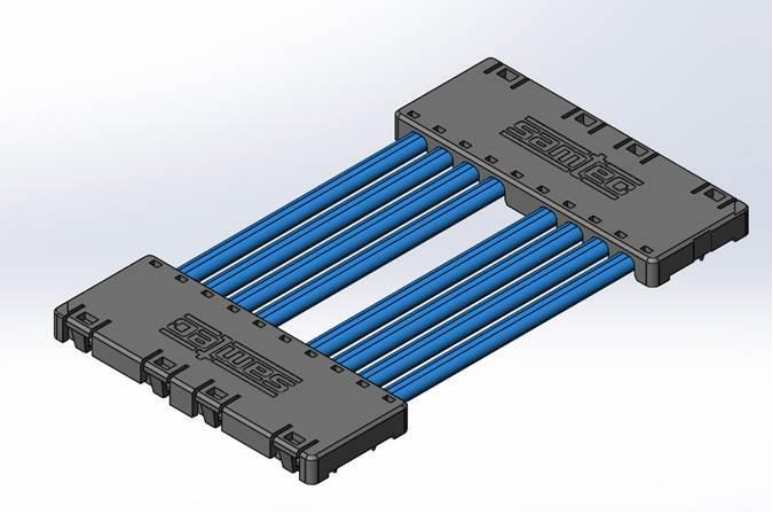
Project Number: Design Qualification Test Report	Tracking Code: 943093_Report_Rev_1
Requested by: Liam Parkes	Date: 1/10/2017
Part #: DCH-08-06.0-T-PF-1-4	Tech: Tony Wagoner
Part description: DCH	Qty to test: 108
Test Start: 09/05/2016	Test Completed: 11/03/2016



Design Qualification Test Report

DCH
DCH-08-06.0-T-PF-1-4

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
12/30/2016	**1**	**Initial Issue**	**PC**

CERTIFICATION

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

SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Samtec Test PCBs used: PCB-107533-TST-XX, PCB-107534-TST-XX, PCB-107535-TST-XX,

FLOWCHARTS

Gas Tight

Note: .016" ENIG PTH for signal pins, .020" ENIG PTH for ground pins

Group 1
DCH-08-06.0-T-PF-1-4

8 Assemblies

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

Compliant Pin Only

Group 2
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
ENIG .016" PTH (Signal)

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

Group 3
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
ENIG .020" PTH (Ground)

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

Thermal Aging

Note: .016" ENIG PTH for signal pins, .020" ENIG PTH for ground pins

Group 1
DCH-08-06.0-T-PF-1-4

8 Assemblies

Step	Description
1.	LLCR (1)
2.	Thermal Age (2) - Non Standard
3.	LLCR (1) Max Delta = 15 mOhm

Compliant Pin Only

Group 2
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
ENIG .016" PTH (Signal)

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

Group 3
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
ENIG .020" PTH (Ground)

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

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

(2) Thermal Age = Other
Test Condition = 2 (70°C)
Time Condition = B (250 Hours)
EIA-364-17

FLOWCHARTS Continued

Mating/Unmating/Durability

Note: .016" ENIG PTH for signal pins, .020" ENIG PTH for ground pins

Group 1
DCH-08-06.0-T-PF-1-4

8 Assemblies

Step	Description
1.	LLCR (2)
2.	Thermal Shock (3) - Non Standard
3.	LLCR (2) Max Delta = 15 mOhm
4.	Humidity (1)
5.	LLCR (2) Max Delta = 15 mOhm

Compliant Pin Only

Group 2
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
ENIG .016" PTH (Signal)

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

Group 3
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
ENIG .020" PTH (Ground)

Step	Description
1.	LLCR (2)
2.	Thermal Shock (3) - 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) Thermal Shock = Other
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = (-55°C to +70°C)
Test Duration = A-3 (100 Cycles)
EIA-364-32

FLOWCHARTS Continued

IR/DWV

Note: .016" ENIG PTH for signal pins, .020" ENIG PTH for ground pins

Pin-to-Pin

Group 1 DCH-08-12.0-T-PF-1-4 2 Assemblies		Group 2 DCH-08-12.0-T-PF-1-4 2 Assemblies	
Step	**Description**	**Step**	**Description**
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)

Pin-to-Ground

Group 3 DCH-08-12.0-T-PF-1-4 2 Assemblies		Group 4 DCH-08-12.0-T-PF-1-4 2 Assemblies	
Step	**Description**	**Step**	**Description**
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)

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(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 = (-55°C to +70°C)
Test Duration = A-3 (100 Cycles)
EIA-364-32

FLOWCHARTS Continued

Current Carrying Capacity

Group 1
DCH-08-12.0-T-PF-1-4

1 Pins Powered
Signal

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

Group 2
DCH-08-12.0-T-PF-1-4

2 Pins Powered
Signal

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

Group 3
DCH-08-12.0-T-PF-1-4

3 Pins Powered
Signal

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

Group 4
DCH-08-12.0-T-PF-1-4

4 Pins Powered
Signal

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

Group 5
DCH-08-12.0-T-PF-1-4

16 Pins Powered
Signal

Step	Description
1.	CCC (2) Rows = 1 Number of Positions = 16

Group 6
DCH-08-12.0-T-PF-1-4

1 Points
Ground
Note: 1 Bank Powered

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

Group 7
DCH-08-12.0-T-PF-1-4

2 Points
Ground
Note: 2 Banks Powered

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

Group 8
DCH-08-12.0-T-PF-1-4

All Power

Step	Description
1.	CCC - All Power (1)

(1) CCC - All Power = 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

(2) 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: .016" ENIG PTH for signal pins, .020" ENIG PTH for ground pins

Group 1
DCH-08-12.0-T-PF-1-4

8 Assemblies

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

Compliant Pin Only

Group 2
DCH-08-12.0-T-PF-1-4

30 Contacts Minimum
ENIG .016" PTH (Signal)

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

Group 3
DCH-08-12.0-T-PF-1-4

30 Contacts Minimum
ENIG .020" PTH (Ground)

Step	Description
1.	LLCR (1)
2.	Mechanical Shock (2)
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 = EIA-364-27
Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

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

FLOWCHARTS Continued

Mechanical Shock/Random Vibration/Event Detection

Note: Signal pins .016" ENIG PTH, ground pins .020" ENIG PTH

Group 1
DCH-08-12.0-T-PF-1-4

60 Points

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

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

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

Cable Pull

Note: .016" ENIG PTH for signal pins, .020" ENIG PTH for ground pins

Group 1
DCH-08-12.0-T-PF-1-4

5 Assemblies
0 Degrees

Step	Description
1.	Cable Pull (1)

Group 2
DCH-08-12.0-T-PF-1-4

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

Cable Flex

Note: .016" ENIG PTH for signal pins, .020" ENIG PTH for ground pins

Group 1
DCH-08-12.0-T-PF-1-4

8 Assemblies
Flat Cable
Note: Use test voltage from IR/DWV Sequence

Step	Description
1.	IR (3)
2.	DWV at Test Voltage (2)
3.	Cable Flex (1) *Note: Flex 500 Cycles*
4.	Visual Inspection
5.	IR (3)
6.	DWV at Test Voltage (2)

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

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

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

FLOWCHARTS Continued

Insertion/Retention/Hole Conditioning

Group 1
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
HASL .012" PTH (Signal)

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

Group 2
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
HASL .016" PTH (Signal)

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

Group 3
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
ENIG .016" PTH (Signal)

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

Group 4
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
HASL .016" PTH (Ground)

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

Group 5
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
HASL .020" PTH (Ground)

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

Group 6
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
ENIG .020" PTH (Ground)

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

Group 7
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
HASL .012" PTH (Signal)

Step	Description
1.	LLCR (1) *Note: Part 1*
2.	LLCR (1) Max Delta = 1 mOhm *Note: Part 2*
3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*

Group 8
DCH-08-06.0-T-PF-1-4

30 Contacts Minimum
HASL .016" PTH (Signal)

Step	Description
1.	LLCR (1) *Note: Part 1*
2.	LLCR (1) Max Delta = 1 mOhm *Note: Part 2*
3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*

FLOWCHARTS Continued

Group 9 DCH-08-06.0-T-PF-1-4 30 Contacts Minimum ENIG .016" PTH (Signal)		Group 10 DCH-08-06.0-T-PF-1-4 30 Contacts Minimum HASL .016" PTH (Ground)		Group 11 DCH-08-06.0-T-PF-1-4 30 Contacts Minimum HASL .020" PTH (Ground)		Group 12 DCH-08-06.0-T-PF-1-4 30 Contacts Minimum ENIG .020" PTH (Ground)	
Step	**Description**	**Step**	**Description**	**Step**	**Description**	**Step**	**Description**
1.	LLCR (1) *Note: Part 1*	1.	LLCR (1) *Note: Part 1*	1.	LLCR (1) *Note: Part 1*	1.	LLCR (1) *Note: Part 1*
2.	LLCR (1) Max Delta = 1 mOhm *Note: Part 2*	2.	LLCR (1) Max Delta = 1 mOhm *Note: Part 2*	2.	LLCR (1) Max Delta = 1 mOhm *Note: Part 2*	2.	LLCR (1) Max Delta = 1 mOhm *Note: Part 2*
3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*	3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*	3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*	3.	LLCR (1) Max Delta = 1 mOhm *Note: Part 3*

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

1) EIA-364-32, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors.*
2) Test Condition : -55°C to +70°C
3) Test Time: ½ hour dwell at each temperature extreme
4) Number of Cycles: 100
5) All test samples are pre-conditioned at ambient.
6) All test samples are exposed to environmental stressing in the mated condition.

THERMAL:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition : 70° C.
3) Test Time Condition B for 250 hours.
4) All test samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:

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

MECHANICAL SHOCK (Specified Pulse):

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

VIBRATION:

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

NANOSECOND-EVENT DETECTION:

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

INSULATION RESISTANCE (IR):

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

1) PROCEDURE:
    a. Reference document: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. Electrification Time 2.0 minutes
        iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.
2) MEASUREMENTS:
3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 5000 megohms.

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

To determine if the sockets can operate at its rated voltage and withstand momentary over potentials due to switching, surges, and other similar phenomenon. Separate samples are used to evaluate the effect of environmental stresses so not to influence the readings from arcing that occurs during the measurement process.

1) PROCEDURE:
    a. Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. Rate of Application 500 V/Sec
        iii. Test Voltage (VAC) until breakdown occurs
2) MEASUREMENTS/CALCULATIONS
    a. The breakdown voltage shall be measured and recorded.
    b. The dielectric withstanding voltage shall be recorded as 75% of the minimum breakdown voltage.
    c. The working voltage shall be recorded as one-third (1/3) of the dielectric withstanding voltage (one-fourth of the breakdown voltage).

