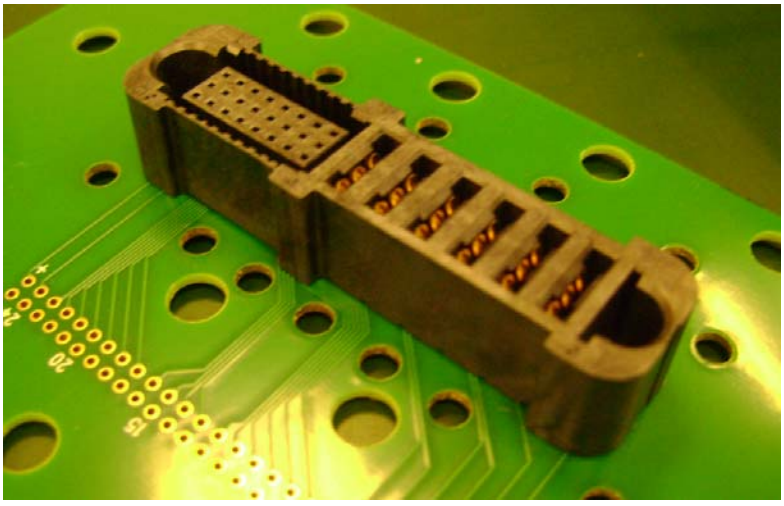
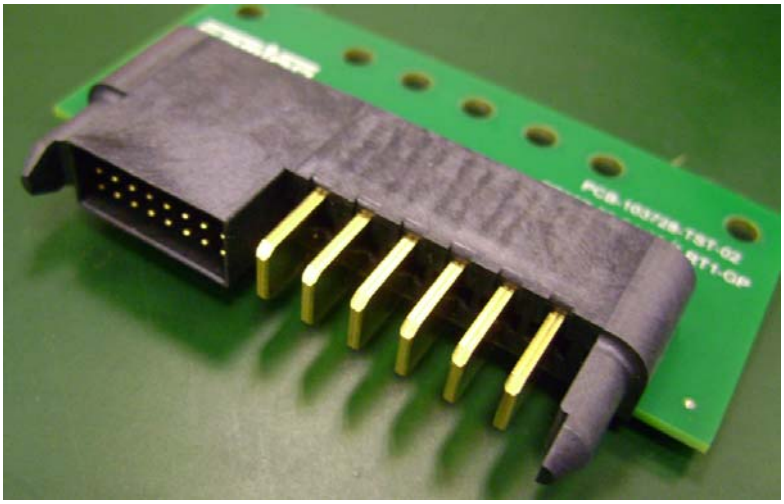
Project Number: 210722	Tracking Code: 210722_Report_Rev_4		
Requested by: Steven Xu	Date: 5/6/2015	Product Rev: 0	
Part #: ET60T-00-24-06-L-RT1-GP/ ET60S-00-24-06-L-VT1-GP	Tech: Peter Chen	Eng: Vico Zhao	
Part description: ET60T/ET60S		Qty to test: 80	
Test Start: 8/5/2012	Test Completed: 11/13/2012		





Design Qualification Test Report

ET60T/ET60S
ET60T-00-24-06-L-RT1-GP/ ET60S-00-24-06-L-VT1-GP

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
1/7/2013	**1**	**Initial Issue**	**PC**
5/20/2013	**2**	**Insert new CCC graph**	**CE**
6/26/2013	**3**	**Updated the CCC graph**	**PC**
5/6/2015	**4**	**Updated the CCC graph**	**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.

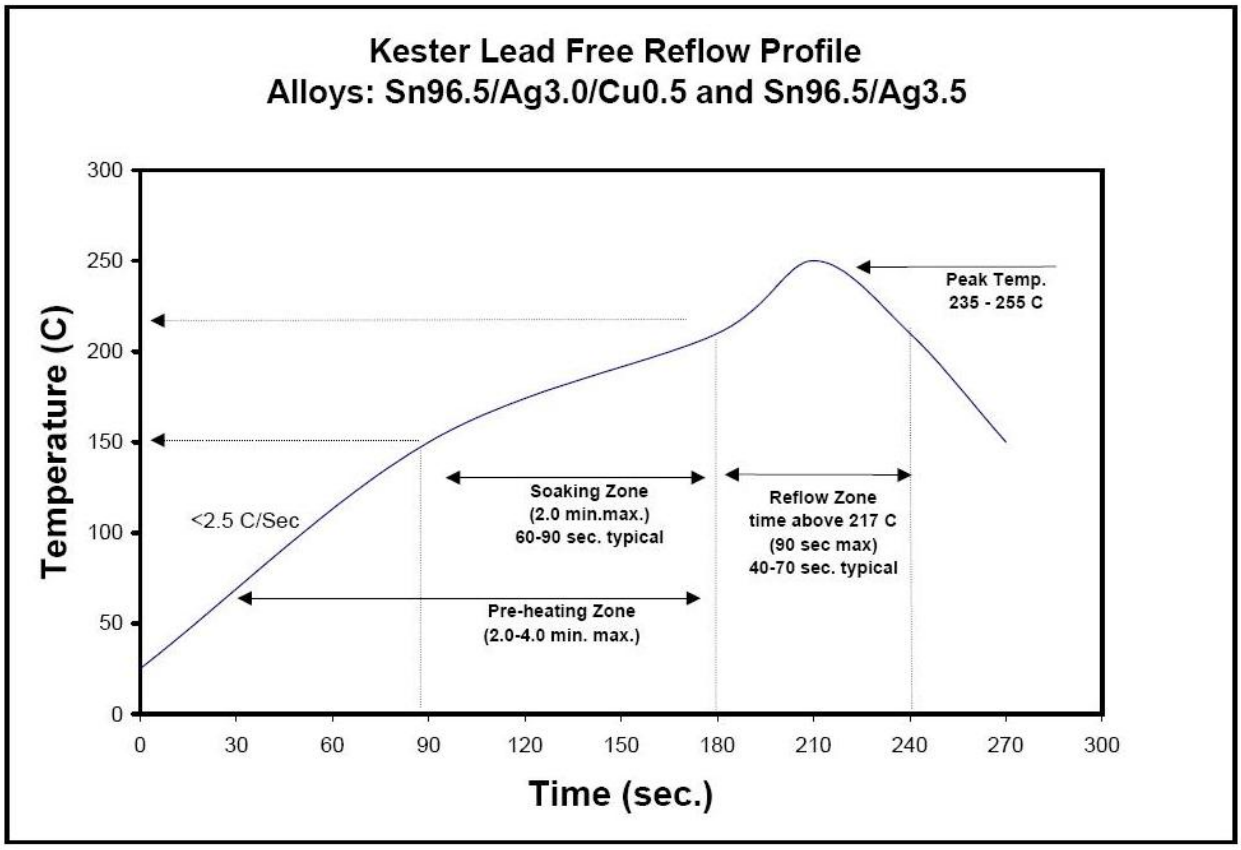
APPLICABLE DOCUMENTS

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 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-103728/103710/-TST-XX

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)



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癈)

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
01	Contact Gaps
02	LLCR-1
03	Forces - Mating / Unmating
04	25 Cycles
05	Forces - Mating / Unmating
06	25 Cycles (50 Total)
07	Forces - Mating / Unmating
08	25 Cycles (75 Total)
09	Forces - Mating / Unmating
10	25 Cycles (100 Total)
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癈 to +65癈 @ 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

Normal Force

TEST STEP	GROUP A1 Individual Contacts (8-10 min)	GROUP A2 Individual Contacts (8-10 min)	GROUP B1 Power - Individual Contacts (8-10 min)	GROUP B2 Power - Individual Contacts (8-10 min)
01	Contact Gaps	Contact Gaps	Contact Gaps	Contact Gaps
02	Setup Approved	Thermal Aging (Mated and Undisturbed)	Setup Approved	Thermal Aging (Mated and Undisturbed)
03	Normal Force (in the body and soldered on PCB unless otherwise specified)	Contact Gaps	Normal Force (in the body and soldered on PCB unless otherwise specified)	Contact Gaps
04		Setup Approved		Setup Approved
05		Normal Force (in the body and soldered on PCB unless otherwise specified)		Normal Force (in the body and soldered on PCB unless otherwise specified)

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

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

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)

FLOWCHARTS Continued

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

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癈 to +65癈 @ 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

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

FLOWCHARTS Continued

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

Current Carrying Capacity - Power Pins

TEST STEP	GROUP A1 3 Mated Assemblies 1 Contact Powered	GROUP A2 3 Mated Assemblies 2 Contacts Powered	GROUP A3 3 Mated Assemblies 3 Contacts Powered	GROUP A4 3 Mated Assemblies 4 Contacts Powered	GROUP A5 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC	CCC

Current Carrying Capacity - Singal Pins

TEST STEP	GROUP D1 3 Mated Assemblies 1 Vertical Row Powered	GROUP D2 3 Mated Assemblies 2 Adjacent Vertical Rows Powered	GROUP D3 3 Mated Assemblies 3 Adjacent Vertical Rows Powered	GROUP D4 3 Mated Assemblies 4 Adjacent Vertical Rows Powered	GROUP D5 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC	CCC

Current Carrying Capacity - Power and Signal Pins

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

(TIN PLATING) - Tabulate calculated current at RT, 65癈, 75癈 and 95癈
after derating 20% and based on 105癈
(GOLD PLATING) - Tabulate calculated current at RT, 85癈, 95癈 and 115癈
after derating 20% and based on 125癈
CCC, Temp rise = EIA-364-70

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

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

THERMAL:

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

HUMIDITY:

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

MECHANICAL SHOCK (Specified Pulse):

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

VIBRATION:

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

NANOSECOND-EVENT DETECTION:

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

MATING/UNMATING:

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

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.

NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

INSULATION RESISTANCE (IR):

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

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

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

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

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets.*
2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
    a. Self heating (resistive)
    b. Reduction in heat sink capacity affecting the heated contacts
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at four temperature points are reported:
    c. Ambient
    d. 80^{o} C
    e. 95^{o} C
    f. 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.

