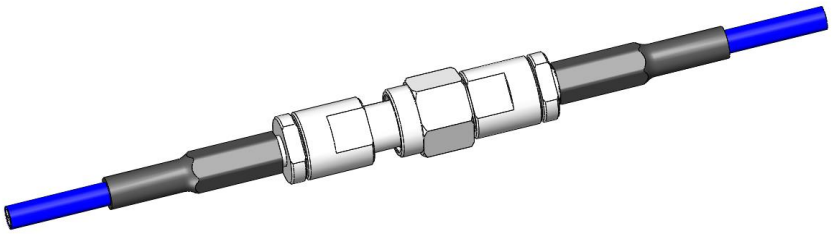
Project Number: Design Qualification Test Report	Tracking Code: 1174465_Report_Rev_2
Requested by: Alvin Wang	Date: 3/5/2018
Part #: RF23C-92SP-505050-0153/ RF23C-92SJ-505050-0153	
Part description: RF23C -92SP/ RF23C -92SJ	Tech: Peter Chen
Test Start: 6/5/2017	Test Completed: 8/7/2017



DESIGN QUALIFICATION TEST REPORT

RF23C -92SP/ RF23C -92SJ
RF23C-92SP-505050-0153/ RF23C-92SJ-505050-0153

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
8/24/2017	**1**	**Initial Issue**	**PC**
3/2/2018	**2**	**Updated the test plan and callout**	**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) Solder Information: Lead free
9) Samtec Test PCBs used: PCB-103219-TST.

FLOWCHARTS

Gas Tight

Group 1
RF23C-92SP-505050-0153
RF23C-92SJ-505050-0153
8 Assemblies

Step	Description
1.	LLCR(2) *Note: Signal and ground.*
2.	Gas Tight(1)
3.	LLCR(2) Max Delta = 15 mOhm *Note: Signal and ground.*

(1) Gas Tight = EIA-364-36

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

Normal Force

Group 1
292-J-C-H-ST-CU3-SKT
8 Contacts Minimum
Signal Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force(1) Deflection = 0.0022 " Expected Force at Max Deflection = 300 g

Group 2
292-J-C-H-ST-CU3-SKT
292-P-C-H-ST-CU3-PIN
8 Contacts Minimum
Signal With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age(2)
3.	Contact Gaps
4.	Normal Force(1) Deflection = 0.0022 " Expected Force at Max Deflection = 300 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

Group 1
RF23C-92SP-505050-0153
RF23C-92SJ-505050-0153
8 Assemblies

Step	Description
1.	Contact Gaps *Note: Signal.*
2.	LLCR(1) *Note: Signal and ground.*
3.	Thermal Age (2)
4.	LLCR(1) Max Delta = 15 mOhm *Note: Signal and ground.*
5.	Contact Gaps *Note: Signal.*

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

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

FLOWCHARTS Continued

Mating/Unmating/Durability

Group 1
RF23C-92SP-505050-0153
RF23C-92SJ-505050-0153
8 Assemblies

Step	Description
1.	Contact Gaps *Note: Signal.*
2.	LLCR(2) *Note: Signal and ground.*
3.	Cycles Quantity = 500 Cycles *Note: By hand;* *Rotate plug coupling nut only. Do not rotate entire assembly;* *Torque each time to 8 in-lbs.*
4.	Contact Gaps *Note: Signal.*
5.	LLCR(2) Max Delta = 15 mOhm *Note: Signal and ground.*
6.	Thermal Shock (3)
7.	LLCR(2) Max Delta = 15 mOhm *Note: Signal and ground.*
8.	Humidity (1)
9.	LLCR(2) Max Delta = 15 mOhm *Note: Signal and ground.*

(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 = EIA-364-32
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = I (-55°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued

IR/DWV

Pin-to-Ground

Group 1 RF23C-92SP-505050-0153 RF23C-92SJ-505050-0153 2 Assemblies		Group 2 RF23C-92SP-505050-0153 2 Assemblies		Group 3 RF40G-92SJP-505050-0153 2 Assemblies		Group 4 RF23C-92SP-505050-0153 RF23C-92SJ-505050-0153 2 Assemblies	
Step	**Description**	**Step**	**Description**	**Step**	**Description**	**Step**	**Description**
1.	DWV Breakdown (2)	1.	DWV Breakdown (2)	1.	DWV Breakdown (2)	1.	IR (4)
						2.	DWV at Test Voltage (1)
						3.	Thermal Shock (5)
						4.	IR (4)
						5.	DWV at Test Voltage (1)
						6.	Humidity (3)
						7.	IR (4)
						8.	DWV at Test Voltage (1)

(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 = EIA-364-32
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = I (-55°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued

Insertion/Withdrawal

Group 1

292-J-C-H-ST-CU3-SKT

8 Contacts Minimum
Insertion/Withdrawal

Step	Description
1.	Insertion Force Mating Pin = 0.940mm +.002/-.0000 IEEE Spec = VERIFY PER IEEE-287 (2007) PARAGRAPH 4.2 5 *Note: REFERENCE PRINT SPEC: MAXIMUM ALLOWABLE INSERTION FORCE: 15N (52.9OZF)*
2.	Withdrawal Force Mating Pin = 0.902mm +.0000/-.002 IEEE Spec = VERIFY PER IEEE-287 (2007) PARAGRAPH 4.2 5 *Note: REFERENCE PRINT SPEC: MINIMUM ALLOWABLE WITHDRAWAL FORCE: 0.4N (1.4OZF)*

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

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

THERMAL:

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

HUMIDITY:

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

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

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

GAS TIGHT:

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

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

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.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

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).

NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):

1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
2) The contacts shall be tested in the loose state, *not* inserted in connector housing.
3) The contacts shall be prepared to allow access to the spring member at the same attitude and deflection level as would occur in actual use.
4) In the event that portions of the contact prevent insertion of the test probe and/or deflection of the spring member under evaluation, said material shall be removed leaving the appropriate contact surfaces exposed.
5) In the case of multi-tine contacts, each tine shall be tested independently on separate samples as required.
6) The connector housing shall be simulated, if required, in order to provide an accurate representation of the actual contact system performance.
7) A holding fixture shall be fashioned to allow the contact to be properly deflected.
8) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC^2, computer controlled test stand with a deflection measurement system accuracy of 5 µm (0.0002”).
9) The probe shall be attached to a Dillon P/N 49761-0105, 5 N (1.1 Lb) load cell providing an accuracy of ± 0.2%.
10) The nominal deflection rate shall be 5 mm (0.2”)/minute.
11) Unless otherwise noted a minimum of five contacts shall be tested.
12) The force/deflection characteristic to load and unload each contact shall be repeated five times.
13) The system shall utilize the TC^2 software in order to acquire and record the test data.
14) The permanent set of each contact shall be measured within the TC^2 software.
15) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

RESULTS

Normal force

Signal pin at 0.0022 Inch deflections

- **Initial**
  - **Min ---------- 179.60 gf Set ----- 0.0000 Inch**
  - **Max ---------- 217.30 gf Set ----- 0.0000 Inch**
- **Thermal**
  - **Min ---------- 132.40 gf**
  - **Max ---------- 230.60 gf**

Insertion &Withdrawal Force

- **Insertion**
  - **Min ---------- 1.12 Lbs (4.99 Newtons)**
  - **Max ---------- 1.87 Lbs (8.33 Newtons)**
- **Withdrawal**
  - **Min ---------- 0.33 Lbs (1.34 Newtons)**
  - **Max ---------- 0.43 Lbs (1.92 Newtons)**

