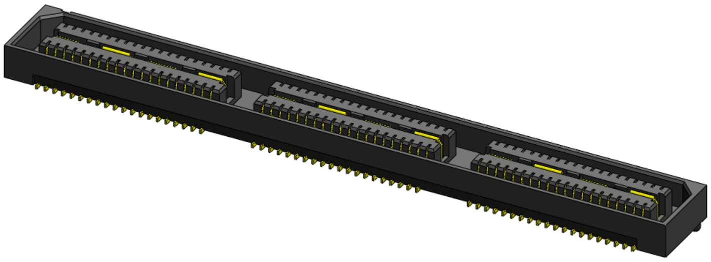
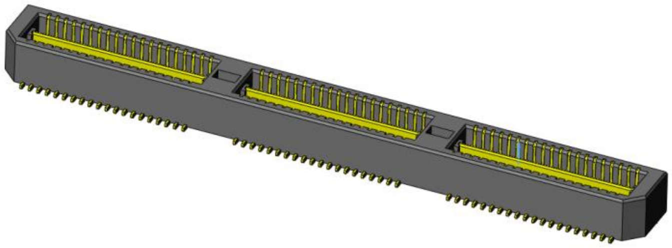
Project Number: Design Qualification Test Report
Tracking Code: 168830_Report_Rev_6
Requested by: Eric Mings
Date: 6/10/2019
Product Rev: BA
Part #: QSE-080-01-L-D-A/QTE-080-01-L-D-A
Lot #: N/A
Tech: Peter Chen
Eng: Vico Zhao
Part description: QSE/QTE
Qty to test: 45
Test Start: 11/23/2011
Test Completed: 12/25/2011





Design Qualification Test Report

QSE/QTE
QSE-080-01-L-D-A/QTE-080-01-L-D-A

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
01/03/2014	**4**	**Update the CCC data**	**KH**
05/12/2014	**5**	**Update the normal force unit**	**PC**
06/6/2019	**6**	**Update the ELP test data issue**	**PC**

CERTIFICATION

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

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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) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-103581-TST-XX

FLOWCHARTS

Gas Tight

TEST STEP	GROUP A 192 Points
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36A

LLCR = EIA-364-23, LLCR

use Keithley 580 in the dry circuit mode, 10 mA Max

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 (4 Bank)	GROUP B2 8 Boards (3 Bank)	GROUP B3 8 Boards (2 Bank)	GROUP B4 8 Boards (1 Bank)
01	Contact Gaps	Contact Gaps	Contact Gaps	Contact Gaps
02	LLCR-1	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
03	Forces - Mating / Unmating	25 Cycles	25 Cycles	25 Cycles
04	25 Cycles	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
05	Forces - Mating / Unmating	25 Cycles (50 Total)	25 Cycles (50 Total)	25 Cycles (50 Total)
06	25 Cycles (50 Total)	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
07	Forces - Mating / Unmating	25 Cycles (75 Total)	25 Cycles (75 Total)	25 Cycles (75 Total)
08	25 Cycles (75 Total)	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
09	Forces - Mating / Unmating	25 Cycles (100 Total)	25 Cycles (100 Total)	25 Cycles (100 Total)
10	25 Cycles (100 Total)	Forces - Mating / Unmating	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	GROUP A2 2 Unmated of Part # Being Tested Break Down Pin-to-Pin	GROUP A3 2 Unmated of Mating Part # Break Down Pin-to-Pin	GROUP B1 2 Mated Sets Pin-to-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 Pin-to-Ground	GROUP E2 2 Unmated of Part # Being Tested Break Down Pin-to-Ground	GROUP E3 2 Unmated of Mating Part # Break Down Pin-to-Ground	GROUP F1 2 Mated Sets Pin-to-Ground
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

Normal Force

TEST STEP	GROUP A1 Individual Contacts (8-10 min)	GROUP A2 Individual Contacts (8-10 min)
01	Contact Gaps	Contact Gaps
02	Setup Approved	Thermal Aging (Mated and Undisturbed)
03	Normal Force (in the body and soldered on PCB unless otherwise specified)	Contact Gaps
04		Setup Approved
05		Normal Force (in the body and soldered on PCB unless otherwise specified)

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

Time Condition 'B' (250 Hours)

Normal Force = EIA-364-04

(Perpendicular) Displacement Force = 12.7 mm/min ± 6 mm/min

Spec is 50 N @ 1 mm displacement

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

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

FLOWCHARTS Continued

Current Carrying Capacity - Ground Planes

TEST STEP	GROUP C1 3 Mated Assemblies 1 Ground Plane Powered	GROUP C2 3 Mated Assemblies 2 Ground Planes Powered	GROUP C3 3 Mated Assemblies 3 Ground Planes Powered
01	CCC	CCC	CCC

TEST STEP	GROUP C4 3 Mated Assemblies 4 Ground Planes Powered	GROUP C5 3 Mated Assemblies All Ground Planes Powered
01	CCC	CCC

Current Carrying Capacity - Double Row

TEST STEP	GROUP B1 3 Mated Assemblies 2 Contacts Powered	GROUP B2 3 Mated Assemblies 4 Contacts Powered	GROUP B3 3 Mated Assemblies 6 Contacts Powered
01	CCC	CCC	CCC

TEST STEP	GROUP B4 3 Mated Assemblies 8 Contacts Powered	GROUP B5 3 Mated Assemblies All Contacts Powered
01	CCC	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 192 Points
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

FLOWCHARTS Continued

Extended Life-QSE-080-01-S-D-A/QTE-080-01-STL-D-A

TEST STEP	GROUP A1 192 Points 100 Cycles	GROUP B1 192 Points 250 Cycles	GROUP C1 192 Points 500 Cycles
01	* Plating Thickness Verification	* Plating Thickness Verification	* Plating Thickness Verification
02	LLCR-1	LLCR-1	LLCR-1
03	100 Cycles	250 Cycles	500 Cycles
04	Clean Mating Interface	Clean Mating Interface	Clean Mating Interface
05	LLCR-2	LLCR-2	LLCR-2
06	Thermal Shock (Mated and undisturbed)	Thermal Shock (Mated and undisturbed)	Thermal Shock (Mated and undisturbed)
07	LLCR-3	LLCR-3	LLCR-3
08	Cyclic Humidity (Mated and undisturbed)	Cyclic Humidity (Mated and undisturbed)	Cyclic Humidity (Mated and undisturbed)
09	LLCR-4	LLCR-4	LLCR-4
10	*** Photos of Contact Area	*** Photos of Contact Area	*** Photos of Contact Area

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
LLCR = EIA-364-23, LLCR
20 mV Max, 100 mA Max
Use Keithley 580 or 3706 in 4 wire dry circuit mode

*** 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. Pins to be provided by requestor.**
***** Save 2-3 photos of contact area in project folder for each group**

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.

CONTACT GAPS:

1) Gaps above the surrounding plastic surface were measured before and after stressing the contacts (e.g. thermal aging, mechanical cycling, etc.).
2) Typically, all contacts on the connector are measured.

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.

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
2) The contacts shall be tested in the connector housing.
3) If necessary, a “window” shall be made in the connector body to allow a probe to engage and deflect the contact at the same attitude and distance (plus 0.05 mm [0.002”]) as would occur in actual use.
4) The connector housing shall be placed in a holding fixture that does not interfere with or otherwise influence the contact force or deflection.
5) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC^2, computer controlled test stand with a deflection measurement system accuracy of 5.0 µm (0.0002”).
6) The nominal deflection rate shall be 5 mm (0.2”)/minute.
7) Unless otherwise noted a minimum of five contacts shall be tested.
8) The force/deflection characteristic to load and unload each contact shall be repeated five times.
9) The system shall utilize the TC^2 software in order to acquire and record the test data.
10) The permanent set of each contact shall be measured within the TC^2 software.
11) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

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.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

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

1) PROCEDURE:
    a. Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
    b. Test Conditions:
        i. Between Adjacent Contacts or Signal-to-Ground
        ii. 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)..

TEMPERATURE RISE (Current Carrying Capacity, CCC):

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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

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.

8) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
9) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
10) 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
11) 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.

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise---------------2.0 A per contact with 2 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise---------------1.5 A per contact with 4 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise---------------1.3 A per contact with 6 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise---------------1.1 A per contact with 8 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise---------------0.5 A per contact with all adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise---------------23.1 A per contact with 1 ground contacts powered**
- **CCC for a 30°C Temperature Rise---------------22.1 A per contact with 2 adjacent ground contacts powered**
- **CCC for a 30°C Temperature Rise---------------21.7 A per contact with 3 adjacent ground contacts powered**
- **CCC for a 30°C Temperature Rise---------------21.2 A per contact with 4 adjacent ground contacts powered**

Mating & Unmating force

Mating&Unmating durability (QSE-080-01-L-D-A/QTE-080-01-L-D-A):

- **Initial**
  - **Mating**
    - **Min -------------------------------------13.72 Lbs**
    - **Max-------------------------------------16.12 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 8.37 Lbs**
    - **Max-------------------------------------11.11 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min -------------------------------------14.17 Lbs**
    - **Max-------------------------------------16.72 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 9.25 Lbs**
    - **Max-------------------------------------12.20 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min -------------------------------------14.20 Lbs**
    - **Max-------------------------------------17.02 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 9.20 Lbs**
    - **Max-------------------------------------12.37 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min -------------------------------------14.14 Lbs**
    - **Max-------------------------------------17.20 Lbs**
  - **Unmating**
    - **Min -------------------------------------10.12 Lbs**
    - **Max-------------------------------------12.52 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min -------------------------------------14.01 Lbs**
    - **Max-------------------------------------17.12 Lbs**
  - **Unmating**
    - **Min -------------------------------------10.05 Lbs**
    - **Max-------------------------------------12.87 Lb**
- **After Humidity**
  - **Mating**
    - **Min -------------------------------------13.33 Lbs**
    - **Max-------------------------------------16.36 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 9.12 Lbs**
    - **Max-------------------------------------11.12 Lbs**

RESULTS Continued

Mating/Unmating basic (QSE-060-01-L-D-A/QTE-060-01-L-D-A):

- **Initial**
  - **Mating**
    - **Min --------------------------------------- 7.78 Lbs**
    - **Max--------------------------------------10.60 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 6.12 Lbs**
    - **Max--------------------------------------- 7.68 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min --------------------------------------- 8.37 Lbs**
    - **Max--------------------------------------11.57 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 7.03 Lbs**
    - **Max--------------------------------------- 7.68 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min --------------------------------------- 8.47 Lbs**
    - **Max--------------------------------------11.52 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 6.99 Lbs**
    - **Max--------------------------------------- 7.83 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min --------------------------------------- 9.10 Lbs**
    - **Max--------------------------------------12.01 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 7.09 Lbs**
    - **Max--------------------------------------- 7.96 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min --------------------------------------10.14 Lbs**
    - **Max--------------------------------------12.28 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 7.21 Lbs**
    - **Max--------------------------------------- 7.68 Lbs**

