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Project Number: Design Qualification Test Report	Tracking Code: 337665_Report_Rev_1
Requested by: Catie Eichhorn	Date: 4/3/2015
Part #: PTF-125-01-L-D/PTT-125-01-L-D	Tech: Peter Chen
Part description: PTF/PTT	Qty to test: 50
Test Start: 11/1/2014	Test Completed: 12/15/2014
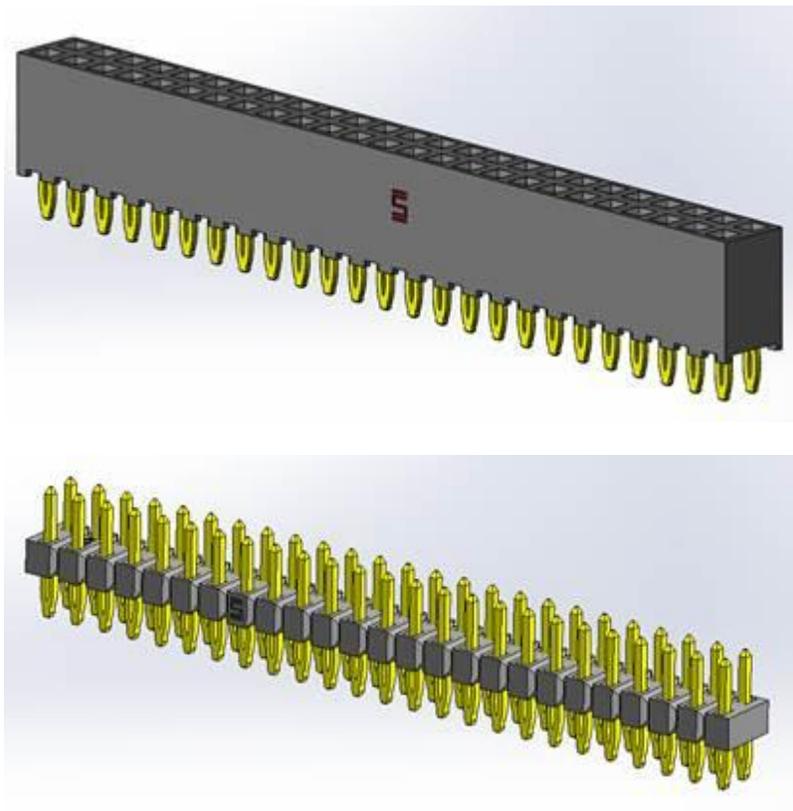
Design Qualification Test Report

PTF/PTT
PTF-125-01-L-D/PTT-125-01-L-D

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
3/21/2015	1	Initial Issue	PC

CERTIFICATION

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

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SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Samtec Test PCBs used: PCB-106435-TST-XX, PCB-106436-TST-XX , PCB-106437-TST-XX, PCB-106459-TST-XX.

FLOWCHARTS

Gas Tight

Group 1
PTF-125-01-L-D

PTT-125-01-L-D

8 Assemblies

ENIG .033" PTH

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

Complilant Pin ONLY

Group 2	Group 3
PTF-125-01-L-D	
	PTT-125-01-L-D
30 Contacts Minimum	30 Contacts Minimum
C-159 ENIG .033" PTH	T-1S47: ENIG .033" PTH
Note: Scan the individual compliant pins for each of the LLCR readings.	*Note: Scan the individual compliant pins for each of the LLCR readings.*

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

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(1) Gas Tight = EIA-364-36

(2) LLCR = EIA-364-23

        Open Circuit Voltage = 20 mV Max

        Test Current = 100 mA Max

Normal Force

Group 1	Group 2
PTF-125-01-L-D	PTF-125-01-L-D
PTT-125-01-L-D	PTT-125-01-L-D
8 Contacts Minimum	8 Contacts Minimum
Signal Without Thermals-ENIG 0.033" PTH	Signal With Thermals-ENIG 0.033" PTH

Step	Description	Step	Description
1.	Contact Gaps	1.	Contact Gaps
2.	Normal Force (1)	2.	Thermal Age (2)
	Deflection = 0.005 "	3.	Contact Gaps
	Expected Force at Max Deflection = 150 g	4.	Normal Force (1)
			Deflection = 0.005 "
			Expected Force at Max Deflection = 150 g

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(1) Normal Force = EIA-364-04

(2) Thermal Age = EIA-364-17

        Test Condition = 4 (105°C)

        Time Condition = B (250 Hours)