LLCR:

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

GAS TIGHT:

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

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

RESULTS

Temperature Rise, CCC at a 20% de-rating

Power pin

- **CCC for a 30°C Temperature Rise ---------- 67.4 A per contact with 1 adjacent power contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 60.3 A per contact with 2 adjacent power contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 53.8 A per contact with 3 adjacent power contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 50.2 A per contact with 4 adjacent power contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 44.3 A per contact with all adjacent power contacts powered**

Signal pin

- **CCC for a 30°C Temperature Rise ---------- 3.7 A per contact with 3 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 2.8 A per contact with 6 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 2.4 A per contact with 9 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 2.3 A per contact with 12 adjacent signal contacts powered**
- **CCC for a 30°C Temperature Rise ---------- 1.7 A per contact with all adjacent signal contacts powered**

Power Pin powered while signal pin @ 1/2 rated current at 1.05 Amps

- **CCC for a 30°C Temperature Rise ---------- 43.8 A per contact with All adjacent power contacts powered**

Mating & Unmating force

Thermal aging

- **Initial**
  - **Mating**
    - **Min ---------- 9.39 Lbs**
    - **Max---------- 12.54 Lbs**
  - **Unmating**
    - **Min ---------- 7.07 Lbs**
    - **Max---------- 8.33 Lbs**
- **After thermal aging**
  - **Mating**
    - **Min ---------- 5.25 Lbs**
    - **Max---------- 6.34 Lbs**
  - **Unmating**
    - **Min ---------- 4.67 Lbs**
    - **Max---------- 5.75 Lbs**

RESULTS Continued

Mating&Unmating durability:

- **Initial**
  - **Mating**
    - **Min ---------- 8.77 Lbs**
    - **Max----------10.83 Lbs**
  - **Unmating**
    - **Min ---------- 6.10 Lbs**
    - **Max---------- 8.67 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 9.36 Lbs**
    - **Max----------11.00 Lbs**
  - **Unmating**
    - **Min ---------- 6.78 Lbs**
    - **Max---------- 9.21 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 9.83 Lbs**
    - **Max----------10.75 Lbs**
  - **Unmating**
    - **Min ---------- 7.20 Lbs**
    - **Max---------- 9.51 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ----------10.22 Lbs**
    - **Max----------11.15 Lbs**
  - **Unmating**
    - **Min ---------- 7.25 Lbs**
    - **Max---------- 9.67 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ----------10.12 Lbs**
    - **Max----------11.23 Lbs**
  - **Unmating**
    - **Min ---------- 7.37 Lbs**
    - **Max----------10.50 Lbs**
- **After Humidity**
  - **Mating**
    - **Min ---------- 4.58 Lbs**
    - **Max---------- 5.51 Lbs**
  - **Unmating**
    - **Min ---------- 3.98 Lbs**
    - **Max---------- 4.96 Lbs**

RESULTS Continued

Normal force:

Signal pin at 0.0055 inch deflection

Left Pin:

- **Initial**
  - **Min----------68.60 gf Set ----- 0.0000 Inch**
  - **Max ---------- 80.60 gf Set ----- 0.0004 Inch**
- **Thermal**
  - **Min----------68.90 gf Set----- 0.0001 Inch**
  - **Max ----------75.70 gf Set----- 0.0001 Inch**

Right Pin

- **Initial**
  - **Min----------71.20 gf Set ----- 0.0000 Inch**
  - **Max ---------- 77.80 gf Set ----- 0.0002 Inch**
- **Thermal**
  - **Min----------67.40 gf Set----- 0.0000 Inch**
  - **Max ----------77.40 gf Set----- 0.0004 Inch**

Power pin at 0.0142 inch deflection

Left Pin:

- **Initial**
  - **Min---------- 429.90 gf Set ----- 0.0003 Inch**
  - **Max ---------- 555.60 gf Set ----- 0.0019 Inch**
- **Thermal**
  - **Min---------- 321.00 gf Set----- 0.0051 Inch**
  - **Max ---------- 391.40 gf Set----- 0.0068 Inch**

Middle Pin:

- **Initial**
  - **Min---------- 372.00 gf Set ----- 0.0002 Inch**
  - **Max ---------- 529.80 gf Set ----- 0.0026 Inch**
- **Thermal**
  - **Min---------- 299.50 gf Set----- 0.0050 Inch**
  - **Max ---------- 400.80 gf Set----- 0.0069 Inch**

Right Pin:

- **Initial**
  - **Min---------- 383.10 gf Set ----- 0.0001 Inch**
  - **Max ---------- 556.40 gf Set ----- 0.0019 Inch**
- **Thermal**
  - **Min---------- 315.80 gf Set----- 0.0058 Inch**
  - **Max ---------- 409.80 gf Set----- 0.0067 Inch**

RESULTS Continued

LLCR Durability (144 pin signal and 48 pin power LLCR test points)

Signal pin:

- **Initial ---------- 10.58 mOhms Max**

Power pin:

- **Initial ---------- 0.24 mOhms Max**
- **After 100 Cycles**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **After humidity**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Thermal Aging (144 pin signal and 48 pin power LLCR test points)

Signal Pin:

- **Initial ---------- 10.55 mOhms Max**

Power Pin:

- **Initial ---------- 0.23 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Gas Tight (144 pin signal and 48 pin power LLCR test points)

Signal Pin:

- **Initial ---------- 10.71 mOhms Max**

Power Pin:

- **Initial ---------- 0.22 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

RESULTS Continued

LLCR Shock Vib (144 pin signal and 48 pin power LLCR test points)

Signal Pin:

- **Initial ---------- 12.81 mOhms Max**

Power Pin:

- **Initial ----------0.26 mOhms Max**
- **S&V**
  - **<= +5.0 mOhms ----------184 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms----------8 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**

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**

Row-Row

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

Pin-Power

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

RESULTS Continued

Power-Power

- **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---------- 1200VAC**
  - **Test Voltage ----------900VAC**
  - **Working Voltage ----------300VAC**

Pin - Pin

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

Row-Row

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

Pin - Power

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

Power - Power

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

DATA SUMMARIES

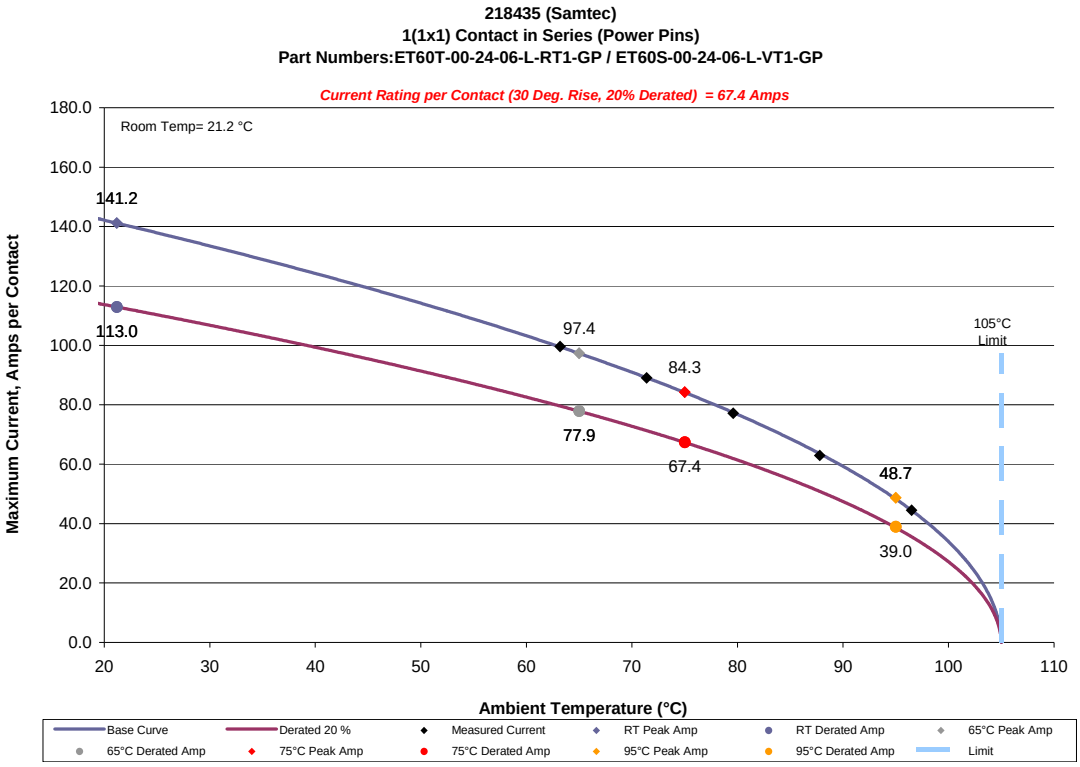
TEMPERATURE RISE (Current Carrying Capacity, CCC):

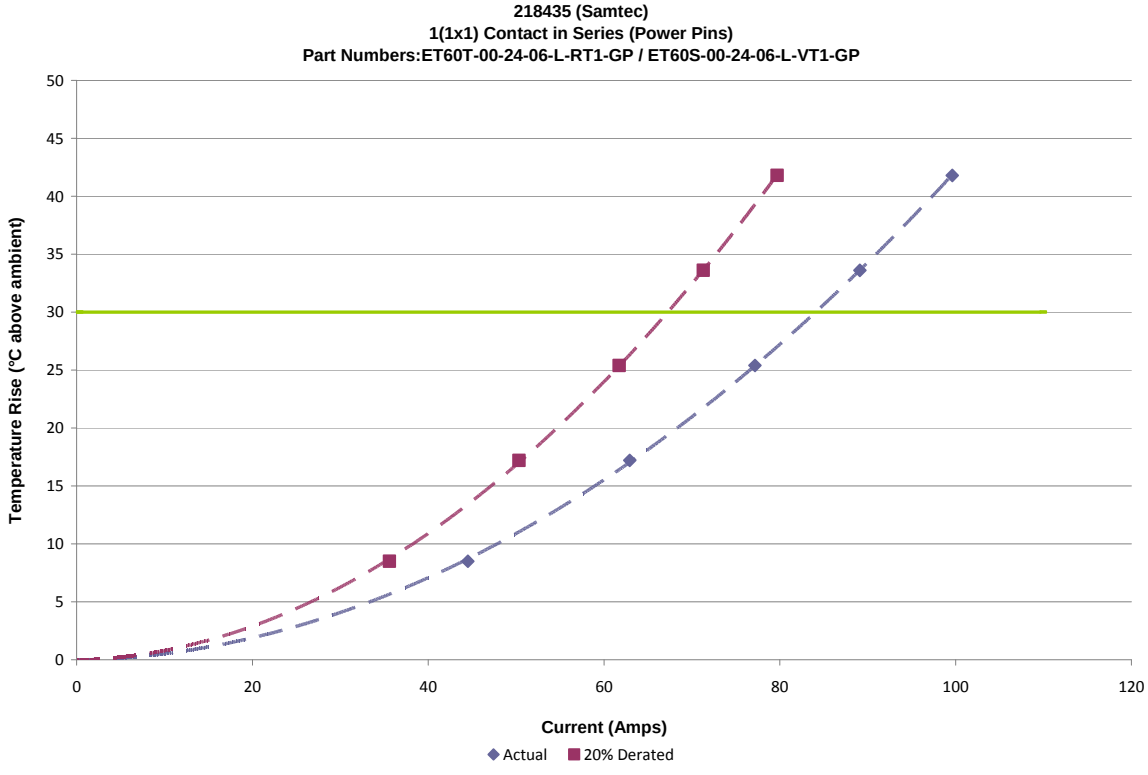
1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes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

DATA SUMMARIES CONTINUED

Power pin:

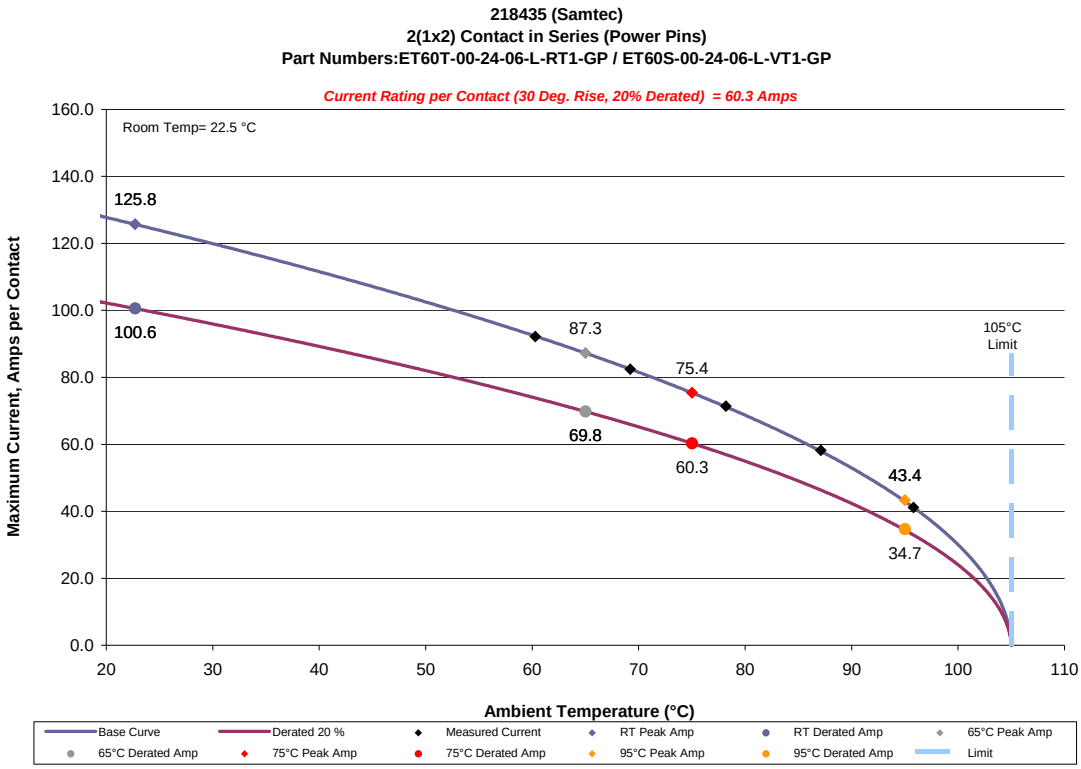
a. Linear configuration with 1 adjacent power conductors/contacts powered

