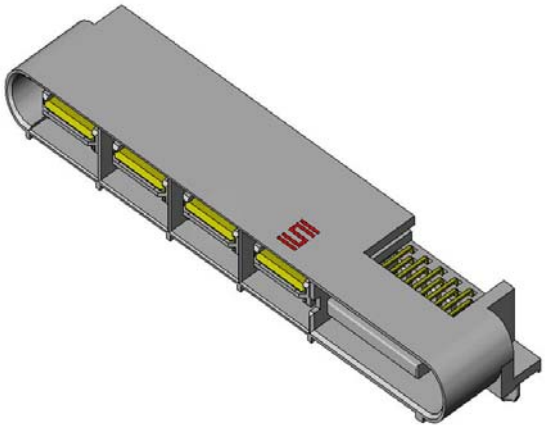
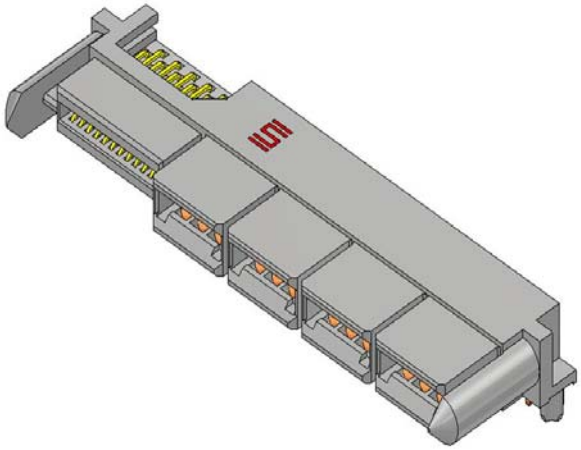
Project Number: Design Qualification Test Report	Tracking Code: 259005_Report_Rev_1
Requested by: Leo lee	Date: 09/4/2015
Part #: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP	
Part description: LPHS/LPHT	Tech: Kason He
Test Start: 05/29/2013	Test Completed: 07/23/2013





DESIGN QUALIFICATION TEST REPORT

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

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
07/23/2013	**1**	**Initial Issue**	**KH**

CERTIFICATION

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

SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead Free
9) Samtec Test PCBs used: PCB-104065-TST/ PCB-104066-TST/ PCB-104067-TST/ PCB-104068-TST

FLOWCHARTS

Gas Tight

TEST STEP	GROUP A1 8 Boards
01	LLCR-1
02	Gas Tight
03	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)
01	Contact Gaps
02	Forces - Mating / Unmating
03	LLCR-1
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)	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)	GROUP A2 2 Unmated of Part # Being Tested Break Down Pin-to-Pin (Signal Pin)	GROUP A3 2 Unmated of Mating Part # Break Down Pin-to-Pin (Signal Pin)	GROUP B1 2 Mated Sets Pin-to-Pin (Signal Pin)
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

TEST STEP	GROUP C1 2 Mated Sets Break Down Row-to-Row (Signal Pin)	GROUP C2 2 Unmated of Part # Being Tested Break Down Row-to-Row (Signal Pin)	GROUP C3 2 Unmated of Mating Part # Break Down Row-to-Row (Signal Pin)	GROUP D1 2 Mated Sets Row-to-Row (Signal Pin)
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 E1 2 Mated Sets Break Down Power-to-Power	GROUP E2 2 Unmated of Part # Being Tested Break Down Power-to-Power	GROUP E3 2 Unmated of Mating Part # Break Down Power-to-Power	GROUP F1 2 Mated Sets Power-to-Power
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 G1 2 Mated Sets Break Down Signal-to-Power	GROUP G2 2 Unmated of Part # Being Tested Break Down Signal-to-Power	GROUP G3 2 Unmated of Mating Part # Break Down Signal-to-Power	GROUP H1 2 Mated Sets Signal-to-Power
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)

POWER PINS

Current Carrying Capacity - Power Pins

TEST STEP	GROUP A1 3 Mated Assemblies 2 Contact Powered	GROUP A2 3 Mated Assemblies 4 Contacts Powered	GROUP A3 3 Mated Assemblies 6 Contacts Powered	GROUP A4 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC

SIGNAL PINS

Current Carrying Capacity - Singal Pins

TEST STEP	GROUP D1 3 Mated Assemblies 2 Pins Powered	GROUP D2 3 Mated Assemblies 4 Pins Powered	GROUP D3 3 Mated Assemblies 6 Pins Powered	GROUP D4 3 Mated Assemblies 8 Pins Powered	GROUP D5 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC	CCC

POWER & SIGNAL PINS

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
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

FLOWCHARTS Continued

Mechanical Shock / Vibration / LLCR

TEST STEP	GROUP A1 8 Boards
01	LLCR-1
02	Shock
03	Vibration
04	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

Shock / Vibration / nanoSecond Event Detection

TEST STEP	GROUP A1 60 Points
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

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 Continued

The following is a brief, simplified description of attributes.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

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

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.

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.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

INSULATION RESISTANCE (IR):

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

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

RESULTS

Temperature Rise, CCC at a 20% de-rating

Power pin

- **CCC for a 30°C Temperature Rise ----------33.0 A per contact with 2 contacts (2 x 1) powered**
- **CCC for a 30°C Temperature Rise ----------29.6 A per contact with 4 contacts (2 x 2) powered**
- **CCC for a 30°C Temperature Rise ----------28.0 A per contact with 6 contacts (2 x 3) powered**
- **CCC for a 30°C Temperature Rise ----------26.0 A per contact with 8 contacts (All) powered**

Signal pin

- **CCC for a 30°C Temperature Rise ----------2.5 A per contact with 2 contacts (2 x 1) powered**
- **CCC for a 30°C Temperature Rise ----------1.9 A per contact with 4 contacts (2 x 2) powered**
- **CCC for a 30°C Temperature Rise ----------1.6 A per contact with 6 contacts (2 x 3) powered**
- **CCC for a 30°C Temperature Rise ----------1.5 A per contact with 8 contacts (2 x 4) powered**
- **CCC for a 30°C Temperature Rise ----------0.9 A per contact with 32 contacts (All) powered**

Power pin and signal pin (signal contacts powered @ 1/2 rated current @ 0.55 AMPS.)

- **CCC for a 30°C Temperature Rise----------24.1 A per contact with all adjacent power contacts powered**

Mating – Unmating Forces

Thermal Aging Group (LPHS-08-32-L-RT1-GP/ LPHT-08-32-L-RT1-GP)

- **Initial**
  - **Mating**
    - **Min ---------- 7.73 Lbs**
    - **Max---------- 9.30 Lbs**
  - **Unmating**
    - **Min ---------- 5.16 Lbs**
    - **Max---------- 6.12 Lbs**
- **After Thermal**
  - **Mating**
    - **Min ---------- 5.33 Lbs**
    - **Max---------- 5.78 Lbs**
  - **Unmating**
    - **Min ---------- 4.36 Lbs**
    - **Max---------- 5.68 Lbs**

RESULTS Continued

Mating – Unmating Forces

Mating-Unmating Durability Gaps Group (LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP)

- **Initial**
  - **Mating**
    - **Min ---------- 7.81 Lbs**
    - **Max---------- 9.88 Lbs**
  - **Unmating**
    - **Min ---------- 4.75 Lbs**
    - **Max---------- 7.77 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 8.29 Lbs**
    - **Max----------11.18 Lbs**
  - **Unmating**
    - **Min ---------- 5.58 Lbs**
    - **Max---------- 8.30 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 8.92 Lbs**
    - **Max----------11.94 Lbs**
  - **Unmating**
    - **Min ---------- 6.15 Lbs**
    - **Max---------- 9.18 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 9.32 Lbs**
    - **Max----------13.36 Lbs**
  - **Unmating**
    - **Min ---------- 6.38 Lbs**
    - **Max----------10.25 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 9.46 Lbs**
    - **Max----------14.27 Lbs**
  - **Unmating**
    - **Min ---------- 6.89 Lbs**
    - **Max----------10.85 Lbs**
- **Humidity**
  - **Mating**
    - **Min ---------- 4.84 Lbs**
    - **Max---------- 6.14 Lbs**
  - **Unmating**
    - **Min ---------- 3.68 Lbs**
    - **Max---------- 4.87 Lbs**

RESULTS Continued

Mating – Unmating Forces

Mating-Unmating Basic (LPHS-06-24-L-RT1-GP/LPHT-06-24-L-RT1-GP)

- **Initial**
  - **Mating**
    - **Min ---------- 7.44 Lbs**
    - **Max---------- 9.17 Lbs**
  - **Unmating**
    - **Min ---------- 5.64 Lbs**
    - **Max---------- 5.98 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 8.36 Lbs**
    - **Max----------10.00 Lbs**
  - **Unmating**
    - **Min ---------- 6.38 Lbs**
    - **Max---------- 8.54 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 9.01 Lbs**
    - **Max----------10.64 Lbs**
  - **Unmating**
    - **Min ---------- 6.64 Lbs**
    - **Max---------- 9.57 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 9.73 Lbs**
    - **Max----------11.75 Lbs**
  - **Unmating**
    - **Min ---------- 7.03 Lbs**
    - **Max----------10.28 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ----------10.03 Lbs**
    - **Max----------12.25 Lbs**
  - **Unmating**
    - **Min ---------- 7.67 Lbs**
    - **Max----------10.89 Lbs**

RESULTS Continued

Mating – Unmating Forces

Mating-Unmating Basic (LPHS-04-20-L-RT1-GP/LPHT-04-20-L-RT1-GP)

- **Initial**
  - **Mating**
    - **Min ---------- 6.18 Lbs**
    - **Max---------- 7.97 Lbs**
  - **Unmating**
    - **Min ---------- 3.87 Lbs**
    - **Max---------- 5.31 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 6.50 Lbs**
    - **Max---------- 8.53 Lbs**
  - **Unmating**
    - **Min ---------- 4.20 Lbs**
    - **Max---------- 6.63 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 6.76 Lbs**
    - **Max---------- 9.68 Lbs**
  - **Unmating**
    - **Min ---------- 4.39 Lbs**
    - **Max---------- 7.29 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 7.22 Lbs**
    - **Max----------10.69 Lbs**
  - **Unmating**
    - **Min ---------- 5.05 Lbs**
    - **Max---------- 8.17 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 7.37 Lbs**
    - **Max----------11.40 Lbs**
  - **Unmating**
    - **Min ---------- 5.46 Lbs**
    - **Max---------- 8.58 Lbs**