RESULTS Continued

Mating/Unmating basic (QSE-040-01-L-D-A/QTE-040-01-L-D-A):

- **Initial**
  - **Mating**
    - **Min -------------------------------------- 6.40 Lbs**
    - **Max-------------------------------------- 7.63 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 4.44 Lbs**
    - **Max-------------------------------------- 6.54 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min -------------------------------------- 7.10 Lbs**
    - **Max-------------------------------------- 7.74 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 5.39 Lbs**
    - **Max-------------------------------------- 6.76 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min -------------------------------------- 7.15 Lbs**
    - **Max-------------------------------------- 7.85 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 5.50 Lbs**
    - **Max-------------------------------------- 6.80 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min -------------------------------------- 7.35 Lbs**
    - **Max-------------------------------------- 7.95 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 5.55 Lbs**
    - **Max-------------------------------------- 6.82 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min -------------------------------------- 7.45 Lbs**
    - **Max-------------------------------------- 8.10 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 5.65 Lbs**
    - **Max-------------------------------------- 6.89 Lbs**

RESULTS Continued

Mating/Unmating basic (QSE-020-01-L-D-A/QTE-020-01-L-D-A):

- **Initial**
  - **Mating**
    - **Min --------------------------------------- 3.59 Lbs**
    - **Max--------------------------------------- 4.05 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 2.38 Lbs**
    - **Max--------------------------------------- 4.23 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min --------------------------------------- 3.52 Lbs**
    - **Max--------------------------------------- 4.34 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 2.78 Lbs**
    - **Max--------------------------------------- 5.05 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min --------------------------------------- 3.70 Lbs**
    - **Max--------------------------------------- 4.17 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 3.04 Lbs**
    - **Max--------------------------------------- 4.53 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min --------------------------------------- 3.76 Lbs**
    - **Max--------------------------------------- 4.48 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 2.52 Lbs**
    - **Max--------------------------------------- 4.59 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min --------------------------------------- 3.91 Lbs**
    - **Max--------------------------------------- 4.73 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 2.56 Lbs**
    - **Max--------------------------------------- 5.67 Lbs**

Thermal aging

- **Initial**
  - **Mating**
    - **Min -------------------------------------12.87 Lbs**
    - **Max-------------------------------------15.75 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 9.76 Lbs**
    - **Max-------------------------------------12.11 Lbs**
- **After thermal aging**
  - **Mating**
    - **Min -------------------------------------11.05 Lbs**
    - **Max-------------------------------------14.25 Lbs**
  - **Unmating**
    - **Min --------------------------------------- 9.21 Lbs**
    - **Max-------------------------------------11.25 Lbs**

RESULTS Continued

Normal Force at 0.005 in deflection

- **Initial**
    - **Min---85.45 gf Set ----- 0.0000 in**
    - **Max --- 94.70 gf Set ----- 0.0003 in**
- **Thermal**
    - **Min---88.90 gf Set ----- 0.0000 in**
    - **Max ---98.07 gf Set ----- 0.0003 in**

LLCR Durability

Signal pin: (184 LLCR Test Points)

- **Initial -- 26.86 mOhms Max**
- **After 100 Cycles**
    - **<= +5.0 mOhms ----------------------------------- 183 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**
- **After thermal shock**
    - **<= +5.0 mOhms ----------------------------------- 182 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**
- **After humidity**
    - **<= +5.0 mOhms ----------------------------------- 183 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**

Ground pin: (8 LLCR Test Points)

- **Initial --3.69 mOhms Max**
- **After 100 Cycles**
    - **<= +5.0 mOhms -------------------------------------- 8 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 --------------------------------------8 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 -------------------------------------- 8 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 Thermal Aging

Signal Pin: (184 LLCR test points)

- **Initial -- 25.48 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ----------------------------------- 184 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**

Ground Pin: (8 LLCR test points)

- **Initial --3.72 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms --------------------------------------8Points-------------------------- 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

Signal Pin: (184 LLCR test points)

- **Initial -- 24.32 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ----------------------------------- 184 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**

Ground Pin: (8 LLCR test points

- **Initial --3.67 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms -------------------------------------- 8 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 Extended Life (QSE-080-01-S-D-A/QTE-080-01-STL-D-A)

100 Cycle Group

Signal pin: (184 LLCR test points)

- **Initial -- 24.27 mOhms Max**
- **After 100 Cycles**
  - **<= +5.0 mOhms ---------------------------------- 184 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 ---------------------------------- 184 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 ---------------------------------- 184 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**

Ground pin: (8 LLCR Test Points)

- **Initial ---3.52 mOhms Max**
- **After 100 Cycles**
  - **<= +5.0 mOhms ------------------------------------- 8 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 -------------------------------------8 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 ------------------------------------- 8 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 Extended Life (QSE-080-01-S-D-A/QTE-080-01-STL-D-A)

250 Cycle Group

Signal pin: (184 LLCR test points)

- **Initial -- 21.59 mOhms Max**
- **After 250 Cycles**
  - **<= +5.0 mOhms ---------------------------------- 184 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 ---------------------------------- 184 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 ---------------------------------- 184 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**

Ground pin: (8 LLCR Test Points)

- **Initial --3.56 mOhms Max**
- **After 250 Cycles**
  - **<= +5.0 mOhms ------------------------------------ 8 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 ------------------------------------8 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 ------------------------------------ 8 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 Extended Life (QSE-080-01-S-D-A/QTE-080-01-STL-D-A)

500 Cycle Group

Signal pin: (184 LLCR test points)

- **Initial -- 22.30 mOhms Max**
- **After 500 Cycles**
    - **<= +5.0 mOhms ----------------------------------- 184 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 ----------------------------------- 183 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**
- **After humidity**
    - **<= +5.0 mOhms ----------------------------------- 183 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**

Ground pin: (8 LLCR Test Points)

- **Initial ---3.52 mOhms Max**
- **After 250 Cycles**
    - **<= +5.0 mOhms -------------------------------------- 8 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 --------------------------------------8 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 -------------------------------------- 8 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 Vib

Signal Pin: (184 LLCR test points)

- **Initial -- 26.71 mOhms Max**
- **S&V**
  - **<= +5.0 mOhms ---------------------------------- 184 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**

Ground Pin: (8 LLCR test points)

- **Initial ---3.81 mOhms Max**
- **S&V**
  - **<= +5.0 mOhms -------------------------------------8 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-----------------------------Passed**
  - **50 Nanoseconds -----------------------Passed**
- **Vibration**
  - **No Damage---------------------------Passed**
  - **50 Nanoseconds----------------------Passed**

RESULTS Continued

Insulation Resistance minimums, IR

Pin-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

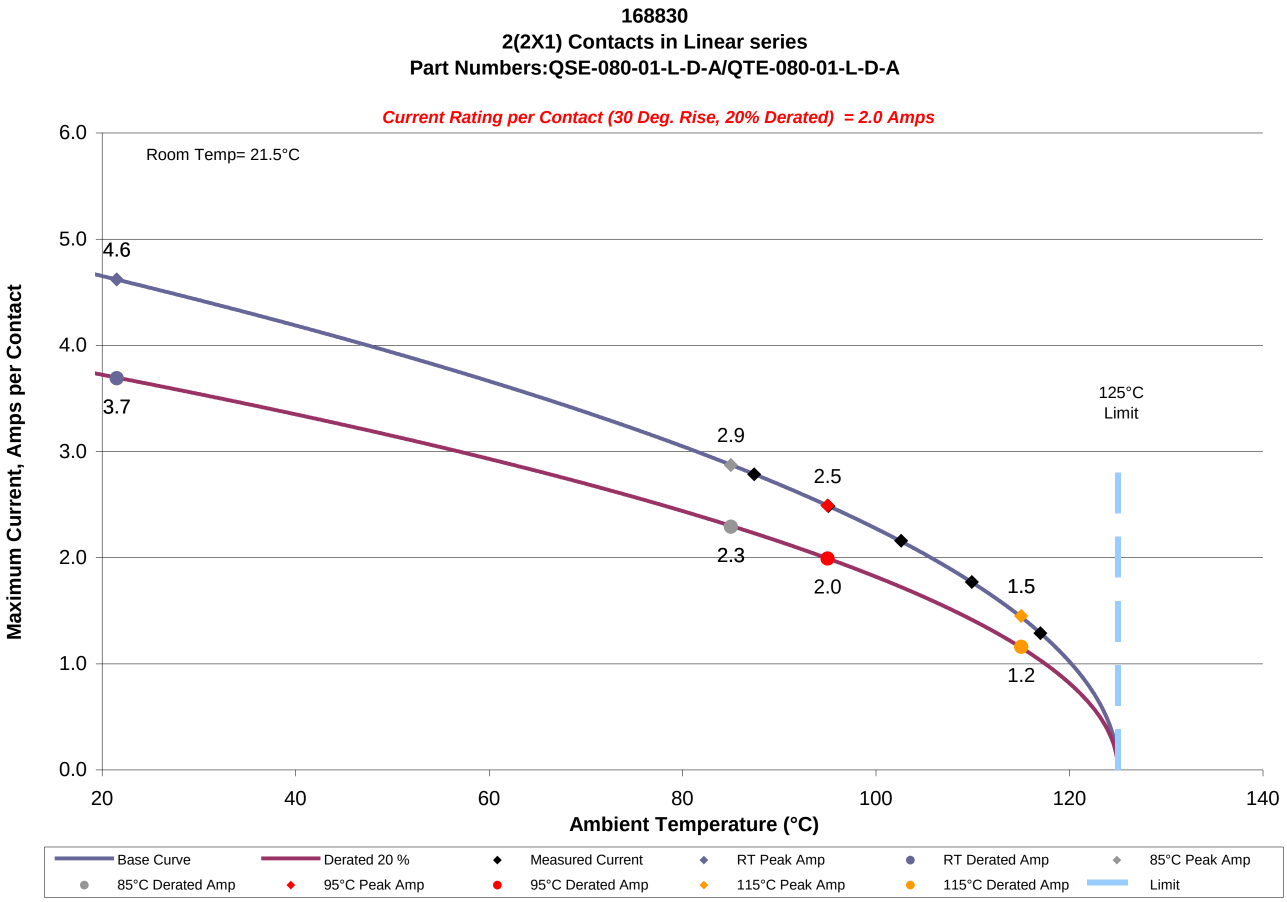
- **Minimums**
  - **Breakdown Voltage --------------------------------- 900VAC**
  - **Test Voltage -- 675VAC**
  - **Working Voltage ------------------------------------ 225VAC**