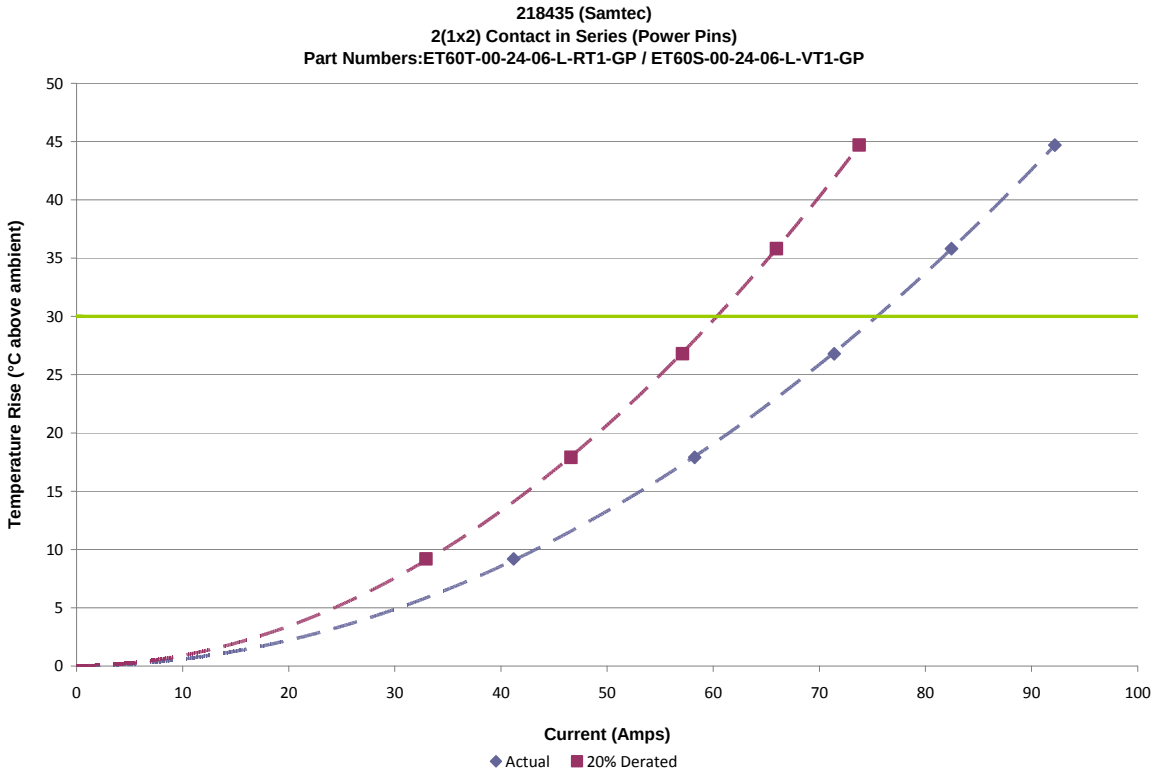




DATA SUMMARIES CONTINUED

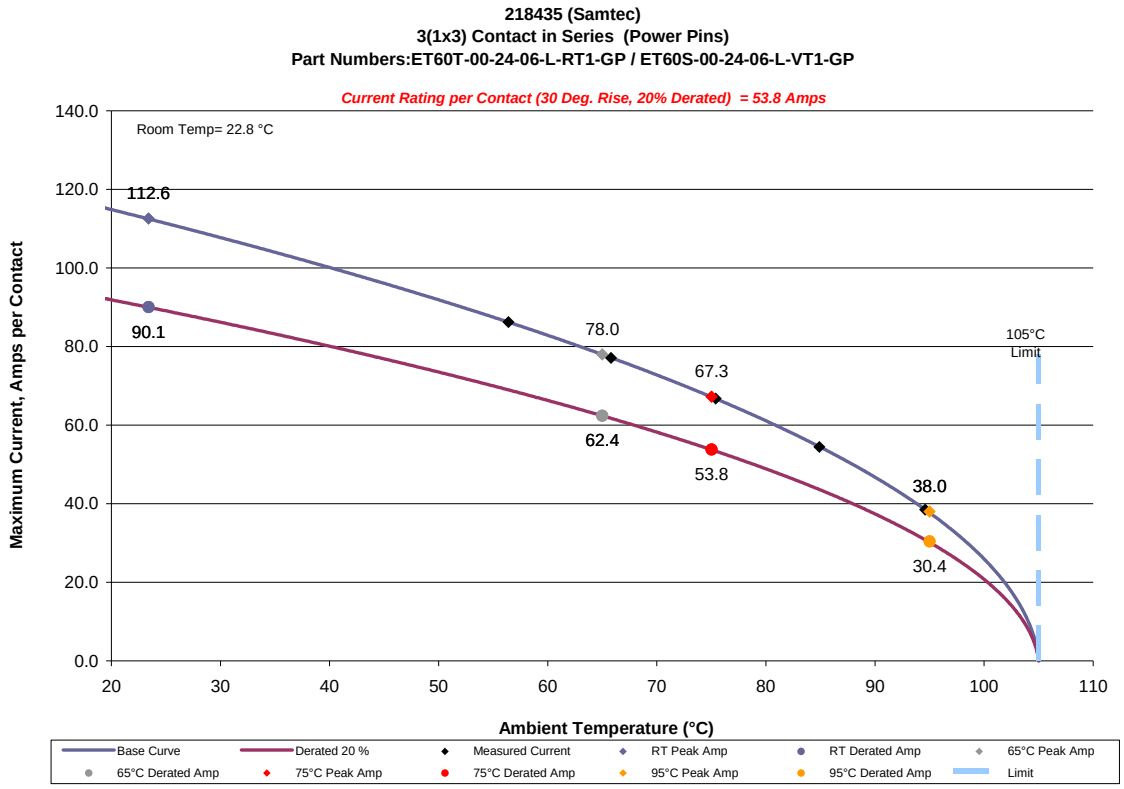
b. Linear configuration with 2 adjacent power conductors/contacts powered

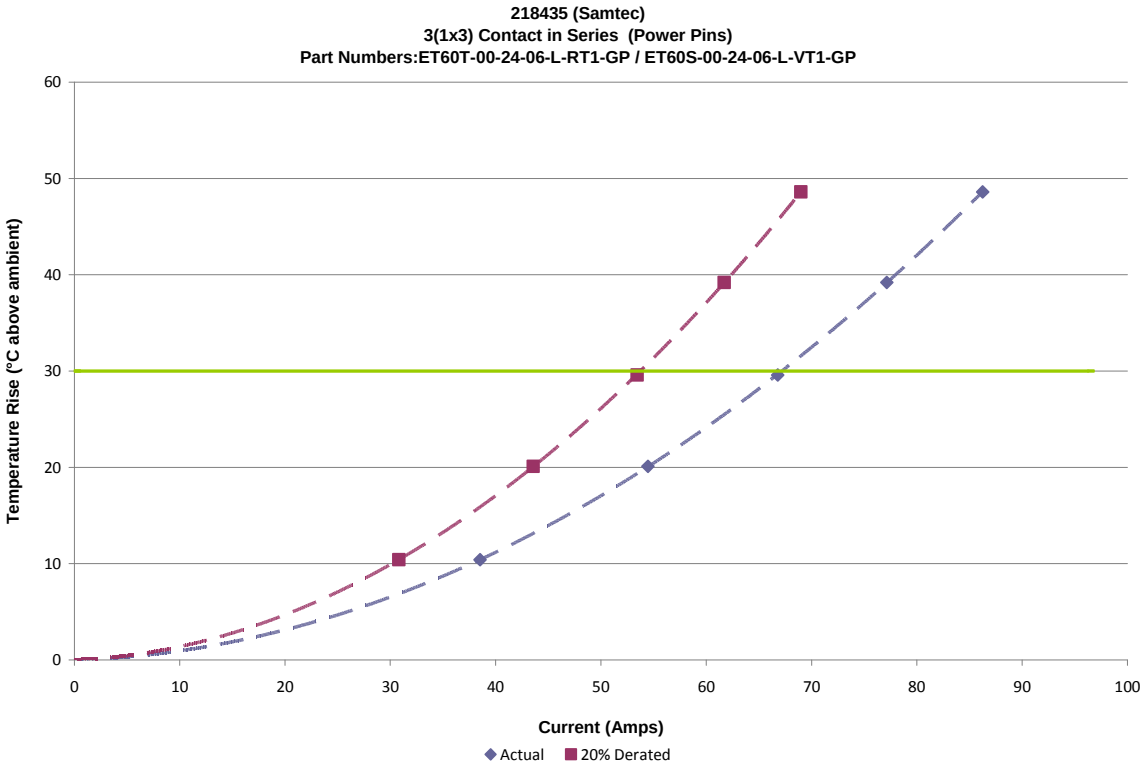




DATA SUMMARIES CONTINUED

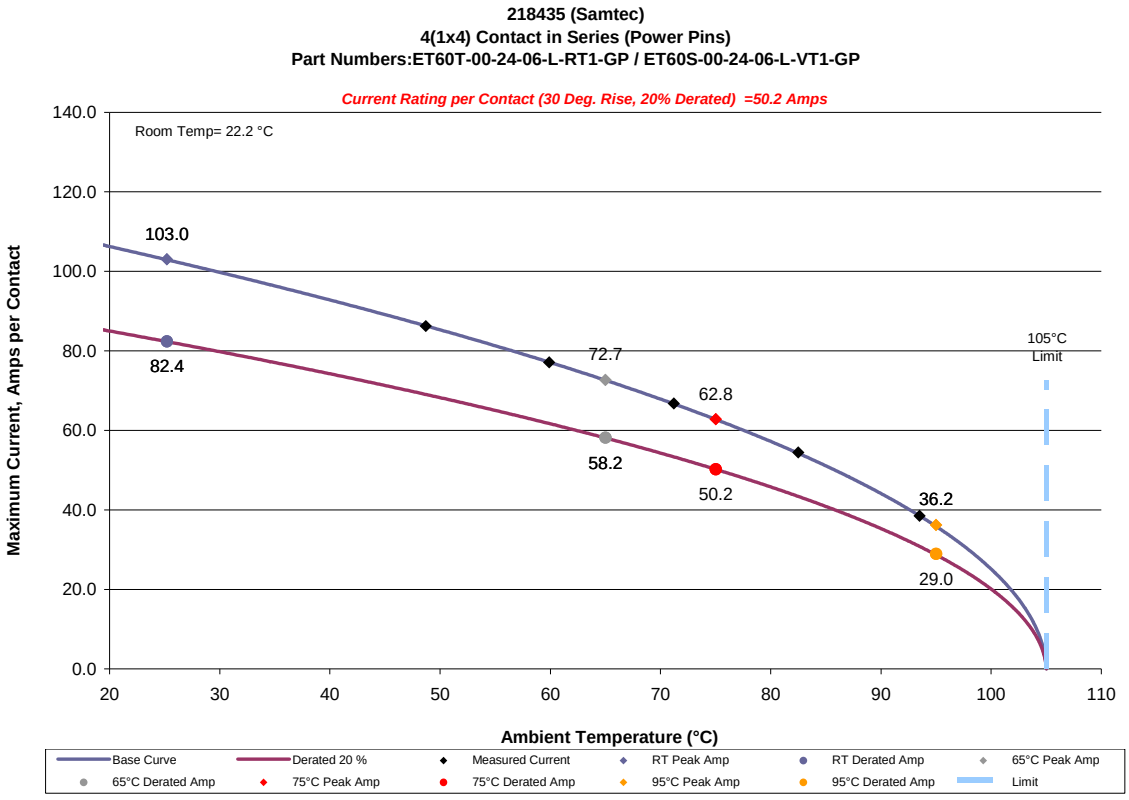
c. Linear configuration with 3 adjacent power conductors/contacts powered

