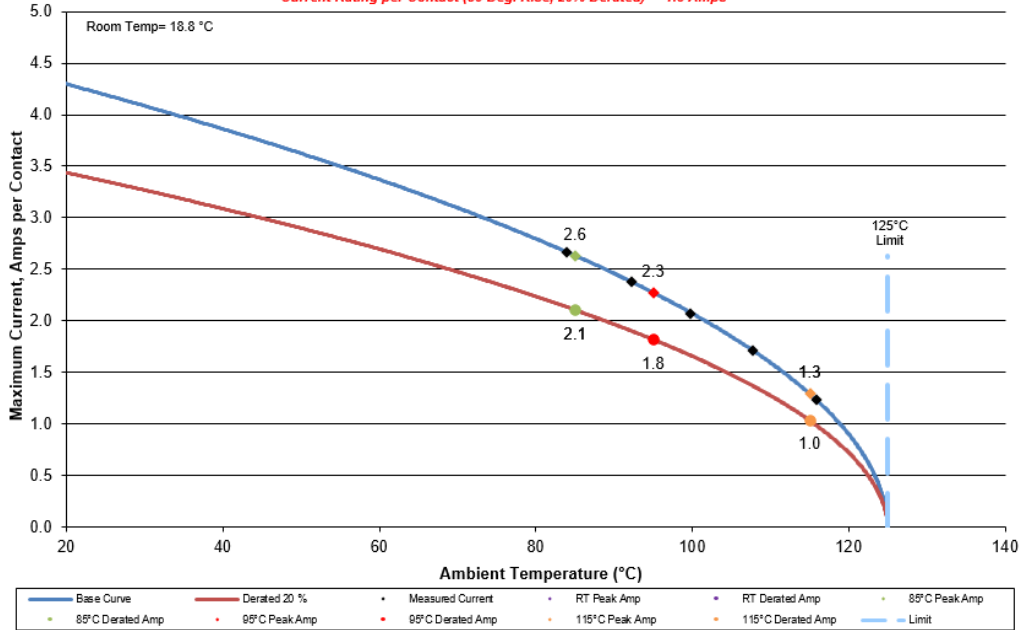


DATA SUMMARIES Continued

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

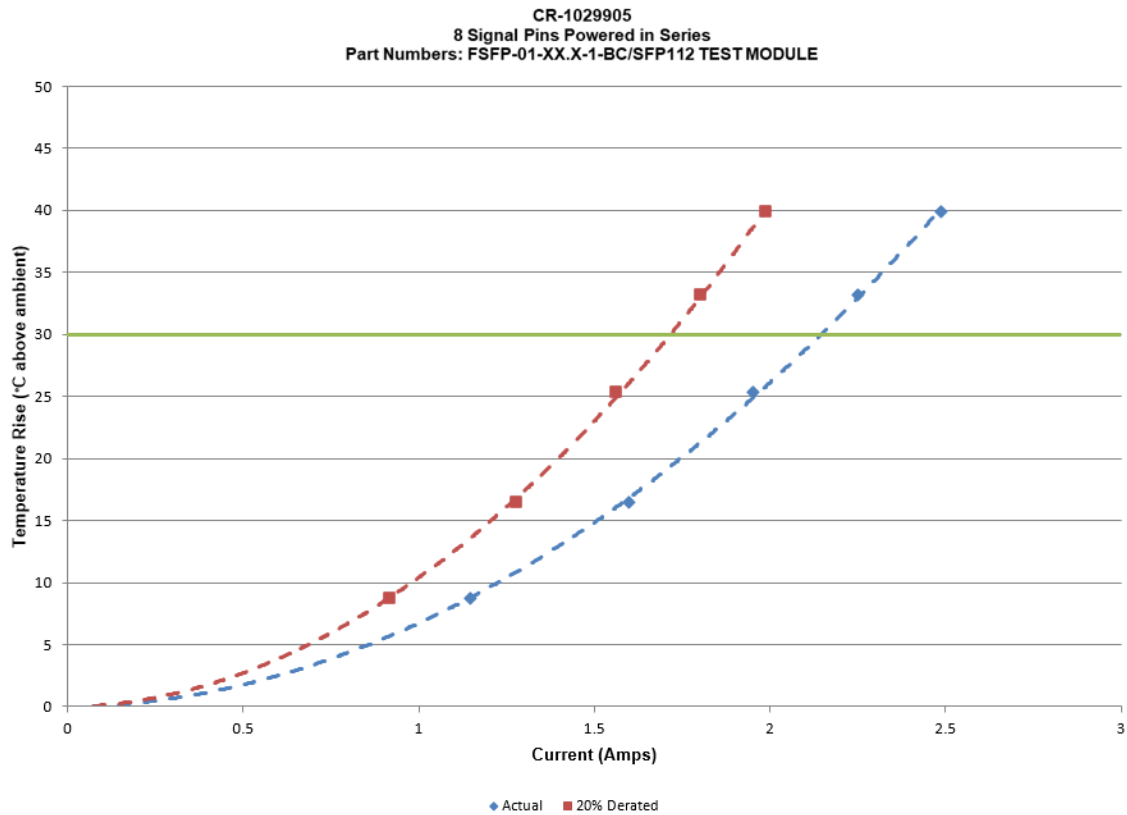
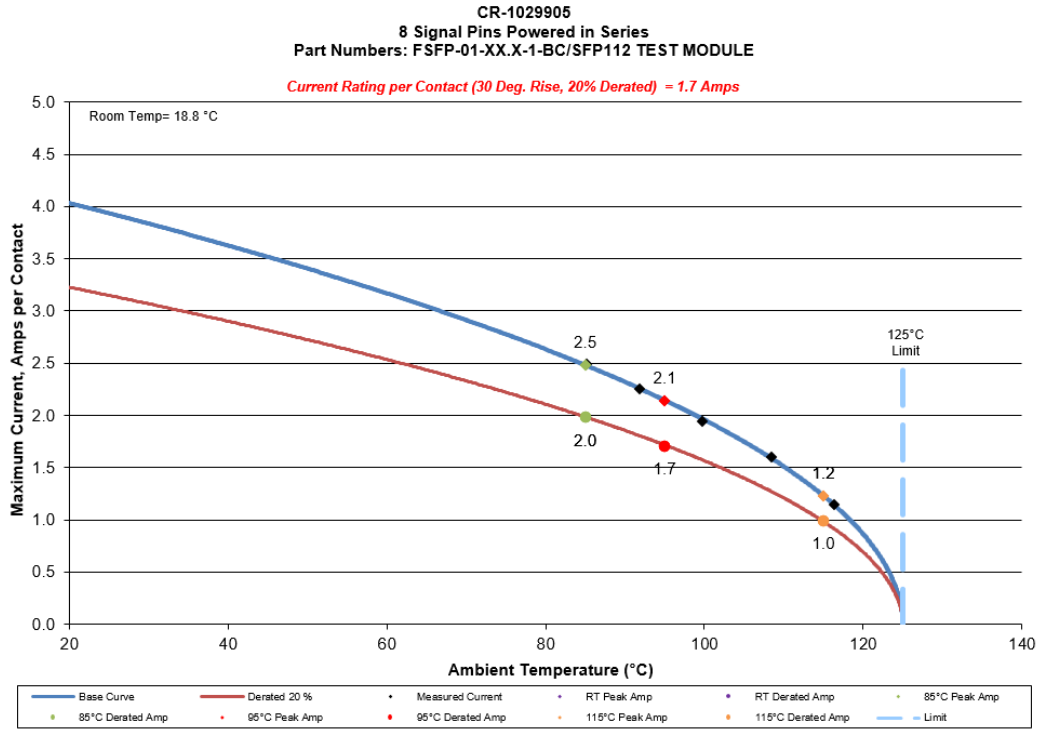
CR-1029905
6 Signal Pins Powered in Series
Part Numbers: FSFP-01-XX.X-1-BC/SFP112 TEST MODULE

