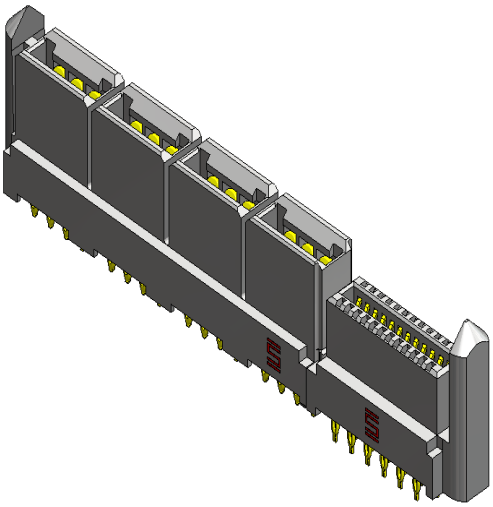
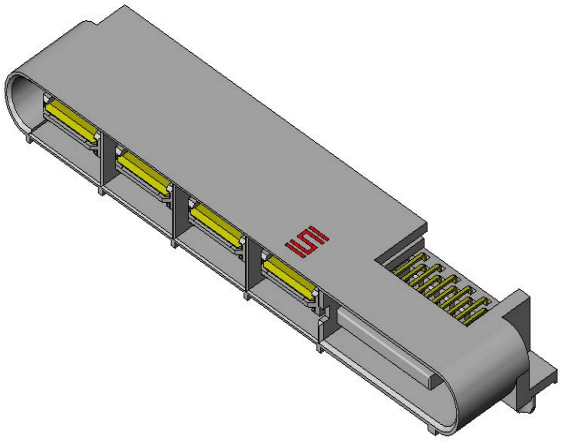
Project Number: Design Qualification Test Report	Tracking Code: 248727_Report_Rev_3
Requested by: Leo Lee	Date: 9/4/2015
Part #: LPHS-08-32-L-VP1-GP/LPHT-08-32-L-RT1-GP	
Part description: LPHS / LPHT	Tech: Peter Chen
Test Start: 03/20/2013	Test Completed: 05/10/2013





Design Qualification Test Report

LPHS / LPHT
LPHS-08-32-L-VP1-GP/LPHT-08-32-L-RT1-GP

REVISION HISTORY

DATE	REV.NUM.	DESCRIPTION	ENG
6/19/2013	**1**	**Initial Issue**	**PC**
7/20/2013	**2**	**Add the mating&unmating basic data**	**PC**
5/22/2015	**3**	**Add ELP testing data**	**KH**

CERTIFICATION

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

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SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR 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-104063-TST/ PCB-104071-TST/PCB-104381-TST.

FLOWCHARTS

Gas Tight

TEST STEP	GROUP A1 8 Boards, .0335"/.0422" ENIG PTH	GROUP B1 30 Points Each (min) Compliant Pin only, .0335"/.0422" ENIG PTH
01	LLCR-1	LLCR-1
02	Gas Tight	Gas Tight
03	LLCR-2	LLCR-2

Gas Tight = EIA-364-36A

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

Thermal Aging

TEST STEP	GROUP A1 8 Boards Thermal Aging (Mated), .0335"/.0422" ENIG PTH	GROUP B1 30 Points Each (min) Compliant Pin only, .0335"/.0422" ENIG PTH
01	Contact Gaps	LLCR-1
02	Forces - Mating / Unmating	Thermal Aging (Mated and Undisturbed)
03	LLCR-1	LLCR-2
04	Thermal Aging (Mated and Undisturbed)	
05	LLCR-2	
06	Forces - Mating / Unmating	
07	Contact Gaps	

Thermal Aging = EIA-364-17, Test Condition 4 (105°C)

Time Condition 'B' (250 Hours)

Mating / Unmating Forces = EIA-364-13

Contact Gaps / Height - No standard method. Usually measured optically.

Gaps to be taken on a minimum of 20% of each part tested

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

FLOWCHARTS Continued

Durability/Mating/Unmating/Gaps

TEST STEP	GROUP B1 8 Boards (largest position submitted), .0335"/.0422" ENIG PTH	GROUP B2 8 Boards (middle position submitted)	GROUP B3 8 Boards (smallest position submitted)
01	Contact Gaps	Contact Gaps	Contact Gaps
02	LLCR-1	Forces - Mating / Unmating	Forces - Mating / Unmating
03	Forces - Mating / Unmating	25 Cycles	25 Cycles
04	25 Cycles	Forces - Mating / Unmating	Forces - Mating / Unmating
05	Forces - Mating / Unmating	25 Cycles (50 Total)	25 Cycles (50 Total)
06	25 Cycles (50 Total)	Forces - Mating / Unmating	Forces - Mating / Unmating
07	Forces - Mating / Unmating	25 Cycles (75 Total)	25 Cycles (75 Total)
08	25 Cycles (75 Total)	Forces - Mating / Unmating	Forces - Mating / Unmating
09	Forces - Mating / Unmating	25 Cycles (100 Total)	25 Cycles (100 Total)
10	25 Cycles (100 Total)	Forces - Mating / Unmating	Forces - Mating / Unmating
11	Forces - Mating / Unmating		
12	Clean w/Compressed Air		
13	Contact Gaps		
14	LLCR-2		
15	Thermal Shock (Mated and Undisturbed)		
16	LLCR-3		
17	Cyclic Humidity (Mated and Undisturbed)		
18	LLCR-4		
19	Forces - Mating / Unmating		

Thermal Shock = EIA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

Humidity = EIA-364-31, Test Condition B (240 Hours)

and Method III (+25°C to +65°C @ 90% RH to 98% RH)

ambient pre-condition and delete steps 7a and 7b

Mating / Unmating Forces = EIA-364-13

Contact Gaps / Height - No standard method. Usually measured optically.

Gaps to be taken on a minimum of 20% of each part tested

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

FLOWCHARTS Continued

IR & DWV

TEST STEP	GROUP A1 2 Mated Sets Break Down Pin-to-Pin (Signal Pin) .0335"/.0422" ENIG PTH	GROUP A2 2 Unmated of Part # Being Tested Break Down Pin-to-Pin (Signal Pin) .0335"/.0422" ENIG PTH	GROUP A3 2 Unmated of Mating Part # Break Down Pin-to-Pin (Signal Pin) .0335"/.0422" ENIG PTH	GROUP B1 2 Mated Sets Pin-to-Pin (Signal Pin) .0335"/.0422" ENIG PTH
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

TEST STEP	GROUP C1 2 Mated Sets Break Down Row-to-Row (Signal Pin) .0335"/.0422" ENIG PTH	GROUP C2 2 Unmated of Part # Being Tested Break Down Row-to-Row (Signal Pin) .0335"/.0422" ENIG PTH	GROUP C3 2 Unmated of Mating Part # Break Down Row-to-Row (Signal Pin) .0335"/.0422" ENIG PTH	GROUP D1 2 Mated Sets Row-to-Row (Signal Pin) .0335"/.0422" ENIG PTH
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

FLOWCHARTS Continued

TEST STEP	GROUP E1 2 Mated Sets Break Down Power-to-Power .0335"/.0422" ENIG PTH	GROUP E2 2 Unmated of Part # Being Tested Break Down Power-to-Power .0335"/.0422" ENIG PTH	GROUP E3 2 Unmated of Mating Part # Break Down Power-to-Power .0335"/.0422" ENIG PTH	GROUP F1 2 Mated Sets Power-to-Power .0335"/.0422" ENIG PTH
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

TEST STEP	GROUP G1 2 Mated Sets Break Down Signal-to-Power .0335"/.0422" ENIG PTH	GROUP G2 2 Unmated of Part # Being Tested Break Down Signal-to-Power .0335"/.0422" ENIG PTH	GROUP G3 2 Unmated of Mating Part # Break Down Signal-to-Power .0335"/.0422" ENIG PTH	GROUP H1 2 Mated Sets Signal-to-Power .0335"/.0422" ENIG PTH
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

DWV on Group B1 to be performed at Test Voltage

DWV test voltage is equal to 75% of the lowest break down voltage from Groups A1, A2 or A3

Thermal Shock = EIA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

Humidity = EIA-364-31, Test Condition B (240 Hours)

and Method III (+25°C to +65°C @ 90% RH to 98% RH)

ambient pre-condition and delete steps 7a and 7b

IR = EIA-364-21

DWV = EIA-364-20, Test Condition 1

FLOWCHARTS Continued

Current Carrying Capacity - Power Pins

TEST STEP	GROUP A1 3 Mated Assemblies 2 Contact Powered .0335"/.0422" ENIG PTH	GROUP A2 3 Mated Assemblies 4 Contacts Powered .0335"/.0422" ENIG PTH	GROUP A3 3 Mated Assemblies 6 Contacts Powered .0335"/.0422" ENIG PTH	GROUP A4 3 Mated Assemblies All Contacts Powered .0335"/.0422" ENIG PTH
01	CCC	CCC	CCC	CCC

Current Carrying Capacity - Singal Pins

TEST STEP	GROUP D1 3 Mated Assemblies 2 Pins Powered .0335"/.0422" ENIG PTH	GROUP D2 3 Mated Assemblies 4 Pins Powered .0335"/.0422" ENIG PTH	GROUP D3 3 Mated Assemblies 6 Pins Powered .0335"/.0422" ENIG PTH	GROUP D4 3 Mated Assemblies 8 Pins Powered .0335"/.0422" ENIG PTH	GROUP D5 3 Mated Assemblies All Contacts Powered .0335"/.0422" ENIG PTH
01	CCC	CCC	CCC	CCC	CCC

Current Carrying Capacity - Power and Signal Pins

TEST STEP	GROUP E1 3 Mated Assemblies Signal Pins @ 1/2 rated current from Group D5 Power Pins - All Contacts Powered .0335"/.0422" ENIG PTH
01	CCC

(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
CCC, Temp rise = EIA-364-70

Mechanical Shock / Vibration / LLCR

TEST STEP	GROUP A1 8 Boards .0335"/.0422" ENIG PTH	GROUP B1 30 Points Each min, Compliant only, .0335"/.0422" ENIG PTH
01	LLCR-1	LLCR-1
02	Shock	Shock
03	Vibration	Vibration
04	LLCR-2	LLCR-2

Mechanical Shock = EIA 364-27 Half Sine,

100 g's, 6 milliSeconds (Condition "C") each axis

Vibration = EIA 364-28, Random Vibration

7.56 g RMS, Condition VB --- 2 hours/axis

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

FLOWCHARTS Continued

Shock / Vibration / nanoSecond Event Detection

TEST STEP	GROUP A1 60 Points .0335"/.0422" ENIG PTH
01	Event Detection, Shock
02	Event Detection, Vibration

Mechanical Shock = EIA 364-27 Half Sine,

100 g's, 6 milliSeconds (Condition "C") each axis

Vibration = EIA 364-28, Random Vibration

7.56 g RMS, Condition VB --- 2 hours/axis

Event detection requirement during Shock / Vibration is 50 nanoseconds minimum

Compliant Pin Insertion/Withdraw

TEST STEP	GROUP A1 180 Points (30 Each Pin Type per cycle, individual pins) Insertion/Retention force Min PTH (.0295"/.0382" dia)–HASL	GROUP A2 180 Points (30 Each Pin Type per cycle, individual pins) Insertion/Retention force Max PTH (.0335"/.0422" dia)-HASL	GROUP B1 180 Points (30 Each Pin Type per cycle, individual pins) Insertion/Retention force Max PTH (.0335"/.0422" dia)–ENIG
01	measure and record the compiant pin (width only)	measure and record the compiant pin (width only)	measure and record the compiant pin (width only)
02	Measure/record PTH hole diameter to determine it is smallest diameter permissible.	Measure/record PTH hole diameter to determine it is largest diameter permissible.	Measure/record PTH hole diameter to determine it is largest diameter permissible.
03	**1st Cycle**	**1 Cycle**	**1 Cycle**
04	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data
05	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data
06	**2nd Cycle (Use new compliant pin, same hole)**	**2nd Cycle (Use new compliant pin, same hole)**	**2nd Cycle (Use new compliant pin, same hole)**
07	measure and record the compiant pin (width only)	Measure Compliant pin size	Measure Compliant pin size
08	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data
09	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data
10	**3rd Cycle (Use new compliant pin, same hole)**	**3rd Cycle (Use new compliant pin, same hole)**	**3rd Cycle (Use new compliant pin, same hole)**
11	measure and record the compiant pin (width only)	Measure Compliant pin size	Measure Compliant pin size
12	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data	Fixture and press pin into PTH, Record data
13	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data	Fixture and remove pin from PTH, Record data
14	**photo inspection of vias (check for cracked barrel)**	**photo inspection of vias (check for cracked barrel)**	**photo inspection of vias (check for cracked barrel)**

Insertion/Retention Forces = EIA-364-13

FLOWCHARTS Continued

Extended Life

Group 1
LPHS-08-32-S-VP1-GP
LPHT-08-32-S-RT1-GP
8 Assemblies
250 Cycles

Step	Description
1.	Plating Thickness Verification (4)
2.	LLCR (2)
3.	Cycles Quantity = 250 Cycles
4.	LLCR (2) Max Delta = 15 mOhm
5.	Thermal Shock (5)
6.	LLCR (2) Max Delta = 15 mOhm
7.	Humidity (1)
8.	LLCR (2) Max Delta = 15 mOhm
9.	Photos (3)

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

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

(3) Photos
Attach 2-3 photos of contact area

(4) Plating Thickness Verification
Measure, verify, and document plating thickness on both male and female (one group only)
Plating thickness to be measured on loose pins used during assembly

(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)

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

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

THERMAL:

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

HUMIDITY:

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

MECHANICAL SHOCK (Specified Pulse):

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

VIBRATION:

1) Reference document: EIA-364-28, *Vibration Test Procedure for Electrical Connectors*
2) Test Condition V, Letter B
3) Power Spectral Density: 0.04 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.

MATING/UNMATING:

1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

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

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

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.

