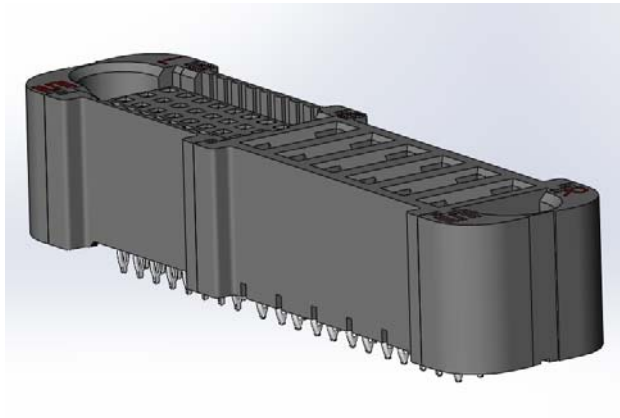
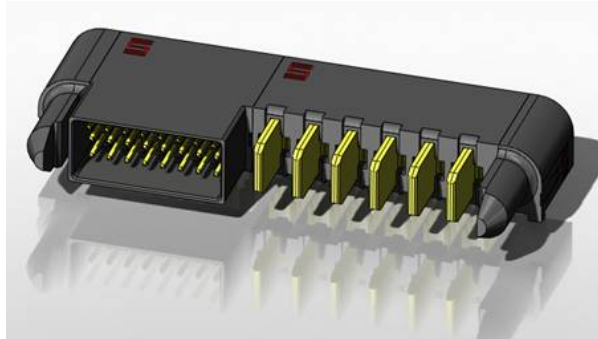


Project Number: Design Qualification Test Report	Tracking Code: 359421_Report_Rev_1
Requested by: Steven Xu	Date: 12/10/2014
Part #: ET60S-00-24-06-L-VP-GP/ET60T-00-24-06-L-RT1-GP	
Part description: ET60S/ET60T	Tech: Kason He
Test Start: 8/21/2014	Test Completed: 10/25/2014



DESIGN QUALIFICATION TEST REPORT

ET60S/ET60T

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

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
11/10/2014	1	Initial Issue	KH

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to ISO 10012-1 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 testing were cleaned according to TLWI-0001.
- 4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
- 5) The automated procedure is used with aqueous compatible soldering materials.
- 6) Parts not intended for testing LLCR are visually inspected and cleaned if necessary.
- 7) Any additional preparation will be noted in the individual test sequences.
- 8) Solder Information: Lead Free
- 9) Re-Flow Time/Temp: See accompanying profile.
- 10) Samtec Test PCBs used: PCB-106488-TST/PCB-106489-TST//PCB-106492-TST/ PCB-106493-TST

FLOWCHARTS

Gas Tight

Group 1

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
8 Assemblies

Note: 042"/.042" ENIG PTH

Step	Description
1.	LLCR (2) Max Delta = 15 mOhm
2.	Gas Tight (1)
3.	LLCR (2) Max Delta = 15 mOhm

Group 2

ET60S-00-24-06-L-VP-GP

30 Contacts Minimum
Compliant Pin ONLY

Note: 30 power compliant pin 0.042" ENIG PTH (C-367)

Step	Description
1.	LLCR (2) Max Delta = 1 mOhm
2.	Gas Tight (1)
3.	LLCR (2) Max Delta = 1 mOhm

Group 3

ET60S-00-24-06-L-VP-GP

30 Contacts Minimum
Compliant Pin ONLY

Note: 30 signal compliant pin 0.042" ENIG PTH (C-374)

Step	Description
1.	LLCR (2) Max Delta = 1 mOhm
2.	Gas Tight (1)
3.	LLCR (2) Max Delta = 1 mOhm

(1) Gas Tight = EIA-364-36

(2) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

Thermal Aging

Group 1

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
8 Assemblies

Note: 042"/.042" ENIG PTH

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force (2)
3.	LLCR (1) Max Delta = 15 mOhm
4.	Thermal Age (3)
5.	LLCR (1) Max Delta = 15 mOhm
6.	Mating/Unmating Force (2)
7.	Contact Gaps

Group 2

ET60S-00-24-06-L-VP-GP

30 Contacts Minimum
COMPLIANT PIN ONLY

Note: 30 power compliant pin 0.042" ENIG PTH (C-367)

Step	Description
1.	LLCR (1) Max Delta = 1 mOhm
2.	Thermal Age (3)
3.	LLCR (1) Max Delta = 1 mOhm

Group 3

ET60S-00-24-06-L-VP-GP

30 Contacts Minimum
COMPLIANT PIN ONLY

Note: 30 signal compliant pin 0.042" ENIG PTH (C-374)

Step	Description
1.	LLCR (1) Max Delta = 1 mOhm
2.	Thermal Age (3)
3.	LLCR (1) Max Delta = 1 mOhm

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mating/Unmating Force = EIA-364-13

(3) Thermal Age = EIA-364-17

Test Condition = 4 (105°C)
Time Condition = B (250 Hours)

FLOWCHARTS Continued**Mating/Unmating/Durability**Group 1

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
8 Assemblies

Note: 042"/.042" ENIG PTH

Step	Description
1.	Contact Gaps
2.	LLCR (2) Max Delta = 15 mOhm
3.	Mating/Unmating Force (3)
4.	Cycles Quantity = 25 Cycles
5.	Mating/Unmating Force (3)
6.	Cycles Quantity = 25 Cycles
7.	Mating/Unmating Force (3)
8.	Cycles Quantity = 25 Cycles
9.	Mating/Unmating Force (3)
10.	Cycles Quantity = 25 Cycles
11.	Mating/Unmating Force (3)
12.	Contact Gaps
13.	LLCR (2) Max Delta = 15 mOhm
14.	Thermal Shock (4)
15.	LLCR (2) Max Delta = 15 mOhm
16.	Humidity (1)
17.	LLCR (2) Max Delta = 15 mOhm
18.	Mating/Unmating Force (3)

Group 2

ET60S-00-24-06-L-VP-GP

30 Contacts Minimum
Compliant Pin ONLY

*Note: 30 power compliant pin 0.042"
ENIG PTH (C-367)*

Step	Description
1.	LLCR (2) Max Delta = 1 mOhm
2.	Thermal Shock (4)
3.	LLCR (2) Max Delta = 1 mOhm
4.	Humidity (1)
5.	LLCR (2) Max Delta = 1 mOhm

Group 3

ET60S-00-24-06-L-VP-GP

30 Contacts Minimum
Compliant Pin ONLY

*Note: 30 signal compliant pin 0.042"
ENIG PTH (C-374)*

Step	Description
1.	LLCR (2) Max Delta = 1 mOhm
2.	Thermal Shock (4)
3.	LLCR (2) Max Delta = 1 mOhm
4.	Humidity (1)
5.	LLCR (2) Max Delta = 1 mOhm

(1) Humidity = EIA-364-31

Test Condition = B (240 Hours)

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

Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(2) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

(3) Mating/Unmating Force = EIA-364-13

(4) Thermal Shock = EIA-364-32

Exposure Time at Temperature Extremes = 1/2 Hour

Method A, Test Condition = I (-55°C to +85°C)

Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued**IR/DWV***Note: 042"/.042" ENIG PTH***Pin-to-Pin**Group 1

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 2

ET60S-00-24-06-L-VP-GP
 2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 3

ET60T-04-24-04-L-RT1-GP
 2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 4

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 2 Assemblies

Step	Description
1.	IR (4)
2.	DWV at Test Voltage (1)
3.	Thermal Shock (5)
4.	IR (4)
5.	DWV at Test Voltage (1)
6.	Humidity (3)
7.	IR (4)
8.	DWV at Test Voltage (1)

Row-to-RowGroup 5

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 6

ET60S-00-24-06-L-VP-GP
 2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 7

ET60T-04-24-04-L-RT1-GP
 2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 8

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 2 Assemblies

Step	Description
1.	IR (4)
2.	DWV at Test Voltage (1)
3.	Thermal Shock (5)
4.	IR (4)
5.	DWV at Test Voltage (1)
6.	Humidity (3)
7.	IR (4)
8.	DWV at Test Voltage (1)

FLOWCHARTS Continued**Pin-to-Power**Group 9

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 10

ET60S-00-24-06-L-VP-GP
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 11

ET60T-04-24-04-L-RT1-GP
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 12

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
2 Assemblies

Step	Description
1.	IR (4)
2.	DWV at Test Voltage (1)
3.	Thermal Shock (5)
4.	IR (4)
5.	DWV at Test Voltage (1)
6.	Humidity (3)
7.	IR (4)
8.	DWV at Test Voltage (1)

Power-to-PowerGroup 13

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 14

ET60S-00-24-06-L-VP-GP
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 15

ET60T-04-24-04-L-RT1-GP
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 16

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
2 Assemblies

Step	Description
1.	IR (4)
2.	DWV at Test Voltage (1)
3.	Thermal Shock (5)
4.	IR (4)
5.	DWV at Test Voltage (1)
6.	Humidity (3)
7.	IR (4)
8.	DWV at Test Voltage (1)

- (1) DWV at Test Voltage = EIA-364-20
Test Condition = 1 (Sea Level)
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds
- (2) DWV Breakdown = EIA-364-20
Test Condition = 1 (Sea Level)
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds
- (3) Humidity = EIA-364-31
Test Condition = B (240 Hours)
Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)
Test Exceptions: ambient pre-condition and delete steps 7a and 7b
- (4) IR = EIA-364-21
Test Condition = 500 Vdc, 2 Minutes Max
- (5) Thermal Shock = EIA-364-32
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = I (-55°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued**Current Carrying Capacity****Group 1**

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 3 Pins Powered
 Signal --1 Vertical Row Powered

Step	Description
1.	CCC (2) Rows = 3 Number of Positions = 1

Group 10

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 6 Pins Powered
 Power Pins -all Pins Powered

Step	Description
1.	CCC - All Power (1)

Group 11

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 6 Pins Powered
 Power Pins - All Contacts Powered
*Note: Signal Pins @ 1/2 rated current
 from Group 5*

Step	Description
1.	CCC - All Power (1)

Group 2

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 6 Pins Powered
 Signal --2 Adjacent Vertical Rows
 Powered

Step	Description
1.	CCC (2) Rows = 3 Number of Positions = 2

Group 3

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 9 Pins Powered
 Signal --3 Adjacent Vertical Rows
 Powered

Step	Description
1.	CCC (2) Rows = 3 Number of Positions = 3

Group 4

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 12 Pins Powered
 Signal --4 Adjacent Vertical Rows
 Powered

Step	Description
1.	CCC (2) Rows = 3 Number of Positions = 4

Group 5

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 24 Pins Powered
 Signal--All Contacts Powered

Step	Description
1.	CCC (2) Rows = 3 Number of Positions = 8

Group 6

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 1 Pins Powered
 Power Pin

Step	Description
1.	CCC (2) Rows = 1 Number of Positions = 1

Group 7

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 2 Pins Powered
 Power Pin

Step	Description
1.	CCC (2) Rows = 1 Number of Positions = 2

Group 8

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 3 Pins Powered
 Power Pin

Step	Description
1.	CCC (2) Rows = 1 Number of Positions = 3

Group 9

ET60S-00-24-06-L-VP-GP
 ET60T-00-24-06-L-RT1-GP
 4 Pins Powered
 Power Pin

Step	Description
1.	CCC (2) Rows = 1 Number of Positions = 4

(1) CCC - All Power = EIA-364-70

Method 2, Temperature Rise Versus Current Curve

(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

(2) CCC = EIA-364-70

Method 2, Temperature Rise Versus Current Curve

(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

FLOWCHARTS Continued**Mechanical Shock/Random Vibration/LLCR**Group 1

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
8 Assemblies

Note: 042"/.042" ENIG PTH

Step Description

1. LLCR (1)
Max Delta = 15 mOhm
2. Mechanical Shock (2)
3. Random Vibration (3)
4. LLCR (1)
Max Delta = 15 mOhm

Group 2

ET60S-00-24-06-L-VP-GP

30 Contacts Minimum
Compliant Pin Only

Note: 30 power compliant pin 0.042" ENIG PTH (C-367)

Step Description

1. LLCR (1)
Max Delta = 1 mOhm
2. Random Vibration (3)
3. LLCR (1)
Max Delta = 1 mOhm

Group 3

ET60S-00-24-06-L-VP-GP

30 Contacts Minimum
Compliant Pin Only

Note: 30 signal compliant pin 0.042" ENIG PTH (C-374)

Step Description

1. LLCR (1)
Max Delta = 1 mOhm
2. Random Vibration (3)
3. LLCR (1)
Max Delta = 1 mOhm

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mechanical Shock = EIA-364-27

Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(3) Random Vibration = EIA-364-28

Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

Mechanical Shock/Random Vibration/Event DetectionGroup 1

ET60S-00-24-06-L-VP-GP
ET60T-00-24-06-L-RT1-GP
60 Points

Note: 042"/.042" ENIG PTH

Step Description

1. Nanosecond Event Detection
(Mechanical Shock) (1)
2. Nanosecond Event Detection
(Random Vibration) (2)

(1) Nanosecond Event Detection (Mechanical Shock)

Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)

Use EIA-364-27 for Mechanical Shock:
Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(2) Nanosecond Event Detection (Random Vibration)

Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)

Use EIA-364-28 for Random Vibration:
Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

FLOWCHARTS Continued

Insertion/Retention/Hole Conditioning

<u>Group 1</u> ET60S-00-24-06-L-VP-GP		<u>Group 2</u> ET60S-00-24-06-L-VP-GP		<u>Group 3</u> ET60S-00-24-06-L-VP-GP		<u>Group 4</u> ET60S-00-24-06-L-VP-GP	
Contacts Minimum 30 Contacts Min. HASL 0.038" PTH C-367 (Power)		Contacts Minimum 30 Contacts Max. HASL 0.042" PTH C-367 (Power)		Contacts Minimum 30 Contacts Max. ENIG 0.042" PTH C-367 (Power)		Contacts Minimum 30 Contacts Min. HASL 0.038" PTH C-374 (signal)	
Step	Description	Step	Description	Step	Description	Step	Description
1.	Insertion Force <i>Note: Rate=2.54mm/min Pin 1</i>	1.	Insertion Force <i>Note: Rate=2.54mm/min Pin 1</i>	1.	Insertion Force <i>Note: Rate=2.54mm/min Pin 1</i>	1.	Insertion Force <i>Note: Rate=2.54mm/min Pin 1</i>
2.	LLCR (1) Max Delta = 1 mOhm	2.	LLCR (1) Max Delta = 1 mOhm	2.	LLCR (1) Max Delta = 1 mOhm	2.	LLCR (1) Max Delta = 1 mOhm
3.	Retention Force <i>Note: Rate= 2.54mm/min Note: EIA 364-29 Note Pin 1</i>	3.	Retention Force <i>Note: Rate= 2.54mm/min Note: EIA 364-29 Note Pin 1</i>	3.	Retention Force <i>Note: Rate= 2.54mm/min Note: EIA 364-29 Note Pin 1</i>	3.	Retention Force <i>Note: Rate= 2.54mm/min Note: EIA 364-29 Note Pin 1</i>
4.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	4.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	4.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>	4.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>
5.	Insertion Force <i>Note: Rate=2.54mm/min Pin 3</i>	5.	Insertion Force <i>Note: Rate=2.54mm/min Pin 3</i>	5.	Insertion Force <i>Note: Rate=2.54mm/min Pin 3</i>	5.	Insertion Force <i>Note: Rate=2.54mm/min Pin 3</i>
6.	LLCR (1) Max Delta = 1 mOhm	6.	LLCR (1) Max Delta = 1 mOhm	6.	LLCR (1) Max Delta = 1 mOhm	6.	LLCR (1) Max Delta = 1 mOhm
7.	Retention Force <i>Note: Rate= 2.54mm/min Note: EIA 364-29 Note Pin 3</i>	7.	Retention Force <i>Note: Rate= 2.54mm/min Note: EIA 364-29 Note Pin 3</i>	7.	Retention Force <i>Note: Rate= 2.54mm/min Note: EIA 364-29 Note Pin 3</i>	7.	Retention Force <i>Note: Rate= 2.54mm/min Note: EIA 364-29 Note Pin 3</i>
8.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>	8.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>	8.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>	8.	Hole Integrity <i>Note: Check for distortion of the PTH according to EIA 364-96</i>