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.8 Amps



DATA SUMMARIES Continued

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

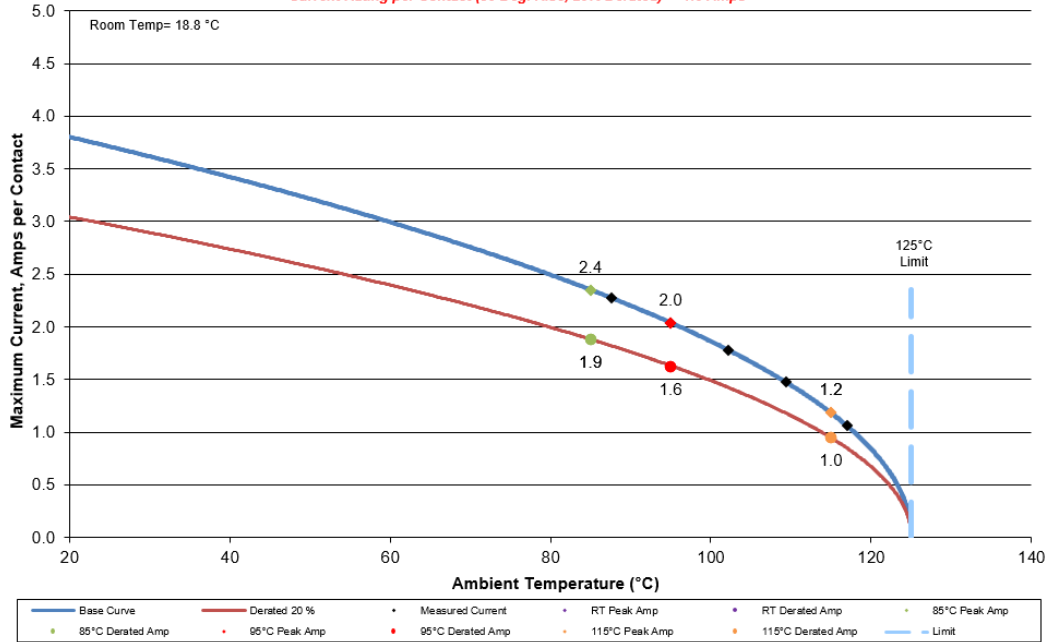


DATA SUMMARIES Continued

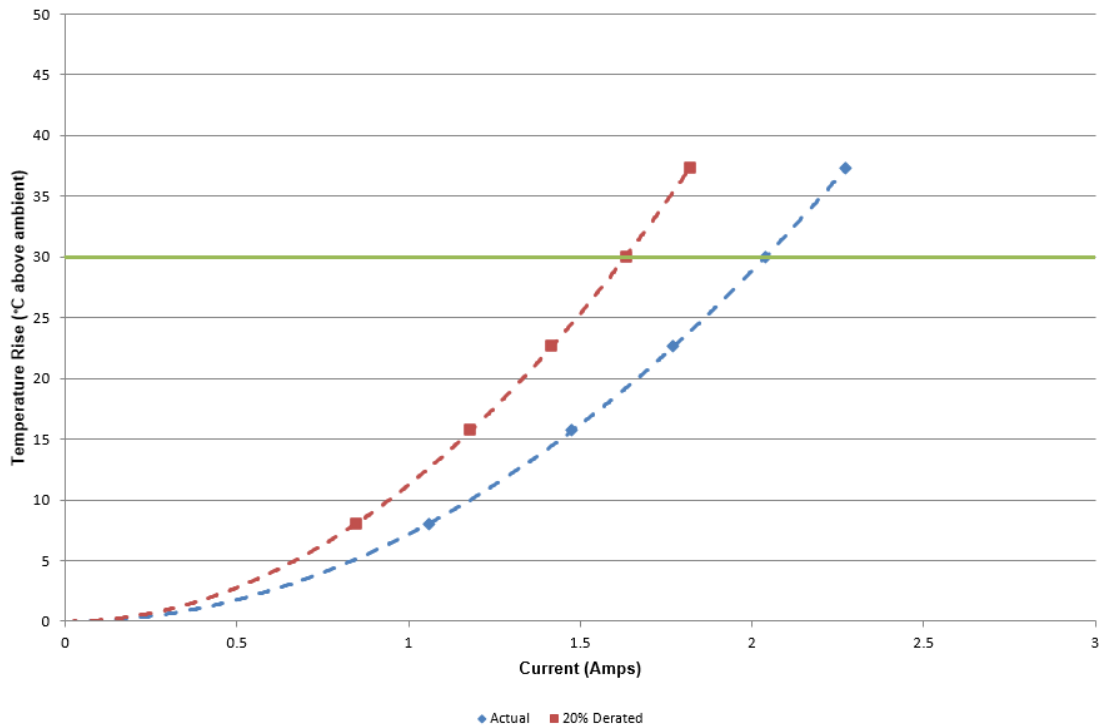
e. Linear configuration with all adjacent signal conductors/contacts powered

CR-1029905
 10 Signal Pins Powered in Series
 Part Numbers: FSFP-01-XX.X-1-BC/SFP112 TEST MODULE

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.6 Amps



CR-1029905
 8 Signal Pins Powered in Series
 Part Numbers: FSFP-01-XX.X-1-BC/SFP112 TEST MODULE



DATA SUMMARIES Continued**Mating\Unmating Force: Thermal Aging Group**

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)
Minimum	49.15	11.05	39.94	8.98	37.81	8.50	29.98	6.74
Maximum	66.72	15.00	45.41	10.21	49.28	11.08	35.90	8.07
Average	58.50	13.15	42.66	9.59	43.17	9.71	32.41	7.29
St Dev	6.01	1.35	1.68	0.38	3.71	0.83	2.00	0.45
Count	8	8	8	8	8	8	8	8

Mating\Unmating Force: Mating\Unmating Durability Group

	Initial				After 25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)
Minimum	45.73	10.28	38.12	8.57	47.82	10.75	54.18	12.18
Maximum	67.79	15.24	46.21	10.39	70.59	15.87	75.30	16.93
Average	56.83	12.78	41.64	9.36	62.87	14.13	65.13	14.64
St Dev	7.49	1.68	2.71	0.61	6.63	1.49	8.09	1.82
Count	8	8	8	8	8	8	8	8
	After 50 Cycles				After 75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)
Minimum	46.97	10.56	59.78	13.44	47.06	10.58	62.72	14.10
Maximum	77.04	17.32	81.80	18.39	81.62	18.35	80.60	18.12
Average	67.07	15.08	72.43	16.28	68.20	15.33	72.76	16.36
St Dev	8.94	2.01	7.32	1.65	10.49	2.36	6.07	1.36
Count	8	8	8	8	8	8	8	8
	After 100 Cycles				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)
Minimum	54.49	12.25	64.50	14.50	28.96	6.51	19.53	4.39
Maximum	82.82	18.62	83.44	18.76	43.77	9.84	34.78	7.82
Average	71.44	16.06	73.89	16.61	37.57	8.45	28.18	6.34
St Dev	8.49	1.91	5.65	1.27	5.01	1.13	6.06	1.36
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued**Cable Pull
0° Pull**

	Force (lbs)
Minimum	15.54
Maximum	18.19
Average	16.42

90° Pull-Vertical

	Force (lbs)
Minimum	8.06
Maximum	9.08
Average	8.61

90° Pull-Lateral

	Force (lbs)
Minimum	16.46
Maximum	18.06
Average	17.29

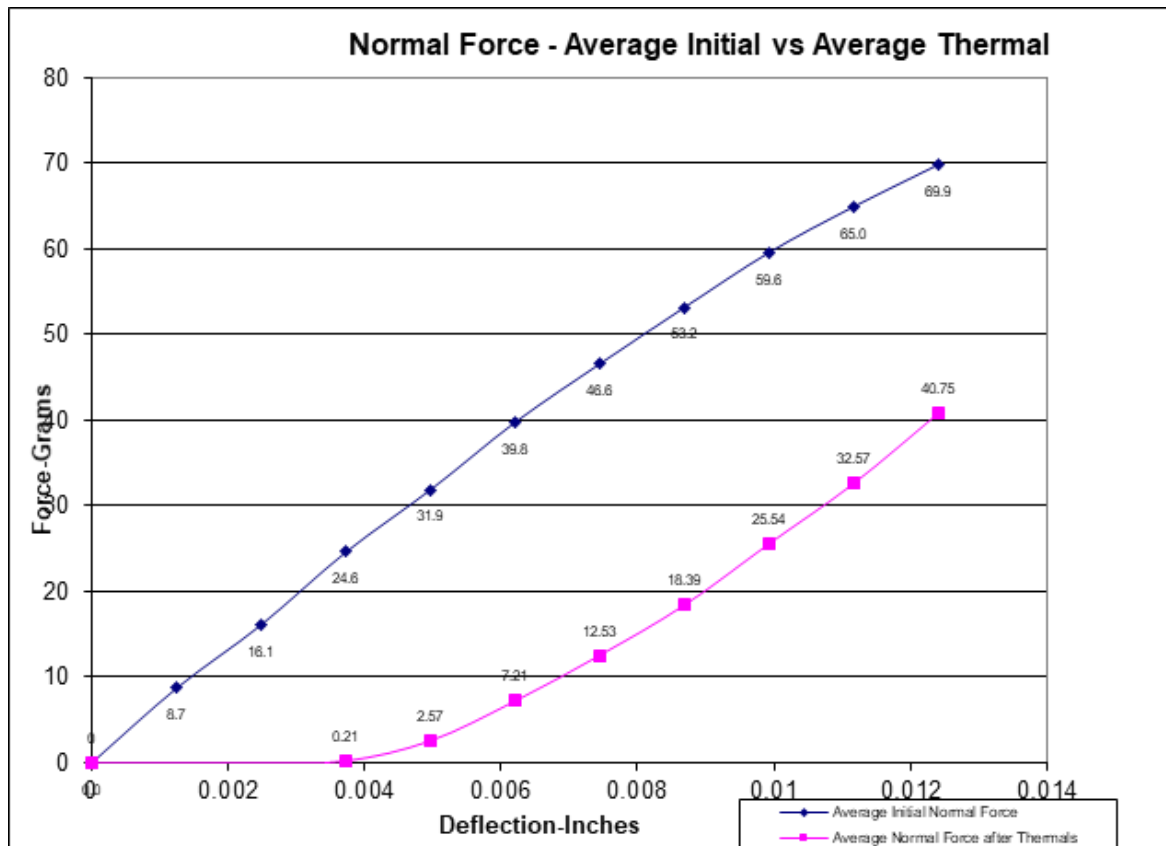
DATA SUMMARIES Continued**NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):**