RESULTS Continued

Insulation Resistance minimums, IR

Pin to Pin (Signal pin)

- **Initial**
  - **Mated ---------- 10000Meg Ω ---------- Passed**
  - **Unmated ---------- 10000Meg Ω ---------- Passed**
- **Thermal Shock**
  - **Mated ---------- 10000Meg Ω ---------- Passed**
  - **Unmated ---------- 10000Meg Ω ---------- Passed**
- **Humidity**
  - **Mated ---------- 6970Meg Ω ---------- Passed**
  - **Unmated ---------- 10000Meg Ω ---------- Passed**

Row to Row (Signal pin)

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

Signal pin to Power pin

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

Pin to Pin (Power pin)

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

Row to Row (Power pin)

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

RESULTS Continued

Dielectric Withstanding Voltage minimums, DWV

Signal pin

- **Minimums**
  - **Breakdown Voltage----------875 VAC**
  - **Test Voltage ----------656 VAC**
  - **Working Voltage ----------219 VAC**

Power pin

- **Minimums**
  - **Breakdown Voltage---------- 1950 VAC**
  - **Test Voltage ---------- 1463 VAC**
  - **Working Voltage ----------488 VAC**

Pin to Pin (Signal pin)

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

Row to Row (Signal pin)

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

Signal pin to Power pin

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

Pin to Pin (Power pin)

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

Row to Row (Power pin)

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

RESULTS Continued

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

Signal pin

- **Initial ---------- 33.81mOhms Max**
- **Thermal**
  - **<= +5.0 mOhms ---------- 160 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Power pin

- **Initial ---------- 1.26mOhms Max**
- **Thermal**
  - **<= +5.0 mOhms ---------- 32 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 (160 signal pin and 32 power pin LLCR test points)

Signal pin

- **Initial ---------- 37.22mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 159 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Power pin

- **Initial ---------- 1.36mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 32 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

LLCR Mating/Unmating Durability Group (160 signal pin and 32 power pin LLCR test points)

Signal pin

- **Initial ---------- 36.41mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 159 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal Shock**
  - **<= +5.0 mOhms ---------- 158 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 2 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ---------- 159 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Power pin

- **Initial ---------- 1.43mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 32 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 ---------- 32Points ---------- 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 ---------- 32 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

LLCR Shock & Vibration Group (160 signal pin and 32 power pin LLCR test points)

Signal pin

- **Initial ---------- 40.59mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 157 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 3 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**

Power pin

- **Initial ---------- 1.50mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 32 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**

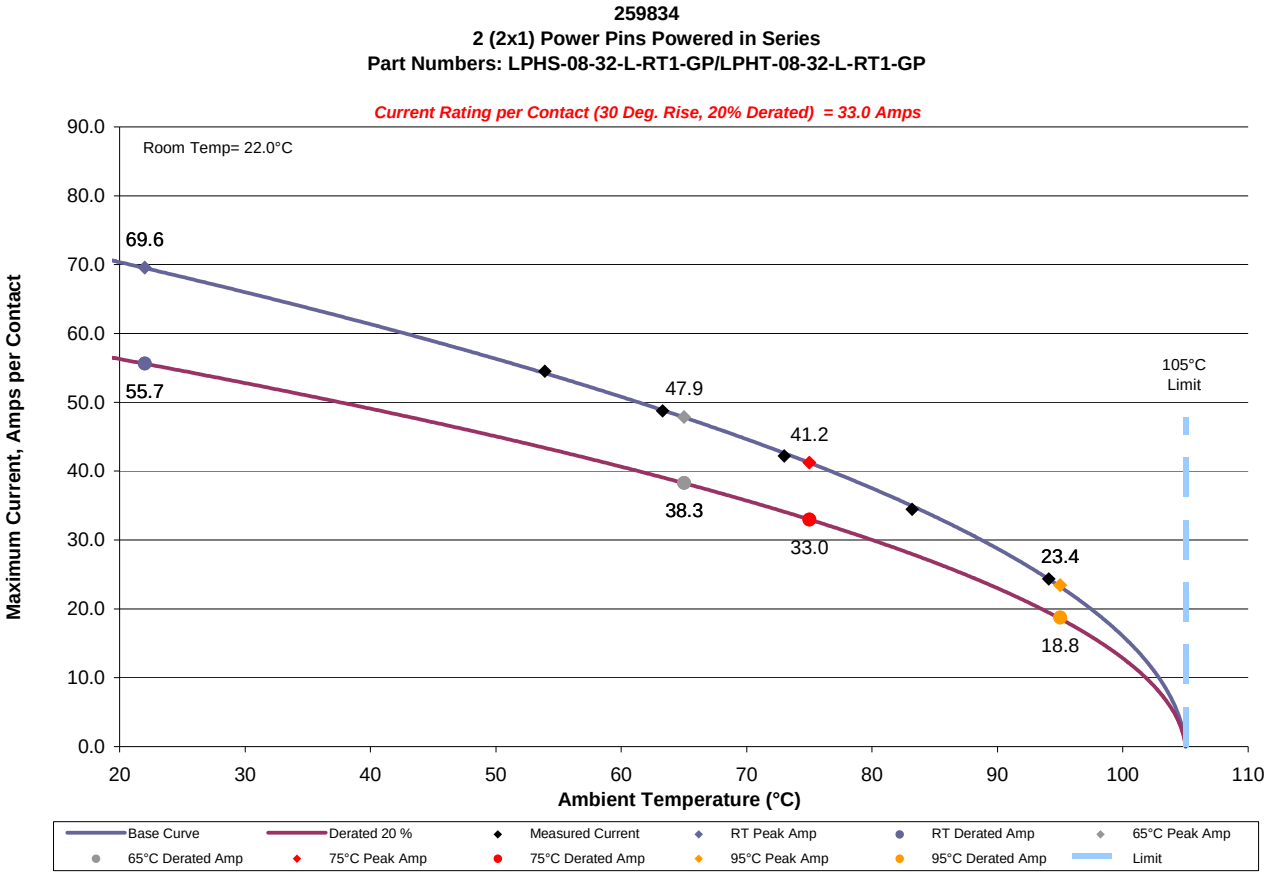
Mechanical Shock & Random Vibration:

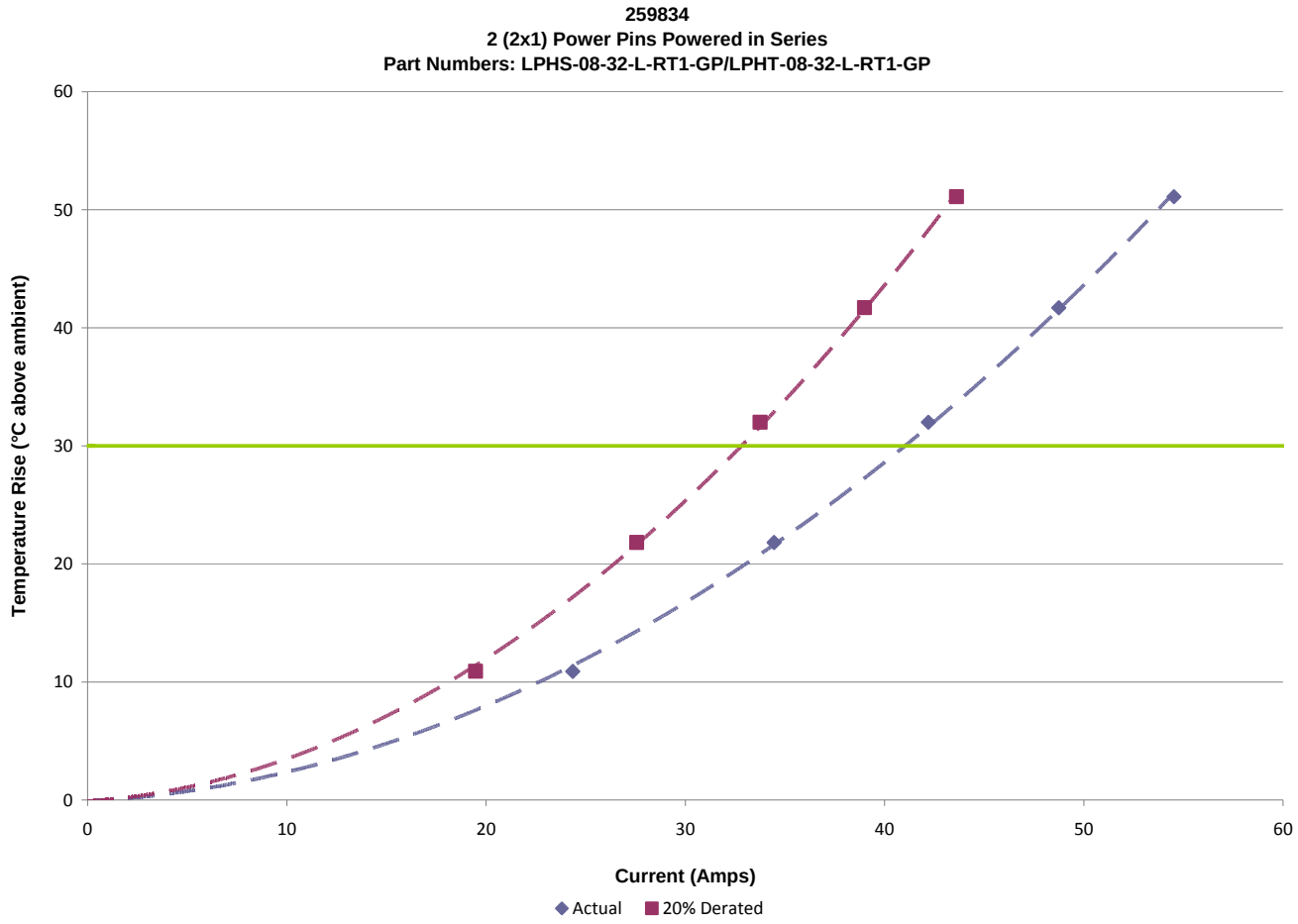
- **Shock**
  - **No Damage ---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**
- **Vibration**
  - **No Damage ---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**

DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

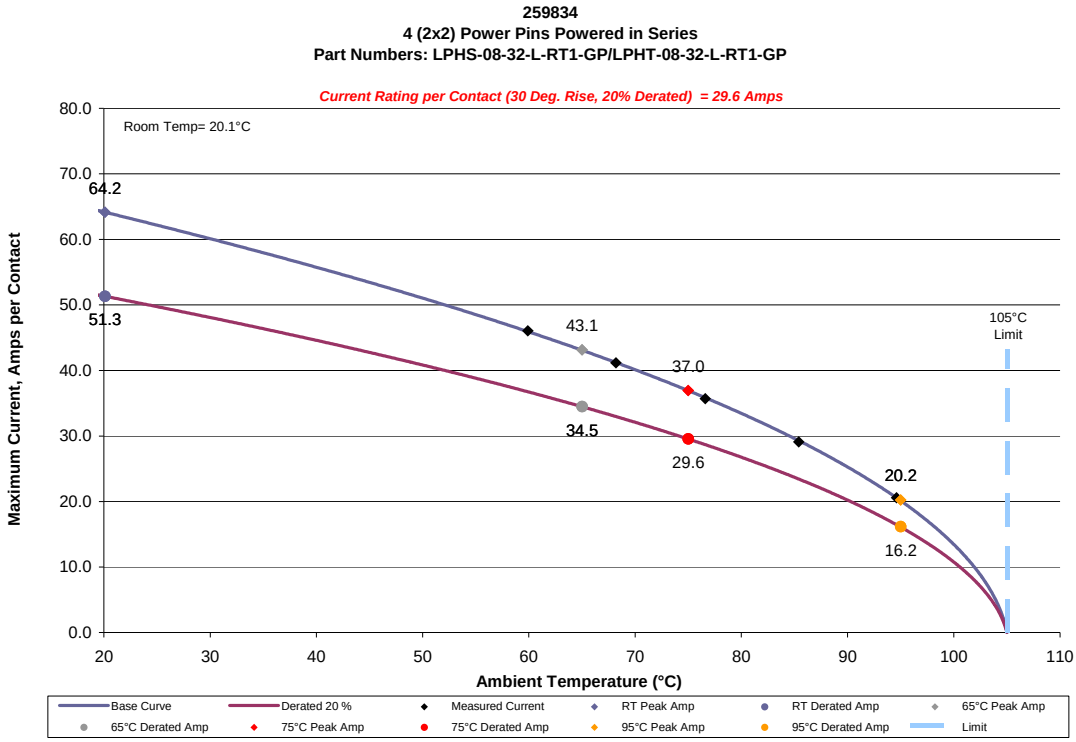
1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes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

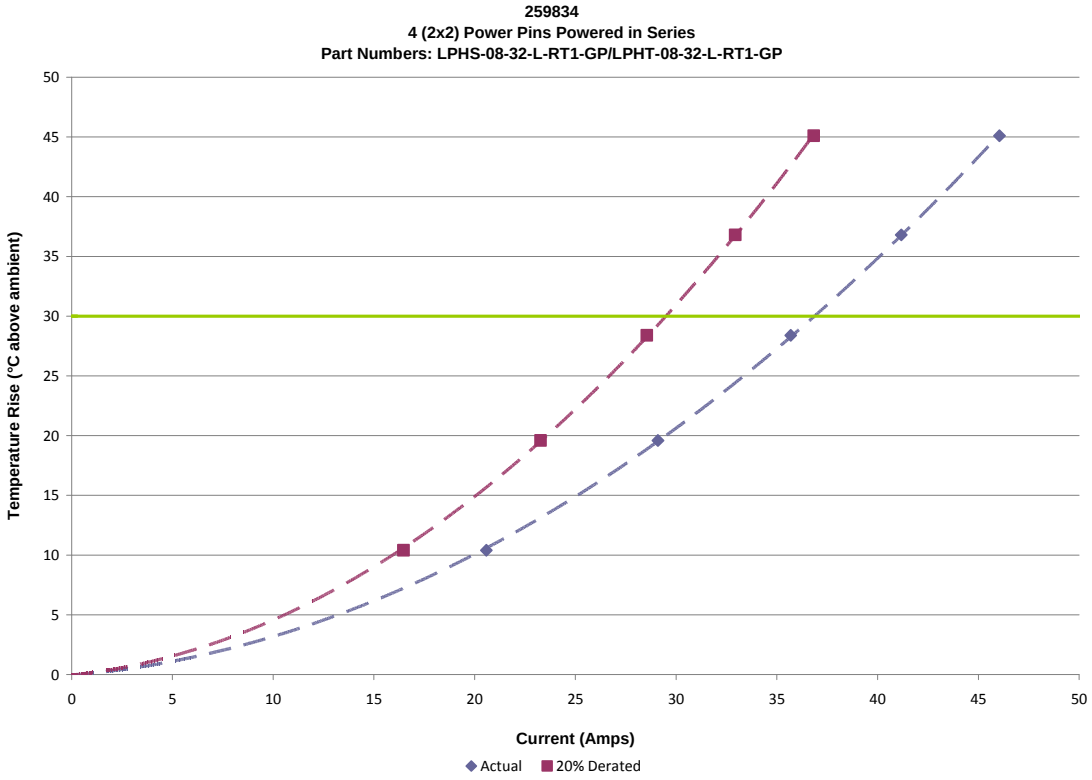



259834
2 (2x1) Power Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (°C above ambient)
0
10
20
30
40
50
60
Current (Amps)
Actual
20% Derated

DATA SUMMARIES Continued

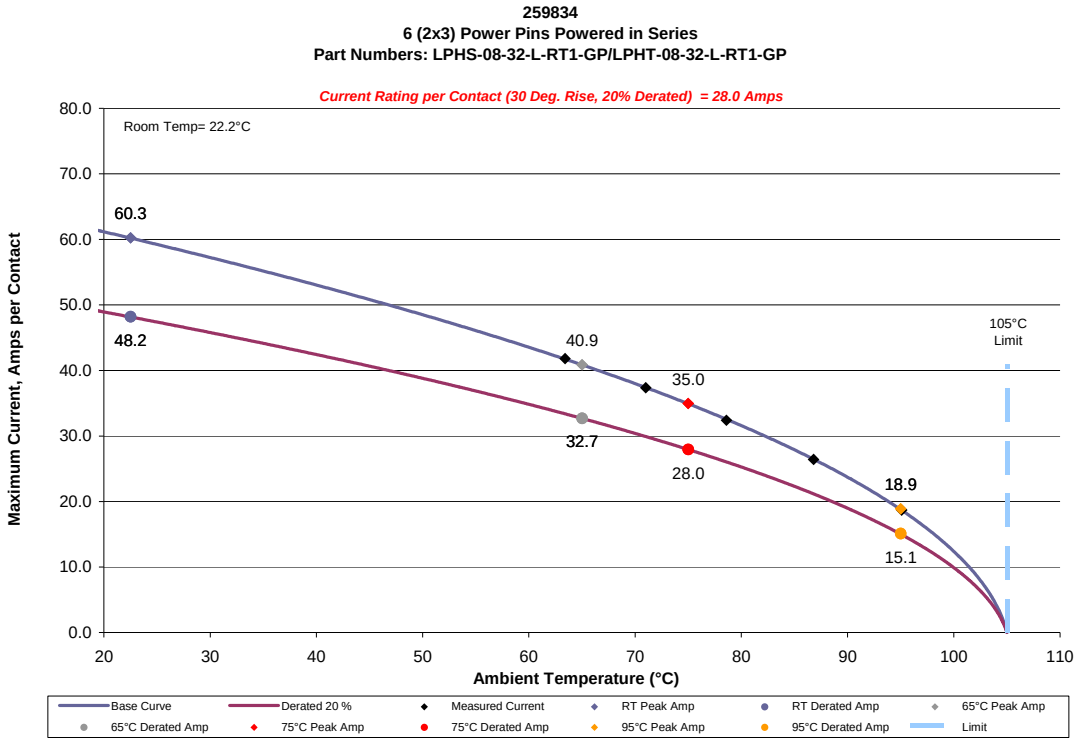
b. Linear configuration with 4 adjacent power conductors/contacts powered