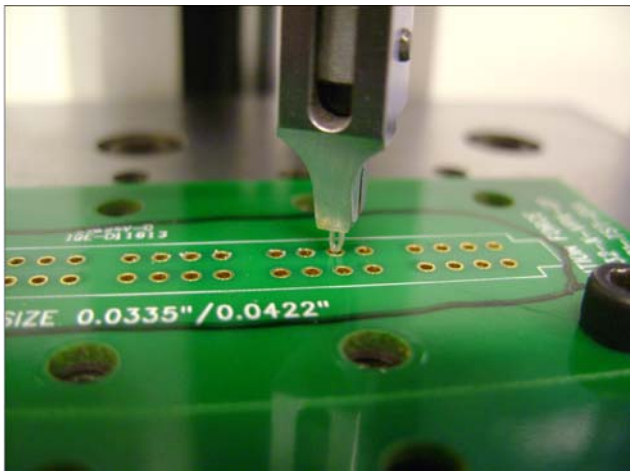
1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- 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.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

ENGAGEMENT/SEPARATION (FOR CONTACTS TESTED OUT OF THE HOUSING):

1) Reference document: EIA-364-37, *Contact Engagement and Separation Force Test Procedure for Electrical Connectors*.
2) Unless otherwise noted a minimum of twenty-five contacts shall be tested.
3) The insertion/withdrawal forces for each contact shall be repeated five times.
4) The contacts shall be tested in the loose state, *not* inserted in connector housing.
5) 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.
6) 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 resolution of 5.0 µm (0.0002”).
7) The probe shall be attached to a load cell providing a typical accuracy of ± 0.2%.
8) The deflection rate shall be 5 mm (0.2”)/minute nominal (not to exceed 2”/min).
9) The system shall utilize the TC^2 software in order to acquire and record the test data.
10) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis.



Compliant pin insertion and withdraw force test photo

RESULTS

Temperature Rise, CCC at a 20% de-rating

Power pin

- **CCC for a 30°C Temperature Rise ---------- 30.8 A per contact with 2 adjacent power contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 28.5 A per contact with 4 adjacent power contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 25.3 A per contact with 6 adjacent power contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 23.6 A per contact with All adjacent power contacts powered**

Signal pin

- **CCC for a 30°C Temperature Rise ---------- 2.5 A per contact with 2 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 2.1 A per contact with 4 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 1.8 A per contact with 6 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 1.7 A per contact with 8 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 1.0 A per contact with all adjacent signal contacts powered**

Power Pin powered while signal pin @ 1/2 rated current at 0.65 Amps

- **CCC for a 30°C Temperature Rise ---------- 23.1 A per contact with All adjacent power contacts powered**

Mating & Unmating force

Thermal aging (LPHS-08-32-L-VP1-GP/LPHT-08-32-L-RT1-GP)

- **Initial**
  - **Mating**
    - **Min ----------11.61 Lbs**
    - **Max----------12.47 Lbs**
  - **Unmating**
    - **Min ---------- 6.59 Lbs**
    - **Max---------- 7.88 Lbs**
- **After thermal aging**
  - **Mating**
    - **Min ---------- 6.09 Lbs**
    - **Max---------- 7.39 Lbs**
  - **Unmating**
    - **Min ---------- 4.37 Lbs**
    - **Max---------- 5.17 Lbs**

RESULTS Continued

Mating&Unmating durability (LPHS-08-32-L-VP1-GP/LPHT-08-32-L-RT1-GP):

- **Initial**
  - **Mating**
    - **Min ----------10.09 Lbs**
    - **Max----------11.28 Lbs**
  - **Unmating**
    - **Min ---------- 6.77 Lbs**
    - **Max---------- 7.65 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ----------11.01 Lbs**
    - **Max----------12.36 Lbs**
  - **Unmating**
    - **Min ---------- 7.21 Lbs**
    - **Max---------- 8.90 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ----------11.29 Lbs**
    - **Max----------12.86 Lbs**
  - **Unmating**
    - **Min ---------- 7.84 Lbs**
    - **Max---------- 9.50 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ----------11.89 Lbs**
    - **Max----------13.07 Lbs**
  - **Unmating**
    - **Min ---------- 8.21 Lbs**
    - **Max----------10.05 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ----------12.23 Lbs**
    - **Max----------13.54 Lbs**
  - **Unmating**
    - **Min ---------- 8.57 Lbs**
    - **Max----------10.40 Lbs**
- **After Humidity**
  - **Mating**
    - **Min ---------- 7.41 Lbs**
    - **Max---------- 9.09 Lbs**
  - **Unmating**
    - **Min ---------- 4.87 Lbs**
    - **Max---------- 6.08 Lbs**

RESULTS Continued

Mating&Unmating basic (LPHS-06-24-L-VP1-GP/LPHT-06-24-L-RT1-GP):

- **Initial**
  - **Mating**
    - **Min ---------- 9.51 Lbs**
    - **Max----------10.63 Lbs**
  - **Unmating**
    - **Min ---------- 5.47 Lbs**
    - **Max---------- 6.33 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 9.54 Lbs**
    - **Max----------10.38 Lbs**
  - **Unmating**
    - **Min ---------- 6.01 Lbs**
    - **Max---------- 6.98 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 9.30 Lbs**
    - **Max----------10.35 Lbs**
  - **Unmating**
    - **Min ---------- 6.16 Lbs**
    - **Max---------- 7.15 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 9.43 Lbs**
    - **Max----------10.72 Lbs**
  - **Unmating**
    - **Min ---------- 6.40 Lbs**
    - **Max---------- 7.38 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 9.55 Lbs**
    - **Max----------10.69 Lbs**
  - **Unmating**
    - **Min ---------- 6.55 Lbs**
    - **Max---------- 7.61 Lbs**

RESULTS Continued

Mating&Unmating basic (LPHS-04-20-L-VP1-GP/LPHT-04-20-L-RT1-GP):

- **Initial**
  - **Mating**
    - **Min ---------- 6.46 Lbs**
    - **Max---------- 7.30 Lbs**
  - **Unmating**
    - **Min ---------- 3.94 Lbs**
    - **Max---------- 4.47 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 7.26 Lbs**
    - **Max---------- 7.88 Lbs**
  - **Unmating**
    - **Min ---------- 4.30 Lbs**
    - **Max---------- 5.38 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 7.28 Lbs**
    - **Max---------- 8.06 Lbs**
  - **Unmating**
    - **Min ---------- 4.87 Lbs**
    - **Max---------- 5.58 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 7.39 Lbs**
    - **Max---------- 8.03 Lbs**
  - **Unmating**
    - **Min ---------- 5.04 Lbs**
    - **Max---------- 5.73 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 7.46 Lbs**
    - **Max---------- 8.38 Lbs**
  - **Unmating**
    - **Min ---------- 5.17 Lbs**
    - **Max---------- 5.88 Lbs**

RESULTS Continued

PCB Hole Sizes

Power pin

PCB-104071-TST-01B-Min PTH -HASL-0.0382"

- **Min ---------- 0.0382 Inch**
- **Max---------- 0.0391 Inch**

PCB-104071-TST-01A-Max PTH -HASL-0.0422"

- **Min ---------- 0.0417 Inch**
- **Max---------- 0.0429 Inch**

PCB-104381-TST-01A- Max PTH -ENIG-0.0422"

- **Min ---------- 0.0413 Inch**
- **Max---------- 0.0422 Inch**

Signal pin

PCB-104071-TST-01B- Min PTH -HASL-0.0295"

- **Min ---------- 0.0303 Inch**
- **Max---------- 0.0309 Inch**

PCB-104071-TST-01A- Max PTH -HASL-0.0335"

- **Min ---------- 0.0339 Inch**
- **Max---------- 0.0349 Inch**

PCB-104381-TST-01A- Max PTH -ENIG-0.0335"

- **Min ---------- 0.0333 Inch**
- **Max---------- 0.0337 Inch**

Compliant pin width

Power pin

- **Min ---------- 0.0463 Inch**
- **Max---------- 0.0475 Inch**

Signal pin

- **Min ---------- 0.0371 Inch**
- **Max---------- 0.0379 Inch**

Compliant pin mating & unmating Forces

Power pin

PCB-104071-TST-01B-Min PTH -HASL-0.0382"

1 cycle

Mating

- **Min ----------13.09 Lbs**
- **Max----------15.75 Lbs**

Unmating

- **Min ---------- 4.85 Lbs**
- **Max---------- 7.65 Lbs**

2 cycles

Mating

- **Min ----------10.70 Lbs**
- **Max----------14.36 Lbs**

Unmating

- **Min ---------- 3.73 Lbs**
- **Max---------- 6.59 Lbs**

RESULTS Continued

3 cycles

Mating

- **Min ----------10.37 Lbs**
- **Max----------12.97 Lbs**

Unmating

- **Min ---------- 3.42 Lbs**
- **Max---------- 5.45 Lbs**

PCB-104071-TST-01A-Max PTH -HASL-0.0422"

1 cycle

Mating

- **Min ---------- 9.76 Lbs**
- **Max----------12.59 Lbs**

Unmating

- **Min ---------- 6.00 Lbs**
- **Max---------- 9.75 Lbs**

2 cycles

Mating

- **Min ---------- 7.69 Lbs**
- **Max----------10.80 Lbs**

Unmating

- **Min ---------- 4.91 Lbs**
- **Max---------- 8.98 Lbs**

3 cycles

Mating

- **Min ---------- 6.89 Lbs**
- **Max---------- 9.80 Lbs**

Unmating

- **Min ---------- 3.19 Lbs**
- **Max---------- 7.84 Lbs**

PCB-104381-TST-01A- Max PTH -ENIG-0.0422"

1 cycle

Mating

- **Min ---------- 8.27 Lbs**
- **Max---------- 9.94 Lbs**

Unmating

- **Min ---------- 3.87 Lbs**
- **Max---------- 5.51 Lbs**

2 cycles

Mating

- **Min ---------- 7.02 Lbs**
- **Max---------- 9.21 Lbs**

Unmating

- **Min ---------- 3.42 Lbs**
- **Max---------- 5.57 Lbs**

3 cycles

Mating

- **Min ---------- 6.62 Lbs**
- **Max---------- 8.38 Lbs**

Unmating

- **Min ---------- 3.24 Lbs**
- **Max---------- 5.85 Lbs**

RESULTS Continued

Signal pin

PCB-104071-TST-01B- Min PTH -HASL-0.0295"

1 cycle

Mating

- **Min ---------- 5.23 Lbs**
- **Max---------- 6.20 Lbs**

Unmating

- **Min ---------- 3.79 Lbs**
- **Max---------- 5.45 Lbs**

2 cycles

Mating

- **Min ---------- 5.05 Lbs**
- **Max---------- 6.01 Lbs**

Unmating

- **Min ---------- 3.90 Lbs**
- **Max---------- 5.14 Lbs**

3 cycles

Mating

- **Min ---------- 4.35 Lbs**
- **Max---------- 6.43 Lbs**

Unmating

- **Min ---------- 3.75 Lbs**
- **Max---------- 5.09 Lbs**

PCB-104071-TST-01A- Max PTH -HASL-0.0335"

1 cycle

Mating

- **Min ---------- 3.78 Lbs**
- **Max---------- 6.20 Lbs**

Unmating

- **Min ---------- 3.15 Lbs**
- **Max---------- 4.87 Lbs**

2 cycles

Mating

- **Min ---------- 3.45 Lbs**
- **Max---------- 6.02 Lbs**

Unmating

- **Min ---------- 3.02 Lbs**
- **Max---------- 4.23 Lbs**

3 cycles

Mating

- **Min ---------- 3.47 Lbs**
- **Max---------- 5.36 Lbs**

Unmating

- **Min ---------- 2.70 Lbs**
- **Max---------- 4.27 Lbs**

RESULTS Continued

PCB-104381-TST-01A- Max PTH -ENIG-0.0335"

1 cycle

Mating

- **Min ---------- 2.23 Lbs**
- **Max---------- 2.68 Lbs**

Unmating

- **Min ---------- 1.54 Lbs**
- **Max---------- 2.11 Lbs**

2 cycles

Mating

- **Min ---------- 2.14 Lbs**
- **Max---------- 2.53 Lbs**

Unmating

- **Min ---------- 1.23 Lbs**
- **Max---------- 2.06 Lbs**

3 cycles

Mating

- **Min ---------- 1.98 Lbs**
- **Max---------- 2.55 Lbs**

Unmating

- **Min ---------- 1.31 Lbs**
- **Max---------- 1.83 Lbs**

LLCR Durability (160 signal pin and 32 power pin LLCR test points)

Signal pin:

- **Initial ---------- 27.60 mOhms Max**

Power pin:

- **Initial ----------1.44 mOhms Max**
- **After 100 Cycles**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 192 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 ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

RESULTS Continued

LLCR Durability 250 cycles (56 signal pin row1, 104 signal pin row2 and 32 power pin LLCR test points)

Signal Row 1:

- **Initial ---------- 24.16 mOhms Max**

Signal Row 2:

- **Initial ---------- 26.32 mOhms Max**

Power pin:

- **Initial ----------1.50 mOhms Max**
- **After 250 Cycles**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 192 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 ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

RESULTS Continued

LLCR Thermal Aging (160 signal pin and 32 power pin LLCR test points)

Signal Pin:

- **Initial ---------- 27.34 mOhms Max**

Power Pin:

- **Initial ---------- 1.51 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 182 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 10 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 ---Compliant pin (38 compliant pin LLCR test points)::

- **Initial ---------- 0.11 mOhms Max**
- **Thermal Aging**
  - **<= +1.0 mOhms: ---------- 38 Stable**
  - **> +1.0 mOhms: ---------- 0 Unstable**

LLCR Gas Tight (160 signal pin and 32 power pin LLCR test points)

Signal Pin:

- **Initial ---------- 27.82 mOhms Max**

Power Pin:

- **Initial ---------- 1.55 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 192 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 ---Compliant pin (38 compliant pin LLCR test points):

- **Initial ---------- 0.11 mOhms Max**
- **Gas-Tight**
  - **<= +1.0 mOhms: ---------- 38 Stable**
  - **> +1.0 mOhms: ---------- 0 Unstable**

LLCR Shock Vib (160 signal pin and 32 power pin LLCR test points)

Signal Pin:

- **Initial ---------- 30.44 mOhms Max**

Power Pin:

- **Initial ---------- 1.63 mOhms Max**
- **S&V**
  - **<= +5.0 mOhms ---------- 191 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

RESULTS Continued

LLCR Shock Vib --Compliant pin (192 compliant pin LLCR test points):

- **Initial----------0.43 mOhms Max**
- **S&V**
  - **<= +1.0 mOhms:----------192 Stable**
  - **＞+1.0 mOhms:----------0 Unstable**

Mechanical Shock & Random Vibration:

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

Insulation Resistance minimums, IR

Signal Pin- signal Pin

- **Initial**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**

Signal Row-signal Row

- **Initial**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**

Signal Pin-Power pin

- **Initial**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**

RESULTS Continued

Power pin –Power pin

- **Initial**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated----------10000Meg Ω ---------- Pass**
  - **Unmated ----------10000Meg Ω ---------- Pass**