FLOWCHARTS Continued**Group 5**

ET60S-00-24-06-L-VP-GP

Contacts Minimum

30 Contacts Max. HASL 0.042" PTH C-374
(signal)

Step	Description
1.	Insertion Force <i>Note: Rate=2.54mm/min</i> <i>Pin 1</i>
2.	LLCR (1) Max Delta = 1 mOhm
3.	Retention Force <i>Note: Rate= 2.54mm/min</i> <i>Note: EIA 364-29</i> <i>Note Pin 1</i>
4.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>
5.	Insertion Force <i>Note: Rate=2.54mm/min</i> <i>Pin 3</i>
6.	LLCR (1) Max Delta = 1 mOhm
7.	Retention Force <i>Note: Rate= 2.54mm/min</i> <i>Note: EIA 364-29</i> <i>Note Pin 3</i>
8.	Hole Integrity <i>Note: Check for distortion of the</i> <i>PTH according to EIA 364-96</i>

Group 6

ET60S-00-24-06-L-VP-GP

Contacts Minimum

30 Contacts Max. ENIG 0.042" PTH C-374
(signal)

Step	Description
1.	Insertion Force <i>Note: Rate=2.54mm/min</i> <i>Pin 1</i>
2.	LLCR (1) Max Delta = 1 mOhm
3.	Retention Force <i>Note: Rate= 2.54mm/min</i> <i>Note: EIA 364-29</i> <i>Note Pin 1</i>
4.	Cycles Quantity = 1 Cycles <i>Note: Pin 2</i>
5.	Insertion Force <i>Note: Rate=2.54mm/min</i> <i>Pin 3</i>
6.	LLCR (1) Max Delta = 1 mOhm
7.	Retention Force <i>Note: Rate= 2.54mm/min</i> <i>Note: EIA 364-29</i> <i>Note Pin 3</i>
8.	Hole Integrity <i>Note: Check for distortion of the</i> <i>PTH according to EIA 364-96</i>

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

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 G² / 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

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.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

TEMPERATURE RISE (Current Carrying Capacity, CCC):

- 1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
- 2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
- 3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
- 4) The size of the temperature probe can affect the measured temperature.
- 5) Copper traces on PC boards will contribute to temperature rise:
 - a. Self heating (resistive)
 - b. Reduction in heat sink capacity affecting the heated contacts
- 6) A de-rating curve, usually 20%, is calculated.
- 7) Calculated de-rated currents at three temperature points are reported:
 - a. Ambient
 - b. 65° C
 - c. 75° C
 - d. 95° 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 Continued

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. $\leq +5.0$ 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) The following guidelines are used to categorize the changes in LLCR for compliant pin only
 - a. $\leq +1.0$ mOhms: ----- Stable
 - b. $> +1.0$ mOhms: ----- Unstable

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. $\leq +5.0$ mOhms:----- Stable
 - b. $+5.1$ to $+10.0$ mOhms: ----- Minor
 - c. $+10.1$ to $+15.0$ mOhms: ----- Acceptable
 - d. $+15.1$ to $+50.0$ mOhms: ----- Marginal
 - e. $+50.1$ to $+2000$ mOhms:----- Unstable
 - f. $>+2000$ mOhms:----- Open Failure
- 4) Procedure:
 - a. Reference document: EIA-364-36, *Test Procedure for Determination of Gas-Tight Characteristics for Electrical Connectors, Sockets and/or Contact Systems*.
 - b. Test Conditions:
 - i. Class II--- Mated pairs of contacts assembled to their plastic housings.
 - ii. Reagent grade Nitric Acid shall be used of sufficient volume to saturate the test chamber
 - iii. The ratio of the volume of the test chamber to the surface area of the acid shall be 10:1.
 - iv. The chamber shall be saturated with the vapor for at least 15 minutes before samples are added.
 - v. Exposure time, 55 to 65 minutes.
 - vi. The samples shall be no closer to the chamber walls than 1 inches and no closer to the surface of the acid than 3 inches.
 - vii. The samples shall be dried after exposure for a minimum of 1 hour.
 - viii. Drying temperature 50° C
 - ix. The final LLCR shall be conducted within 1 hour after drying.
- 5) The following guidelines are used to categorize the changes in LLCR for compliant pin only
 - a. $\leq +1.0$ mOhms: ----- Stable
 - b. $> +1.0$ mOhms: ----- Unstable

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

INSULATION RESISTANCE (IR):

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

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

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

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

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

Insertion/Retention force

- 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.

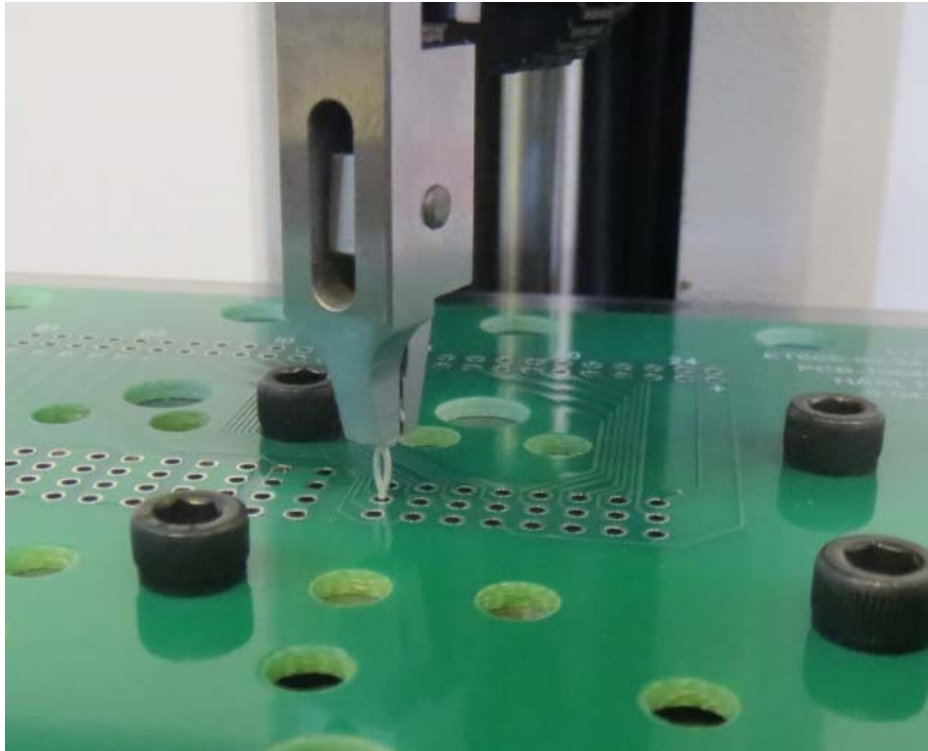


Fig. 1

RESULTS

Temperature Rise, CCC at a 20% de-rating

Power pin

- CCC for a 30°C Temperature Rise-----61.2 A per contact with 1 power contacts (1x1) powered
- CCC for a 30°C Temperature Rise-----55.8 A per contact with 2 power contacts (1x2) powered
- CCC for a 30°C Temperature Rise-----52.1 A per contact with 3 power contacts (1x3) powered
- CCC for a 30°C Temperature Rise-----47.7 A per contact with 4 power contacts (1x4) powered
- CCC for a 30°C Temperature Rise-----43.5 A per contact with 6 power contacts (1x6) powered

Signal pin

- CCC for a 30°C Temperature Rise-----3.5 A per contact with 3 signal contacts (3x1) powered
- CCC for a 30°C Temperature Rise-----2.7 A per contact with 6 signal contacts (3x2) powered
- CCC for a 30°C Temperature Rise-----2.4 A per contact with 9 signal contacts (3x3) powered
- CCC for a 30°C Temperature Rise-----2.1 A per contact with 12 signal contacts (3x4) powered
- CCC for a 30°C Temperature Rise-----1.7 A per contact with 24 signal contacts (3x8) powered

Power pin and Signal pin (signal contacts powered @ 1/2 rated current @ 1.05 AMPS)

- CCC for a 30°C Temperature Rise-----43.2A per contact with 6 power contacts(1x6) powered

Mating/Unmating Forces:

Thermal Aging Group

- Initial
 - Mating
 - Min -----10.20 Lbs
 - Max-----11.76 Lbs
 - Unmating
 - Min -----5.67 Lbs
 - Max-----6.36 Lbs
- After Thermal
 - Mating
 - Min -----3.73 Lbs
 - Max-----4.23 Lbs
 - Unmating
 - Min -----2.96 Lbs
 - Max-----3.21 Lbs

RESULTS Continued**Mating/Unmating Forces:
Mating/Unmating Durability Group**

- **Initial**
 - **Mating**
 - **Min** ----- 8.19 Lbs
 - **Max** ----- 9.93 Lbs
 - **Unmating**
 - **Min** ----- 5.29 Lbs
 - **Max** ----- 6.23 Lbs
- **After 25 Cycles**
 - **Mating**
 - **Min** ----- 7.58 Lbs
 - **Max** ----- 9.29 Lbs
 - **Unmating**
 - **Min** ----- 6.49 Lbs
 - **Max** ----- 7.12 Lbs
- **After 50 Cycles**
 - **Mating**
 - **Min** ----- 7.95 Lbs
 - **Max** ----- 9.11 Lbs
 - **Unmating**
 - **Min** ----- 7.26 Lbs
 - **Max** ----- 8.24 Lbs
- **After 75 Cycles**
 - **Mating**
 - **Min** ----- 8.81 Lbs
 - **Max** ----- 10.06 Lbs
 - **Unmating**
 - **Min** ----- 8.22 Lbs
 - **Max** ----- 9.52 Lbs
- **After 100 Cycles**
 - **Mating**
 - **Min** ----- 9.57 Lbs
 - **Max** ----- 11.39 Lbs
 - **Unmating**
 - **Min** ----- 9.04 Lbs
 - **Max** ----- 10.70 Lbs
- **After Humidity**
 - **Mating**
 - **Min** ----- 4.72 Lbs
 - **Max** ----- 5.95 Lbs
 - **Unmating**
 - **Min** ----- 3.75 Lbs
 - **Max** ----- 5.09 Lbs

RESULTS Continued**Compliant pin Insertion/Retention****Power Compliant pin Insertion/Retention force****Min HASL 0.038" PTH (C-367)**

- 1 Cycle
 - Insertion
 - Min -----11.99 Lbs
 - Max-----13.51 Lbs
 - Retention
 - Min -----4.29 Lbs
 - Max-----7.32 Lbs
- 3 Cycles
 - Insertion
 - Min -----9.37 Lbs
 - Max-----11.46 Lbs
 - Retention
 - Min -----4.41 Lbs
 - Max-----6.80 Lbs

Max HASL 0.042" PTH (C-367)

- 1 Cycle
 - Insertion
 - Min -----8.79 Lbs
 - Max-----10.74 Lbs
 - Retention
 - Min -----6.53 Lbs
 - Max-----8.38 Lbs
- 3 Cycles
 - Insertion
 - Min -----8.72 Lbs
 - Max-----11.30 Lbs
 - Retention
 - Min -----6.85 Lbs
 - Max-----8.99 Lbs

Max ENIG 0.042" PTH (C-367)

- 1 Cycle
 - Insertion
 - Min -----6.09 Lbs
 - Max-----7.16 Lbs
 - Retention
 - Min -----4.54 Lbs
 - Max-----6.26 Lbs
- 3 Cycles
 - Insertion
 - Min -----5.73 Lbs
 - Max-----7.43 Lbs
 - Retention
 - Min -----4.23 Lbs
 - Max-----6.34 Lbs

RESULTS Continued**Compliant pin Insertion/Retention****Signal Compliant pin Insertion/Retention force****Min HASL 0.038" PTH (C-374)**

- 1 Cycle
 - Insertion
 - Min ----- 7.09 Lbs
 - Max ----- 8.77 Lbs
 - Retention
 - Min ----- 3.84 Lbs
 - Max ----- 5.61 Lbs
- 3 Cycles
 - Insertion
 - Min ----- 5.99 Lbs
 - Max ----- 7.25 Lbs
 - Retention
 - Min ----- 3.64 Lbs
 - Max ----- 5.18 Lbs

Max HASL 0.042" PTH (C-374)