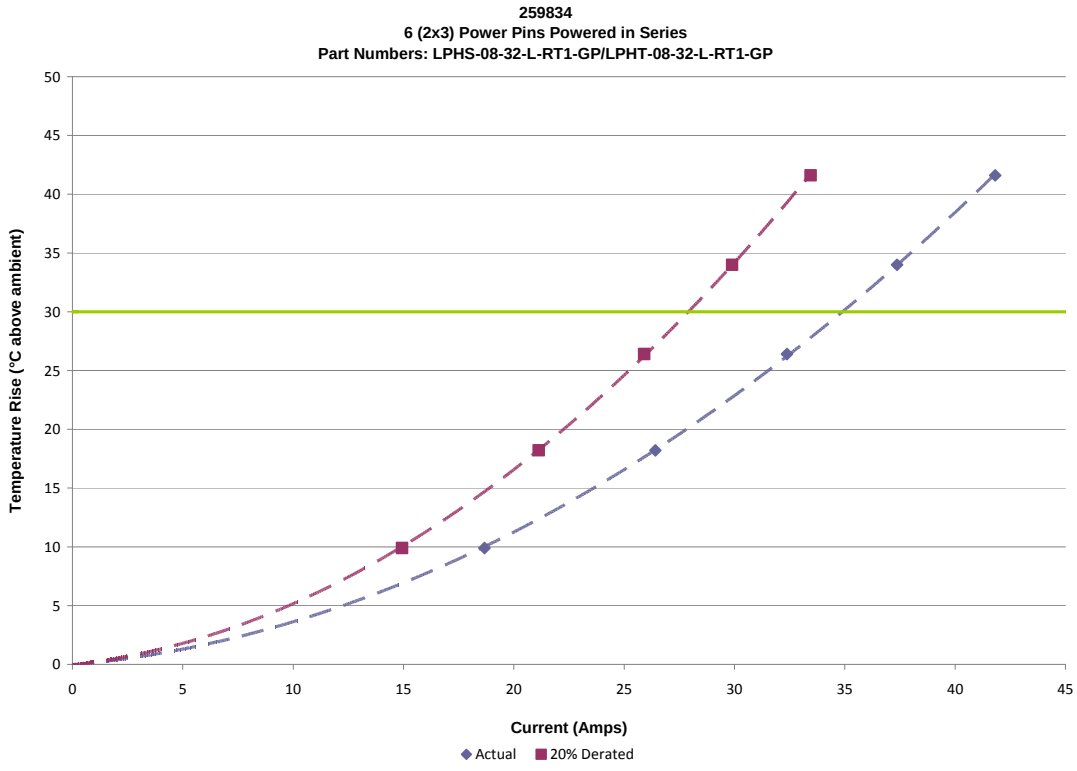




DATA SUMMARIES Continued

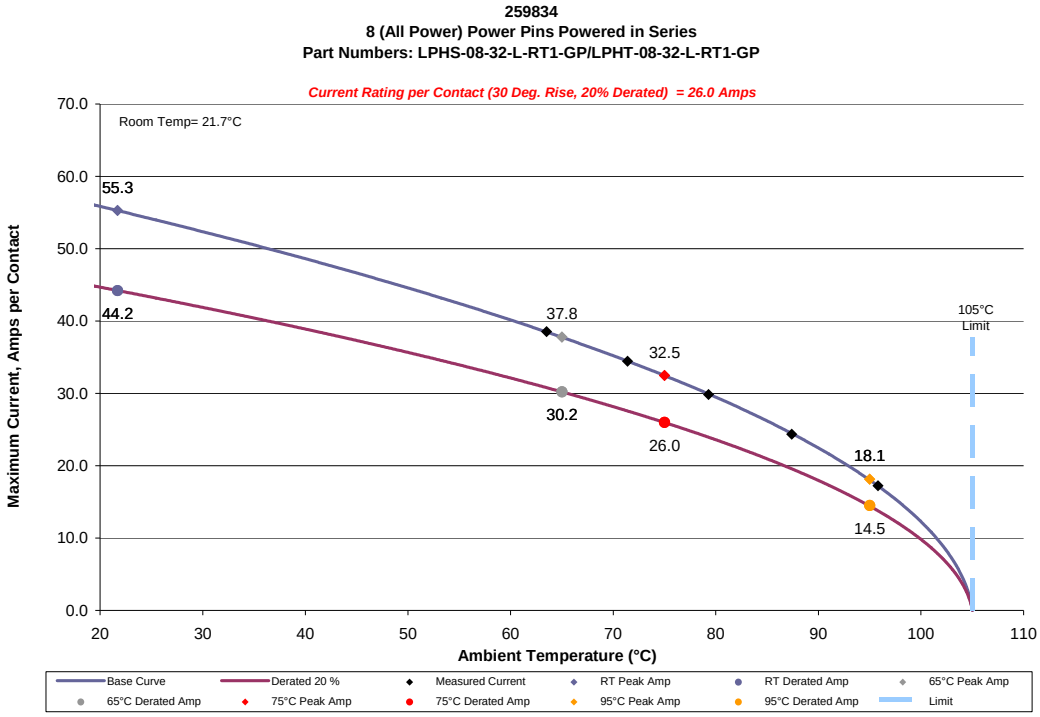
c. Linear configuration with 6 adjacent power conductors/contacts powered

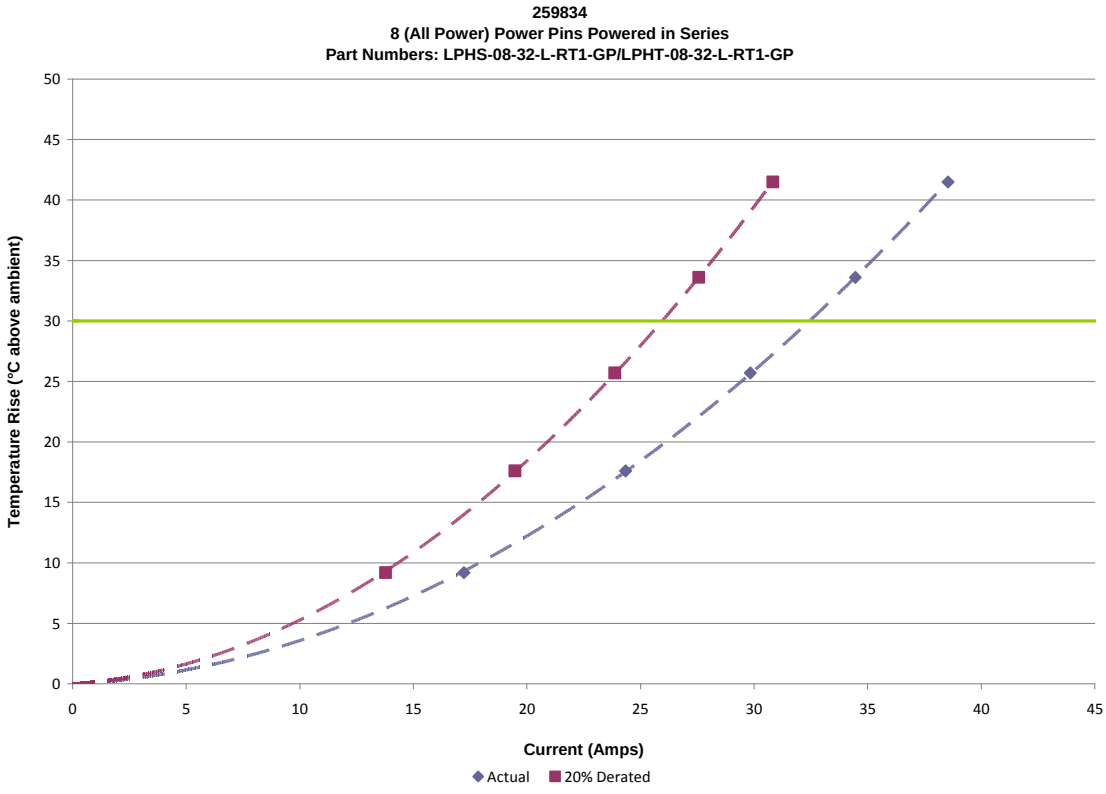




DATA SUMMARIES Continued

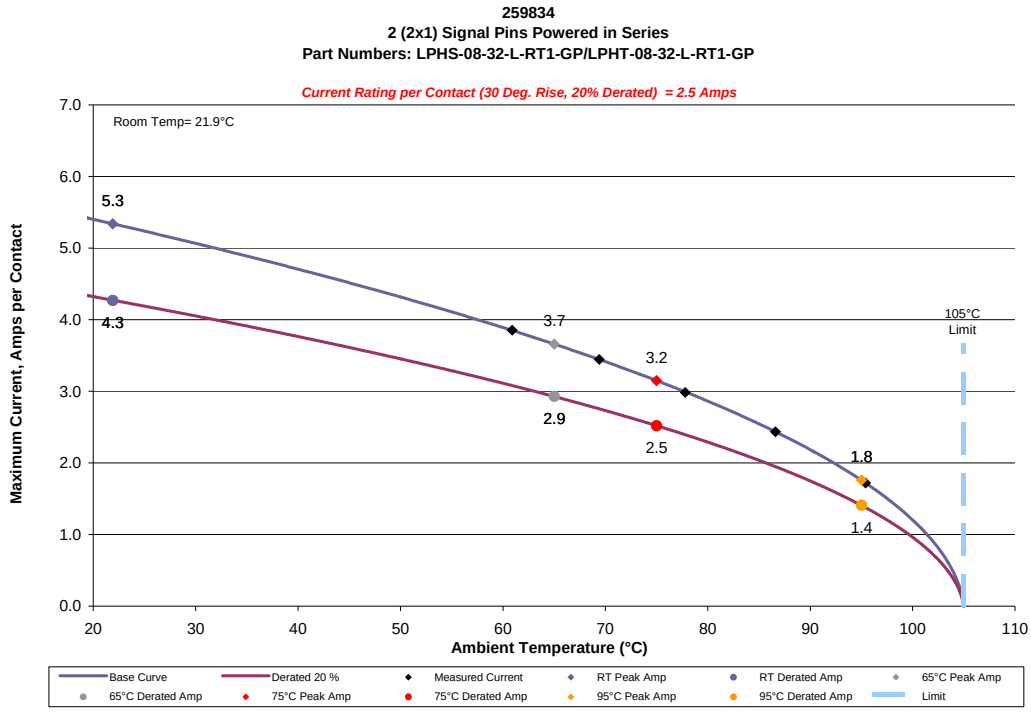
d. Linear configuration with all adjacent power conductors/contacts powered