- 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-540-1-S-Signal

Initial	Deflections in inches Forces in Grams										
	<u>0.0012</u>	<u>0.0025</u>	<u>0.0037</u>	<u>0.0050</u>	<u>0.0062</u>	<u>0.0074</u>	<u>0.0087</u>	<u>0.0099</u>	<u>0.0112</u>	<u>0.0124</u>	<i>SET</i>
Averages	8.71	16.12	24.61	31.89	39.77	46.60	53.19	59.60	64.96	69.86	0.0010
Min	7.20	13.70	21.40	28.20	34.90	41.80	48.50	54.80	60.50	65.60	0.0004
Max	9.80	17.70	27.20	34.70	44.00	51.60	58.20	65.60	71.30	76.50	0.0015
St. Dev	0.827	1.280	1.830	1.889	2.493	2.603	2.568	3.168	3.431	3.782	0.0004
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	<u>0.0012</u>	<u>0.0025</u>	<u>0.0037</u>	<u>0.0050</u>	<u>0.0062</u>	<u>0.0074</u>	<u>0.0087</u>	<u>0.0099</u>	<u>0.0112</u>	<u>0.0124</u>	<i>SET</i>
Averages	-0.01	-0.01	0.21	2.57	7.21	12.53	18.39	25.54	32.57	40.75	0.0048
Min	-0.20	-0.30	-0.20	-0.20	3.40	8.40	13.20	19.90	26.20	34.00	0.0034
Max	0.50	0.40	1.60	6.30	12.20	18.00	24.60	32.10	39.90	47.40	0.0058
St. Dev	0.213	0.191	0.515	2.034	2.503	2.804	3.178	3.461	3.767	3.653	0.0007
Count	10	10	10	10	10	10	10	10	10	10	10

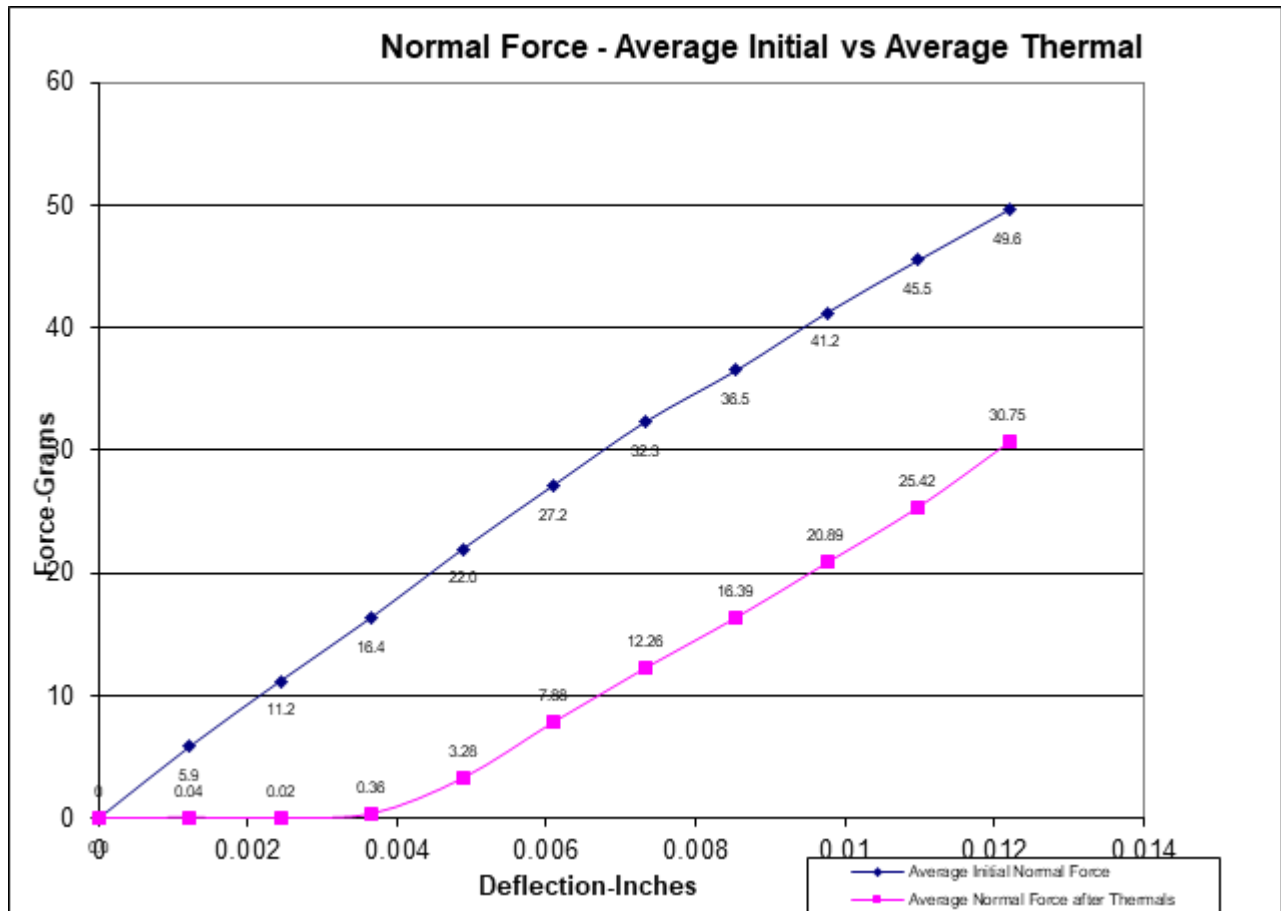


DATA SUMMARIES Continued

C-540-1-S-Ground

Initial	Deflections in inches Forces in Grams										
	0.0012	0.0024	0.0037	0.0049	0.0061	0.0073	0.0085	0.0098	0.0110	0.0122	SET
Average	5.86	11.23	16.42	21.98	27.19	32.32	36.52	41.24	45.50	49.64	0.0004
Min	4.30	10.10	15.40	20.50	26.00	30.20	34.50	38.80	43.50	47.40	0.0000
Max	8.40	13.70	18.50	24.30	29.50	34.70	39.50	44.00	47.80	52.40	0.0007
St. Dev	1.121	1.000	0.895	1.069	1.057	1.246	1.548	1.822	1.649	1.981	0.0002
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	0.0012	0.0024	0.0037	0.0049	0.0061	0.0073	0.0085	0.0098	0.0110	0.0122	SET
Averages	0.04	0.02	0.36	3.28	7.88	12.26	16.39	20.89	25.42	30.75	0.0046
Min	-0.40	-0.40	-0.40	0.40	4.80	9.30	13.20	17.50	22.20	27.80	0.0037
Max	0.90	0.90	2.80	6.80	11.60	15.60	20.10	24.50	29.60	35.30	0.0055
St. Dev	0.357	0.365	0.965	2.009	2.097	2.012	2.115	2.200	2.241	2.301	0.0006
Count	10	10	10	10	10	10	10	10	10	10	10