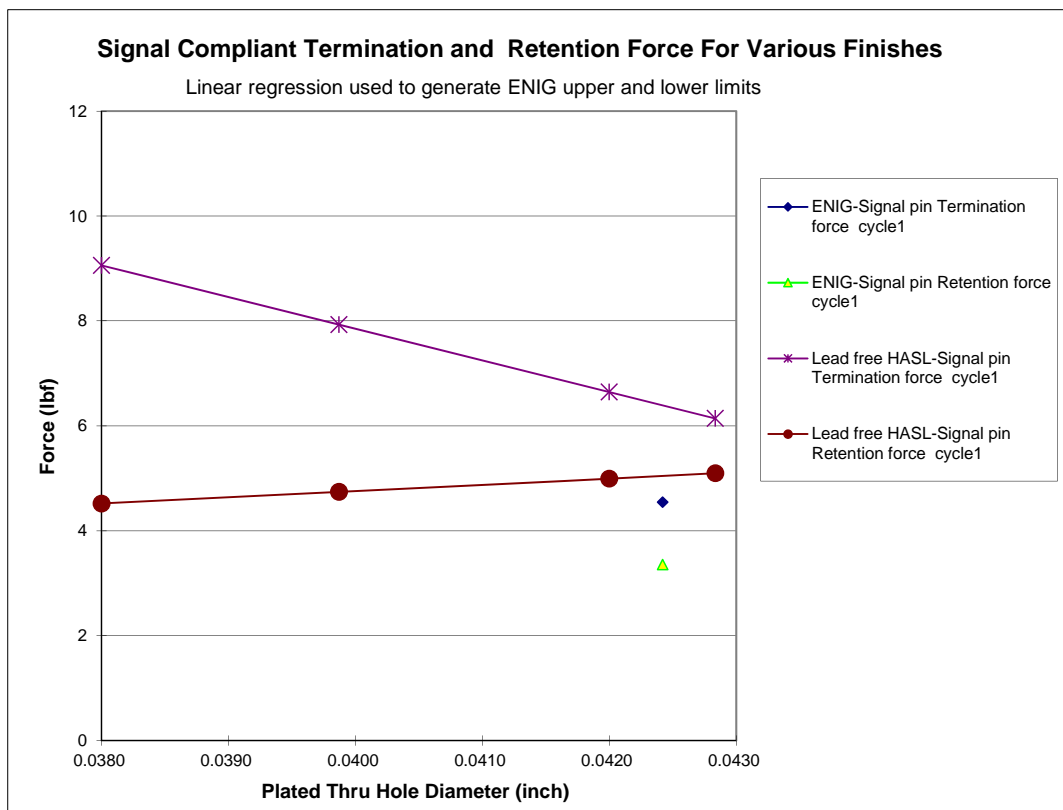
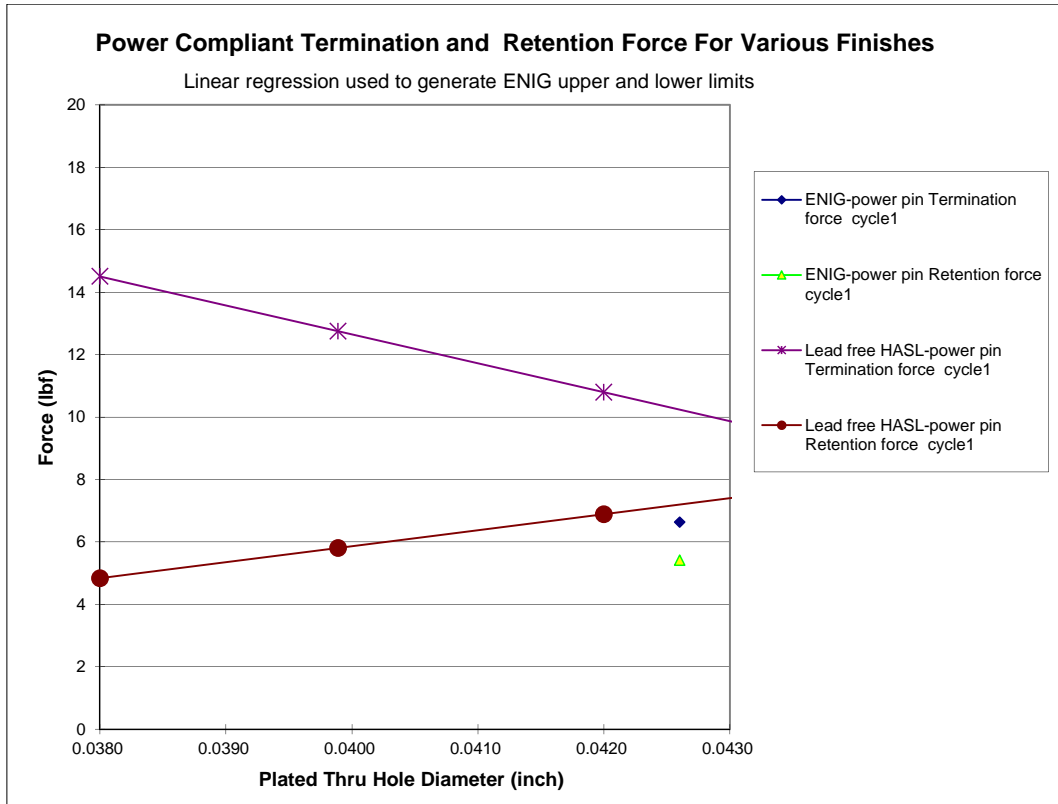
- 1 Cycle
 - Insertion
 - Min ----- 5.65 Lbs
 - Max ----- 6.63 Lbs
 - Retention
 - Min ----- 4.64 Lbs
 - Max ----- 5.55 Lbs
- 3 Cycles
 - Insertion
 - Min ----- 5.52 Lbs
 - Max ----- 7.30 Lbs
 - Retention
 - Min ----- 3.86 Lbs
 - Max ----- 5.96 Lbs

Max ENIG 0.042" PTH (C-374)

- 1 Cycle
 - Insertion
 - Min ----- 4.21 Lbs
 - Max ----- 4.87 Lbs
 - Retention
 - Min ----- 2.84 Lbs
 - Max ----- 3.87 Lbs
- 3 Cycles
 - Insertion
 - Min ----- 3.50 Lbs
 - Max ----- 5.01 Lbs
 - Retention
 - Min ----- 2.44 Lbs
 - Max ----- 4.29 Lbs

RESULTS Continued

Compliant pin summary graph



RESULTS Continued**Insulation Resistance minimums, IR****Pin to Pin (Signal)**

- **Initial**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed
- **Thermal**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed
- **Humidity**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed

Row to Row (Signal)

- **Initial**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed
- **Thermal**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed
- **Humidity**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed

Signal to Power

- **Initial**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed
- **Thermal**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed
- **Humidity**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed

Pin to Pin (Power)

- **Initial**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed
- **Thermal**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed
- **Humidity**
 - Mated-----1000Meg Ω ----- Passed
 - Unmated -----1000Meg Ω ----- Passed

RESULTS Continued

Dielectric Withstanding Voltage minimums, DWV

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

Pin to Pin (Signal)

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

Row to Row (Signal)

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

Signal to Power

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

Pin to Pin (Power)

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

RESULTS Continued**LLCR Gas Tight (144 signal and 48 power LLCR test points)****Signal pin**

- **Initial**----- 13.67 mOhms Max
- **Gas-Tight**
 - **<= +5.0 mOhms** ----- 144 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure

Power pin

- **Initial**----- 0.28 mOhms Max
- **Gas-Tight**
 - **<= +5.0 mOhms** ----- 48 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 (30 power and 30 signal LLCR test points)**Power pin -- Compliant pin**

- **Initial**----- 0.02 mOhms Max
- **Gas-Tight**
 - **<= +1.0 mOhms** ----- 30 Points ----- Stable
 - **>+1.0 mOhms** ----- 0 Points ----- Unstable

Signal pin -- Compliant pin

- **Initial**----- 0.05 mOhms Max
- **Gas-Tight**
 - **<= +1.0 mOhms** ----- 30 Points ----- Stable
 - **>+1.0 mOhms** ----- 0 Points ----- Unstable

RESULTS Continued**LLCR Thermal Aging (144 signal and 48 power LLCR test points)****Signal pin**

- **Initial**----- 13.03 mOhms Max
- **Thermal Aging**
 - **<= +5.0 mOhms** ----- 144 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure

Power pin

- **Initial**----- 0.30 mOhms Max
- **Thermal Aging**
 - **<= +5.0 mOhms** ----- 48 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 Thermal Aging (30 power and 30signal LLCR test points)**Power pin -- Compliant pin**

- **Initial**----- 0.02 mOhms Max
- **Thermal Aging**
 - **<= +1.0 mOhms** ----- 30 Points ----- Stable
 - **> +1.0 mOhms** ----- 0 Points ----- Unstable

Signal pin -- Compliant pin

- **Initial**----- 0.04 mOhms Max
- **Thermal Aging**
 - **<= +1.0 mOhms** ----- 30 Points ----- Stable
 - **> +1.0 mOhms** ----- 0 Points ----- Unstable

RESULTS Continued**LLCR Durability (144 signal and 48 power LLCR test points)****Signal pin**

- **Initial**----- 15.23 mOhms Max
- **Durability, 100 Cycles**
 - **<= +5.0 mOhms** ----- 144 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure
- **Thermal**
 - **<= +5.0 mOhms** ----- 144 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure
- **Humidity**
 - **<= +5.0 mOhms** ----- 144 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure

Power pin

- **Initial**----- 0.28 mOhms Max
- **Durability, 100 Cycles**
 - **<= +5.0 mOhms** ----- 48 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure
- **Thermal**
 - **<= +5.0 mOhms** ----- 48 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure
- **Humidity**
 - **<= +5.0 mOhms** ----- 48 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 Durability (30 power and 30 signal LLCR test points)****Power pin -- Compliant pin**

- **Initial**-----0.02 mOhms Max
- **Thermal**
 - **<= +1.0 mOhms** ----- 30 Points ----- Stable
 - **> +1.0 mOhms** ----- 0 Points ----- Unstable
- **Humidity**
 - **<= +1.0 mOhms** ----- 30 Points ----- Stable
 - **> +1.0 mOhms** ----- 0 Points ----- Unstable

Signal pin -- Compliant pin

- **Initial**-----0.04 mOhms Max
- **Thermal**
 - **<= +1.0 mOhms** ----- 30 Points ----- Stable
 - **> +1.0 mOhms** ----- 0 Points ----- Unstable
- **Humidity**
 - **<= +1.0 mOhms** ----- 30 Points ----- Stable
 - **> +1.0 mOhms** ----- 0 Points ----- Unstable

RESULTS Continued**LLCR Shock & Vibration (144 signal and 48 power LLCR test points)****Signal pin**

- **Initial**----- 13.73 mOhms Max
- **Shock &Vibration**
 - **<= +5.0 mOhms** ----- 135 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 7 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 2 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure

Power pin

- **Initial**----- 0.30 mOhms Max
- **Shock &Vibration**
 - **<= +5.0 mOhms** ----- 48 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms** ----- 0 Points ----- Unstable
 - **>+2000 mOhms** ----- 0 Points ----- Open Failure

Mechanical Shock & Random Vibration:

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

LLCR Shock & Vibration (48 power and 48 signal LLCR test points)**Power pin -- Compliant pin**

- **Initial**----- 0.18 mOhms Max
- **Shock &Vibration**
 - **<= +1.0 mOhms** ----- 48 Points ----- Stable
 - **> +1.0 mOhms** ----- 0 Points ----- Unstable

Signal pin -- Compliant pin

- **Initial**----- 0.17 mOhms Max
- **Shock &Vibration**
 - **<= +1.0 mOhms** ----- 48 Points ----- Stable
 - **> +1.0 mOhms** ----- 0 Points ----- Unstable

RESULTS Continued**LLCR Compliant pin Insertion/Retention (30 LLCR test points)****Min HASL 0.038" PTH (C-367)**

- 1 cycle -----0.03 mOhms Max
- 3 cycles
 - $\leq +1.0$ mOhms ----- 30 Points ----- Stable
 - $> +1.0$ mOhms ----- 0 Points ----- Unstable

Max HASL 0.042" PTH (C-367)

- 1 cycle -----0.03 mOhms Max
- 3 cycles
 - $\leq +1.0$ mOhms ----- 30 Points ----- Stable
 - $> +1.0$ mOhms ----- 0 Points ----- Unstable

Max ENIG 0.042" PTH (C-367)

- 1 cycle -----0.03 mOhms Max
- 3 cycles
 - $\leq +1.0$ mOhms ----- 30 Points ----- Stable
 - $> +1.0$ mOhms ----- 0 Points ----- Unstable

Min HASL 0.038" PTH (C-374)

- 1 cycle -----0.03 mOhms Max
- 3 cycles
 - $\leq +1.0$ mOhms ----- 30 Points ----- Stable
 - $> +1.0$ mOhms ----- 0 Points ----- Unstable

Max HASL 0.042" PTH (C-374)

- 1 cycle -----0.03 mOhms Max
- 3 cycles
 - $\leq +1.0$ mOhms ----- 30 Points ----- Stable
 - $> +1.0$ mOhms ----- 0 Points ----- Unstable

Max ENIG 0.042" PTH (C-374)

- 1 cycle -----0.03 mOhms Max
- 3 cycles
 - $\leq +1.0$ mOhms ----- 30 Points ----- Stable
 - $> +1.0$ mOhms ----- 0 Points ----- Unstable

DATA SUMMARIES

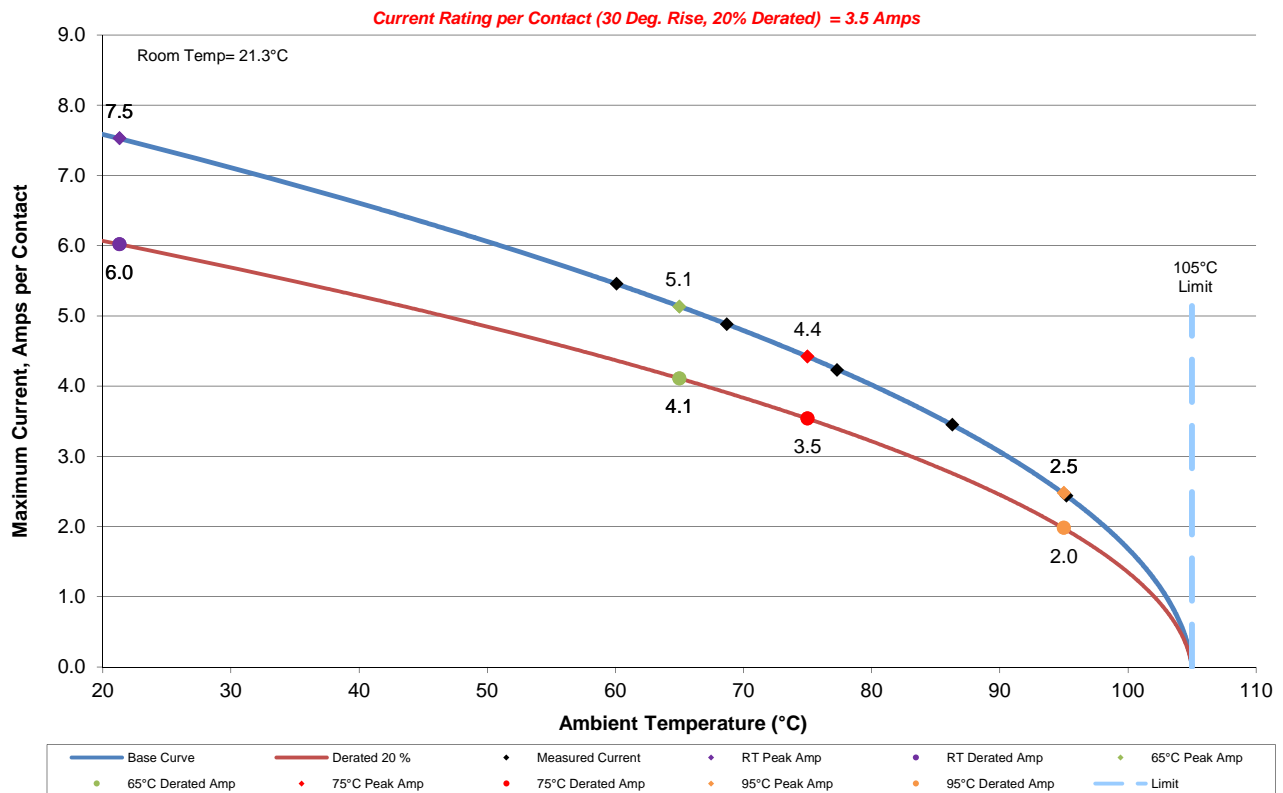
TEMPERATURE RISE (Current Carrying Capacity, CCC):