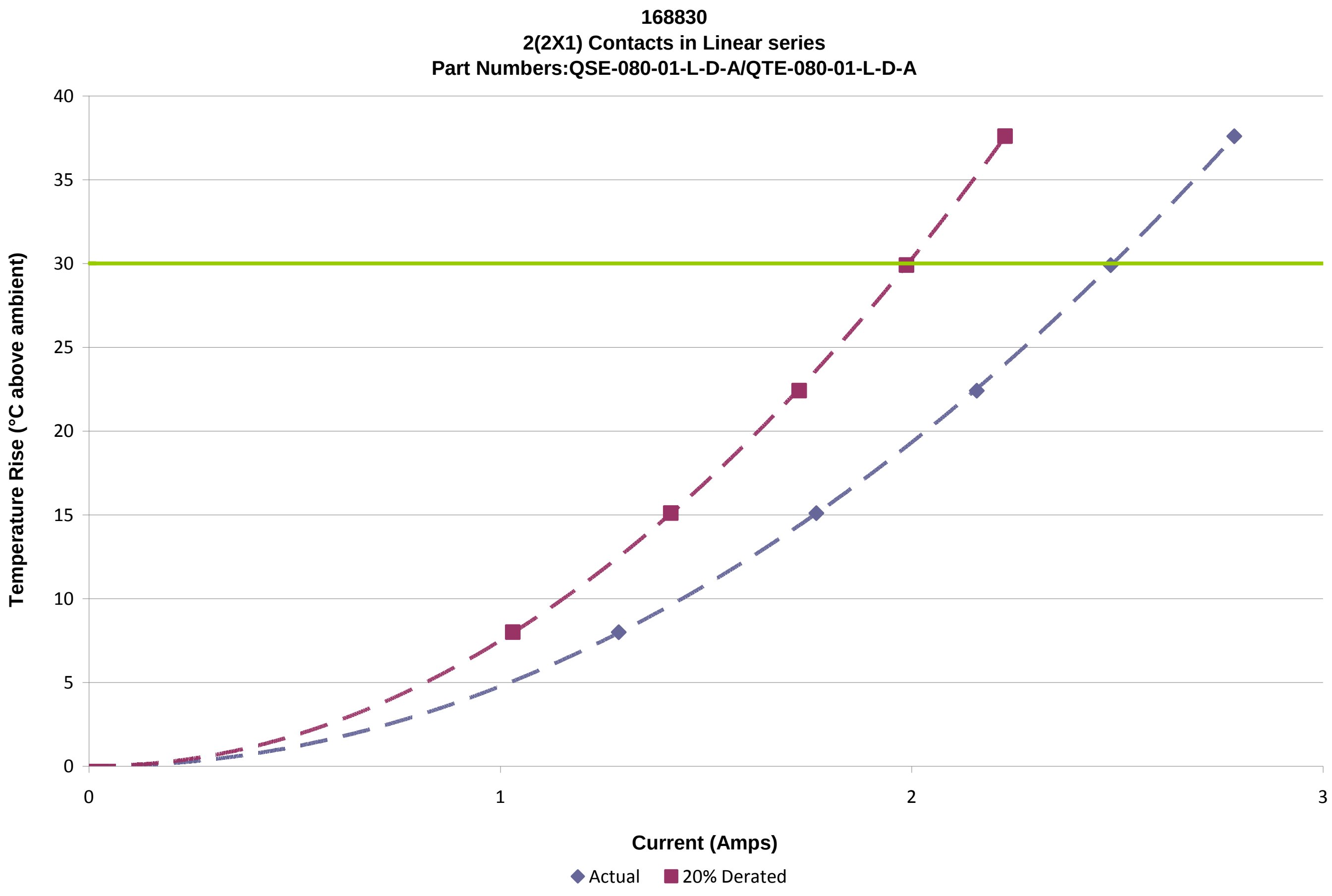
- **Pin - Pin**
  - **Initial DWV --------------------------------------- Passed**
  - **Thermal DWV ------------------------------------ Passed**
  - **Humidity DWV ---------------------------------- Passed**
- **Pin-Ground**
  - **Initial DWV --------------------------------------- Passed**
  - **Thermal DWV ------------------------------------ Passed**
  - **Humidity DWV ---------------------------------- Passed**

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 signal conductors/contacts powered

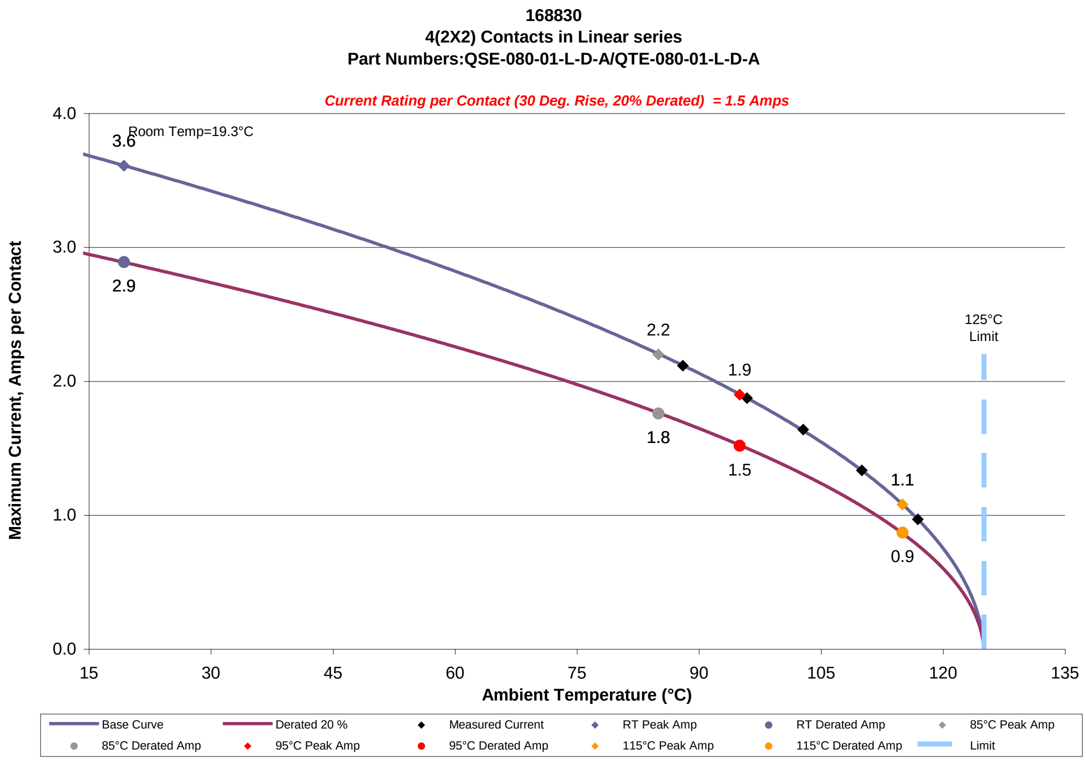


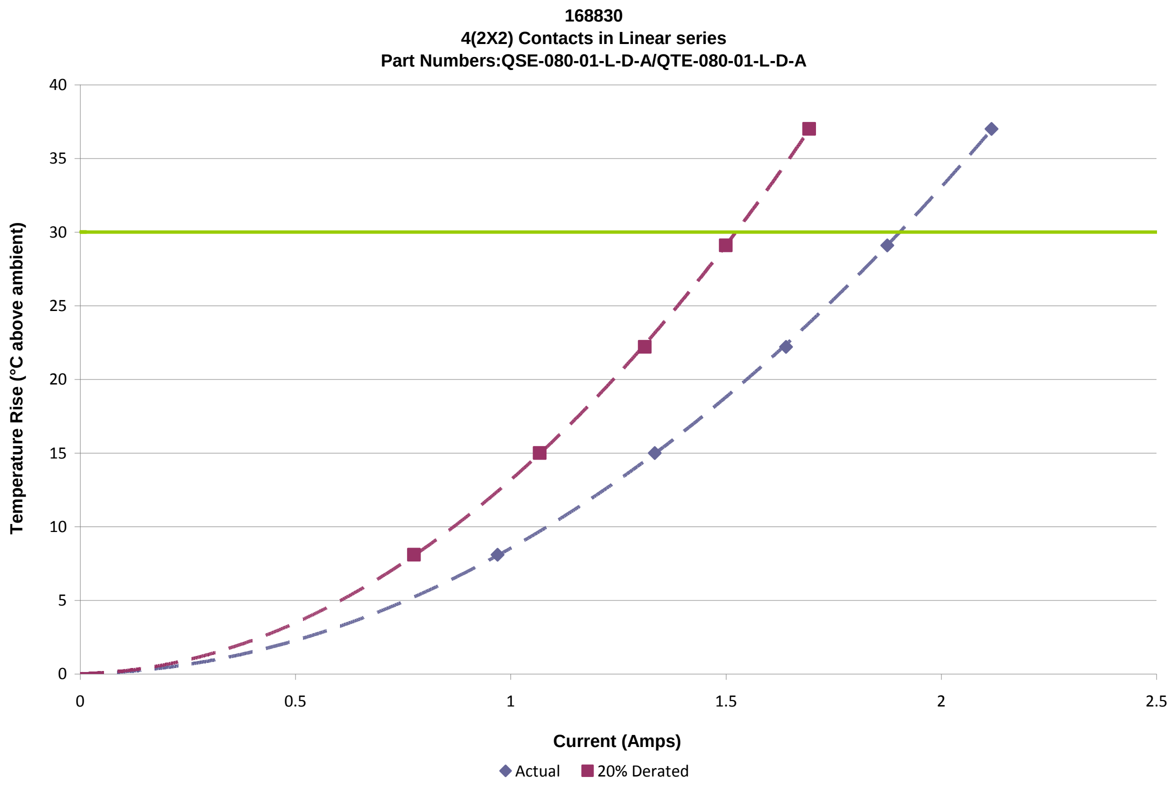


168830
2(2X1) Contacts in Linear series
Part Numbers:QSE-080-01-L-D-A/QTE-080-01-L-D-A
Temperature Rise (°C above ambient)
40
35
30
25
20
15
10
5
0
0
1
2
3
Current (Amps)
◆ Actual
■ 20% Derated