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
    a. Self heating (resistive)
    b. Reduction in heat sink capacity affecting the heated contacts
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at four temperature points are reported:
    c. Ambient
    d. 45^{o} C
    e. 55^{o} C
    f. 75^{o} C
8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

LLCR:

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

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

CABLE PULL:

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

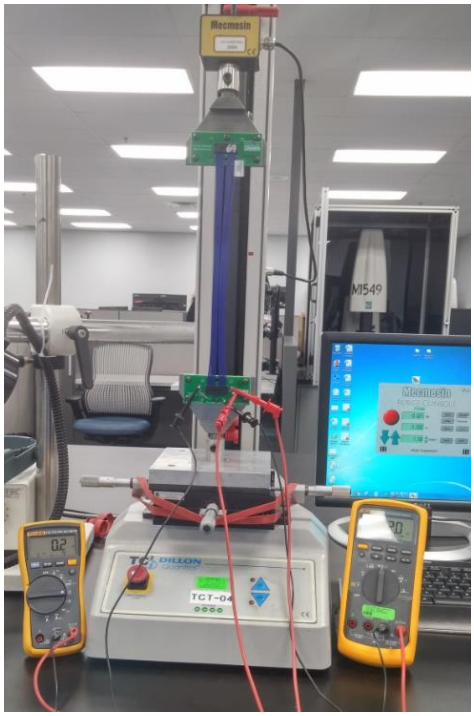


Fig. 1
0° Connector pull, notice the electrical continuity hook-up wires.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

CABLE Flex:

1) Oscillate and monitor electrical continuity for open circuit indication.
    a. ± 70° Pendulum Mode, bend up to 500 cycles with 2 Lbs. load on cable end.

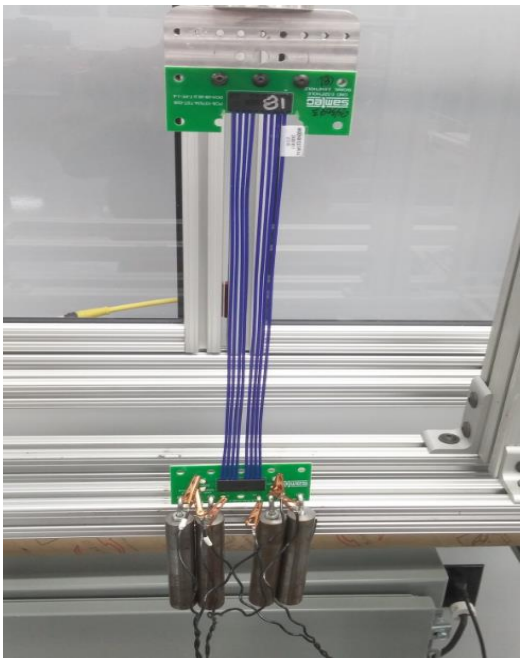


Fig. 2

RESULTS

Temperature Rise, CCC at a 20% de-rating

Signal Pin

- **CCC for a 30°C Temperature Rise----------3.0 A per contact with 1 contact (1x1) powered**
- **CCC for a 30°C Temperature Rise----------2.1 A per contact with 2 contacts (1x2) powered**
- **CCC for a 30°C Temperature Rise----------2.1 A per contact with 3 contacts (1x3) powered**
- **CCC for a 30°C Temperature Rise----------2.1 A per contact with 4 contacts (1x4) powered**
- **CCC for a 30°C Temperature Rise----------1.7 A per contact with 16 contacts (1x16) powered**

Ground Pin

- **CCC for a 30°C Temperature Rise----------10.7 A per bank with 1 bank (1x1) powered**
- **CCC for a 30°C Temperature Rise----------10.2 A per bank with 2 banks (1x2) powered**

All Power

- **CCC for a 30°C Temperature Rise----------7.8 A per bank with 2 banks (1x2) powered / All Signal Pins powered at ½ rated current (1 Amp)**

Cable Pull force

- **0° Pull**
  - **Min----------31.07 Lbs**
  - **Max ----------34.70 Lbs**
- **90° Pull**
  - **Min---------- 8.44 Lbs**
  - **Max ---------- 9.89 Lbs**

RESULTS Continued

Compliant pin Insertion/Retention Forces

Signal Pin- HASL-0.012"

- **Initial**
  - **Mating**
    - **Min ---------- 2.14 Lbs**
    - **Max---------- 2.60 Lbs**
  - **Unmating**
    - **Min ---------- 1.02 Lbs**
    - **Max---------- 1.45 Lbs**
- **After 2 Cycles**
  - **Mating**
    - **Min ---------- 1.76 Lbs**
    - **Max---------- 2.19 Lbs**
  - **Unmating**
    - **Min ---------- 0.96 Lbs**
    - **Max---------- 1.39 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 1.65 Lbs**
    - **Max---------- 2.08 Lbs**
  - **Unmating**
    - **Min ---------- 0.94 Lbs**
    - **Max---------- 1.37 Lbs**

Signal Pin- HASL-0.016"

- **Initial**
  - **Mating**
    - **Min ---------- 1.09 Lbs**
    - **Max---------- 1.46 Lbs**
  - **Unmating**
    - **Min ---------- 0.76 Lbs**
    - **Max---------- 1.24 Lbs**
- **After 2 Cycles**
  - **Mating**
    - **Min ---------- 1.08 Lbs**
    - **Max---------- 1.40 Lbs**
  - **Unmating**
    - **Min ---------- 0.82 Lbs**
    - **Max---------- 1.20 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 1.08 Lbs**
    - **Max---------- 1.45 Lbs**
  - **Unmating**
    - **Min ---------- 0.81 Lbs**
    - **Max---------- 1.15 Lbs**

RESULTS Continued

Signal Pin- ENIG-0.016"

- **Initial**
  - **Mating**
    - **Min ---------- 0.90 Lbs**
    - **Max---------- 1.14 Lbs**
  - **Unmating**
    - **Min ---------- 0.55 Lbs**
    - **Max---------- 0.75 Lbs**
- **After 2 Cycles**
  - **Mating**
    - **Min ---------- 0.90 Lbs**
    - **Max---------- 1.17 Lbs**
  - **Unmating**
    - **Min ---------- 0.60 Lbs**
    - **Max---------- 0.82 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 0.78 Lbs**
    - **Max---------- 1.08 Lbs**
  - **Unmating**
    - **Min ---------- 0.57 Lbs**
    - **Max---------- 0.87 Lbs**

Ground Pin- HASL-0.016"

- **Initial**
  - **Mating**
    - **Min ---------- 5.20 Lbs**
    - **Max---------- 6.44 Lbs**
  - **Unmating**
    - **Min ---------- 1.06 Lbs**
    - **Max---------- 2.14 Lbs**
- **After 2 Cycles**
  - **Mating**
    - **Min ---------- 4.27 Lbs**
    - **Max---------- 5.27 Lbs**
  - **Unmating**
    - **Min ---------- 1.29 Lbs**
    - **Max---------- 2.15 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 3.87 Lbs**
    - **Max---------- 5.06 Lbs**
  - **Unmating**
    - **Min ---------- 1.14 Lbs**
    - **Max---------- 2.06 Lbs**

RESULTS Continued

Ground Pin- HASL-0.020"

- **Initial**
  - **Mating**
    - **Min ---------- 0.79 Lbs**
    - **Max---------- 1.33 Lbs**
  - **Unmating**
    - **Min ---------- 0.51 Lbs**
    - **Max---------- 0.87 Lbs**
- **After 2 Cycles**
  - **Mating**
    - **Min ---------- 0.57 Lbs**
    - **Max---------- 1.15 Lbs**
  - **Unmating**
    - **Min ---------- 0.43 Lbs**
    - **Max---------- 0.88 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 0.50 Lbs**
    - **Max---------- 0.97 Lbs**
  - **Unmating**
    - **Min ---------- 0.41 Lbs**
    - **Max---------- 0.81 Lbs**

Ground Pin- ENIG-0.020"

- **Initial**
  - **Mating**
    - **Min ---------- 0.54 Lbs**
    - **Max---------- 0.80 Lbs**
  - **Unmating**
    - **Min ---------- 0.42 Lbs**
    - **Max---------- 0.64 Lbs**
- **After 2 Cycles**
  - **Mating**
    - **Min ---------- 0.44 Lbs**
    - **Max---------- 0.82 Lbs**
  - **Unmating**
    - **Min ---------- 0.40 Lbs**
    - **Max---------- 0.67 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ---------- 0.44 Lbs**
    - **Max---------- 0.69 Lbs**
  - **Unmating**
    - **Min ---------- 0.37 Lbs**
    - **Max---------- 0.65 Lbs**

RESULTS Continued

LLCR Durability (128 pin LLCR test points)

Signal pin:

- **Initial ---------- 51.23 mOhms Max**

Ground Pin:

- **Initial ---------- 13.38 mOhms Max**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 128 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
- **After humidity**
  - **<= +5.0 mOhms ---------- 128 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

LLCR Durability-compliant pin (30 pin LLCR test points)

Signal Pin- ENIG 0.016"

- **Initial ----------0.19 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After humidity**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin-ENIG 0.020"

- **Initial ----------0.38 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After humidity**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

RESULTS Continued

LLCR Thermal Aging (128 pin LLCR test points)

Signal pin:

- **Initial ---------- 54.96 mOhms Max**

Ground Pin:

- **Initial ---------- 13.40 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 128 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

LLCR Thermal Aging (30 compliant pin LLCR test points)

Signal Pin- ENIG 0.016"

- **Initial ----------0.18 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After humidity**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- ENIG 0.020"

- **Initial ----------0.37 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After humidity**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

RESULTS Continued

LLCR Gas Tight (128 pin LLCR test points)

Signal pin:

- **Initial ---------- 51.02 mOhms Max**

Ground Pin:

- **Initial ---------- 14.47 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 128 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

LLCR Gas Tight (30 compliant pin LLCR test points)

Signal Pin- ENIG 0.016"

- **Initial ----------0.18 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After humidity**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- ENIG 0.020"

- **Initial ----------0.37 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After humidity**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

RESULTS Continued

LLCR Shock Vib (128 pin LLCR test points)

Signal pin:

- **Initial ----------103.75 mOhms Max**

Ground Pin:

- **Initial ---------- 24.58 mOhms Max**
- **S&V**
  - **<= +5.0 mOhms ---------- 128 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

LLCR Shock Vib (30 compliant pin LLCR test points)

Signal Pin- ENIG 0.016"

- **Initial ----------0.13 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After humidity**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- ENIG 0.020"

- **Initial ----------0.34 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After humidity**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Mechanical Shock & Random Vibration:

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

RESULTS Continued

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

Signal Pin- HASL 0.012"