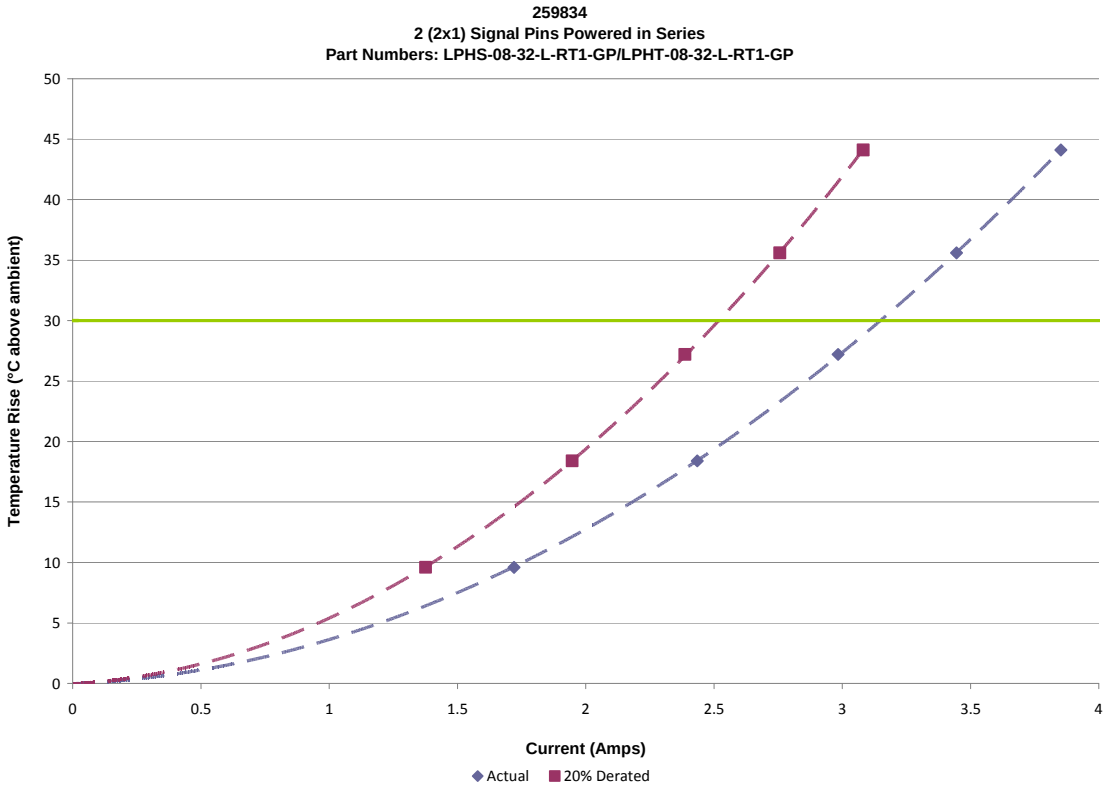




DATA SUMMARIES Continued

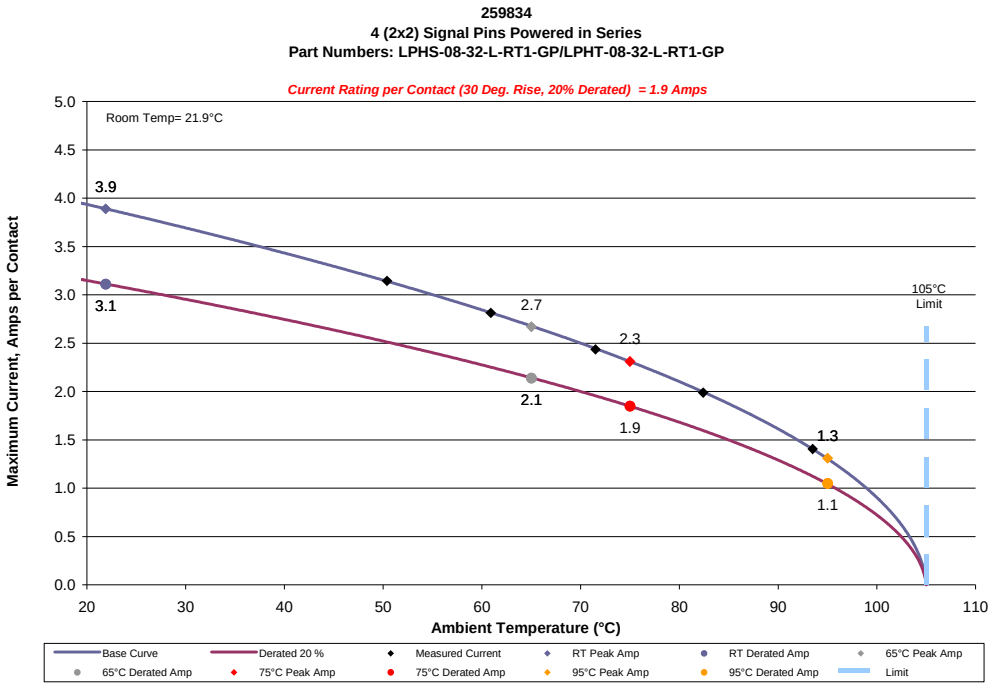
e. Linear configuration with 2 adjacent signal conductors/contacts powered

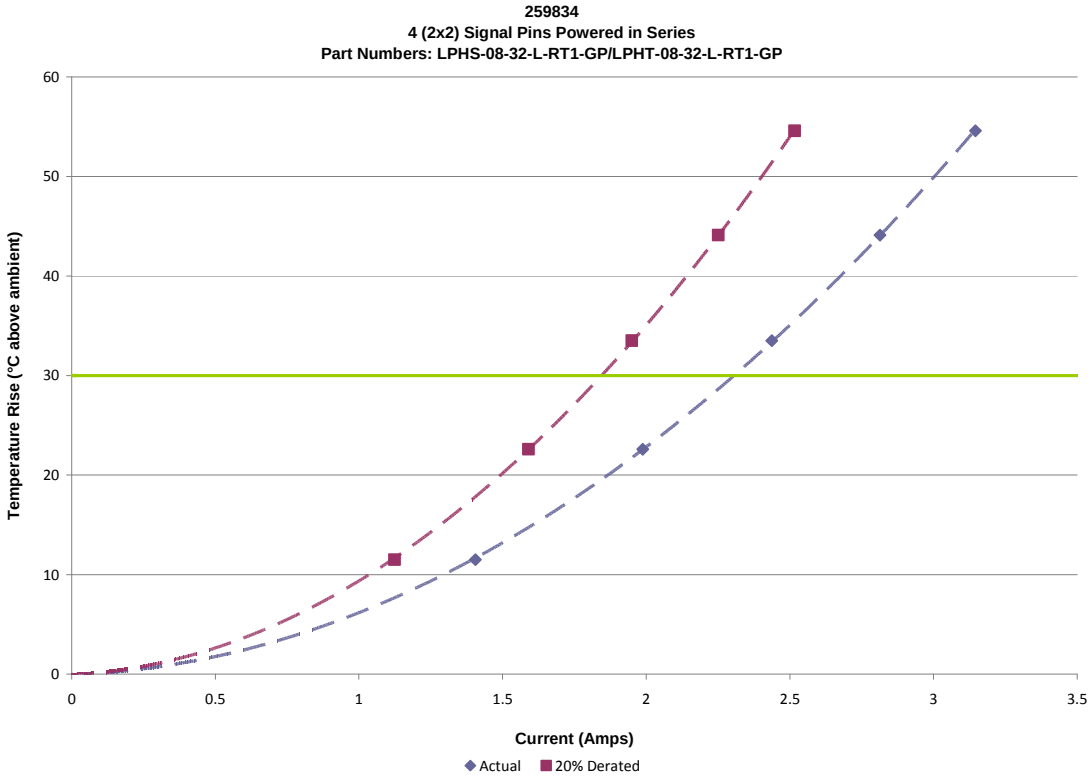




DATA SUMMARIES Continued

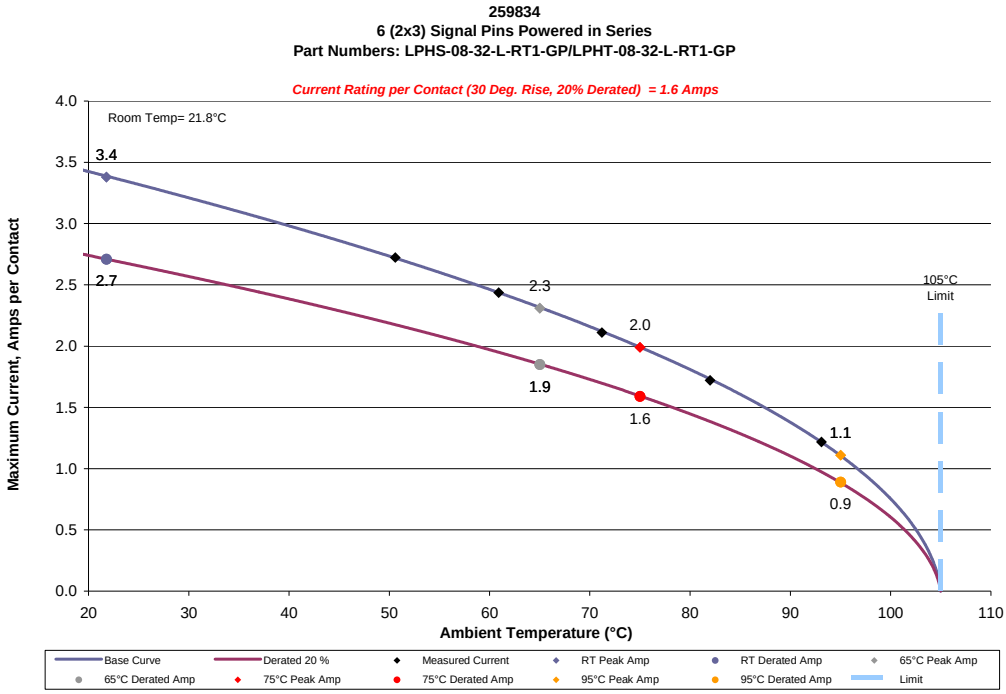
f. Linear configuration with 4 adjacent signal conductors/contacts powered