DATA SUMMARIES Continued

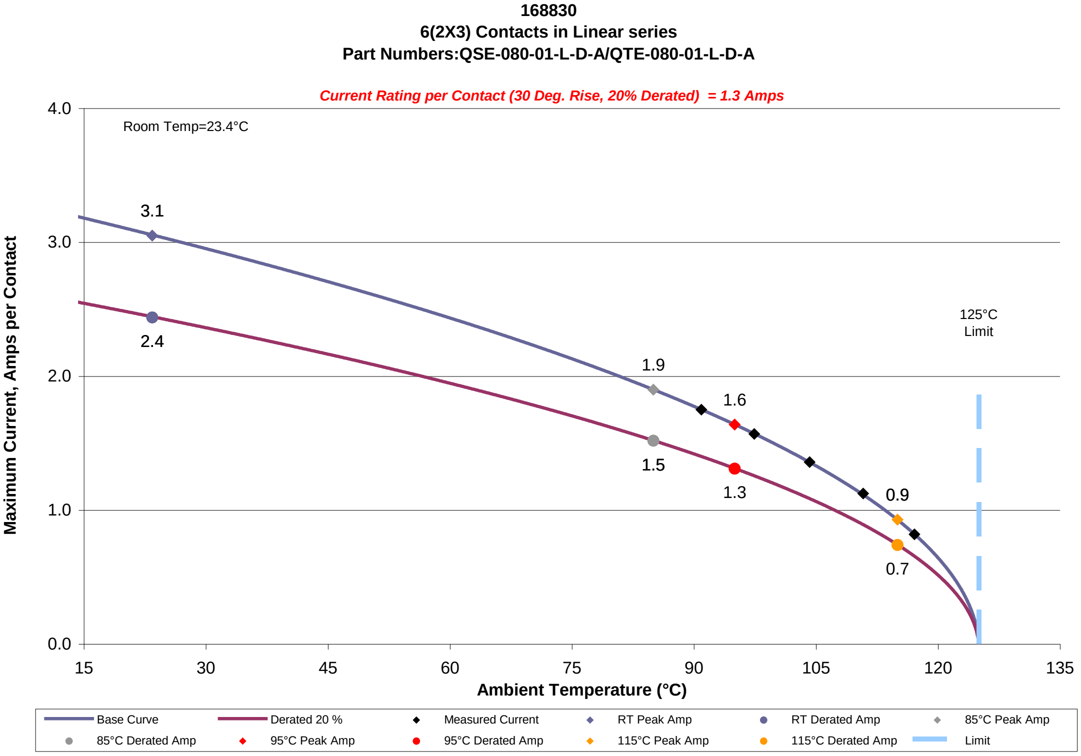
b. Linear configuration with 4 adjacent signal conductors/contacts powered

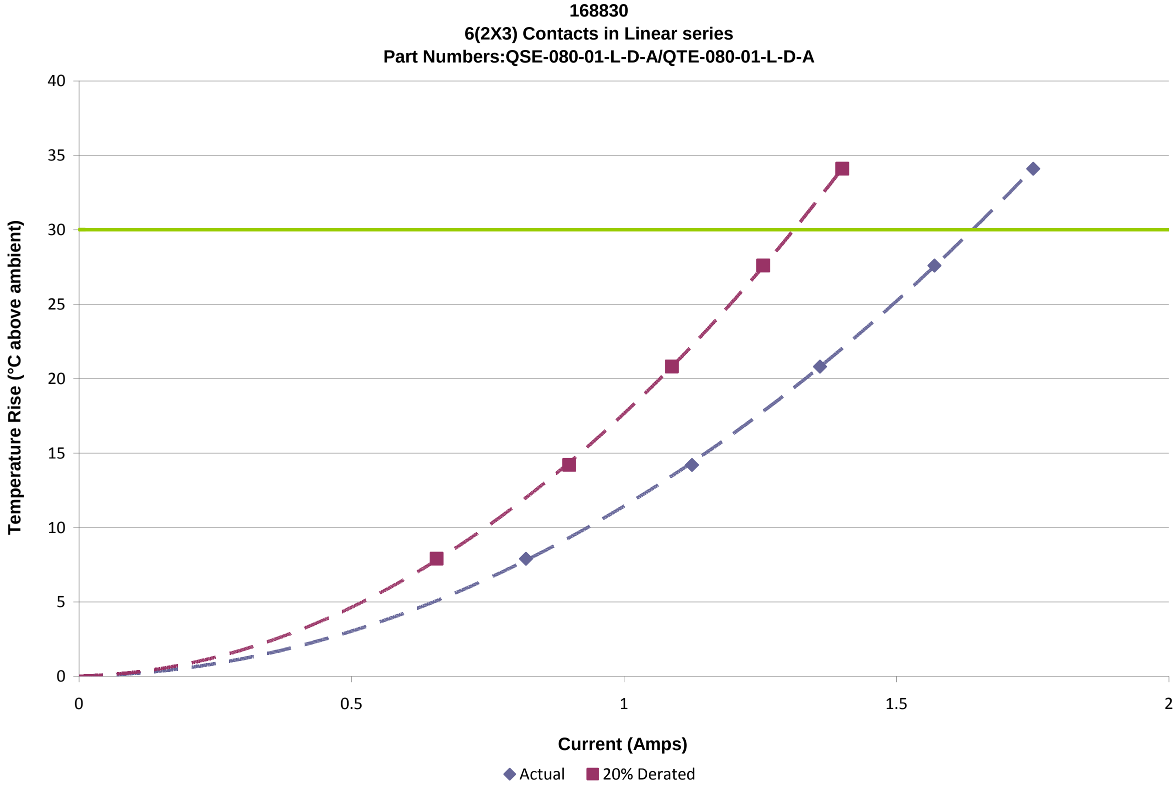




DATA SUMMARIES Continued

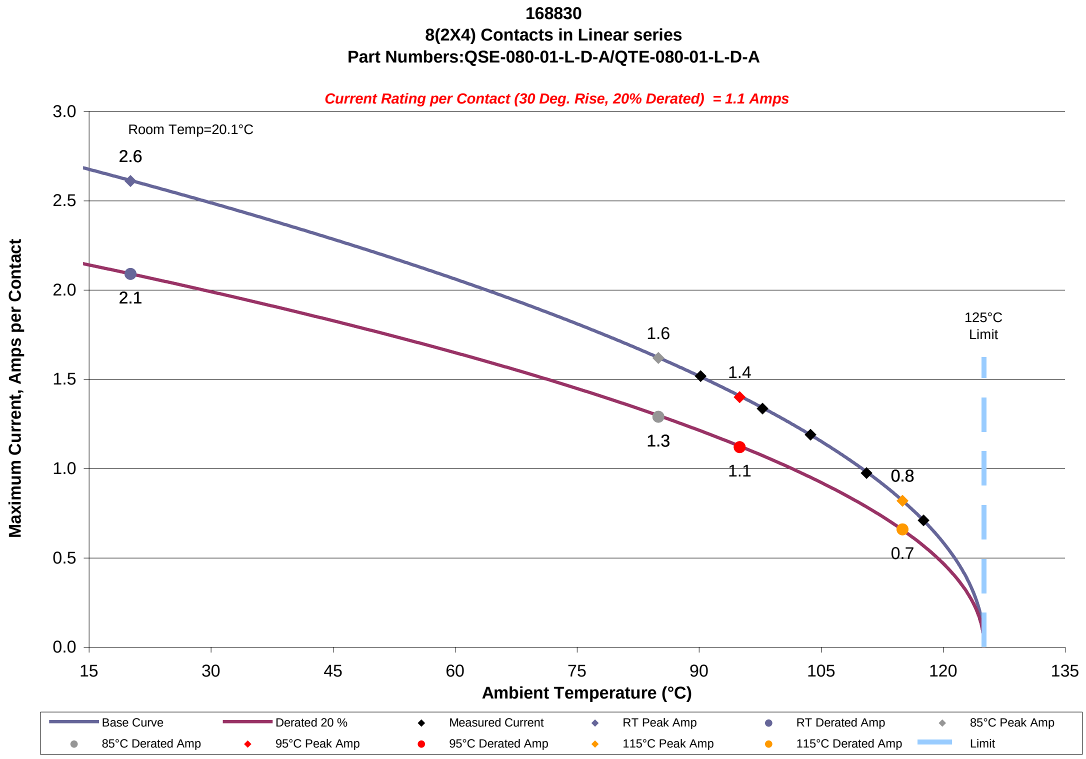
c. Linear configuration with 6 adjacent signal conductors/contacts powered