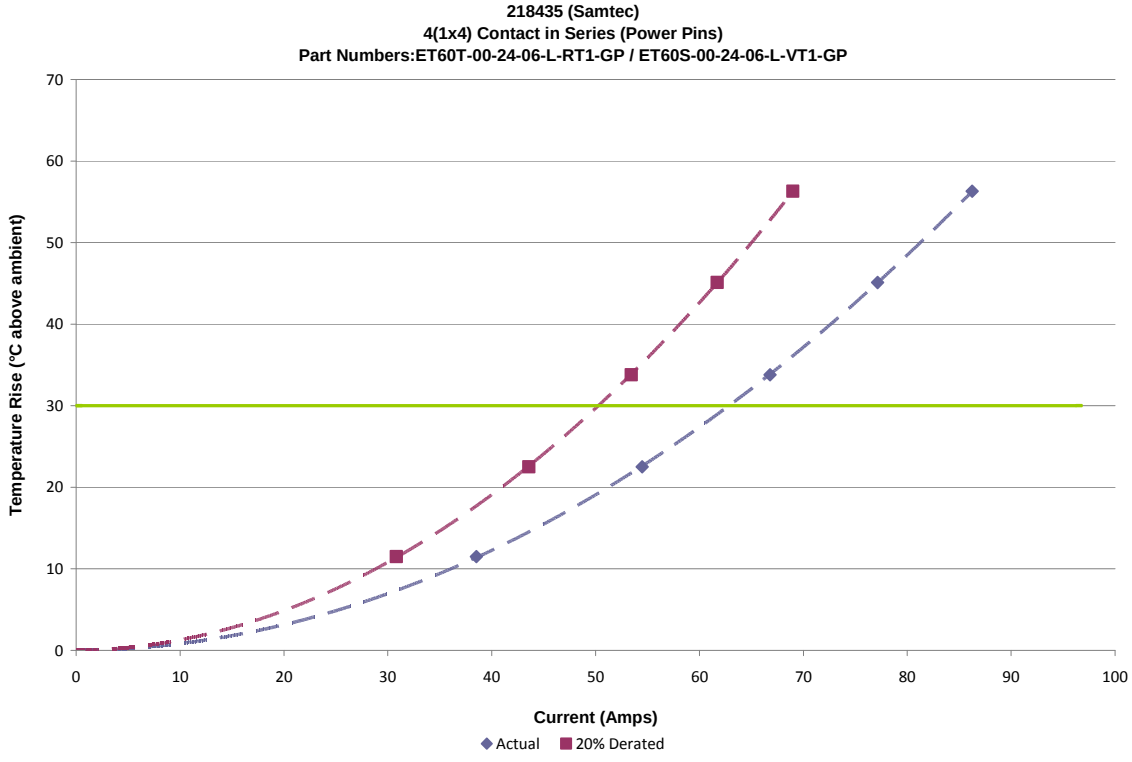




DATA SUMMARIES CONTINUED

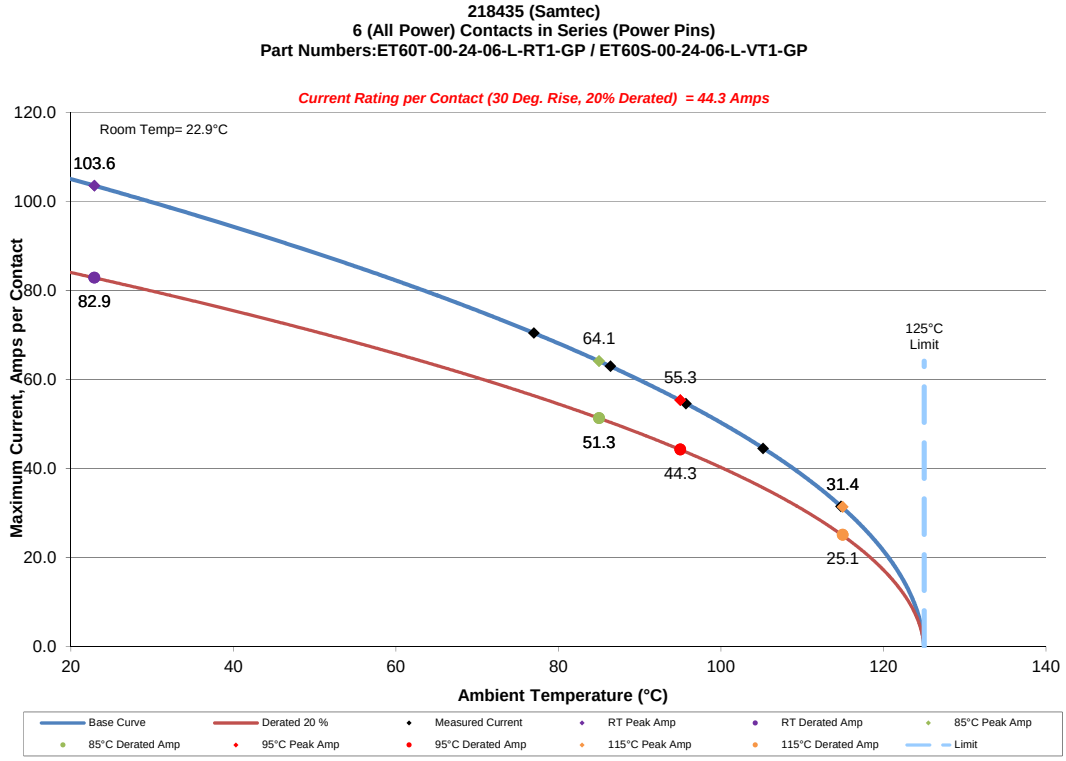
d. Linear configuration with 4 adjacent power conductors/contacts powered