Dielectric Withstanding Voltage minimums, DWV

Signal pin

- **Minimums**
  - **Breakdown Voltage---------- 1100VAC**
  - **Test Voltage ----------825VAC**
  - **Working Voltage ----------275VAC**

Power pin

- **Minimums**
  - **Breakdown Voltage---------- 1500VAC**
  - **Test Voltage ---------- 1125VAC**
  - **Working Voltage ----------375VAC**

Signal Pin- signal Pin

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

Signal Row-signal Row

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

Signal Pin-Power pin

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

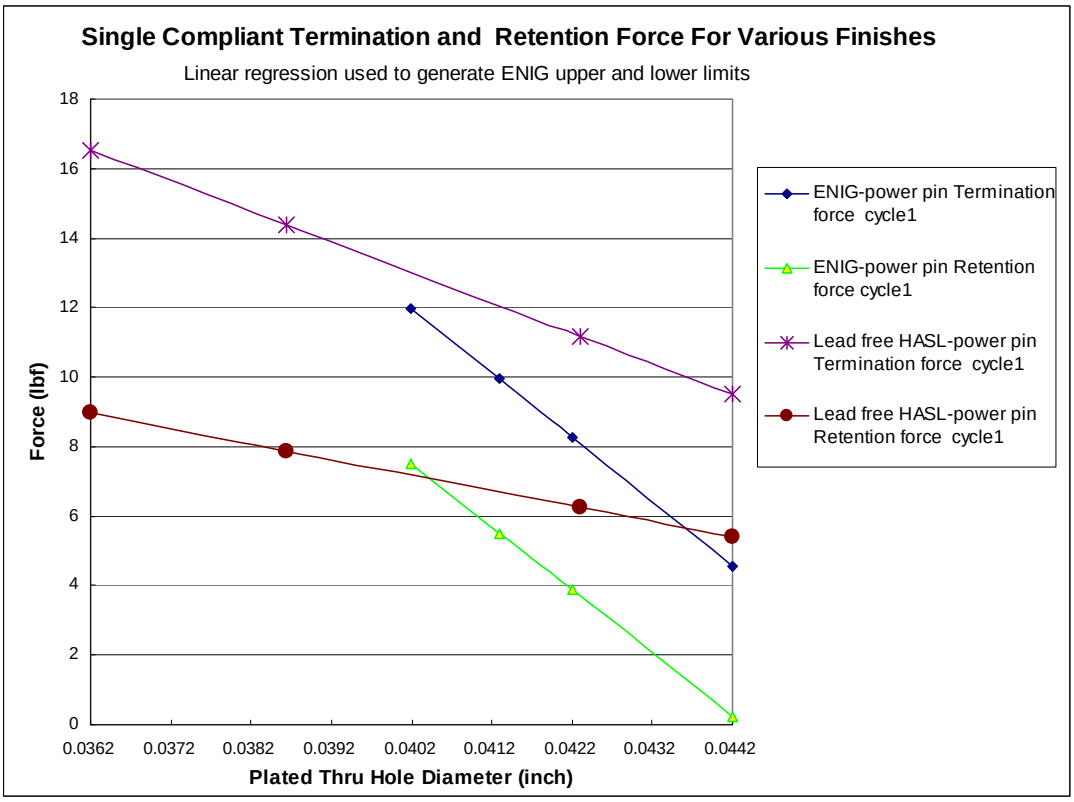
Power pin –Power pin

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

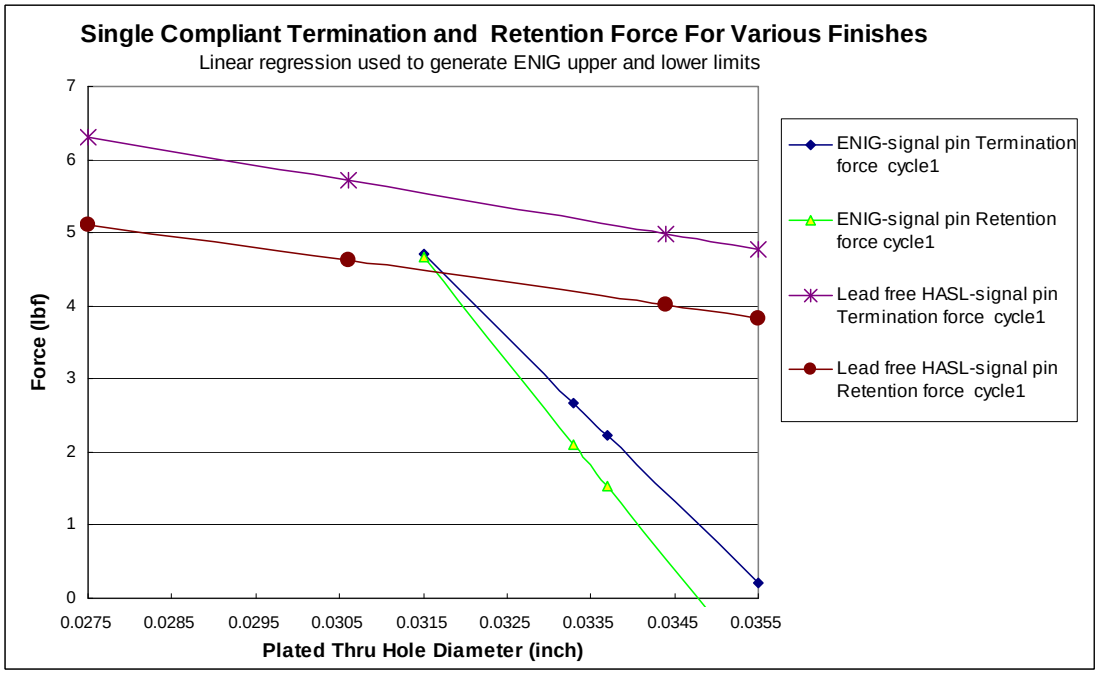
RESULTS Continued

Compliant pin summary graph

Power pin



Signal pin



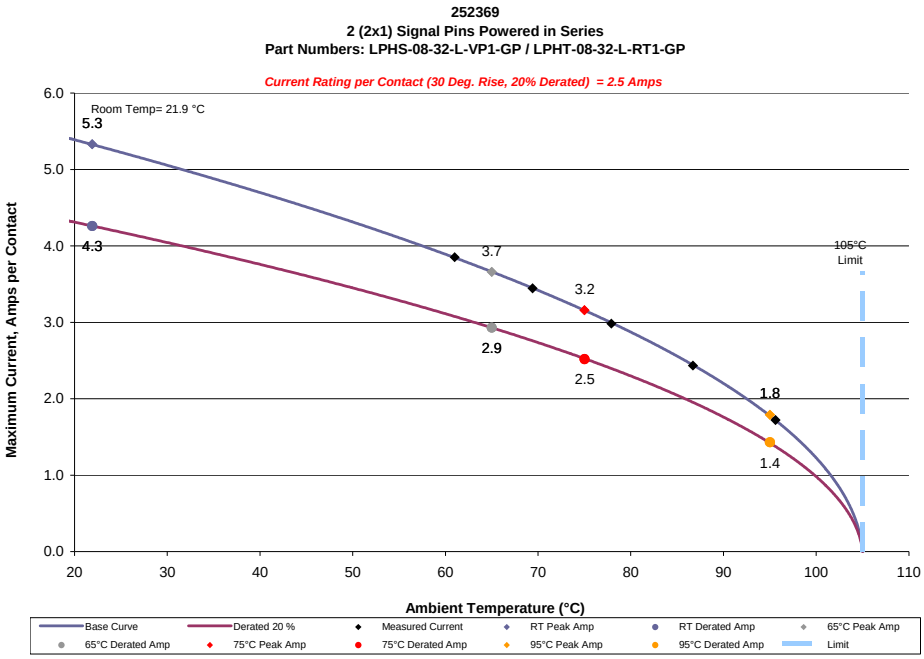
DATA SUMMARIES

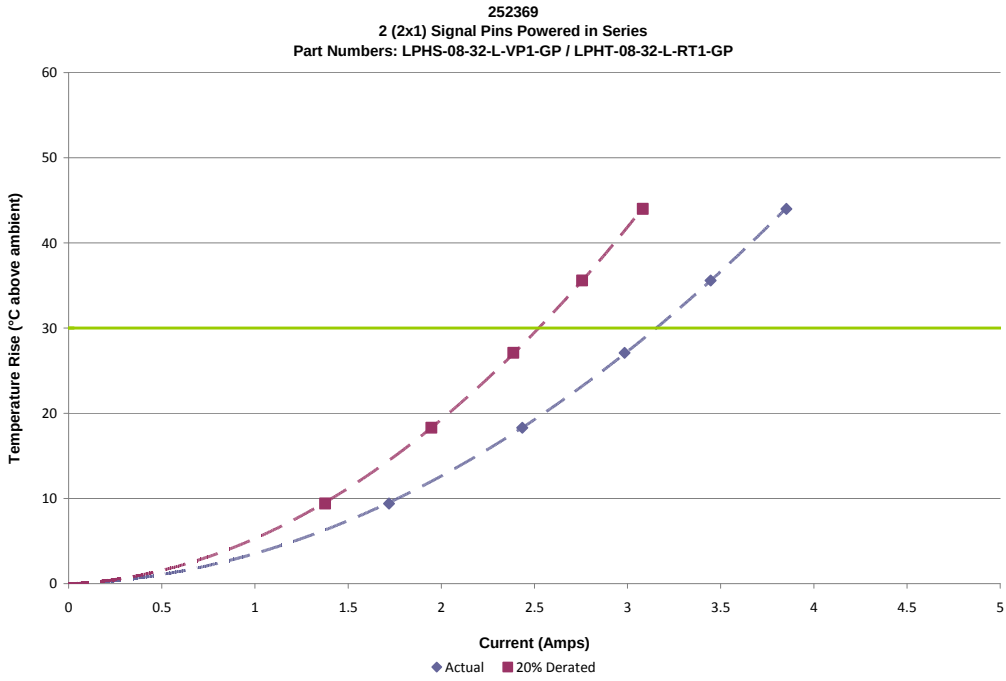
TEMPERATURE RISE (Current Carrying Capacity, CCC):

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:

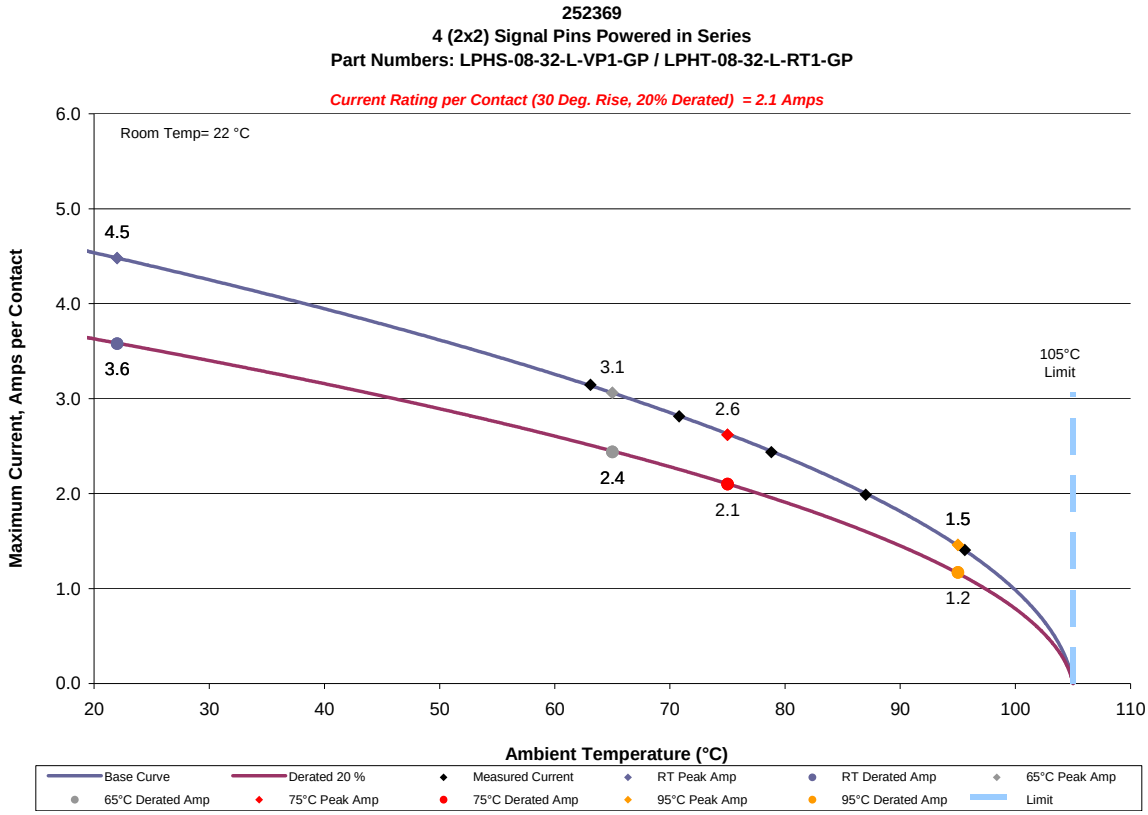
a. Linear configuration with 2 adjacent signal conductors/contacts powered

