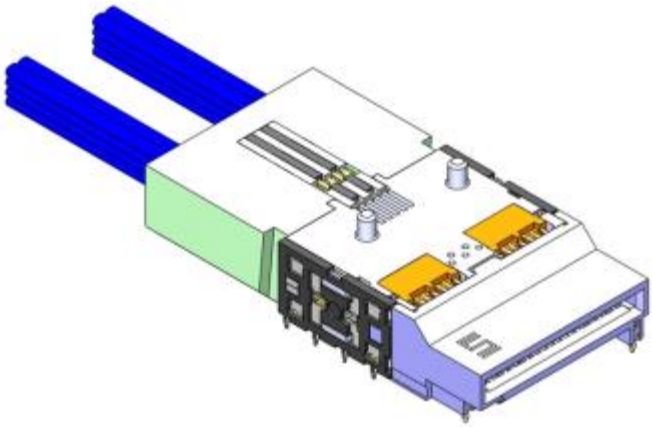
Project Number: Design Qualification Test Report	Tracking Code: CR-872102_Report_Rev_1
Requested by: Michael Boone	Date: 6/7/2023
Part #: FQSFP-D8-03-A-06.0-BC/QSFPO-D8	
Part description: FQSFP/QSFPO	Tech: Richard Ison
Test Start: 3/2/2023	Test Completed: 3/27



DESIGN QUALIFICATION TEST REPORT

FQSFP/QSFPO
FQSFP-D8-03-A-06.0-BC/QSFPO-D8

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
6/6/2023	**1**	**Initial Issue**	**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 CO-SC-WI-3029.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead Free
9) Samtec Test PCBs used: PCB-111823-TST

FLOWCHARTS

Gas Tight

Note: HDR-224316-01-FQSFPD8

Group 1
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
8 Assemblies
ENIG .0165" PTH

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

Compliant Pin Only

Group 2
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
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

FLOWCHARTS Continued

Normal Force

SNG-IM-C-509-3-H

Group 1
FQSFP-D8-03-A-04.0-BC

8 Contacts Minimum
Signal Pair Without Thermals
Note: Deflect both differential pair beams at the same time.

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0116 " Expected Force at Max Deflection = 80 g

Group 2
FQSFP-D8-03-A-04.0-BC
QSFPO-D8
8 Contacts Minimum
Signal Pair With Thermals
Note: Deflect both differential pair beams at the same time.

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0116 " Expected Force at Max Deflection = 80 g

Group 3
FQSFP-D8-03-A-06.0-BC

8 Contacts Minimum
Ground Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0116 " Expected Force at Max Deflection = 40 g

Group 4
FQSFP-D8-03-A-04.0-BC
QSFPO-D8
8 Contacts Minimum
Ground With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0116 " Expected Force at Max Deflection = 40 g

Group 19
FQSFP-D8-03-A-06.0-BC

8 Contacts Minimum
Power Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0116 " Expected Force at Max Deflection = 40 g

Group 20
FQSFP-D8-03-A-04.0-BC
QSFPO-D8
8 Contacts Minimum
Power With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0116 " Expected Force at Max Deflection = 40 g

SNG-IM-C-510-3-H

Group 5
FQSFP-D8-03-A-04.0-BC

8 Contacts Minimum
Signal Pair Without Thermals
Note: Deflect both differential pair beams at the same time.
Note: Front of connector needs to be removed.

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0115 " Expected Force at Max Deflection = 80 g

Group 6
FQSFP-D8-03-A-04.0-BC
QSFPO-D8
8 Contacts Minimum
Signal Pair With Thermals
Note: Front of connector needs to be removed.
Note: Deflect both differential pair beams at the same time.

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0115 " Expected Force at Max Deflection = 80 g

Group 7
FQSFP-D8-03-A-04.0-BC

8 Contacts Minimum
Ground Without Thermals
Note: Front of connector needs to be removed.

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0115 " Expected Force at Max Deflection = 40 g

Group 8
FQSFP-D8-03-A-04.0-BC
QSFPO-D8
8 Contacts Minimum
Ground With Thermals
Note: Front of connector needs to be removed.

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0115 " Expected Force at Max Deflection = 40 g

Group 21
FQSFP-D8-03-A-04.0-BC

8 Contacts Minimum
Power Without Thermals
Note: Front of connector needs to be removed.

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0115 " Expected Force at Max Deflection = 40 g

Group 22
FQSFP-D8-03-A-04.0-BC
QSFPO-D8
8 Contacts Minimum
Power With Thermals
Note: Front of connector needs to be removed.

Step	Description
1.	Contact Gaps
2.	Thermal Age (2)
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0115 " Expected Force at Max Deflection = 40 g

FLOWCHARTS Continued

SNG-IM-C-511-L

Group 9

FQSFP-D8-03-A-04.0-BC

8 Contacts Minimum
Without Thermals
Note: Loose piece

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0055 " Expected Force at Max Deflection = 60 g

Group 10

FQSFP-D8-03-A-04.0-BC
IM-C-509-3-H/IM-C-510-3-H
8 Contacts Minimum
With Thermals
Note: Loose piece SNG-IM-C-511-L mated with SNG-IM-C-509 and SNG-IM-C-510 during thermals.
Note: Connectors will be dropped off with the low speeds not mated to the high speed wafers.

Step	Description
1.	Contact Gaps
2.	Thermal Age (2) *Note: After contact gaps the DUTs will be returned to production for low speed wafer fill before thermal aging.*
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0055 " Expected Force at Max Deflection = 60 g

SNG-IM-C-512-L

Group 11

FQSFP-D8-03-A-04.0-BC

8 Contacts Minimum
Without Thermals
Note: Loose piece

Step	Description
1.	Contact Gaps
2.	Normal Force (1) Deflection = 0.0055 " Expected Force at Max Deflection = 60 g

Group 12

FQSFP-D8-03-A-04.0-BC
SNG-IM-C-509-3-H / SNG-IM-C-510-3-H
8 Contacts Minimum
With Thermals
Note: Loose piece SNG-IM-C-512-L mated with SNG-IM-C-509 and SNG-IM-C-510 during thermals.
Note: Connectors will be dropped off with the low speeds not mated to the high speed wafers.

Step	Description
1.	Contact Gaps
2.	Thermal Age (2) *Note: After contact gaps the DUTs will be returned to production for low speed wafer fill before thermal aging.*
3.	Contact Gaps
4.	Normal Force (1) Deflection = 0.0055 " Expected Force at Max Deflection = 60 g

SH157-1 (Top/Bottom) External

Group 13

QSFPC-D8-1-1-S-F

8 Contacts Minimum
External EMI Fingers Without Thermals

Step	Description
1.	Contact Gaps *Note: Measure C2 on the SH154-X-X-X-F print.*
2.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 69 g

FLOWCHARTS Continued

SH157-2 (Side/Side) External

Group 14

QSFPC-D8-1-1-S-F

8 Contacts Minimum

External EMI Fingers Without Thermals

Step	Description
1.	Contact Gaps *Note: Measure C1 on the SH154-X-X-X-F print.*
2.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 69 g

SH157-1 (Top/Bottom) Internal

Group 15

QSFPC-D8-1-1-S-F

8 Contacts Minimum

Internal EMI Fingers Without Thermals

Step	Description
1.	Contact Gaps *Note: Measure C10 on SH154-X-X-X-F.*
2.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 69 g *Note: Press both contact regions at the same time.*

FLOWCHARTS Continued

SH157-2 (Side/Side) Internal

Group 16
QSFPC-D8-1-1-S-F

8 Contacts Minimum
Internal EMI Fingers Without Thermals

Step	Description
1.	Contact Gaps *Note: Measure C4 on SH154-X-X-X-F.*
2.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 69 g *Note: Press both contact regions at the same time.*

S Shaped Heat Sink Spring Fingers

Group 17
QSFPC-D8-1-1-S-F

8 Contacts Minimum
Heat Sink Without Thermals

Step	Description
1.	Contact Gaps *Note: Measure SH154-X-X-X-F sheet 2 detail 'H' 0.84 dimension.*
2.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 567 g

Group 18
QSFPC-D8-1-1-S-F
QSFPO-D8
8 Contacts Minimum
Heat Sink With Thermals

Step	Description
1.	Contact Gaps *Note: Measure SH154-X-X-X-F sheet 2 detail 'H' 0.84 dimension.*
2.	Thermal Age (2)
3.	Contact Gaps *Note: Measure SH154-X-X-X-F sheet 2 detail 'H' 0.84 dimension.*
4.	Normal Force (1) Deflection = 0.0206 " Expected Force at Max Deflection = 69 g

(1) Normal Force = EIA-364-04

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

FLOWCHARTS Continued

Thermal Aging

Note: HDR-224316-01-FQSFPD8

Group 1
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
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 Only

Group 2
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
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

Note: HDR-224316-01-FQSFPD8

Group 1
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
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)

FLOWCHARTS Continued

Compliant Pin Only

Group 2

FQSFP-D8-03-A-06.0-BC

QSFPO-D8

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 = (-25°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 FQSFP-D8-03-A-06.0-BC QSFPO-D8 2 Assemblies		Group 2 FQSFP-D8-03-A-06.0-BC 2 Assemblies		Group 3 FQSFP-D8-03-A-06.0-BC QSFPO-D8 2 Assemblies	
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) - 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 Row

Group 4 FQSFP-D8-03-A-06.0-BC QSFPO-D8 2 Assemblies		Group 5 FQSFP-D8-03-A-06.0-BC 2 Assemblies		Group 6 FQSFP-D8-03-A-06.0-BC QSFPO-D8 2 Assemblies	
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) - 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
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Out wafer 509 pin to pin. PCB-112092-TST-01

Step	Description
1.	DWV Breakdown(2)

Group 8
FQSFP-D8-03-A-06.0-BC
2 Assemblies

Note: Out wafer 509 pin to pin. PCB-112092-TST-01

Step	Description
1.	DWV Breakdown(2)

Group 9
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Out wafer 509 pin to pin. PCB-112092-TST-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)

Group 19
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Inner wafer 510 pin to pin. PCB-112092-TST-01

Step	Description
1.	DWV Breakdown(2)

Group 20
FQSFP-D8-03-A-06.0-BC
2 Assemblies

Note: Inner wafer 510 pin to pin. PCB-112092-TST-01

Step	Description
1.	DWV Breakdown(2)

Group 21
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Inner wafer 510 pin to pin. PCB-112092-TST-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)

FLOWCHARTS Continued

HS Row-to-HS Row

Group 10
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Inner to outer wafer row to row. 509 to 510.
PCB-112092-TST-01

Step	Description
1.	DWV Breakdown(2)

Group 11
FQSFP-D8-03-A-06.0-BC
2 Assemblies

Note: Inner to outer wafer row to row. 509 to 510.
PCB-112092-TST-01

Step	Description
1.	DWV Breakdown(2)

Group 12
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Inner to outer wafer row to row. 509 to 510.
PCB-112092-TST-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)

Group 22
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Inner wafer to inner wafer row to row. 510
PCB-112092-TST-03

Step	Description
1.	DWV Breakdown(2)

Group 23
FQSFP-D8-03-A-06.0-BC
2 Assemblies

Note: Inner wafer to inner wafer row to row. 510
PCB-112092-TST-03

Step	Description
1.	DWV Breakdown(2)

Group 24
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Inner wafer to inner wafer row to row. 510
PCB-112092-TST-03

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)

Group 28
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Outer wafer to outer wafer row to row. 509
PCB-112092-TST-03

Step	Description
1.	DWV Breakdown(2)

Group 29
FQSFP-D8-03-A-06.0-BC
2 Assemblies

Note: Outer wafer to outer wafer row to row. 509
PCB-112092-TST-03

Step	Description
1.	DWV Breakdown(2)

FLOWCHARTS Continued

Group 30
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Outer wafer to outer wafer row to row. 509
PCB-112092-TST-03

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 13
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Outer wafer 509 pin to ground.
PCB-112092-TST-02

Step	Description
1.	DWV Breakdown (2)

Group 14
FQSFP-D8-03-A-06.0-BC
2 Assemblies

Note: Outer wafer 509 pin to ground.
PCB-112092-TST-02

Step	Description
1.	DWV Breakdown (2)

Group 15
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Outer wafer 509 pin to ground.
PCB-112092-TST-02

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)

Group 25
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Inner wafer 510 pin to ground.
PCB-112092-TST-02

Step	Description
1.	DWV Breakdown (2)

Group 26
FQSFP-D8-03-A-06.0-BC
2 Assemblies

Note: Inner wafer 510 pin to ground.
PCB-112092-TST-02

Step	Description
1.	DWV Breakdown (2)

Group 27
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
2 Assemblies

Note: Inner wafer 510 pin to ground.
PCB-112092-TST-02

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 16 FQSFP-D8-03-A-06.0-BC QSFPO-D8 2 Assemblies		Group 17 FQSFP-D8-03-A-06.0-BC 2 Assemblies		Group 18 FQSFP-D8-03-A-06.0-BC QSFPO-D8 2 Assemblies	
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) - 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 = (-25°C to +85°C)
Test Duration = A-3 (100 Cycles)
EIA-364-32

FLOWCHARTS Continued

Current Carrying Capacity

Group 1
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
4 Pins Powered
Signal - ENIG .0165" PTH
Note: PCB-108300-TST-01
PCB-108301-TST-01

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

Group 2
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
8 Pins Powered
Signal - ENIG .0165" PTH
Note: PCB-108300-TST-02
PCB-108301-TST-01

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

Group 3
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
12 Pins Powered
Signal - ENIG .0165" PTH
Note: PCB-108300-TST-02
PCB-108301-TST-01

Step	Description
1.	CCC (1) Rows = 4 Number of Positions = 3

Group 4
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
16 Pins Powered
Signal - ENIG .0165" PTH
Note: PCB-108300-TST-01
PCB-108301-TST-01

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

Group 5
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
20 Pins Powered
Signal - ENIG .0165" PTH
Note: PCB-108300-TST-03
PCB-108301-TST-01

Step	Description
1.	CCC (1) Rows = 4 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

Note: HDR-224316-01-FQSFPD8

Group 1
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
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 Only

Group 2
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
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 (30 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
FQSFP-D8-03-A-06.0-BC
QSFPO-D8
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 (30 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-D8-03-A-12.0-BC	
QSFPO-D8	
5 Assemblies	
0 Degrees	
Step	**Description**
1.	Cable Pull (1)

Group 2	
FQSFP-D8-03-A-12.0-BC	
QSFPO-D8	
5 Assemblies	
90 Degrees	
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

Insertion/Retention/Hole Conditioning

511 Low Speed Signal

Group 1 SNG-IM-C-511-L 32 Points HASL .0125" PTH (LS Sig) *Note: See SK-13515-17 for Components*		Group 2 SNG-IM-C-511-L 32 Points HASL .0165" PTH (LS Sig) *Note: See SK-13515-18 for Components*		Group 3 SNG-IM-C-511-L 32 Points ENIG .0165" PTH (LS Sig) *Note: See SK-13515-19 for Components*	
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: 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*
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: 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*

FLOWCHARTS Continued

131 Ground

Group 4
SNG-IM-WT-131-01-T

32 Points
HASL .0125" PTH (Ground)
Note: See SK-13515-17 for Components

Step	Description
1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*
2.	Retention Force Rate = 2.54 mm/min *Note: Pin 1* *Note: EIA 364-29*
3.	Cycles Quantity = 1 Cycles *Note: Pin 2*
4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*
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*

Group 5
SNG-IM-WT-131-01-T

32 Points
HASL .0165" PTH (Ground)
Note: See SK-13515-18 for Components

Step	Description
1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*
2.	Retention Force Rate = 2.54 mm/min *Note: Pin 1* *Note: EIA 364-29*
3.	Cycles Quantity = 1 Cycles *Note: Pin 2*
4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*
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*

Group 6
SNG-WT-131-01-T

32 Points
ENIG .0165" PTH (Ground)
Note: See SK-13515-19 for Components

Step	Description
1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*
2.	Retention Force Rate = 2.54 mm/min *Note: Pin 1* *Note: EIA 364-29*
3.	Cycles Quantity = 1 Cycles *Note: Pin 2*
4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*
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*

FLOWCHARTS Continued

Cage

Group 7
QSFPC-D8-1-1-S-F

30 Points
HASL .039" PTH (Cage)
Note: See SK-13515-17 for Components

Step	Description
1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*
2.	Retention Force Rate = 2.54 mm/min *Note: Pin 1* *Note: EIA 364-29*
3.	Cycles Quantity = 1 Cycles *Note: Pin 2*
4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*
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*

Group 8
QSFPC-D8-1-1-S-F

30 Points
HASL .043" PTH (Cage)
Note: See SK-13515-18 for Components

Step	Description
1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*
2.	Retention Force Rate = 2.54 mm/min *Note: Pin 1* *Note: EIA 364-29*
3.	Cycles Quantity = 1 Cycles *Note: Pin 2*
4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*
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*

Group 9
QSFPC-D8-1-1-S-F

30 Points
ENIG .043" PTH (Cage)
Note: See SK-13515-19 for Components

Step	Description
1.	Insertion Force Rate = 2.54 mm/min *Note: Pin 1*
2.	Retention Force Rate = 2.54 mm/min *Note: Pin 1* *Note: EIA 364-29*
3.	Cycles Quantity = 1 Cycles *Note: Pin 2*
4.	Insertion Force Rate = 2.54 mm/min *Note: Pin 3*
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*

512 Low Speed Signal

Group 10
SNG-IM-C-512-L

32 Points
HASL .0125" PTH (LS Sig)
Note: See SK-13515-17 for Components

Step	Description
1.	LLCR (1) *Note: Part 1*
2.	Cycles Quantity = 1 Cycles *Note: Part 2*
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*

Group 11
SNG-IM-C-512-L

32 Points
HASL .0165" PTH (LS Sig)
Note: See SK-13515-18 for Components

Step	Description
1.	LLCR (1) *Note: Part 1*
2.	Cycles Quantity = 1 Cycles *Note: Part 2*
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*

Group 12
SNG-IM-C-512-L

32 Points
ENIG .0165" PTH (LS Sig)
Note: See SK-13515-19 for Components

Step	Description
1.	LLCR (1) *Note: Part 1*
2.	Cycles Quantity = 1 Cycles *Note: Part 2*
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*

(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:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition 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.

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.

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: 30 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: 0.10 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

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.

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 +1000 mOhms: ----------Unstable
    f. >+1000 mOhms:----------Open Failure
4) The following guidelines are used to categorize the changes in LLCR for compliant pin only.
    a. <= +0.33 mOhms: ----------Stable
    b. +0.34 to +0.66 mOhms: ----------Minor
    c. +0.66 to +1.0 mOhms:----------Acceptable
    d. +1.1 to +50.0 mOhms:----------Marginal
    e. +50.1 to +1000 mOhms: ----------Unstable
    f. >+1000 mOhms:----------Open Failure

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

GAS TIGHT:

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

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
    a. <= +5.0 mOhms:----------Stable
    b. +5.1 to +10.0 mOhms:----------Minor
    c. +10.1 to +15.0 mOhms: ----------Acceptable
    d. +15.1 to +50.0 mOhms: ----------Marginal
    e. +50.1 to +1000 mOhms:----------Unstable
    f. >+1000 mOhms:----------Open Failure
4) The following guidelines are used to categorize the changes in LLCR for compliant pin only.
    a. <= +0.33 mOhms: ----------Stable
    b. +0.34 to +0.66 mOhms: ----------Minor
    c. +0.66 to +1.0 mOhms:----------Acceptable
    d. +1.1 to +50.0 mOhms:----------Marginal
    e. +50.1 to +1000 mOhms:----------Unstable
    f. >+1000 mOhms:----------Open Failure
5) 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 inche 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.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
    a. Self-heating (resistive)
    b. Reduction in heat sink capacity affecting the heated contacts.
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at three temperature points are reported:
    a. Ambient
    b. 85^{o} C
    c. 95^{o} C
    d. 115^{o} C
8) Typically, neighboring contacts (in close proximity to maximize heat buildup) 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.