FLOWCHARTS Continued

Thermal Aging

Group 1
PTF-125-01-L-D
PTT-125-01-L-D
8 Assemblies
ENIG 0.033" PTH

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

COMPLIANT PIN ONLY

Group 2
PTF-125-01-L-D

30 Contacts Minimum
C-159: ENIG 0.033" PTH
Note: probe each of the compliant pins individually to take readings.

Step	Description
1.	LLCR (1)
2.	Thermal Age (4) - Non Standard
3.	LLCR (1)
	Max Delta = 1 mOhm

Group 3
PTT-125-01-L-D

30 Contacts Minimum
T-1S47: ENIG 0.033" PTH
Note: probe each of the compliant pins individually to take readings.

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

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(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)

(4) Thermal Age = EIA-364-17
  Test Condition = 4 (105°C)
  Time Condition = B (250 Hours)

FLOWCHARTS Continued

Mating/Unmating/Durability

Group 1
PTF-125-01-L-D
PTT-125-01-L-D
8 Assemblies
ENIG 0.033" PTH

Step	Description
1.	Contact Gaps
2.	LLCR (2)
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
PTF-105-01-L-D
PTT-105-01-L-D
8 Assemblies
ENIG 0.033" PTH

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force (3)
3.	Cycles Quantity = 25 Cycles
4.	Mating/Unmating Force (3)
5.	Cycles Quantity = 25 Cycles
6.	Mating/Unmating Force (3)
7.	Cycles Quantity = 25 Cycles
8.	Mating/Unmating Force (3)
9.	Cycles Quantity = 25 Cycles
10.	Mating/Unmating Force (3)

Group 3
PTF-150-01-L-D
PTT-150-01-L-D
8 Assemblies
ENIG 0.033" PTH

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force (3)
3.	Cycles Quantity = 25 Cycles
4.	Mating/Unmating Force (3)
5.	Cycles Quantity = 25 Cycles
6.	Mating/Unmating Force (3)
7.	Cycles Quantity = 25 Cycles
8.	Mating/Unmating Force (3)
9.	Cycles Quantity = 25 Cycles
10.	Mating/Unmating Force (3)

Compliant Pin Only

Group 4
PTF-125-01-L-D

30 Contacts Minimum

ENIG 0.033" C- 159

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

Group 5

PTT-125-01-L-D

30 Contacts Minimum

ENIG 0.033" T-1S47

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

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(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

Pin-to-Pin

Group 1	Group 2	Group 3	Group 4
PTF-125-01-L-D	PTF-125-01-L-D		PTF-125-01-L-D
PTT-125-01-L-D		PTT-125-01-L-D	PTT-125-01-L-D
2 Assemblies	2 Assemblies	2 Assemblies	2 Assemblies
ENIG 0.033" PTH	ENIG 0.033" PTH	ENIG 0.033" PTH	ENIG 0.033" PTH

Step	Description		Step	Description		Step	Description		Step	Description
1.	DWV Breakdown (2)		1.	DWV Breakdown (2)		1.	DWV Breakdown (2)		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-Row

Group 5	Group 6	Group 7	Group 8
PTF-125-01-L-D	PTF-125-01-L-D		PTF-125-01-L-D
PTT-125-01-L-D		PTT-125-01-L-D	PTT-125-01-L-D
2 Assemblies	2 Assemblies	2 Assemblies	2 Assemblies
ENIG 0.033" PTH	ENIG 0.033" PTH	ENIG 0.033" PTH	ENIG 0.033" PTH

Step	Description		Step	Description		Step	Description		Step	Description
1.	DWV Breakdown (2)		1.	DWV Breakdown (2)		1.	DWV Breakdown (2)		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)

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(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

ENIG- 0.033" PTH

Group 1	Group 2	Group 3	Group 4
PTF-150-01-L-D	PTF-150-01-L-D	PTF-150-01-L-D	PTF-150-01-L-D
PTT-150-01-L-D	PTT-150-01-L-D	PTT-150-01-L-D	PTT-150-01-L-D
2 Pins Powered	4 Pins Powered	6 Pins Powered	8 Pins Powered
Signal	Signal	Signal	Signal

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

Group 5
PTF-150-01-L-D
PTT-150-01-L-D
100 Pins Powered
Signal

Step	Description
1.	CCC (1) Rows = 2 Number of Positions = 50

(1) 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
PTF-125-01-L-D
PTT-125-01-L-D
8 Assemblies
ENIG 0.033" PTH