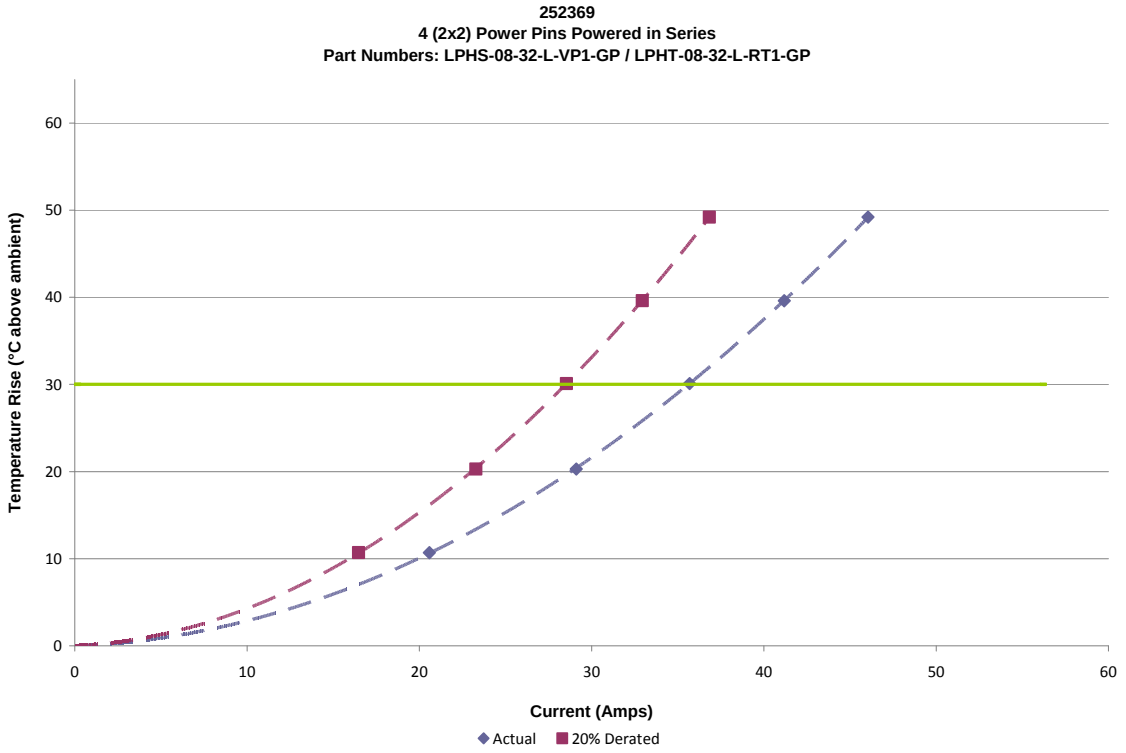




DATA SUMMARIES

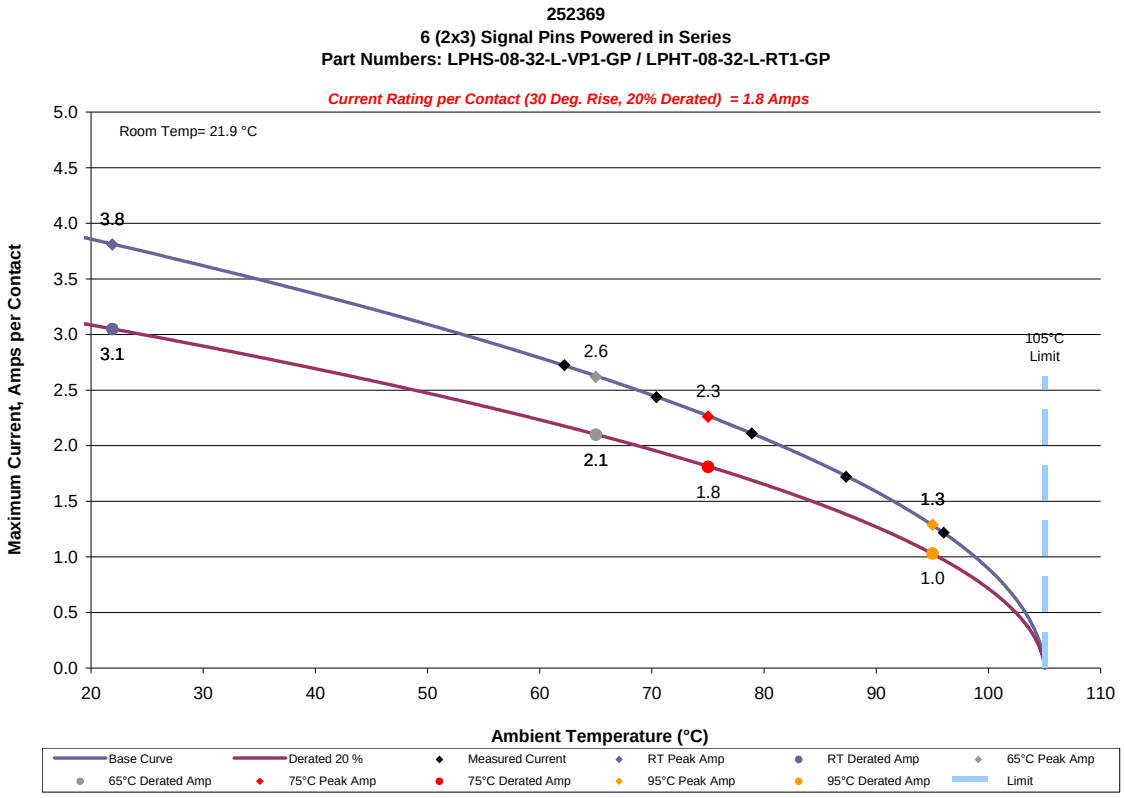
b. Linear configuration with 4 adjacent signal conductors/contacts powered

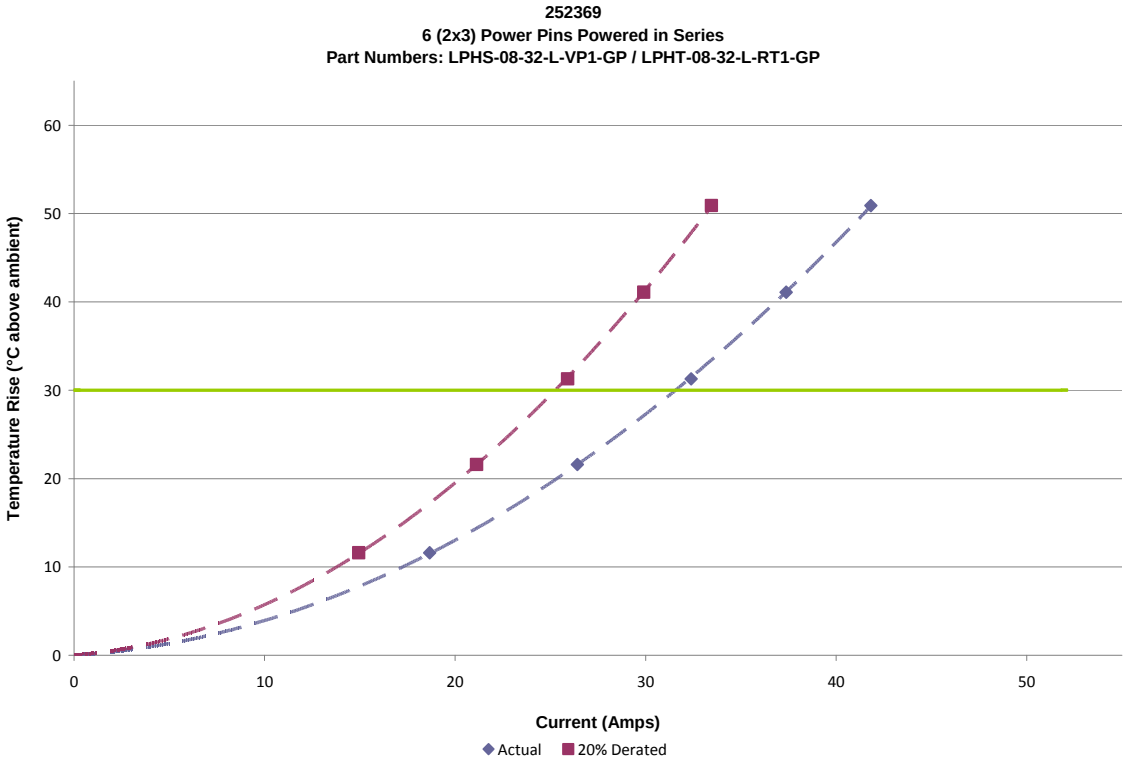




DATA SUMMARIES

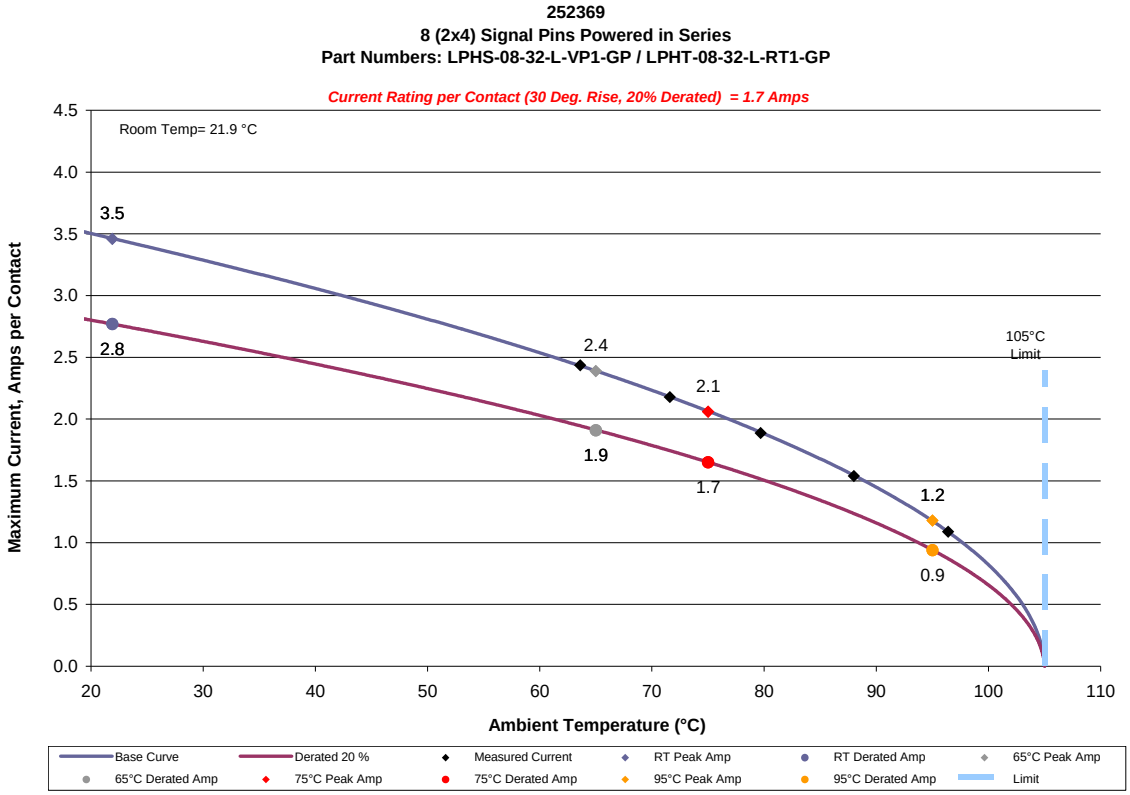
c. Linear configuration with 6 adjacent signal conductors/contacts powered

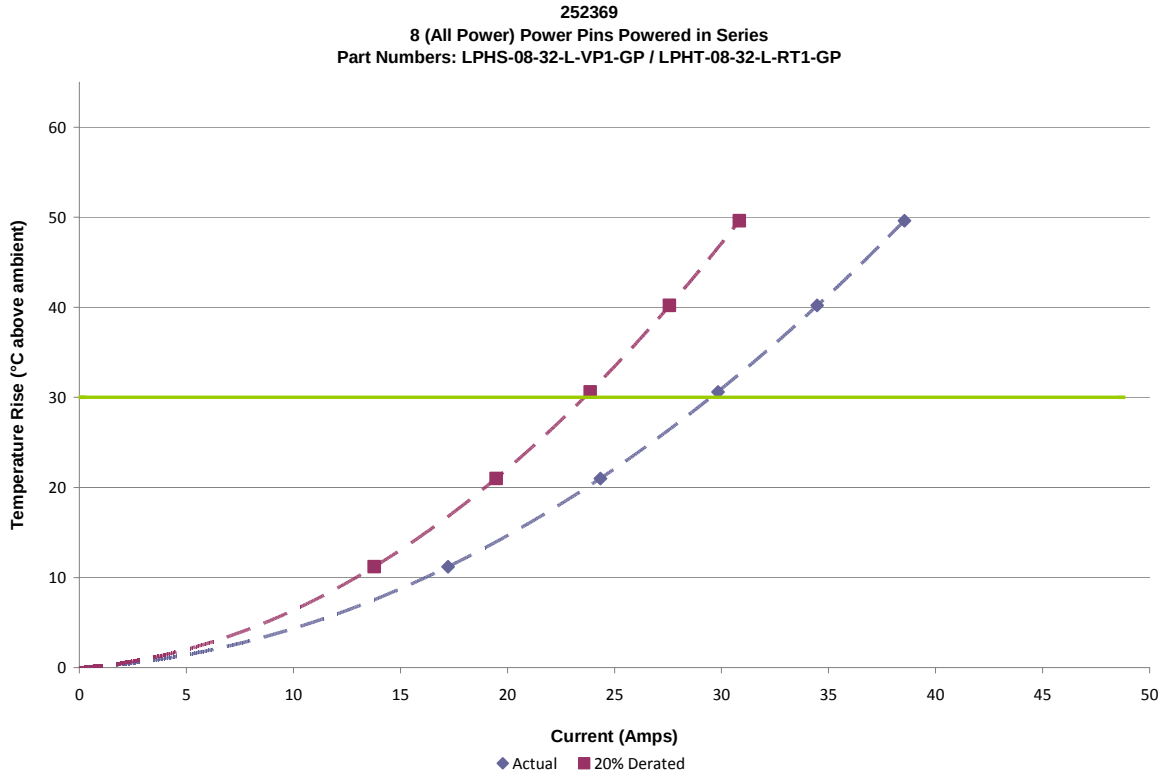




DATA SUMMARIES

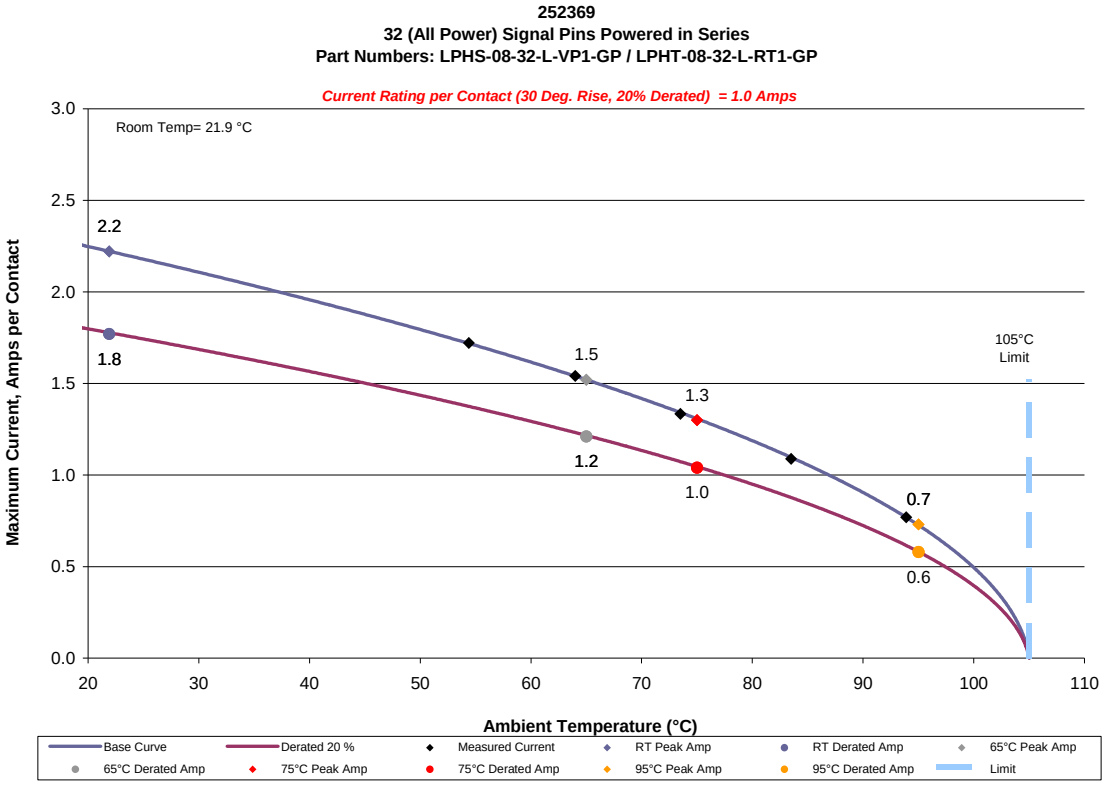
d. Linear configuration with 8 adjacent signal conductors/contacts powered