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 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

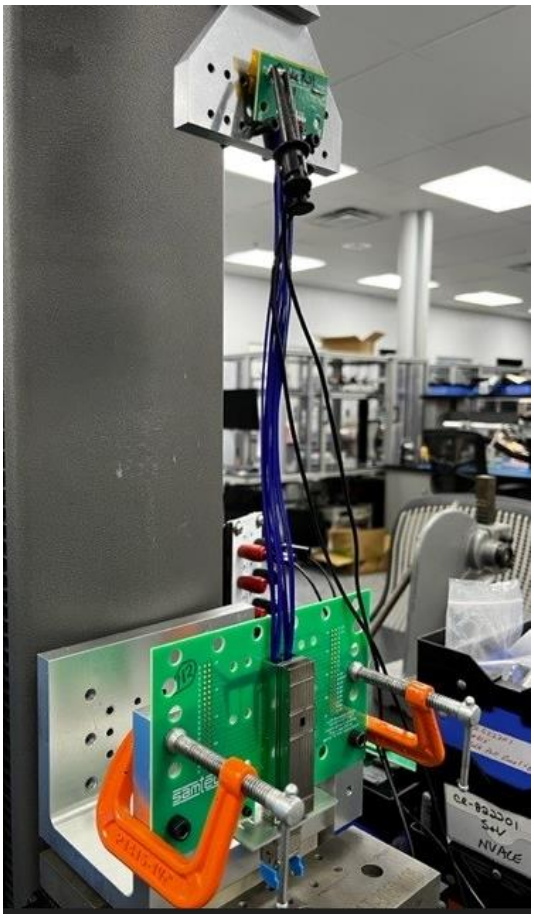


Fig. 1
0° Connector pull.

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise----------2.6 A per contact with 4 contacts (4x1) powered.**
- **CCC for a 30°C Temperature Rise----------1.9 A per contact with 8 contacts (4x2) powered.**
- **CCC for a 30°C Temperature Rise----------1.6 A per contact with 12 contacts (4x3) powered.**
- **CCC for a 30°C Temperature Rise----------1.5 A per contact with 16 contacts (4x4) powered.**
- **CCC for a 30°C Temperature Rise----------1.3 A per contact with 20 contacts (4x5) powered.**

Mating – Unmating Forces

Thermal Aging Group

- **Initial**
  - **Mating**
    - **Min ----------10.55 lbs**
    - **Max----------12.08 lbs**
  - **Unmating**
    - **Min ---------- 2.10 lbs**
    - **Max---------- 3.68 lbs**
- **After Thermal**
  - **Mating**
    - **Min ---------- 7.13 lbs**
    - **Max---------- 9.55 lbs**
  - **Unmating**
    - **Min ---------- 1.76 lbs**
    - **Max---------- 2.44 lbs**

RESULTS Continued

Mating/Unmating Durability Group

- **Initial**
  - **Mating**
    - **Min ----------10.23 lbs**
    - **Max----------11.54 lbs**
  - **Unmating**
    - **Min ---------- 1.74 lbs**
    - **Max---------- 5.74 lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ----------10.05 lbs**
    - **Max----------13.30 lbs**
  - **Unmating**
    - **Min ---------- 2.72 lbs**
    - **Max---------- 4.49 lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ----------10.37 lbs**
    - **Max----------13.71 lbs**
  - **Unmating**
    - **Min ---------- 2.95 lbs**
    - **Max---------- 4.54 lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ----------10.78 lbs**
    - **Max----------13.57 lbs**
  - **Unmating**
    - **Min ---------- 2.78 lbs**
    - **Max---------- 5.26 lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ----------10.77 lbs**
    - **Max----------13.80 lbs**
  - **Unmating**
    - **Min ---------- 3.47 lbs**
    - **Max---------- 5.52 lbs**
- **After Humidity**
  - **Mating**
    - **Min ---------- 7.09 lbs**
    - **Max---------- 8.81 lbs**
  - **Unmating**
    - **Min ---------- 1.77 lbs**
    - **Max---------- 3.16 lbs**

Cable Pull force:

- **0° Pull**
  - **Min----------67.51 lbs**
  - **Max ----------73.11 lbs**
- **90° Pull**
  - **Min---------- 9.79 lbs**
  - **Max ----------12.77 lbs**

RESULTS Continued

Normal Force:

SNG-IM-C-509-3-H

Signal Pin at 0.0140-inch deflection

- **Initial**
  - **Min ---------- 103.00 gf Set ----- 0.0001 in**
  - **Max ---------- 113.30 gf Set ----- 0.0004 in**
- **Thermal**
  - **Min ----------50.80 gf Set----- 0.0058 in**
  - **Max ----------63.10 gf Set----- 0.0070 in**

Ground Pin at 0.0126-inch deflection

- **Initial**
  - **Min ----------54.00 gf Set ----- 0.0000 in**
  - **Max ----------57.70 gf Set ----- 0.0002 in**
- **Thermal**
  - **Min ----------24.50 gf Set----- 0.0051 in**
  - **Max ----------30.30 gf Set----- 0.0068 in**

Power Pin at 0.0140-inch deflection

- **Initial**
  - **Min ----------69.70 gf Set ----- 0.0002 in**
  - **Max ----------82.70 gf Set ----- 0.0004 in**
- **Thermal**
  - **Min ----------36.10 gf Set----- 0.0065 in**
  - **Max ----------45.00 gf Set----- 0.0071 in**

SNG-IM-C-510-3-H

Signal Pin at 0.0140-inch deflection

- **Initial**
  - **Min ---------- 160.90 gf Set ----- 0.0001 in**
  - **Max ---------- 181.70 gf Set ----- 0.0003 in**
- **Thermal**
  - **Min ----------42.70 gf Set----- 0.0070 in**
  - **Max ----------72.30 gf Set----- 0.0089 in**

Ground Pin at 0.0140-inch deflection

- **Initial**
  - **Min ----------57.60 gf Set ----- 0.0001 in**
  - **Max ----------63.00 gf Set ----- 0.0002 in**
- **Thermal**
  - **Min ----------27.70 gf Set----- 0.0047 in**
  - **Max ----------38.40 gf Set----- 0.0073 in**

Power Pin at 0.0140-inch deflection

- **Initial**
  - **Min ----------74.90 gf Set ----- 0.0002 in**
  - **Max ----------93.50 gf Set ----- 0.0006 in**
- **Thermal**
  - **Min ----------25.10 gf Set----- 0.0078 in**
  - **Max ----------36.70 gf Set----- 0.0102 in**

RESULTS Continued

Normal Force:

SNG-IM-C-511-L at 0.0055-inch deflection

- **Initial**
  - **Min ---------- 108.80 gf Set ----- 0.0001 in**
  - **Max ---------- 120.30 gf Set ----- 0.0003 in**
- **Thermal**
  - **Min ---------- 91.30 gf Set ----- 0.0003 in**
  - **Max ---------- 112.50 gf Set ----- 0.0017 in**

SNG-IM-C-512-L at 0.0055-inch deflection

- **Initial**
  - **Min ---------- 113.80 gf Set ----- 0.0000 in**
  - **Max ---------- 127.30 gf Set ----- 0.0004 in**
- **Thermal**
  - **Min ---------- 84.60 gf Set ----- 0.0005 in**
  - **Max ---------- 117.30 gf Set ----- 0.0015 in**

SH157-1 Top/Bottom External EMI Fingers at 0.0206-inch deflection.

- **Initial**
  - **Min ---------- 191.10 gf Set ----- 0.0037 in**
  - **Max ---------- 291.70 gf Set ----- 0.0065 in**

SH157-1 Top/Bottom Internal EMI Fingers at 0.0206-inch deflection.

- **Initial**
  - **Min ---------- 2127.00 gf Set ----- 0.0027 in**
  - **Max ---------- 2669.00 gf Set ----- 0.0048 in**

SH157-2 Side/Side External EMI Fingers at 0.0206-inch deflection.

- **Initial**
  - **Min ---------- 162.30 gf Set ----- 0.0003 in**
  - **Max ---------- 210.10 gf Set ----- 0.0053 in**

SH157-2 Side/Side Internal EMI Fingers at 0.0205-inch deflection.

- **Initial**
  - **Min ---------- 1914.20 gf Set ----- 0.0039 in**
  - **Max ---------- 2645.10 gf Set ----- 0.0068 in**

S Shaped Heat Sink Spring Fingers at 0.0206-inch deflection.

- **Initial**
  - **Min ---------- 418.40 gf Set ----- 0.0000 in**
  - **Max ---------- 478.70 gf Set ----- 0.0017 in**
- **Thermal**
  - **Min ---------- 293.30 gf Set ----- 0.0006 in**
  - **Max ---------- 432.50 gf Set ----- 0.0015 in**

RESULTS Continued

Insertion/Retention/Hole Conditioning.

511 Low Speed Signal

Group 1 SK-13515-17 (HASL .0125" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 1.09 Lbs**
    - **Max---------- 1.44 Lbs**
  - **Retention**
    - **Min ---------- 0.70 Lbs**
    - **Max---------- 1.32 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 1.04 Lbs**
    - **Max---------- 1.42 Lbs**
  - **Retention**
    - **Min ---------- 0.09 Lbs**
    - **Max---------- 1.27 Lbs**

Group 2 SK-13515-18 (HASL .0165" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 0.61 Lbs**
    - **Max---------- 0.85 Lbs**
  - **Retention**
    - **Min ---------- 0.46 Lbs**
    - **Max---------- 0.72 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 0.57 Lbs**
    - **Max---------- 0.91 Lbs**
  - **Retention**
    - **Min ---------- 0.45 Lbs**
    - **Max---------- 0.71 Lbs**

Group 3 SK-13515-19 (ENIG .0165" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 0.73 Lbs**
    - **Max---------- 0.97 Lbs**
  - **Retention**
    - **Min ---------- 0.50 Lbs**
    - **Max---------- 0.72 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 0.72 Lbs**
    - **Max---------- 0.93 Lbs**
  - **Retention**
    - **Min ---------- 0.51 Lbs**
    - **Max---------- 0.82 Lbs**

RESULTS Continued

Insertion/Retention/Hole Conditioning.

131 Ground

Group 4 SK-13515-17 (HASL .0125" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 1.29 Lbs**
    - **Max---------- 2.97 Lbs**
  - **Retention**
    - **Min ---------- 0.76 Lbs**
    - **Max---------- 1.32 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 1.17 Lbs**
    - **Max---------- 2.32 Lbs**
  - **Retention**
    - **Min ---------- 0.77 Lbs**
    - **Max---------- 1.36 Lbs**

Group 5 SK-13515-18 (HASL .0165" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 0.09 Lbs**
    - **Max---------- 1.34 Lbs**
  - **Retention**
    - **Min ---------- 0.53 Lbs**
    - **Max---------- 1.11 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 0.72 Lbs**
    - **Max---------- 1.37 Lbs**
  - **Retention**
    - **Min ---------- 0.64 Lbs**
    - **Max---------- 0.89 Lbs**

Group 6 SK-13515-19 (ENIG .0165" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 0.84 Lbs**
    - **Max---------- 0.97 Lbs**
  - **Retention**
    - **Min ---------- 0.47 Lbs**
    - **Max---------- 0.81 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 0.80 Lbs**
    - **Max---------- 1.01 Lbs**
  - **Retention**
    - **Min ---------- 0.56 Lbs**
    - **Max---------- 0.85 Lbs**

RESULTS Continued

Insertion/Retention/Hole Conditioning.

Cage

Group 7 SK-13515-17 (HASL .039" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 5.44 Lbs**
    - **Max---------- 7.08 Lbs**
  - **Retention**
    - **Min ---------- 0.25 Lbs**
    - **Max---------- 1.53 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 0.58 Lbs**
    - **Max---------- 5.67 Lbs**
  - **Retention**
    - **Min ---------- 0.24 Lbs**
    - **Max---------- 2.25 Lbs**

Group 8 SK-13515-18 (HASL .043" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 2.70 Lbs**
    - **Max---------- 4.46 Lbs**
  - **Retention**
    - **Min ---------- 0.86 Lbs**
    - **Max---------- 2.47 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 2.56 Lbs**
    - **Max---------- 4.91 Lbs**
  - **Retention**
    - **Min ---------- 0.79 Lbs**
    - **Max---------- 2.77 Lbs**

Group 9 SK-13515-19 (ENIG .043" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 2.72 Lbs**
    - **Max---------- 3.92 Lbs**
  - **Retention**
    - **Min ---------- 0.73 Lbs**
    - **Max---------- 3.00 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 2.36 Lbs**
    - **Max---------- 3.51 Lbs**
  - **Retention**
    - **Min ---------- 0.57 Lbs**
    - **Max---------- 2.39 Lbs**

RESULTS Continued

Insertion/Retention/Hole Conditioning.

512 Low Speed Signal

Group 10 SK-13515-17 (HASL .0125" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 1.08 Lbs**
    - **Max---------- 1.28 Lbs**
  - **Retention**
    - **Min ---------- 0.50 Lbs**
    - **Max---------- 1.19 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 1.08 Lbs**
    - **Max---------- 1.76 Lbs**
  - **Retention**
    - **Min ---------- 0.63 Lbs**
    - **Max---------- 1.29 Lbs**

Group 11 SK-13515-18 (HASL .0165" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 0.67 Lbs**
    - **Max---------- 0.98 Lbs**
  - **Retention**
    - **Min ---------- 0.48 Lbs**
    - **Max---------- 0.73 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 0.71 Lbs**
    - **Max---------- 1.00 Lbs**
  - **Retention**
    - **Min ---------- 0.48 Lbs**
    - **Max---------- 0.85 Lbs**

Group 12 SK-13515-19 (ENIG .0165" PTH)

- **Sample Pin 1**
  - **Insertion**
    - **Min ---------- 0.74 Lbs**
    - **Max---------- 0.94 Lbs**
  - **Retention**
    - **Min ---------- 0.52 Lbs**
    - **Max---------- 0.80 Lbs**
- **Sample Pin 3**
  - **Insertion**
    - **Min ---------- 0.77 Lbs**
    - **Max---------- 1.02 Lbs**
  - **Retention**
    - **Min ---------- 0.53 Lbs**
    - **Max---------- 0.91 Lbs**

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 ---------- 1230 Meg Ω ---------- Passed**
  - **Unmated ---------- 1270 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 ---------- 2530 Meg Ω ---------- Passed**
  - **Unmated ---------- 3300 Meg Ω ---------- Passed**

HS Pin to HS Pin (Outer)

- **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 ---------- 1040 Meg Ω ---------- Passed**
  - **Unmated ---------- 4800 Meg Ω ---------- Passed**

HS Row to HS Row (Outer)

- **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 ---------- 2820 Meg Ω ---------- Passed**
  - **Unmated ---------- 22300 Meg Ω ---------- Passed**

HS Row to HS Row (Inner to Outer)

- **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 ---------- 1360 Meg Ω ---------- Passed**
  - **Unmated ---------- 7900 Meg Ω ---------- Passed**

RESULTS Continued

HS Pin to HS Pin (Inner)

- **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---------- 2390 Meg Ω ---------- Passed**
  - **Unmated ---------- 3600 Meg Ω ---------- Passed**

HS Row to HS Row (Inner to Inner)

- **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---------- 6200 Meg Ω ---------- Passed**
  - **Unmated ----------10500 Meg Ω ---------- Passed**

HS Pin to Ground (Outer)

- **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---------- 1480 Meg Ω ---------- Passed**
  - **Unmated ----------20200 Meg Ω ---------- Passed**

HS Pin to Ground (Inner)

- **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---------- 1540 Meg Ω ---------- Passed**
  - **Unmated ---------- 4800 Meg Ω ---------- Passed**

Ground to Cage 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----------12700 Meg Ω ---------- Passed**
  - **Unmated ----------22300 Meg Ω ---------- Passed**

RESULTS Continued

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage ---------- 622 VAC**
  - **Test Voltage ---------- 467 VAC**
  - **Working Voltage ---------- 156 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**

- **Minimums**
  - **Breakdown Voltage ---------- 557 VAC**
  - **Test Voltage ---------- 418 VAC**
  - **Working Voltage ---------- 139 VAC**

HS Pin to HS Pin (Outer)

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

HS Row to HS Row (Outer to Outer)

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

HS Row to HS Row (Inner to Outer)

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

HS Pin to HS Pin (Inner)

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

HS Row to HS Row (Inner to Inner)

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

- **Minimums**
  - **Breakdown Voltage ---------- 563 VAC**
  - **Test Voltage ---------- 422 VAC**
  - **Working Voltage ---------- 141 VAC**

HS Pin to Ground (Outer)

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

HS Pin to Ground (Inner)

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

RESULTS Continued

- **Minimums**
  - **Breakdown Voltage----------403 VAC**
  - **Test Voltage ----------302 VAC**
  - **Working Voltage ----------101 VAC**

Ground to Cage Ground

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

RESULTS Continued

LLCR Gas Tight (256 signal 1, 160 signal 2 and 64 ground LLCR test points)

Signal 1

- **Initial ---------- 291.91 mOhms Max**
- **Gas Tight**
  - **<= +5.0 mOhms ---------- 247 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 9 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**

Signal 2

- **Initial ---------- 23.21 mOhms Max**
- **Gas Tight**
  - **<= +5.0 mOhms ---------- 156 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**

Ground

- **Initial ---------- 21.51 mOhms Max**
- **Gas Tight**
  - **<= +5.0 mOhms ---------- 64 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 (30 LLCR test points)

- **Initial ---------- 0.35 mOhms Max**
- **Gas Tight**
  - **<= +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 Thermal Aging (256 signal 1, 160 signal 2 and 64 ground LLCR test points)

Signal 1

- **Initial ---------- 290.94 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 252 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**

Signal 2

- **Initial ---------- 29.77 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 140 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 16 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 4 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**

Ground

- **Initial ---------- 22.23 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 59 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 +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Thermal Aging Compliant (30 LLCR test points)

- **Initial ---------- 0.62 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 Mating-Unmating Durability (256 signal 1, 160 signal 2 and 64 ground LLCR test points)

Signal 1

- **Initial ---------- 292.07 mOhms Max**
- **Durability 100 cycles**
  - **<= +5.0 mOhms ---------- 255 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 +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 252 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**
- **Humidity**
  - **<= +5.0 mOhms ---------- 255 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 +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

Signal 2

- **Initial ---------- 23.85 mOhms Max**
- **Durability 100 cycles**
  - **<= +5.0 mOhms ---------- 159 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 +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 152 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 ---------- 146 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 14 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**

RESULTS Continued

Ground

- **Initial ---------- 21.97 mOhms Max**
- **Durability 100 cycles**
  - **<= +5.0 mOhms ---------- 64 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**
- **Thermal**
  - **<= +5.0 mOhms ---------- 64 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**
- **Humidity**
  - **<= +5.0 mOhms ---------- 64 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**