- **Initial ----------0.45 mOhms Max**
- **After 1 cycle**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After 2 cycles**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Signal Pin- HASL 0.016"

- **Initial ----------0.41 mOhms Max**
- **After 1 cycle**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After 2 cycles**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Signal Pin- ENIG 0.016"

- **Initial ----------0.31 mOhms Max**
- **After 1 cycle**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After 2 cycles**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- HASL 0.016"

- **Initial ----------0.49 mOhms Max**
- **After 1 cycle**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After 2 cycles**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- HASL 0.020"

- **Initial ----------0.59 mOhms Max**
- **After 1 cycle**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After 2 cycles**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

Ground Pin- ENIG 0.020"

- **Initial ----------0.07 mOhms Max**
- **After 1 cycle**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**
- **After 2 cycles**
  - **<= +1.0 mOhms ----------30 Points ---------- Stable**
  - **>+1.0 mOhms ----------0 Points ---------- Unstable**

RESULTS Continued

Insulation Resistance minimums, IR

Pin- Pin

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Pass**
- **Thermal**
  - **Mated----------45000 Meg Ω ---------- Pass**
- **Humidity**
  - **Mated----------45000 Meg Ω ---------- Pass**

Pin-Ground

- **Initial**
  - **Mated----------45000 Meg Ω ---------- Pass**
- **Thermal**
  - **Mated----------45000 Meg Ω ---------- Pass**
- **Humidity**
  - **Mated----------45000 Meg Ω ---------- Pass**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage----------920 VAC**
  - **Test Voltage ----------695 VAC**
  - **Working Voltage ----------230 VAC**

Pin - Pin

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

Pin-Ground

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

RESULTS Continued

CABLE FLEX

Insulation Resistance minimums, IR

Pin to Pin

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

Pin to Ground

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

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage----------920 VAC**
  - **Test Voltage ----------695 VAC**
  - **Working Voltage ----------230 VAC**

Pin to Pin

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

Pin to Ground

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

Supplemental – Cable Bend 500 Cycles

- **±70° Flex Mode---------- No Electrical Failures**

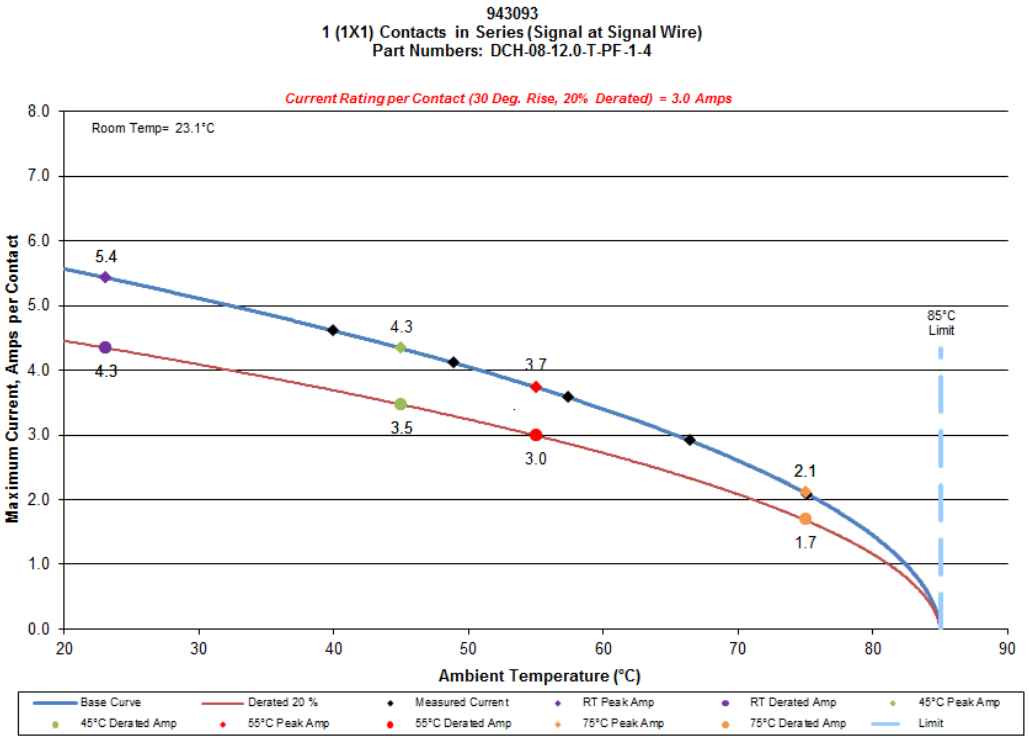
DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

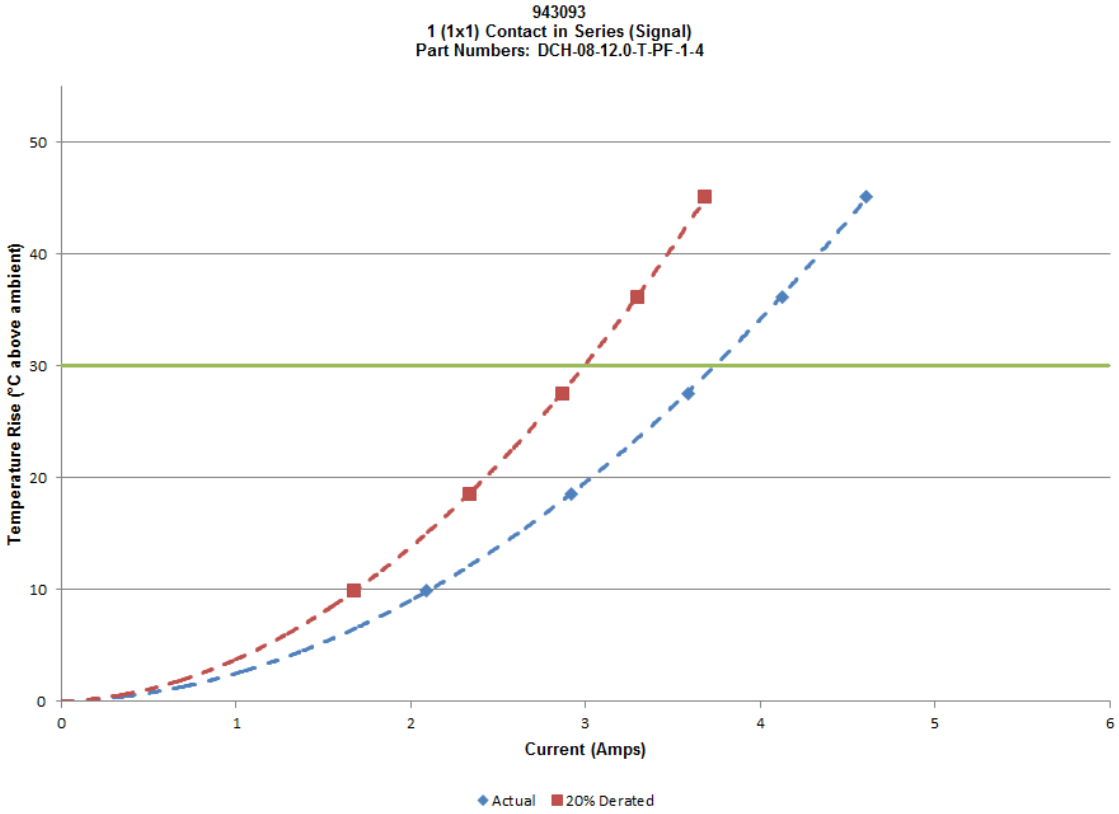
1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes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

Signal Pin:

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

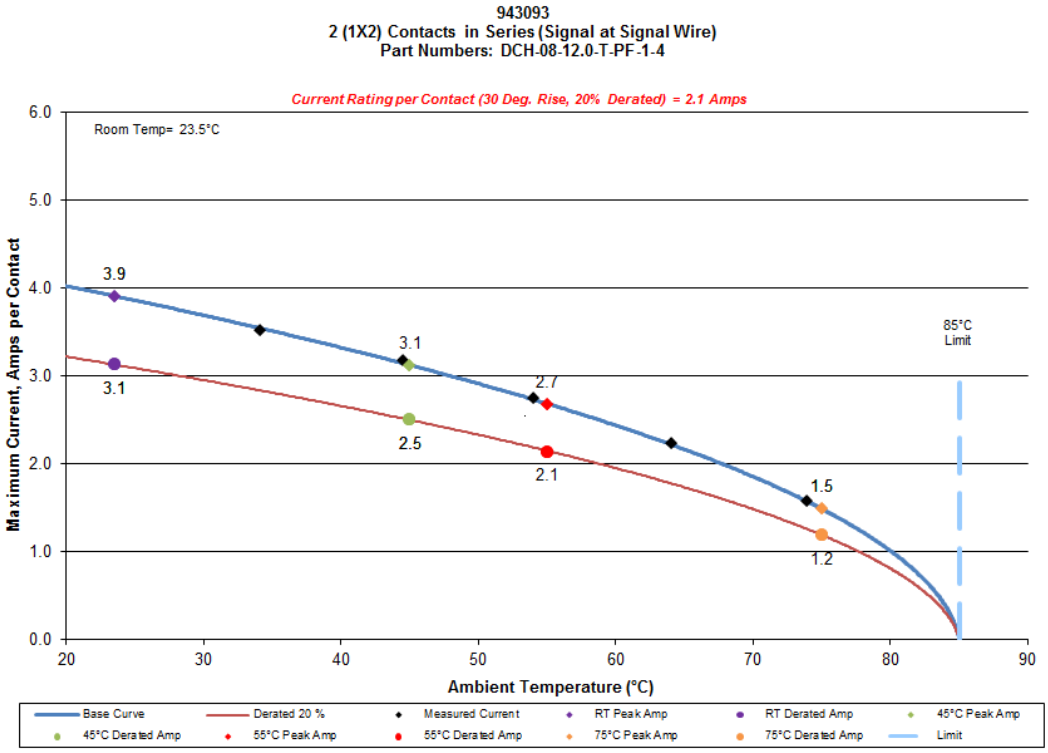


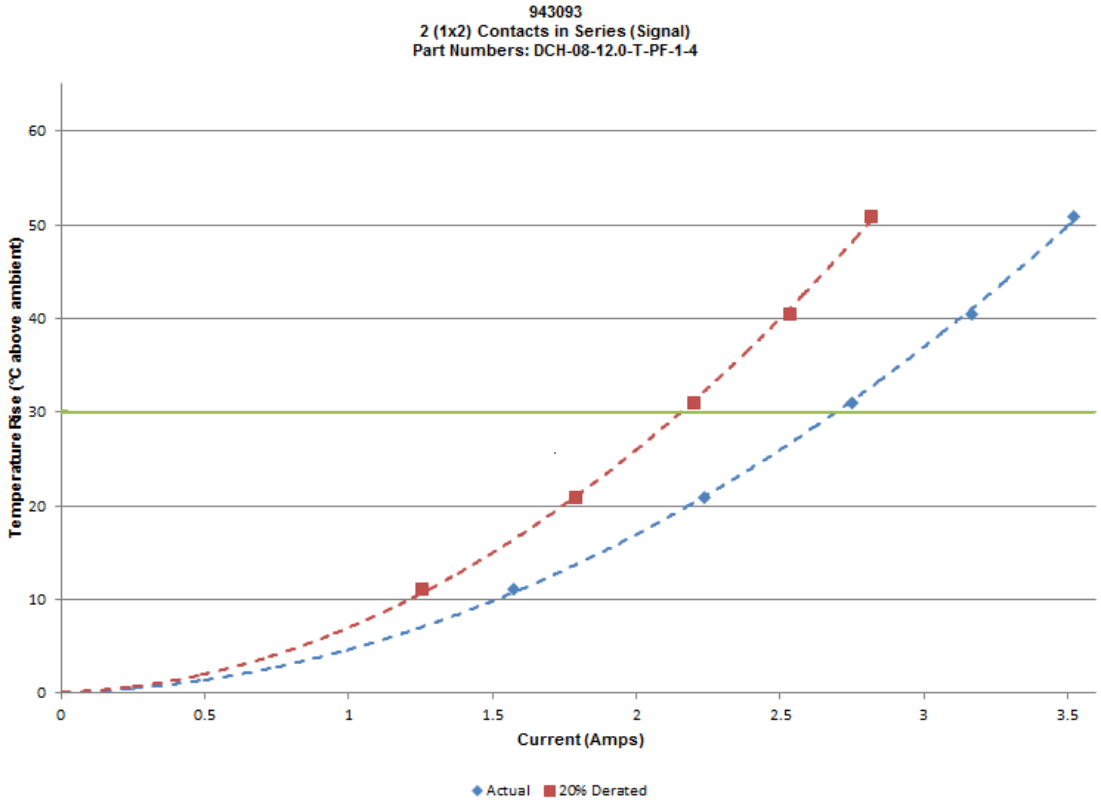
DATA SUMMARIES



DATA SUMMARIES

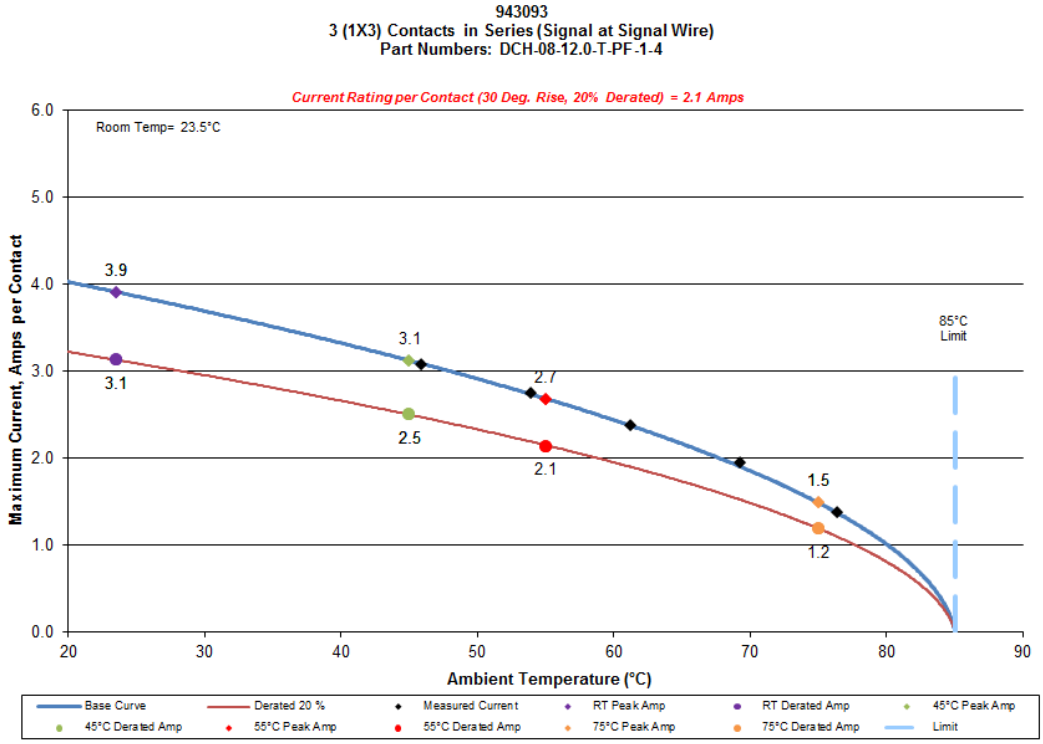
b. Linear configuration with 2 adjacent power conductors/contacts powered

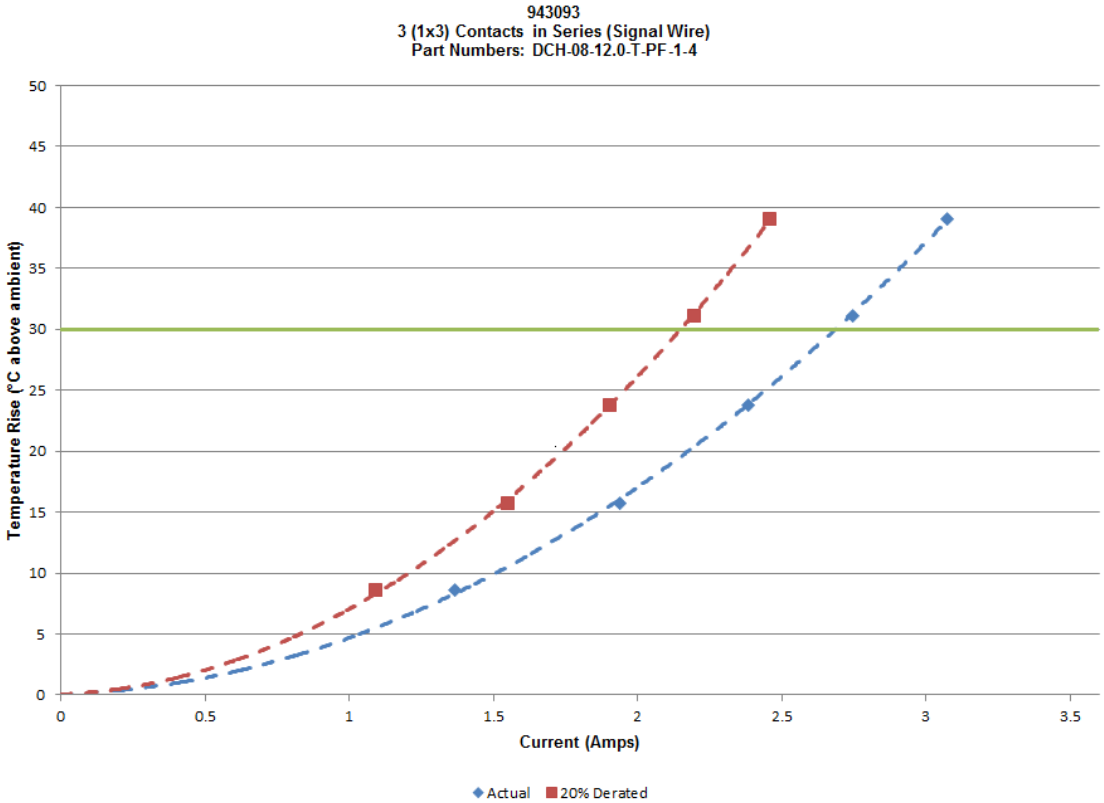




DATA SUMMARIES

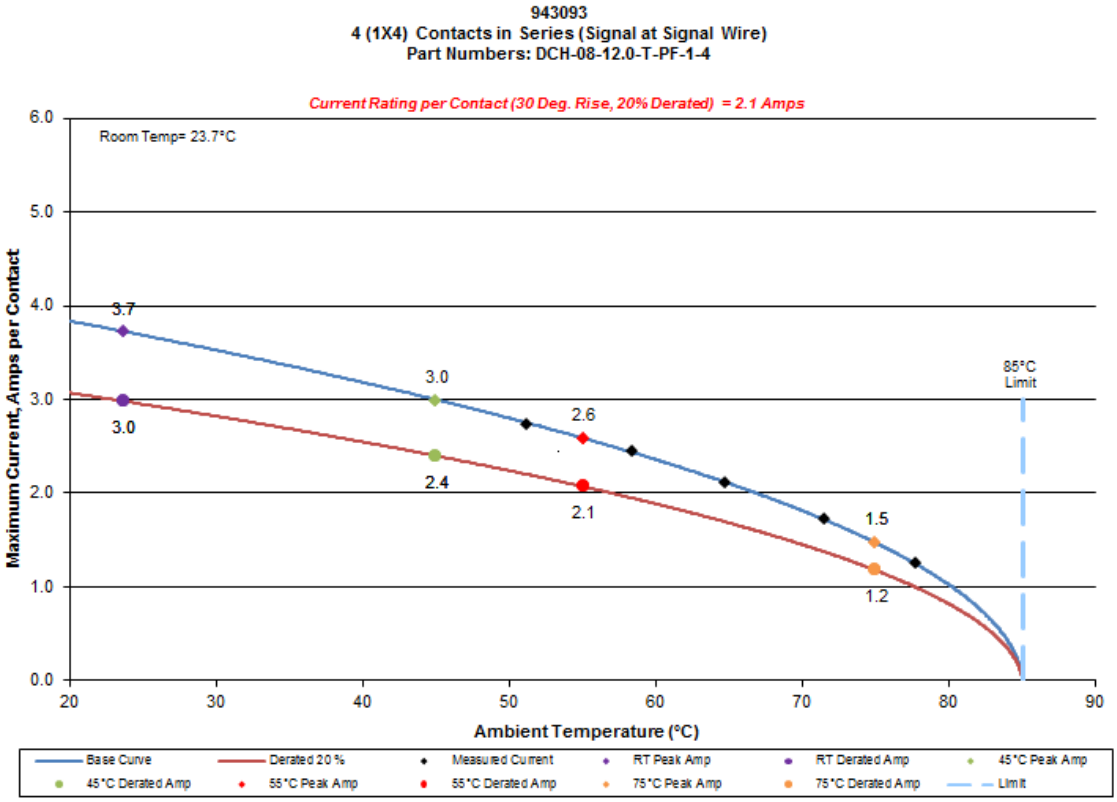
c. Linear configuration with 3 adjacent power conductors/contacts powered