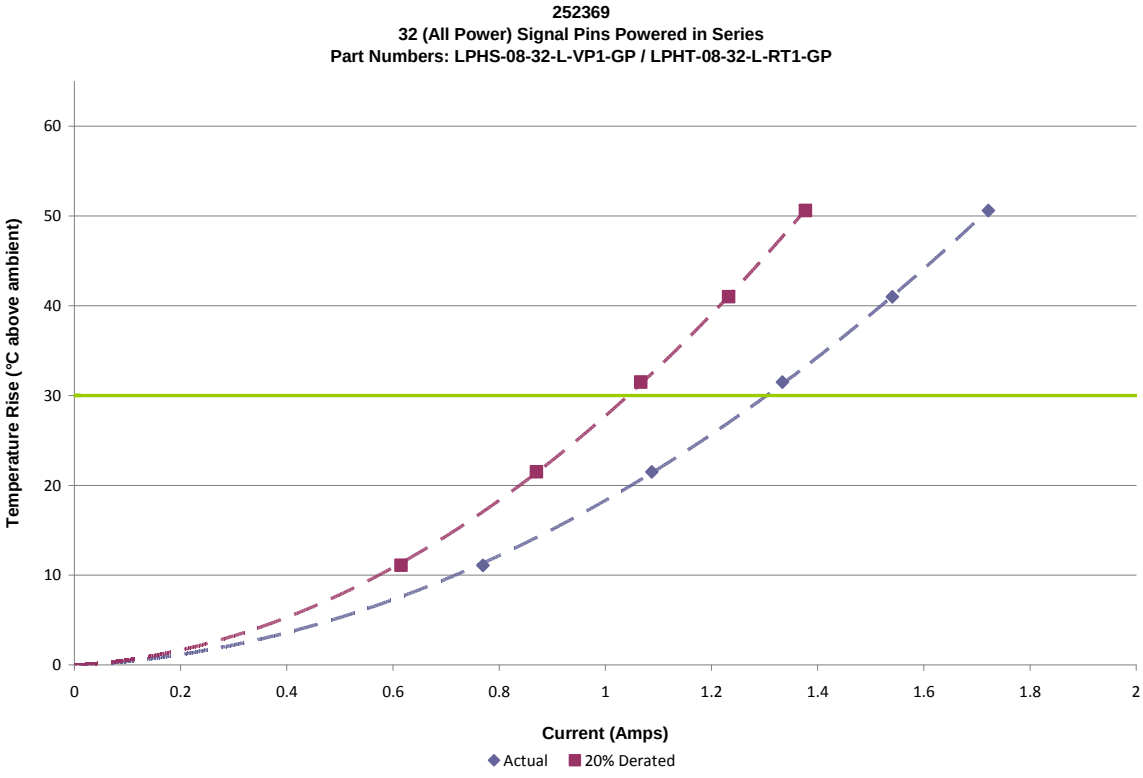




DATA SUMMARIES

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

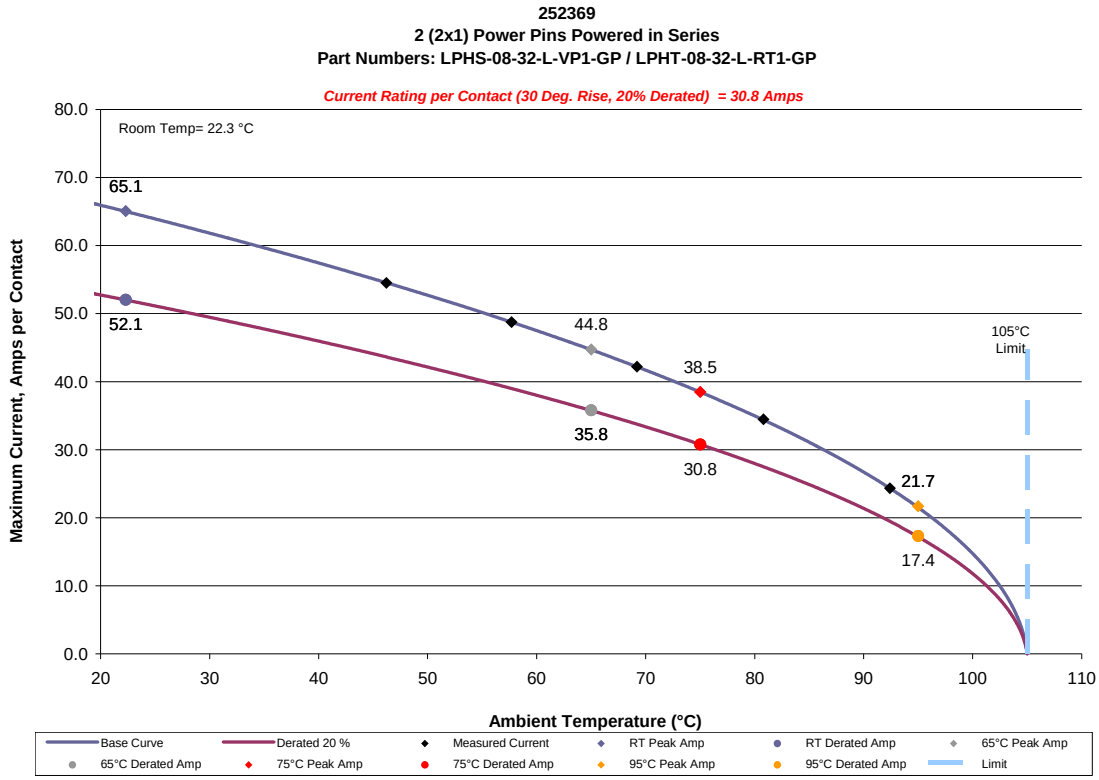


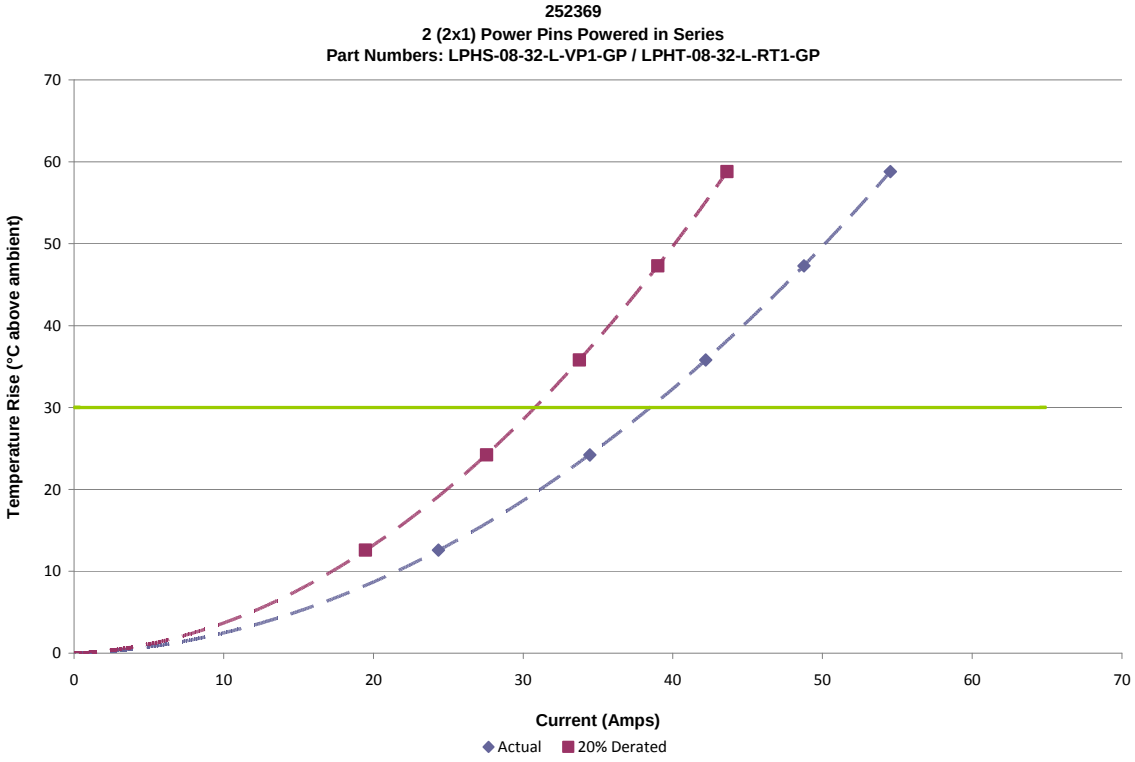


DATA SUMMARIES

Power pin:

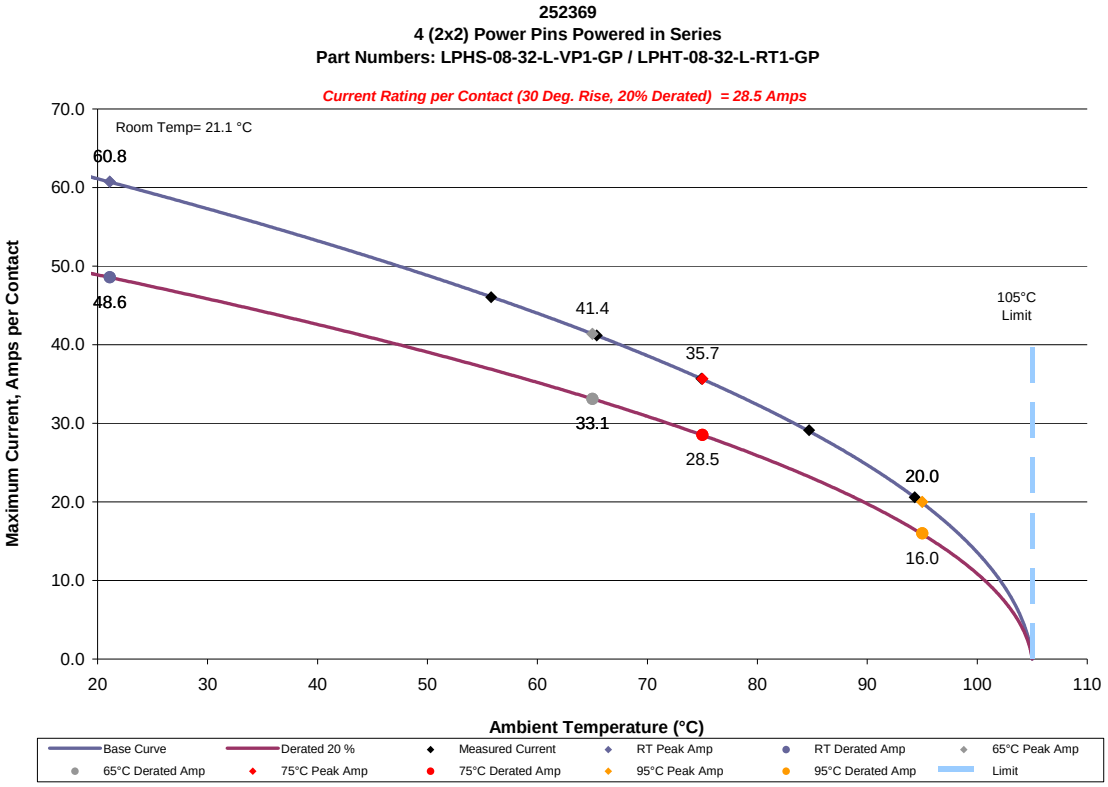
f. Linear configuration with 2 adjacent power conductors/contacts powered