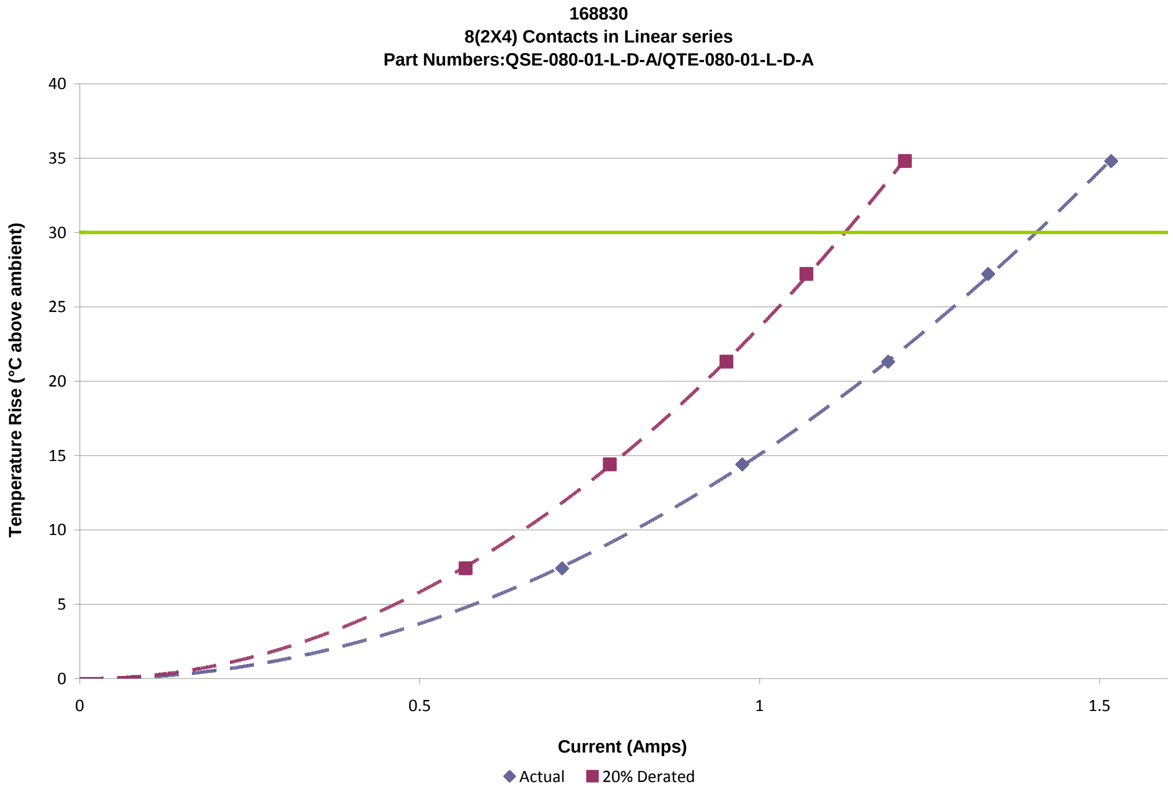




DATA SUMMARIES Continued

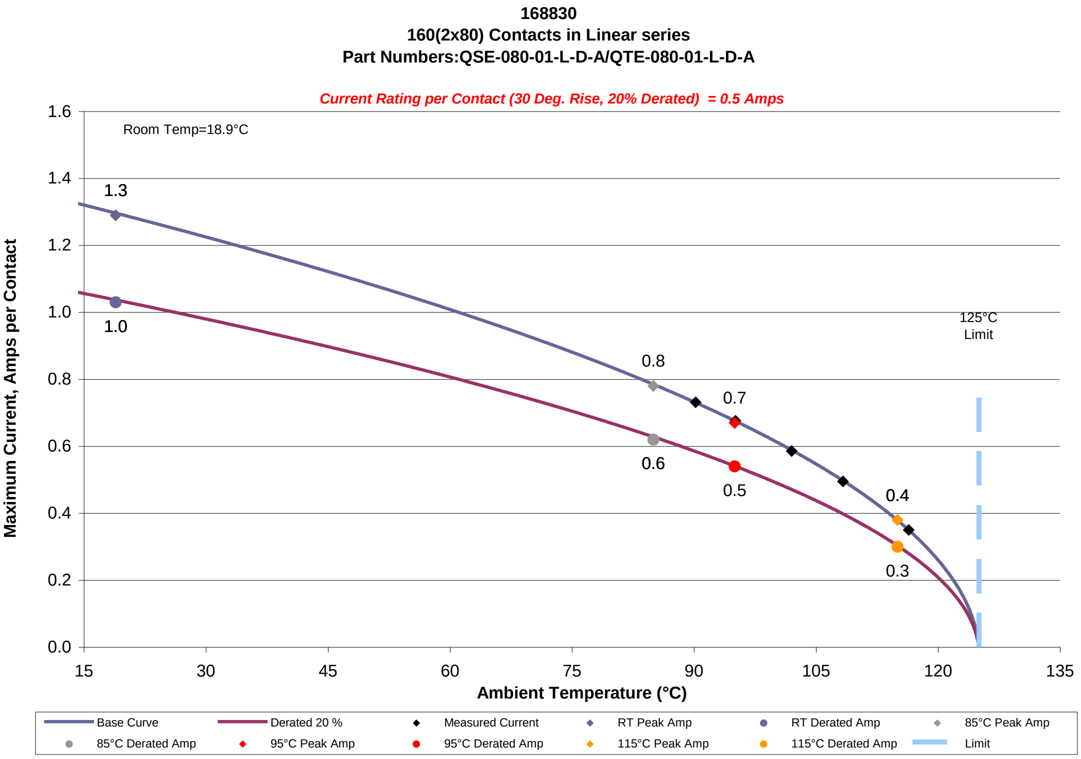
d. Linear configuration with 8 adjacent signal conductors/contacts powered

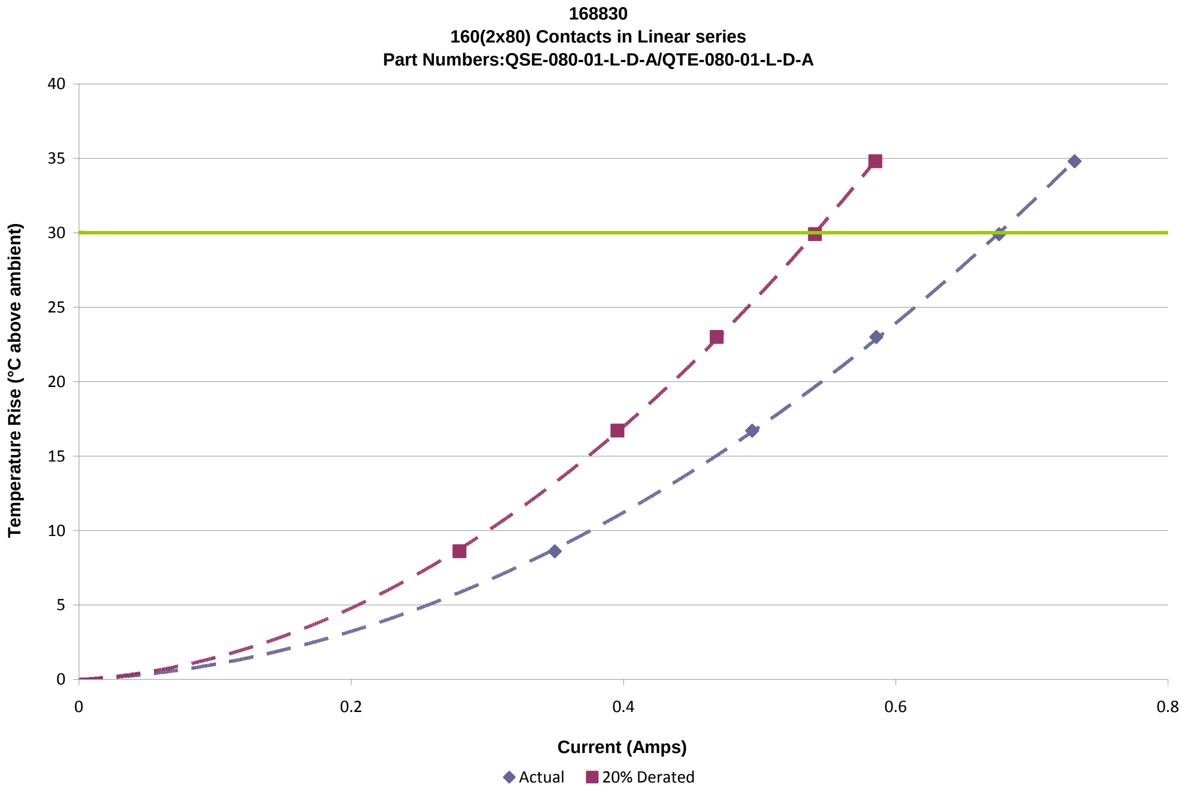




DATA SUMMARIES Continued

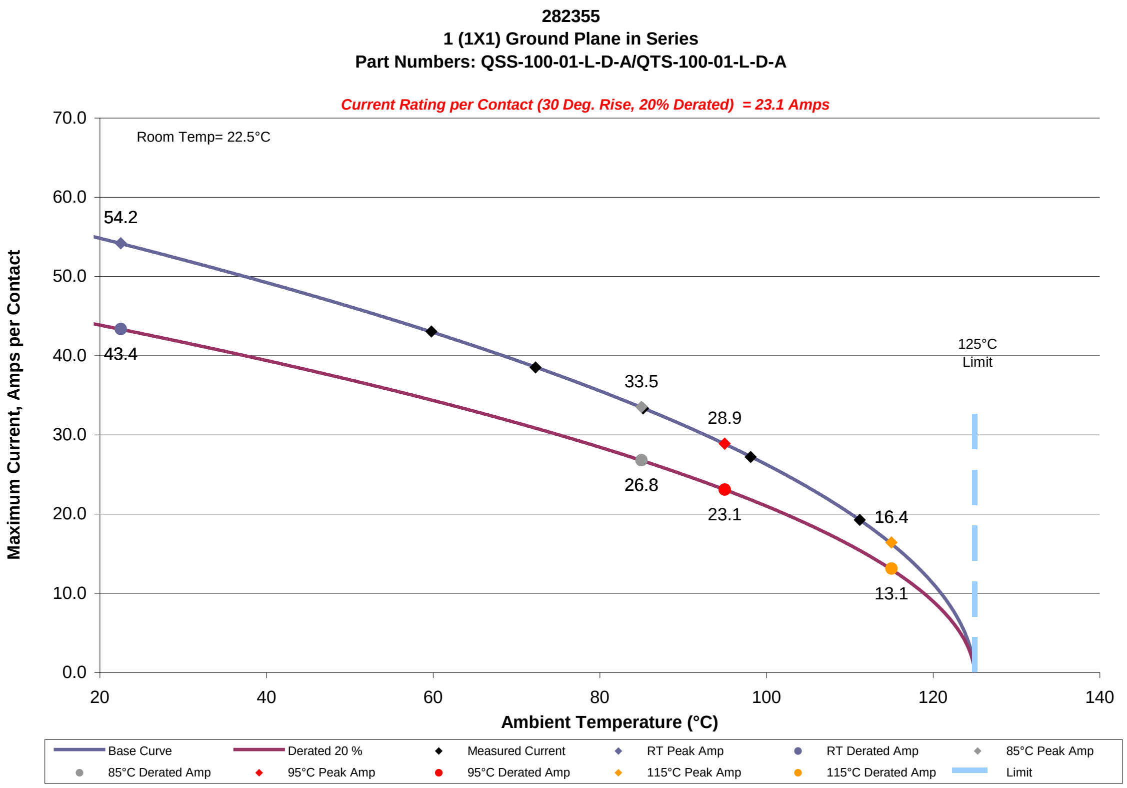
e. Linear configuration with all adjacent signal conductors/contacts powered