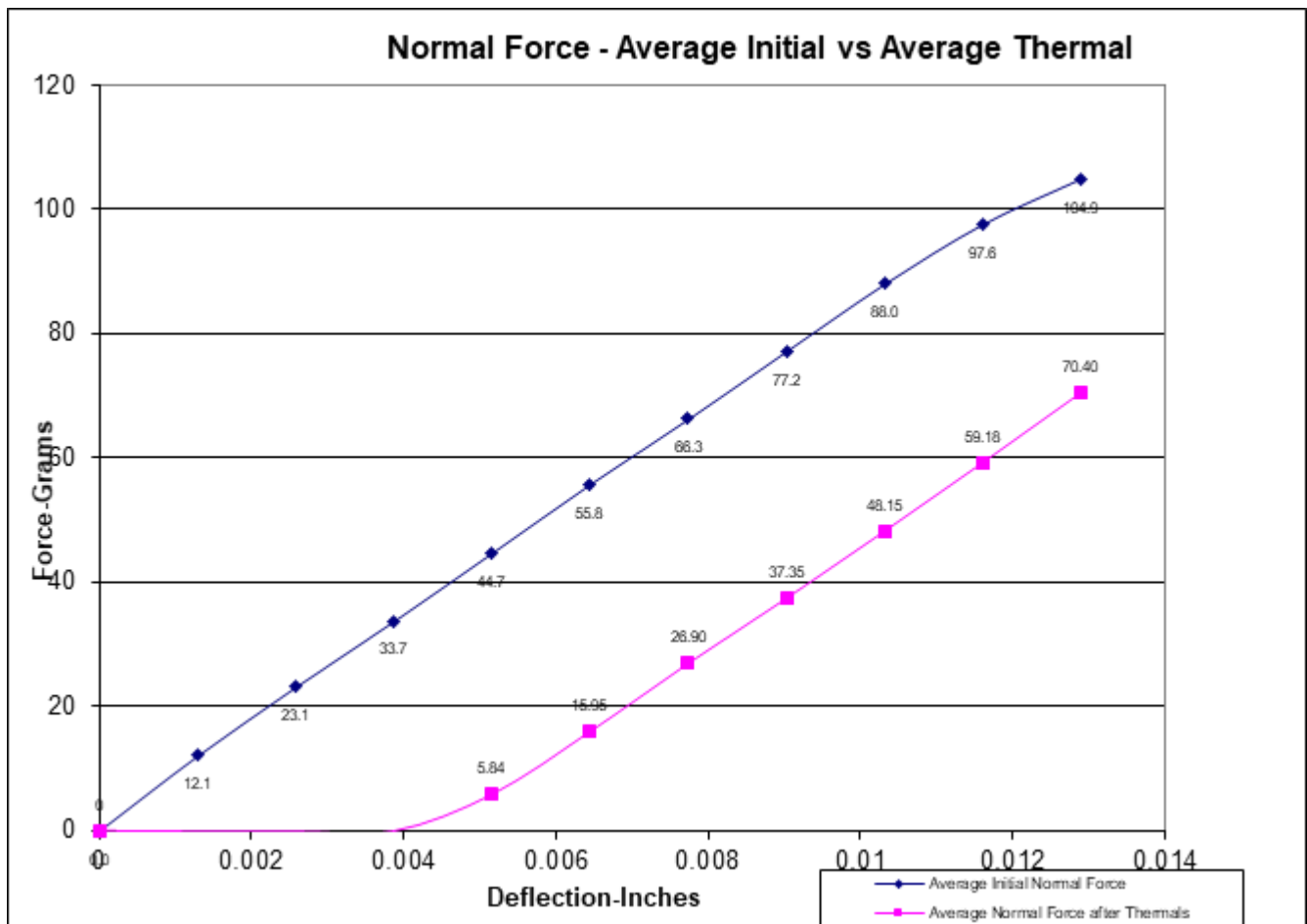


DATA SUMMARIES Continued

C-538-XX-S

Initial	Deflections in inches Forces in Grams										
	<u>0.0013</u>	<u>0.0026</u>	<u>0.0039</u>	<u>0.0052</u>	<u>0.0065</u>	<u>0.0077</u>	<u>0.0090</u>	<u>0.0103</u>	<u>0.0116</u>	<u>0.0129</u>	<i>SET</i>
Averages	12.09	23.14	33.73	44.72	55.76	66.26	77.18	88.01	97.61	104.93	0.0012
Min	9.90	20.90	31.30	42.10	53.30	63.50	73.90	85.20	95.00	102.70	0.0008
Max	15.90	27.40	36.70	47.70	59.60	69.50	80.10	90.60	100.20	107.30	0.0016
St. Dev	1.718	2.170	1.738	2.009	2.024	2.212	2.212	2.044	1.723	1.634	0.0002
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	<u>0.0013</u>	<u>0.0026</u>	<u>0.0039</u>	<u>0.0052</u>	<u>0.0065</u>	<u>0.0077</u>	<u>0.0090</u>	<u>0.0103</u>	<u>0.0116</u>	<u>0.0129</u>	<i>SET</i>
Averages	-0.12	-0.15	-0.06	5.84	15.95	26.90	37.35	48.15	59.18	70.40	0.0052
Min	-0.40	-0.50	-0.40	-0.10	6.80	17.90	29.10	39.80	49.30	61.00	0.0044
Max	0.10	0.10	0.70	12.00	22.60	34.30	44.80	55.20	66.20	77.40	0.0063
St. Dev	0.193	0.212	0.331	4.063	5.255	5.254	5.086	4.990	5.530	5.502	0.0007
Count	10	10	10	10	10	10	10	10	10	10	10