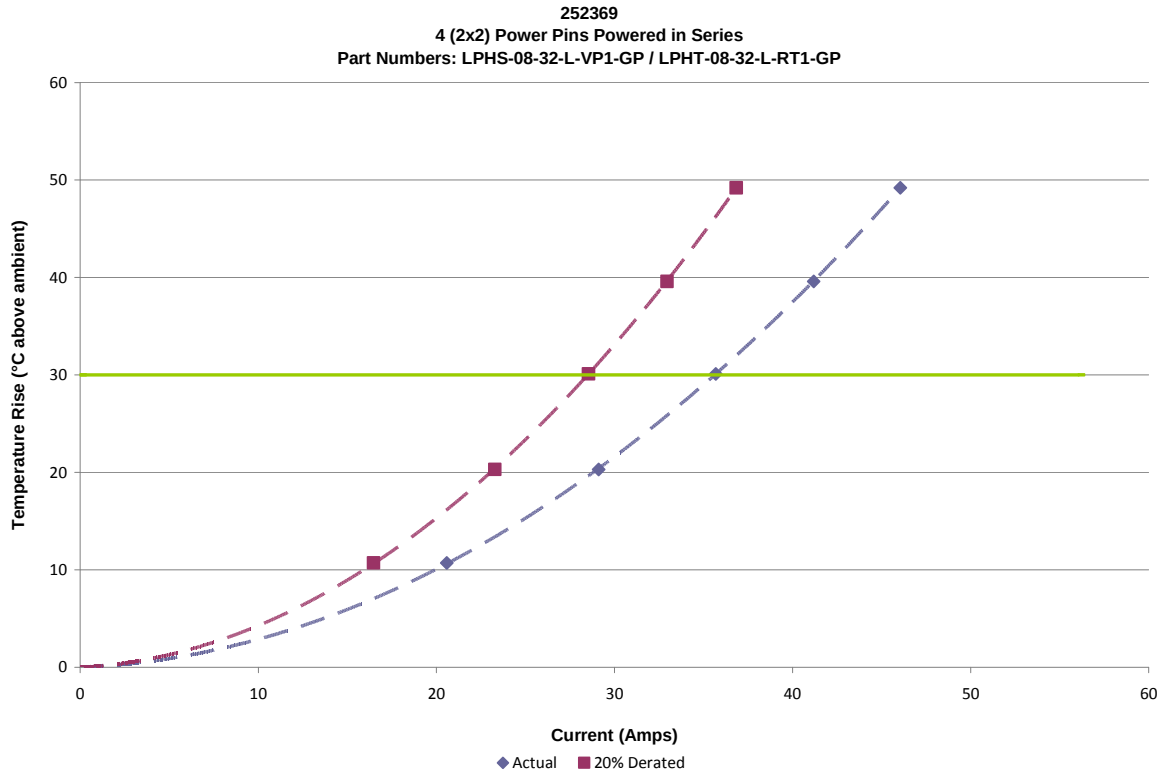




DATA SUMMARIES

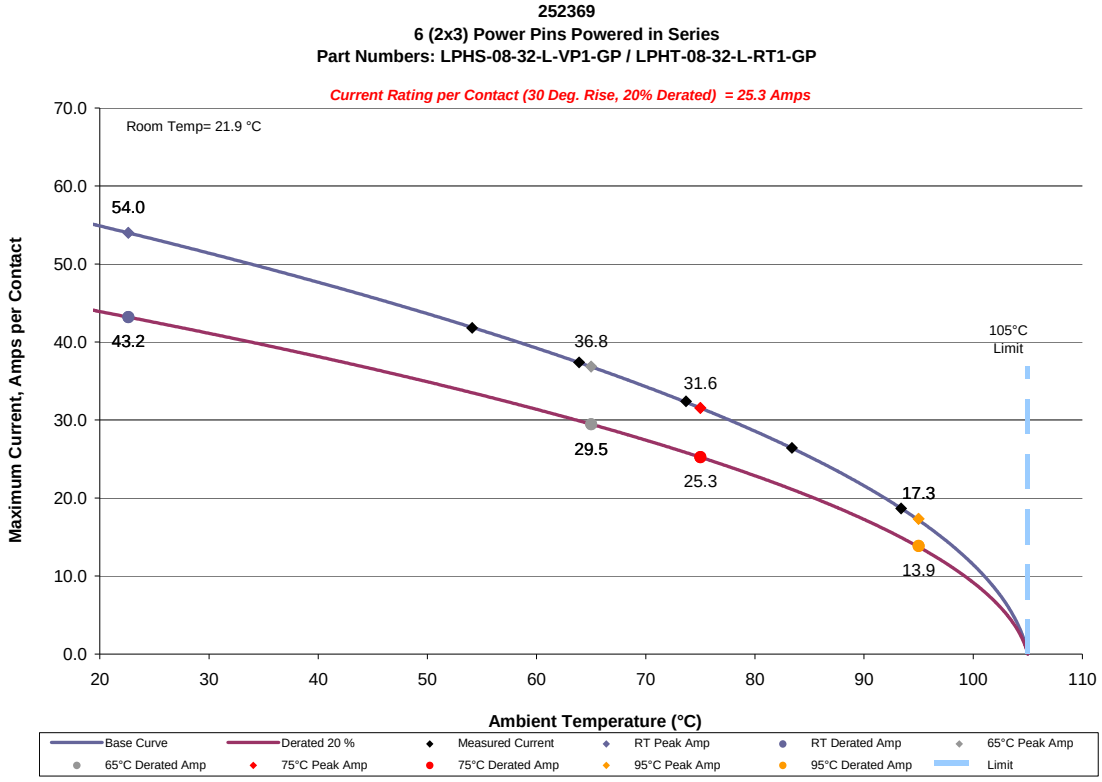
g. Linear configuration with 4 adjacent power conductors/contacts powered

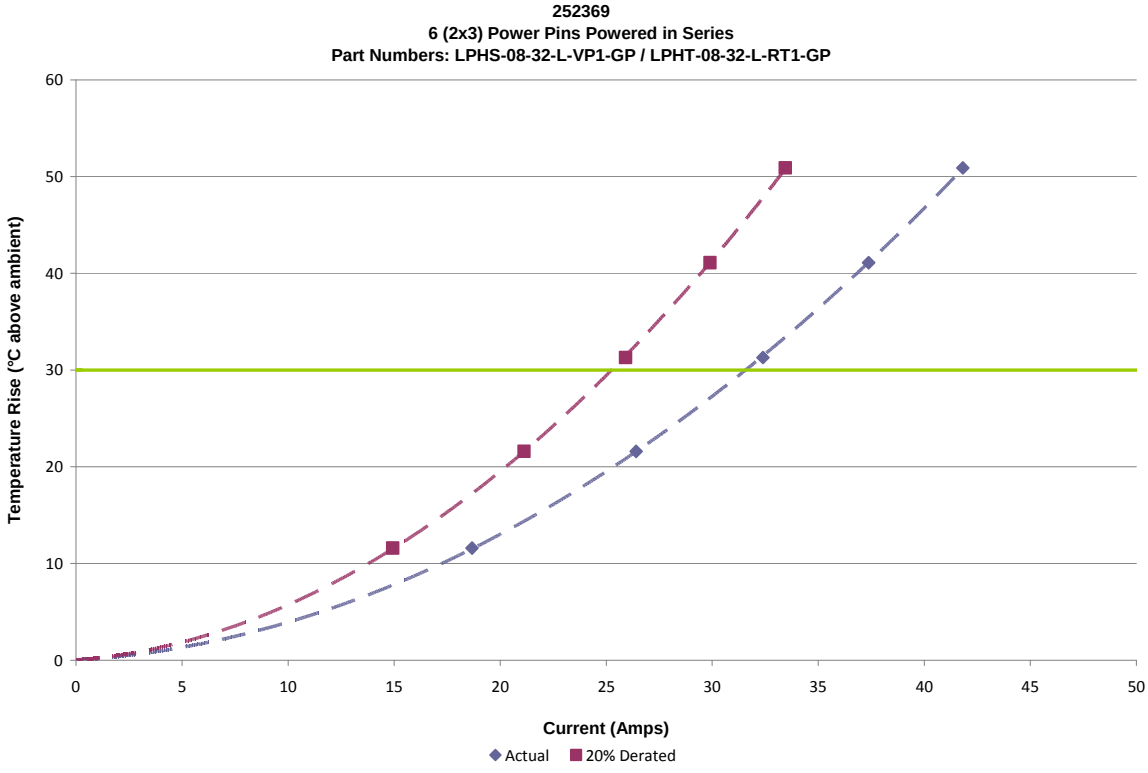




DATA SUMMARIES

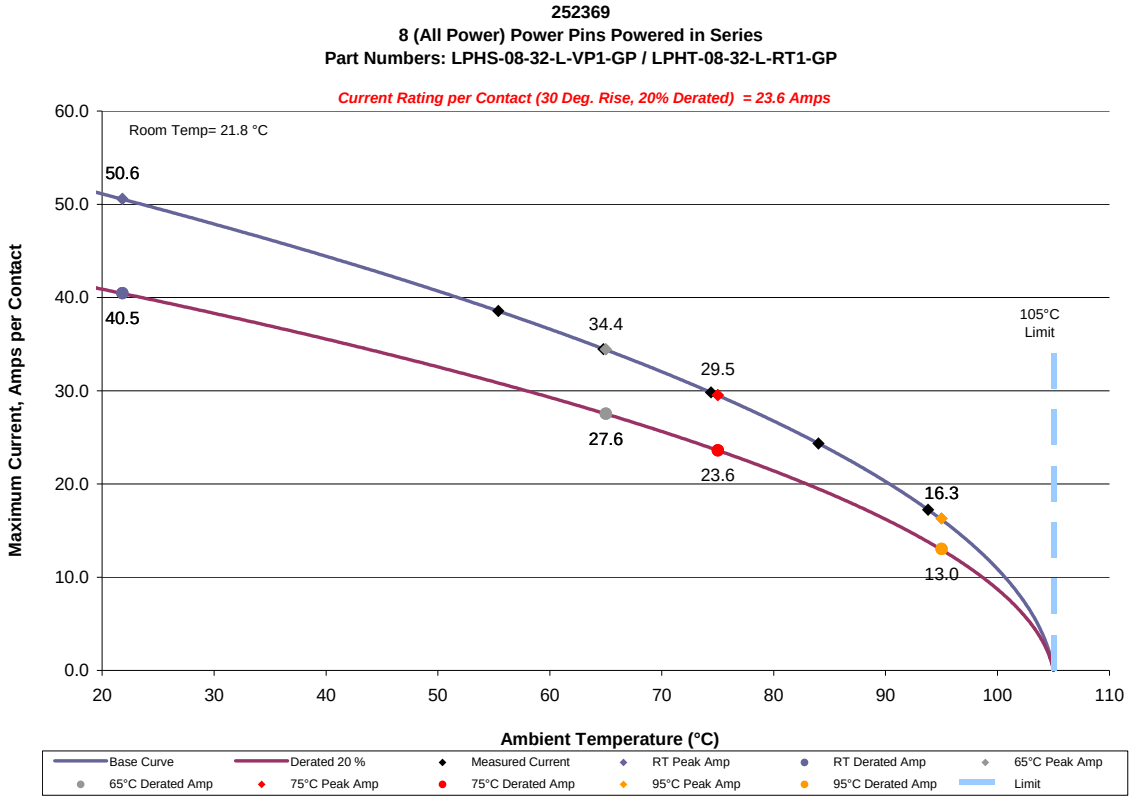
h. Linear configuration with 6 adjacent power conductors/contacts powered