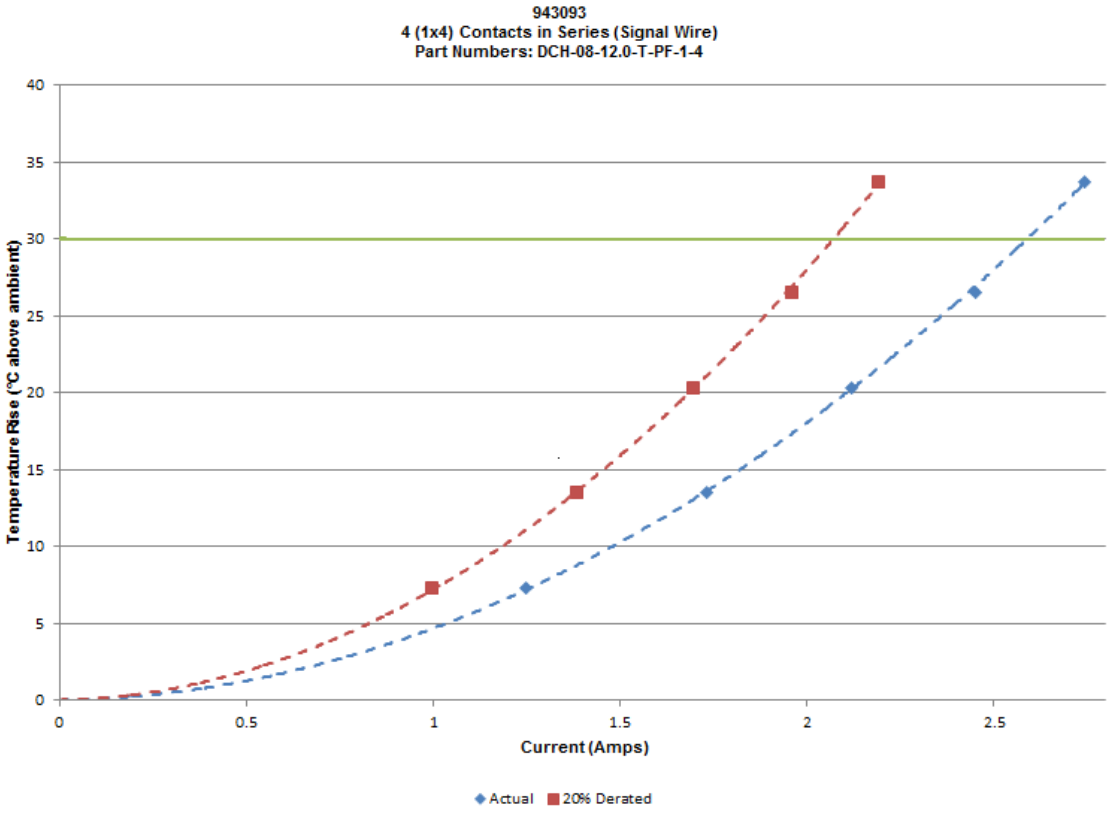




DATA SUMMARIES

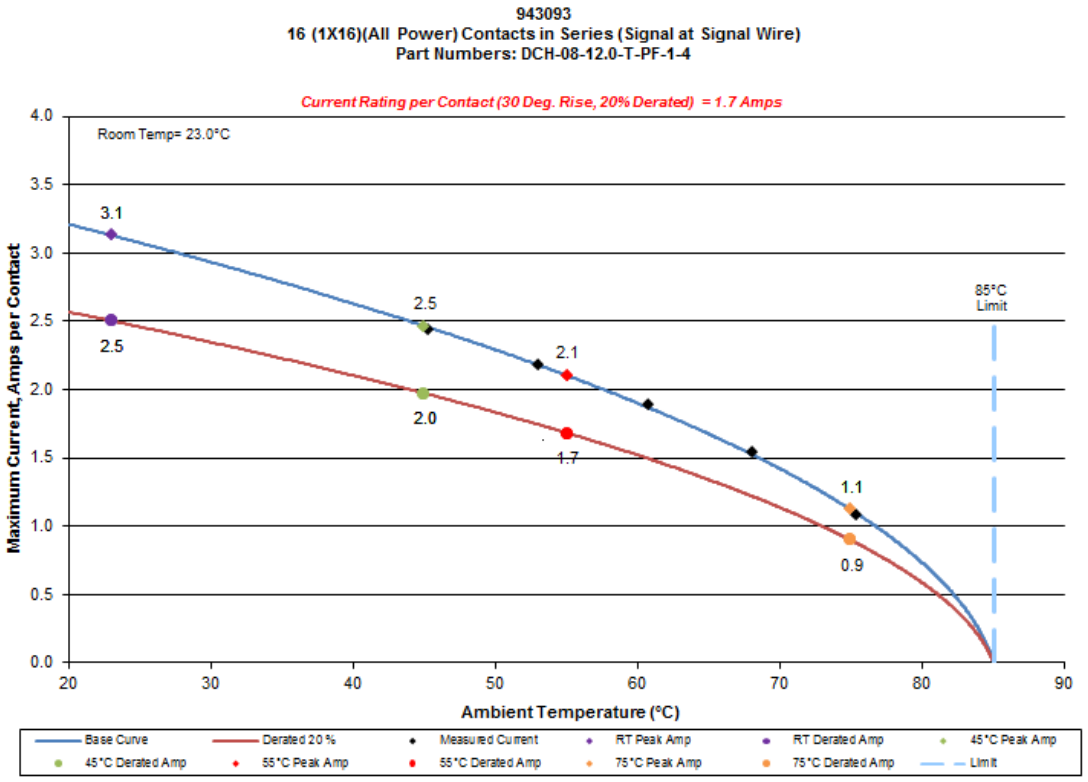
d. Linear configuration with 4 adjacent power conductors/contacts powered