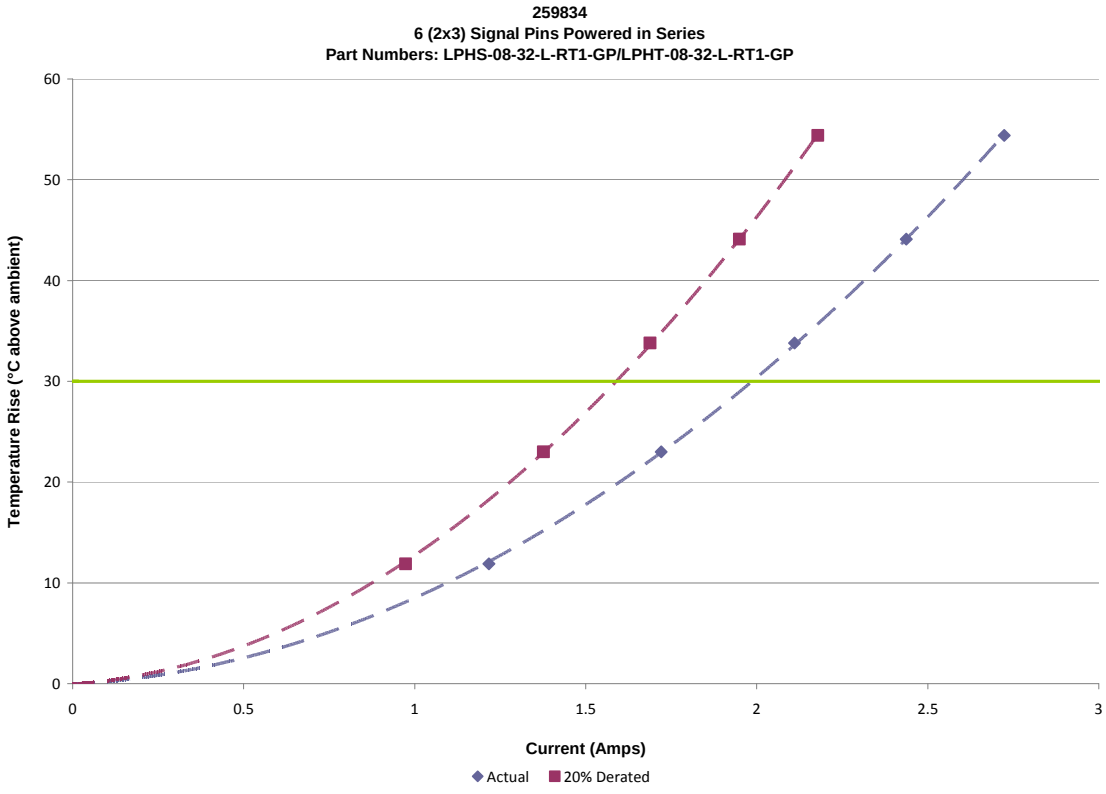




DATA SUMMARIES Continued

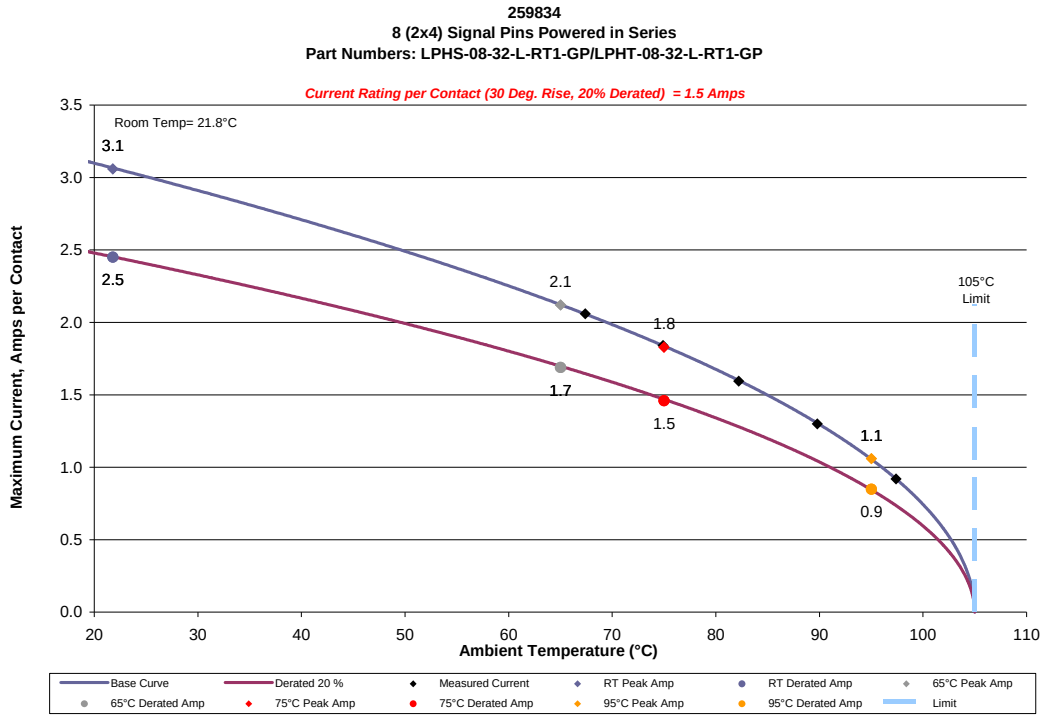
g. Linear configuration with 6 adjacent signal conductors/contacts powered

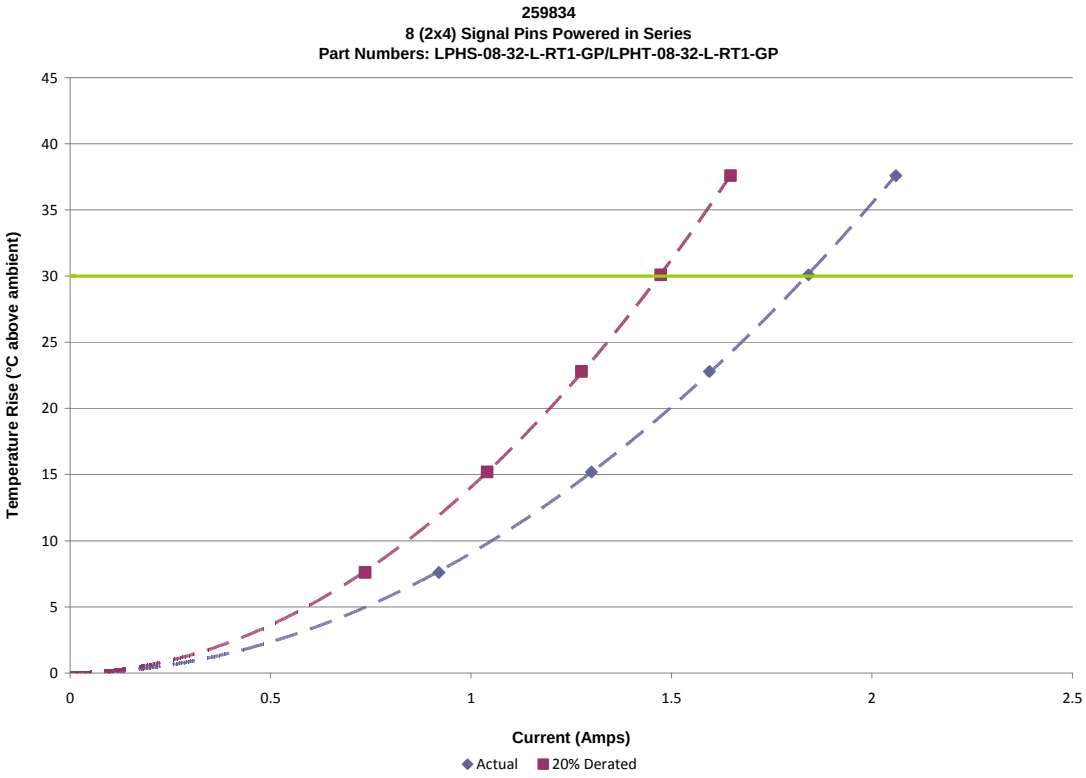




DATA SUMMARIES Continued

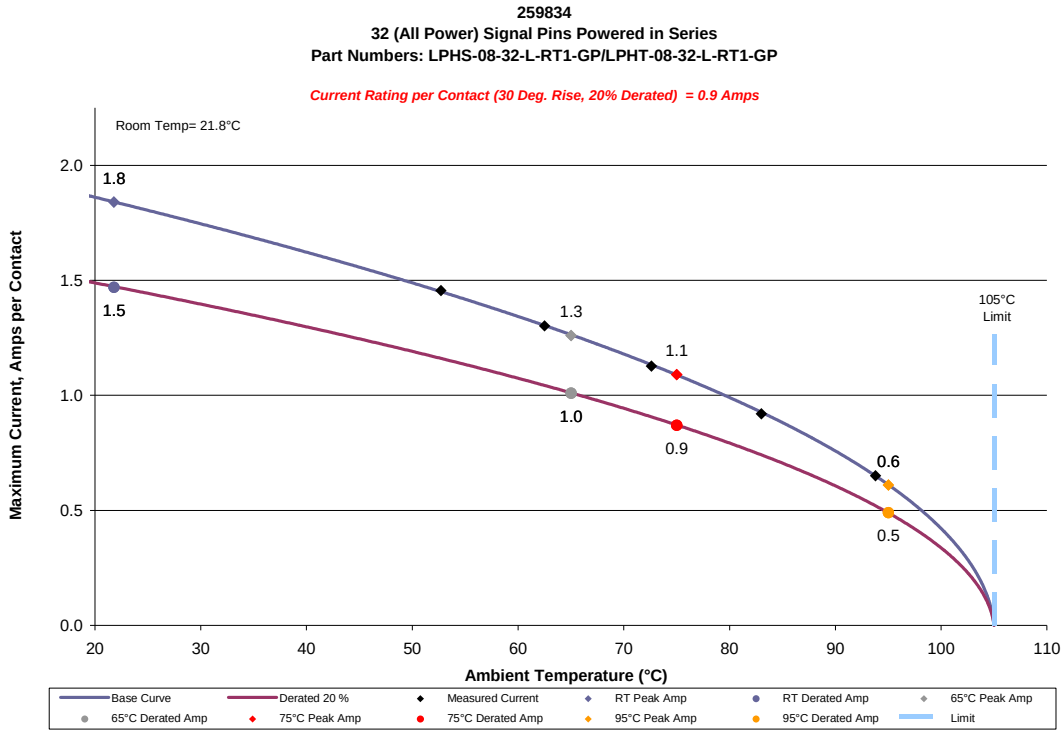
h. Linear configuration with 8 adjacent signal conductors/contacts powered