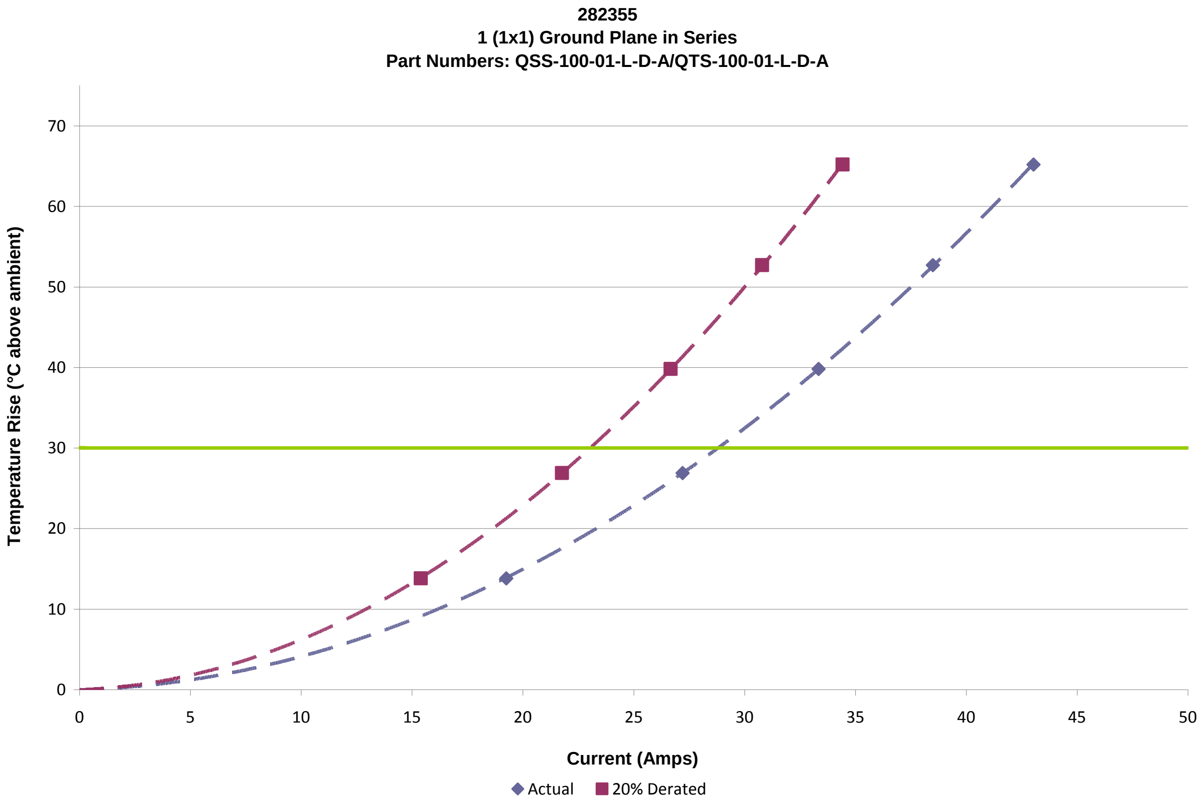




DATA SUMMARIES Continued

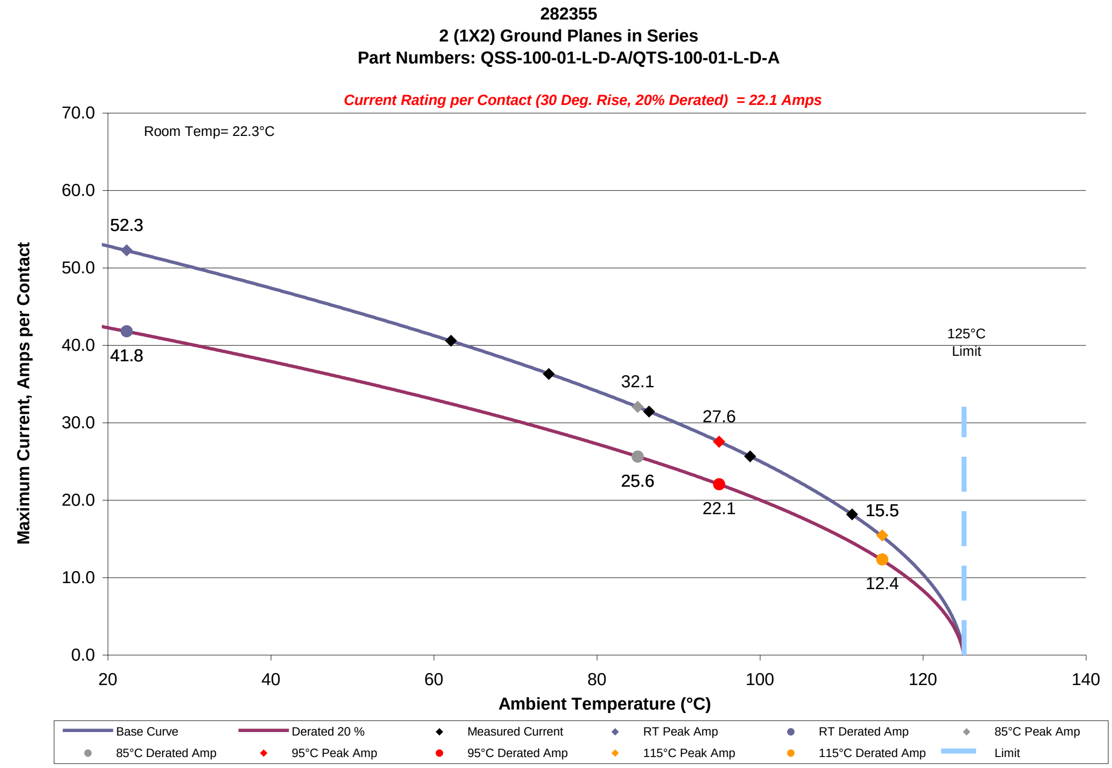
f. Linear configuration with 1 ground conductors/contacts powered


282355
1 (1X1) Ground Plane in Series
Part Numbers: QSS-100-01-L-D-A/QTS-100-01-L-D-A

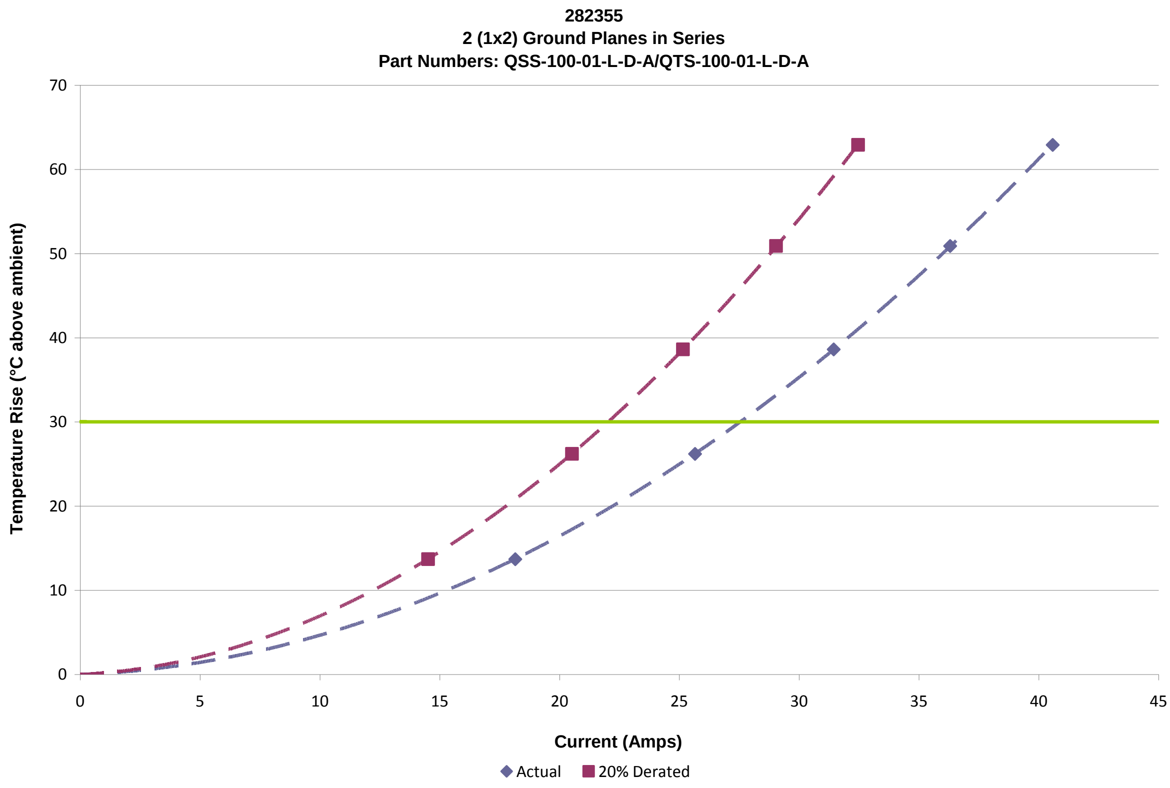

282355
1 (1x1) Ground Plane in Series
Part Numbers: QSS-100-01-L-D-A/QTS-100-01-L-D-A

DATA SUMMARIES Continued

g. Linear configuration with 2 adjacent ground conductors/contacts powered

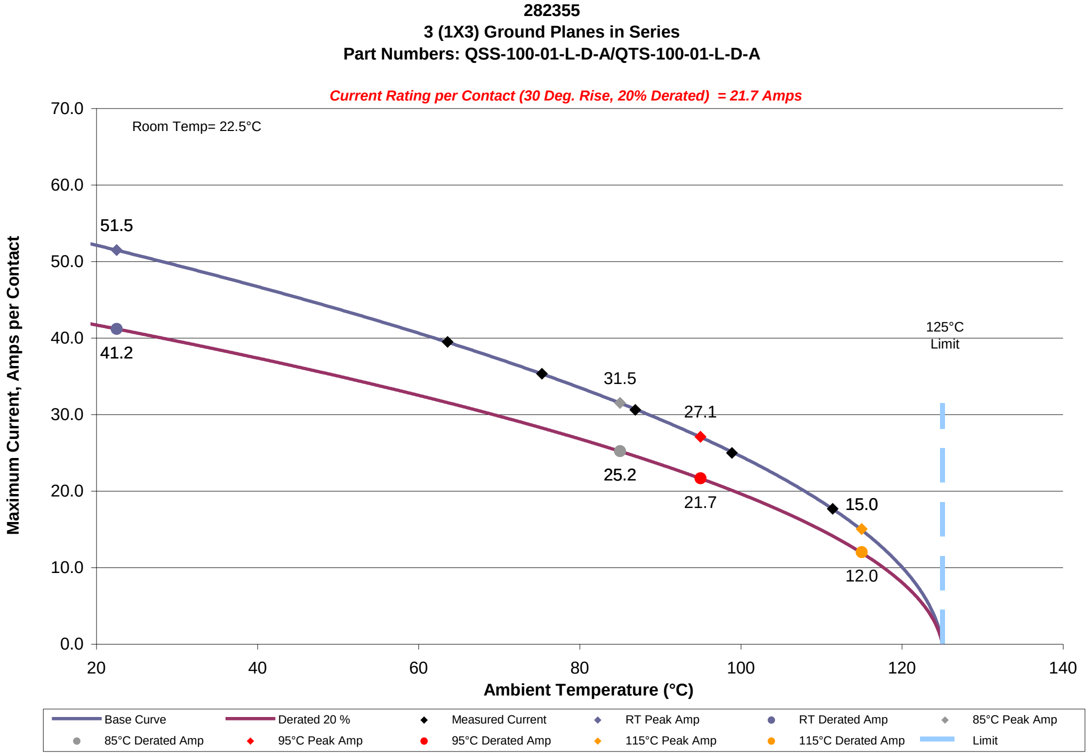

282355
2 (1X2) Ground Planes in Series
Part Numbers: QSS-100-01-L-D-A/QTS-100-01-L-D-A