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

Compliant Pin only

Group 2	Group 3
PTF-125-01-L-D	PTT-125-01-L-D
30 Contacts Minimum	30 Contacts Minimum
C-159 ENIG 0.033" PTH	T-1S47 ENIG 0.033" PTH

Step	Description	Step	Description
1.	LLCR (1)	1.	LLCR (1)
2.	Random Vibration (3) - Non Standard	2.	Random Vibration (3) - Non Standard
3.	LLCR (1)	3.	LLCR (1)
	Max Delta = 1 mOhm		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 Detection

Group 1
PTF-125-01-L-D
PTT-125-01-L-D
60 Points
ENIG 0.033" 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

Group 1
PTF-125-01-L-D

30 Contacts Minimum
HASL 0.027" PTH C-159

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

Group 2
PTF-125-01-L-D

30 Contacts Minimum
HASL 0.033" PTH C-159

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

Group 3
PTF-125-01-L-D

30 Contacts Minimum
ENIG 0.033" PTH C-159

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

Group 4

PTT-125-01-L-D

30 Contacts Minimum
HASL 0.027" PTH T-1S47

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

FLOWCHARTS Continued

Group 5

PTT-125-01-L-D
30 Contacts Minimum
HASL 0.033" PTH T-1S47

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

Group 6

PTT-125-01-L-D
30 Contacts Minimum
ENIG 0.033" PTH T-1S47

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

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(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

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 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 $\pm$ 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.

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

ATTRIBUTE DEFINITIONS
The following is a brief, simplified description of attributes.

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

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

TEMPERATURE RISE (Current Carrying Capacity, CCC):
1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
   a. Self heating (resistive)
   b. Reduction in heat sink capacity affecting the heated contacts
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at four temperature points are reported:
   c. Ambient
   d. 85° C
   e. 95° C
   f. 115° C
8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

ATTRIBUTE DEFINITIONS
The following is a brief, simplified description of attributes.

LLCR:
1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a.   <= +5.0 mOhms:----------------------------- Stable
    b.   +5.1 to +10.0 mOhms:--------------------- Minor
    c.   +10.1 to +15.0 mOhms: ------------------- Acceptable
    d.   +15.1 to +50.0 mOhms: ------------------- Marginal
    e.   +50.1 to +2000 mOhms: ----------------- Unstable
    f.   >+2000 mOhms:---------------------------- Open Failure
4) The following guidelines are used to categorize the changes in LLCR for compliant pin only
    a.   <= +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.   <= +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° 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.   <= +1.0 mOhms:---------------------------- Stable
    b.   > +1.0 mOhms: ---------------------------- Unstable

RESULTS

Temperature Rise, CCC at a 20% de-rating
- **CCC for a 30°C Temperature Rise----------4.5 A per contact with 2 contacts (2x1) powered**
- **CCC for a 30°C Temperature Rise----------3.5 A per contact with 4 contacts (2x2) powered**
- **CCC for a 30°C Temperature Rise----------3.0 A per contact with 6 contacts (2x3) powered**
- **CCC for a 30°C Temperature Rise----------2.8 A per contact with 8 contacts (2x4) powered**
- **CCC for a 30°C Temperature Rise----------1.8 A per contact with 20 contacts (2x10) powered**

Mating & Unmating force
Thermal aging
PTF-125-01-L-D/PTT-125-01-L-D
- **Initial**
  - **Mating**
    - **Min ------------------------------------- 7.84 Lbs**
    - **Max------------------------------------- 9.25 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 7.87 Lbs**
    - **Max------------------------------------- 9.22 Lbs**
- **After thermal aging**
  - **Mating**
    - **Min ------------------------------------- 6.28 Lbs**
    - **Max------------------------------------- 8.45 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 5.30 Lbs**
    - **Max------------------------------------- 8.27 Lbs**