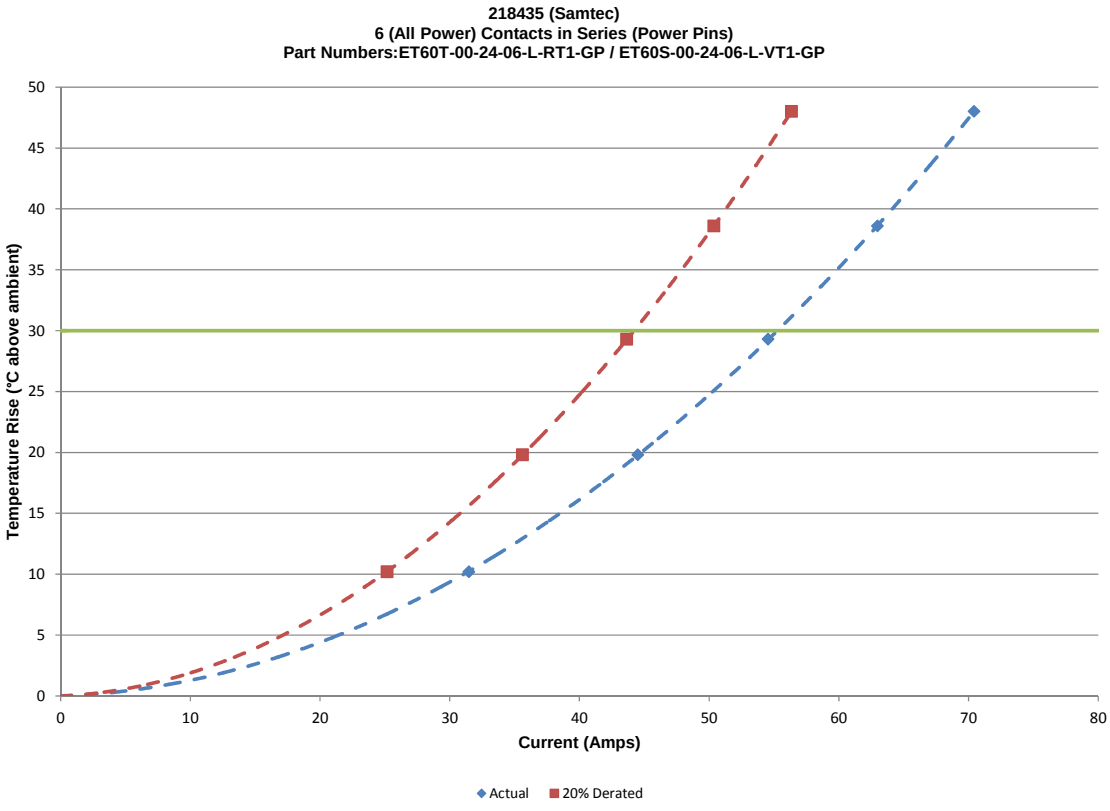




DATA SUMMARIES CONTINUED

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

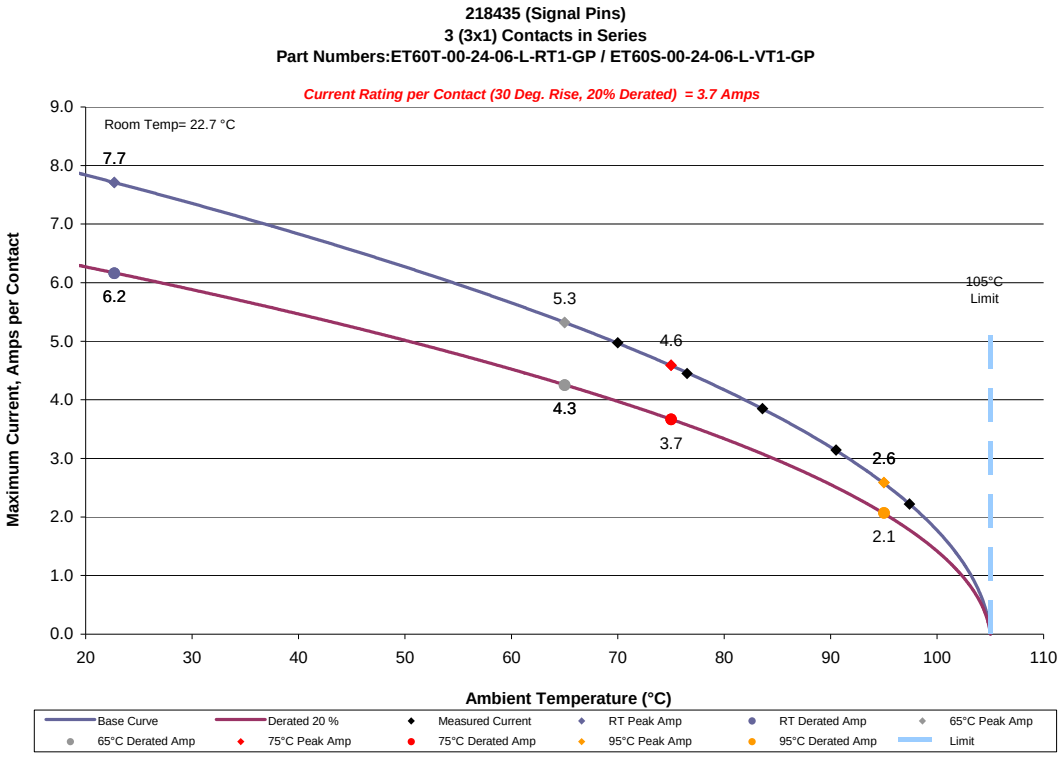


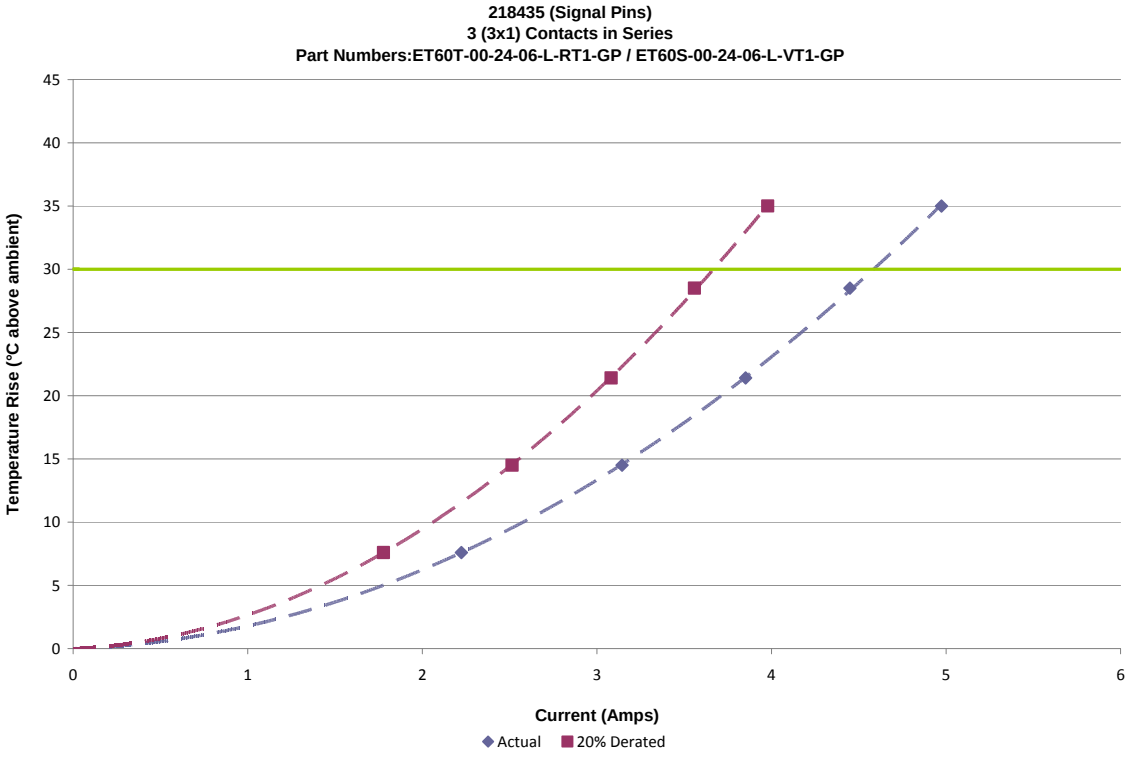


DATA SUMMARIES CONTINUED

Signal pin:

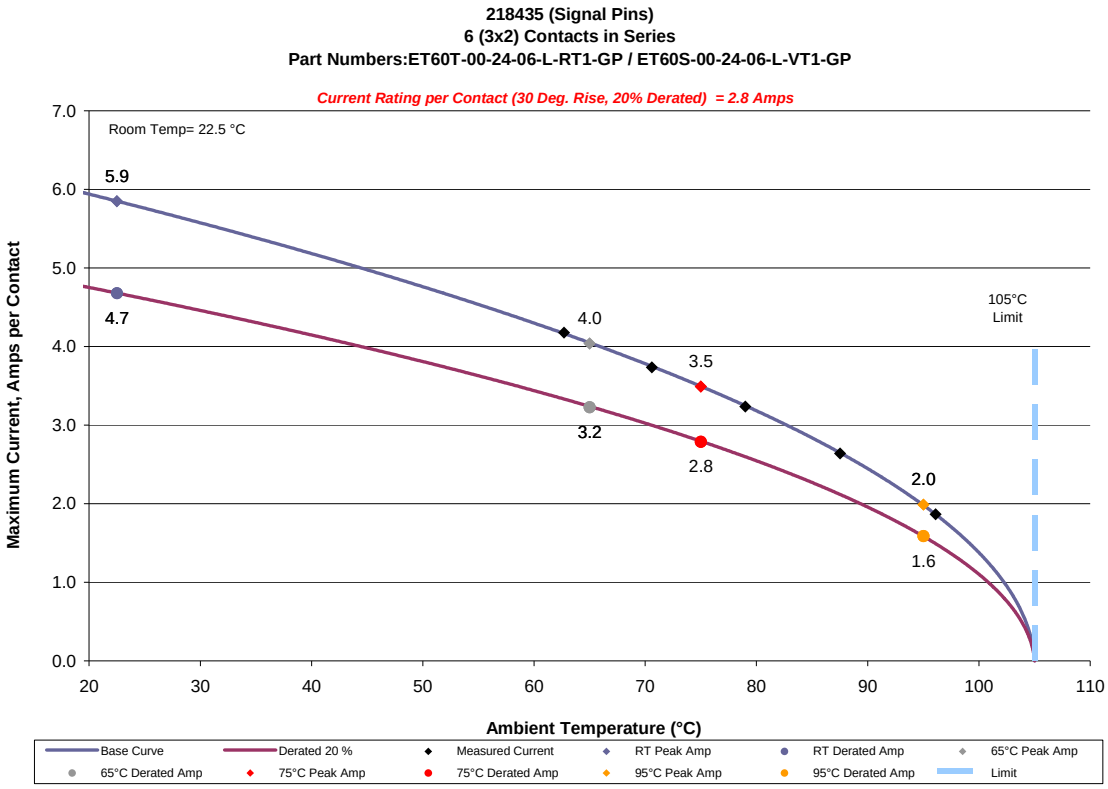
f. Linear configuration with 3 adjacent signal conductors/contacts powered

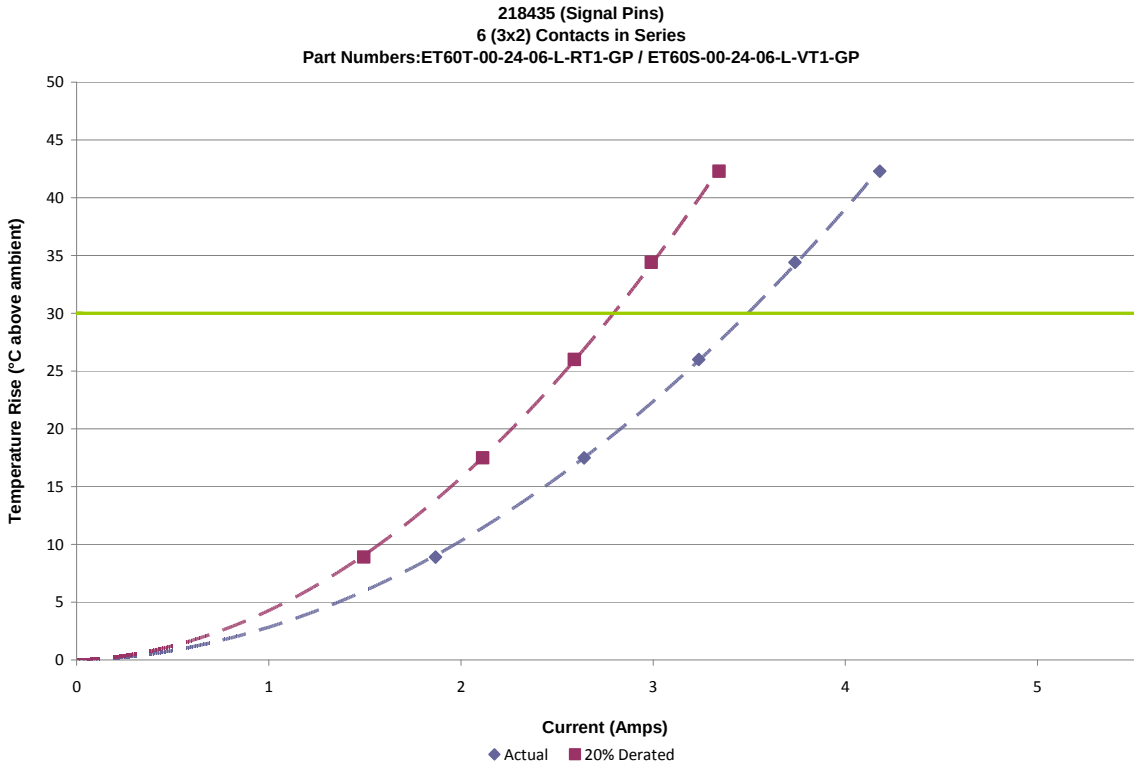




DATA SUMMARIES CONTINUED

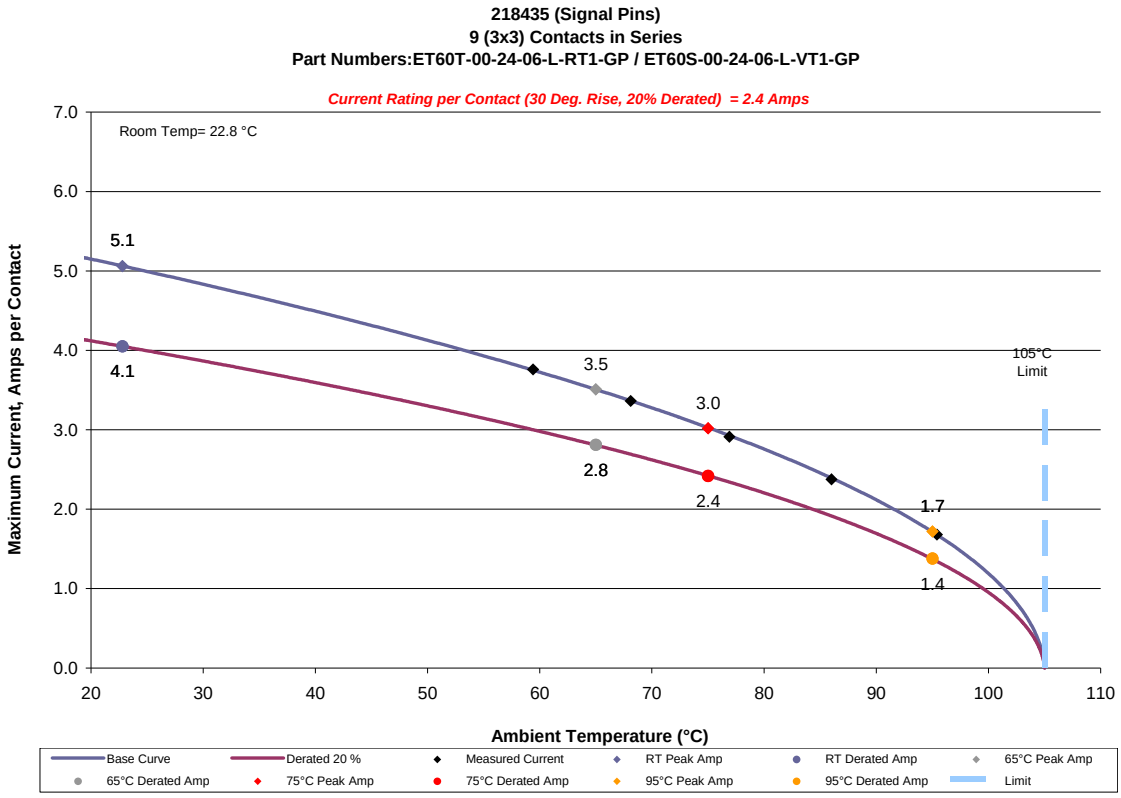
g. Linear configuration with 6 adjacent signal conductors/contacts powered