Insulation Resistance minimums, IR

Pin to Ground

- **Initial**
  - **Mated ---------- 10000 Meg Ω ---------- Passed**
  - **Unmated ---------- 10000 Meg Ω ---------- Passed**
- **Thermal Shock**
  - **Mated ---------- 10000 Meg Ω ---------- Passed**
  - **Unmated ---------- 10000 Meg Ω ---------- Passed**
- **Humidity**
  - **Mated ---------- 10000 Meg Ω ---------- Passed**
  - **Unmated ---------- 10000 Meg Ω ---------- Passed**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage ---------- 1125 VAC**
  - **Test Voltage ---------- 845 VAC**
  - **Working Voltage ---------- 280 VAC**

Pin to Ground

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

RESULTS Continued

LLCR Thermal Aging Group (16 LLCR test points)

Signal

- **Initial ---------- 24.19 mOhms Max**

Ground Pin:

- **Initial ---------- 13.78 mOhms Max**
- **Thermal**
  - **<= +5.0 mOhms ---------- 16 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Gas Tight Group (16 LLCR test points)

Signal

- **Initial ---------- 21.25 mOhms Max**

Ground

- **Initial ---------- 11.11 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 16 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Mating/Unmating Durability Group (16 LLCR test points)

Signal

- **Initial ---------- 20.73 mOhms Max**

Ground

- **Initial ---------- 11.09 mOhms Max**
- **Durability, 500 Cycles**
  - **<= +5.0 mOhms ---------- 16 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal Shock**
  - **<= +5.0 mOhms ---------- 16 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ---------- 16 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