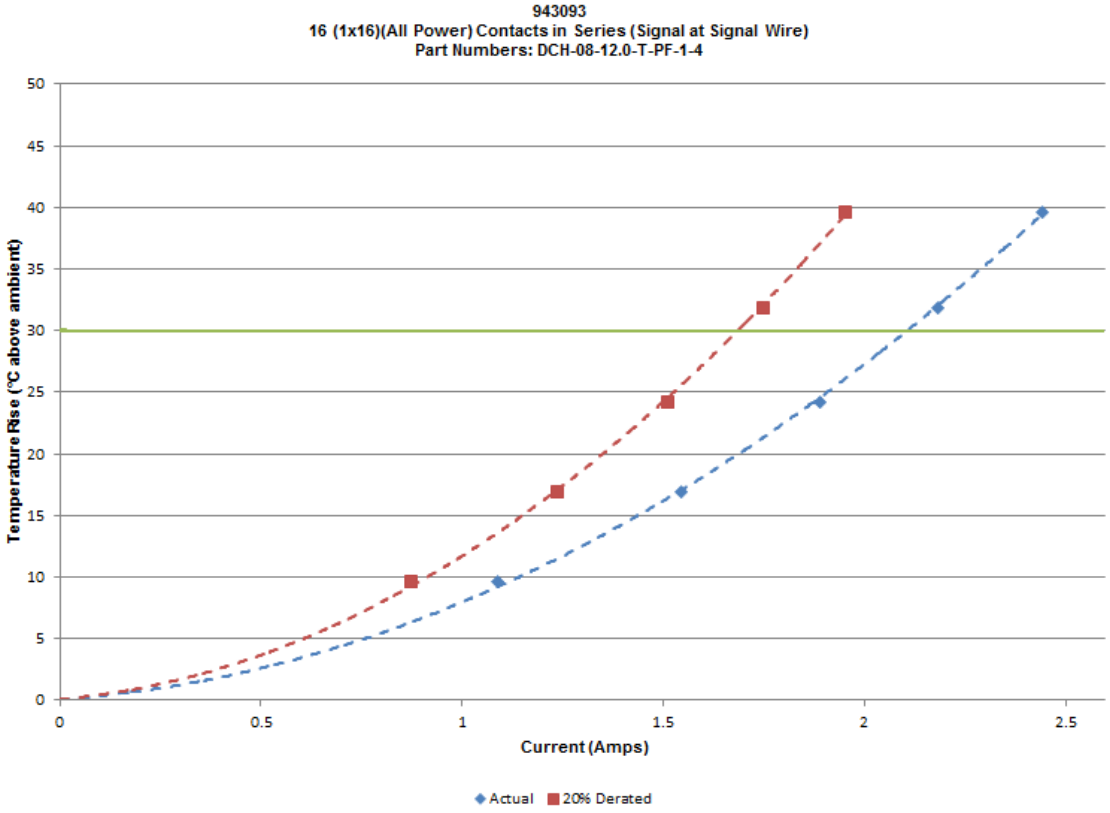




DATA SUMMARIES

e. Linear configuration with 16 adjacent power conductors/contacts powered

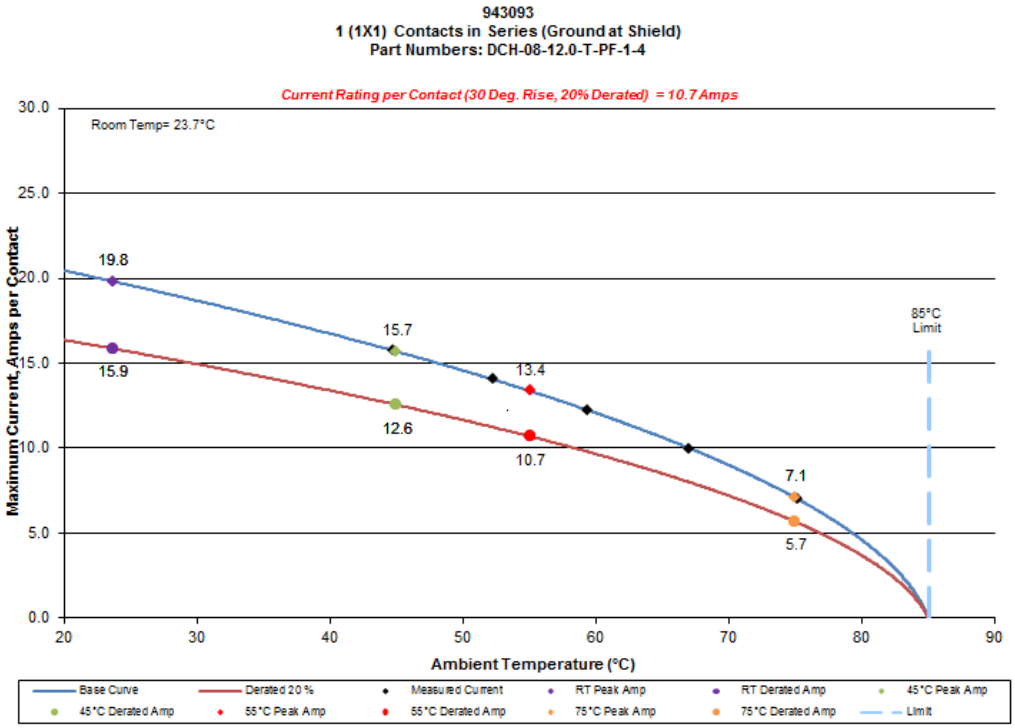


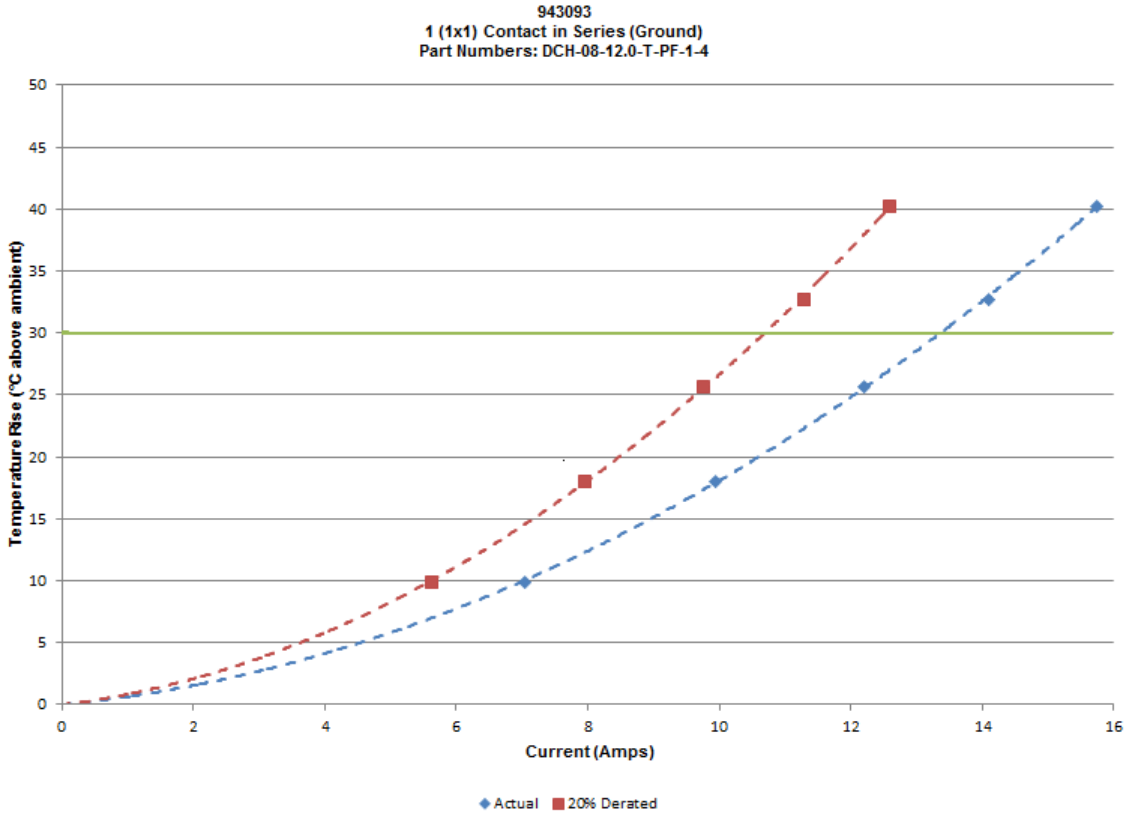


DATA SUMMARIES

Ground Pin

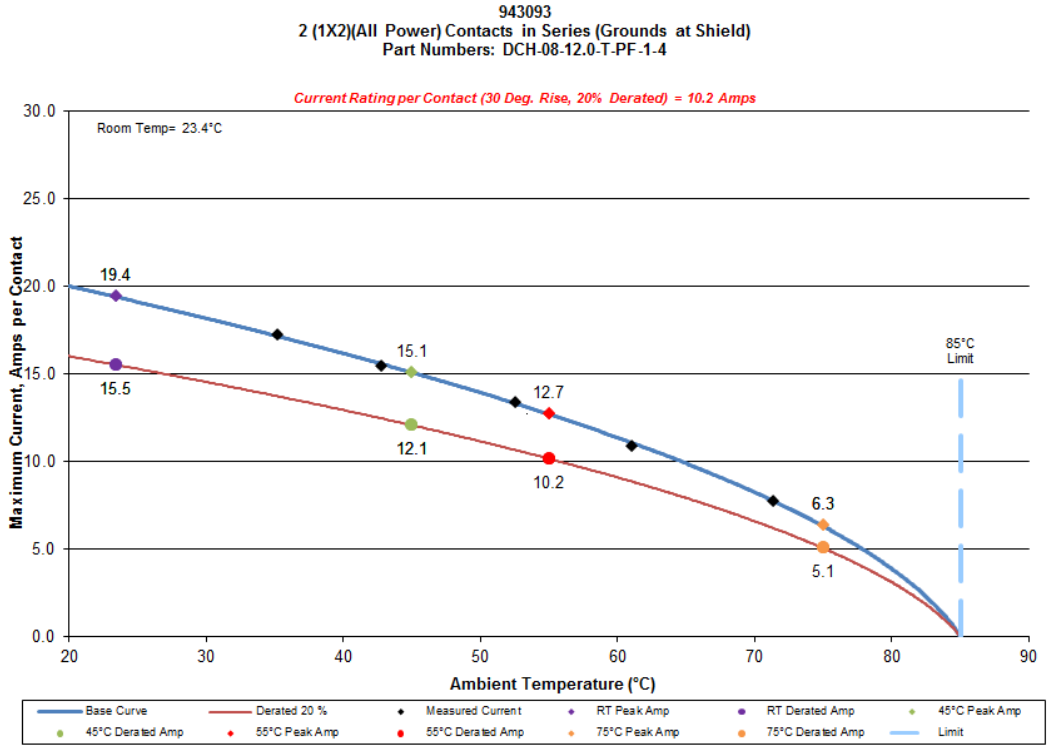
a. Linear configuration with 1 adjacent power conductors/contacts powered