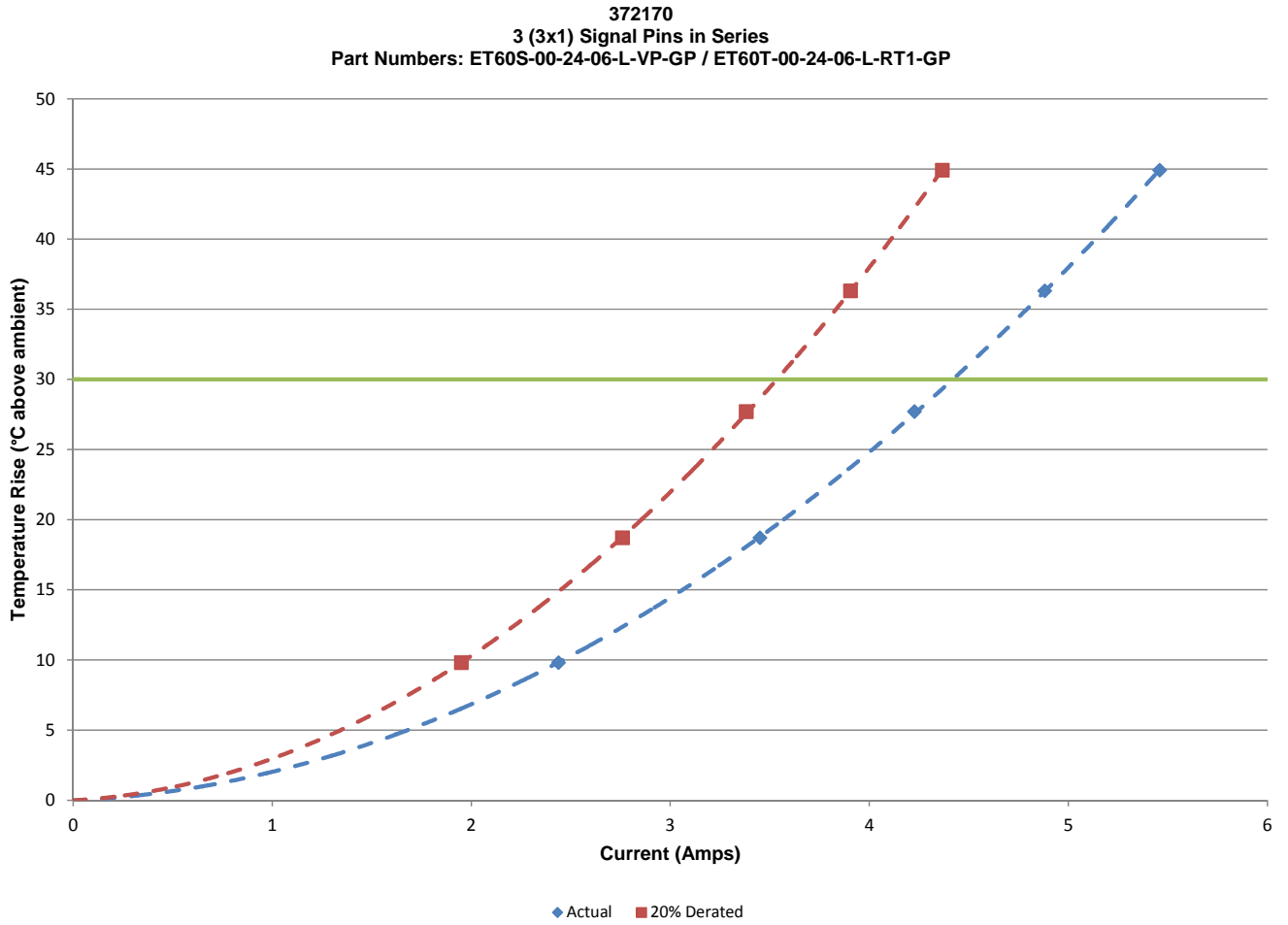
- 1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
- 2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
- 3) Temperature readings recorded are those for which three successive readings,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

Signal Pins

- a. Linear configuration with 3 adjacent signal conductors/contacts powered

372170
3 (3x1) Signal Pins in Series
Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP

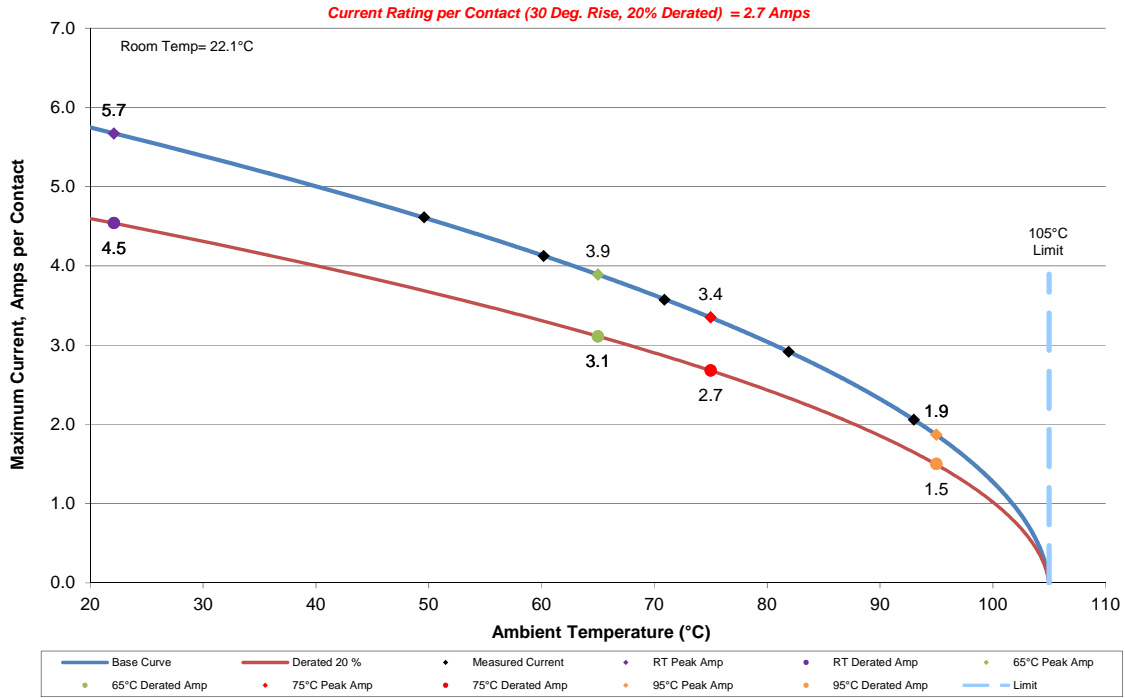




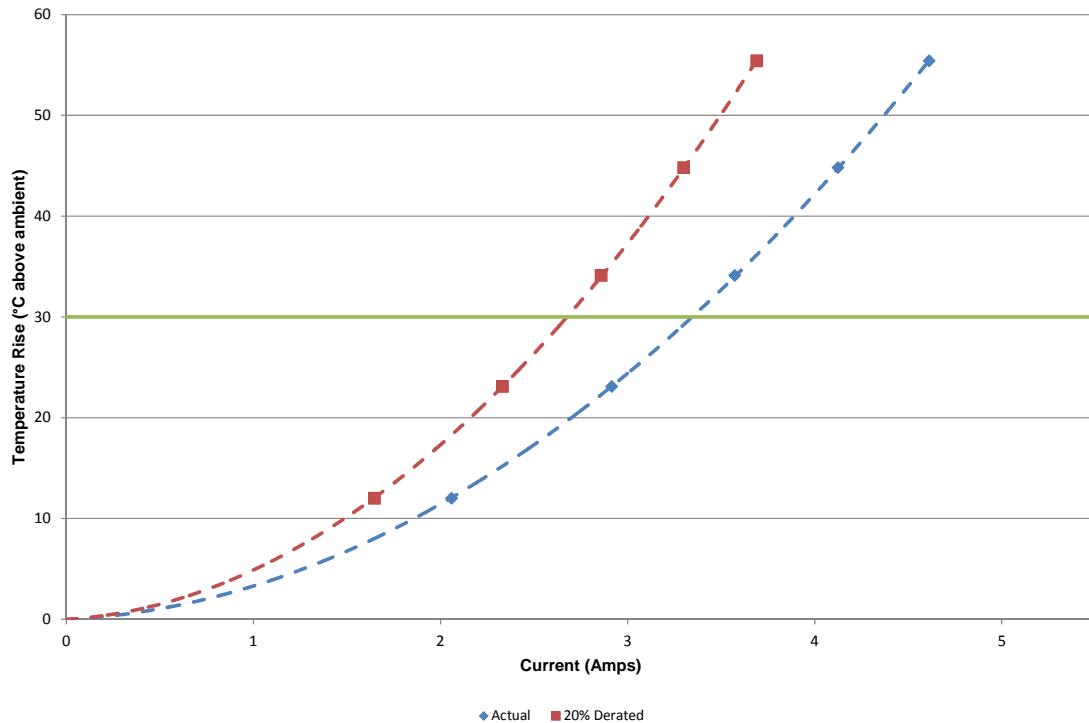
DATA SUMMARIES Continued

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

372170
6 (3x2) Signal Pins in Series
Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



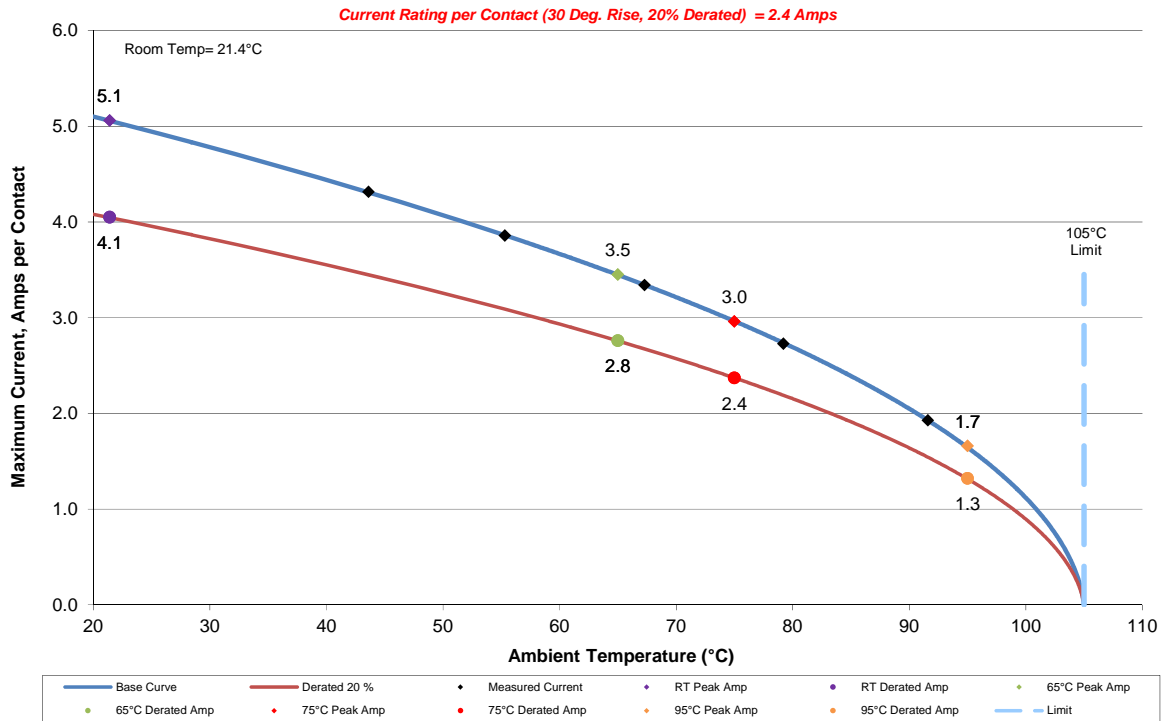
372170
6 (3x2) Signal Pins in Series
Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



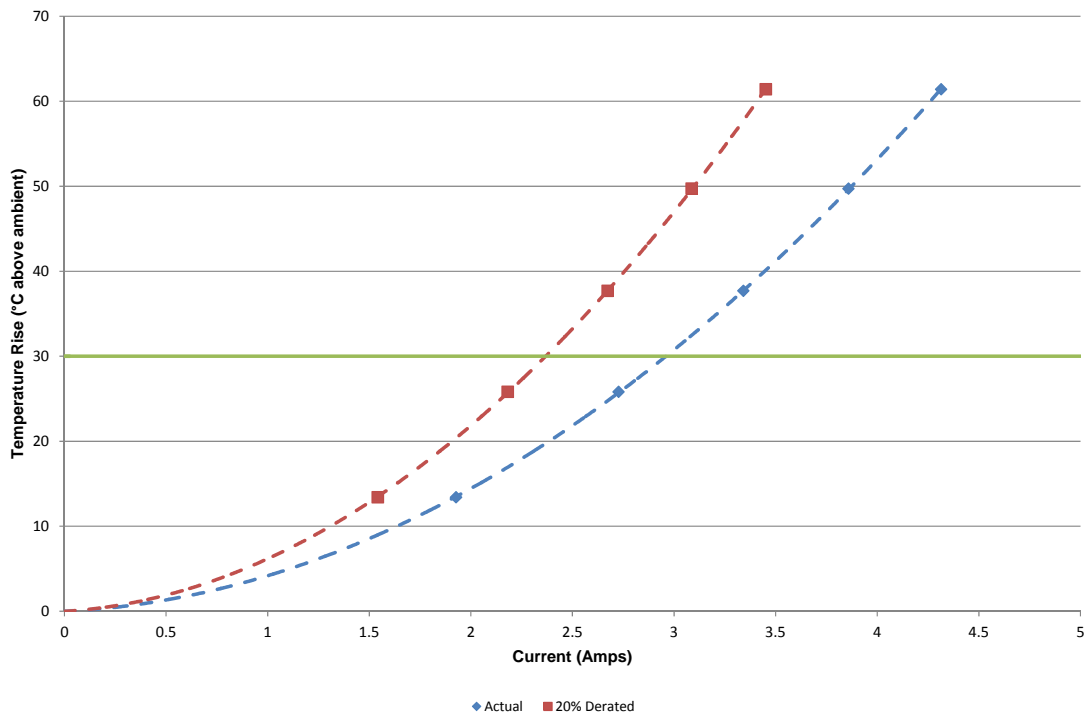
DATA SUMMARIES Continued

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

372170
 9 (3x3) Signal Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



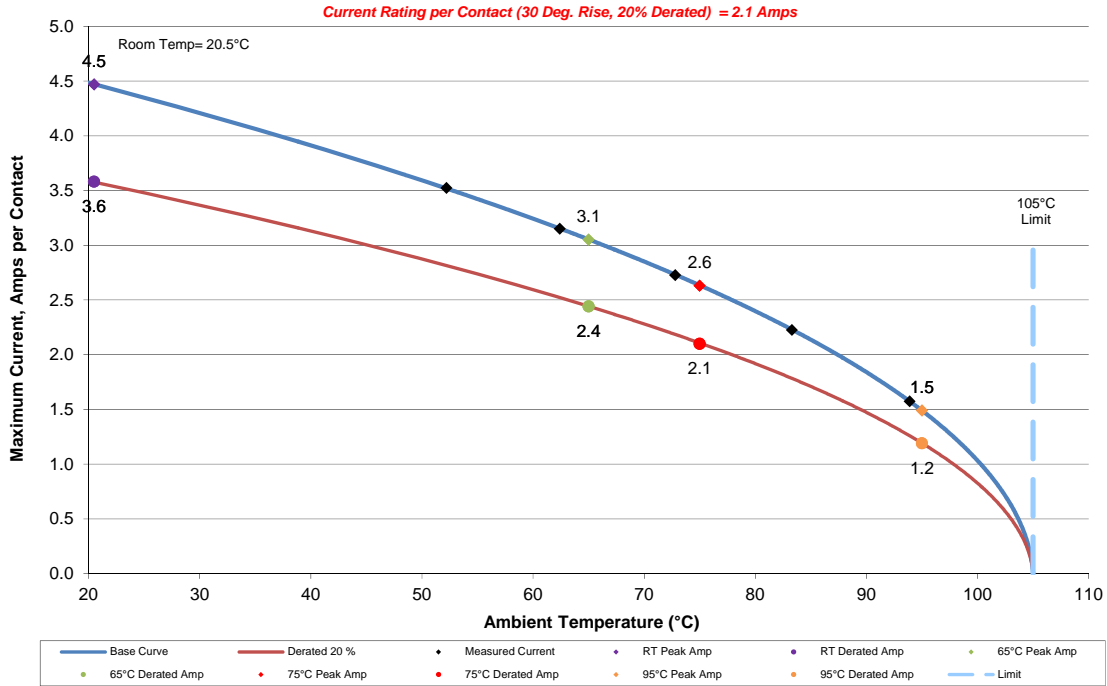
372170
 9 (3x3) Signal Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