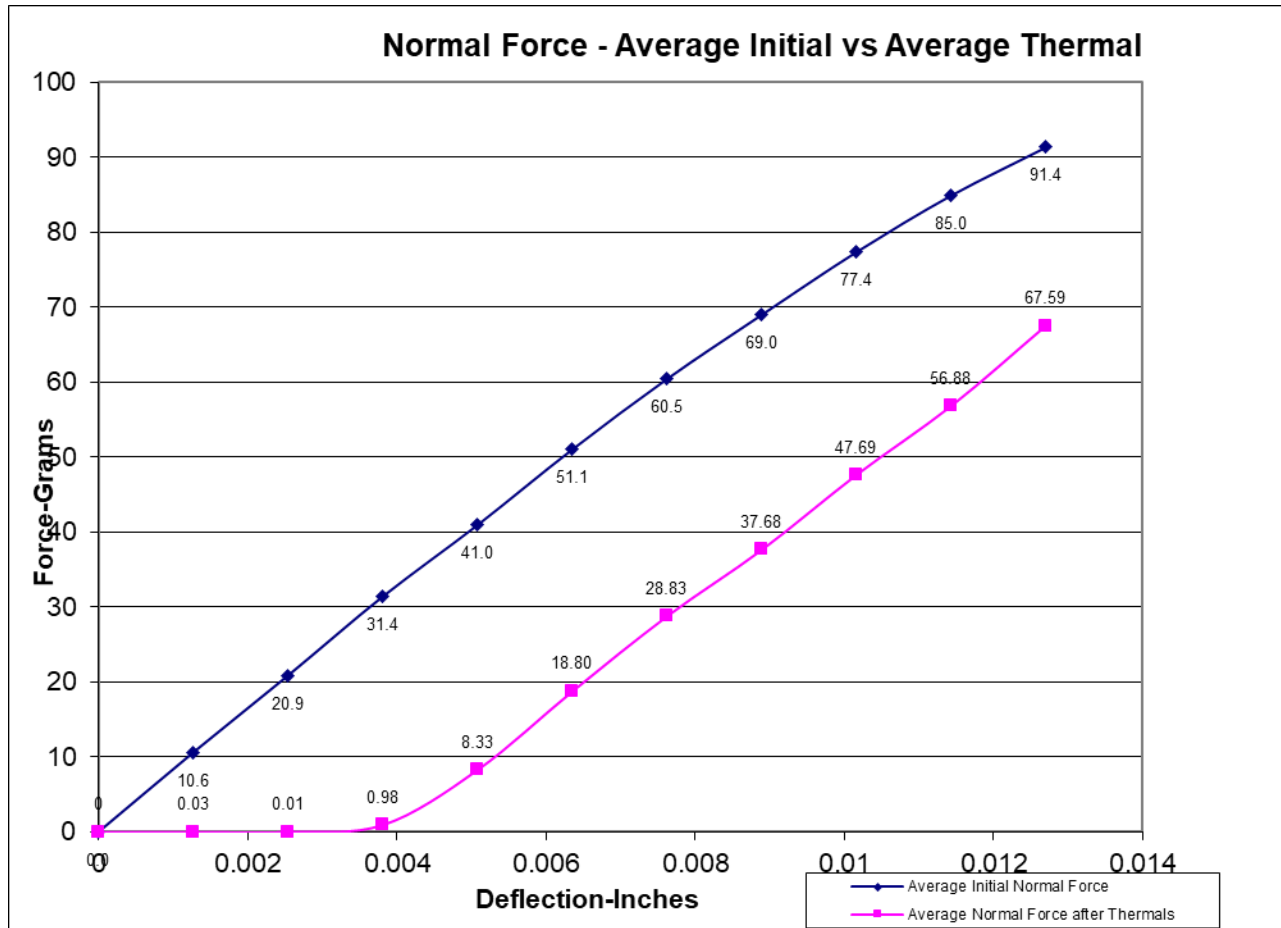


DATA SUMMARIES Continued

C-539-XX-S

Initial	Deflections in inches Forces in Grams										
	<u>0.0013</u>	<u>0.0025</u>	<u>0.0038</u>	<u>0.0051</u>	<u>0.0064</u>	<u>0.0076</u>	<u>0.0089</u>	<u>0.0102</u>	<u>0.0114</u>	<u>0.0127</u>	<i>SET</i>
Averages	10.61	20.89	31.43	40.98	51.06	60.48	69.04	77.43	84.96	91.39	0.0014
Min	9.90	18.70	29.10	37.60	47.70	56.90	66.00	72.60	79.20	85.30	0.0004
Max	11.30	23.00	33.60	43.30	53.80	63.80	71.70	82.10	90.30	96.60	0.0023
St. Dev	0.517	1.276	1.348	1.766	2.332	2.472	2.396	3.445	3.911	4.020	0.0005
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	<u>0.0013</u>	<u>0.0025</u>	<u>0.0038</u>	<u>0.0051</u>	<u>0.0064</u>	<u>0.0076</u>	<u>0.0089</u>	<u>0.0102</u>	<u>0.0114</u>	<u>0.0127</u>	<i>SET</i>
Averages	0.03	0.01	0.98	8.33	18.80	28.83	37.68	47.69	56.88	67.59	0.0045
Min	-0.40	-0.40	-0.40	2.40	13.00	22.80	32.10	41.80	51.80	61.80	0.0034
Max	0.40	0.40	5.60	15.60	25.50	35.50	45.30	55.30	65.40	78.20	0.0053
St. Dev	0.315	0.323	2.163	4.239	3.994	4.137	4.172	4.142	4.100	4.924	0.0006
Count	8	8	8	8	8	8	8	8	8	8	8



DATA SUMMARIES Continued**Compliant pin Insertion/Retention**

Signal Compliant pin Insertion/Retention force

HASL 0.0125" PTH

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	1.65	Minimum	1.14
Maximum	2.00	Maximum	1.57
Average	1.86	Average	1.37
St. Dev.	0.09	St. Dev.	0.11
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	1.14	Minimum	0.47
Maximum	1.57	Maximum	1.18
Average	1.37	Average	0.71
St. Dev.	0.11	St. Dev.	0.19

HASL 0.0165" PTH

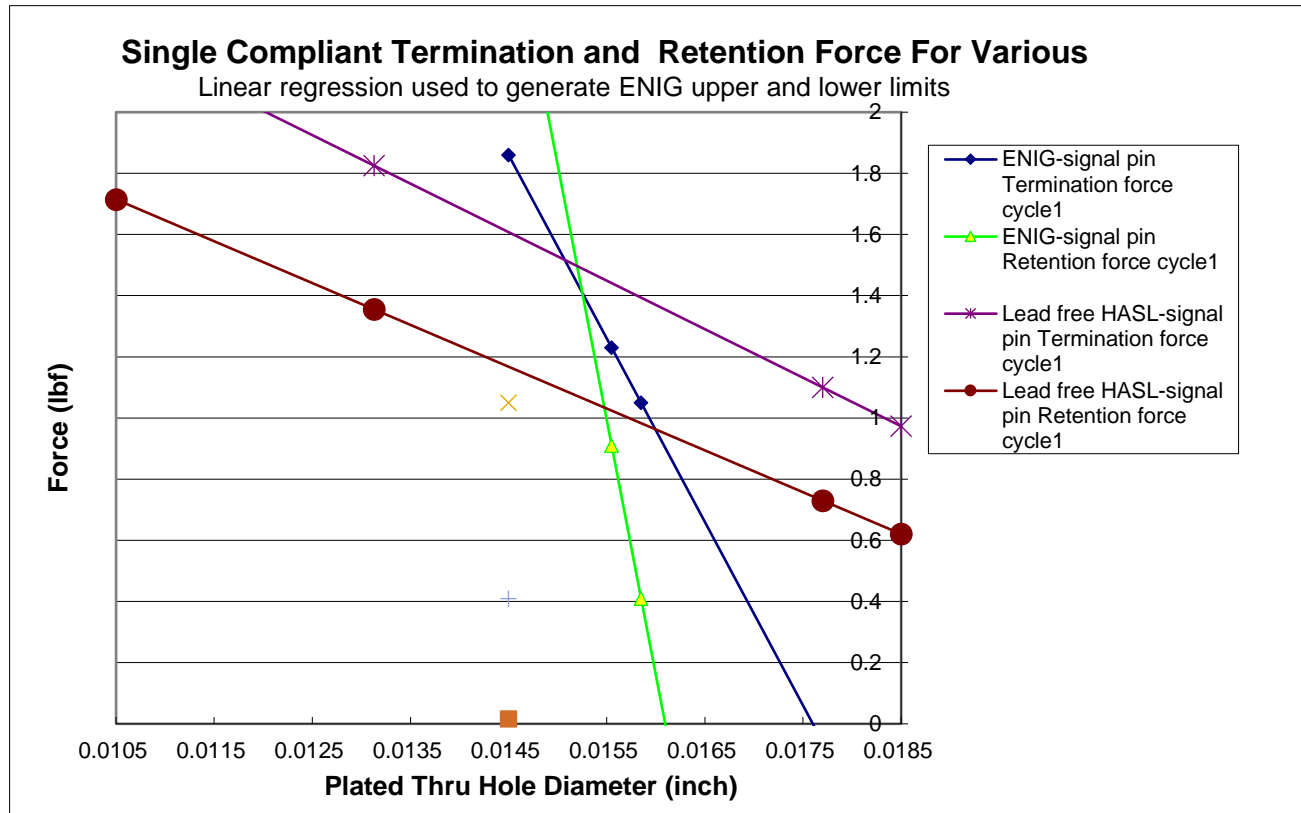
Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	0.99	Minimum	0.76
Maximum	1.21	Maximum	1.10
Average	1.11	Average	0.92
St. Dev.	0.06	St. Dev.	0.10
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	0.51	Minimum	0.31
Maximum	0.95	Maximum	0.90
Average	0.78	Average	0.58
St. Dev.	0.12	St. Dev.	0.18

ENIG 0.0165" PTH

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	1.05	Minimum	0.80
Maximum	1.23	Maximum	1.15
Average	1.10	Average	1.00
St. Dev.	0.04	St. Dev.	0.07
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	0.41	Minimum	0.20
Maximum	0.91	Maximum	0.55
Average	0.52	Average	0.37
St. Dev.	0.10	St. Dev.	0.09

DATA SUMMARIES Continued

Compliant pin summary graph



DATA SUMMARIES Continued**Compliant pin Insertion/Retention****Ground Compliant pin Insertion/Retention force****HASL 0.0125" PTH**

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	1.77	Minimum	1.22
Maximum	2.92	Maximum	1.73
Average	2.04	Average	1.40
St. Dev.	0.19	St. Dev.	0.11
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	0.95	Minimum	0.59
Maximum	1.72	Maximum	1.28
Average	1.23	Average	0.89
St. Dev.	0.20	St. Dev.	0.20