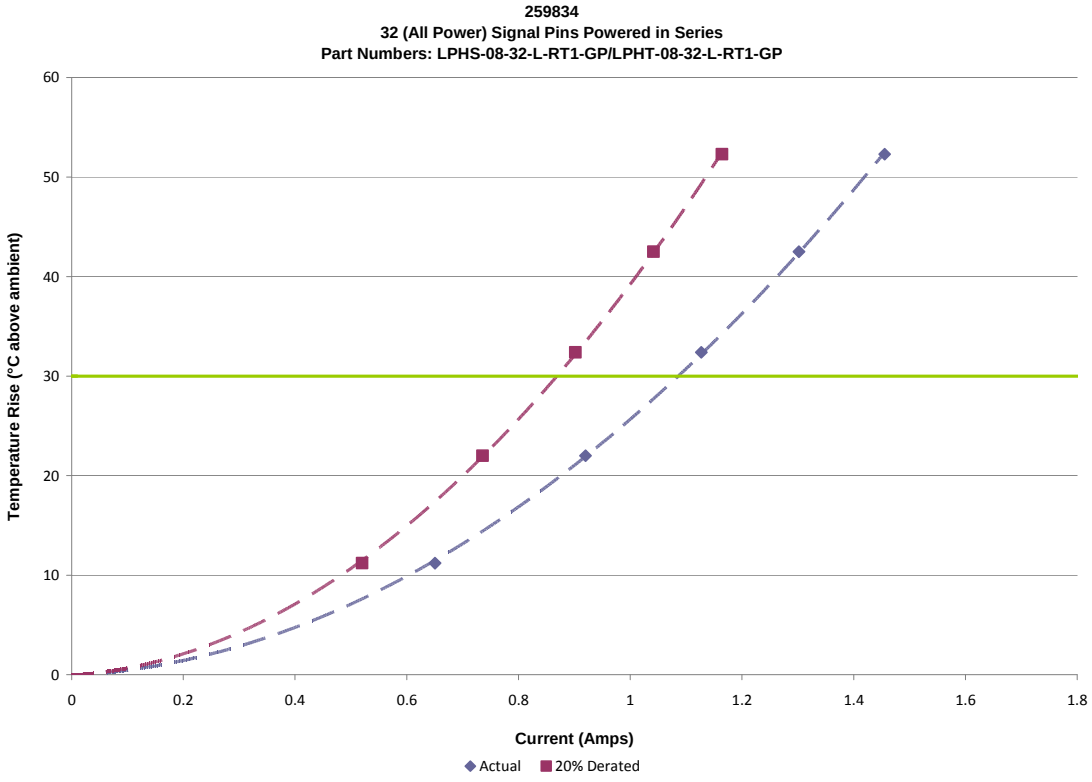




DATA SUMMARIES Continued

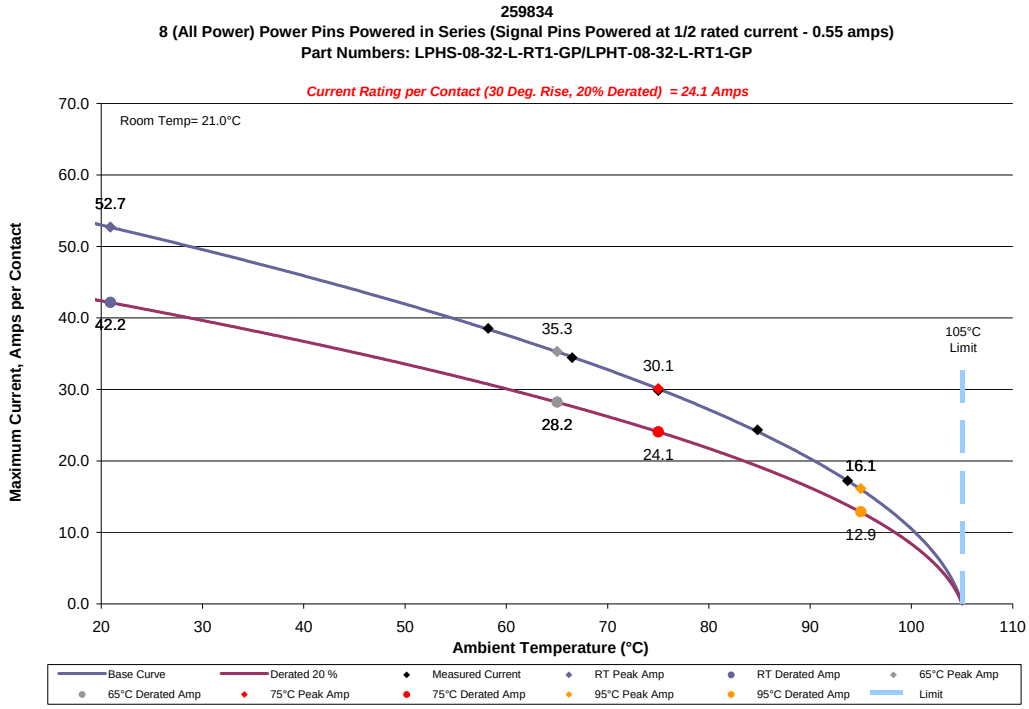
i. Linear configuration with all adjacent signal conductors/contacts powered

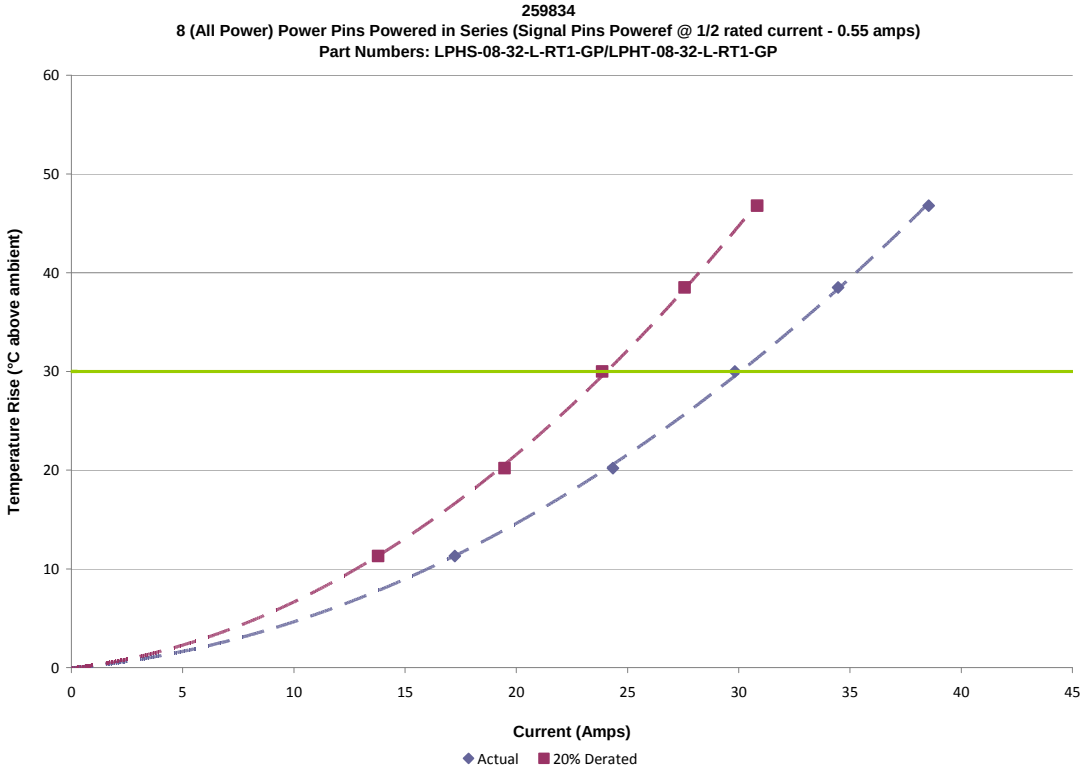




DATA SUMMARIES Continued

j. Linear configuration with all power pins (while signal pin at1/2 rated current 0.55 Amps) contacts powered





DATA SUMMARIES Continued

MATING-UNMATING FORCE:

Thermal Aging Group (LPHS-08-32-L-RT1-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	34.38	7.73	22.95	5.16	23.71	5.33	19.39	4.36
Maximum	41.37	9.30	27.22	6.12	25.71	5.78	25.26	5.68
Average	37.54	**8.44**	25.55	**5.75**	24.69	**5.55**	22.69	**5.10**
St Dev	2.44	0.55	1.75	0.39	0.79	0.18	1.84	0.41
Count	8	8	8	8	8	8	8	8

MATING-UNMATING FORCE:

Mating-Unmating Durability Gaps Group (LPHS-08-32-L-RT1-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	34.74	7.81	21.13	4.75	36.87	8.29	24.82	5.58
Maximum	43.95	9.88	34.56	7.77	49.73	11.18	36.92	8.30
Average	39.46	**8.87**	26.38	**5.93**	44.00	**9.89**	30.65	**6.89**
St Dev	3.04	0.68	4.94	1.11	5.42	1.22	4.70	1.06
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	39.68	8.92	27.36	6.15	41.46	9.32	28.38	6.38
Maximum	53.11	11.94	40.83	9.18	59.43	13.36	45.59	10.25
Average	46.59	**10.48**	33.68	**7.57**	49.34	**11.09**	36.47	**8.20**
St Dev	5.38	1.21	5.30	1.19	6.92	1.56	6.34	1.43
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	42.08	9.46	30.65	6.89	21.53	4.84	16.37	3.68
Maximum	63.47	14.27	48.26	10.85	27.31	6.14	21.66	4.87
Average	51.44	**11.57**	38.76	**8.71**	24.07	**5.41**	18.99	**4.27**
St Dev	8.29	1.86	6.73	1.51	2.13	0.48	1.90	0.43
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

MATING-UNMATING FORCE:

Mating-Unmating Basic (LPHS-06-24-L-RT1-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	33.09	7.44	25.09	5.64	37.19	8.36	28.38	6.38
Maximum	40.79	9.17	31.05	6.98	44.48	10.00	37.99	8.54
Average	35.61	**8.01**	27.08	**6.09**	40.35	**9.07**	30.58	**6.88**
St Dev	2.44	0.55	2.07	0.47	2.64	0.59	3.27	0.74
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	40.08	9.01	29.53	6.64	43.28	9.73	31.27	7.03
Maximum	47.33	10.64	42.57	9.57	52.26	11.75	45.73	10.28
Average	44.59	**10.02**	34.46	**7.75**	47.78	**10.74**	37.81	**8.50**
St Dev	2.92	0.66	4.38	0.99	2.94	0.66	5.02	1.13
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	44.61	10.03	34.12	7.67
Maximum	54.49	12.25	48.44	10.89
Average	50.02	**11.25**	40.37	**9.08**
St Dev	3.56	0.80	4.95	1.11
Count	8	8	8	8

DATA SUMMARIES Continued

MATING-UNMATING FORCE:

Mating-Unmating Basic (LPHS-04-20-L-RT1-GP/ LPHT-04-20-L-RT1-GP)