RESULTS Continued

LLCR Mating-Unmating Durability Compliant (30 LLCR test points)

- **Initial ----------0.48 mOhms Max**
- **Thermal**
  - **<= +0.33 mOhms ----------22 Points ---------- Stable**
  - **+0.33 to +0.67 mOhms ----------7 Points ---------- Minor**
  - **+0.67 to +1.00 mOhms ----------1 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 ----------20 Points ---------- Stable**
  - **+0.33 to +0.67 mOhms ----------8 Points ---------- Minor**
  - **+0.67 to +1.00 mOhms ----------2 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 (256 signal 1, 160 signal 2 and 64 ground LLCR test points)

Signal 1

- **Initial ---------- 286.17 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 256 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**

Signal 2

- **Initial ---------- 20.56 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 160 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**

Ground

- **Initial ---------- 23.66 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 64 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**

Mechanical Shock & Random Vibration:

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

LLCR Shock & Vibration Compliant (30 LLCR test points)

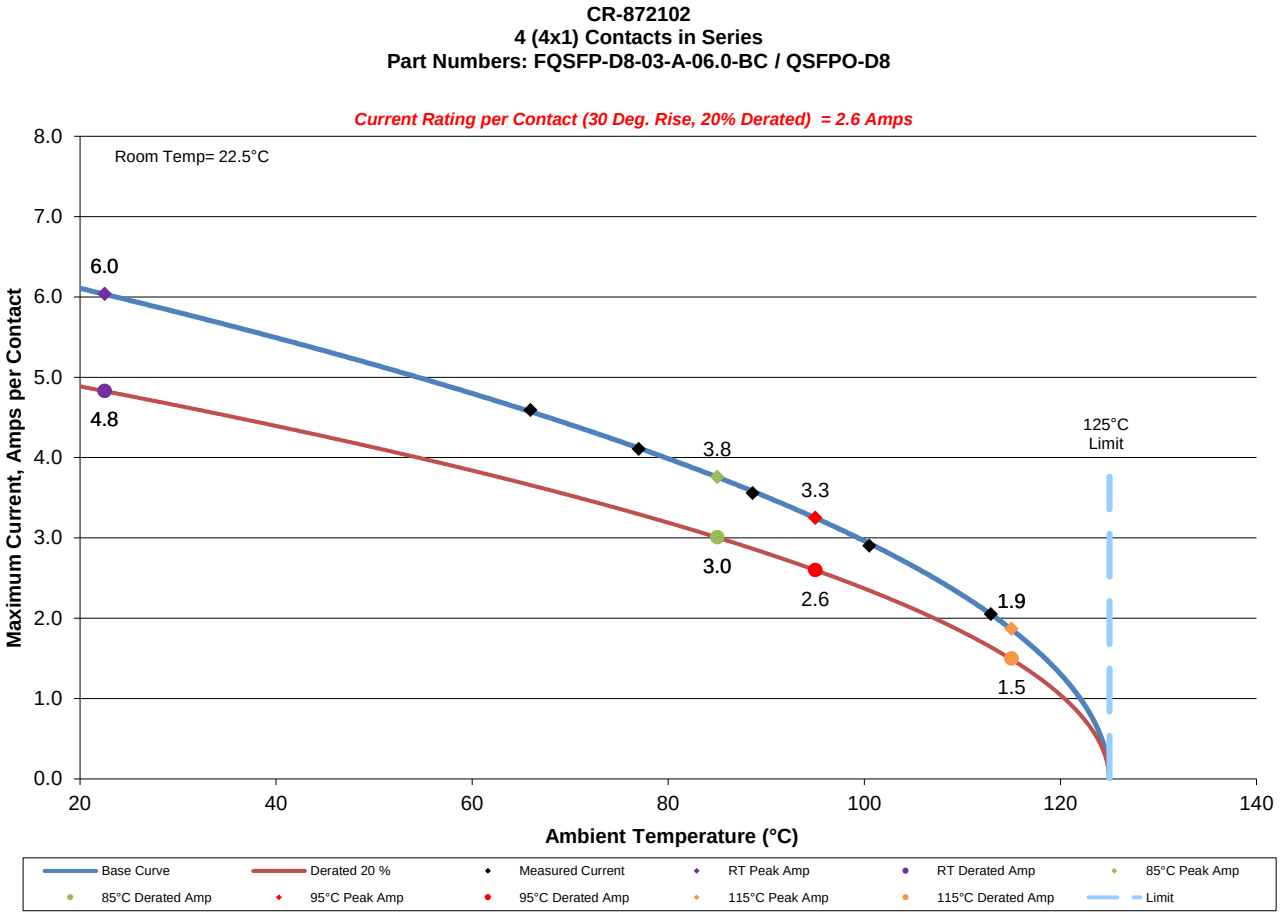
- **Initial ---------- 0.32 mOhms Max**
- **Shock &Vibration**
  - **<= +0.33 mOhms ---------- 30 Points ---------- Stable**
  - **+0.33 to +0.67 mOhms ---------- 0 Points ---------- Minor**
  - **+0.67 to +1.00 mOhms ---------- 0 Points ---------- Acceptable**
  - **+1.00 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

DATA SUMMARIES

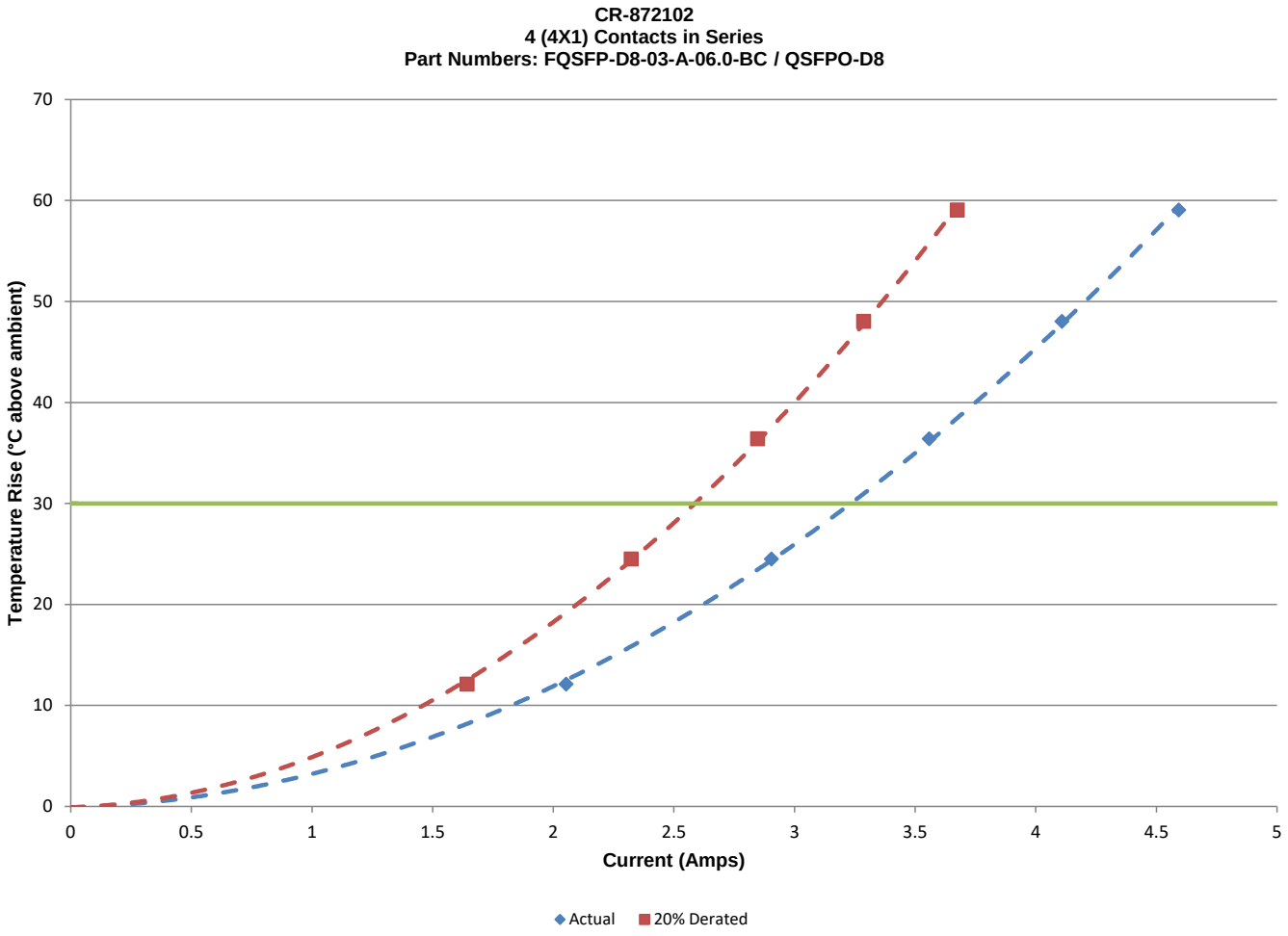
TEMPERATURE RISE (Current Carrying Capacity, CCC):

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 4 adjacent conductors/contacts powered.

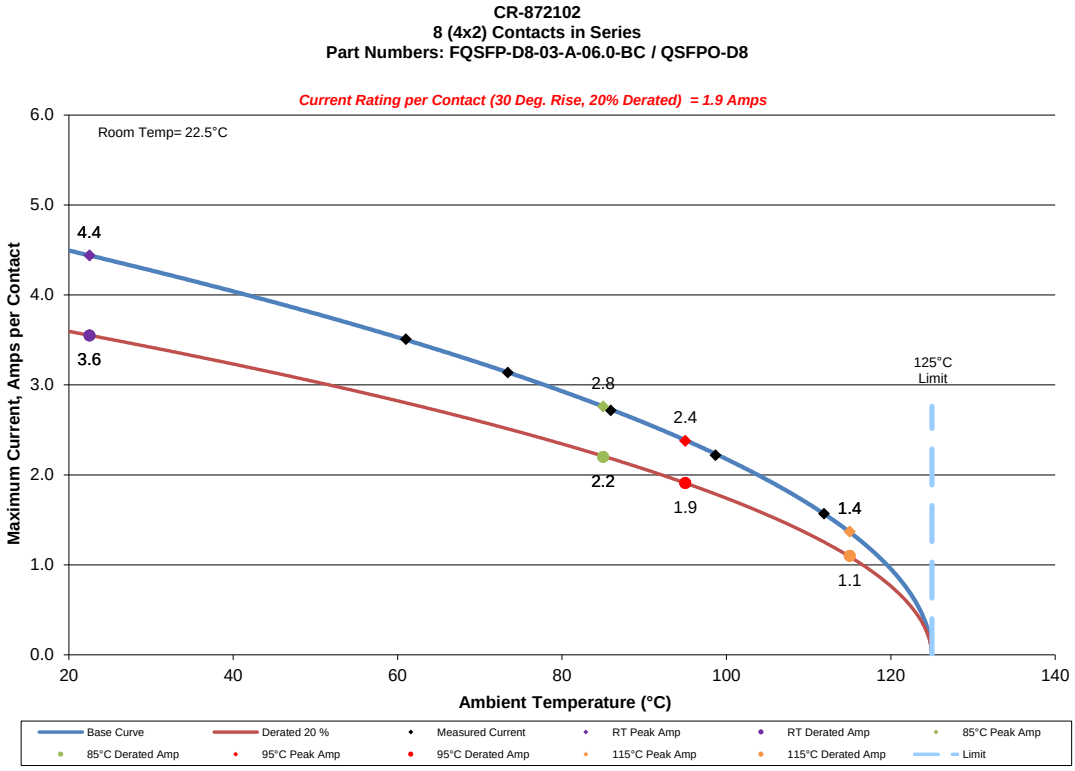


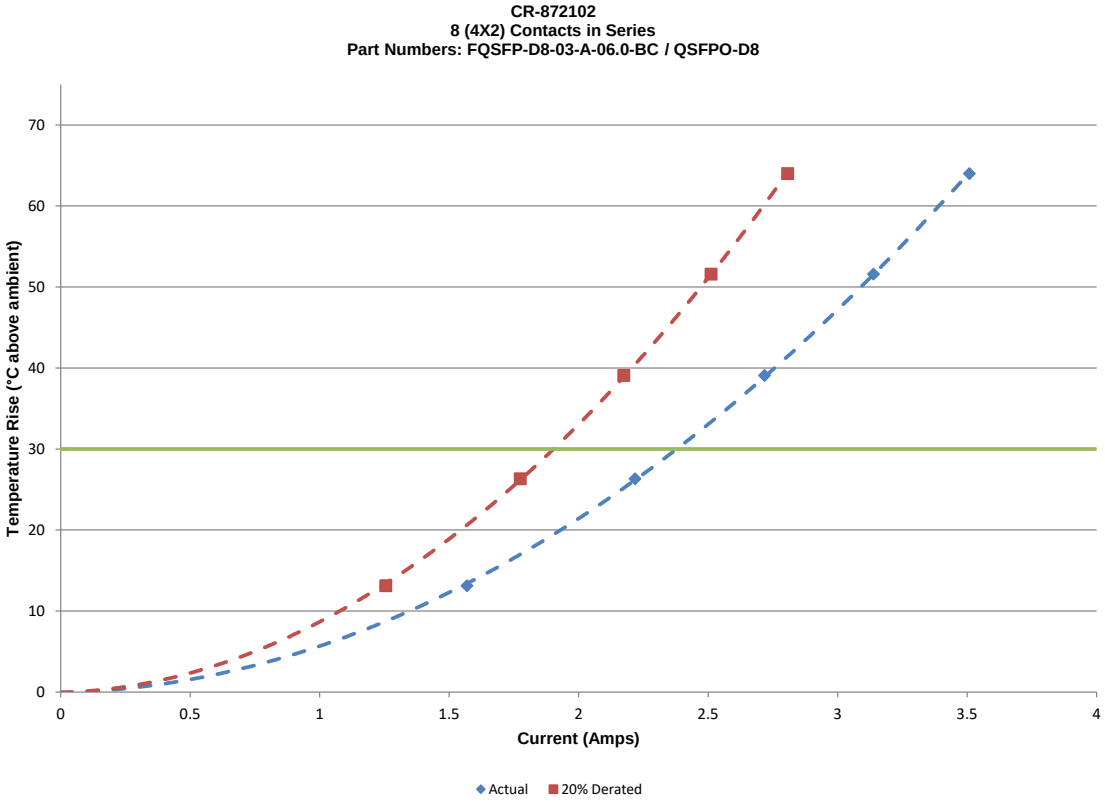
DATA SUMMARIES Continued



DATA SUMMARIES Continued

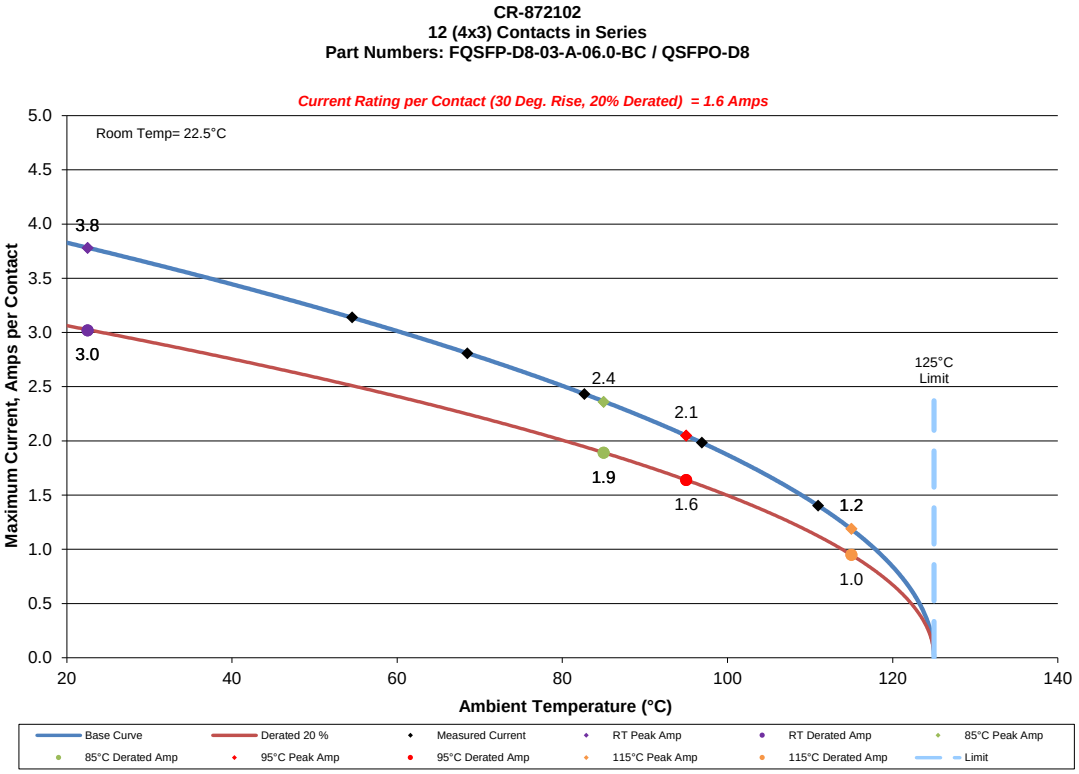
b. Linear configuration with 8 adjacent conductors/contacts powered.