HASL 0.0165" PTH

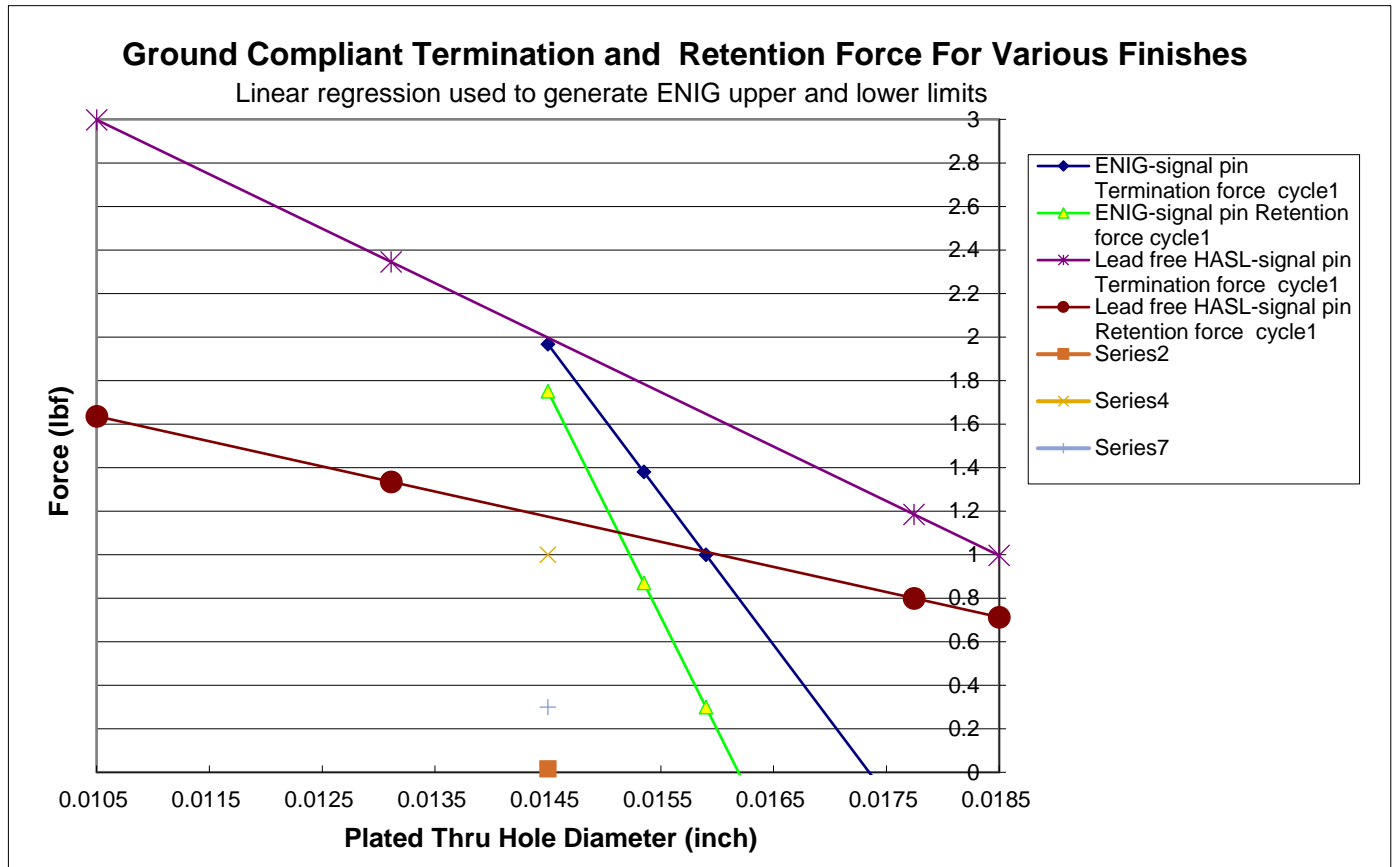
Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	1.03	Minimum	0.86
Maximum	1.34	Maximum	1.20
Average	1.16	Average	1.05
St. Dev.	0.07	St. Dev.	0.08
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	0.59	Minimum	0.38
Maximum	1.01	Maximum	0.85
Average	0.83	Average	0.65
St. Dev.	0.09	St. Dev.	0.11

ENIG 0.0165" PTH

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	1.00	Minimum	0.96
Maximum	1.38	Maximum	1.17
Average	1.18	Average	1.08
St. Dev.	0.08	St. Dev.	0.05
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	0.30	Minimum	0.17
Maximum	0.87	Maximum	0.60
Average	0.47	Average	0.38
St. Dev.	0.11	St. Dev.	0.10

DATA SUMMARIES Continued

Compliant pin summary graph



DATA SUMMARIES Continued**Compliant pin Insertion/Retention****Cage Compliant pin Insertion/Retention force****HASL 0.039" PTH**

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	4.39	Minimum	3.64
Maximum	6.84	Maximum	5.26
Average	5.46	Average	4.41
St. Dev.	0.62	St. Dev.	0.43
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	1.16	Minimum	0.89
Maximum	1.78	Maximum	1.72
Average	1.46	Average	1.17
St. Dev.	0.17	St. Dev.	0.14

HASL 0.043" PTH

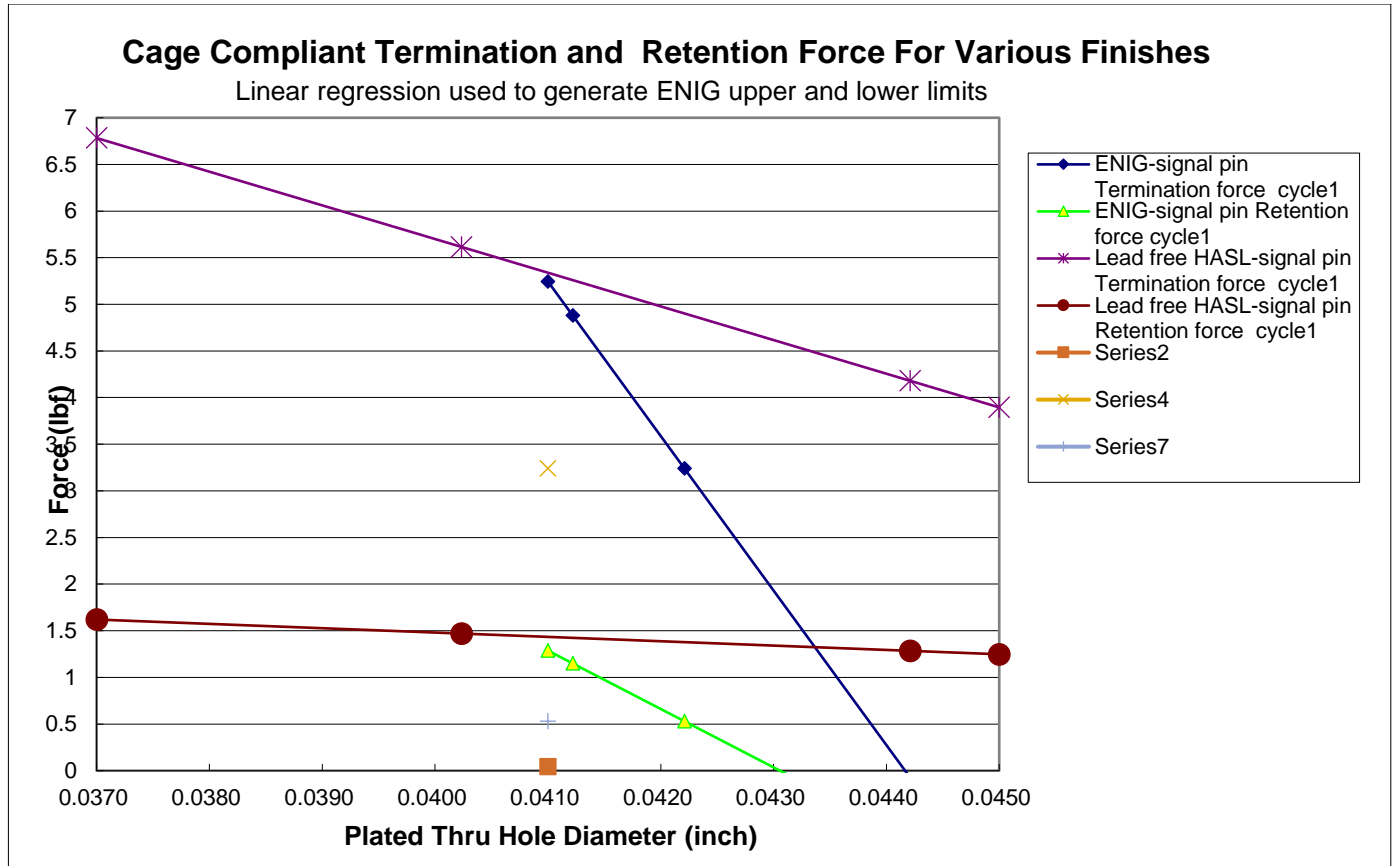
Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	3.24	Minimum	2.63
Maximum	5.12	Maximum	4.26
Average	4.04	Average	3.40
St. Dev.	0.59	St. Dev.	0.43
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	0.85	Minimum	0.86
Maximum	1.72	Maximum	1.65
Average	1.29	Average	1.20
St. Dev.	0.19	St. Dev.	0.14

ENIG 0.043" PTH

Cycle 1		Cycle 3	
Insertion Force Summary		Insertion Force Summary	
Minimum	3.24	Minimum	2.68
Maximum	4.88	Maximum	3.98
Average	3.87	Average	3.48
St. Dev.	0.30	St. Dev.	0.31
Cycle 1		Cycle 3	
Retention Force Summary		Retention Force Summary	
Minimum	0.53	Minimum	0.27
Maximum	1.15	Maximum	0.69
Average	0.87	Average	0.51
St. Dev.	0.14	St. Dev.	0.10

DATA SUMMARIES Continued

Compliant pin summary graph



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

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

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

	Ground to Cage Ground		
	Mated	Unmated	Unmated
Minimum	FSFP/CARD	FSFP	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	FSFP/CARD	FSFP	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	FSFP/CARD	FSFP	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	FSFP/CARD
Break Down Voltage	931
Test Voltage	700
Working Voltage	230

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

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

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

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

Ground to Cage Ground	
Initial Test Voltage	Pass
After Thermal Test Voltage	Pass
After Humidity Test Voltage	Pass

DATA SUMMARIES Continued**Cable Flex****Insulation Resistance minimums, IR**

Pin to Pin	
Mated	
Minimum	
Initial	45000
After 500 Flex Cycles	45000

Pin to Ground	
Mated	
Minimum	
Initial	45000
After 500 Flex Cycles	45000

Dielectric Withstanding Voltage minimums, DWV

Voltage Rating Summary	
Minimum	B1SDT/P1M
Test Voltage	700

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

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

DATA SUMMARIES Continued**LLCR Durability:**

- 1) A total of 176 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 $+1000$ mOhms -----Unstable
 - f. $>+1000$ mOhms: -----Open Failure