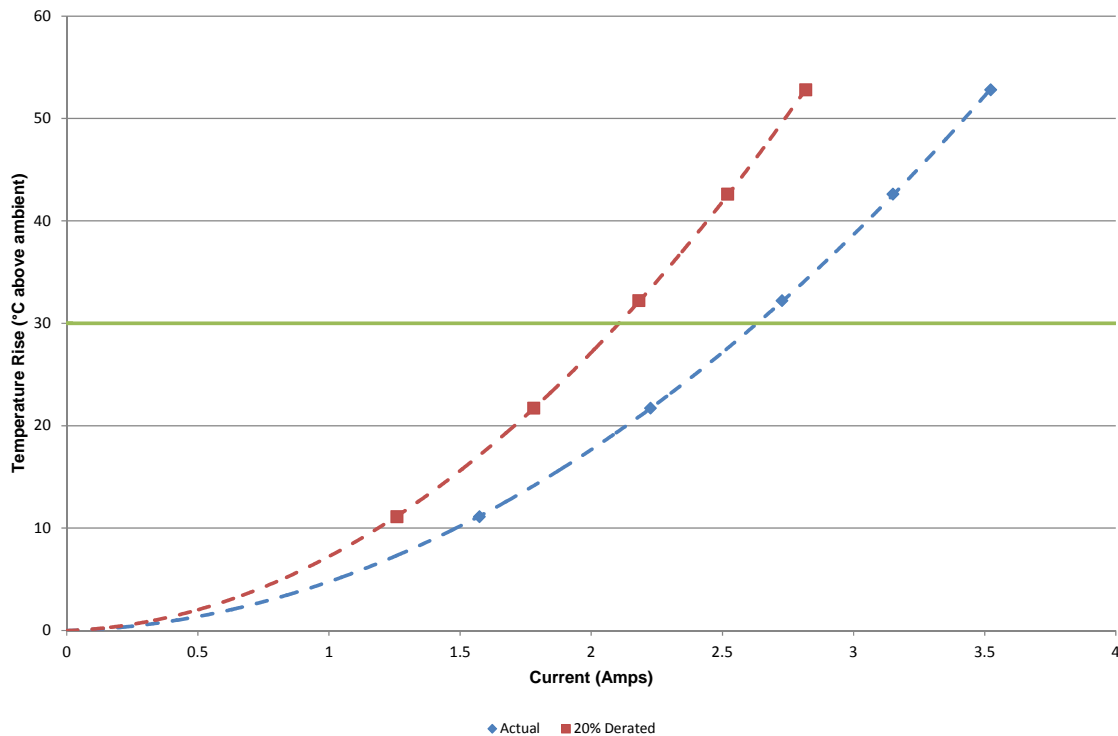
DATA SUMMARIES Continued

d. Linear configuration with 12 adjacent Signal conductors/contacts powered

372170
 12 (3x4) Signal Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



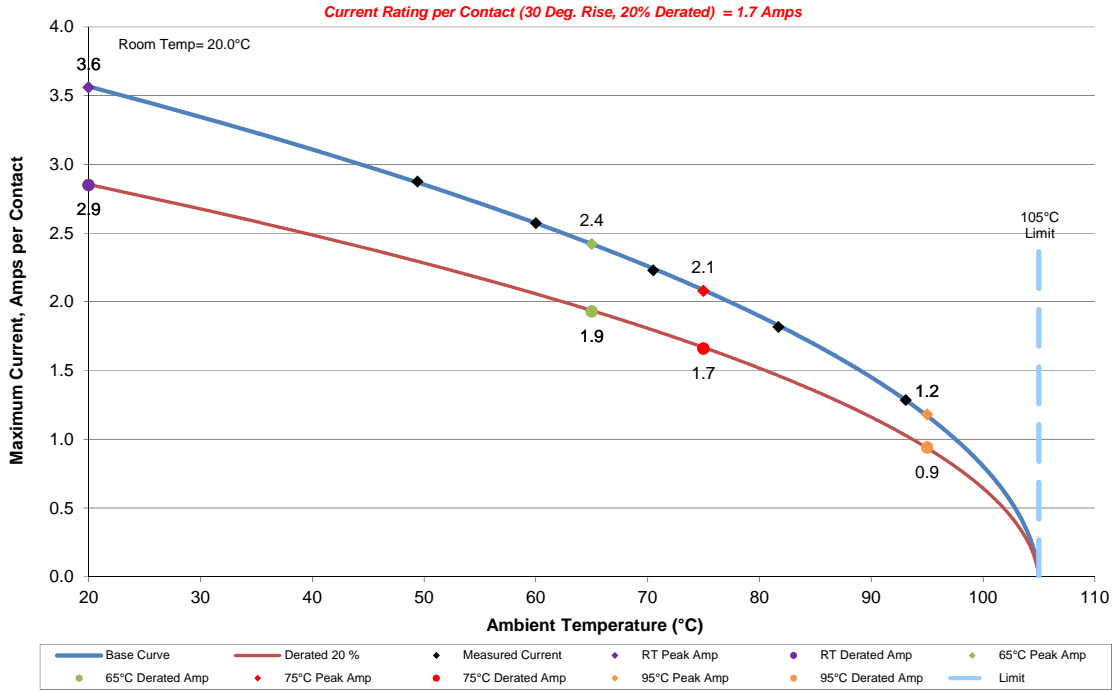
372170
 12 (3x4) Signal Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



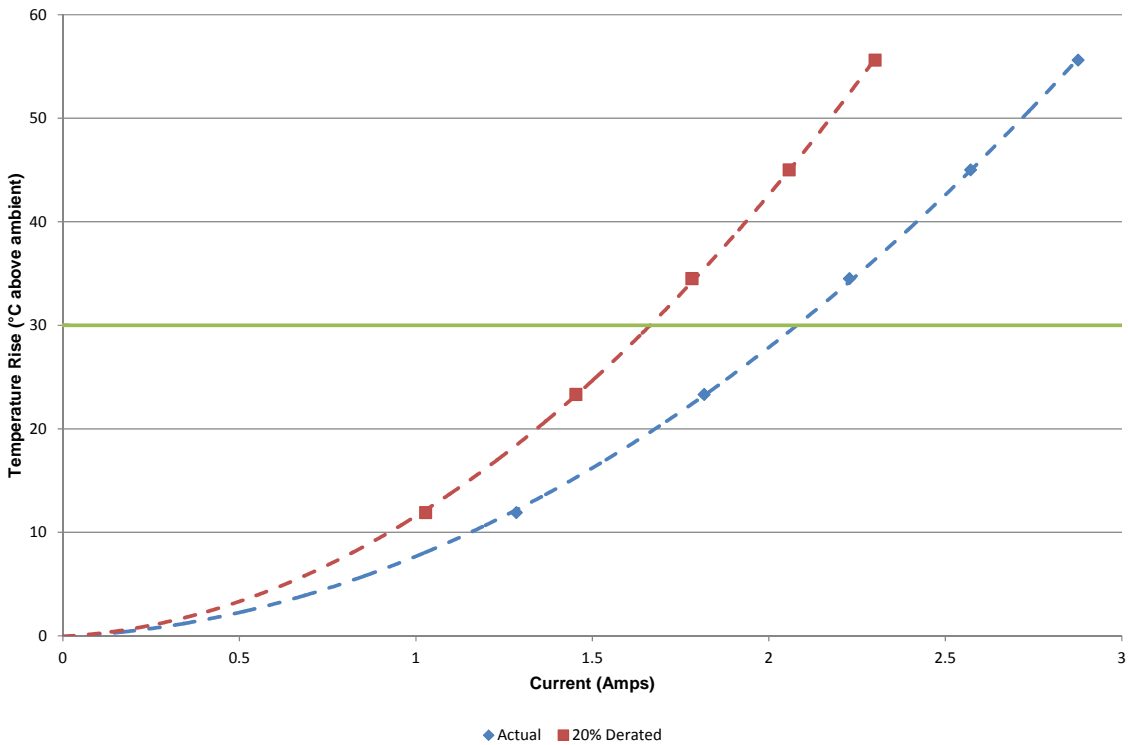
DATA SUMMARIES Continued

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

372170
 24 (All Power) Signal Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



372170
 24 (All Power) Signal Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP

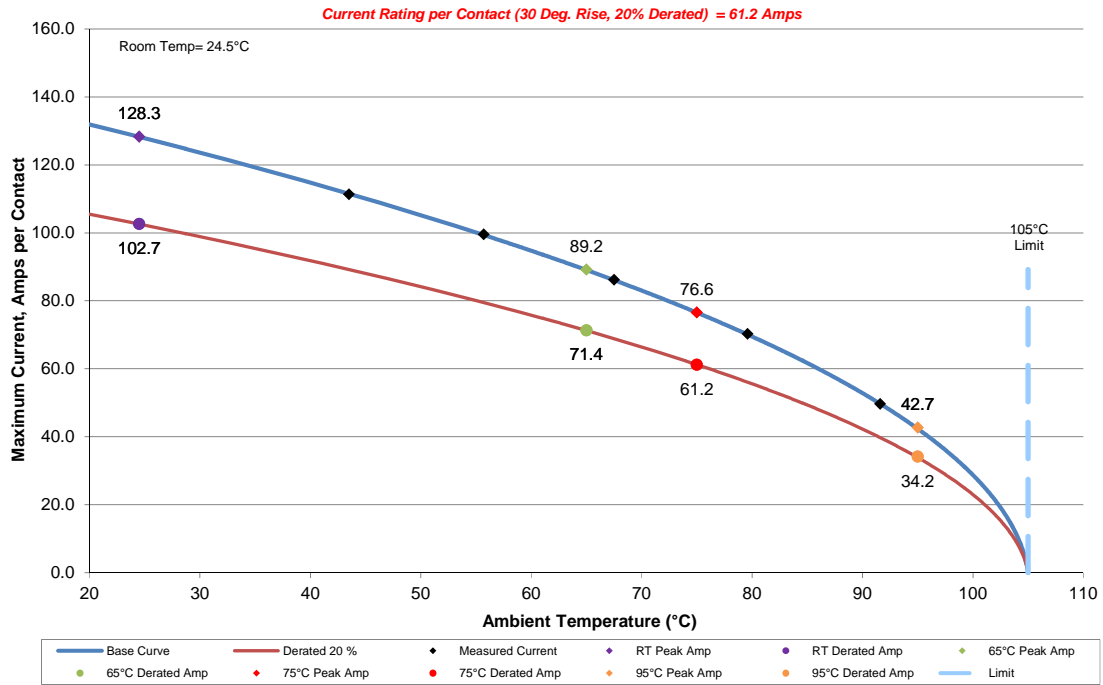


DATA SUMMARIES Continued

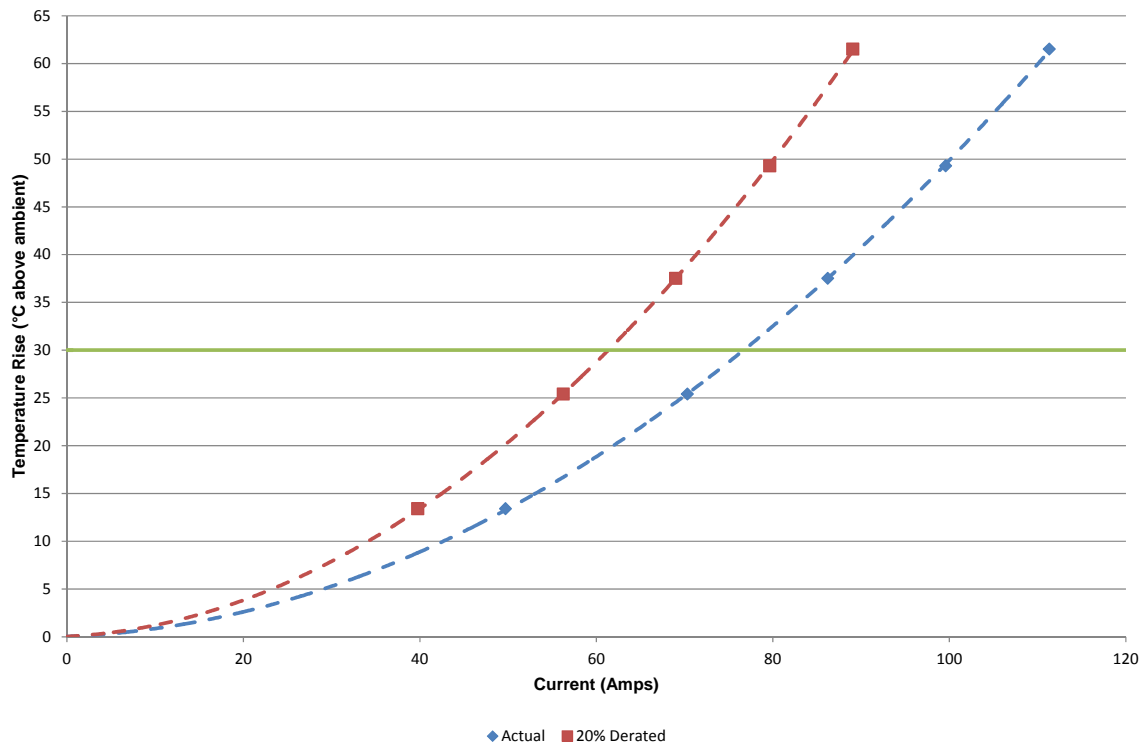
Power Pins

f. Linear configuration with 1 adjacent Power conductors/contacts powered

372170
1 (1X1) Power Pins in Series
Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



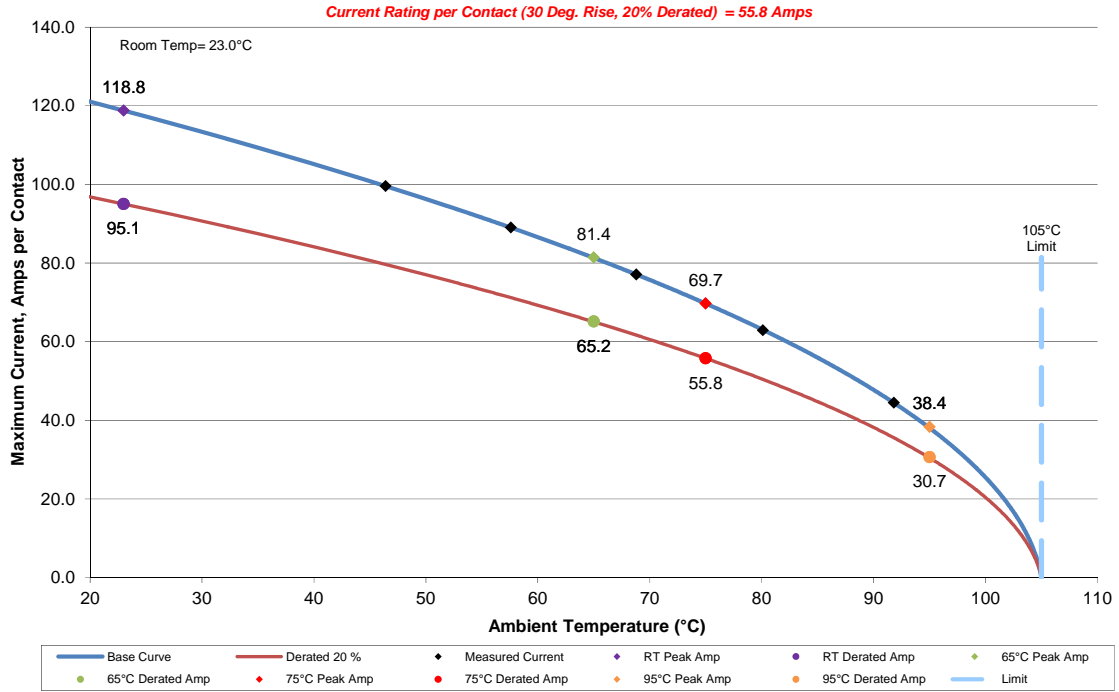
372170
1 (1X1) Power Pins in Series
Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