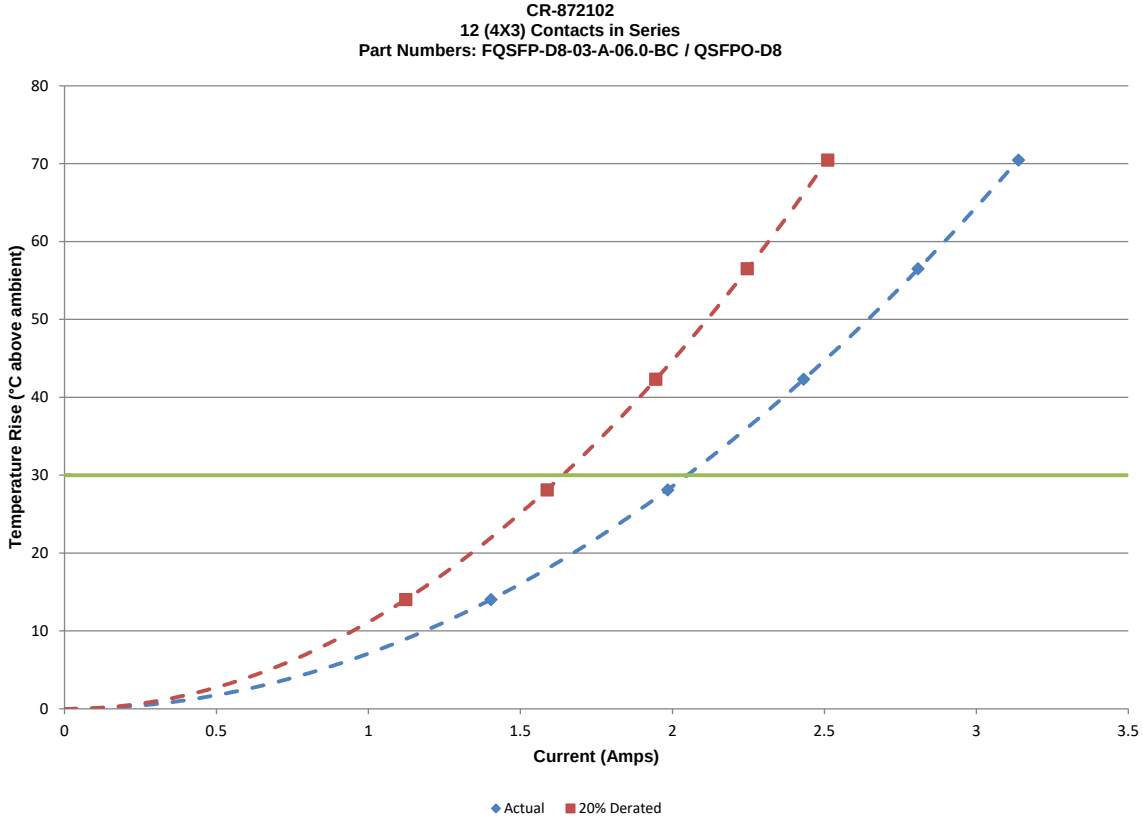




DATA SUMMARIES Continued

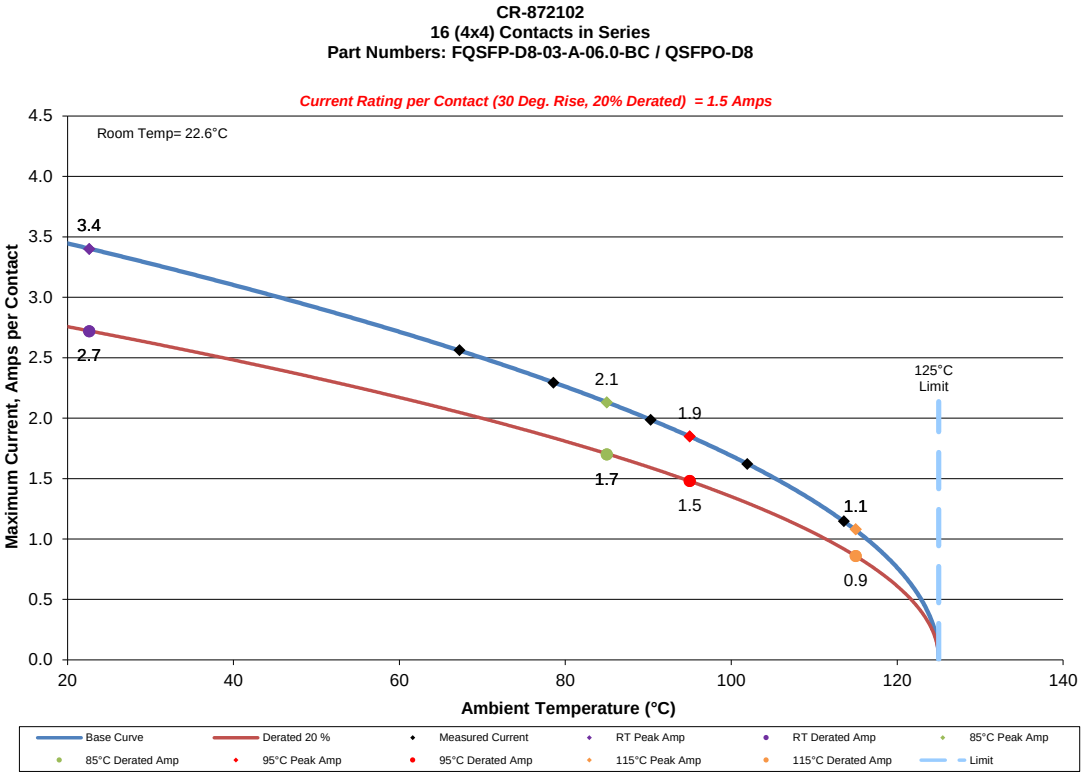
c. Linear configuration with 12 adjacent conductors/contacts powered.

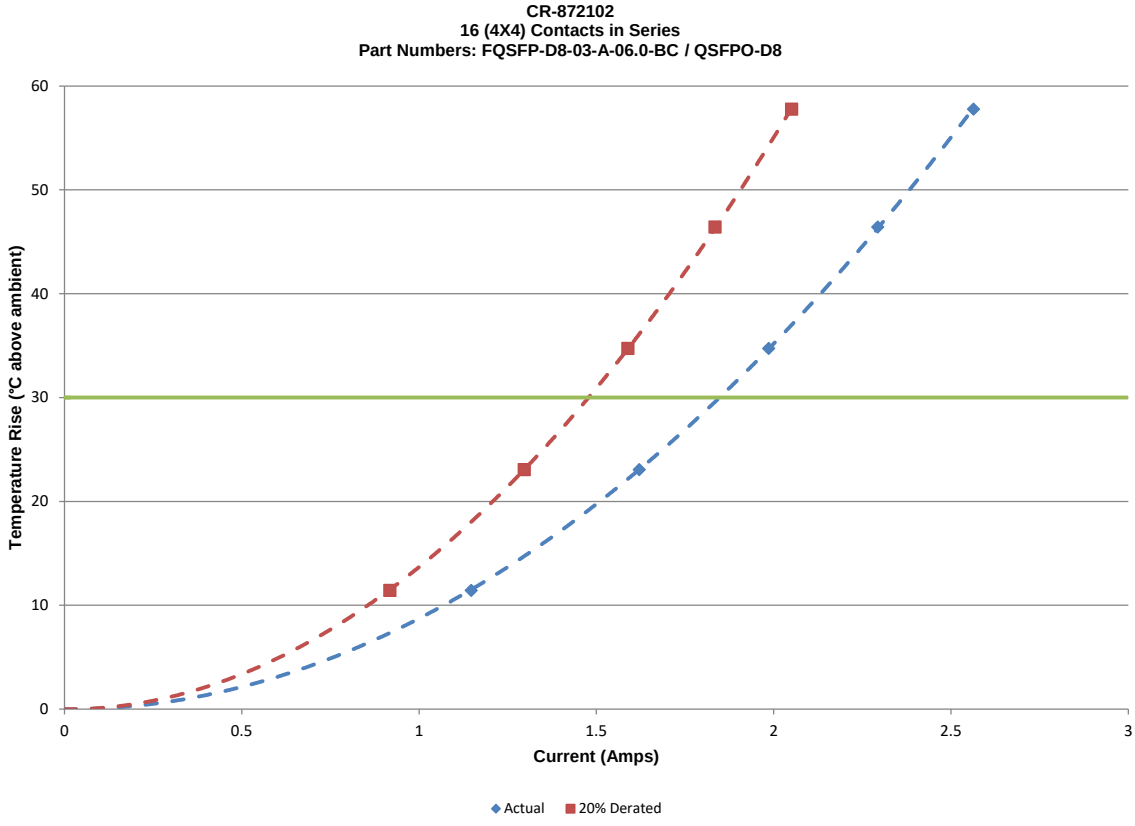




DATA SUMMARIES Continued

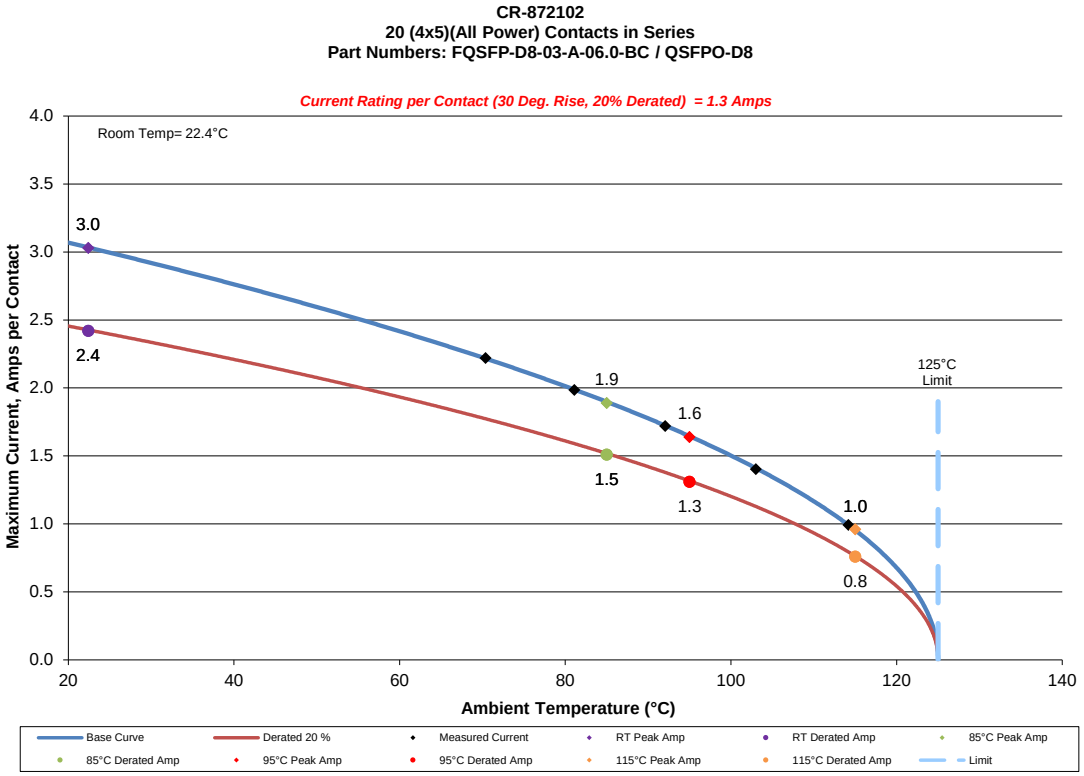
d. Linear configuration with 16 adjacent conductors/contacts powered.

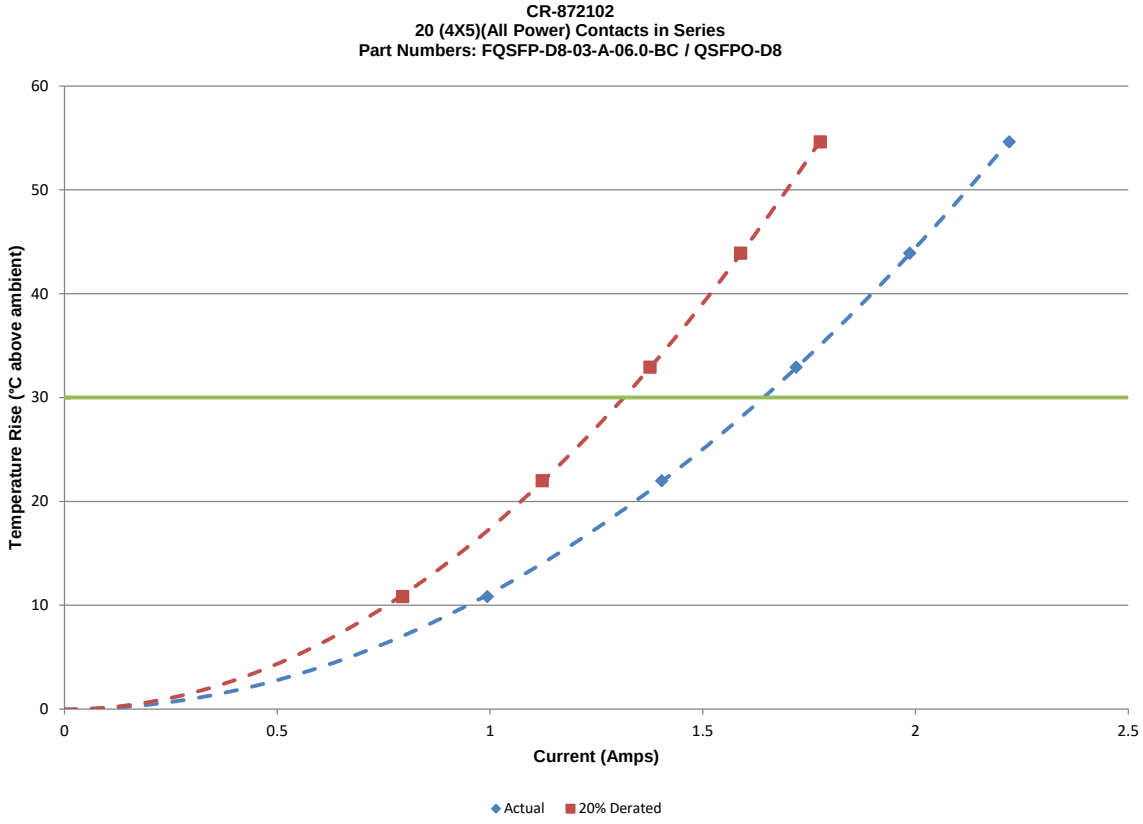




DATA SUMMARIES Continued

e. Linear configuration with 20 adjacent conductors/contacts powered.





DATA SUMMARIES Continued

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	46.93	10.55	9.34	2.10	31.71	7.13	7.83	1.76
Maximum	53.73	12.08	16.37	3.68	42.48	9.55	10.85	2.44
Average	49.87	**11.21**	11.52	**2.59**	36.84	**8.28**	8.85	**1.99**
St Dev	2.84	0.64	2.68	0.60	3.54	0.79	1.26	0.28
Count	8	8	8	8	8	8	8	8

Mating/Unmating Durability Group

	Initial				25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	45.50	10.23	7.74	1.74	44.70	10.05	12.10	2.72
Maximum	51.33	11.54	25.53	5.74	59.16	13.30	19.97	4.49
Average	48.71	**10.95**	12.46	**2.80**	53.36	**12.00**	16.67	**3.75**
St Dev	2.16	0.49	5.80	1.30	4.89	1.10	2.76	0.62
Count	8	8	8	8	8	8	8	8
	50 Cycles				75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	46.13	10.37	13.12	2.95	47.95	10.78	12.37	2.78
Maximum	60.98	13.71	20.19	4.54	60.36	13.57	23.40	5.26
Average	53.70	**12.07**	17.70	**3.98**	55.12	**12.39**	18.60	**4.18**
St Dev	4.46	1.00	2.28	0.51	4.40	0.99	3.15	0.71
Count	8	8	8	8	8	8	8	8
	100 Cycles				After Humidity			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	47.90	10.77	15.43	3.47	31.54	7.09	7.87	1.77
Maximum	61.38	13.80	24.55	5.52	39.19	8.81	14.06	3.16
Average	56.45	**12.69**	19.91	**4.48**	35.77	**8.04**	10.15	**2.28**
St Dev	4.70	1.06	3.12	0.70	2.64	0.59	1.94	0.44
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

Cable Pull Force:

0° Pull

	Force (lbs)
Minimum	**67.51**
Maximum	73.11
Average	69.82

90° Pull

	Force (lbs)
Minimum	**9.79**
Maximum	12.77
Average	11.23

DATA SUMMARIES Continued

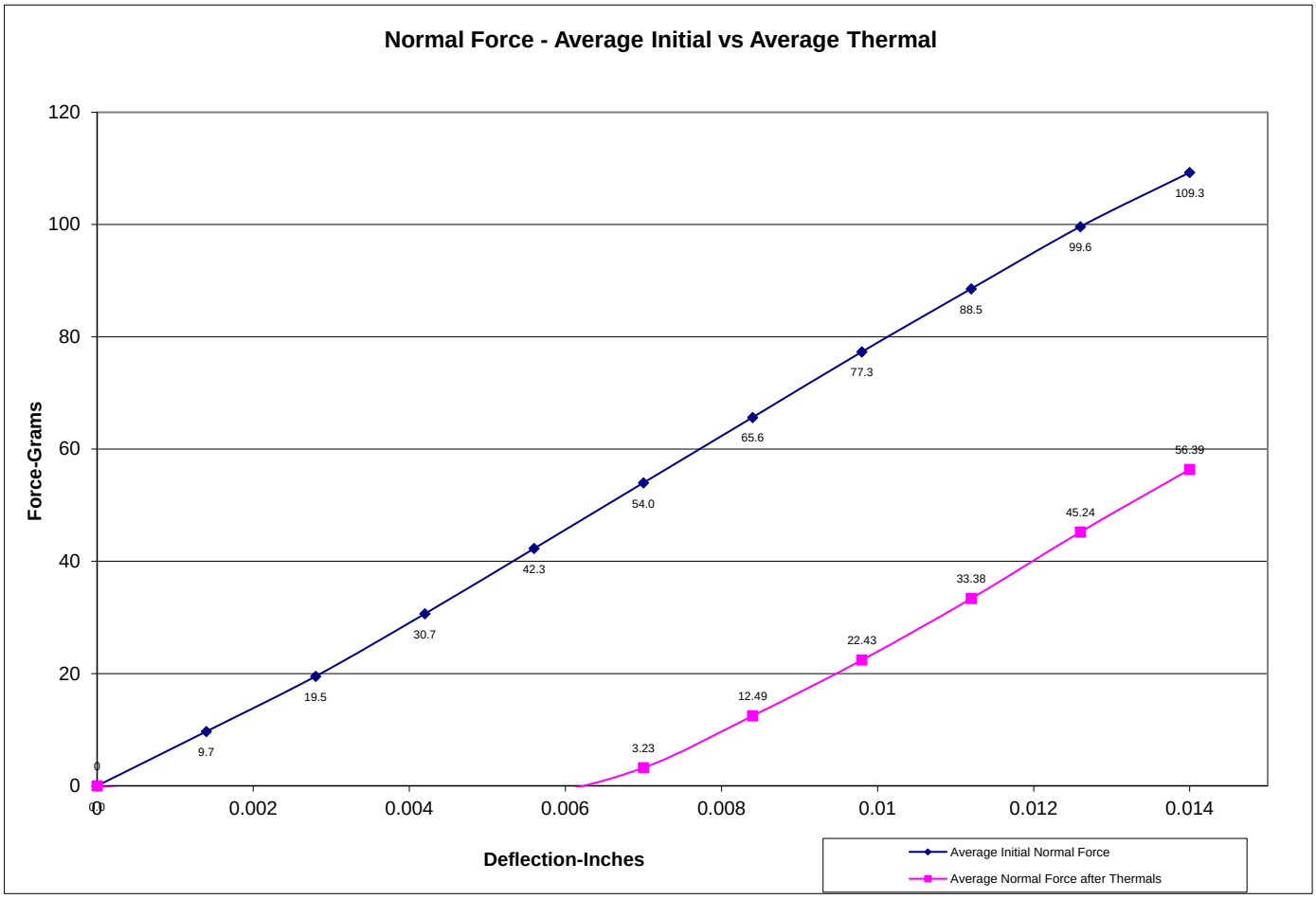
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

SNG-IM-C-509-3-H
Signal pin

	Deflections in inches Forces in Grams										
Initial	**0.0014**	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	9.69	19.51	30.65	42.28	53.98	65.64	77.31	88.54	99.61	109.25	0.0003
Min	5.50	15.60	26.50	38.20	49.60	60.80	71.90	83.00	93.50	103.00	0.0001
Max	11.30	21.50	33.00	45.10	57.00	68.90	80.90	92.40	103.50	113.30	0.0004
St. Dev	2.218	2.259	2.424	2.632	2.951	3.174	3.494	3.635	3.877	3.847	0.0001
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	0.0014	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	-1.98	-1.99	-1.98	-1.64	3.23	12.49	22.43	33.38	45.24	56.39	0.0066
Min	-2.00	-2.00	-2.00	-2.00	0.30	5.90	16.50	27.40	39.10	50.80	0.0058
Max	-1.90	-1.90	-1.90	-0.30	8.70	17.90	28.50	39.40	51.40	63.10	0.0070
St. Dev	0.046	0.035	0.046	0.661	2.839	3.559	3.509	3.683	3.862	4.060	0.0005
Count	8	8	8	8	8	8	8	8	8	8	8