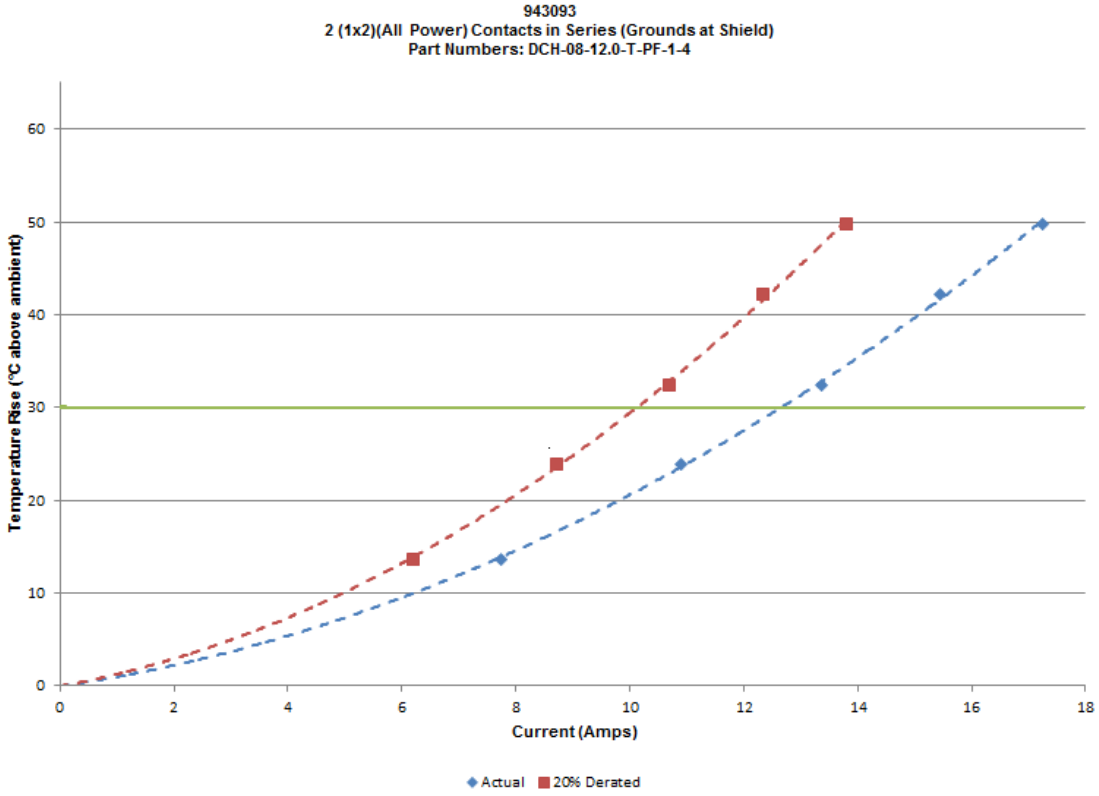




DATA SUMMARIES

b. Linear configuration with 2 adjacent power conductors/contacts powered

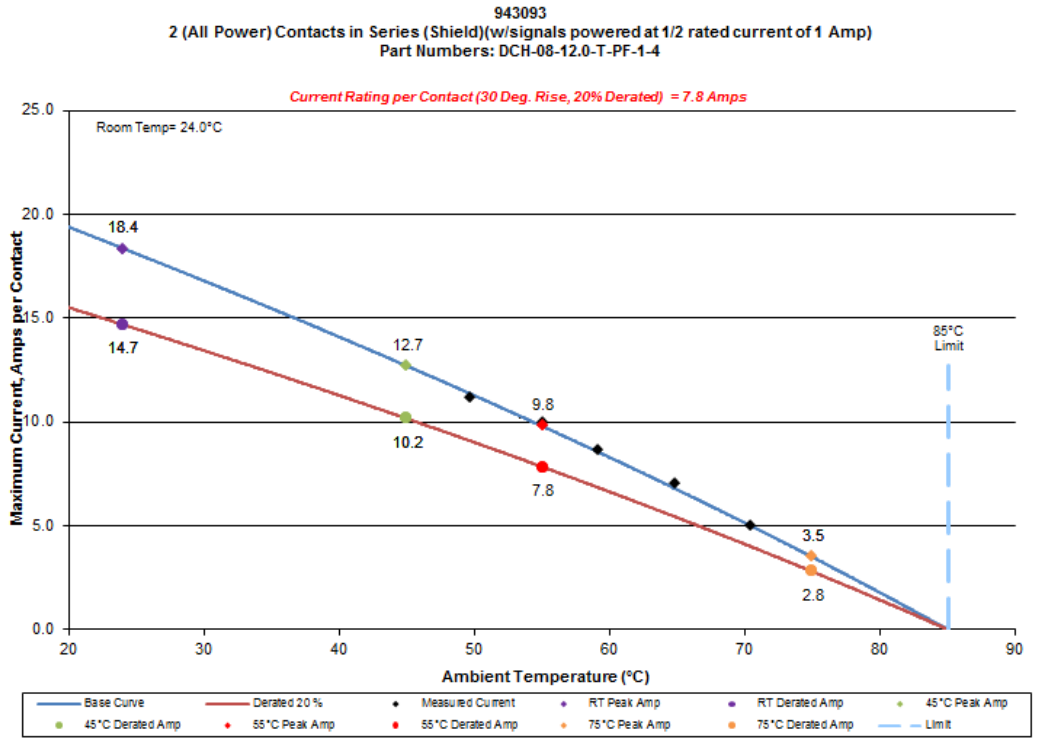


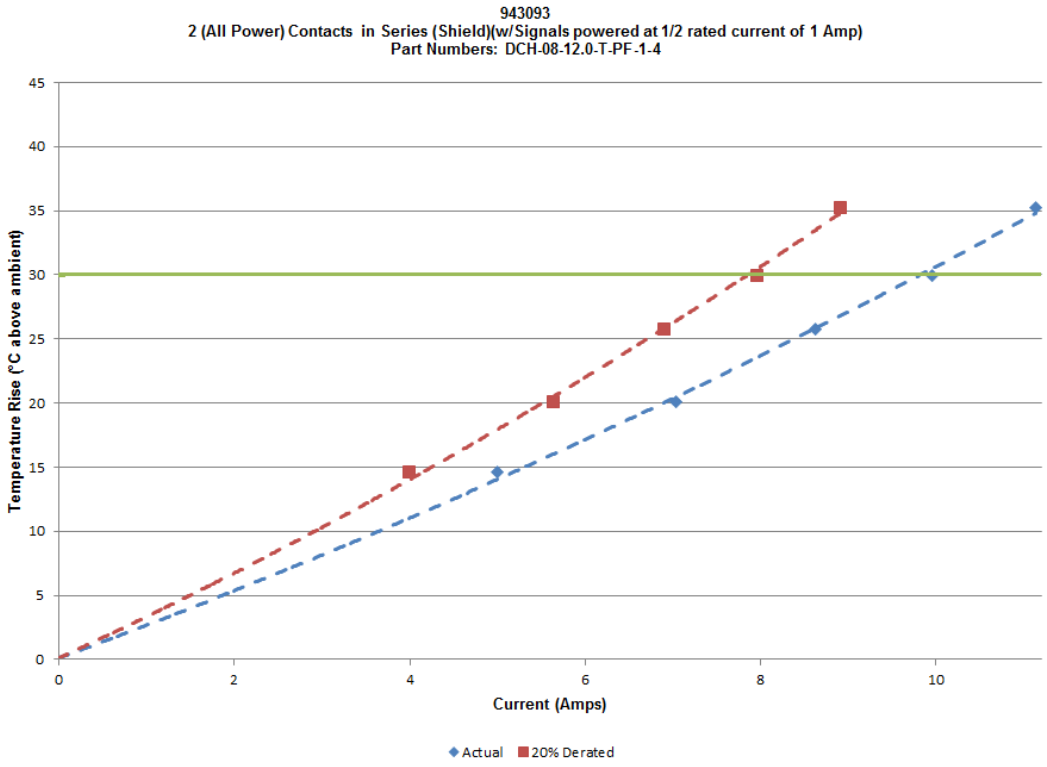


DATA SUMMARIES

All Power

a. Linear configuration with All adjacent power conductors/contacts powered





DATA SUMMARIES

Cable Pull Force:

0° Pull

	Force (lbs)
Minimum	**31.07**
Maximum	34.70
Average	32.54

90° Pull

	Force (lbs)
Minimum	**8.44**
Maximum	9.89
Average	9.07

DATA SUMMARIES Continued

Compliant pin Insertion/Retention force:

Signal - HASL 0.012"

	Pin 1				Pin 2			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	9.52	2.14	4.53	1.02	7.81	1.76	4.25	0.96
Maximum	11.55	2.60	6.43	1.45	9.74	2.19	6.20	1.39
Average	10.56	**2.37**	5.64	**1.27**	8.67	**1.95**	5.10	**1.15**
St Dev	0.49	0.11	0.45	0.10	0.50	0.11	0.51	0.11
Count	30	30	30	30	30	30	30	30

	Pin 3			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	7.35	1.65	4.18	0.94
Maximum	9.27	2.08	6.12	1.37
Average	8.18	**1.84**	5.19	**1.17**
St Dev	0.46	0.10	0.47	0.10
Count	30	30	30	30

Signal - HASL 0.016"

	Pin 1				Pin 2			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	4.87	1.09	3.36	0.76	4.81	1.08	3.64	0.82
Maximum	6.49	1.46	5.50	1.24	6.25	1.40	5.35	1.20
Average	5.55	**1.25**	4.32	**0.97**	5.52	**1.24**	4.34	**0.98**
St Dev	0.40	0.09	0.51	0.11	0.40	0.09	0.43	0.10
Count	30	30	30	30	30	30	30	30

	Pin 3			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	4.79	1.08	3.61	0.81
Maximum	6.44	1.45	5.12	1.15
Average	5.48	**1.23**	4.36	**0.98**
St Dev	0.42	0.10	0.47	0.10
Count	30	30	30	30

DATA SUMMARIES Continued

Signal - ENIG 0.016"

	Pin 1				Pin 2			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	4.00	0.90	2.43	0.55	4.02	0.90	2.67	0.60
Maximum	5.05	1.14	3.35	0.75	5.21	1.17	3.67	0.82
Average	4.51	**1.01**	2.94	**0.66**	4.43	**1.00**	3.11	**0.70**
St Dev	0.24	0.05	0.26	0.06	0.28	0.06	0.28	0.06
Count	30	30	30	30	30	30	30	30

	Pin 3			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	3.45	0.78	2.52	0.57
Maximum	4.80	1.08	3.88	0.87
Average	4.37	**0.98**	3.16	**0.71**
St Dev	0.29	0.07	0.32	0.07
Count	30	30	30	30

DATA SUMMARIES Continued

Ground - HASL 0.016"

	Pin 1				Pin 2			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	23.13	5.20	4.71	1.06	18.99	4.27	5.75	1.29
Maximum	28.64	6.44	9.52	2.14	23.46	5.27	9.54	2.15
Average	24.72	**5.56**	7.74	**1.74**	20.92	**4.70**	7.68	**1.73**
St Dev	1.46	0.33	1.12	0.25	1.37	0.31	1.00	0.23
Count	30	30	30	30	30	30	30	30

	Pin 3			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	17.22	3.87	5.07	1.14
Maximum	22.51	5.06	9.15	2.06
Average	20.13	**4.53**	7.61	**1.71**
St Dev	1.25	0.28	1.10	0.25
Count	30	30	30	30

Ground- HASL 0.020"

	Pin 1				Pin 2			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	3.50	0.79	2.29	0.51	2.55	0.57	1.93	0.43
Maximum	5.92	1.33	3.88	0.87	5.10	1.15	3.90	0.88
Average	4.75	**1.07**	3.26	**0.73**	3.63	**0.82**	3.02	**0.68**
St Dev	0.70	0.16	0.44	0.10	0.57	0.13	0.48	0.11
Count	30	30	30	30	30	30	30	30

	Pin 3			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.22	0.50	1.82	0.41
Maximum	4.33	0.97	3.61	0.81
Average	3.23	**0.73**	2.67	**0.60**
St Dev	0.59	0.13	0.48	0.11
Count	30	30	30	30

DATA SUMMARIES Continued

Ground - ENIG 0.020"

	Pin 1				Pin 2			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.38	0.54	1.87	0.42	1.94	0.44	1.79	0.40
Maximum	3.56	0.80	2.85	0.64	3.66	0.82	2.98	0.67
Average	2.99	**0.67**	2.41	**0.54**	2.69	**0.61**	2.31	**0.52**
St Dev	0.35	0.08	0.26	0.06	0.34	0.08	0.32	0.07
Count	30	30	30	30	30	30	30	30

	Pin 3			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	1.97	0.44	1.65	0.37
Maximum	3.05	0.69	2.88	0.65
Average	2.43	**0.55**	2.08	**0.47**
St Dev	0.33	0.07	0.31	0.07
Count	30	30	30	30

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	**DCH/PCB**	**DCH**	**PCB**
Initial	45000	Not Tested	Not Tested
Thermal	45000	Not Tested	Not Tested
Humidity	45000	Not Tested	Not Tested

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	**DCH/PCB**	**DCH**	**PCB**
Initial	45000	Not Tested	Not Tested
Thermal	45000	Not Tested	Not Tested
Humidity	45000	Not Tested	Not Tested

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**DCH/PCB**
Break Down Voltage	926
Test Voltage	695
Working Voltage	230

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

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

DATA SUMMARIES Continued

LLCR Durabiltiy:

1) A total of 128 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only. Total 30 points were measured.
   a. <= +1.0 mOhms:---------- Stable
   b. > +1.0 mOhms: ---------- Unstable

	LLCR Measurement Summaries by Pin Type			
Date	10/12/2016		10/19/2016	11/3/2016
Room Temp (Deg C)	23		22	22
Rel Humidity (%)	40		49	43
Technician	Tony Wagoner		Tony Wagoner	Tony Wagoner
mOhm values	**Actual Initial**	**Delta**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	50.87		0.09	0.18
St. Dev.	0.13		0.04	0.08
Min	50.57		0.01	0.04
Max	51.23		0.30	0.53
Summary Count	112		112	112
Total Count	112		112	112
	Pin Type 2: Ground			
Average	12.53		1.61	0.71
St. Dev.	0.50		0.56	0.44
Min	11.83		0.43	0.09
Max	13.38		2.31	1.58
Summary Count	16		16	16
Total Count	16		16	16

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Therm Shck	**128**	**0**	**0**	**0**	**0**	**0**
Humidity	**128**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Signal Pin-Compliant LLCR (ENIG 0.016"):

	LLCR Measurement Summaries by Pin Type			
Date	10/13/2016		10/19/2016	11/3/2016
Room Temp (Deg C)	22		22	22
Rel Humidity (%)	41		49	43
Technician	Tony Wagoner		Tony Wagoner	Tony Wagoner
mOhm values	**Actual Initial**	**Delta**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	0.16		0.02	0.03
St. Dev.	0.02		0.01	0.02
Min	0.11		0.00	0.00
Max	0.19		0.04	0.09
Summary Count	30		30	30
Total Count	30		30	30