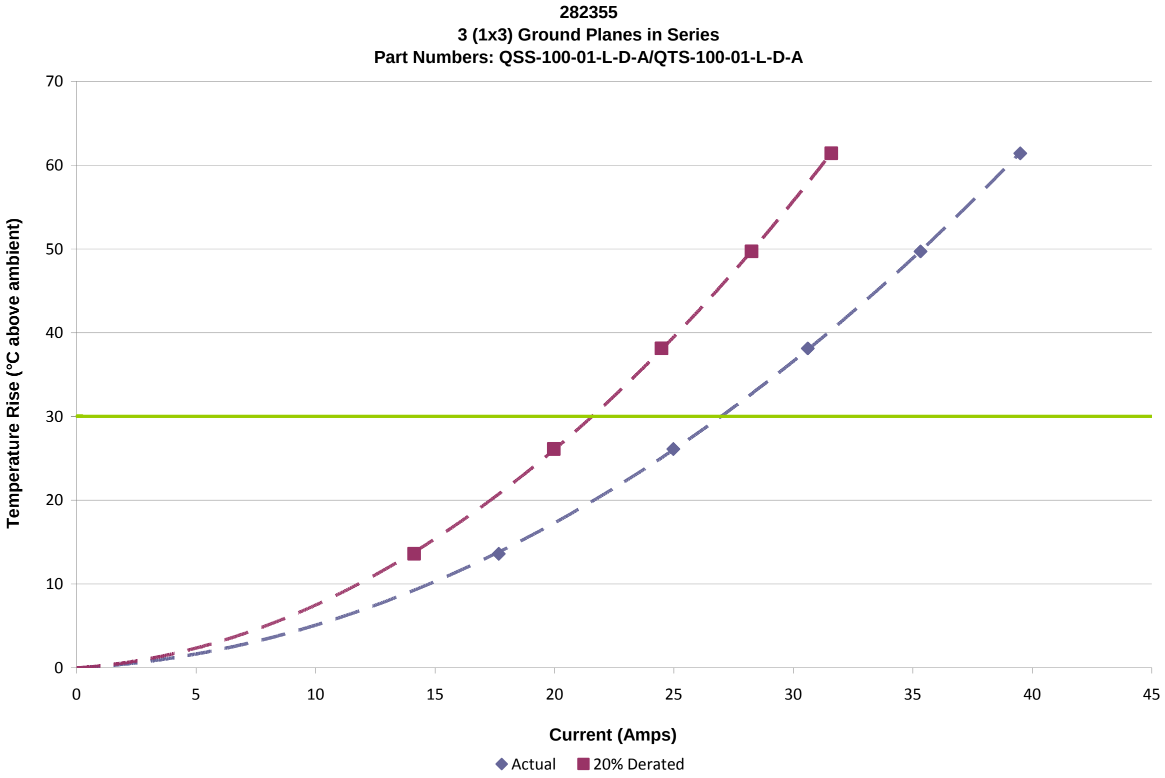
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 22.1 Amps


282355
2 (1x2) Ground Planes in Series
Part Numbers: QSS-100-01-L-D-A/QTS-100-01-L-D-A

DATA SUMMARIES Continued

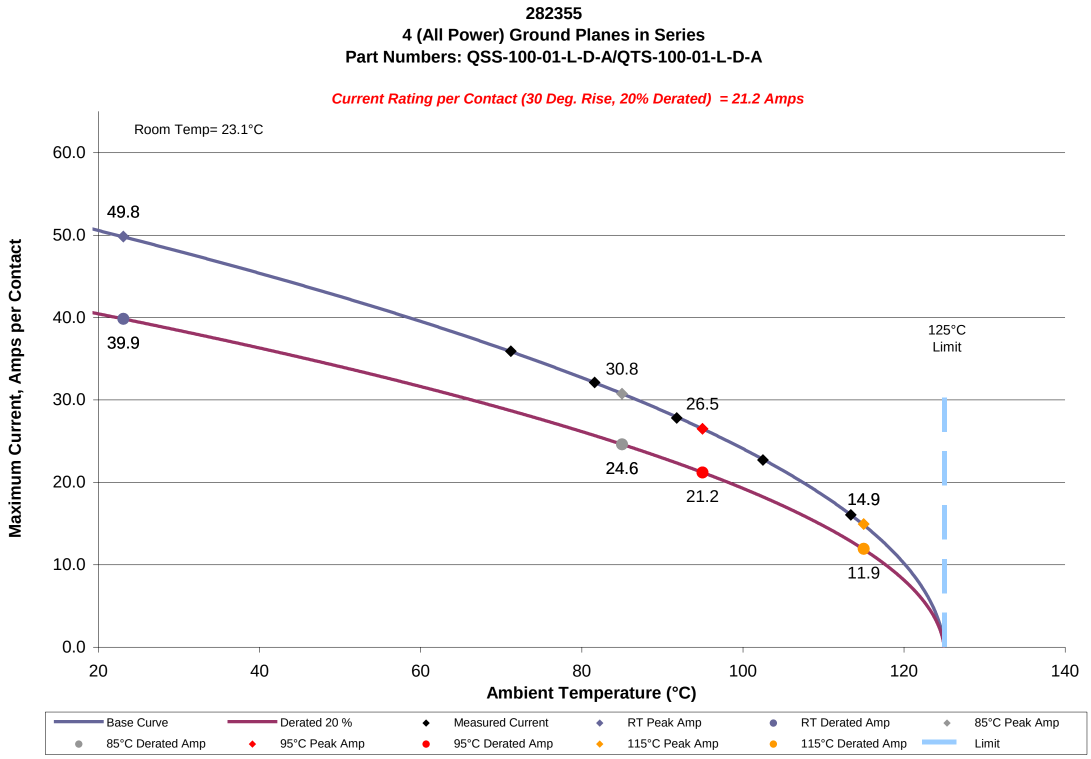
h. Linear configuration with 3 adjacent ground conductors/contacts powered





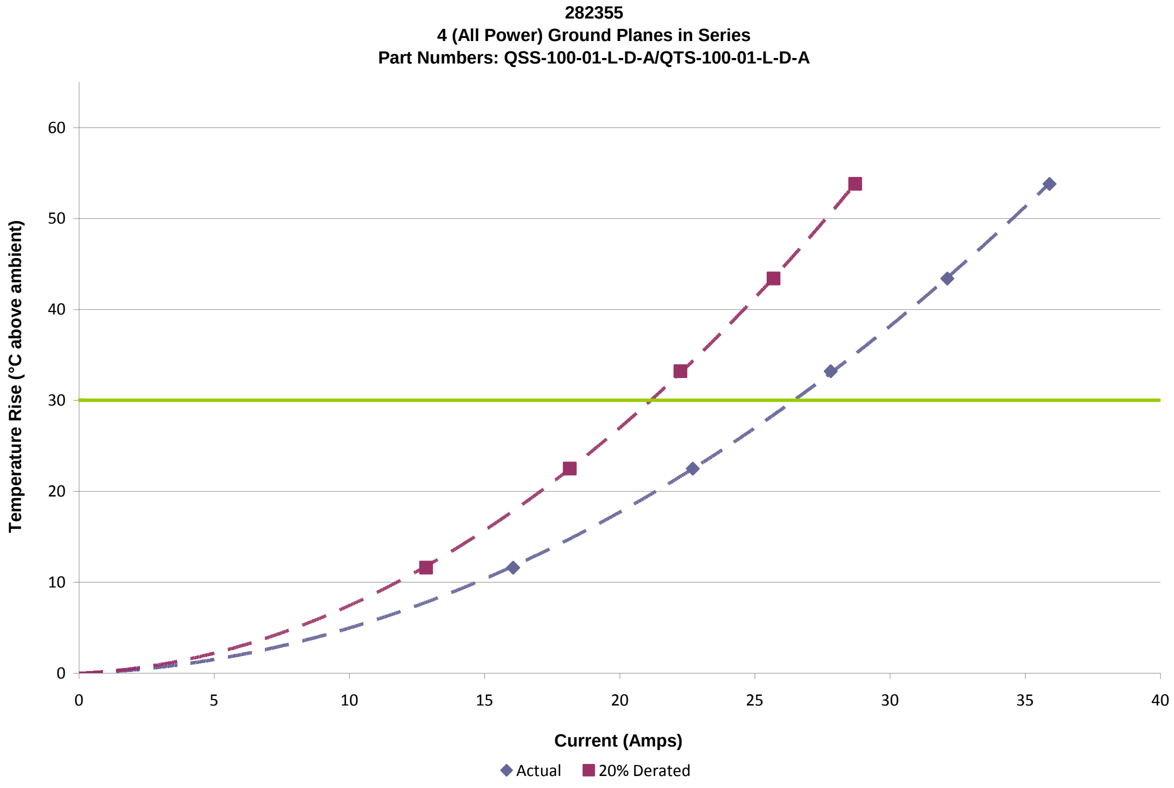
DATA SUMMARIES Continued

i. Linear configuration with 4 adjacent ground conductors/contacts powered



282355
4 (All Power) Ground Planes in Series
Part Numbers: QSS-100-01-L-D-A/QTS-100-01-L-D-A

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 21.2 Amps



282355
4 (All Power) Ground Planes in Series
Part Numbers: QSS-100-01-L-D-A/QTS-100-01-L-D-A

DATA SUMMARIES Continued

MATING/UNMATING FORCE:

Mating/Unmating durability (QSE-080-01-L-D-A/QTE-080-01-L-D-A):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	61.03	13.72	37.23	8.37	63.03	14.17	41.14	9.25
Maximum	71.70	16.12	49.42	11.11	74.37	16.72	54.27	12.20
Average	67.02	**15.07**	45.46	**10.22**	68.74	**15.46**	50.52	**11.36**
St Dev	3.39	0.76	3.88	0.87	3.53	0.79	4.01	0.90
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	63.16	14.20	40.92	9.20	62.89	14.14	45.01	10.12
Maximum	75.70	17.02	55.02	12.37	76.51	17.20	55.69	12.52
Average	70.18	**15.78**	51.80	**11.65**	71.22	**16.01**	52.65	**11.84**
St Dev	3.91	0.88	4.64	1.04	4.17	0.94	3.56	0.80
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	62.32	14.01	44.70	10.05	59.29	13.33	40.57	9.12
Maximum	76.15	17.12	57.25	12.87	72.77	16.36	49.46	11.12
Average	71.96	**16.18**	53.23	**11.97**	67.99	**15.29**	46.28	**10.40**
St Dev	4.75	1.07	4.16	0.93	4.44	1.00	3.41	0.77
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

Mating/Unmating basic (QSE-060-01-L-D-A/QTE-060-01-L-D-A):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	34.61	7.78	27.22	6.12	37.23	8.37	31.27	7.03
Maximum	47.15	10.60	34.16	7.68	51.46	11.57	34.16	7.68
Average	41.73	**9.38**	29.97	**6.74**	46.22	**10.39**	32.39	**7.28**
St Dev	4.09	0.92	2.14	0.48	4.30	0.97	1.16	0.26
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	37.67	8.47	31.09	6.99	40.48	9.10	31.54	7.09
Maximum	51.24	11.52	34.83	7.83	53.42	12.01	35.41	7.96
Average	46.99	**10.56**	32.85	**7.39**	48.36	**10.87**	32.99	**7.42**
St Dev	4.35	0.98	1.33	0.30	4.02	0.90	1.23	0.28
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	45.10	10.14	32.07	7.21
Maximum	54.62	12.28	34.03	7.65
Average	49.57	**11.14**	33.07	**7.44**
St Dev	3.16	0.71	0.77	0.17
Count	8	8	8	8