Date	12/21/2023	12/22/2023	1/8/2024	1/20/2024
mOhm values	Actual Initial	Delta Cycles	Delta Therm Shck	Delta Humidity
Pin Type: Signal 1				
Average	8.97	0.59	0.74	0.89
St. Dev.	0.68	0.49	0.61	0.77
Min	7.79	0	0.01	0.04
Max	11.72	2.54	2.77	4.58
Summary Count	96	96	96	96
Total Count	96	96	96	96
Pin Type: Ground				
Average	4.41	0.21	1.18	2.18
St. Dev.	0.89	0.19	0.60	1.49
Min	3.27	0.01	0.25	0.54
Max	6.11	0.69	2.6	5.97
Summary Count	32	32	32	32
Total Count	32	32	32	32
Pin Type: Cable				
Average	137.16	1.10	2.28	0.90
St. Dev.	1.96	1.05	0.92	0.62
Min	131.68	0.12	0.51	0.01
Max	140.52	5.69	3.92	2.24
Summary Count	32	32	32	32
Total Count	32	32	32	32
Pin Type: GND				
Average	55.74	2.00	5.02	4.76
St. Dev.	3.38	1.42	2.35	2.70
Min	51.53	0.19	0.43	0.59
Max	63.55	5.39	8.74	9
Summary Count	16	16	16	16
Total Count	16	16	16	16

	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \ \& \ \leq 10$	$>10 \ \& \ \leq 15$	$>15 \ \& \ \leq 50$	$>50 \ \& \ \leq 1000$	>1000
Cycles	174	2	0	0	0	0
Therm Shck	168	8	0	0	0	0
Humidity	169	7	0	0	0	0

DATA SUMMARIES Continued

LLCR Durability: Compliant pin

- 1) A total of 30 compliant pin 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) $\leq +0.33$ mOhms: -----Stable
 - b) $+0.33$ to $+0.67$ mOhms: -----Minor
 - c) $+0.67$ to $+1.00$ mOhms: -----Acceptable
 - d) $+1.00$ to $+50.0$ mOhms: -----Marginal
 - e) $+50.1$ to $+1000$ mOhms -----Unstable
 - f) $>+1000$ mOhms:-----Open Failure

LLCR Measurement Summaries by Pin Type			
Date	12/25/2023	1/8/2024	1/22/2024
Room Temp (Deg C)	23	20	22
Rel Humidity (%)	54	54	50
Technician	Peter Chen	Peter Chen	Peter Chen
mOhm values	Actual	Delta	Delta
	Initial	Therm Shck	Humidity
Pin Type: Signal 2			
Average	0.44	0.09	0.11
St. Dev.	0.09	0.09	0.08
Min	0.22	0.00	0.00
Max	0.65	0.33	0.29
Summary Count	30	30	30
Total Count	30	30	30

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 0.33	>0.33 & ≤ 0.66	>0.66 & ≤ 1	>1 & ≤ 50	>50 & ≤ 1000	>1000
Therm Shck	30	0	0	0	0	0
Humidity	30	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Thermal Aging:

- 1) A total of 176 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 $+1000$ mOhms: -----Unstable
 - f. $>+1000$ mOhms:-----Open Failure

		LLCR Measurement Summaries by Pin Type			
Date	12/20/2023	1/9/2024			
mOhm values	Actual Initial	Delta Thermal			
Pin Type: Signal					
Average	9.05	0.56			
St. Dev.	0.64	0.43			
Min	7.61	0.00			
Max	10.79	1.98			
Summary Count	96	96			
Total Count	96	96			
Pin Type: Ground					
Average	4.62	1.34			
St. Dev.	0.87	1.42			
Min	2.76	0.01			
Max	6.09	7.1			
Summary Count	32	32			
Total Count	32	32			
Pin Type: Cable					
Average	134.87	3.57			
St. Dev.	2.06	0.89			
Min	130.72	2.43			
Max	139.54	6.59			
Summary Count	32	32			
Total Count	32	32			
Pin Type: GND					
Average	53.89	8.06			
St. Dev.	2.14	1.47			
Min	49.55	4.32			
Max	57.96	10.01			
Summary Count	16	16			
Total Count	16	16			

	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	>5 & ≤ 10	>10 & ≤ 15	>15 & ≤ 50	>50 & ≤ 1000	>1000
Thermal	159	17	0	0	0	0

DATA SUMMARIES Continued

LLCR Thermal Aging: Compliant pin

- 1) A total of 30 compliant pin 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. +0.33 to +0.67 mOhms: -----Minor
 - b. +0.67 to +1.00 mOhms: -----Acceptable
 - c. +1.00 to +50.0 mOhms: -----Marginal
 - d. +50.1 to +1000 mOhms -----Unstable
 - e. >+1000 mOhms:-----Open Failure

LLCR Measurement Summaries by Pin Type			
Date	12/26/2023	1/9/2024	
Room Temp (Deg C)	23	22	
Rel Humidity (%)	51	50	
Technician	Peter Chen	Peter Chen	
mOhm values	Actual	Delta	
	Initial	Thermal	
Pin Type: Signal 2			
Average	0.44	0.11	
St. Dev.	0.08	0.09	
Min	0.31	0.00	
Max	0.59	0.26	
Summary Count	30	30	
Total Count	30	30	

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=0.33	>0.33 & <=0.66	>0.66 & <=1	>1 & <=50	>50 & <=1000	>1000
Thermal	30	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Gas Tight:

- 1) A total of 176 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. $>+1000$ mOhms: -----Open Failure

Date	12/20/2023	12/27/2023		
mOhm values	Actual Initial	Delta Acid Vapor		
Pin Type: Signal				
Average	8.72	0.69		
St. Dev.	0.59	0.56		
Min	7.55	0.00		
Max	10.20	2.95		
Summary Count	96	96		
Total Count	96	96		
Pin Type: Ground				
Average	4.51	1.49		
St. Dev.	1.00	0.91		
Min	3.08	0.08		
Max	6.84	3.35		
Summary Count	32	32		
Total Count	32	32		
Pin Type: Cable				
Average	135.72	1.74		
St. Dev.	2.54	0.91		
Min	130.97	0.59		
Max	141.37	4.13		
Summary Count	32	32		
Total Count	32	32		
Pin Type: GND				
Average	54.15	2.05		
St. Dev.	2.28	1.60		
Min	48.63	0		
Max	58.74	4.99		
Summary Count	16	16		
Total Count	16	16		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	>5 & ≤ 10	>10 & ≤ 15	>15 & ≤ 50	>50 & ≤ 1000	>1000
Acid Vapor	176	0	0	0	0	0

DATA SUMMARIES Continued**LLCR Gas tight: Compliant pin**

- 5) A total of 30 compliant pin points were measured
- 6) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 7) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 8) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - f. +0.33 to +0.67 mOhms: -----Minor
 - g. +0.67 to +1.00 mOhms: -----Acceptable
 - h. +1.00 to +50.0 mOhms: -----Marginal
 - i. +50.1 to +1000 mOhms -----Unstable
 - j. >+1000 mOhms:-----Open Failure

LLCR Measurement Summaries by Pin Type			
Date	12/26/2023	12/27/2023	
Room Temp (Deg C)	23	20	
Rel Humidity (%)	51	54	
Technician	Peter Chen	Peter Chen	
mOhm values	Actual	Delta	
	Initial	Acid Vapor	
Pin Type: Signal 2			
Average	0.39	0.13	
St. Dev.	0.08	0.10	
Min	0.23	0.00	
Max	0.55	0.50	
Summary Count	30	30	
Total Count	30	30	

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=0.33	>0.33 & <=0.66	>0.66 & <=1	>1 & <=50	>50 & <=1000	>1000
Acid Vapor	29	1	0	0	0	0

DATA SUMMARIES Continued

LLCR Shock &Vibration:

- 1). A total of 176 points were measured.
- 2). EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
- 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 $+1000$ mOhms -----Unstable
 - f. $>+1000$ mOhms: -----Open Failure

Date	4/9/2024	4/17/2024		
mOhm values	Actual Initial	Delta Shock-Vib		
Pin Type: Cable				
Average	289.24	1.05		
St. Dev.	3.71	0.66		
Min	282.37	0.2		
Max	293.55	3.22		
Summary Count	32	32		
Total Count	32	32		
Pin Type: Signal				
Average	8.72	0.47		
St. Dev.	0.54	0.65		
Min	7.66	0		
Max	10.25	5.72		
Summary Count	96	96		
Total Count	96	96		
Pin Type: GND				
Average	114.09	3.01		
St. Dev.	4.24	2.53		
Min	108.72	0.94		
Max	122.51	8.08		
Summary Count	8	8		
Total Count	8	8		
Pin Type: GND				
Average	114.88	2.98		
St. Dev.	3.59	2.61		
Min	109.11	0.97		
Max	119.58	8.79		
Summary Count	8	8		
Total Count	8	8		
Pin Type: Ground				
Average	4.27	0.33		
St. Dev.	0.89	0.73		
Min	3.17	0.01		
Max	5.57	3.91		
Summary Count	32	32		
Total Count	32	32		