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
Therm Shck	**30**	**0**	**0**	**0**	**0**	**0**
Humidity	**30**	**0**	**0**	**0**	**0**	**0**

Ground Pin- Compliant LLCR (ENIG 0.020"):

	LLCR Measurement Summaries by Pin Type			
Date	10/19/2016		10/19/2016	11/3/2016
Room Temp (Deg C)	22		22	22
Rel Humidity (%)	49		49	43
Technician	Tony Wagoner		Tony Wagoner	Tony Wagoner
mOhm values	**Actual Initial**	**Delta**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	0.19		0.04	0.07
St. Dev.	0.06		0.05	0.04
Min	0.10		0.00	0.02
Max	0.38		0.17	0.18
Summary Count	30		30	30
Total Count	30		30	30

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
Therm Shck	**30**	**0**	**0**	**0**	**0**	**0**
Humidity	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR thermal aging

1) A total of 128 points were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only. Total 30 points were measured.

   a. <= +1.0 mOhms:---------- Stable
   b. > +1.0 mOhms: ---------- Unstable

	LLCR Measurement Summaries by Pin Type			
Date	10/14/2016	10/25/2016		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	40	36		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	50.98	0.07		
St. Dev.	0.51	0.10		
Min	50.60	0.00		
Max	54.96	0.37		
Summary Count	112	112		
Total Count	112	112		
	Pin Type 2: Ground			
Average	12.95	0.33		
St. Dev.	0.34	0.19		
Min	12.35	0.02		
Max	13.40	0.69		
Summary Count	16	16		
Total Count	16	16		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal	**128**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Signal Pin- Compliant LLCR (ENIG 0.016"):

	LLCR Measurement Summaries by Pin Type			
Date	10/17/2016	10/25/2016		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	40	36		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.15	0.02		
St. Dev.	0.02	0.01		
Min	0.12	0.00		
Max	0.18	0.04		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
Thermal	**30**	**0**	**0**	**0**	**0**	**0**

Ground Pin- Compliant LLCR (ENIG 0.020"):

	LLCR Measurement Summaries by Pin Type			
Date	10/14/2016	10/25/2016		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	40	36		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.12	0.02		
St. Dev.	0.09	0.01		
Min	0.03	0.00		
Max	0.37	0.03		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
Thermal	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR GAS TIGHT:

1) A total of 128 points were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only. Total 30 points were measured.
   a. <= +1.0 mOhms:---------- Stable
   b. > +1.0 mOhms: ---------- Unstable

LLCR Measurement Summaries by Pin Type				
Date	10/17/2016	10/17/2016		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	45	46		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	50.55	0.89		
St. Dev.	0.15	0.15		
Min	50.25	0.49		
Max	51.02	1.19		
Summary Count	112	112		
Total Count	112	112		
	Pin Type 2: Ground			
Average	13.50	0.39		
St. Dev.	0.52	0.24		
Min	12.29	0.08		
Max	14.47	0.90		
Summary Count	16	16		
Total Count	16	16		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**128**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Signal Pin- Compliant LLCR (ENIG 0.016"):

	LLCR Measurement Summaries by Pin Type			
Date	10/17/2016	10/17/2016		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	45	45		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.15	0.02		
St. Dev.	0.02	0.01		
Min	0.11	0.00		
Max	0.19	0.04		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**30**	**0**	**0**	**0**	**0**	**0**

Ground Pin_ Compliant LLCR (ENIG 0.020"):

	LLCR Measurement Summaries by Pin Type			
Date	10/17/2016	10/17/2016		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	45	45		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.21	0.02		
St. Dev.	0.07	0.01		
Min	0.12	0.00		
Max	0.41	0.03		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock Vib:

1) A total of 128 points were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only. Total 30 points were measured.
   c. <= +1.0 mOhms:---------- Stable
   d. > +1.0 mOhms: ---------- Unstable

LLCR Measurement Summaries by Pin Type				
Date	10/25/2016	10/27/2016		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	35	41		
Technician	Toiny Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	101.64	0.72		
St. Dev.	0.91	0.28		
Min	99.49	0.47		
Max	103.75	1.53		
Summary Count	112	112		
Total Count	112	112		
	Pin Type 2: Ground			
Average	23.14	0.49		
St. Dev.	0.55	0.40		
Min	22.46	0.04		
Max	24.58	1.34		
Summary Count	16	16		
Total Count	16	16		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**128**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Signal Pin- Compliant LLCR (ENIG 0.016"):

	LLCR Measurement Summaries by Pin Type			
Date	10/25/2016	10/27/2016		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	36	41		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.11	0.02		
St. Dev.	0.01	0.01		
Min	0.09	0.00		
Max	0.13	0.05		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**30**	**0**	**0**	**0**	**0**	**0**

Ground Pin_ Compliant LLCR (ENIG 0.020"):

	LLCR Measurement Summaries by Pin Type			
Date	10/25/2016	10/27/2016		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	36	41		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.12	0.01		
St. Dev.	0.09	0.01		
Min	0.01	0.00		
Max	0.34	0.04		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Shock Vibration Event Detection:

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

DATA SUMMARIES Continued

LLCR Insertion/Retention force:

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

Signal - HASL 0.012"

LLCR Measurement Summaries by Pin Type				
Date	9/6/2016	9/7/2016	9/7/2016	
Room Temp (Deg C)	23	22	22	
Rel Humidity (%)	48	50	50	
Technician	Tony Wagoner	Tony Wagoner	Tony Wagoner	
mOhm values	**Actual Initial**	**Delta 1 Cycle**	**Delta 2 Cycles**	**Delta**
	Pin Type 1: Signal			
Average	0.36	-0.01	0.04	
St. Dev.	0.05	0.05	0.08	
Min	0.24	-0.12	-0.12	
Max	0.45	0.09	0.22	
Summary Count	30	30	30	
Total Count	30	30	30	

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
1 Cycle	**30**	**0**	**0**	**0**	**0**	**0**
2 Cycles	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Signal - HASL 0.016"

	LLCR Measurement Summaries by Pin Type			
Date	9/6/2016	9/7/2016	9/7/2016	
Room Temp (Deg C)	23	22	22	
Rel Humidity (%)	48	50	50	
Technician	Tony Wagoner	Tony Wagoner	Tony Wagoner	
mOhm values	**Actual Initial**	**Delta 1 Cycle**	**Delta 2 Cycles**	**Delta**
	Pin Type 1: Signal			
Average	0.32	0.06	0.08	
St. Dev.	0.04	0.05	0.07	
Min	0.24	-0.02	-0.09	
Max	0.41	0.16	0.21	
Summary Count	30	30	30	
Total Count	30	30	30	

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
1 Cycle	**30**	**0**	**0**	**0**	**0**	**0**
2 Cycles	**30**	**0**	**0**	**0**	**0**	**0**

Signal - ENIG 0.016"

	LLCR Measurement Summaries by Pin Type			
Date	9/6/2016	9/7/2016	9/7/2016	
Room Temp (Deg C)	23	22	22	
Rel Humidity (%)	48	50	50	
Technician	Tony Wagoner	Tony Wagoner	Tony Wagoner	
mOhm values	**Actual Initial**	**Delta 1 Cycle**	**Delta 2 Cycles**	**Delta**
	Pin Type 1: Signal			
Average	0.26	0.04	0.04	
St. Dev.	0.03	0.04	0.05	
Min	0.19	-0.06	-0.05	
Max	0.31	0.09	0.20	
Summary Count	30	30	30	
Total Count	30	30	30	

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
1 Cycle	**30**	**0**	**0**	**0**	**0**	**0**
2 Cycles	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Ground - HASL 0.016"

	LLCR Measurement Summaries by Pin Type			
Date	9/6/2016	9/7/2016	9/7/2016	
Room Temp (Deg C)	23	22	22	
Rel Humidity (%)	48	50	50	
Technician	Tony Wagoner	Tony Wagoner	Tony Wagoner	
mOhm values	**Actual Initial**	**Delta 1 Cycle**	**Delta 2 Cycles**	**Delta**
	Pin Type 1: Ground			
Average	0.15	-0.08	-0.07	
St. Dev.	0.13	0.11	0.11	
Min	0.02	-0.32	-0.32	
Max	0.49	0.07	0.07	
Summary Count	30	30	30	
Total Count	30	30	30	

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
1 Cycle	**30**	**0**	**0**	**0**	**0**	**0**
2 Cycles	**30**	**0**	**0**	**0**	**0**	**0**

Ground - HASL 0.020"

	LLCR Measurement Summaries by Pin Type			
Date	9/6/2016	9/7/2016	9/7/2016	
Room Temp (Deg C)	23	22	22	
Rel Humidity (%)	48	50	50	
Technician	Tony Wagoner	Tony Wagoner	Tony Wagoner	
mOhm values	**Actual Initial**	**Delta 1 Cycle**	**Delta 2 Cycles**	**Delta**
	Pin Type 1: Ground			
Average	0.23	0.01	-0.01	
St. Dev.	0.17	0.06	0.08	
Min	0.02	-0.24	-0.31	
Max	0.59	0.15	0.16	
Summary Count	30	30	30	
Total Count	30	30	30	

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
1 Cycle	**30**	**0**	**0**	**0**	**0**	**0**
2 Cycles	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Ground – ENIG 0.020"

	LLCR Measurement Summaries by Pin Type			
Date	9/6/2016	9/7/2016	9/7/2016	
Room Temp (Deg C)	23	22	22	
Rel Humidity (%)	48	50	50	
Technician	Tony Wagoner	Tony Wagoner	Tony Wagoner	
mOhm values	**Actual Initial**	**Delta 1 Cycle**	**Delta 2 Cycles**	**Delta**
	Pin Type 1: Ground			
Average	0.04	-0.02	-0.02	
St. Dev.	0.02	0.03	0.03	
Min	0.01	-0.07	-0.08	
Max	0.07	0.04	0.02	
Summary Count	30	30	30	
Total Count	30	30	30	

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=.33**	**>.34 & <=.66**	**>.67 & <=1**	**>1& <=50**	**>50 & <=1000**	**>1000**
1 Cycle	**30**	**0**	**0**	**0**	**0**	**0**
2 Cycles	**30**	**0**	**0**	**0**	**0**	**0**

EQUIPMENT AND CALIBRATION SCHEDULES

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

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

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 04/30/2016, Next Cal: 04/30/2017

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

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

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

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-02
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0780546
Accuracy: Last Cal: 2014-6-16, Next Cal: 2015-6-16

Equipment #: PS-01
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 3329A-07330
Accuracy: Not calibrated

Equipment #: PS-02
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 2847A-04167
Accuracy: Not calibrated

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 2014-11-31, Next Cal: 2015-11-31

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 2014-07-9, Next Cal: 2015-7-9

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 2014-06-4, Next Cal: 2015-06-4