DATA SUMMARIES Continued

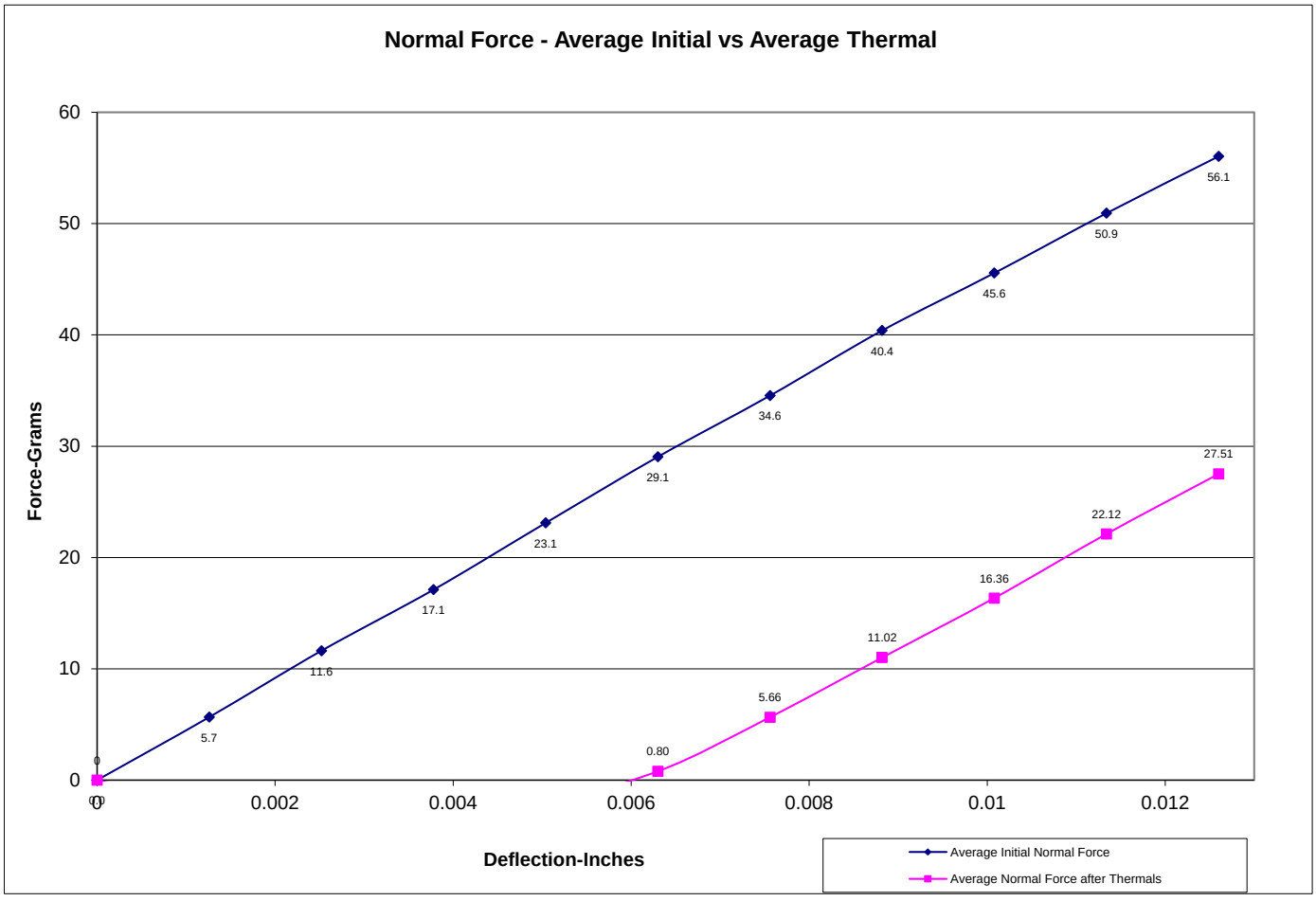
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

SNG-IM-C-509-3-H
Ground pin

	Deflections in inches Forces in Grams										
Initial	**0.0013**	**0.0025**	**0.0038**	**0.0050**	**0.0063**	**0.0076**	**0.0088**	**0.0101**	**0.0113**	**0.0126**	***SET***
Averages	5.66	11.63	17.11	23.11	29.05	34.55	40.40	45.56	50.94	56.05	0.0002
Min	5.10	10.70	16.00	21.90	27.40	32.70	38.40	43.60	49.00	54.00	0.0000
Max	6.30	12.90	18.30	24.50	30.70	36.40	42.10	47.10	52.50	57.70	0.0002
St. Dev	0.450	0.798	0.960	1.068	1.112	1.254	1.296	1.279	1.427	1.401	0.0001
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	0.0013	**0.0025**	**0.0038**	**0.0050**	**0.0063**	**0.0076**	**0.0088**	**0.0101**	**0.0113**	**0.0126**	***SET***
Averages	-1.96	-1.95	-1.96	-1.79	0.80	5.66	11.02	16.36	22.12	27.51	0.0062
Min	-2.00	-2.00	-2.00	-2.00	-1.90	3.30	9.10	14.10	19.50	24.50	0.0051
Max	-1.90	-1.90	-1.90	-0.20	5.00	9.20	14.10	19.40	24.90	30.30	0.0068
St. Dev	0.051	0.052	0.051	0.505	2.005	1.721	1.602	1.671	1.713	1.853	0.0005
Count	12	12	12	12	12	12	12	12	12	12	12



DATA SUMMARIES Continued

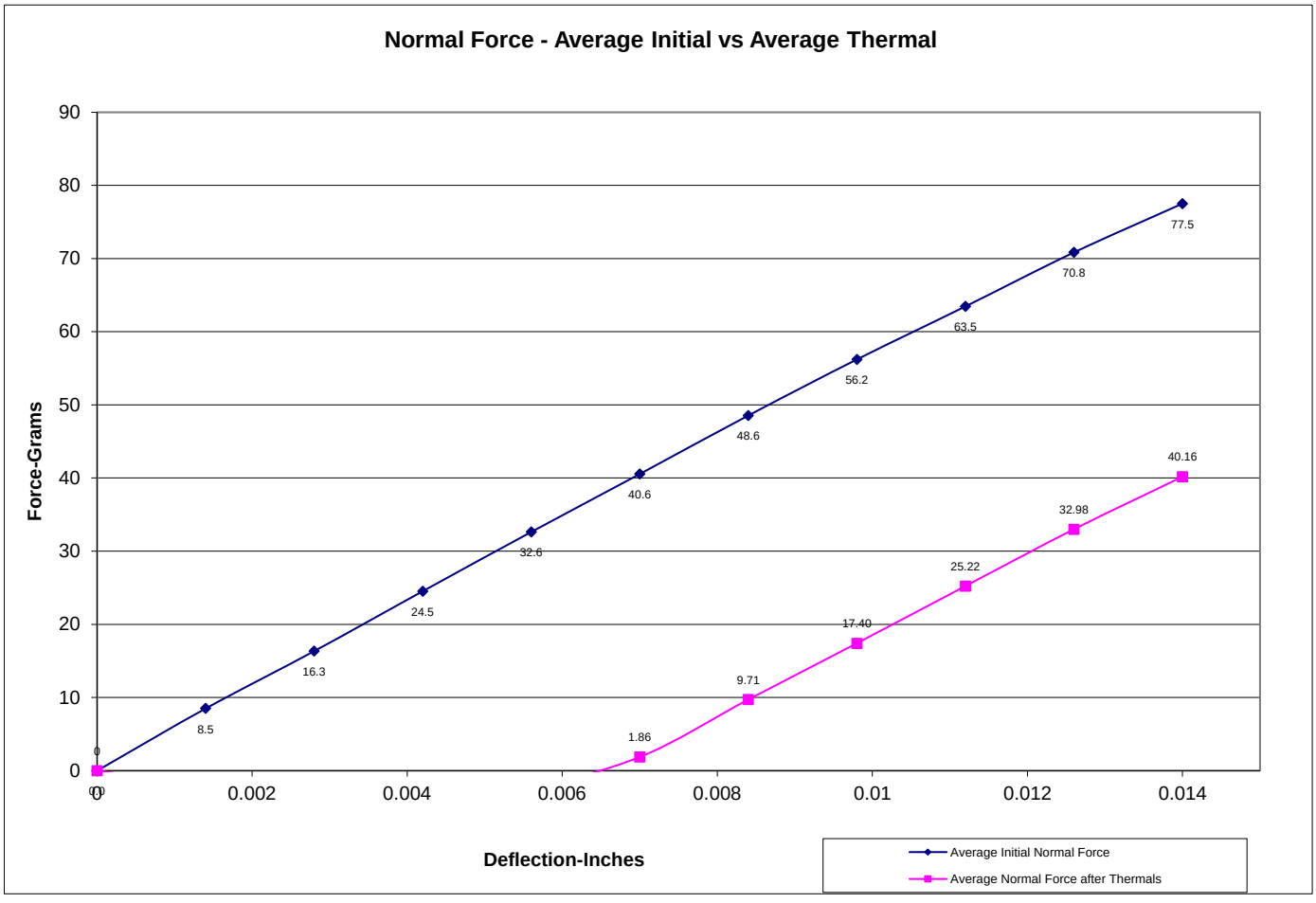
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

SNG-IM-C-509-3-H
Power pin

	Deflections in inches Forces in Grams										
Initial	**0.0014**	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	8.50	16.34	24.53	32.63	40.55	48.55	56.21	63.46	70.84	77.51	0.0002
Min	7.60	14.50	21.50	28.90	36.20	43.50	50.50	57.40	63.60	69.70	0.0002
Max	9.30	17.80	26.80	35.50	43.90	52.70	60.70	68.30	76.00	82.70	0.0004
St. Dev	0.727	1.440	2.046	2.587	3.005	3.648	4.259	4.738	5.378	5.887	0.0001
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	0.0014	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	-2.00	-1.98	-1.99	-2.00	1.86	9.71	17.40	25.22	32.98	40.16	0.0068
Min	-2.00	-2.00	-2.00	-2.00	0.80	7.90	15.60	23.10	29.50	36.10	0.0065
Max	-2.00	-1.90	-1.90	-2.00	3.60	11.80	20.40	29.10	37.40	45.00	0.0071
St. Dev	0.000	0.042	0.032	0.000	0.924	1.084	1.464	1.976	2.562	3.041	0.0002
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

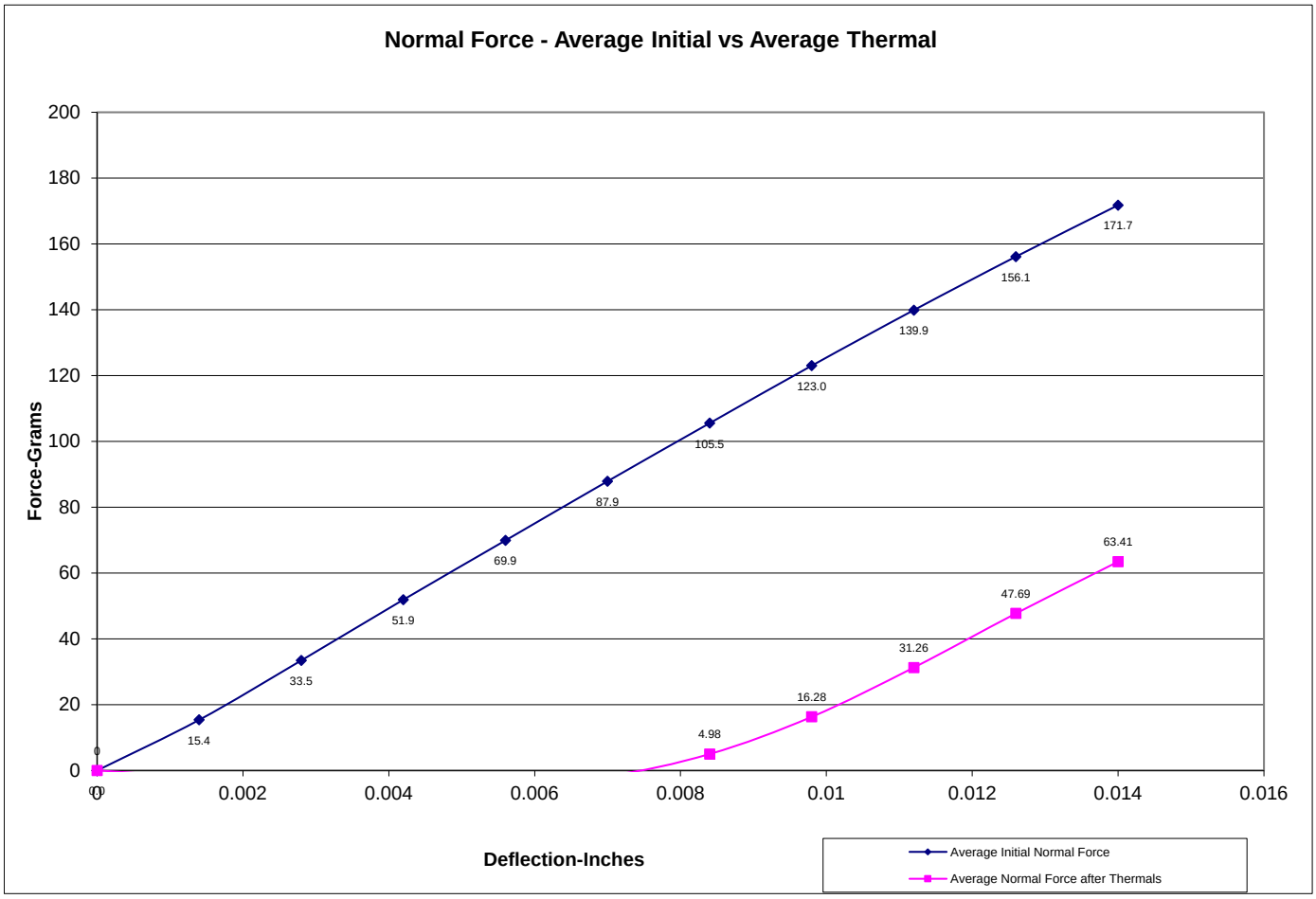
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

SNG-IM-C-510-3-H
Signal pin

	Deflections in inches Forces in Grams										
Initial	**0.0014**	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	15.39	33.45	51.90	69.90	87.89	105.53	123.00	139.88	156.13	171.74	0.0002
Min	10.90	28.00	46.80	65.30	83.20	99.80	116.50	132.50	147.50	160.90	0.0001
Max	19.60	37.70	56.80	75.80	94.80	113.90	131.70	148.70	165.10	181.70	0.0003
St. Dev	3.502	3.721	3.675	3.701	3.991	4.520	4.940	5.297	5.680	6.473	0.0001
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	0.0014	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	-1.96	-1.98	-1.96	-1.96	-1.56	4.98	16.28	31.26	47.69	63.41	0.0079
Min	-2.00	-2.00	-2.00	-2.00	-2.00	-0.30	6.70	17.90	29.90	42.70	0.0070
Max	-1.90	-1.90	-1.90	-1.90	1.40	13.50	26.00	40.90	56.80	72.30	0.0089
St. Dev	0.052	0.046	0.052	0.052	1.198	4.579	6.182	7.338	8.670	9.639	0.0006
Count	8	8	8	8	8	8	8	8	8	8	8



DATA SUMMARIES Continued

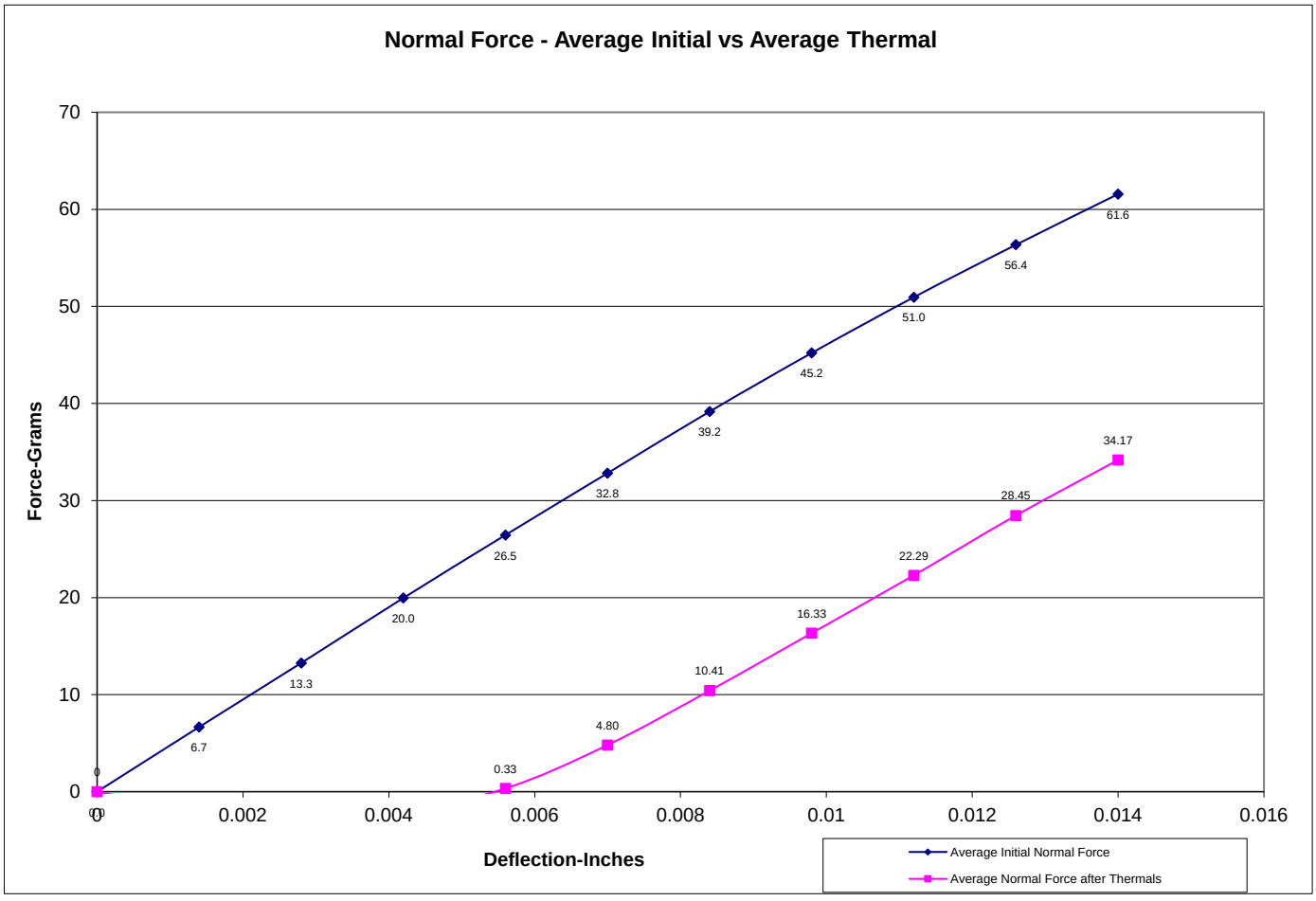
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