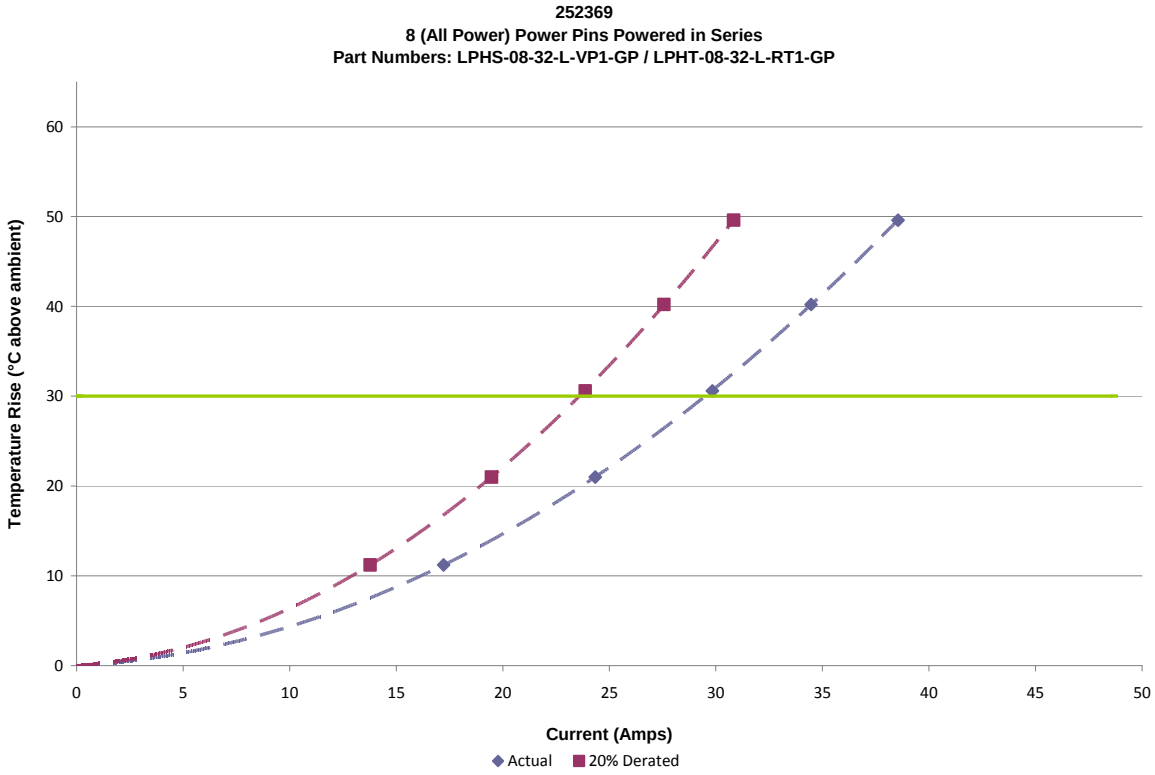




DATA SUMMARIES

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

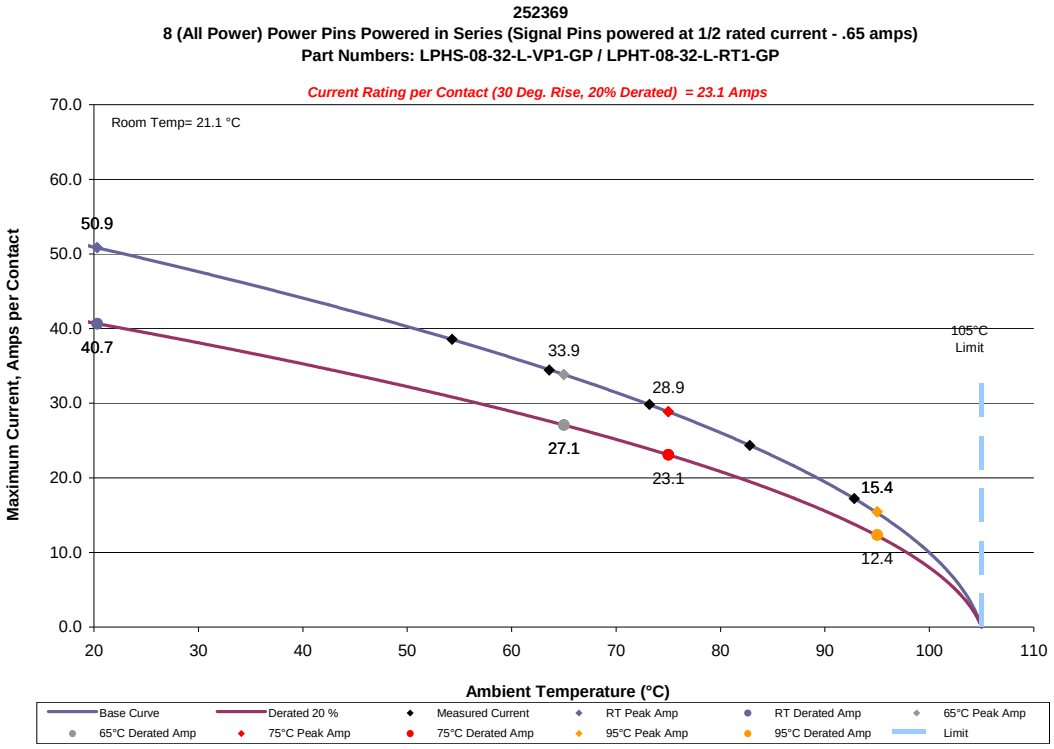


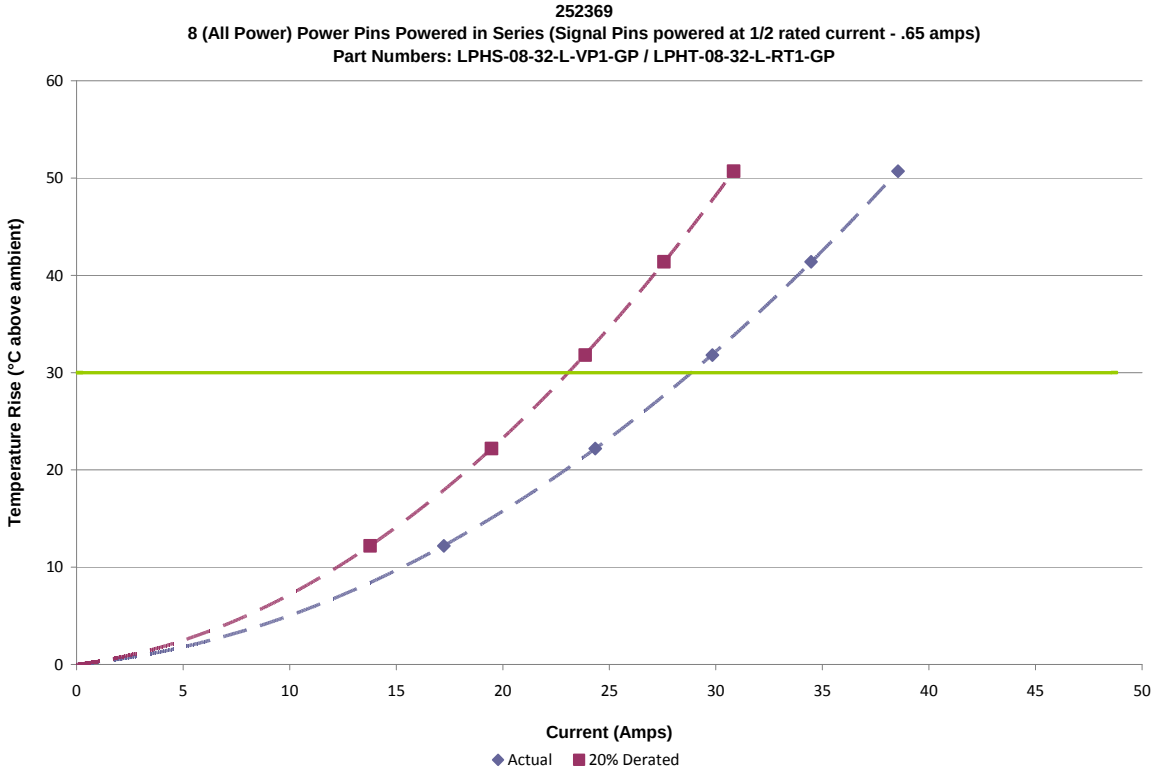


DATA SUMMARIES

Power Pin powered while signal pin @ 1/2 rated current at 0.65 Amps

j. All Power Pins (while signal pin at 0.65 Amps) Contacts Powered





DATA SUMMARIES

MATING/UNMATING FORCE:

Mating/Unmating durability (LPHS-08-32-L-VP1-GP/LPHT-08-32-L-RT1-GP):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	44.88	10.09	30.11	6.77	48.97	11.01	32.07	7.21
Maximum	50.17	11.28	34.03	7.65	54.98	12.36	39.59	8.90
Average	47.90	**10.77**	32.01	**7.20**	51.03	**11.47**	34.98	**7.86**
St Dev	1.57	0.35	1.16	0.26	2.14	0.48	2.17	0.49
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	50.22	11.29	34.87	7.84	52.89	11.89	36.52	8.21
Maximum	57.20	12.86	42.26	9.50	58.14	13.07	44.70	10.05
Average	53.70	**12.07**	37.46	**8.42**	55.51	**12.48**	39.38	**8.85**
St Dev	2.13	0.48	2.30	0.52	1.80	0.40	2.61	0.59
Count	8	8	8	8	8	8	8	8

	After 100 Cycles				After Humidity			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	54.40	12.23	38.12	8.57	32.96	7.41	21.66	4.87
Maximum	60.23	13.54	46.26	10.40	40.43	9.09	27.04	6.08
Average	56.81	**12.77**	41.01	**9.22**	34.97	**7.86**	23.08	**5.19**
St Dev	2.04	0.46	2.54	0.57	2.51	0.56	1.66	0.37
Count	8	8	8	8	8	8	8	8

Thermal aging (LPHS-08-32-L-VP1-GP/LPHT-08-32-L-RT1-GP):

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	51.64	11.61	29.31	6.59	27.09	6.09	19.44	4.37
Maximum	55.47	12.47	35.05	7.88	32.87	7.39	23.00	5.17
Average	52.96	**11.91**	31.43	**7.07**	28.54	**6.42**	21.01	**4.72**
St Dev	1.25	0.28	1.79	0.40	1.81	0.41	1.37	0.31
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

Mating&Unmating basic (LPHS-06-24-L-VP1-GP/LPHT-06-24-L-RT1-GP):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	42.30	9.51	24.33	5.47	42.43	9.54	26.73	6.01
Maximum	47.28	10.63	28.16	6.33	46.17	10.38	31.05	6.98
Average	44.39	**9.98**	26.11	**5.87**	43.71	**9.83**	29.24	**6.57**
St Dev	1.74	0.39	1.38	0.31	1.41	0.32	1.42	0.32
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	41.37	9.30	27.40	6.16	41.94	9.43	28.47	6.40
Maximum	46.04	10.35	31.80	7.15	47.68	10.72	32.83	7.38
Average	43.89	**9.87**	30.07	**6.76**	44.86	**10.09**	31.06	**6.98**
St Dev	1.37	0.31	1.49	0.34	1.82	0.41	1.38	0.31
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	42.48	9.55	29.13	6.55
Maximum	47.55	10.69	33.85	7.61
Average	45.20	**10.16**	31.73	**7.13**
St Dev	1.59	0.36	1.51	0.34
Count	8	8	8	8

DATA SUMMARIES Continued

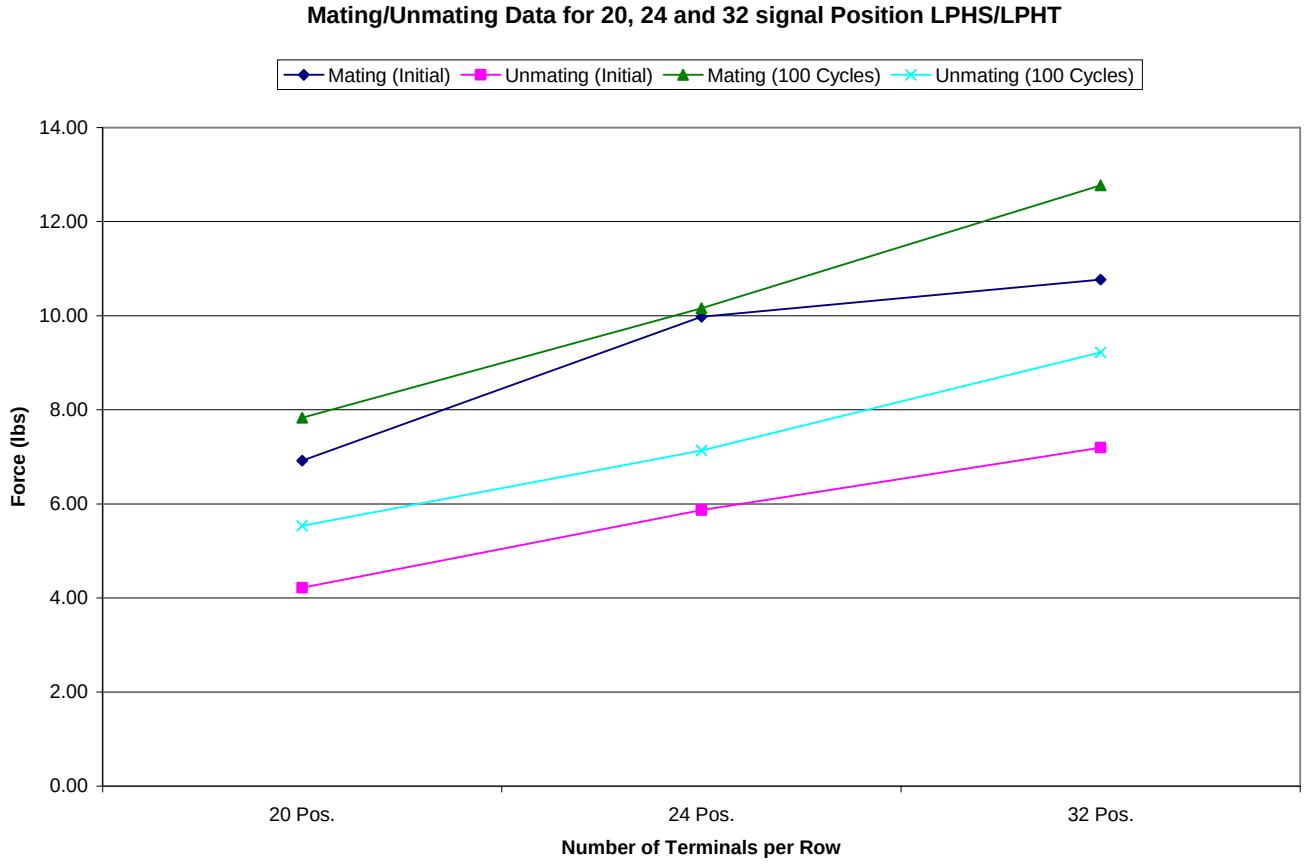
Mating&Unmating basic (LPHS-04-20-L-VP1-GP/LPHT-04-20-L-RT1-GP):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	28.73	6.46	17.53	3.94	31.85	7.16	19.13	4.30
Maximum	32.47	7.30	19.88	4.47	35.05	7.88	23.93	5.38
Average	30.78	**6.92**	18.76	**4.22**	32.95	**7.41**	22.17	**4.98**
St Dev	1.38	0.31	0.84	0.19	1.20	0.27	1.54	0.35
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	32.38	7.28	21.66	4.87	32.87	7.39	22.42	5.04
Maximum	35.85	8.06	24.82	5.58	35.72	8.03	25.49	5.73
Average	33.77	**7.59**	23.41	**5.26**	34.20	**7.69**	24.14	**5.43**
St Dev	1.23	0.28	0.98	0.22	0.99	0.22	1.00	0.22
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	33.18	7.46	23.00	5.17
Maximum	37.27	8.38	26.15	5.88
Average	34.83	**7.83**	24.62	**5.54**
St Dev	1.30	0.29	1.04	0.23
Count	8	8	8	8

DATA SUMMARIES Continued



DATA SUMMARIES Continued

PTH hole diameter -Power pin

	Min PTH 0.0382" dia -HASL	Max PTH 0.0422" dia -HASL	Max PTH 0.0422" dia -ENIG
Minimum	0.0382	0.0417	0.0413
Maximum	0.0391	0.0429	0.0422
Average	*0.0386*	*0.0423*	*0.0417*
St. Dev.	*0.0002*	*0.0003*	*0.0002*
Count	*30*	*30*	*30*

PTH hole diameter -Signal pin

	Min PTH 0.0295" dia -HASL	Max PTH 0.0335" dia -HASL	Max PTH 0.0335" dia -ENIG
Minimum	0.0303	0.0339	0.0333
Maximum	0.0309	0.0349	0.0337
Average	*0.0307*	*0.0345*	*0.0335*
St. Dev.	*0.0002*	*0.0002*	*0.0001*
Count	*30*	*30*	*30*

Power compliant pin width:

248727 Measurements Summary	
Minimum	0.0463
Maximum	0.0475
Average	0.0352
St. Dev.	0.0024
Count	270
% high	50.37%
% low	0.00%

Signal compliant pin width:

248727 Measurements Summary	
Minimum	0.0371
Maximum	0.0379
Average	0.0282
St. Dev.	0.0017
Count	270
% high	0.37%
% low	0.00%

DATA SUMMARIES Continued

Compliant pin mating & unmating Forces

Power pin

PCB-104071-TST-01B-Min PTH -HASL-0.0382"

Cycle 1 Insertion Force Summary		Cycle 2 Insertion Force Summary		Cycle 3 Insertion Force Summary	
Minimum	13.0900	*Minimum*	10.7000	*Minimum*	10.3700
Maximum	15.7500	*Maximum*	14.3600	*Maximum*	12.9700
Average	14.6527	*Average*	12.1100	*Average*	11.2137
St. Dev.	0.7061	*St. Dev.*	0.8319	*St. Dev.*	0.6761
Withdraw Force Summary		Withdraw Force Summary		Withdraw Force Summary	
Minimum	4.8500	*Minimum*	3.7300	*Minimum*	3.4200
Maximum	7.6500	*Maximum*	6.5900	*Maximum*	5.4500
Average	6.0477	*Average*	5.1637	*Average*	4.4087
St. Dev.	0.6567	*St. Dev.*	0.8157	*St. Dev.*	0.6287