RESULTS Continued

Mating&Unmating durability:
PTF-125-01-L-D/PTT-125-01-L-D

- **Initial**
  - **Mating**
    - **Min ------------------------------------- 7.57 Lbs**
    - **Max-------------------------------------11.39 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 7.40 Lbs**
    - **Max-------------------------------------10.96 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ------------------------------------- 8.60 Lbs**
    - **Max-------------------------------------13.55 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 9.05 Lbs**
    - **Max-------------------------------------12.27 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min -------------------------------------10.97 Lbs**
    - **Max-------------------------------------15.35 Lbs**
  - **Unmating**
    - **Min -------------------------------------10.45 Lbs**
    - **Max-------------------------------------12.89 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min -------------------------------------12.05 Lbs**
    - **Max-------------------------------------16.33 Lbs**
  - **Unmating**
    - **Min -------------------------------------11.33 Lbs**
    - **Max-------------------------------------13.64 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min -------------------------------------13.22 Lbs**
    - **Max-------------------------------------17.23 Lbs**
  - **Unmating**
    - **Min -------------------------------------11.87 Lbs**
    - **Max-------------------------------------14.70 Lb**
- **After Humidity**
  - **Mating**
    - **Min -------------------------------------10.29 Lbs**
    - **Max-------------------------------------11.44 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 9.25 Lbs**
    - **Max-------------------------------------11.07 Lbs**

RESULTS Continued

Mating & Unmating basic:

PTF-150-01-L-D/PTT-150-01-L-D

- **Initial**
  - **Mating**
    - **Min --------------------------------------18.64 Lbs**
    - **Max-------------------------------------20.91 Lbs**
  - **Unmating**
    - **Min --------------------------------------14.56 Lbs**
    - **Max-------------------------------------19.99 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min --------------------------------------16.56 Lbs**
    - **Max-------------------------------------23.24 Lbs**
  - **Unmating**
    - **Min --------------------------------------16.40 Lbs**
    - **Max-------------------------------------22.87 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min --------------------------------------18.20 Lbs**
    - **Max-------------------------------------25.23 Lbs**
  - **Unmating**
    - **Min --------------------------------------17.78 Lbs**
    - **Max-------------------------------------24.78 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min --------------------------------------20.17 Lbs**
    - **Max-------------------------------------26.72 Lbs**
  - **Unmating**
    - **Min --------------------------------------19.64 Lbs**
    - **Max-------------------------------------25.89 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min --------------------------------------22.15 Lbs**
    - **Max-------------------------------------28.10 Lbs**
  - **Unmating**
    - **Min --------------------------------------22.01 Lbs**
    - **Max-------------------------------------26.66 Lbs**

RESULTS Continued

PTF-105-01-L-D/PTT-105-01-L-D

- **Initial**
    - **Mating**
        - **Min** ----------------------------------- **1.57 Lbs**
        - **Max** ----------------------------------- **1.89 Lbs**
    - **Unmating**
        - **Min** ----------------------------------- **1.43 Lbs**
        - **Max** ----------------------------------- **1.94 Lbs**
- **After 25 Cycles**
    - **Mating**
        - **Min** ----------------------------------- **1.73 Lbs**
        - **Max** ----------------------------------- **2.81 Lbs**
    - **Unmating**
        - **Min** ----------------------------------- **1.67 Lbs**
        - **Max** ----------------------------------- **2.74 Lbs**
- **After 50 Cycles**
    - **Mating**
        - **Min** ----------------------------------- **1.91 Lbs**
        - **Max** ----------------------------------- **2.96 Lbs**
    - **Unmating**
        - **Min** ----------------------------------- **1.80 Lbs**
        - **Max** ----------------------------------- **2.80 Lbs**
- **After 75 Cycles**
    - **Mating**
        - **Min** ----------------------------------- **2.12 Lbs**
        - **Max** ----------------------------------- **3.02 Lbs**
    - **Unmating**
        - **Min** ----------------------------------- **2.03 Lbs**
        - **Max** ----------------------------------- **2.91 Lbs**
- **After 100 Cycles**
    - **Mating**
        - **Min** ----------------------------------- **2.37 Lbs**
        - **Max** ----------------------------------- **3.05 Lbs**
    - **Unmating**
        - **Min** ----------------------------------- **2.13 Lbs**
        - **Max** ----------------------------------- **2.98 Lbs**

Normal force:

Signal pin at 0.0027 Inch deflections

- **Initial**
    - **Min** -- **114.90 gf**   **Set ----- 0.0000 Inch**
    - **Max** --------------------------------------- **133.30 gf**   **Set ----- 0.0002 Inch**
- **Thermal**
    - **Min** -- **78.40 gf**   **Set ----- 0.0001 Inch**
    - **Max** --------------------------------------- **100.70 gf**   **Set ----- 0.0009 Inch**

RESULTS Continued

Compliant pin Insertion/Withdraw Forces

PTF -HASL-0.027"
- **Initial**
  - **Mating**
    - **Min ------------------------------------- 7.58 Lbs**
    - **Max------------------------------------- 8.89 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 3.53 Lbs**
    - **Max------------------------------------- 5.51 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ------------------------------------- 5.78 Lbs**
    - **Max------------------------------------- 9.71 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 3.52 Lbs**
    - **Max------------------------------------- 5.01 Lbs**