SNG-IM-C-510-3-H
Ground pin

	Deflections in inches Forces in Grams										
Initial	**0.0014**	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	6.67	13.27	19.96	26.45	32.82	39.17	45.21	50.95	56.35	61.57	0.0002
Min	6.30	12.20	18.50	24.40	30.40	36.40	42.10	47.40	52.80	57.60	0.0001
Max	7.10	14.00	20.60	27.30	33.90	40.50	46.80	52.60	57.90	63.30	0.0002
St. Dev	0.298	0.542	0.662	0.963	1.235	1.484	1.662	1.805	1.862	2.021	0.0000
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	0.0014	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	-1.93	-1.94	-1.92	0.33	4.80	10.41	16.33	22.29	28.45	34.17	0.0058
Min	-2.00	-2.00	-2.00	-2.00	-1.00	4.90	10.20	16.20	22.30	27.70	0.0047
Max	-1.90	-1.90	-1.70	3.00	8.30	14.10	20.00	26.20	32.60	38.40	0.0073
St. Dev	0.049	0.051	0.083	1.968	3.376	3.415	3.682	3.838	3.872	4.060	0.0009
Count	12	12	12	12	12	12	12	12	12	12	12



DATA SUMMARIES Continued

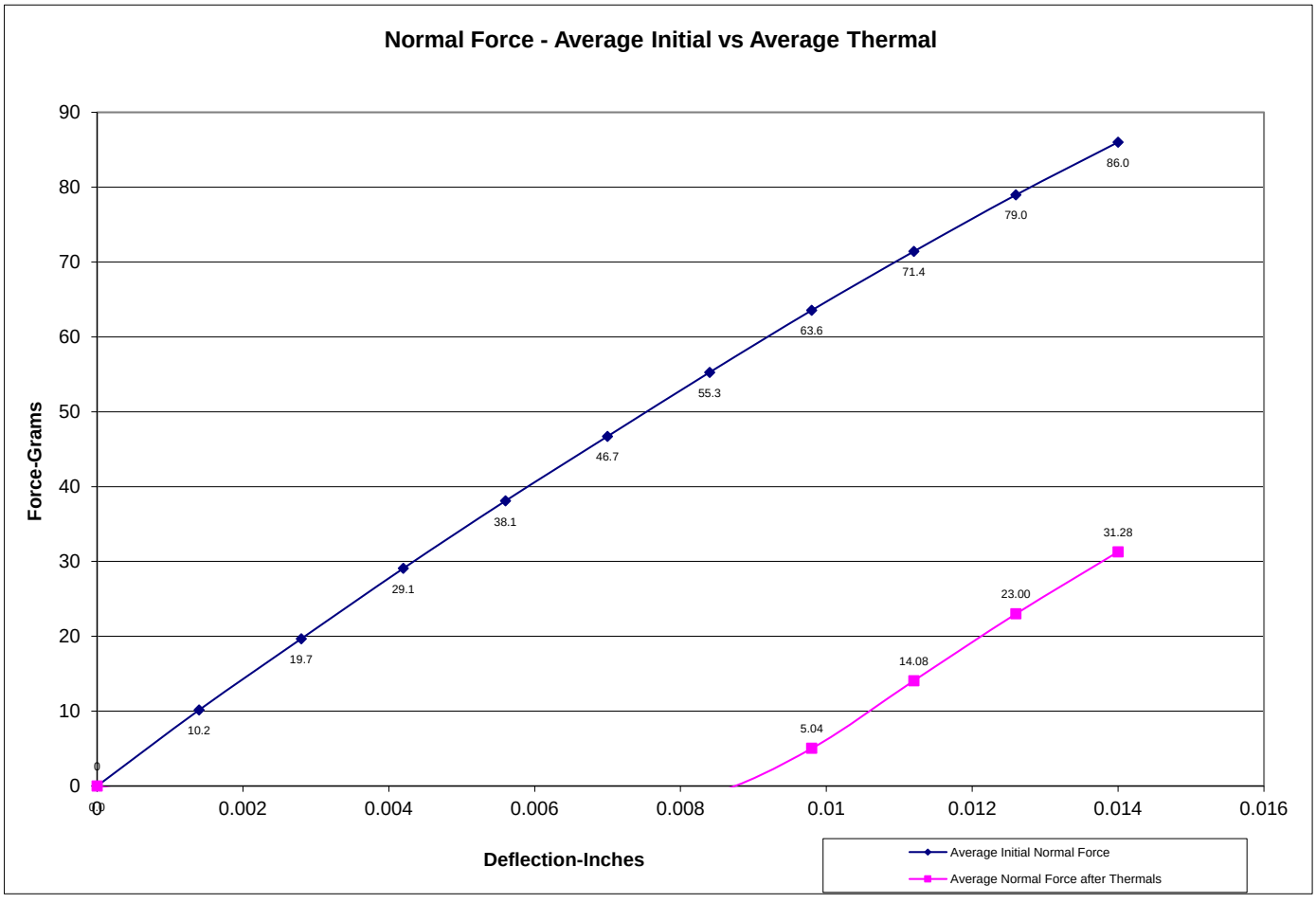
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

SNG-IM-C-510-3-H
Power pin

	Deflections in inches Forces in Grams										
Initial	**0.0014**	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	10.16	19.68	29.08	38.09	46.71	55.26	63.55	71.41	78.96	86.00	0.0004
Min	9.20	17.30	25.30	33.40	40.40	48.00	55.40	62.40	68.80	74.90	0.0002
Max	10.80	21.40	31.80	41.40	50.90	60.50	69.60	78.00	85.80	93.50	0.0006
St. Dev	0.711	1.858	2.829	3.773	4.766	5.672	6.508	7.272	8.185	9.031	0.0001
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	0.0014	**0.0028**	**0.0042**	**0.0056**	**0.0070**	**0.0084**	**0.0098**	**0.0112**	**0.0126**	**0.0140**	***SET***
Averages	-2.00	-1.99	-1.97	-2.00	-1.99	-1.07	5.04	14.08	23.00	31.28	0.0090
Min	-2.10	-2.10	-2.00	-2.10	-2.00	-2.00	-1.90	6.80	16.20	25.10	0.0078
Max	-1.90	-1.90	-1.90	-1.90	-1.90	4.20	12.50	20.60	28.80	36.70	0.0102
St. Dev	0.047	0.057	0.048	0.047	0.032	2.076	4.151	4.033	3.930	3.886	0.0007
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

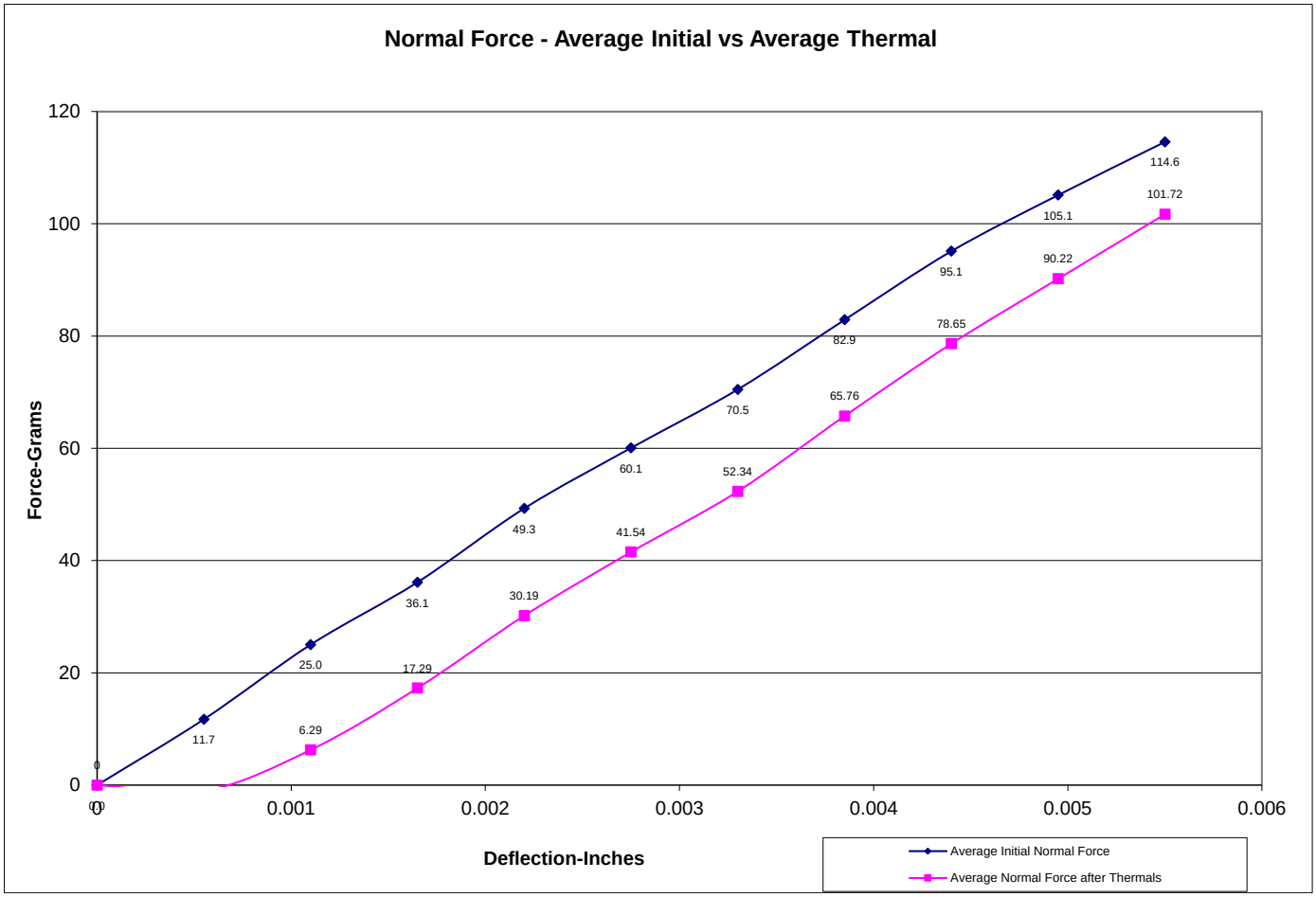
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

SNG-IM-C-511-L

	Deflections in inches Forces in Grams										
Initial	**0.0006**	**0.0011**	**0.0017**	**0.0022**	**0.0028**	**0.0033**	**0.0039**	**0.0044**	**0.0050**	**0.0055**	***SET***
Averages	11.72	25.03	36.14	49.30	60.07	70.50	82.90	95.13	105.12	114.60	0.0002
Min	10.30	24.00	33.80	45.40	56.10	66.00	78.60	90.30	99.70	108.80	0.0001
Max	12.80	27.10	38.40	51.90	63.20	74.70	87.10	99.90	110.30	120.30	0.0003
St. Dev	0.711	1.063	1.461	2.088	2.310	2.936	2.995	3.581	3.760	3.876	0.0001
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	0.0006	**0.0011**	**0.0017**	**0.0022**	**0.0028**	**0.0033**	**0.0039**	**0.0044**	**0.0050**	**0.0055**	***SET***
Averages	-1.04	6.29	17.29	30.19	41.54	52.34	65.76	78.65	90.22	101.72	0.0010
Min	-2.30	-2.10	3.30	15.90	27.60	38.60	54.50	67.90	78.40	91.30	0.0003
Max	6.30	20.10	30.70	43.00	53.30	63.00	75.50	88.40	100.90	112.50	0.0017
St. Dev	2.662	6.934	7.774	7.579	7.490	7.225	6.539	6.592	7.305	7.348	0.0004
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

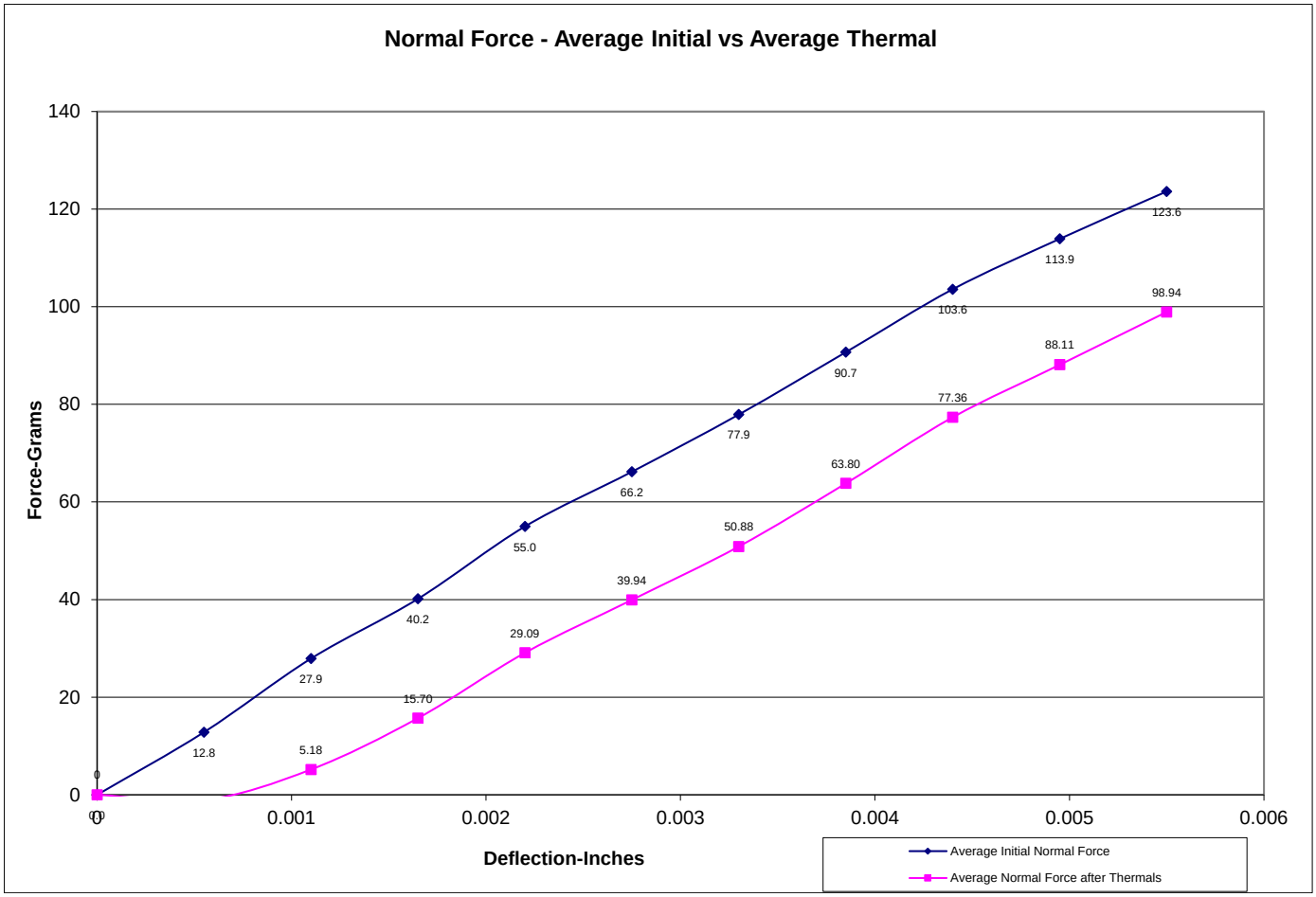
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

SNG-IM-C-512-L

	Deflections in inches Forces in Grams										
Initial	**0.0006**	**0.0011**	**0.0017**	**0.0022**	**0.0028**	**0.0033**	**0.0039**	**0.0044**	**0.0050**	**0.0055**	***SET***
Averages	12.84	27.92	40.16	54.98	66.19	77.92	90.69	103.59	113.91	123.62	0.0002
Min	10.30	24.40	35.60	48.80	59.50	69.90	81.30	93.60	104.10	113.80	0.0000
Max	14.10	30.60	43.40	58.30	69.40	81.80	95.00	107.40	117.30	127.30	0.0004
St. Dev	1.342	1.923	2.609	2.777	3.019	3.499	3.916	4.012	3.951	4.090	0.0001
Count	10	10	10	10	10	10	10	10	10	10	10

After Thermals	Deflections in inches Forces in Grams										
	0.0006	**0.0011**	**0.0017**	**0.0022**	**0.0028**	**0.0033**	**0.0039**	**0.0044**	**0.0050**	**0.0055**	***SET***
Averages	-1.10	5.18	15.70	29.09	39.94	50.88	63.80	77.36	88.11	98.94	0.0010
Min	-2.20	-2.20	5.30	16.40	27.40	38.30	49.90	63.50	73.70	84.60	0.0005
Max	3.20	17.80	30.30	44.60	56.50	67.30	81.50	94.80	106.30	117.30	0.0015
St. Dev	1.909	8.046	9.250	9.441	9.313	8.983	9.462	9.317	9.844	9.976	0.0004
Count	8	8	8	8	8	8	8	8	8	8	8



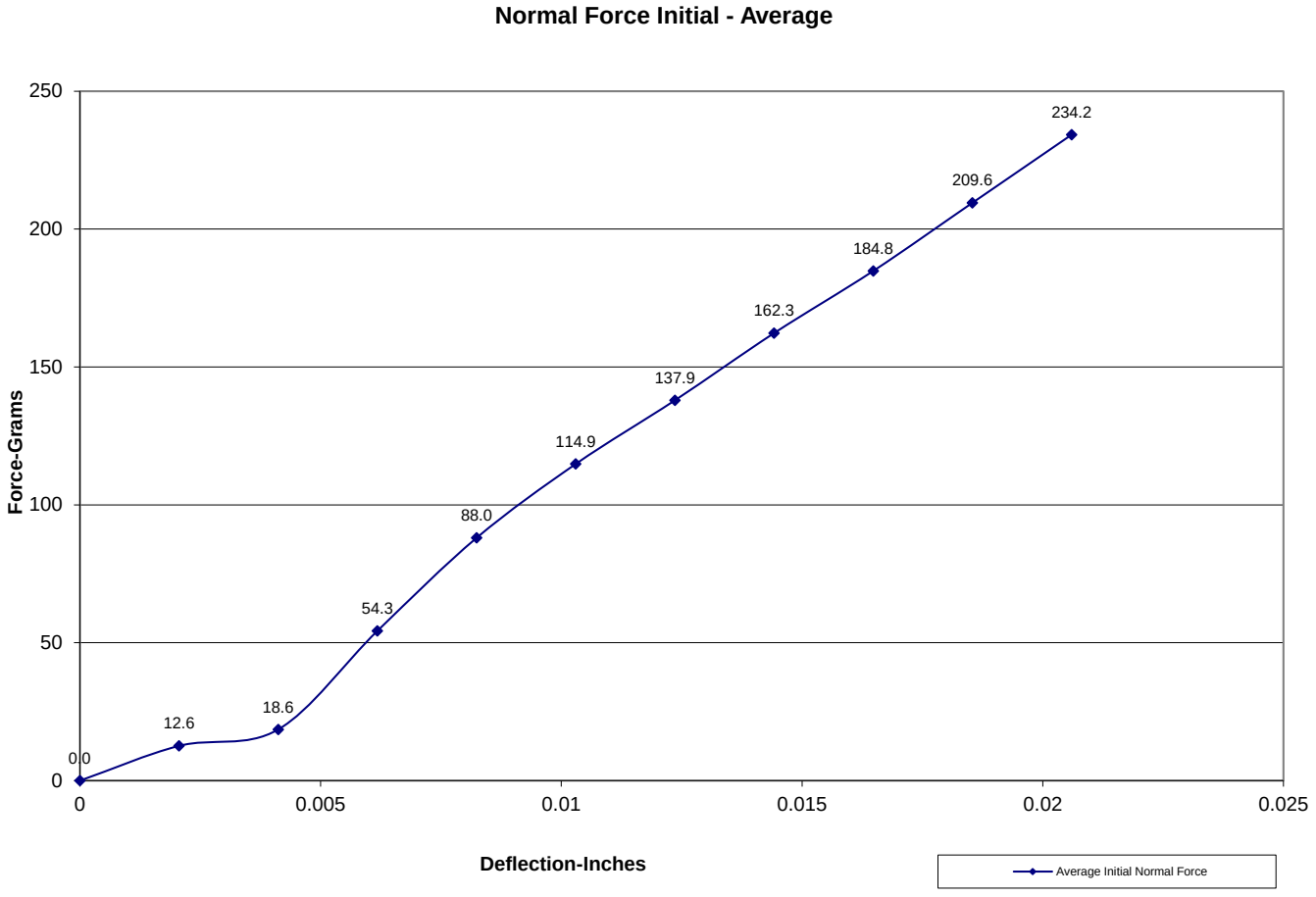
DATA SUMMARIES Continued

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.