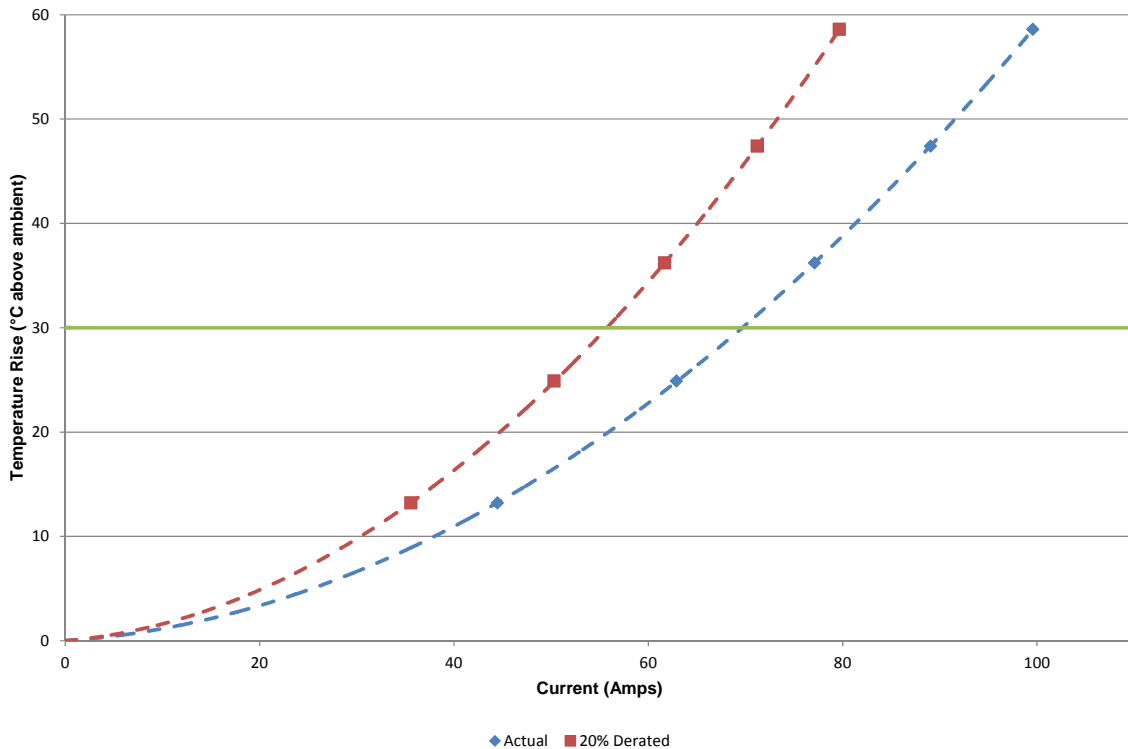
DATA SUMMARIES Continued

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

372170
2 (1X2) Power Pins in Series
Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



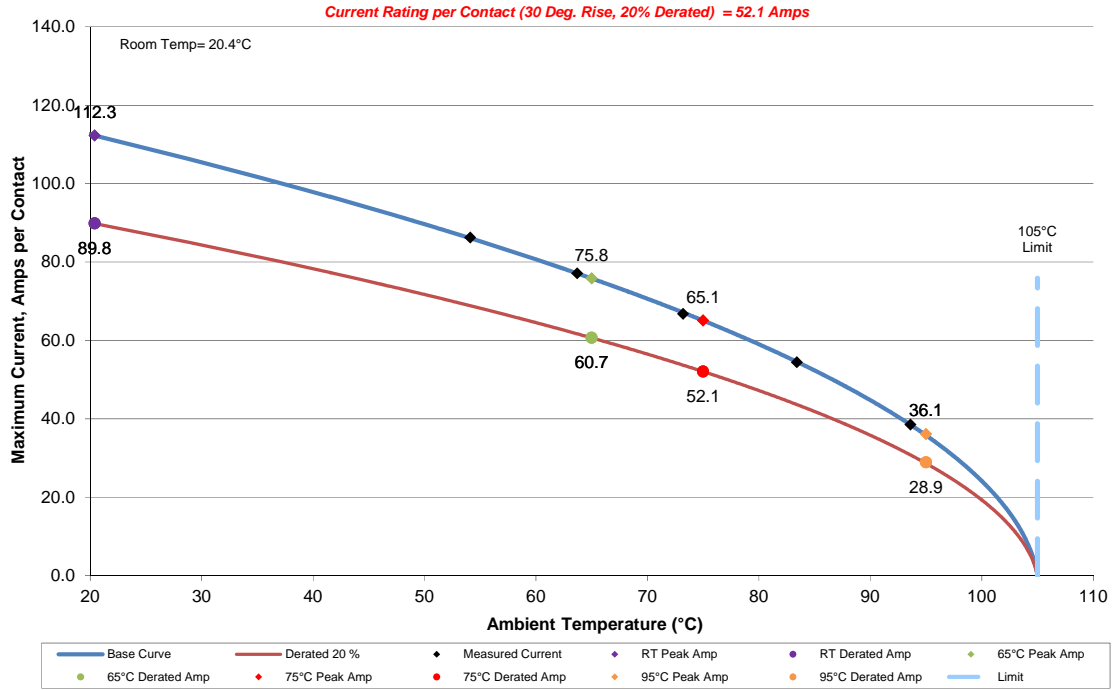
372170
2 (1X2) Power Pins in Series
Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



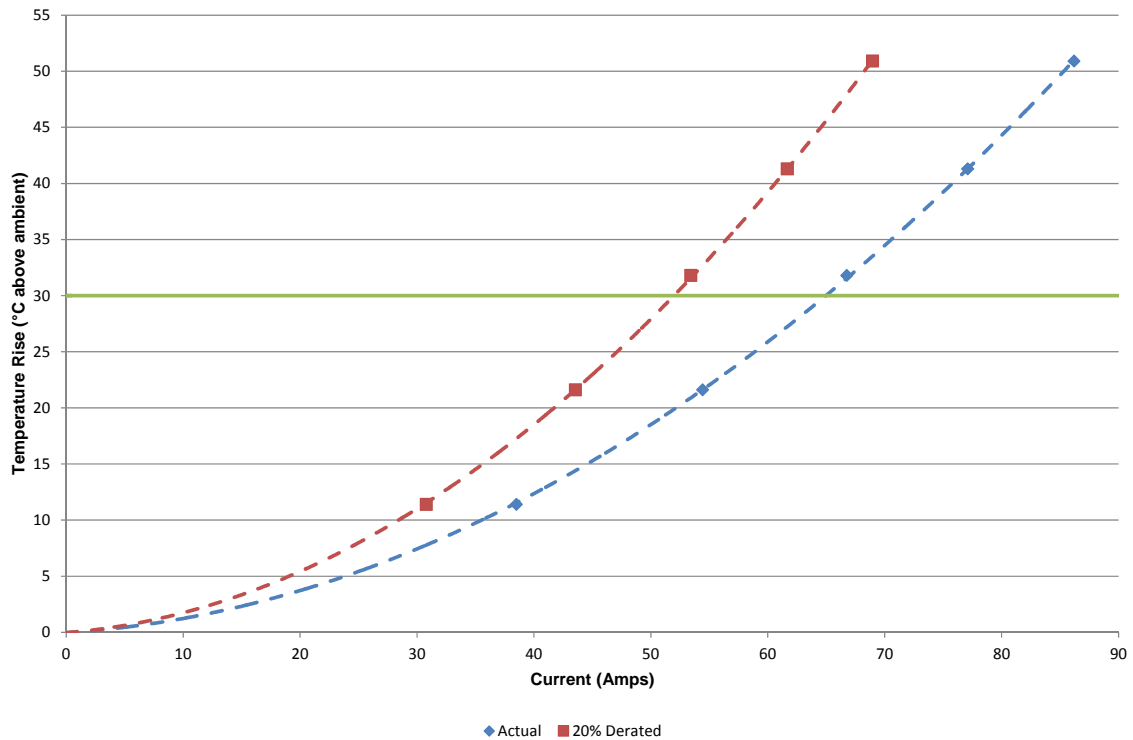
DATA SUMMARIES Continued

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

372170
 3 (1X3) Power Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



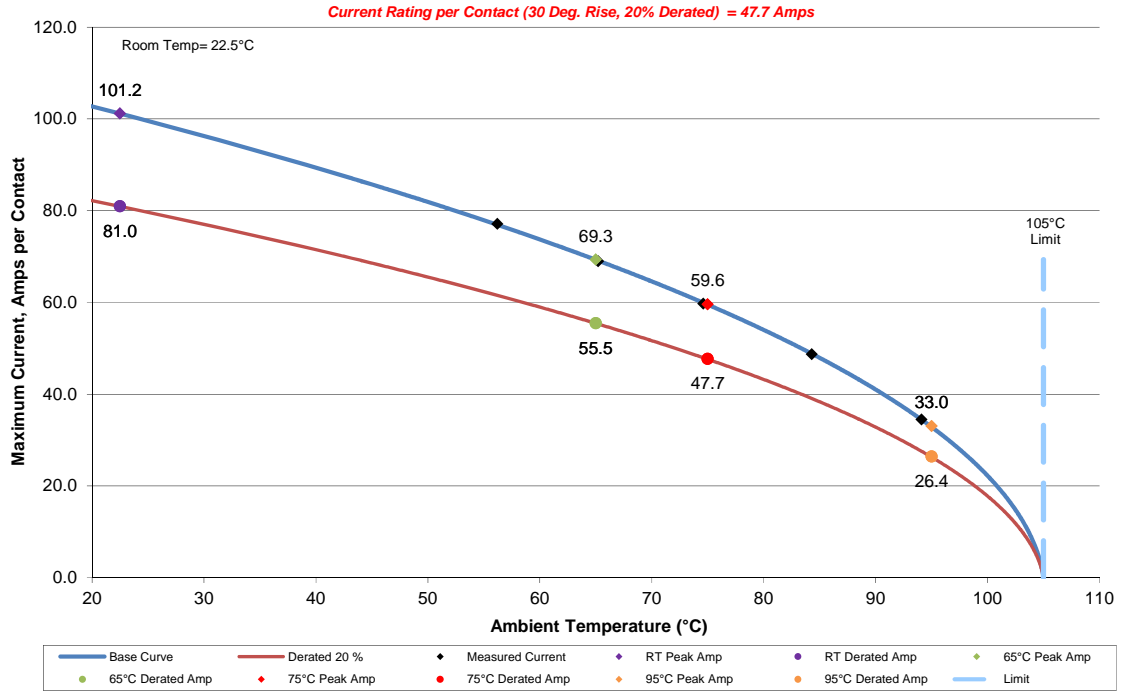
372170
 3 (1X3) Power Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



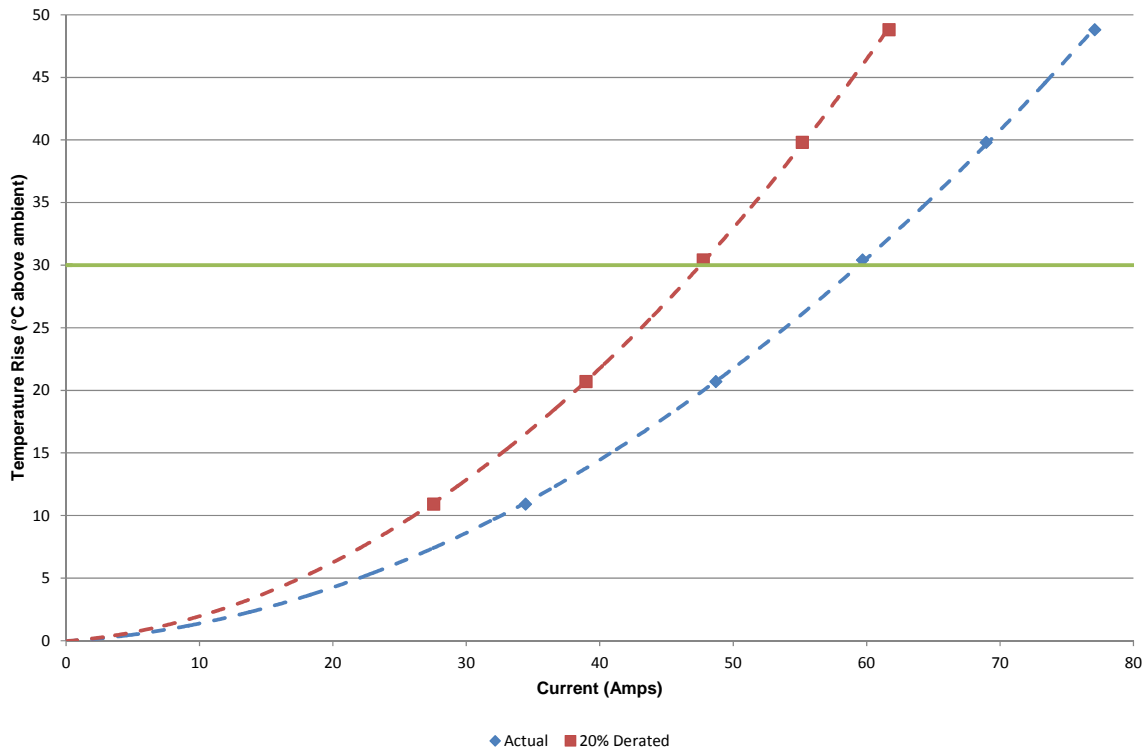
DATA SUMMARIES Continued

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

372170
 4 (1X4) Power Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



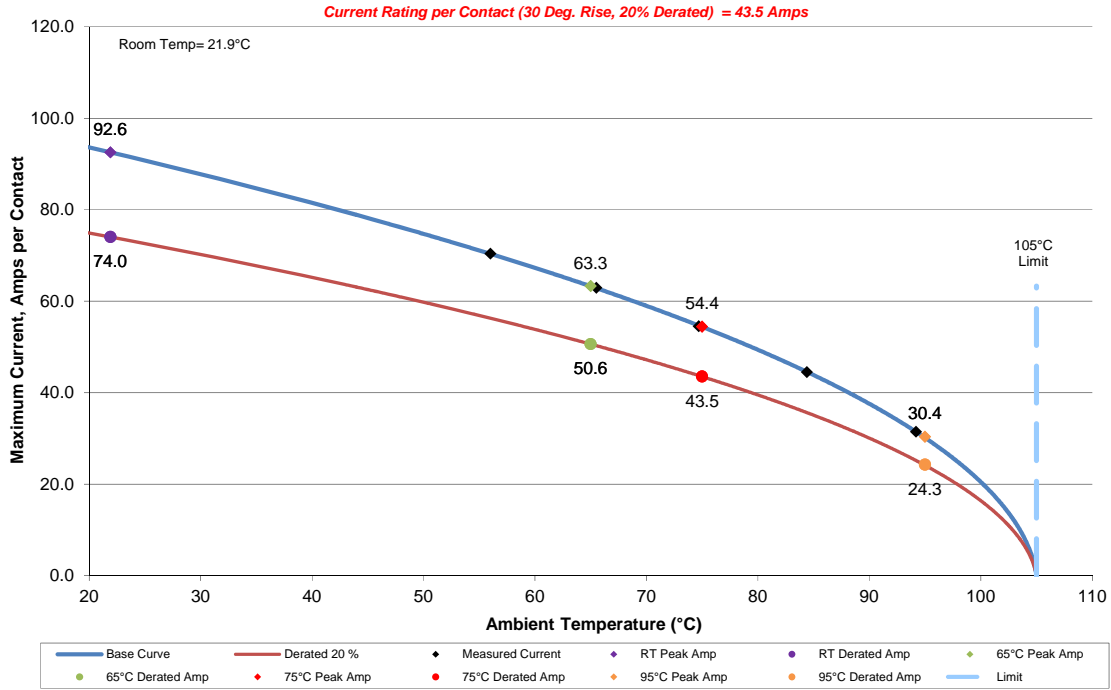
372170
 4 (1X4) Power Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