	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	>5 & ≤ 10	>10 & ≤ 15	>15 & ≤ 50	>50 & ≤ 1000	>1000
Shock-Vib	172	4	0	0	0	0

DATA SUMMARIES Continued**Nanosecond Event Detection:**

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

DATA SUMMARIES Continued

LLCR Shock & Vibration: Compliant pin

- 1) A total of 30 compliant pin 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. +0.33 to +0.67 mOhms: -----Minor
 - b. +0.67 to +1.00 mOhms: -----Acceptable
 - c. +1.00 to +50.0 mOhms: -----Marginal
 - d. +50.1 to +2000 mOhms -----Unstable
 - e. >+1000 mOhms:-----Open Failure

LLCR Measurement Summaries by Pin Type		
Date	4/9/2024	4/17/2024
Room Temp (Deg C)	22	22
Rel Humidity (%)	50	53
Technician	Daniel Haydon	Daniel Haydon
mOhm values	Actual	Delta After Shock & Vibe
Pin Type: Signal 1		
Average	0.24	0.04
St. Dev.	0.05	0.03
Min	0.17	0.00
Max	0.34	0.10
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=.33	>.33 & <=.66	>.67 & <=1.00	>1.01 & <=50	>50.1 & <=1000	>1000
After Shock & Vibe	30	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Compliant pin Insertion/Retention Group

- 1) A total of 32 compliant pin 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.
 - k. +0.33 to +0.67 mOhms: -----Minor
 - l. +0.67 to +1.00 mOhms: -----Acceptable
 - m. +1.00 to +50.0 mOhms: -----Marginal
 - n. +50.1 to +2000 mOhms -----Unstable
 - o. >+1000 mOhms:-----Open Failure

Signal Pin:

HASL 0.0125" PTH

LLCR Measurement Summaries by Pin Type			
Date	5/20/2024	5/20/2024	
Room Temp (Deg C)	23	20	
Rel Humidity (%)	51	54	
Technician	Peter Chen	Peter Chen	
mOhm values	Actual	Delta	
	Initial	Acid Vapor	
Pin Type: Signal 2			
Average	0.09	0.07	
St. Dev.	0.04	0.04	
Min	0.04	0.02	
Max	0.20	0.18	
Summary Count	32	32	
Total Count	32	32	

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=0.33	>0.33 & <=0.66	>0.66 & <=1	>1 & <=50	>50 & <=1000	>1000
Acid Vapor	32	0	0	0	0	0

DATA SUMMARIES Continued**HASL 0.0165" PTH**

		LLCR Measurement Summaries by Pin Type			
Date		5/20/2024	5/20/2024		
Room Temp (Deg C)		23	20		
Rel Humidity (%)		51	54		
Technician		Peter Chen	Peter Chen		
mOhm values	Actual		Delta		
	Initial		Acid Vapor		
		Pin Type: Signal 2			
Average		0.08	0.05		
St. Dev.		0.03	0.04		
Min		0.04	0.00		
Max		0.15	0.15		
Summary Count		32	32		
Total Count		32	32		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=0.33	>0.33 & <=0.66	>0.66 & <=1	>1 & <=50	>50 & <=1000	>1000
Acid Vapor	32	0	0	0	0	0

ENIG 0.0165" PTH

		LLCR Measurement Summaries by Pin Type			
Date		5/20/2024	5/20/2024		
Room Temp (Deg C)		23	20		
Rel Humidity (%)		51	54		
Technician		Peter Chen	Peter Chen		
mOhm values	Actual		Delta		
	Initial		Acid Vapor		
		Pin Type: Signal 2			
Average		0.10	0.05		
St. Dev.		0.05	0.05		
Min		0.04	0.00		
Max		0.24	0.18		
Summary Count		32	32		
Total Count		32	32		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=0.33	>0.33 & <=0.66	>0.66 & <=1	>1 & <=50	>50 & <=1000	>1000
Acid Vapor	32	0	0	0	0	0

DATA SUMMARIES Continued**Ground Pin:
HASL 0.0125" PTH**

		LLCR Measurement Summaries by Pin Type			
Date		5/20/2024	5/20/2024		
Room Temp (Deg C)		23	20		
Rel Humidity (%)		51	54		
Technician		Peter Chen	Peter Chen		
mOhm values	Actual		Delta		
	Initial		Acid Vapor		
		Pin Type: Signal 2			
Average		0.09	0.04		
St. Dev.		0.04	0.03		
Min		0.04	0.00		
Max		0.20	0.11		
Summary Count		32	32		
Total Count		32	32		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=0.33	>0.33 & <=0.66	>0.66 & <=1	>1 & <=50	>50 & <=1000	>1000
Acid Vapor	32	0	0	0	0	0

HASL 0.0165" PTH

		LLCR Measurement Summaries by Pin Type			
Date		5/20/2024	5/20/2024		
Room Temp (Deg C)		23	20		
Rel Humidity (%)		51	54		
Technician		Peter Chen	Peter Chen		
mOhm values	Actual		Delta		
	Initial		Acid Vapor		
		Pin Type: Signal 2			
Average		0.09	0.03		
St. Dev.		0.03	0.03		
Min		0.05	0.00		
Max		0.16	0.11		
Summary Count		32	32		
Total Count		32	32		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=0.33	>0.33 & <=0.66	>0.66 & <=1	>1 & <=50	>50 & <=1000	>1000
Acid Vapor	32	0	0	0	0	0

DATA SUMMARIES Continued**ENIG 0.0165" PTH**

LLCR Measurement Summaries by Pin Type			
Date	5/20/2024	5/20/2024	
Room Temp (Deg C)	23	20	
Rel Humidity (%)	51	54	
Technician	Peter Chen	Peter Chen	
mOhm values	Actual	Delta	
	Initial	Acid Vapor	
Pin Type: Signal 2			
Average	0.10	0.04	
St. Dev.	0.03	0.02	
Min	0.04	0.00	
Max	0.18	0.08	
Summary Count	32	32	
Total Count	32	32	

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=0.33	>0.33 & <=0.66	>0.66 & <=1	>1 & <=50	>50 & <=1000	>1000
Acid Vapor	32	0	0	0	0	0

EQUIPMENT AND CALIBRATION SCHEDULES**Equipment #:** HZ-TCT-01**Description:** Normal force analyzer**Manufacturer:** Mecmesin Multitester**Model:** Mecmesin Multitester 2.5-i**Serial #:** 08-1049-04**Accuracy:** Last Cal: 4/26/2024, Next Cal: 4/27/2025**Equipment #:** HZ-OV-01**Description:** Oven**Manufacturer:** Huida**Model:** CS101-1E**Serial #:** CS101-1E-B**Accuracy:** Last Cal: 12/13/2023, Next Cal: 12/12/2024**Equipment #:** HZ-THC-01**Description:** Humidity transmitter**Manufacturer:** Thermtron**Model:** HMM30C**Serial #:** D0240037**Accuracy:** Last Cal: 3/1/2024, Next Cal: 2/28/2025**Equipment #:** HZ-HPM-01**Description:** NA9636H**Manufacturer:** Ainuo**Model:** 6031A**Serial #:** 089601091**Accuracy:** Last Cal: 3/8/2024, Next Cal: 3/7/2025**Equipment #:** MO-04**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0798688**Accuracy:** Last Cal: 4/20/2024, Next Cal: 4/20/2025**Equipment #:** PS-11**Description:** Power Supply**Manufacturer:** Hewlett Packard / Agilent**Model:** AT-6032A**Serial #:** 3440A10457**Accuracy:** Last Cal: no calibrate, Next Cal: no calibrate**Equipment #:** HZ-MO-05**Description:** Micro-ohmmeter**Manufacturer:** Keithley**Model:** 3706**Serial #:** 1285188**Accuracy:** Last Cal: 11/15/2023, Next Cal: 11/14/2024

EQUIPMENT AND CALIBRATION SCHEDULES**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: 06/28/2023, Next Cal: 06/27/2024

Equipment #: SVC-01**Description:** Shock & Vibration Table**Manufacturer:** Data Physics**Model:** LE-DSA-10-20K**Serial #:** 10037**Accuracy:** See Manual

... Last Cal: 11/30/2023, Next Cal: 11/30/2024

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

... Last Cal: 07/09/2023, Next Cal: 07/09/2024

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

... Last Cal: 06/04/2023, Next Cal: 06/04/2024