SH157-1 Top/Bottom External EMI Fingers

	Deflections in inches Forces in Grams										
Initial	**0.0021**	**0.0041**	**0.0062**	**0.0082**	**0.0103**	**0.0124**	**0.0144**	**0.0165**	**0.0185**	**0.0206**	***SET***
Averages	12.61	18.56	54.31	88.04	114.85	137.93	162.30	184.84	209.55	234.24	0.0054
Min	11.90	14.00	40.90	70.00	92.30	110.40	128.30	145.10	168.60	191.10	0.0037
Max	13.10	21.00	63.20	101.60	136.60	171.80	205.20	236.60	264.90	291.70	0.0065
St. Dev	0.409	2.771	7.345	9.929	13.856	18.445	22.721	26.901	28.996	31.045	0.0011
Count	8	8	8	8	8	8	8	8	8	8	8



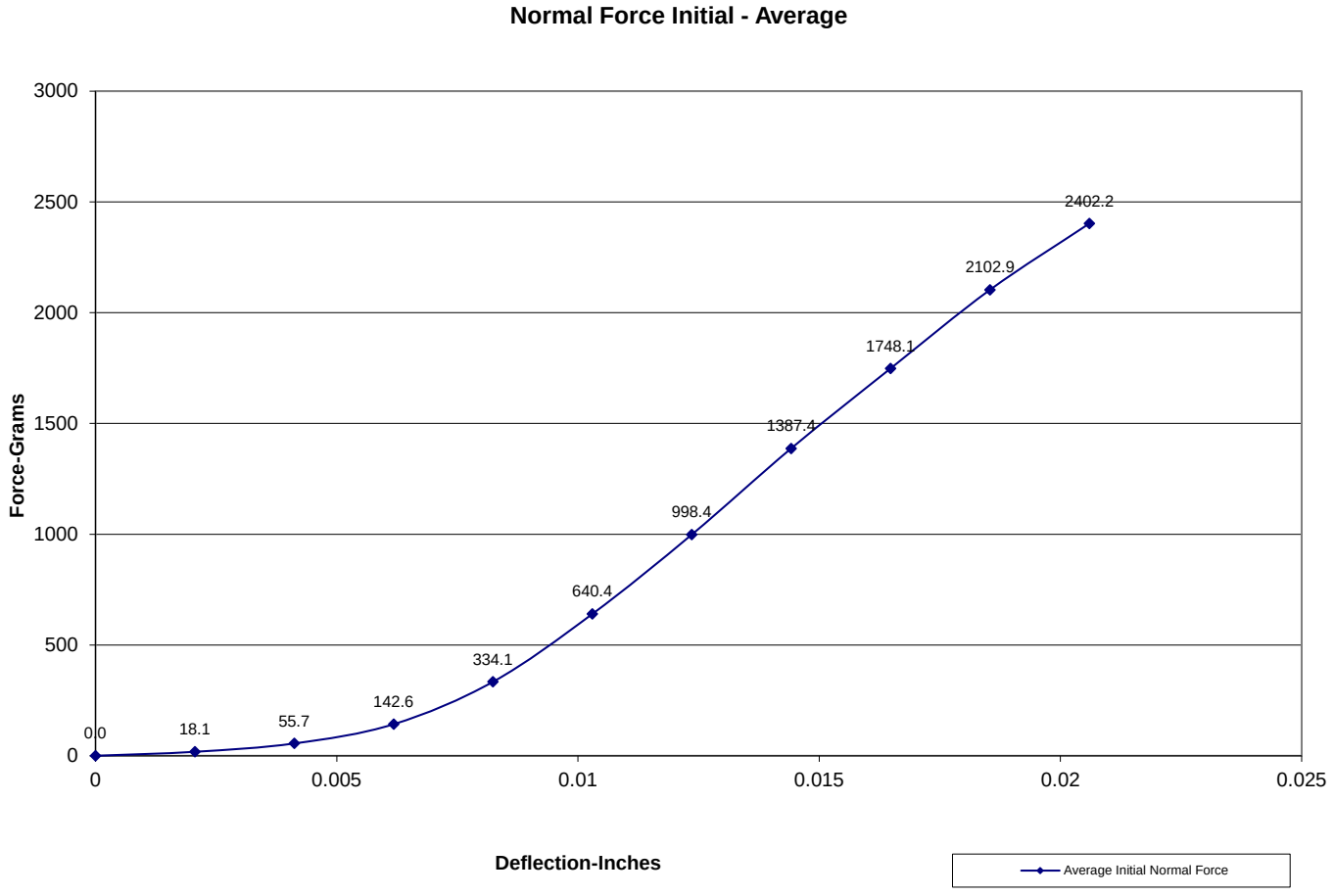
DATA SUMMARIES Continued

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.

SH157-1 Top/Bottom Internal EMI Fingers

	Deflections in inches Forces in Grams										
Initial	**0.0021**	**0.0041**	**0.0062**	**0.0082**	**0.0103**	**0.0124**	**0.0144**	**0.0165**	**0.0185**	**0.0206**	***SET***
Averages	18.10	55.66	142.56	334.14	640.38	998.44	1387.35	1748.10	2102.94	2402.23	0.0035
Min	0.00	0.70	34.30	97.60	333.90	738.70	1184.90	1566.50	1876.00	2127.00	0.0027
Max	65.10	184.90	385.70	665.70	1058.40	1422.30	1774.20	2093.50	2384.00	2669.00	0.0048
St. Dev	20.713	58.982	114.809	181.787	239.447	243.719	223.940	201.357	182.619	174.886	0.0006
Count	8	8	8	8	8	8	8	8	8	8	8



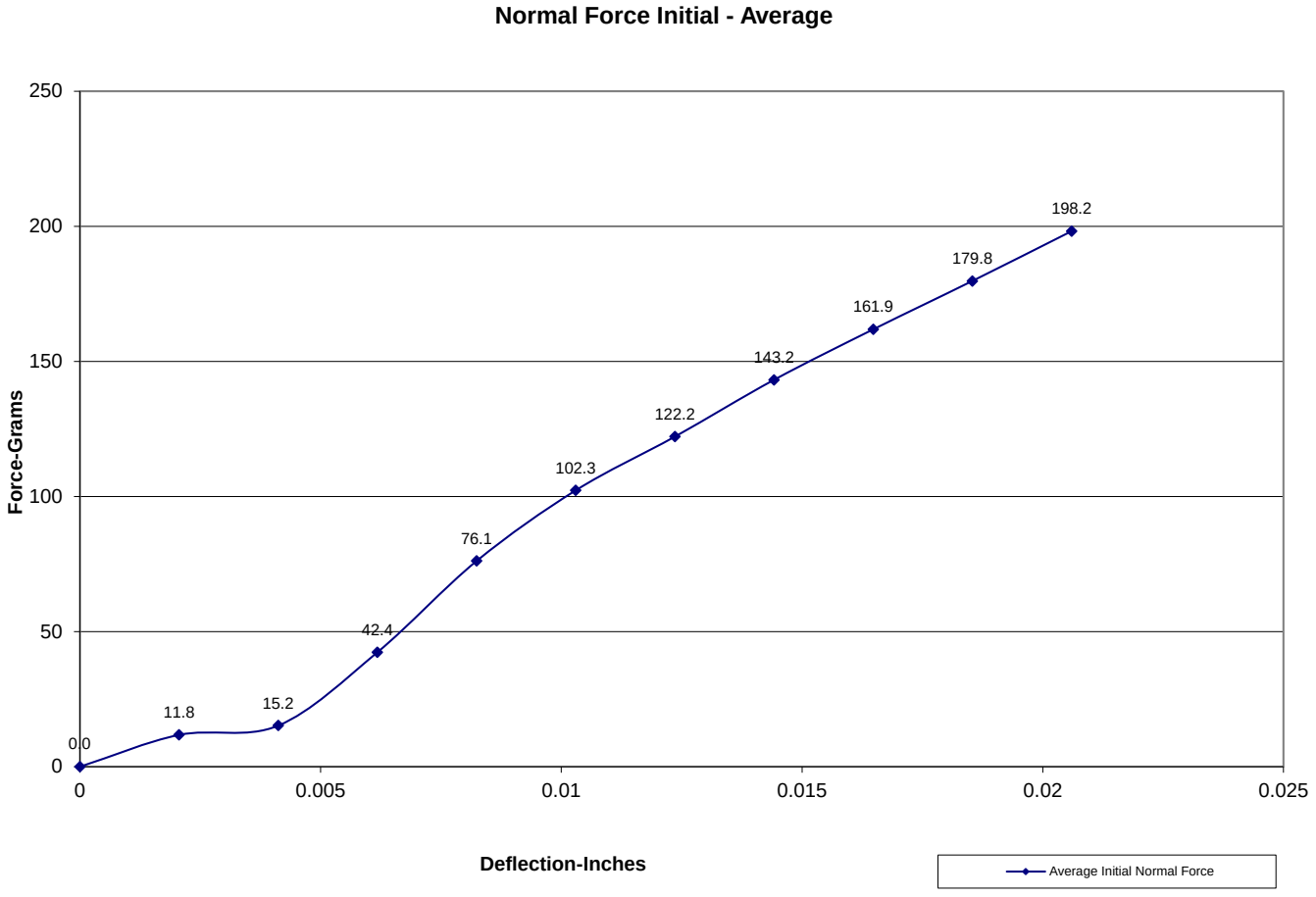
DATA SUMMARIES Continued

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.

SH157-2 Side/Side External EMI Fingers

	Deflections in inches Forces in Grams										
Initial	**0.0021**	**0.0041**	**0.0062**	**0.0082**	**0.0103**	**0.0124**	**0.0144**	**0.0165**	**0.0185**	**0.0206**	***SET***
Averages	11.78	15.21	42.36	76.13	102.28	122.15	143.18	161.85	179.76	198.18	0.0038
Min	4.30	13.10	13.40	39.50	71.60	94.80	116.20	130.10	145.00	162.30	0.0003
Max	13.50	22.10	61.60	92.60	118.20	135.40	155.00	175.90	193.50	210.10	0.0053
St. Dev	3.033	3.526	13.907	15.654	14.225	13.005	12.031	13.902	14.844	15.125	0.0017
Count	8	8	8	8	8	8	8	8	8	8	8



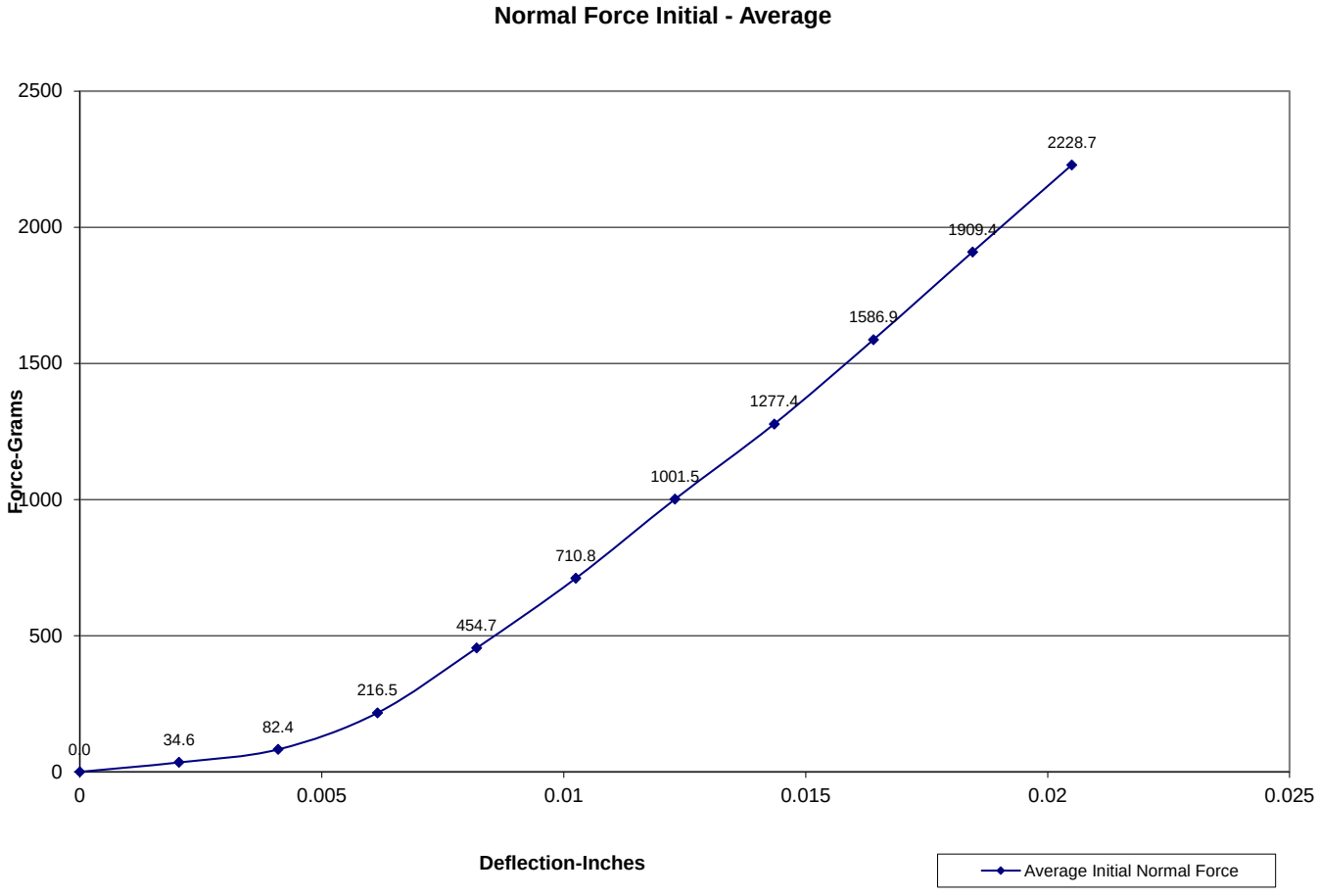
DATA SUMMARIES Continued

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.

SH157-2 Side/Side Internal EMI Fingers

	Deflections in inches Forces in Grams										
Initial	**0.0021**	**0.0041**	**0.0062**	**0.0082**	**0.0103**	**0.0123**	**0.0144**	**0.0164**	**0.0185**	**0.0205**	***SET***
Averages	34.64	82.37	216.46	454.70	710.83	1001.45	1277.38	1586.93	1909.43	2228.69	0.0053
Min	15.60	33.70	70.60	254.60	449.30	752.10	1016.40	1328.90	1637.60	1914.20	0.0039
Max	65.50	128.70	397.80	720.30	996.20	1259.80	1540.00	1863.40	2205.80	2645.10	0.0068
St. Dev	15.699	34.091	112.272	176.286	202.051	189.109	192.592	203.117	240.160	297.153	0.0008
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

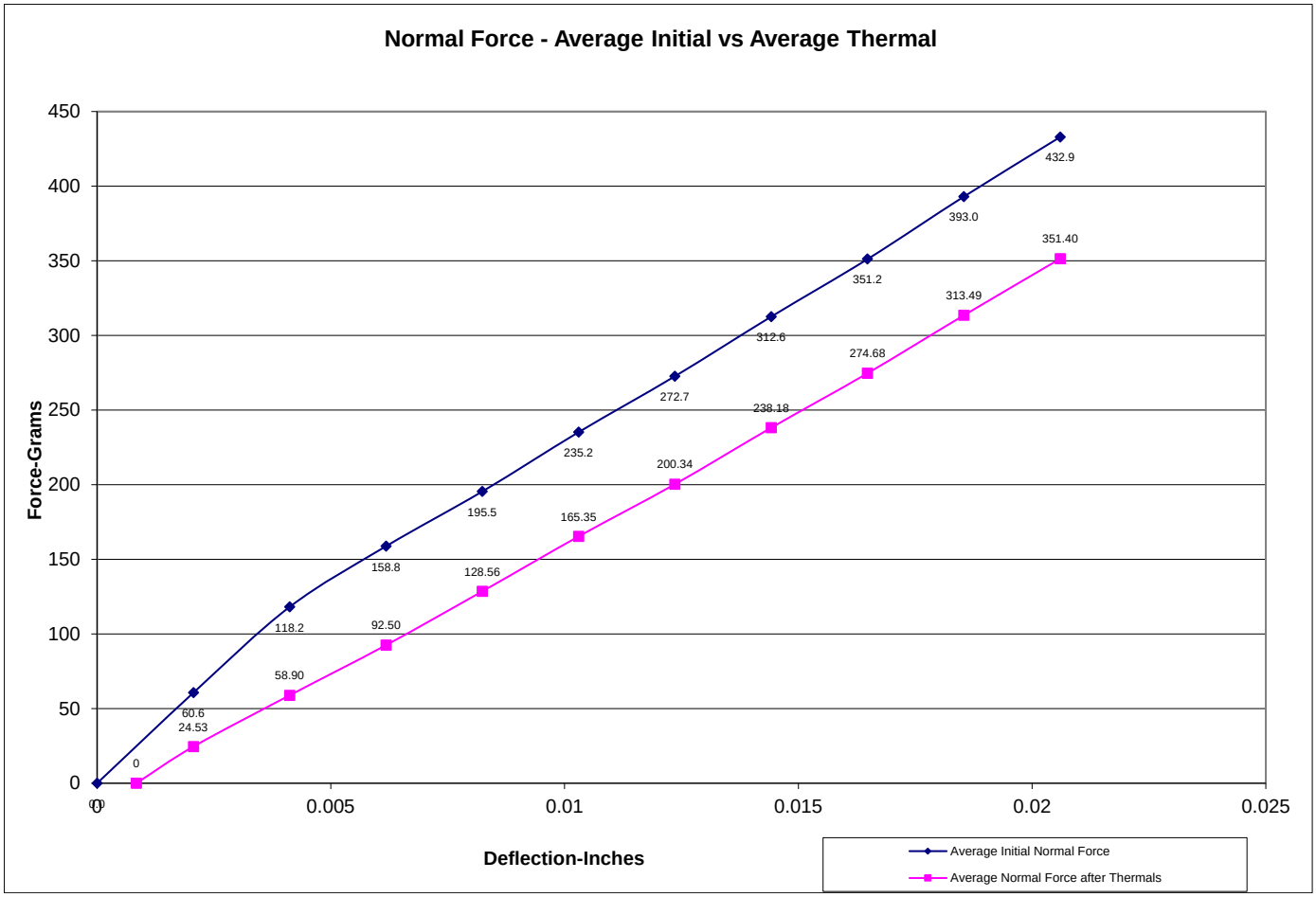
NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

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.