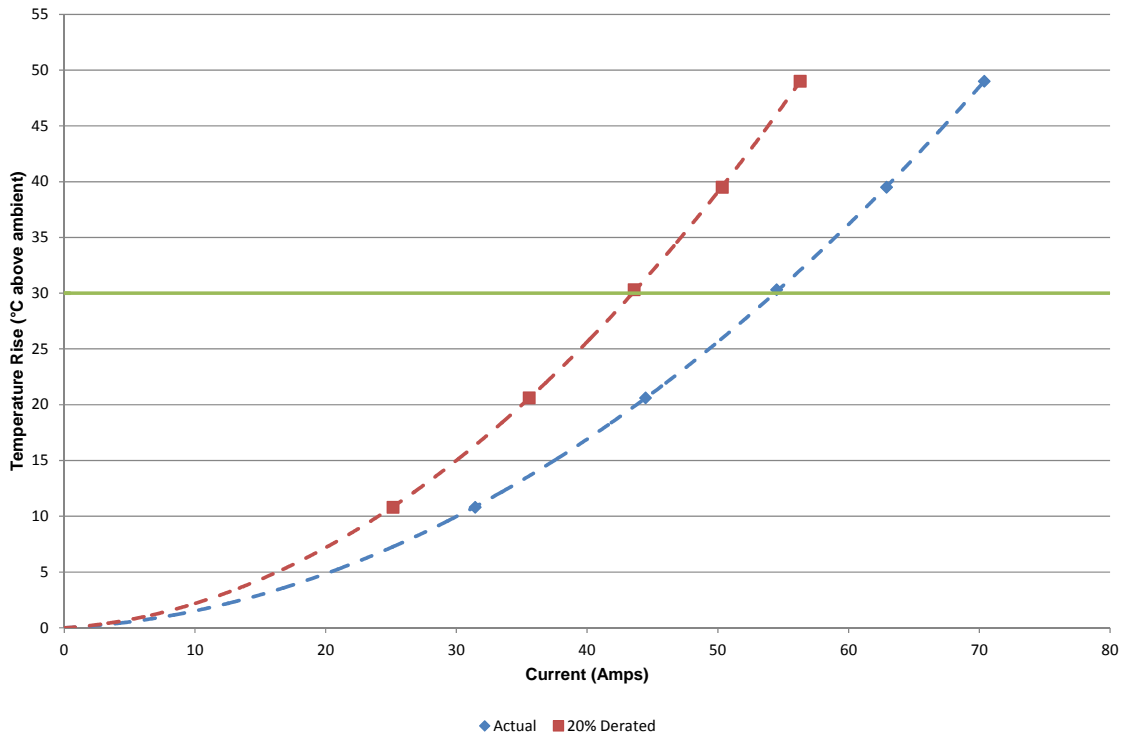
DATA SUMMARIES Continued

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

372170
 6 (All Power) Power Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



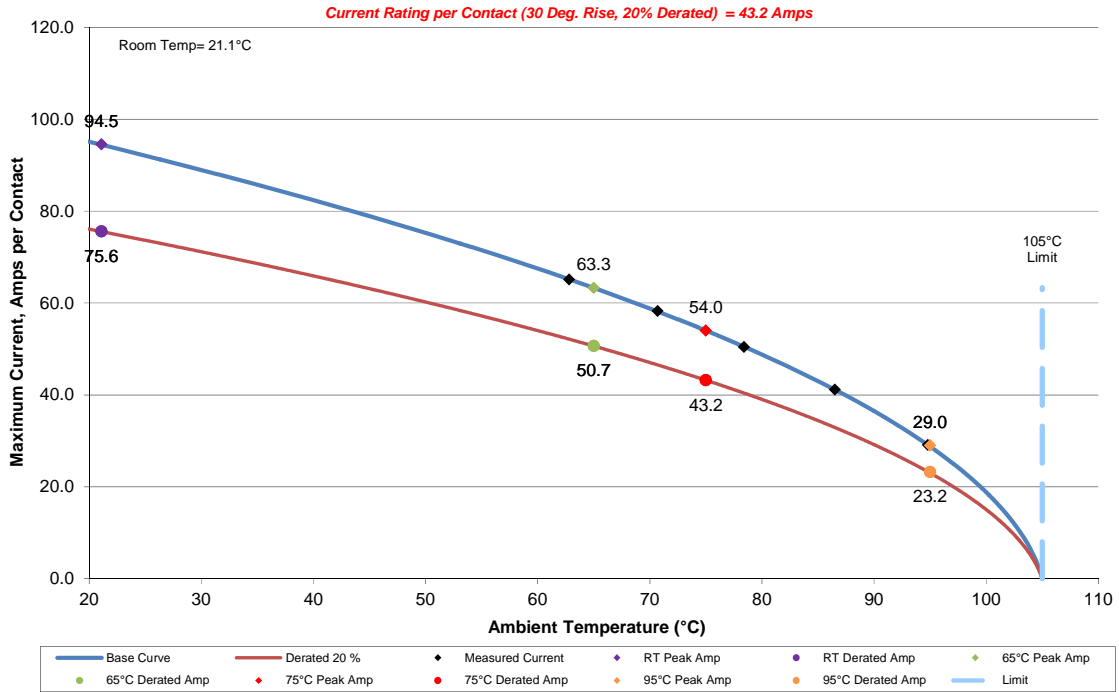
372170
 6 (All Power) Power Pins in Series
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



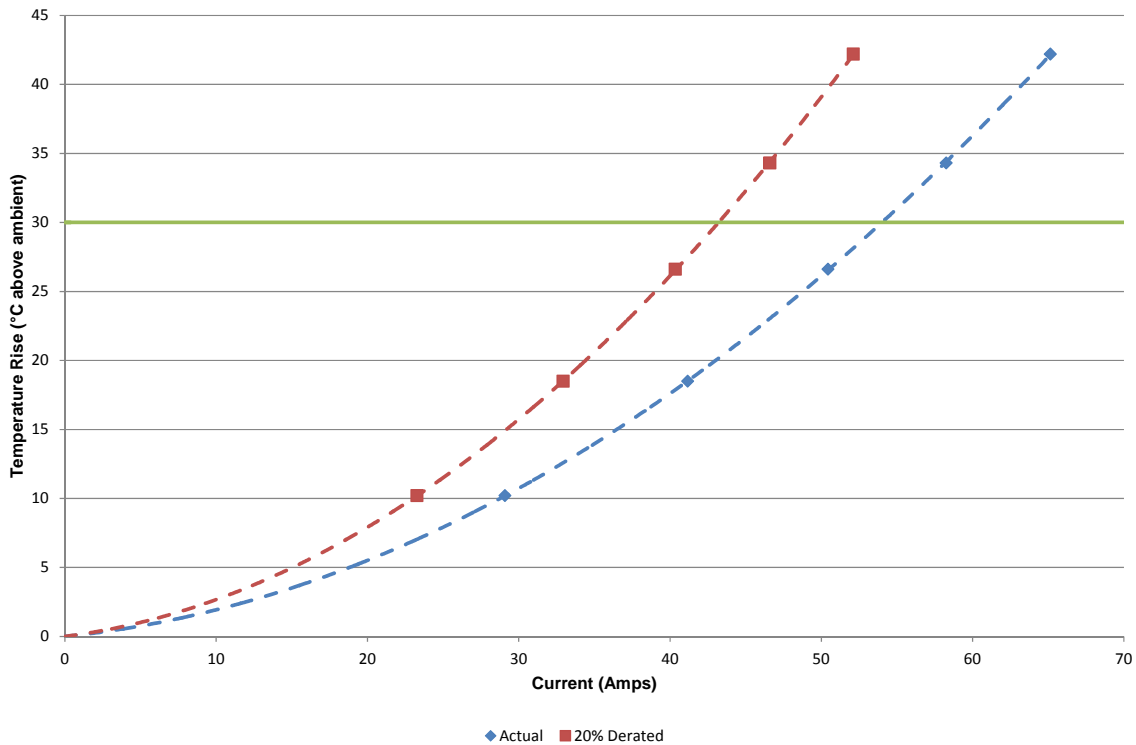
DATA SUMMARIES Continued

k. Linear configuration with all adjacent signal conductors and power conductors/contacts powered

372170
 6 (All Power) Power Pins in Series(Signal Pins Powered at .5 Rated Current (1.05))
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



372170
 6 (All Power) Power Pins in Series(Signal Pins Powered at .5 Rated Current (1.05))
 Part Numbers: ET60S-00-24-06-L-VP-GP / ET60T-00-24-06-L-RT1-GP



DATA SUMMARIES Continued**Mating\Unmating Force: Thermal Aging Group**

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	45.37	10.20	25.22	5.67	16.59	3.73	13.17	2.96
Maximum	52.31	11.76	28.29	6.36	18.82	4.23	14.28	3.21
Average	47.83	10.75	27.20	6.12	17.60	3.96	13.68	3.08
St Dev	2.21	0.50	1.05	0.24	0.82	0.18	0.45	0.10
Count	8	8	8	8	8	8	8	8

Mating\Unmating Force: Mating\Unmating Durability Group

	Initial				After 25 Cycles			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	36.43	8.19	23.53	5.29	33.72	7.58	28.87	6.49
Maximum	44.17	9.93	27.71	6.23	41.32	9.29	31.67	7.12
Average	39.67	8.92	25.51	5.74	37.77	8.49	30.29	6.81
St Dev	2.80	0.63	1.31	0.29	2.73	0.61	1.08	0.24
Count	8	8	8	8	8	8	8	8
	After 50 Cycles				After 75 Cycles			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	35.36	7.95	32.29	7.26	39.19	8.81	36.56	8.22
Maximum	40.52	9.11	36.65	8.24	44.75	10.06	42.34	9.52
Average	38.47	8.65	34.84	7.83	42.73	9.61	39.79	8.95
St Dev	1.69	0.38	1.53	0.34	1.92	0.43	1.83	0.41
Count	8	8	8	8	8	8	8	8
	After 100 Cycles				After Humidity			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	42.57	9.57	40.21	9.04	20.99	4.72	16.68	3.75
Maximum	50.66	11.39	47.59	10.70	26.47	5.95	22.64	5.09
Average	46.89	10.54	44.08	9.91	22.79	5.12	18.61	4.19
St Dev	2.53	0.57	2.38	0.54	1.74	0.39	1.82	0.41
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued**Compliant pin Insertion/Retention****Power Compliant pin Insertion/Retention force****Min HASL 0.038" PTH (C-367)**

	Initial				3 Cycles			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	53.33	11.99	19.08	4.29	41.68	9.37	19.62	4.41
Maximum	60.09	13.51	32.56	7.32	50.97	11.46	30.25	6.80
Average	56.58	12.72	26.55	5.97	45.13	10.15	25.67	5.77
St Dev	1.93	0.43	2.95	0.66	2.17	0.49	2.87	0.65
Count	30	30	30	30	30	30	30	30

Max HASL 0.042" PTH (C-367)

	Initial				3 Cycles			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	39.10	8.79	29.05	6.53	38.79	8.72	30.47	6.85
Maximum	47.77	10.74	37.27	8.38	50.26	11.30	39.99	8.99
Average	43.91	9.87	34.39	7.73	44.90	10.09	35.03	7.88
St Dev	1.76	0.40	2.08	0.47	2.48	0.56	2.26	0.51
Count	30	30	30	30	30	30	30	30

Max ENIG 0.042" PTH (C-367)

	Initial				3 Cycles			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	27.09	6.09	20.28	4.56	25.49	5.73	18.82	4.23
Maximum	31.85	7.16	27.84	6.26	33.05	7.43	28.20	6.34
Average	29.36	6.60	23.34	5.25	28.54	6.42	22.19	4.99
St Dev	1.38	0.31	1.64	0.37	1.60	0.36	2.05	0.46
Count	30	30	30	30	30	30	30	30

DATA SUMMARIES Continued**Signal Compliant pin Insertion/Retention force
Min HASL 0.038" PTH (C-374)**

	Initial				3 Cycles			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	31.54	7.09	17.08	3.84	26.64	5.99	16.19	3.64
Maximum	39.01	8.77	24.95	5.61	32.25	7.25	23.04	5.18
Average	35.61	8.01	20.77	4.67	28.19	6.34	20.33	4.57
St Dev	1.54	0.35	1.83	0.41	1.20	0.27	1.82	0.41
Count	30	30	30	30	30	30	30	30

Max HASL 0.042" PTH (C-374)

	Initial				3 Cycles			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	25.13	5.65	20.64	4.64	24.55	5.52	17.17	3.86
Maximum	29.49	6.63	24.69	5.55	32.47	7.30	26.51	5.96
Average	27.23	6.12	22.27	5.01	29.32	6.59	23.26	5.23
St Dev	0.96	0.22	0.97	0.22	1.90	0.43	2.01	0.45
Count	30	30	30	30	30	30	30	30

Max ENIG 0.042" PTH (C-374)

	Initial				3 Cycles			
	Mating		Unmating		Mating		Unmating	
	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)	New tons	Force (Lbs)
Minimum	18.73	4.21	12.63	2.84	15.57	3.50	10.85	2.44
Maximum	21.66	4.87	17.21	3.87	22.28	5.01	19.08	4.29
Average	20.42	4.59	15.89	3.57	19.59	4.41	16.06	3.61
St Dev	0.74	0.17	1.19	0.27	1.78	0.40	1.89	0.42
Count	30	30	30	30	30	30	30	30

DATA SUMMARIES Continued**INSULATION RESISTANCE (IR):**

	Pin to Pin (Signal)				Row to Row (Signal)		
	Mated	Unmated	Unmated		Mated	Unmated	Unmated
Minimum	ET60S/ET60T	ET60S	ET60T	Minimum	ET60S/ET60T	ET60S	ET60T
Initial	10000	10000	10000	Initial	10000	10000	10000
Thermal	10000	10000	10000	Thermal	10000	10000	10000
Humidity	10000	10000	10000	Humidity	10000	10000	10000

	Signal to Power				Pin to Pin (Power)		
	Mated	Unmated	Unmated		Mated	Unmated	Unmated
Minimum	ET60S/ET60T	ET60S	ET60T	Minimum	ET60S/ET60T	ET60S	ET60T
Initial	10000	10000	10000	Initial	10000	10000	10000
Thermal	10000	10000	10000	Thermal	10000	10000	10000
Humidity	10000	10000	10000	Humidity	10000	10000	10000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	ET60S/ET60T
Break Down Voltage	1500
Test Voltage	1125
Working Voltage	375