PTF -HASL-0.033"
- **Initial**
  - **Mating**
    - **Min ------------------------------------- 4.25 Lbs**
    - **Max------------------------------------- 5.89 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 2.68 Lbs**
    - **Max------------------------------------- 3.54 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ------------------------------------- 4.23 Lbs**
    - **Max------------------------------------- 5.34 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 3.00 Lbs**
    - **Max------------------------------------- 3.70 Lbs**

PTF -ENIG-0.033"
- **Initial**
  - **Mating**
    - **Min ------------------------------------- 4.91 Lbs**
    - **Max------------------------------------- 5.90 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 1.15 Lbs**
    - **Max------------------------------------- 3.37 Lbs**
- **After 3 Cycles**
  - **Mating**
    - **Min ------------------------------------- 4.37 Lbs**
    - **Max------------------------------------- 5.01 Lbs**
  - **Unmating**
    - **Min ------------------------------------- 2.68 Lbs**
    - **Max------------------------------------- 4.84 Lbs**

RESULTS Continued

PTT -HASL-0.027"
- **Initial**
    - **Mating**
        - **Min ------------------------------------10.70 Lbs**
        - **Max------------------------------------12.48 Lbs**
    - **Unmating**
        - **Min ------------------------------------ 7.10 Lbs**
        - **Max------------------------------------ 8.88 Lbs**
- **After 3 Cycles**
    - **Mating**
        - **Min ------------------------------------ 9.00 Lbs**
        - **Max------------------------------------11.92 Lbs**
    - **Unmating**
        - **Min ------------------------------------ 5.30 Lbs**
        - **Max------------------------------------ 7.67 Lbs**

PTT-HASL-0.033"
- **Initial**
    - **Mating**
        - **Min ------------------------------------ 7.35 Lbs**
        - **Max------------------------------------ 9.63 Lbs**
    - **Unmating**
        - **Min ------------------------------------ 5.09 Lbs**
        - **Max------------------------------------ 7.82 Lbs**
- **After 3 Cycles**
    - **Mating**
        - **Min ------------------------------------ 5.68 Lbs**
        - **Max------------------------------------ 8.38 Lbs**
    - **Unmating**
        - **Min ------------------------------------ 3.28 Lbs**
        - **Max------------------------------------ 5.92 Lbs**

PTT -ENIG-0.033"
- **Initial**
    - **Mating**
        - **Min ------------------------------------ 7.79 Lbs**
        - **Max------------------------------------ 9.09 Lbs**
    - **Unmating**
        - **Min ------------------------------------ 3.37 Lbs**
        - **Max------------------------------------ 6.57 Lbs**
- **After 3 Cycles**
    - **Mating**
        - **Min ------------------------------------ 6.08 Lbs**
        - **Max------------------------------------ 7.89 Lbs**
    - **Unmating**
        - **Min ------------------------------------ 2.14 Lbs**
        - **Max------------------------------------ 4.09 Lbs**

RESULTS Continued

LLCR Durability (192 pin LLCR test points)
- **Initial** --**4.53 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 Durability-compliant pin (30 pin LLCR test points)
PTF ENIG 0.033"
- **Initial** --**0.18 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms** ---------------------------------- **30 Points** ----------------------- **Stable**
  - **>+1.0 mOhms** --**0 Points** ----------------------- **Unstable**
- **After humidity**
  - **<= +1.0 mOhms** ---------------------------------- **30 Points** ----------------------- **Stable**
  - **>+1.0 mOhms** --**0 Points** ----------------------- **Unstable**

PTT ENIG 0.033"
- **Initial** --**0.18 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms** ---------------------------------- **30 Points** ----------------------- **Stable**
  - **>+1.0 mOhms** --**0 Points** ----------------------- **Unstable**
- **After humidity**
  - **<= +1.0 mOhms** ---------------------------------- **30 Points** ----------------------- **Stable**
  - **>+1.0 mOhms** --**0 Points** ----------------------- **Unstable**

LLCR Thermal Aging (192 pin LLCR test points)
- **Initial** --**5.73 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**