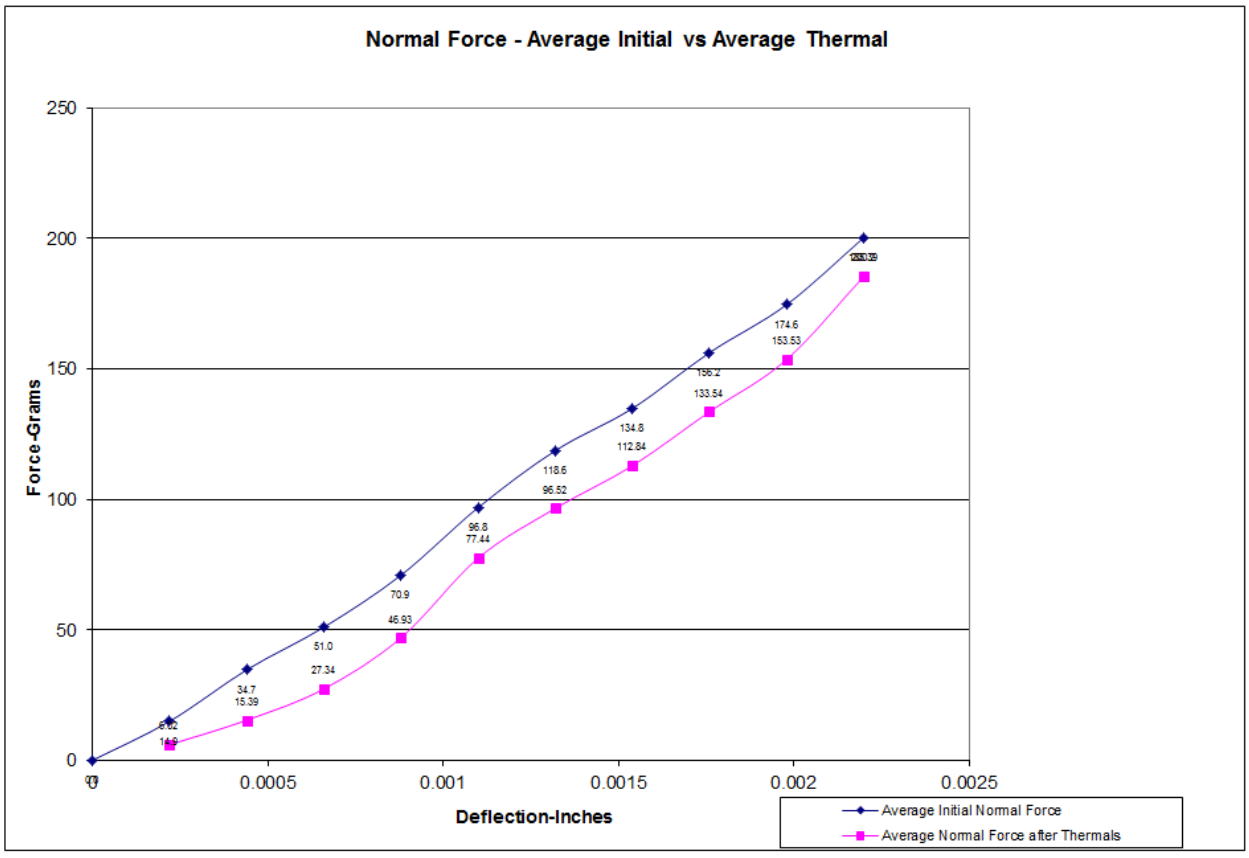
RESULTS Continued

Normal force

1) Calibrated force gauges are used along with computer controlled positioning equipment.
2) Typically, 8-10 readings are taken and the averages reported.

Initial	Deflections in inches Forces in Grams										
	0.0002	**0.0004**	**0.0007**	**0.0009**	**0.0011**	**0.0013**	**0.0015**	**0.0018**	**0.0020**	**0.0022**	***SET***
Averages	14.94	34.68	50.99	70.92	96.80	118.61	134.81	156.16	174.56	200.23	0.0000
Min	5.80	17.40	30.40	58.30	71.60	100.90	113.20	133.00	148.40	179.60	0.0000
Max	26.70	45.00	65.20	87.10	114.60	135.00	151.80	169.10	188.00	217.30	0.0000
St. Dev	7.396	9.366	9.777	8.178	12.344	9.959	10.219	10.074	11.129	11.172	0.0000
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflections in inches Forces in Grams										
	0.0002	**0.0004**	**0.0007**	**0.0009**	**0.0011**	**0.0013**	**0.0015**	**0.0018**	**0.0020**	**0.0022**	***SET***
Averages	6.02	15.39	27.34	46.93	77.44	96.52	112.84	133.54	153.53	185.39	0.0000
Min	-0.30	-0.20	-0.10	11.70	39.50	57.70	78.00	94.80	108.60	132.40	0.0000
Max	18.30	37.50	58.90	73.20	107.40	127.70	148.70	174.40	195.70	230.60	0.0003
St. Dev	7.059	14.164	19.981	22.725	22.696	23.031	22.411	24.375	28.232	34.497	0.0001
Count	11	11	11	11	11	11	11	11	11	11	11



DATA SUMMARIES

Insertion &Withdrawal Force

Insertion Force

	Force	
	lbs	newtons
Minimum	**1.12**	**4.99**
Maximum	1.87	8.33
Average	1.48	6.59

Withdrawal Force

	Force	
	lbs	newtons
Minimum	**0.33**	**1.34**
Maximum	0.43	1.92
Average	0.38	1.70

INSULATION RESISTANCE (IR):

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	**92SPP/92SJP**	**92SPP**	**92SJP**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**92SPP/92SJP**
Break Down Voltage	1125
Test Voltage	845
Working Voltage	280

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

DATA SUMMARIES Continued

LLCR Thermal Aging Group

1) A total of 16 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:----------Stable
   b. +5.1 to +10.0 mOhms:----------Minor
   c. +10.1 to +15.0 mOhms: ----------Acceptable
   d. +15.1 to +50.0 mOhms: ----------Marginal
   e. +50.1 to +2000 mOhms ----------Unstable
   f. >+2000 mOhms:----------Open Failure