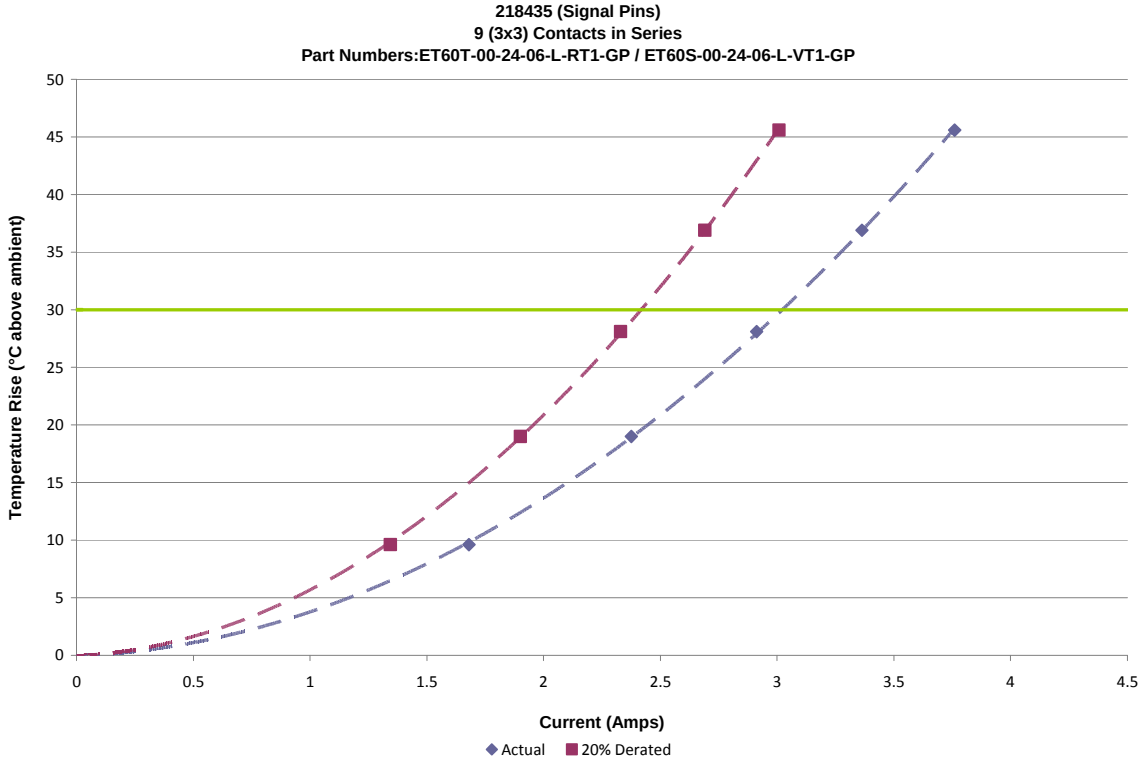




DATA SUMMARIES CONTINUED

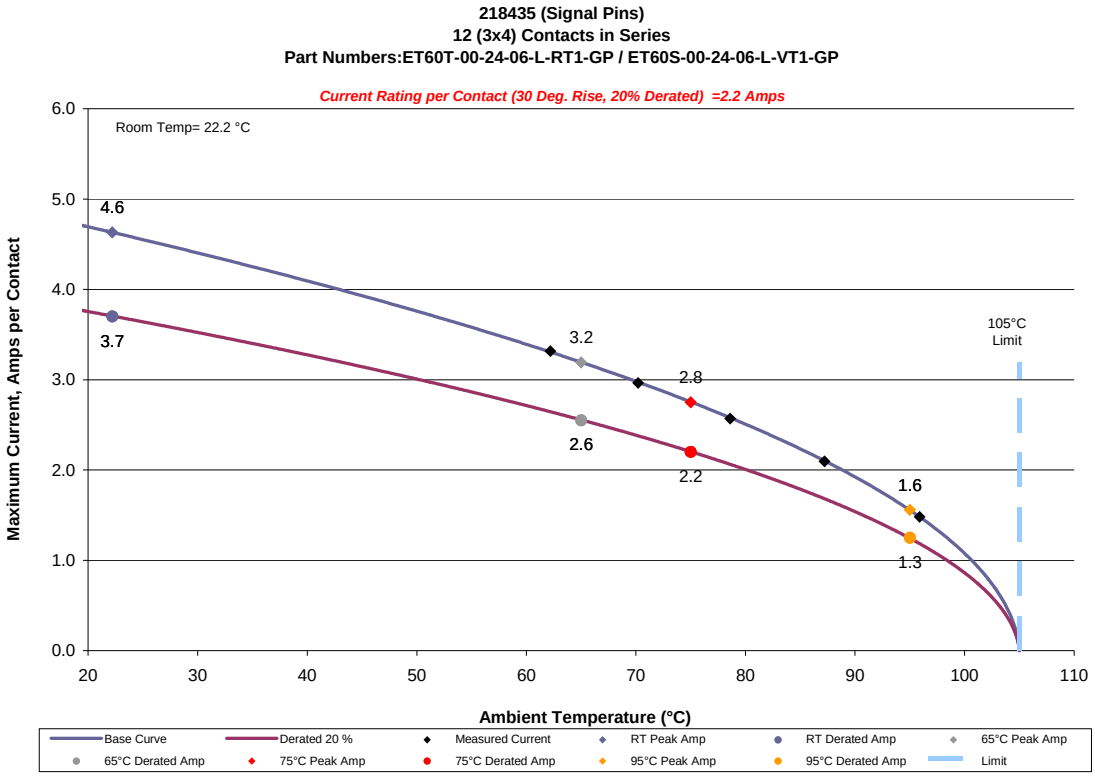
h. Linear configuration with 9 adjacent signal conductors/contacts powered

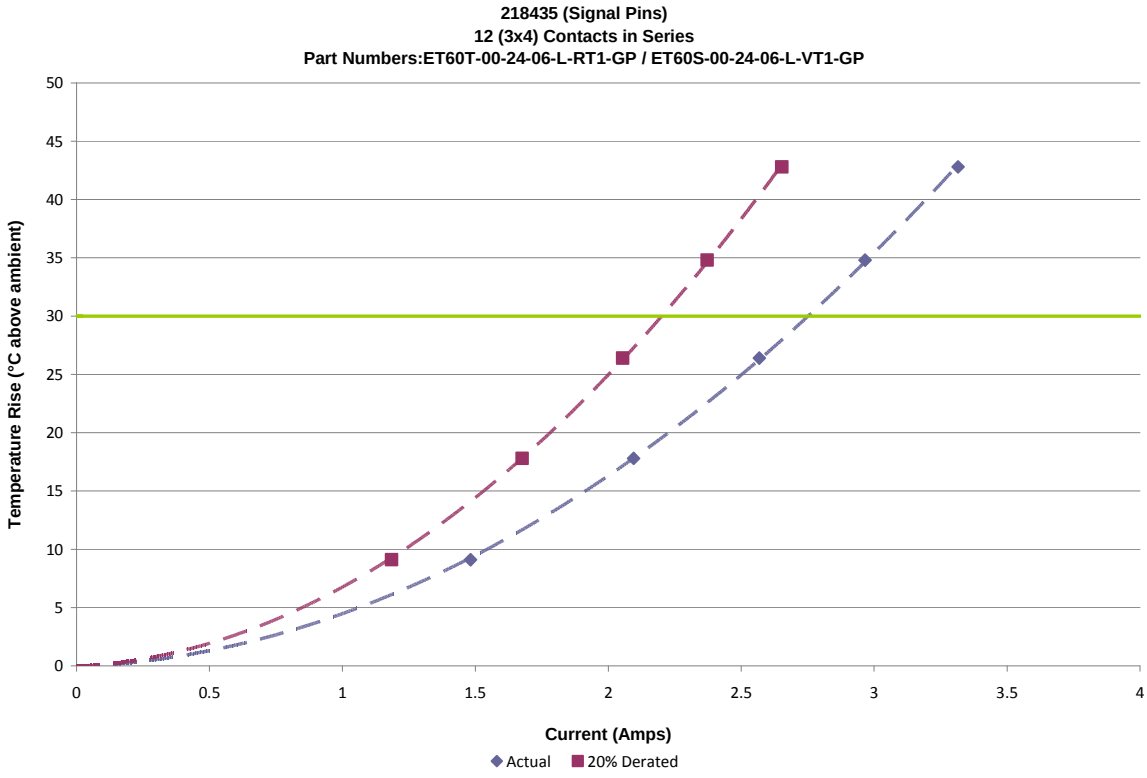




DATA SUMMARIES CONTINUED

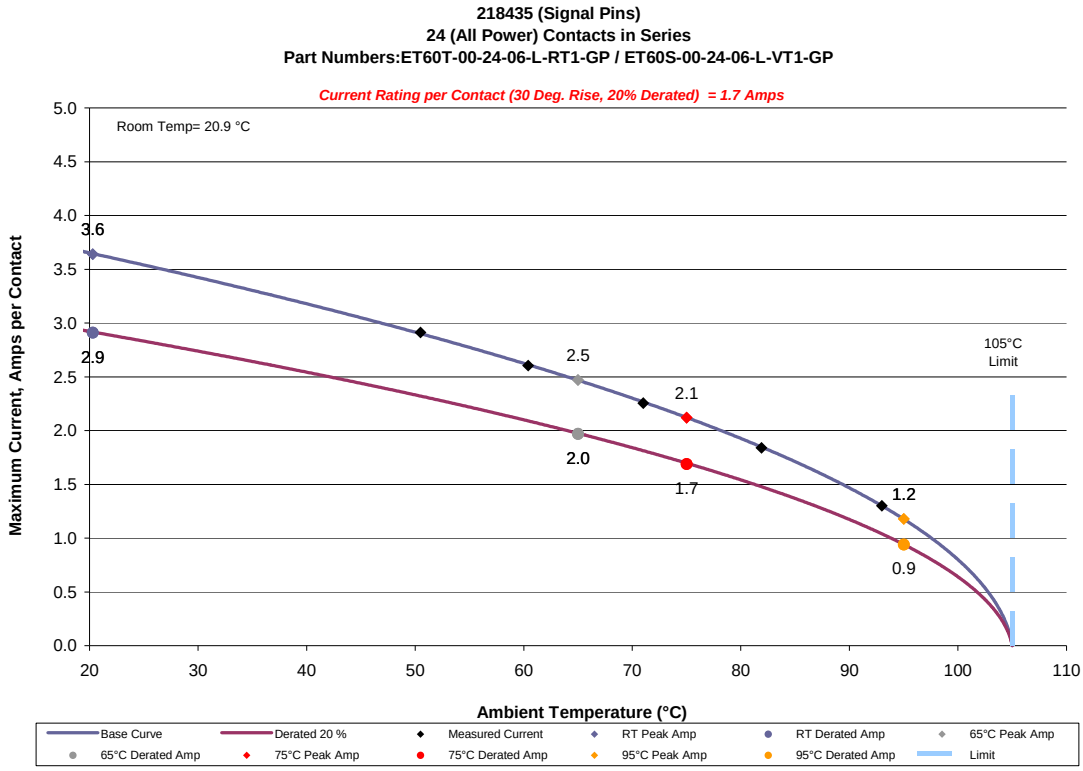
i. Linear configuration with 12 adjacent signal conductors/contacts powered