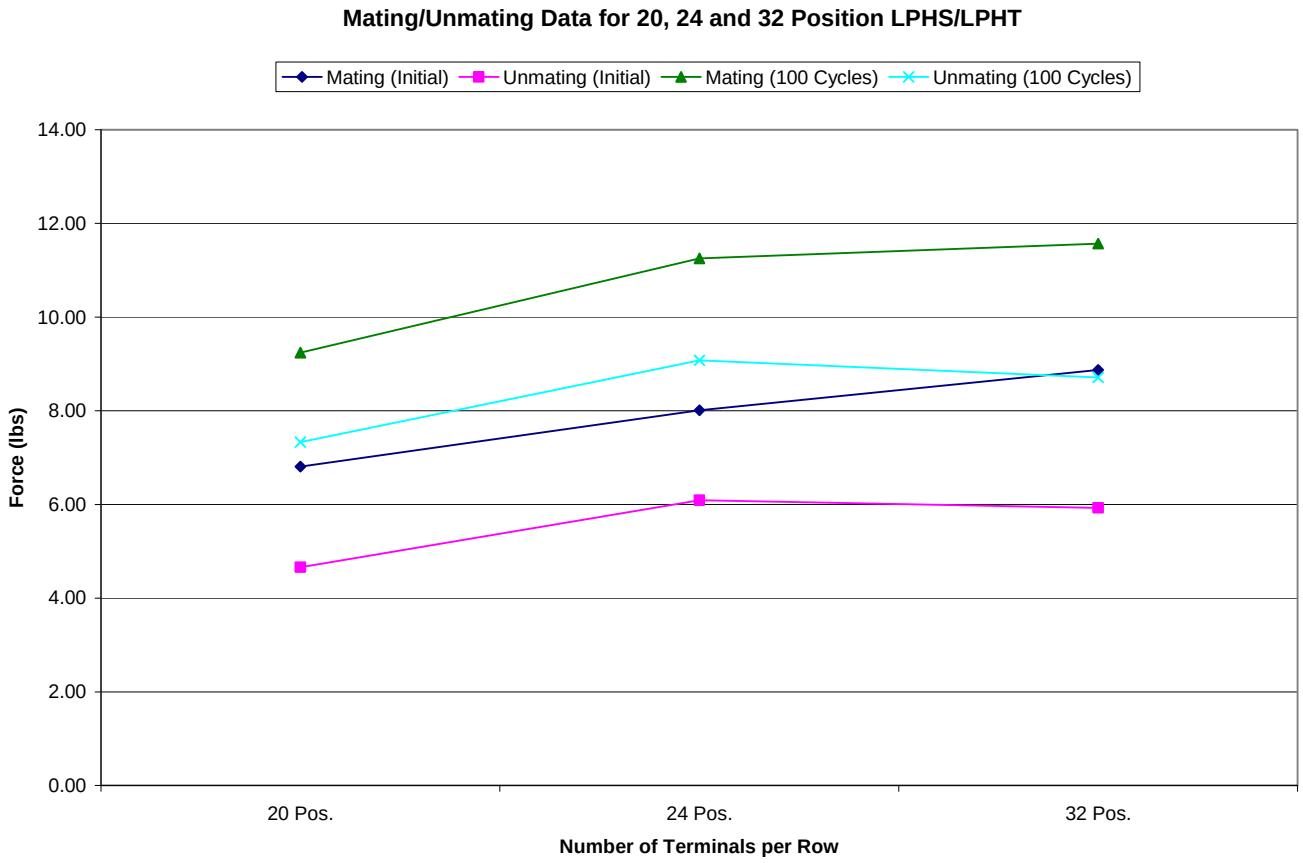
	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	27.49	6.18	17.21	3.87	28.91	6.50	18.68	4.20
Maximum	35.45	7.97	23.62	5.31	37.94	8.53	29.49	6.63
Average	30.28	**6.81**	20.72	**4.66**	33.87	**7.61**	24.75	**5.56**
St Dev	2.42	0.54	2.22	0.50	2.97	0.67	3.39	0.76
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	30.07	6.76	19.53	4.39	32.11	7.22	22.46	5.05
Maximum	43.06	9.68	32.43	7.29	47.55	10.69	36.34	8.17
Average	36.64	**8.24**	27.54	**6.19**	40.11	**9.02**	30.66	**6.89**
St Dev	4.35	0.98	4.22	0.95	5.27	1.18	4.51	1.01
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	32.78	7.37	24.29	5.46
Maximum	50.71	11.40	38.16	8.58
Average	41.09	**9.24**	32.61	**7.33**
St Dev	5.61	1.26	4.52	1.02
Count	8	8	8	8

DATA SUMMARIES Continued

Mating\Unmating Force Comparison



DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

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

	Row to Row (Signal pin)		
	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

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

	Row to Row (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):

Signal Pin

Voltage Rating Summary	
Minimum	**LPHS/LPHT**
Break Down Voltage	875
Test Voltage	656
Working Voltage	219

Power Pin

Voltage Rating Summary	
Minimum	**LPHS/LPHT**
Break Down Voltage	1950
Test Voltage	1463
Working Voltage	488

Pin to Pin (Signal Pin)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Row to Row (Signal Pin)	
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

Pin to Pin (Power Pin)	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Row to Row (Power Pin)	
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 192 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	2013-5-29	2013-6-13		
Room Temp (Deg C)	23	24		
Rel Humidity (%)	60	56		
Technician	kason he	Kason He		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Row 1			
Average	26.13	0.36		
St. Dev.	1.89	0.32		
Min	21.69	0.00		
Max	29.35	1.42		
Summary Count	64	64		
Total Count	64	64		
	Pin Type 2: Row 2			
Average	31.68	0.38		
St. Dev.	1.07	0.29		
Min	29.65	0.01		
Max	33.81	1.49		
Summary Count	96	96		
Total Count	96	96		
	Pin Type 3: Power			
Average	0.96	0.03		
St. Dev.	0.23	0.03		
Min	0.67	0.00		
Max	1.26	0.13		
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	**192**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Mating/Unmating Durability Group

1). A total of 192 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	2013-5-29	2013-6-1	2013-6-7	2013-6-25
Room Temp (Deg C)	24	23	22	24
Rel Humidity (%)	60	60	59	59
Technician	Kason he	Kason he	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Row 1			
Average	32.80	0.67	0.72	0.78
St. Dev.	1.41	0.56	0.67	0.72
Min	29.84	0.07	0.00	0.01
Max	36.41	3.72	4.47	4.38
Summary Count	96	96	96	96
Total Count	96	96	96	96
	Pin Type 2: Row 2			
Average	27.40	0.76	0.95	0.92
St. Dev.	2.23	0.98	1.15	0.92
Min	22.77	0.01	0.02	0.01
Max	32.01	6.99	6.72	5.17
Summary Count	64	64	64	64
Total Count	64	64	64	64
	Pin Type 3: Power			
Average	1.03	0.02	0.04	0.07
St. Dev.	0.25	0.03	0.03	0.11
Min	0.68	0.00	0.00	0.00
Max	1.43	0.13	0.14	0.53
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	**191**	**1**	**0**	**0**	**0**	**0**
Therm Shck	**190**	**2**	**0**	**0**	**0**	**0**
Humidity	**191**	**1**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Gas Tight Group

1) A total of 192 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	2013-6-5	2013-6-6		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	58	59		
Technician	Kason He	Kason He		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Row 1			
Average	26.96	0.57		
St. Dev.	2.04	0.62		
Min	22.51	0.01		
Max	31.20	3.43		
Summary Count	64	64		
Total Count	64	64		
	Pin Type 2: Row 2			
Average	32.43	0.69		
St. Dev.	1.39	0.97		
Min	29.73	0.01		
Max	37.22	8.51		
Summary Count	96	96		
Total Count	96	96		
	Pin Type 3: Power			
Average	1.00	0.02		
St. Dev.	0.22	0.02		
Min	0.71	0.00		
Max	1.36	0.06		
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	**191**	**1**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock & Vibration Group

1) A total of 192 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	2013-6-18	2013-6-26		
Room Temp (Deg C)	21	22		
Rel Humidity (%)	52	55		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Row 1			
Average	32.61	0.67		
St. Dev.	1.82	0.78		
Min	28.84	0.01		
Max	40.59	5.24		
Summary Count	104	104		
Total Count	104	104		
	Pin Type 2: Row 2			
Average	28.16	1.27		
St. Dev.	2.62	1.31		
Min	22.95	0.01		
Max	34.30	5.93		
Summary Count	56	56		
Total Count	56	56		
	Pin Type 3: Power			
Average	1.07	0.04		
St. Dev.	0.25	0.04		
Min	0.70	0.00		
Max	1.50	0.16		
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	**189**	**3**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Nanosecond Event Detection:

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

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: 4/26/2013, Next Cal: 4/25/2014

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

Equipment #: HZ-THC-01
Description: Humidity transmitter
Manufacturer: Thermtron
Model: SM-8-8200
Serial #: 38846
Accuracy: Last Cal: 2/28/2013, Next Cal: 2/27/2014

Equipment #: HZ-HPM-01
Description: NA9636H
Manufacturer: Ainuo
Model: 6031A
Serial #: 089601091
Accuracy: Last Cal: 3/7/2013, Next Cal: 3/6/2014

Equipment #: HZ-MO-05
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 3706
Serial #: 1285188
Accuracy: Last Cal: 11/15/2012, Next Cal: 11/14/2013

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: 06/28/2012, Next Cal: 06/27/2013

EQUIPMENT AND CALIBRATION SCHEDULES Continued

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 04/30/2013, Next Cal: 04/30/2014

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

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/09/2012, Next Cal: 07/09/2013

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 06/04/2013, Next Cal: 06/04/2014

Equipment #: PS-07
Description: 20 V, 120 A DC Power Supply - AutoRanging SO/HPIB
Manufacturer: Hewlett Packard / Agilent
Model: AT-6031A
Serial #: 2721A00648
Accuracy: See Manual
… Last Cal: Reference Only, Next Cal: Reference Only

Equipment #: MO-11
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 3706
Serial #: 120169
Accuracy: See Manual
… Last Cal: 08/21/2012, Next Cal: 08/21/2013