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

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

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

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

DATA SUMMARIES Continued**LLCR Durability:**

- 1) A total of 144 signal points and 48 power 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. $\leq +5.0$ 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	2014/8/21	2014/8/25	2014/9/2	2014/9/23
Room Temp (Deg C)	25	24	24	23
Rel Humidity (%)	61	50	55	52
Technician	Kason He	Kason He	Kason He	Kason He
mOhm values	Actual Initial	Delta 100 Cycles	Delta Therm Shck	Delta Humidity
Pin Type 1: Signal				
Average	12.24	0.52	0.63	0.59
St. Dev.	0.95	0.66	0.74	0.76
Min	9.94	0.00	0.00	0.00
Max	15.23	4.05	4.46	3.97
Summary Count	144	144	144	144
Total Count	144	144	144	144
Pin Type 2: Power				
Average	0.25	0.01	0.04	0.16
St. Dev.	0.01	0.01	0.01	0.11
Min	0.23	0.00	0.01	0.01
Max	0.28	0.03	0.08	0.50
Summary Count	48	48	48	48
Total Count	48	48	48	48

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 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 Durability: Compliant pin**

- 1) A total of 30 compliant pin points were measured
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a) $\leq +1.0$ mOhms: ----- Stable
 - b) $>+1.0$ mOhms:----- Unstable

Power Compliant pin

LLCR Measurement Summaries by Pin Type			
Date	2014/8/19	2014/9/2	2014/9/23
Room Temp (Deg C)	24	24	23
Rel Humidity (%)	52	55	52
Technician	Kason He	Kason He	Kason He
mOhm values	Actual Initial	Delta Therm Shck	Delta Humidity
Pin Type1: Power Compliant pin			
Average	0.01	0.01	0.01
St. Dev.	0.00	0.01	0.01
Min	0.01	0.00	0.00
Max	0.02	0.02	0.02
Summary Count	30	30	30
Total Count	30	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	≤ 1	> 1
Therm Shck	30	0
Humidity	30	0

DATA SUMMARIES Continued**Signal Compliant pin**

LLCR Measurement Summaries by Pin Type			
Date	2014/8/19	2014/9/2	2014/9/23
Room Temp (Deg C)	24	24	23
Rel Humidity (%)	52	55	52
Technician	Kason He	Kason He	Kason He
mOhm values	Actual	Delta	Delta
	Initial	Therm Shck	Humidity
Pin Type 1: Signal Compliant pin			
Average	0.03	0.01	0.01
St. Dev.	0.01	0.01	0.01
Min	0.01	0.00	-0.01
Max	0.04	0.03	0.02
Summary Count	30	30	30
Total Count	30	30	30

LLCR Delta Count by Category		
mOhms	Stable	Unstable
	<=1	>1
Therm Shck	30	0
Humidity	30	0

DATA SUMMARIES Continued

LLCR Thermal Aging:

- 1) A total of 144 signal points and 48 power 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. $\leq +5.0$ 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		
	2014/8/21	2014/9/2
Date	2014/8/21	2014/9/2
Room Temp (Deg C)	25	24
Rel Humidity (%)	61	55
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta Thermal
Pin Type 1: Signal		
Average	11.66	0.24
St. Dev.	0.80	0.23
Min	9.67	0.00
Max	13.03	1.74
Summary Count	144	144
Total Count	144	144
Pin Type 2: Power		
Average	0.25	0.06
St. Dev.	0.02	0.03
Min	0.22	0.00
Max	0.30	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 Thermal Aging: Compliant pin**

- 1) A total of 30 compliant pin points were measured
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +1.0$ mOhms: ----- Stable
 - b. $>+1.0$ mOhms: ----- Unstable

Power Compliant pin

LLCR Measurement Summaries by Pin Type		
	2014/8/19	2014/9/2
Date	2014/8/19	2014/9/2
Room Temp (Deg C)	24	24
Rel Humidity (%)	52	55
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta Thermal
Pin Type1: Power Compliant pin		
Average	0.01	0.01
St. Dev.	0.00	0.01
Min	0.01	0.00
Max	0.02	0.02
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	≤ 1	> 1
Thermal	30	0

DATA SUMMARIES Continued**Signal Compliant pin**

LLCR Measurement Summaries by Pin Type		
	2014/8/18	2014/9/2
Date	2014/8/18	2014/9/2
Room Temp (Deg C)	23	24
Rel Humidity (%)	53	55
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta Thermal
Pin Type1: Signal Compliant pin		
Average	0.03	0.01
St. Dev.	0.01	0.01
Min	0.02	0.00
Max	0.04	0.02
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	<=1	>1
Thermal	30	0

DATA SUMMARIES Continued

LLCR Gas Tight:

- 1) A total of 144 signal points and 48 power 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. $\leq +5.0$ 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		
	2014/8/18	2014/9/29
Date	2014/8/18	2014/9/29
Room Temp (Deg C)	23	23
Rel Humidity (%)	53	52
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta Acid Vapor
Pin Type 1: Signal		
Average	11.78	0.27
St. Dev.	0.79	0.26
Min	9.78	0.00
Max	13.67	1.84
Summary Count	144	144
Total Count	144	144
Pin Type 2: Power		
Average	0.26	0.02
St. Dev.	0.01	0.02
Min	0.24	0.00
Max	0.28	0.07
Summary Count	48	48
Total Count	48	48

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$>5 \ \& \ \leq 10$	$>10 \ \& \ \leq 15$	$>15 \ \& \ \leq 50$	$>50 \ \& \ \leq 1000$	>1000
Acid Vapor	192	0	0	0	0	0

DATA SUMMARIES Continued**LLCR Gas Tight: Compliant pin**

- 1) A total of 30 compliant pin points were measured
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +1.0$ mOhms:-----Stable
 - b. $>+1.0$ mOhms:-----Unstable

Power Compliant pin

LLCR Measurement Summaries by Pin Type		
	2014/8/18	2014/9/29
Date	2014/8/18	2014/9/29
Room Temp (Deg C)	23	23
Rel Humidity (%)	53	52
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta Acid Vapor
Pin Type1: Power Compliant pin		
Average	0.01	0.01
St. Dev.	0.00	0.01
Min	0.01	0.00
Max	0.02	0.02
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	≤ 1	> 1
Acid Vapor	30	0

DATA SUMMARIES Continued**Signal Compliant pin**

LLCR Measurement Summaries by Pin Type		
Date	2014/8/18	2014/9/29
Room Temp (Deg C)	23	23
Rel Humidity (%)	53	52
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta Acid Vapor
Pin Type1: Signal Compliant pin		
Average	0.03	0.01
St. Dev.	0.01	0.01
Min	0.01	0.01
Max	0.05	0.02
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	<=1	>1
Acid Vapor	30	0

DATA SUMMARIES Continued

LLCR Shock & Vibration:

- 1). A total of 144 signal points and 48 power points were measured.
- 2). EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
- 3). The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ 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	2014/10/20 2014/10/22
	Room Temp (Deg C)	21 21
	Rel Humidity (%)	38 35
	Technician	Tony Wagoner Tony Wagoner
	mOhm values	Actual Delta Initial Shock-Vib
Pin Type 1: Signal		
	Average	11.83 1.53
	St. Dev.	0.83 2.23
	Min	9.78 0.01
	Max	13.73 14.27
	Summary Count	144 144
	Total Count	144 144
Pin Type 2: Power		
	Average	0.26 0.03
	St. Dev.	0.02 0.03
	Min	0.23 0.00
	Max	0.30 0.08
	Summary Count	48 48
	Total Count	48 48

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \ \& \ \leq 10$	$>10 \ \& \ \leq 15$	$>15 \ \& \ \leq 50$	$>50 \ \& \ \leq 1000$	>1000
Shock-Vib	183	7	2	0	0	0

Nanosecond Event Detection:

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

DATA SUMMARIES Continued**LLCR Shock & Vibration: Compliant pin**

- 1) A total of 48 compliant pin points were measured
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +1.0$ mOhms: -----Stable
 - b. $>+1.0$ mOhms: -----Unstable

Power Compliant pin

LLCR Measurement Summaries by Pin Type		
	2014/10/20	2014/10/22
Date	2014/10/20	2014/10/22
Room Temp (Deg C)	22	22
Rel Humidity (%)	38	39
Technician	Tony Wagoner	Tony Wagoner
mOhm values	Actual Initial	Delta Shock-Vib
Pin Type1: Power Compliant pin		
Average	0.14	0.03
St. Dev.	0.02	0.03
Min	0.09	0.00
Max	0.18	0.15
Summary Count	48	48
Total Count	48	48

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	≤ 1	> 1
Shock-Vib	48	0

DATA SUMMARIES Continued**Signal Compliant pin**

LLCR Measurement Summaries by Pin Type		
	2014/10/20	2014/10/22
Date	2014/10/20	2014/10/22
Room Temp (Deg C)	22	22
Rel Humidity (%)	38	36
Technician	Tony Wagoner	Tony Wagoner
mOhm values	Actual Initial	Delta Shock-Vib
Pin Type1: Signal Compliant pin		
Average	0.11	0.03
St. Dev.	0.02	0.03
Min	0.01	0.00
Max	0.17	0.12
Summary Count	48	48
Total Count	48	48

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	<=1	>1
Shock-Vib	48	0

DATA SUMMARIES Continued**LLCR: Compliant pin Insertion/Retention Group**

- 1) A total of 30 compliant pin points were measured
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +1.0$ mOhms: ----- Stable
 - b. $>+1.0$ mOhms:----- Unstable

Min HASL 0.038" PTH (C-367)

		LLCR Measurement Summaries by Pin Type	
		2014/9/25	2014/9/25
Date		2014/9/25	2014/9/25
Room Temp (Deg C)		24	24
Rel Humidity (%)		52	55
Technician		Kason He	Kason He
mOhm values		Actual Initial	Delta 3 Cycles
		Pin Type1: Power Complilant pin	
Average		0.02	0.00
St. Dev.		0.01	0.01
Min		0.01	0.00
Max		0.03	0.01
Summary Count		30	30
Total Count		30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	≤ 1	> 1
3 Cycles	30	0

DATA SUMMARIES Continued**Max HASL 0.042" PTH (C-367)**

LLCR Measurement Summaries by Pin Type		
Date	2014/9/25	2014/9/25
Room Temp (Deg C)	24	24
Rel Humidity (%)	52	55
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta 3 Cycles
Pin Type1: Power Complilant pin		
Average	0.02	0.00
St. Dev.	0.00	0.00
Min	0.01	0.00
Max	0.03	0.01
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	<=1	>1
3 Cycles	30	0

Max ENIG 0.042" PTH (C-367)

LLCR Measurement Summaries by Pin Type		
Date	2014/9/25	2014/9/25
Room Temp (Deg C)	24	24
Rel Humidity (%)	52	55
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta 3 Cycles
Pin Type1: Power Complilant pin		
Average	0.02	0.00
St. Dev.	0.00	0.00
Min	0.01	0.00
Max	0.03	0.01
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	<=1	>1
3 Cycles	30	0

DATA SUMMARIES Continued**Min HASL 0.038" PTH (C-374)**

LLCR Measurement Summaries by Pin Type		
Date	2014/9/25	2014/9/25
Room Temp (Deg C)	24	24
Rel Humidity (%)	52	55
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta 3 Cycles
Pin Type1: Signal Complilant pin		
Average	0.02	0.00
St. Dev.	0.00	0.00
Min	0.02	0.00
Max	0.03	0.01
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	<=1	>1
3 Cycles	30	0

Max HASL 0.042" PTH (C-374)

LLCR Measurement Summaries by Pin Type		
Date	2014/9/25	2014/9/25
Room Temp (Deg C)	24	24
Rel Humidity (%)	52	55
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta 3 Cycles
Pin Type1: Signal Complilant pin		
Average	0.02	0.00
St. Dev.	0.00	0.00
Min	0.02	0.00
Max	0.03	0.01
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	<=1	>1
3 Cycles	30	0

DATA SUMMARIES Continued**Max ENIG 0.042" PTH (C-374)**

LLCR Measurement Summaries by Pin Type		
Date	2014/9/25	2014/9/25
Room Temp (Deg C)	24	24
Rel Humidity (%)	52	55
Technician	Kason He	Kason He
mOhm values	Actual Initial	Delta 3 Cycles
Pin Type1: Signal Complilant pin		
Average	0.02	0.00
St. Dev.	0.00	0.00
Min	0.01	0.00
Max	0.03	0.01
Summary Count	30	30
Total Count	30	30

LLCR Delta Count by Category		
	Stable	Unstable
mOhms	<=1	>1
3 Cycles	30	0

EQUIPMENT AND CALIBRATION SCHEDULES**Equipment #:** HZ-TCT-01**Description:** Normal force analyzer**Manufacturer:** Mecmesin Multitester**Model:** Mecmesin Multitester 2.5-i**Serial #:** 08-1049-04**Accuracy:** Last Cal: 4/26/2014, Next Cal: 4/27/2015**Equipment #:** HZ-OV-01**Description:** Oven**Manufacturer:** Huida**Model:** CS101-1E**Serial #:** CS101-1E-B**Accuracy:** Last Cal: 12/13/2013, Next Cal: 12/12/2014**Equipment #:** HZ-THC-01**Description:** Humidity transmitter**Manufacturer:** Thermtron**Model:** HMM30C**Serial #:** D0240037**Accuracy:** Last Cal: 3/1/2014, Next Cal: 2/28/2015**Equipment #:** HZ-HPM-01**Description:** NA9636H**Manufacturer:** Ainuo**Model:** 6031A**Serial #:** 089601091**Accuracy:** Last Cal: 3/8/2014, Next Cal: 3/7/2015**Equipment #:** MO-04**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0798688**Accuracy:** Last Cal: 4/20/2014, Next Cal: 4/20/2015**Equipment #:** PS-11**Description:** Power Supply**Manufacturer:** Hewlett Packard / Agilent**Model:** AT-6032A**Serial #:** 3440A10457**Accuracy:** Last Cal: no calibrate, Next Cal: no calibrate**Equipment #:** HZ-MO-05**Description:** Micro-ohmmeter**Manufacturer:** Keithley**Model:** 3706**Serial #:** 1285188**Accuracy:** Last Cal: 11/15/2013, Next Cal: 11/14/2014

EQUIPMENT AND CALIBRATION SCHEDULES**Equipment #:** HZ-TSC-01**Description:** Vertical Thermal Shock Chamber**Manufacturer:** Cincinnatti Sub Zero**Model:** VTS-3-6-6-SC/AC**Serial #:** 10-VT14994**Accuracy:** See Manual

... Last Cal: 06/28/2014, Next Cal: 06/27/2015

Equipment #: SVC-01**Description:** Shock & Vibration Table**Manufacturer:** Data Physics**Model:** LE-DSA-10-20K**Serial #:** 10037**Accuracy:** See Manual

... Last Cal: 11/30/2013, Next Cal: 11/30/2014

Equipment #: ACLM-01**Description:** Accelerometer**Manufacturer:** PCB Piezotronics**Model:** 352C03**Serial #:** 115819**Accuracy:** See Manual

... Last Cal: 07/09/2014, Next Cal: 07/09/2015

Equipment #: ED-03**Description:** Event Detector**Manufacturer:** Analysis Tech**Model:** 32EHD**Serial #:** 1100604**Accuracy:** See Manual

... Last Cal: 06/04/2014, Next Cal: 06/04/2015