PCB-104071-TST-01A-Max PTH -HASL-0.0422"

Cycle 1 Insertion Force Summary		Cycle 2 Insertion Force Summary		Cycle 3 Insertion Force Summary	
Minimum	9.7600	*Minimum*	7.6900	*Minimum*	6.8900
Maximum	12.5900	*Maximum*	10.8000	*Maximum*	9.8000
Average	11.1203	*Average*	9.1923	*Average*	8.1413
St. Dev.	0.7675	*St. Dev.*	0.9539	*St. Dev.*	0.8159
Withdraw Force Summary		Withdraw Force Summary		Withdraw Force Summary	
Minimum	6.0000	*Minimum*	4.9100	*Minimum*	3.1900
Maximum	9.7500	*Maximum*	8.9800	*Maximum*	7.8400
Average	8.0683	*Average*	6.8003	*Average*	5.8417
St. Dev.	1.0330	*St. Dev.*	1.1262	*St. Dev.*	1.1600

PCB-104381-TST-01A- Max PTH -ENIG-0.0422"

Cycle 1 Insertion Force Summary		Cycle 2 Insertion Force Summary		Cycle 3 Insertion Force Summary	
Minimum	8.2700	*Minimum*	7.0200	*Minimum*	6.6200
Maximum	9.9400	*Maximum*	9.2100	*Maximum*	8.3800
Average	8.8997	*Average*	7.8273	*Average*	7.5777
St. Dev.	0.4041	*St. Dev.*	0.4570	*St. Dev.*	0.4158
Withdraw Force Summary		Withdraw Force Summary		Withdraw Force Summary	
Minimum	3.8700	*Minimum*	3.4200	*Minimum*	3.2400
Maximum	5.5100	*Maximum*	5.5700	*Maximum*	5.8500
Average	4.7017	*Average*	4.6160	*Average*	4.5187
St. Dev.	0.4320	*St. Dev.*	0.6142	*St. Dev.*	0.6450

DATA SUMMARIES Continued

Signal pin

PCB-104071-TST-01B- Min PTH -HASL-0.0295"

Cycle 1 Insertion Force Summary		Cycle 2 Insertion Force Summary		Cycle 3 Insertion Force Summary	
Minimum	5.2300	*Minimum*	5.0500	*Minimum*	4.3500
Maximum	6.2000	*Maximum*	6.0100	*Maximum*	6.4300
Average	5.6670	*Average*	5.5083	*Average*	5.2677
St. Dev.	0.2365	*St. Dev.*	0.2651	*St. Dev.*	0.5166
Withdraw Force Summary		Withdraw Force Summary		Withdraw Force Summary	
Minimum	3.7900	*Minimum*	3.9000	*Minimum*	3.7500
Maximum	5.4500	*Maximum*	5.1400	*Maximum*	5.0900
Average	4.5397	*Average*	4.4357	*Average*	4.2987
St. Dev.	0.3864	*St. Dev.*	0.3264	*St. Dev.*	0.3082

PCB-104071-TST-01A- Max PTH -HASL-0.0335"

Cycle 1 Insertion Force Summary		Cycle 2 Insertion Force Summary		Cycle 3 Insertion Force Summary	
Minimum	3.7800	*Minimum*	3.4500	*Minimum*	3.4700
Maximum	6.2000	*Maximum*	6.0200	*Maximum*	5.3600
Average	4.6000	*Average*	4.4147	*Average*	4.3213
St. Dev.	0.5867	*St. Dev.*	0.5540	*St. Dev.*	0.4824
Withdraw Force Summary		Withdraw Force Summary		Withdraw Force Summary	
Minimum	3.1500	*Minimum*	3.0200	*Minimum*	2.7000
Maximum	4.8700	*Maximum*	4.2300	*Maximum*	4.2700
Average	3.8820	*Average*	3.4953	*Average*	3.4663
St. Dev.	0.4594	*St. Dev.*	0.3680	*St. Dev.*	0.3579

PCB-104381-TST-01A- Max PTH -ENIG-0.0335"

Cycle 1 Insertion Force Summary		Cycle 2 Insertion Force Summary		Cycle 3 Insertion Force Summary	
Minimum	2.2300	*Minimum*	2.1400	*Minimum*	1.9800
Maximum	2.6800	*Maximum*	2.5300	*Maximum*	2.5500
Average	2.4727	*Average*	2.2687	*Average*	2.2030
St. Dev.	0.1020	*St. Dev.*	0.0928	*St. Dev.*	0.1348
Withdraw Force Summary		Withdraw Force Summary		Withdraw Force Summary	
Minimum	1.5400	*Minimum*	1.2300	*Minimum*	1.3100
Maximum	2.1100	*Maximum*	2.0600	*Maximum*	1.8300
Average	1.8810	*Average*	1.7703	*Average*	1.5627
St. Dev.	0.1226	*St. Dev.*	0.1828	*St. Dev.*	0.1481

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Signal Pin to signal Pin		
	Mated	Unmated	Unmated
Minimum	**LPHS/LPHT**	**LPHS**	**LPHT**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

	Signal Row to signal Row		
	Mated	Unmated	Unmated
Minimum	**LPHS/LPHT**	**LPHS**	**LPHT**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

	Signal Pin to Power pin		
	Mated	Unmated	Unmated
Minimum	**LPHS/LPHT**	**LPHS**	**LPHT**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

	Power pin to Power pin		
	Mated	Unmated	Unmated
Minimum	**LPHS/LPHT**	**LPHS**	**LPHT**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

DATA SUMMARIES Continued

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary-Signal pin	
Minimum	**LPHS/LPHT signal pin**
Break Down Voltage	1100
Test Voltage	825
Working Voltage	275

Voltage Rating Summary-Power pin	
Minimum	**LPHS/LPHT power pin**
Break Down Voltage	1500
Test Voltage	1125
Working Voltage	375

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

Signal Row to signal Row	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Signal Pin to Power pin	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Power pin to Power pin	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

DATA SUMMARIES Continued

LLCR Durabiltiy:

1) A total of 192 points (160 signal pin and 32 power pin LLCR test points) were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

	LLCR Measurement Summaries by Pin Type			
Date	3/21/2013	3/27/2013	4/1/2013	4/23/2013
Room Temp (Deg C)	20	23	21	23
Rel Humidity (%)	60	56	56	60
Technician	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	23.97	0.49	0.44	0.55
St. Dev.	1.99	0.61	0.35	0.51
Min	18.09	0.00	0.00	0.01
Max	27.60	4.43	1.93	3.81
Summary Count	160	160	160	160
Total Count	160	160	160	160
	Pin Type 2: Power			
Average	1.09	0.05	0.06	0.06
St. Dev.	0.27	0.06	0.06	0.06
Min	0.76	0.00	0.01	0.02
Max	1.44	0.32	0.31	0.28
Summary Count	32	32	32	32
Total Count	32	32	32	32

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
100 Cycles	**192**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**192**	**0**	**0**	**0**	**0**	**0**
Humidity	**192**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Durabiltiy 250 Cycles:

1) A total of 192 points (56 signal pin row1, 104 signal pin row2 and 32 power pin LLCR test 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	4/17/2015	4/23/2015	5/4/2015	5/19/2015
Room Temp (Deg C)	23	22	22	24
Rel Humidity (%)	50	52	60	58
Technician	Kason He	Kason He	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta 250 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Row 1			
Average	20.89	0.41	0.37	0.42
St. Dev.	1.78	0.25	0.29	0.42
Min	16.71	0.04	0.00	0.01
Max	24.16	1.06	1.08	1.94
Summary Count	56	56	56	56
Total Count	56	56	56	56
	Pin Type 2: Row 2			
Average	23.47	0.61	0.45	0.53
St. Dev.	1.60	0.50	0.37	0.59
Min	18.49	0.00	0.00	0.00
Max	26.32	3.31	1.69	4.53
Summary Count	104	104	104	104
Total Count	104	104	104	104
	Pin Type 3: Power			
Average	1.07	0.03	0.03	0.04
St. Dev.	0.26	0.02	0.04	0.04
Min	0.74	0.00	0.00	0.00
Max	1.50	0.09	0.20	0.14
Summary Count	32	32	32	32
Total Count	32	32	32	32

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
250 Cycles	**192**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**192**	**0**	**0**	**0**	**0**	**0**
Humidity	**192**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR thermal aging

1) A total of 192 points (160 signal pin and 32 power pin LLCR test points) were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

LLCR Measurement Summaries by Pin Type				
Date	3/21/2013	4/10/2013		
Room Temp (Deg C)	20	23		
Rel Humidity (%)	60	56		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	23.33	2.21		
St. Dev.	1.90	1.62		
Min	18.04	0.00		
Max	27.34	7.25		
Summary Count	160	160		
Total Count	160	160		
	Pin Type 2: Power			
Average	1.05	0.27		
St. Dev.	0.26	0.17		
Min	0.73	0.00		
Max	1.51	0.70		
Summary Count	32	32		
Total Count	32	32		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal	**182**	**10**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR thermal aging-compliant pin:

1) A total of 38 compliant pin points were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +1.0 mOhms: ---------- Stable
   b. >+1.0 mOhms:---------- Unstable

LLCR Measurement Summaries by Pin Type				
Date	4/17/2013	4/28/2012		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	62	56		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.07	0.08		
St. Dev.	0.01	0.02		
Min	0.05	0.12		
Max	0.11	0.05		
Summary Count	30	30		
Total Count	30	30		
	Pin Type 2: Power			
Average	0.02	0.03		
St. Dev.	0.01	0.01		
Min	0.01	0.03		
Max	0.03	0.02		
Summary Count	8	8		
Total Count	8	8		

LLCR Delta Count by Category		
	Stable	**Unstable**
mOhms	**<=1**	**>1**
After thermal	**38**	**0**

DATA SUMMARIES Continued

LLCR GAS TIGHT:

1) A total of 192 points (160 signal pin and 32 power pin LLCR test points) were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

	LLCR Measurement Summaries by Pin Type			
Date	3/26/2013	3/26/2013		
Room Temp (Deg C)	23	20		
Rel Humidity (%)	62	59		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	24.06	0.39		
St. Dev.	2.10	0.34		
Min	18.17	0.00		
Max	27.82	2.84		
Summary Count	160	160		
Total Count	160	160		
	Pin Type 2: Power			
Average	1.13	0.03		
St. Dev.	0.27	0.02		
Min	0.78	0.00		
Max	1.55	0.07		
Summary Count	32	32		
Total Count	32	32		

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

DATA SUMMARIES Continued

LLCR gas tight -compliant pin:

1) A total of 38 compliant pin points were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +1.0 mOhms: ---------- Stable
   b. >+1.0 mOhms:---------- Unstable

LLCR Measurement Summaries by Pin Type				
Date	4/17/2013	4/20/2013		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	62	60		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.07	0.01		
St. Dev.	0.02	0.02		
Min	0.05	-0.02		
Max	0.11	0.07		
Summary Count	30	30		
Total Count	30	30		
	Pin Type 2: Power			
Average	0.02	0.00		
St. Dev.	0.01	0.01		
Min	0.01	-0.02		
Max	0.04	0.01		
Summary Count	8	8		
Total Count	8	8		

LLCR Delta Count by Category		
	Stable	**Unstable**
mOhms	**<=1**	**>1**
Acid Vapor	**38**	**0**

DATA SUMMARIES Continued

LLCR Shock Vib:

1) A total of 192 points(160 signal pin and 32 power pin LLCR test 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	5/14/2013	5/16/2013		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	38	44		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	23.96	0.50		
St. Dev.	2.09	0.64		
Min	18.24	0.01		
Max	30.44	6.65		
Summary Count	160	160		
Total Count	160	160		
	Pin Type 2: Power			
Average	1.19	0.14		
St. Dev.	0.26	0.13		
Min	0.79	0.00		
Max	1.63	0.68		
Summary Count	32	32		
Total Count	32	32		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**191**	**1**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock Vib -compliant pin:

5) A total of 192 compliant pin points were measured
6) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
7) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
8) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   c. <= +1.0 mOhms: ---------- Stable
   d. >+1.0 mOhms:---------- Unstable

LLCR Measurement Summaries by Pin Type				
Date	5/14/2013	5/16/2013		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	38	44		
Technician	Aaron McKim	Aaron McKim		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.17	0.04		
St. Dev.	0.08	0.05		
Min	0.08	0.00		
Max	0.43	0.26		
Summary Count	160	160		
Total Count	160	160		
	Pin Type 2: Power			
Average	0.04	0.00		
St. Dev.	0.00	0.01		
Min	0.04	0.00		
Max	0.05	0.02		
Summary Count	32	32		
Total Count	32	32		

LLCR Delta Count by Category		
	Stable	**Unstable**
mOhms	**<=1**	**>1**
Shock-Vib	**192**	**0**

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

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-MO-05
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 3706
Serial #: 297288
Accuracy: Last Cal: 2012-8-6, Next Cal: 2013-8-5

Equipment #: HZ-HPM-01
Description: IR/DWV Tester
Manufacturer: AN9636H
Model: AN9636H
Serial #: 089601091
Accuracy: Last Cal: 2012-7-6, Next Cal: 2013-7-5

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 2013-4-28, Next Cal: 2014-4-27

Equipment #: HZ-OV-01
Description: Oven
Manufacturer: Huida
Model: CS101-1E
Serial #: CS101-1E-B
Accuracy: Last Cal: 2012-12-14, Next Cal: 2013-12-13

Equipment #: HZ-THC-01
Description: Humidity transmitter
Manufacturer: Thermtron
Model: HMM30C
Serial #: D0240037
Accuracy: Last Cal: 2013-3-3, Next Cal: 2014-3-2

Equipment #: MO-02
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0780546
Accuracy: Last Cal: 2013-6-16, Next Cal: 2014-6-16

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: PS-01
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 3329A-07330
Accuracy: Last Cal: 2013-6-12, Next Cal: 2014-6-12

Equipment #: PS-02
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 2847A-04167
Accuracy: Last Cal: 2013-6-12, Next Cal: 2014-6-12

Equipment #: HZ-TSC-01
Description: Thermal Shock transmitter
Manufacturer: CSZ
Model: 10-VT14994
Serial #: VTS-3-6-6-SC/AC
Accuracy: Last Cal: 2012-11-1, Next Cal: 2013-11-1

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 2012-11-31, Next Cal: 2013-11-31

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 2012-07-9, Next Cal: 2013-7-9

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 2013-06-4, Next Cal: 2014-06-4