S Shaped Heat Sink Spring Fingers

	Deflections in inches Forces in Grams										
Initial	**0.0021**	**0.0041**	**0.0062**	**0.0082**	**0.0103**	**0.0124**	**0.0144**	**0.0165**	**0.0185**	**0.0206**	***SET***
Averages	60.64	118.15	158.76	195.48	235.21	272.68	312.61	351.15	393.01	432.93	0.0006
Min	38.30	80.70	120.50	162.30	204.00	244.00	287.90	328.50	377.30	418.40	0.0000
Max	75.80	129.90	171.40	214.10	256.90	297.10	338.60	384.10	433.00	478.70	0.0017
St. Dev	10.954	15.716	16.705	15.869	16.083	16.164	15.311	16.669	18.066	20.001	0.0006
Count	8	8	8	8	8	8	8	8	8	8	8

After Thermals	Deflections in inches Forces in Grams										
	0.0021	**0.0041**	**0.0062**	**0.0082**	**0.0103**	**0.0124**	**0.0144**	**0.0165**	**0.0185**	**0.0206**	***SET***
Averages	24.53	58.90	92.50	128.56	165.35	200.34	238.18	274.68	313.49	351.40	0.0012
Min	13.60	42.20	71.40	102.20	133.30	161.20	197.40	230.60	261.80	293.30	0.0006
Max	36.60	78.50	117.50	165.00	212.10	256.20	303.30	345.20	389.80	432.50	0.0015
St. Dev	10.778	15.753	19.648	25.337	31.047	36.603	41.330	44.943	48.148	50.916	0.0003
Count	8	8	8	8	8	8	8	8	8	8	8



DATA SUMMARIES Continued

Insertion/Retention/Hole Conditioning.

511 Low Speed Signal

Group 1 SK-13515-17 (HASL .0125" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	4.83	1.09	3.13	0.70	4.61	1.04	0.39	0.09
Maximum	6.38	1.44	5.86	1.32	6.29	1.42	5.66	1.27
Average	5.60	**1.26**	4.77	**1.07**	5.38	**1.21**	4.10	**0.92**
St Dev	0.44	0.10	0.61	0.14	0.51	0.12	1.21	0.27
Count	32	32	32	32	32	32	32	32

Group 2 SK-13515-18 (HASL .0165" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.71	0.61	2.03	0.46	2.54	0.57	2.01	0.45
Maximum	3.77	0.85	3.21	0.72	4.04	0.91	3.15	0.71
Average	3.27	**0.73**	2.70	**0.61**	3.36	**0.76**	2.50	**0.56**
St Dev	0.29	0.07	0.33	0.07	0.41	0.09	0.28	0.06
Count	32	32	32	32	32	32	32	32

Group 3 SK-13515-19 (ENIG .0165" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	3.23	0.73	2.24	0.50	3.18	0.72	2.25	0.51
Maximum	4.31	0.97	3.19	0.72	4.11	0.93	3.65	0.82
Average	3.59	**0.81**	2.79	**0.63**	3.66	**0.82**	3.00	**0.67**
St Dev	0.23	0.05	0.27	0.06	0.22	0.05	0.35	0.08
Count	32	32	32	32	32	32	32	32

DATA SUMMARIES Continued

Insertion/Retention/Hole Conditioning.

131 Ground

Group 4 SK-13515-17 (HASL .0125" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.73	1.29	3.36	0.76	5.22	1.17	3.43	0.77
Maximum	13.19	2.97	5.86	1.32	10.34	2.32	6.04	1.36
Average	6.64	**1.49**	4.48	**1.01**	6.08	**1.37**	4.54	**1.02**
St Dev	1.31	0.29	0.53	0.12	0.94	0.21	0.74	0.17
Count	32	32	32	32	32	32	32	32

Group 5 SK-13515-18 (HASL .0165" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	0.40	0.09	2.38	0.53	3.19	0.72	2.82	0.64
Maximum	5.97	1.34	4.95	1.11	6.11	1.37	3.96	0.89
Average	4.28	**0.96**	3.45	**0.78**	4.52	**1.02**	3.41	**0.77**
St Dev	1.01	0.23	0.65	0.15	0.81	0.18	0.27	0.06
Count	32	32	32	32	32	32	32	32

Group 6 SK-13515-19 (ENIG .0165" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	3.74	0.84	2.08	0.47	3.55	0.80	2.50	0.56
Maximum	4.30	0.97	3.60	0.81	4.51	1.01	3.78	0.85
Average	3.95	**0.89**	3.02	**0.68**	4.12	**0.93**	3.27	**0.73**
St Dev	0.15	0.03	0.36	0.08	0.20	0.04	0.36	0.08
Count	32	32	32	32	32	32	32	32

DATA SUMMARIES Continued

Insertion/Retention/Hole Conditioning.

Cage

Group 7 SK-13515-17 (HASL .039" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	24.17	5.44	1.11	0.25	2.59	0.58	1.07	0.24
Maximum	31.51	7.08	6.79	1.53	25.21	5.67	10.03	2.25
Average	26.92	**6.05**	3.03	**0.68**	20.42	**4.59**	2.94	**0.66**
St Dev	1.90	0.43	1.21	0.27	3.80	0.86	1.77	0.40
Count	32	32	32	32	32	32	32	32

Group 8 SK-13515-17 (HASL .043" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	12.00	2.70	3.81	0.86	11.37	2.56	3.53	0.79
Maximum	19.83	4.46	10.97	2.47	21.82	4.91	12.33	2.77
Average	15.70	**3.53**	5.78	**1.30**	15.14	**3.40**	5.42	**1.22**
St Dev	1.43	0.32	1.52	0.34	2.27	0.51	1.58	0.35
Count	32	32	32	32	32	32	32	32

Group 9 SK-13515-17 (ENIG .043" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	12.08	2.72	3.25	0.73	10.50	2.36	2.51	0.57
Maximum	17.45	3.92	13.35	3.00	15.59	3.51	10.61	2.39
Average	14.51	**3.26**	6.64	**1.49**	12.60	**2.83**	4.05	**0.91**
St Dev	1.56	0.35	2.52	0.57	1.29	0.29	1.39	0.31
Count	32	32	32	32	32	32	32	32

DATA SUMMARIES Continued

Insertion/Retention/Hole Conditioning.

512 Low Speed Signal

Group 10 SK-13515-17 (HASL .0125" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	4.81	1.08	2.24	0.50	4.82	1.08	2.78	0.63
Maximum	5.69	1.28	5.30	1.19	7.85	1.76	5.74	1.29
Average	5.17	**1.16**	4.41	**0.99**	5.70	**1.28**	4.78	**1.07**
St Dev	0.25	0.06	0.60	0.13	0.66	0.15	0.73	0.16
Count	32	32	32	32	32	32	32	32

Group 11 SK-13515-18 (HASL .0165" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.98	0.67	2.12	0.48	3.15	0.71	2.14	0.48
Maximum	4.38	0.98	3.26	0.73	4.46	1.00	3.76	0.85
Average	3.68	**0.83**	2.64	**0.59**	3.96	**0.89**	3.05	**0.69**
St Dev	0.31	0.07	0.26	0.06	0.36	0.08	0.38	0.09
Count	32	32	32	32	31	31	31	31

Group 12 SK-13515-19 (ENIG .0165" PTH)

	Pin 1 Insertion/Retention				Pin 3 Insertion/Retention			
	Insertion		**Retention**		**Insertion**		**Retention**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	3.30	0.74	2.30	0.52	3.44	0.77	2.38	0.53
Maximum	4.19	0.94	3.54	0.80	4.54	1.02	4.04	0.91
Average	3.55	**0.80**	3.08	**0.69**	3.83	**0.86**	3.33	**0.75**
St Dev	0.17	0.04	0.30	0.07	0.30	0.07	0.43	0.10
Count	32	32	32	32	32	32	32	32

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	LS Pin to Pin		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	1230	1270	Not Tested

	LS Row to Row		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	2530	3300	Not Tested

	HS Pin to Pin (Outer)		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	1040	4800	Not Tested

	HS Row to Row (Outer to Outer)		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	2820	22300	Not Tested

	HS Row to Row (Inner to Outer)		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	1360	7900	Not Tested

DATA SUMMARIES Continued

	HS Pin to Pin (Inner)		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	2390	3600	Not Tested

	HS Row to Row (Inner to Inner)		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	6200	10500	Not Tested

	HS Pin to Ground (Outer)		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	1480	20200	Not Tested

	HS Pin to Ground (Inner)		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	1540	4800	Not Tested

	Ground to Cage		
	Mated	Unmated	Unmated
Minimum	**FQSFP/QSFPO**	**FQSFP**	**QSFPO**
Initial	45000	45000	Not Tested
Thermal	45000	45000	Not Tested
Humidity	12700	22300	Not Tested

DATA SUMMARIES Continued

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

LS

Voltage Rating Summary	
Minimum	**FQSFP/QSFPO**
Break Down Voltage	622
Test Voltage	467
Working Voltage	156

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

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

HS

Voltage Rating Summary	
Minimum	**FQSFP/QSFPO**
Break Down Voltage	557
Test Voltage	418
Working Voltage	139

HS Pin to Pin (Outer)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

HS Row to Row (Outer to Outer)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

HS Pin to Pin (Inner)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

HS Row to Row (Inner to Inner)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

DATA SUMMARIES Continued

HS Row to Row (Inner to Outer)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Voltage Rating Summary	
Minimum	**FQSFP/QSFPO**
Break Down Voltage	563
Test Voltage	422
Working Voltage	141

HS Pin to Ground (Outer)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

HS Pin to Ground (Inner)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Voltage Rating Summary	
Minimum	**FQSFP/QSFPO**
Break Down Voltage	403
Test Voltage	302
Working Voltage	101

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

DATA SUMMARIES Continued

LLCR Gas Tight:

1) A total of 256 signal 1, 160 signal 2 and 64 ground 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 +1000 mOhms: ----------Unstable
    f. >+1000 mOhms:----------Open Failure

DATA SUMMARIES Continued

LLCR Measurement Summaries by Pin Type		
Date	2023/2/21	2023/2/22
Room Temp (Deg C)	22	22
Rel Humidity (%)	40	41
Technician	Richard Ison	Richard Ison
mOhm values	Actual	**Delta**
	Initial	**Acid Vapor**
Pin Type: Signal 1		
Average	286.05	2.23
St. Dev.	1.59	1.31
Min	282.92	0.01
Max	291.91	6.41
Summary Count	256	256
Total Count	256	256
Pin Type: Signal 2		
Average	17.19	1.06
St. Dev.	2.38	1.25
Min	13.14	0.01
Max	23.21	9.12
Summary Count	160	160
Total Count	160	160
Pin Type: GND 1		
Average	20.9	0.38
St. Dev.	0.39	0.49
Min	19.99	0
Max	21.51	1.76
Summary Count	64	64
Total Count	64	64

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**467**	**13**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Gas Tight: Compliant pin

1) A total of 30 compliant 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 +0.66 mOhms: ----------Minor
   b. +0.66 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	2023/4/5	2023/4/5		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	53	53		
Technician	Richard Ison	Richard Ison		
mOhm values	**Actual Initial**	**Delta Gas Tight**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.20	0.02		
St. Dev.	0.06	0.01		
Min	0.10	0.00		
Max	0.35	0.04		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.33 & <=.66**	**>.66 & <=1**	**>1 & <=50**	**>50 & <=1000**	**>1000**
Gas Tight	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Thermal Aging:

2) A total of 256 signal 1, 160 signal 2 and 64 ground points were measured.
3) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
4) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
5) 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 +1000 mOhms: ----------Unstable
    f. >+1000 mOhms:----------Open Failure

LLCR Measurement Summaries by Pin Type				
Date	2023/3/6	2023/3/20		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	38	40		
Technician	Richard Ison	Richard Ison		
mOhm values	Actual	**Delta**		
	Initial	**Thermal**		
Pin Type: Signal 1				
Average	285.18	1.2		
St. Dev.	1.9	1.18		
Min	282.05	0.01		
Max	290.94	8.93		
Summary Count	256	256		
Total Count	256	256		
Pin Type: Signal 2				
Average	16.91	2.84		
St. Dev.	2.88	2.43		
Min	12.35	0.04		
Max	29.77	14.45		
Summary Count	160	160		
Total Count	160	160		
Pin Type: GND 1				
Average	20.38	1.71		
St. Dev.	1.55	1.4		
Min	16.44	0.2		
Max	22.23	5.52		
Summary Count	64	64		
Total Count	64	64		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal	**451**	**25**	**4**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Thermal Aging: Compliant pin

1) A total of 30 compliant pinpoints 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 +0.66 mOhms:----------Minor
   b. +0.66 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	2023/3/8	2023/3/21		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	38	39		
Technician	Richard Ison	Richard Ison		
mOhm values	**Actual Initial**	**Delta After Ther**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.39	0.11		
St. Dev.	0.13	0.09		
Min	0.16	0.00		
Max	0.62	0.28		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.66 & <=1**	**>1 & <=50**	**>50 & <=1000**	**>1000**
After Ther	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Mating-Unmating Durability:

1) A total of 256 signal 1, 160 signal 2 and 64 ground 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 +1000 mOhms: ----------Unstable
    f. >+1000 mOhms:----------Open Failure

DATA SUMMARIES Continued

	LLCR Measurement Summaries by Pin Type			
Date	2023/3/2	2023/3/10	2023/3/15	2023/3/27
Room Temp (Deg C)	22	22	22	22
Rel Humidity (%)	38	39	37	40
Technician	Richard Ison	Richard Ison	Richard Ison	Richard Ison
mOhm values	Actual **Initial**	**Delta Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type: Signal 1			
Average	286.28	1.22	1.25	1.31
St. Dev.	1.82	0.96	1.11	1.05
Min	282.73	0	0	0.01
Max	292.07	5.62	6.62	5.27
Summary Count	256	256	256	256
Total Count	256	256	256	256
	Pin Type: Signal 2			
Average	17.3	1.14	1.81	2.16
St. Dev.	2.49	1.1	1.52	1.97
Min	13.21	0	0.04	0
Max	23.85	5.47	7.69	9.85
Summary Count	160	160	160	160
Total Count	160	160	160	160
	Pin Type: GND 1			
Average	20.93	0.8	0.63	0.92
St. Dev.	0.56	0.56	0.39	0.54
Min	20.02	0.01	0.04	0.02
Max	21.97	2.27	1.71	2.39
Summary Count	64	64	64	64
Total Count	64	64	64	64

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Cycles	**478**	**2**	**0**	**0**	**0**	**0**
Therm Shck	**468**	**12**	**0**	**0**	**0**	**0**
Humidity	**465**	**15**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Mating-Unmating Durability: Compliant pin

5) A total of 30 compliant pinpoints 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 +0.66 mOhms:----------Minor
   g. +0.66 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	2023/3/8	2023/3/15	2023/3/27	
Room Temp (Deg C)	22	22	22	
Rel Humidity (%)	38	39	40	
Technician	Richard Ison	Richard Ison	Richard Ison	
mOhm values	**Actual Initial**	**Delta Ther Shock**	**Delta Humidity**	**Delta**
	Pin Type 1: Signal			
Average	0.29	0.23	0.28	
St. Dev.	0.10	0.16	0.18	
Min	0.14	0.02	0.03	
Max	0.48	0.69	0.72	
Summary Count	30	30	30	
Total Count	30	30	30	

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.33 & <=.66**	**>.66 & <=1**	**>1 & <=50**	**>50 & <=1000**	**>1000**
Ther Shock	**22**	**7**	**1**	**0**	**0**	**0**
Humidity	**20**	**8**	**2**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock &Vibration:

1). A total of 256 signal 1, 160 signal 2 and 64 ground 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. <= +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

DATA SUMMARIES Continued

LLCR Measurement Summaries by Pin Type		
Date	2023/4/3	2023/4/4
Room Temp (Deg C)	22	22
Rel Humidity (%)	38	49
Technician	Richard Ison	Richard Ison
mOhm values	Actual **Initial**	**Delta Shock-Vib**
Pin Type: Signal 1		
Average	279.21	0.72
St. Dev.	4.46	0.56
Min	272.6	0
Max	286.17	3.66
Summary Count	256	256
Total Count	256	256
Pin Type: Signal 2		
Average	15.37	1.02
St. Dev.	2.35	0.62
Min	11.23	0.02
Max	20.56	3.11
Summary Count	160	160
Total Count	160	160
Pin Type: GND 1		
Average	21.74	1.94
St. Dev.	1.17	1.36
Min	19.8	0
Max	23.66	4.4
Summary Count	64	64
Total Count	64	64

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**480**	**0**	**0**	**0**	**0**	**0**

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	60
Test Condition	C, 30g'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 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. +0.33 to +0.66 mOhms: ----------Minor.
b. +0.66 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	2023/3/31	2023/4/5		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	43	53		
Technician	Richard Ison	Richard Ison		
mOhm values	**Actual Initial**	**Delta Shock & Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.22	0.07		
St. Dev.	0.05	0.07		
Min	0.14	0.00		
Max	0.32	0.23		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.33 & <=.66**	**>.66 & <=1**	**>1 & <=50**	**>50 & <=1000**	**>1000**
Shock & Vib	**30**	**0**	**0**	**0**	**0**	**0**

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: TCT-04
Description: Dillon Quantrol TC21 25-1000 mm/min series test stand
Manufacturer: Dillon Quantrol
Model: TC2 I series test stand
Serial #: 04-1041-04
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;
… Last Cal: 05/29/2022, Next Cal: 05/29/2023

Equipment #: MO-11
Description: Switch/Multimeter
Manufacturer: Keithley
Model: 3706
Serial #: 120169
Accuracy: See Manual
… Last Cal: 09/11/2022, Next Cal: 09/11/2023

Equipment #: THC-05
Description: Temperature/Humidity Chamber (Chamber Room)
Manufacturer: Thermotron
Model: SM-8-3800
Serial #: 05 23 00 02
Accuracy: See Manual
… Last Cal: 11/14/2022, Next Cal: 11/14/2023

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: 06/30/2022, Next Cal: 06/30/2023

Equipment #: HPT-01
Description: Hipot Safety Tester
Manufacturer: Vitrek
Model: V73
Serial #: 019808
Accuracy:
… Last Cal: 05/15/2022, Next Cal: 05/15/2023

Equipment #: PS-02
Description: Power Supply
Manufacturer: Hewlett-Packer
Model: 6033A
Serial #: N/A
Accuracy: See Manual
… Last Cal: NOT CALIBRATED

EQUIPMENT AND CALIBRATION SCHEDULES Continued

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 04/22/2022, Next Cal: 04/22/2023

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/18/2022, Next Cal: 07/18/2023

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 10/31/2022, Next Cal: 10/31/2023

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 09/11/2022, Next Cal: 09/11/2023