LLCR Measurement Summaries by Pin Type				
Date	2017/6/9	2017/6/19		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	56	56		
Technician	Peter Chen	peter Chen		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	20.91	0.35		
St. Dev.	1.25	0.62		
Min	20.29	0.04		
Max	24.19	1.99		
Summary Count	8	8		
Total Count	8	8		
	Pin Type 2: Ground			
Average	9.98	1.15		
St. Dev.	1.80	0.55		
Min	8.44	0.00		
Max	13.78	1.89		
Summary Count	8	8		
Total Count	8	8		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal	**16**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Mating/Unmating Durability Group

1). A total of 16 points were measured.
2). EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3). A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4). The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:----------Stable
   b. +5.1 to +10.0 mOhms: ----------Minor
   c. +10.1 to +15.0 mOhms: ----------Acceptable
   d. +15.1 to +50.0 mOhms: ----------Marginal
   e. +50.1 to +2000 mOhms ----------Unstable
   f. > +2000 mOhms:----------Open Failure

	LLCR Measurement Summaries by Pin Type			
Date	2017/6/9	2017/6/19	2017/7/3	2017/8/7
Room Temp (Deg C)	23	23	23	23
Rel Humidity (%)	56	56	57	62
Technician	Peter Chen	peter Chen	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	20.35	0.25	0.30	0.28
St. Dev.	0.20	0.25	0.17	0.10
Min	20.02	0.00	0.20	0.19
Max	20.73	0.65	0.70	0.49
Summary Count	8	8	8	8
Total Count	8	8	8	8
	Pin Type 2: Ground			
Average	10.54	0.58	2.13	2.13
St. Dev.	0.39	0.44	0.54	0.54
Min	9.87	0.14	1.32	1.28
Max	11.09	1.50	2.97	2.96
Summary Count	8	8	8	8
Total Count	8	8	8	8

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
500 Cycles	**16**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**16**	**0**	**0**	**0**	**0**	**0**
Humidity	**16**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Gas Tight Group

1) A total of 16 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ----------Stable
   b. +5.1 to +10.0 mOhms:----------Minor
   c. +10.1 to +15.0 mOhms: ----------Acceptable
   d. +15.1 to +50.0 mOhms: ----------Marginal
   e. +50.1 to +2000 mOhms: ----------Unstable
   f. >+2000 mOhms:----------Open Failure

LLCR Measurement Summaries by Pin Type				
Date	2017/6/20	2017/6/26		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	56	65		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	20.65	0.54		
St. Dev.	0.27	0.83		
Min	20.40	0.04		
Max	21.25	2.54		
Summary Count	8	8		
Total Count	8	8		
	Pin Type 2: Ground			
Average	10.25	0.54		
St. Dev.	0.41	0.75		
Min	9.65	0.04		
Max	11.11	2.14		
Summary Count	8	8		
Total Count	8	8		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**16**	**0**	**0**	**0**	**0**	**0**

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 4/26/2017, Next Cal: 4/25/2018

Equipment #: HZ-OV-01
Description: Oven
Manufacturer: Huida
Model: CS101-1E
Serial #: CS101-1E-B
Accuracy: Last Cal: 12/13/2016, Next Cal: 12/12/2017

Equipment #: HZ-THC-01
Description: Humidity transmitter
Manufacturer: Thermtron
Model: SM-8-8200
Serial #: 38846
Accuracy: Last Cal: 2/28/2017, Next Cal: 2/27/2018

Equipment #: HZ-TSC-01
Description: Vertical Thermal Shock Chamber
Manufacturer: Cincinnatti Sub Zero
Model: VTS-3-6-6-SC/AC
Serial #: 10-VT14994
Accuracy: See Manual
… Last Cal: 06/28/2017, Next Cal: 06/27/2018

Equipment #: HZ-HPM-01
Description: NA9636H
Manufacturer: Ainuo
Model: 6031A
Serial #: 089601091
Accuracy: Last Cal: 3/7/2017, Next Cal: 3/6/2018

Equipment #: HZ-MO-05
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 3706
Serial #: 1285188
Accuracy: Last Cal: 11/15/2016, Next Cal: 11/14/2017