DATA SUMMARIES Continued

Mating/Unmating basic (QSE-040-01-L-D-A/QTE-040-01-L-D-A):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	28.47	6.40	19.75	4.44	31.58	7.10	23.97	5.39
Maximum	33.94	7.63	29.09	6.54	34.43	7.74	30.07	6.76
Average	30.04	**6.75**	26.41	**5.94**	32.73	**7.36**	28.08	**6.31**
St Dev	1.77	0.40	3.21	0.72	1.00	0.23	2.38	0.54
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	31.80	7.15	24.46	5.50	32.69	7.35	24.69	5.55
Maximum	34.92	7.85	30.25	6.80	35.36	7.95	30.34	6.82
Average	33.31	**7.49**	28.61	**6.43**	33.92	**7.63**	28.80	**6.48**
St Dev	1.27	0.28	2.15	0.48	1.05	0.24	2.15	0.48
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	33.14	7.45	25.13	5.65
Maximum	36.03	8.10	30.65	6.89
Average	34.34	**7.72**	29.12	**6.55**
St Dev	1.05	0.24	2.15	0.48
Count	8	8	8	8

DATA SUMMARIES Continued

Mating/Unmating basic (QSE-020-01-L-D-A/QTE-020-01-L-D-A):

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	15.97	3.59	10.59	2.38	15.66	3.52	12.37	2.78
Maximum	18.01	4.05	18.82	4.23	19.30	4.34	22.46	5.05
Average	16.46	**3.70**	15.20	**3.42**	16.87	**3.79**	15.96	**3.59**
St Dev	0.66	0.15	2.50	0.56	1.10	0.25	2.96	0.67
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	16.46	3.70	13.52	3.04	16.72	3.76	11.21	2.52
Maximum	18.55	4.17	20.15	4.53	19.93	4.48	20.42	4.59
Average	17.58	**3.95**	16.41	**3.69**	18.39	**4.13**	16.51	**3.71**
St Dev	0.74	0.17	2.24	0.50	1.10	0.25	3.17	0.71
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	17.39	3.91	11.39	2.56
Maximum	21.04	4.73	25.22	5.67
Average	19.05	**4.28**	17.10	**3.84**
St Dev	1.40	0.32	4.45	1.00
Count	8	8	8	8

DATA SUMMARIES Continued

Thermal aging:

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	57.25	12.87	43.41	9.76	49.15	11.05	40.97	9.21
Maximum	70.06	15.75	53.87	12.11	63.38	14.25	50.04	11.25
Average	62.23	**13.99**	48.41	**10.88**	56.04	**12.60**	44.19	**9.94**
St Dev	5.39	1.21	3.24	0.73	5.04	1.13	3.21	0.72
Count	8	8	8	8	8	8	8	8

Normal Force:

Initial	**Deflections in in Forces in Grams**				
	0.0016	**0.0031**	**0.0039**	**0.0051**	**SET**
Averages	29.03	56.87	70.58	90.00	0.0002
Min	26.10	54.20	67.50	85.45	0.0000
Max	30.80	60.20	74.10	94.70	0.0003
St. Dev	1.468	2.032	2.224	3.450	0.0001
Count	12	12	12	12	12

After Thermals	Deflections in in Forces in Grams				
	0.0016	**0.0031**	**0.0039**	**0.0051**	***SET***
Averages	31.22	59.44	73.71	93.46	0.0025
Min	27.80	54.20	69.70	88.90	0.0000
Max	33.80	63.50	78.40	98.07	0.0070
St. Dev	1.761	2.760	2.896	2.953	0.0022
Count	12	12	12	12	12

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	**QSE/QTE**	**QSE**	**QTE**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	**QSE/QTE**	**QSE**	**QTE**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**QSE/QTE**
Break Down Voltage	900
Test Voltage	675
Working Voltage	225

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

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

DATA SUMMARIES Continued

LLCR Durabiltiy:

1) A total of 192 points (184 signal pin and 8 ground pin) 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	11/28/2011	11/28/2011	12/5/2011	12/19/2011
Room Temp (Deg C)	23	23	23	22
Rel Humidity (%)	53	54	53	43
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	21.71	0.93	1.44	1.24
St. Dev.	0.94	0.85	1.01	0.92
Min	19.94	0.00	0.00	0.01
Max	26.86	3.85	5.73	5.01
Summary Count	184	184	184	184
Total Count	184	184	184	184
	Pin Type 2: Ground			
Average	3.56	0.60	0.58	4.08
St. Dev.	0.10	0.16	0.15	0.31
Min	3.40	0.01	0.01	0.03
Max	3.69	0.46	0.44	0.94
Summary Count	8	8	8	8
Total Count	8	8	8	8

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

1) A total of 192 points (184 signal pin and 8 ground pin) 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	11/29/2011	12/12/2011
Room Temp (Deg C)	23	21
Rel Humidity (%)	54	51
Technician	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta Thermal**
	Pin Type 1: Signal	
Average	21.27	0.97
St. Dev.	0.81	0.84
Min	19.78	0.00
Max	25.48	4.86
Summary Count	184	184
Total Count	184	184
	Pin Type 2: Ground	
Average	3.54	0.64
St. Dev.	0.20	0.11
Min	3.04	0.06
Max	3.72	0.37
Summary Count	8	8
Total Count	8	8

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

DATA SUMMARIES Continued

LLCR GAS TIGHT:

1) A total of 192 points (184 signal pin and 8 ground pin) 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	11/23/2011	12/1/2011
Room Temp (Deg C)	23	23
Rel Humidity (%)	51	54
Technician	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta Acid Vapor**
	Pin Type 1: Signal	
Average	21.33	1.17
St. Dev.	0.82	0.77
Min	19.64	0.03
Max	24.32	4.00
Summary Count	184	184
Total Count	184	184
	Pin Type 2: Ground	
Average	3.55	0.49
St. Dev.	0.09	0.03
Min	3.36	0.00
Max	3.67	0.09
Summary Count	8	8
Total Count	8	8

LLCR Delta Count by Category

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

DATA SUMMARIES Continued

LLCR Extended Life 100 Cycles:

1) A total of 192 points (184 signal pin and 8 ground pin) 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	1/9/2012	1/18/2012	1/24/2012	2/6/2012
Room Temp (Deg C)	22	22	22	22
Rel Humidity (%)	33	36	36	36
Technician	Troy Cook	Troy Cook	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	20.06	0.46	0.56	0.55
St. Dev.	0.72	0.43	0.54	0.57
Min	17.99	0.01	0.00	0.00
Max	24.27	3.38	4.46	4.70
Summary Count	184	184	184	184
Total Count	184	184	184	184
	Pin Type 2: Ground			
Average	3.34	0.03	0.02	0.05
St. Dev.	0.14	0.02	0.02	0.02
Min	3.13	0.01	0.00	0.01
Max	3.52	0.07	0.06	0.07
Summary Count	8	8	8	8
Total Count	8	8	8	8

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
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 Extended Life 250 Cycles:

1) A total of 192 points (184 signal pin and 8 ground pin) 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	1/9/2012	1/18/2012	1/24/2012	2/6/2012
Room Temp (Deg C)	22	22	22	22
Rel Humidity (%)	33	35	36	36
Technician	Troy Cook	Troy Cook	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 250 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	20.06	0.49	0.55	0.58
St. Dev.	0.55	0.42	0.46	0.48
Min	18.66	0.00	0.00	0.00
Max	21.59	2.35	2.50	2.90
Summary Count	184	184	184	184
Total Count	184	184	184	184
	Pin Type 2: Ground			
Average	3.32	0.10	0.08	0.11
St. Dev.	0.17	0.11	0.12	0.10
Min	3.10	0.02	0.00	0.02
Max	3.56	0.32	0.28	0.31
Summary Count	8	8	8	8
Total Count	8	8	8	8

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
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 Extended Life 500 Cycles:

1) A total of 192 points (184 signal pin and 8 ground pin) 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	1/9/2012	1/18/2012	1/24/2012	2/6/2012
Room Temp (Deg C)	22	22	22	22
Rel Humidity (%)	32	36	36	36
Technician	Troy Cook	Troy Cook	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	20.10	0.56	0.64	0.68
St. Dev.	0.59	0.48	0.68	0.85
Min	18.28	0.01	0.01	0.01
Max	22.30	4.27	6.23	9.63
Summary Count	184	184	184	184
Total Count	184	184	184	184
	Pin Type 2: Ground			
Average	3.35	0.03	0.02	0.05
St. Dev.	0.11	0.01	0.01	0.02
Min	3.17	0.01	0.00	0.03
Max	3.52	0.05	0.04	0.11
Summary Count	8	8	8	8
Total Count	8	8	8	8

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
500 Cycles	**192**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**191**	**1**	**0**	**0**	**0**	**0**
Humidity	**191**	**1**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock Vib:

1) A total of 192 points (184 signal pin and 8 ground pin) 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	12/19/2011	12/27/2011
Room Temp (Deg C)	23	22
Rel Humidity (%)	40	33
Technician	Tony Wagoner	Tony Wagoner
mOhm values	**Actual Initial**	**Delta Shock-Vib**
	Pin Type 1: Signal	
Average	21.68	0.44
St. Dev.	0.99	0.49
Min	19.33	0.00
Max	26.71	3.74
Summary Count	184	184
Total Count	184	184
	Pin Type 2: Ground	
Average	3.53	0.05
St. Dev.	0.18	0.02
Min	3.30	0.02
Max	3.81	0.08
Summary Count	8	8
Total Count	8	8

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

DATA SUMMARIES Continued

Shock Vibration Event Detection:

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

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-MO-03
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 580
Serial #: 297288
Accuracy: Last Cal: 2010-8-06, Next Cal: 2011-8-05

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 2010-4-28, Next Cal: 2011-4-27

Equipment #: HZ-OV-01
Description: Oven
Manufacturer: Huida
Model: CS101-1E
Serial #: CS101-1E-B
Accuracy: Last Cal: 2010-12-14, Next Cal: 2011-12-13

Equipment #: HZ-THC-01
Description: Humidity transmitter
Manufacturer: Thermtron
Model: HMM30C
Serial #: D0240037
Accuracy: Last Cal: 2010-3-3, Next Cal: 2011-3-2

Equipment #: HZ-OGP-01
Description: Video measurement system
Manufacturer: OGP
Model: SMARTSCOPE FLASH 200
Serial #: SVW2003632
Accuracy: Last Cal: 2010-6-10, Next Cal: 2011-6-9

Equipment #: HZ-MO-01
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 2700
Serial #: 1199807
Accuracy: Last Cal: 2010-4-28, Next Cal: 2011-4-27

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-PS-01
Description: Power Supply
Manufacturer: Agilent
Model: 6031A
Serial #: MY41000982
Accuracy: Last Cal: 4/27/2011, Next Cal: 4/26/2012

Equipment #: HZ-TSC-01
Description: Thermal Shock transmitter
Manufacturer: Keithley
Model: 10-VT14994
Serial #: VTS-3-6-6-SC/AC
Accuracy: Last Cal: 11/01/2011, Next Cal: 10/31/2012

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 11/31/2011, Next Cal: 11/31/2012

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 2011-07-9, Next Cal: 2012-7-9

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 2011-06-4, Next Cal: 2012-06-4