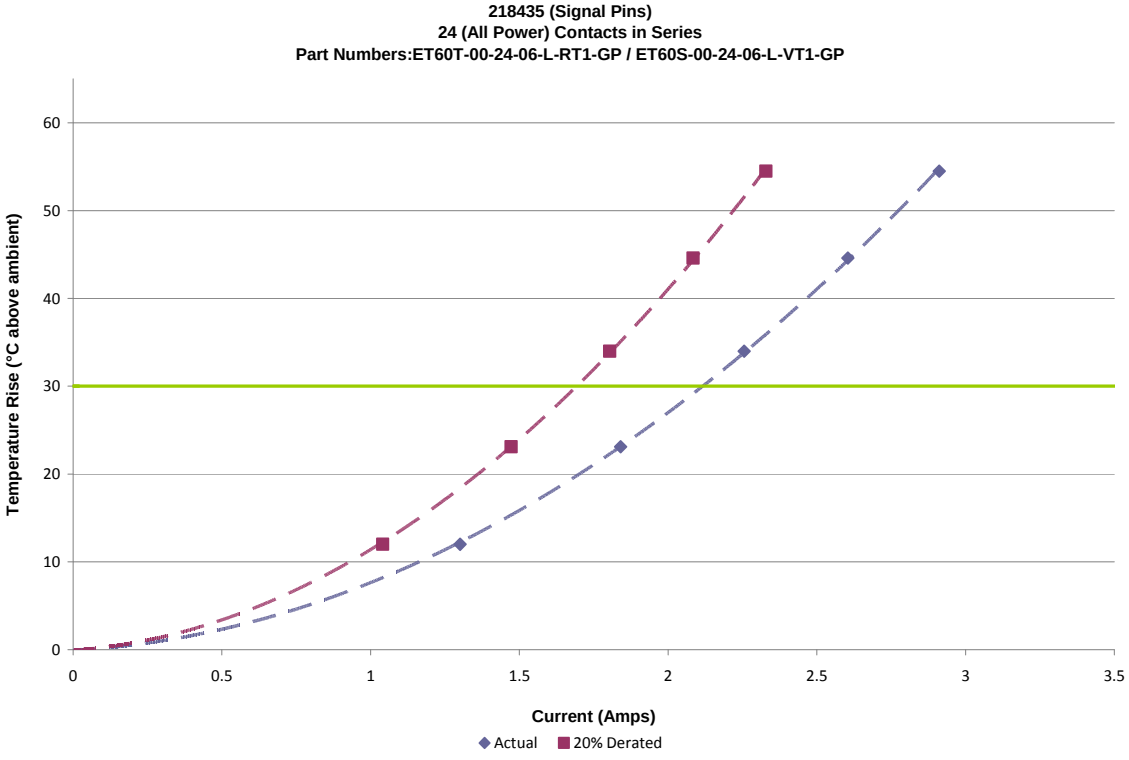




DATA SUMMARIES CONTINUED

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

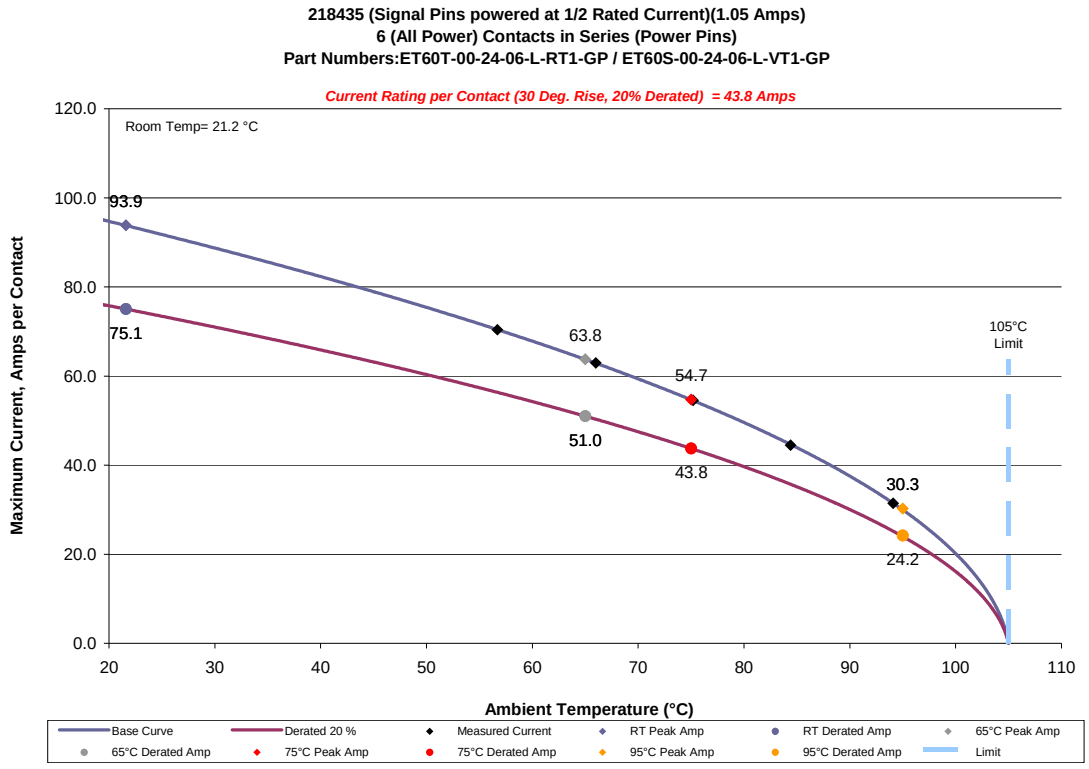


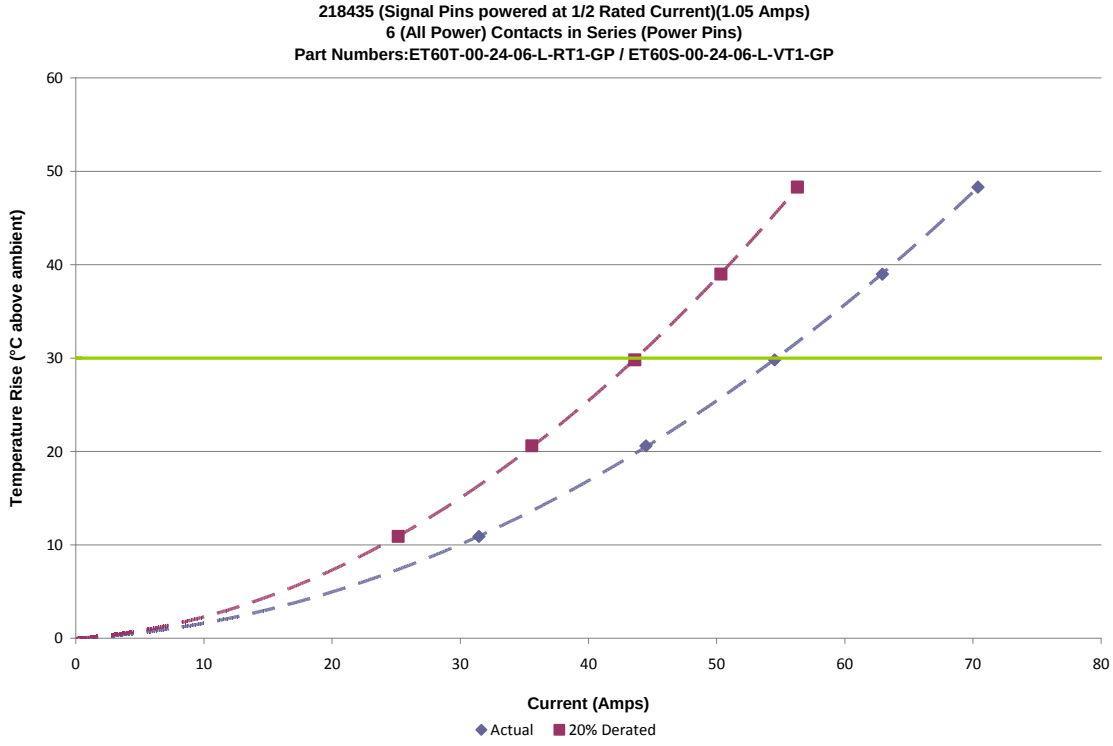


DATA SUMMARIES CONTINUED

Power Pin powered while signal pin @ 1/2 rated current at 1.05 Amps

k. All Power Pins (while signal pin at 1.05 Amps) Contacts Powered





DATA SUMMARIES

MATING/UNMATING FORCE:

Mating/Unmating durability:

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	39.01	8.77	27.13	6.10	41.63	9.36	30.16	6.78
Maximum	48.17	10.83	38.56	8.67	48.93	11.00	40.97	9.21
Average	43.17	**9.71**	33.09	**7.44**	44.70	**10.05**	35.64	**8.01**
St Dev	2.57	0.58	3.82	0.86	2.31	0.52	4.14	0.93
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	43.72	9.83	32.03	7.20	45.46	10.22	32.25	7.25
Maximum	47.82	10.75	42.30	9.51	49.60	11.15	43.01	9.67
Average	45.61	**10.26**	37.99	**8.54**	46.83	**10.53**	38.77	**8.72**
St Dev	1.44	0.32	4.17	0.94	1.51	0.34	4.37	0.98
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	45.01	10.12	32.78	7.37	20.37	4.58	17.70	3.98
Maximum	49.95	11.23	46.70	10.50	24.51	5.51	22.06	4.96
Average	47.83	**10.75**	40.26	**9.05**	22.45	**5.05**	19.50	**4.38**
St Dev	1.56	0.35	4.97	1.12	1.53	0.34	1.67	0.38
Count	8	8	8	8	8	8	8	8

Thermal aging:

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	41.77	9.39	31.45	7.07	23.35	5.25	20.77	4.67
Maximum	55.78	12.54	37.05	8.33	28.20	6.34	25.58	5.75
Average	49.47	**11.12**	34.02	**7.65**	25.51	**5.74**	23.50	**5.28**
St Dev	4.60	1.03	1.74	0.39	1.66	0.37	1.80	0.40
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

Normal force:

Signal-left pin:

Initial	Deflection in inches, Force in Grams										
	0.0006	**0.0011**	**0.0017**	**0.0022**	**0.0028**	**0.0035**	**0.0039**	**0.0044**	**0.005**	**0.0055**	***SET***
Averages	7.55	16.14	22.31	31.32	37.59	48.79	52.99	61.76	67.72	75.9	0.0002
Min	5.9	14.3	20.3	28.6	33.3	44.9	48.1	55	61.5	68.6	0.0000
Max	9.7	18	24.4	33.8	40.7	53	57	65.7	71.9	80.6	0.0004
St. Dev	1.365	1.07	1.117	1.348	1.93	2.332	2.404	2.892	2.851	3.592	0.0001
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflection in inches, Force in Grams										
	0.0006	**0.0011**	**0.0017**	**0.0022**	**0.0028**	**0.0033**	**0.0039**	**0.0044**	**0.005**	**0.0055**	***SET***
Averages	3.39	12.18	18.53	27.43	33.67	40.43	48.52	56.52	63.85	71.43	0.0004
Min	0	7.8	13	21.7	30.8	37.3	46.6	53.8	61.5	68.9	0.0001
Max	8.3	16.8	23.2	31.6	38.3	44.7	51.8	61	67.3	75.7	0.0007
St. Dev	2.191	2.159	2.423	2.49	2.079	2.112	1.791	2.371	1.989	2.23	0.0002
Count	12	12	12	12	12	12	12	12	12	12	12

Signal-right pin:

Initial	Deflection in inches, Force in Grams										
	0.0006	**0.0011**	**0.0017**	**0.0022**	**0.0028**	**0.0035**	**0.0039**	**0.0044**	**0.005**	**0.0055**	***SET***
Averages	7	15.88	22.32	31.02	37.62	48.72	52.53	60.85	67.53	75.24	0.0000
Min	4.2	14.6	20.9	28.9	35.6	45.9	50	59.2	64.6	71.2	0.0000
Max	11.5	18.3	26.4	34.3	40.3	52	55.6	64.4	71.1	77.8	0.0002
St. Dev	1.848	1.185	1.504	1.528	1.494	1.714	1.787	1.552	1.893	2.3	0.0001
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflection in inches, Force in Grams										
	0.0006	**0.0011**	**0.0017**	**0.0022**	**0.0028**	**0.0033**	**0.0039**	**0.0044**	**0.005**	**0.0055**	***SET***
Averages	1.48	10.36	17.06	26.02	32.78	40.25	48.36	56.41	63.83	71.54	0.0003
Min	-0.1	5.7	14.3	21.5	30.1	36.5	46.1	53.3	61.4	67.4	0.0000
Max	4.5	13.9	19.8	28.9	36.6	44.2	50.9	59.1	67	77.4	0.0004
St. Dev	1.482	2.139	1.779	2.123	1.99	2.488	1.707	2.268	2.028	2.94	0.0001
Count	12	12	12	12	12	12	12	12	12	12	12

DATA SUMMARIES Continued

Power-left pin:

Initial	Deflection in inches, Force in Grams										
	0.0014	**0.0028**	**0.0043**	**0.0057**	**0.0071**	**0.0085**	**0.0099**	**0.011**	**0.0128**	**0.0142**	***SET***
Averages	55.22	106.34	155.84	204.58	256.03	302.23	347.48	382.56	436.4	482.56	0.0011
Min	44	88.8	126.2	166.5	210.9	255.6	296.5	328.6	383.6	429.9	0.0003
Max	87	147.3	200.1	255.3	309.4	363.6	410.5	450.1	507.2	555.6	0.0019
St. Dev	11.987	17.499	22.025	26.511	28.594	31.462	33.263	34.744	36.512	38.039	0.0006
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflection in inches, Force in Grams										
	0.0014	**0.0028**	**0.0043**	**0.0057**	**0.0071**	**0.0085**	**0.0099**	**0.0114**	**0.0128**	**0.0142**	***SET***
Averages	0.02	0.04	0.05	2.02	49.63	112.56	172.47	233.08	293.77	353.63	0.006
Min	-0.3	-0.4	-0.4	-0.4	22.7	86.7	145.1	205.9	262.2	321	0.0051
Max	0.4	0.5	0.5	16.9	78.6	138.6	197.6	269.5	334.8	391.4	0.0068
St. Dev	0.233	0.278	0.268	5.091	15.697	16.833	17.046	19.632	21.597	20.943	0.0005
Count	12	12	12	12	12	12	12	12	12	12	12

Power-middle pin:

Initial	Deflection in inches, Force in Grams										
	0.0014	**0.0028**	**0.0043**	**0.0057**	**0.0071**	**0.0085**	**0.0099**	**0.011**	**0.0128**	**0.0142**	***SET***
Averages	50.2	98.37	144.66	190.38	238.64	282.69	326.63	361.09	411.53	453.81	0.0009
Min	37.4	72.8	104.6	140.8	179.3	214.7	248.7	280.8	329.7	372	0.0002
Max	57.5	109.5	164.1	214.5	270.8	325.5	378.1	419.6	477.3	529.8	0.0026
St. Dev	6.187	11.234	17.57	20.999	25.533	30.475	34.448	36.226	38.402	41.482	0.0007
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflection in inches, Force in Grams										
	0.0014	**0.0028**	**0.0043**	**0.0057**	**0.0071**	**0.0085**	**0.0099**	**0.0114**	**0.0128**	**0.0142**	***SET***
Averages	0.01	0	0.01	6.6	60.39	121.54	181.88	238.54	295.65	351.65	0.0058
Min	-0.3	-0.3	-0.3	-0.2	17.3	71.8	132.4	188.6	245	299.5	0.0050
Max	0.6	0.7	0.6	33.7	100.8	163	228.5	288.4	340.2	400.8	0.0069
St. Dev	0.297	0.295	0.294	10.195	23.127	29.647	29.357	31.074	30.731	31.374	0.0006
Count	12	12	12	12	12	12	12	12	12	12	12

DATA SUMMARIES Continued

Power-right pin:

Initial	Deflection in inches, Force in Grams										
	0.0014	**0.0028**	**0.0043**	**0.0057**	**0.0071**	**0.0085**	**0.0099**	**0.011**	**0.0128**	**0.0142**	***SET***
Averages	53.02	101.38	149.13	196.6	247.57	294.22	341.13	375.86	431.03	477.98	0.0009
Min	32.4	61.3	96.4	138.8	177.3	212.4	252	280.5	334.5	383.1	0.0001
Max	69	128.8	188.2	243.4	295.8	347.3	401.2	443.1	503.5	556.4	0.0019
St. Dev	9.329	19.207	27.185	32.235	36.967	41.029	43.988	46.928	49.352	50.837	0.0005
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflection in inches, Force in Grams										
	0.0014	**0.0028**	**0.0043**	**0.0057**	**0.0071**	**0.0085**	**0.0099**	**0.0114**	**0.0128**	**0.0142**	***SET***
Averages	0.01	-0.03	-0.03	2.98	52.74	115.93	176.68	237.46	295.85	354.85	0.0062
Min	-0.4	-0.4	-0.4	-0.1	31.7	89.5	140.5	193.9	254.6	315.8	0.0058
Max	0.3	0.2	0.3	34.2	102.8	173.4	241.4	308.1	359.1	409.8	0.0067
St. Dev	0.215	0.196	0.223	9.836	20.088	24.514	28.625	33.412	32.335	31.429	0.0003
Count	12	12	12	12	12	12	12	12	12	12	12

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	**ET60T/ET60S**	**ET60T**	**ET60S**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

	Row to Row		
	Mated	Unmated	Unmated
Minimum	**ET60T/ET60S**	**ET60T**	**ET60S**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

	Pin to Power		
	Mated	Unmated	Unmated
Minimum	**ET60T/ET60S**	**ET60T**	**ET60S**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

	Power to Power		
	Mated	Unmated	Unmated
Minimum	**ET60T/ET60S**	**ET60T**	**ET60S**
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

DATA SUMMARIES Continued

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**ET60T/ET60S**
Break Down Voltage	1200
Test Voltage	900
Working Voltage	300

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

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

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

Power to Power	
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 (144 signal pin and 48 power pin LLCR test points) were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

	LLCR Measurement Summaries by Pin Type			
Date	8/9/2012	8/12/2012	8/19/2012	8/29/2012
Room Temp (Deg C)	23	23	23	23
Rel Humidity (%)	54	58	56	56
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	9.40	0.28	0.32	0.45
St. Dev.	0.81	0.23	0.30	0.56
Min	7.48	0.00	0.00	0.00
Max	10.58	1.06	1.82	3.48
Summary Count	144	144	144	144
Total Count	144	144	144	144
	Pin Type 2: Power			
Average	0.19	0.02	0.03	0.09
St. Dev.	0.03	0.02	0.02	0.08
Min	0.10	0.00	0.00	0.00
Max	0.24	0.08	0.11	0.36
Summary Count	48	48	48	48
Total Count	48	48	48	48

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 thermal aging

1) A total of 192 points (144 signal pin and 48 power pin LLCR test points) were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

LLCR Measurement Summaries by Pin Type		
Date	8/9/2012	8/22/2012
Room Temp (Deg C)	23	23
Rel Humidity (%)	56	59
Technician	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta Thermal**
	Pin Type 1: Signal	
Average	9.35	0.80
St. Dev.	0.78	0.82
Min	7.43	0.00
Max	10.55	3.94
Summary Count	144	144
Total Count	144	144
	Pin Type 2: Power	
Average	0.19	0.04
St. Dev.	0.02	0.03
Min	0.15	0.00
Max	0.23	0.11
Summary Count	48	48
Total Count	48	48

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 (144 signal pin and 48 power pin LLCR test points) were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

	LLCR Measurement Summaries by Pin Type	
Date	8/10/2012	8/12/2012
Room Temp (Deg C)	23	23
Rel Humidity (%)	56	57
Technician	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta Acid Vapor**
	Pin Type 1: Signal	
Average	9.44	0.25
St. Dev.	0.84	0.24
Min	7.61	0.00
Max	10.71	1.37
Summary Count	144	144
Total Count	144	144
	Pin Type 2: Power	
Average	0.18	0.03
St. Dev.	0.03	0.03
Min	0.11	0.00
Max	0.22	0.11
Summary Count	48	48
Total Count	48	48

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

DATA SUMMARIES Continued

LLCR Shock Vib:

1) A total of 192 points (144 signal pin and 48 power pin LLCR test points) were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

	LLCR Measurement Summaries by Pin Type	
Date	11/2/2012	11/6/2012
Room Temp (Deg C)	21	22
Rel Humidity (%)	34	32
Technician	Tony Wagoner	Tony Wagoner
mOhm values	**Actual Initial**	**Delta Shock-Vib**
	Pin Type 1: Power	
Average	0.21	0.01
St. Dev.	0.02	0.01
Min	0.18	0.00
Max	0.26	0.07
Summary Count	48	48
Total Count	48	48
	Pin Type 2: Signal	
Average	11.36	1.03
St. Dev.	0.83	1.65
Min	9.29	0.02
Max	12.81	9.64
Summary Count	144	144
Total Count	144	144

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**184**	**8**	**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-05
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 3706
Serial #: 297288
Accuracy: Last Cal: 2012-8-6, Next Cal: 2013-8-5

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

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 2012-4-28, Next Cal: 2013-4-27

Equipment #: HZ-OV-01
Description: Oven
Manufacturer: Huida
Model: CS101-1E
Serial #: CS101-1E-B
Accuracy: Last Cal: 2011-12-14, Next Cal: 2012-12-13

Equipment #: HZ-THC-01
Description: Humidity transmitter
Manufacturer: Thermtron
Model: HMM30C
Serial #: D0240037
Accuracy: Last Cal: 2012-3-3, Next Cal: 2013-3-2

Equipment #: MO-02
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0780546
Accuracy: Last Cal: 2012-6-16, Next Cal: 2013-6-16

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: PS-01
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 3329A-07330
Accuracy: Last Cal: 2012-6-12, Next Cal: 2013-6-12

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

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

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

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 2012-06-4, Next Cal: 2013-06-4