RESULTS Continued

LLCR Thermal Aging (30 compliant pin LLCR test points)
PTF ENIG 0.033"
- **Initial** ---**0.18 mOhms Max**
- **After thermal shock**
  - o **<= +1.0 mOhms** ------------------------------- **30 Points** ----------------------- **Stable**
  - o **>+1.0 mOhms** ---------------------------------------**0 Points** ----------------------- **Unstable**
- **After humidity**
  - o **<= +1.0 mOhms** ------------------------------- **30 Points** ----------------------- **Stable**
  - o **>+1.0 mOhms** ---------------------------------------**0 Points** ----------------------- **Unstable**

PTT ENIG 0.033"
- **Initial** ---**0.17 mOhms Max**
- **After thermal shock**
  - o **<= +1.0 mOhms** ------------------------------- **30 Points** ----------------------- **Stable**
  - o **>+1.0 mOhms** ---------------------------------------**0 Points** ----------------------- **Unstable**
- **After humidity**
  - o **<= +1.0 mOhms** ------------------------------- **30 Points** ----------------------- **Stable**
  - o **>+1.0 mOhms** ---------------------------------------**0 Points** ----------------------- **Unstable**

LLCR Gas Tight (192 pin LLCR test points)
- **Initial** ---**4.67 mOhms Max**
- **Gas-Tight**
  - o **<= +5.0 mOhms** -------------------------------- **192 Points** ----------------------- **Stable**
  - o **+5.1 to +10.0 mOhms** ---------------------------------**0 Points** ----------------------- **Minor**
  - o **+10.1 to +15.0 mOhms** --------------------------------**0 Points** ----------------------- **Acceptable**
  - o **+15.1 to +50.0 mOhms** --------------------------------**0 Points** ----------------------- **Marginal**
  - o **+50.1 to +2000 mOhms** -------------------------------**0 Points** ----------------------- **Unstable**
  - o **>+2000 mOhms** --------------------------------------**0 Points** ----------------------- **Open Failure**

LLCR Gas Tight (30 compliant pin LLCR test points)
PTF ENIG 0.033"
- **Initial** ---**0.17 mOhms Max**
- **After thermal shock**
  - o **<= +1.0 mOhms** ------------------------------- **30 Points** ----------------------- **Stable**
  - o **>+1.0 mOhms** ---------------------------------------**0 Points** ----------------------- **Unstable**
- **After humidity**
  - o **<= +1.0 mOhms** ------------------------------- **30 Points** ----------------------- **Stable**
  - o **>+1.0 mOhms** ---------------------------------------**0 Points** ----------------------- **Unstable**

PTT ENIG 0.033"
- **Initial** ---**0.18 mOhms Max**
- **After thermal shock**
  - o **<= +1.0 mOhms** ------------------------------- **30 Points** ----------------------- **Stable**
  - o **>+1.0 mOhms** ---------------------------------------**0 Points** ----------------------- **Unstable**
- **After humidity**
  - o **<= +1.0 mOhms** ------------------------------- **30 Points** ----------------------- **Stable**
  - o **>+1.0 mOhms** ---------------------------------------**0 Points** ----------------------- **Unstable**

RESULTS Continued

LLCR Shock Vib (192 pin LLCR test points)

- **Initial** --**4.75 mOhms Max**
- **S&V**
  - **<= +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 Shock Vib (30 compliant pin LLCR test points)

PTF ENIG 0.033"

- **Initial** ---**0.13 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms** --------------------------------- **30 Points** ----------------------- **Stable**
  - **>+1.0 mOhms** --**0 Points** ----------------------- **Unstable**
- **After humidity**
  - **<= +1.0 mOhms** --------------------------------- **30 Points** ----------------------- **Stable**
  - **>+1.0 mOhms** --**0 Points** ---------------------- **Unstable**

PTT ENIG 0.033"

- **Initial** ---**0.10 mOhms Max**
- **After thermal shock**
  - **<= +1.0 mOhms** --------------------------------- **30 Points** ----------------------- **Stable**
  - **>+1.0 mOhms** --**0 Points** ---------------------- **Unstable**
- **After humidity**
  - **<= +1.0 mOhms** --------------------------------- **30 Points** ----------------------- **Stable**
  - **>+1.0 mOhms** --**0 Points** ---------------------- **Unstable**

Mechanical Shock & Random Vibration:

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

RESULTS Continued

Insulation Resistance minimums, IR

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

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

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage**-------------------------------- **1000 VAC**
  - **Test Voltage** -------------------------------------**750 VAC**
  - **Working Voltage** ----------------------------------**250 VAC**

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

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

DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

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

337665
2 (2x1) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 4.5 Amps
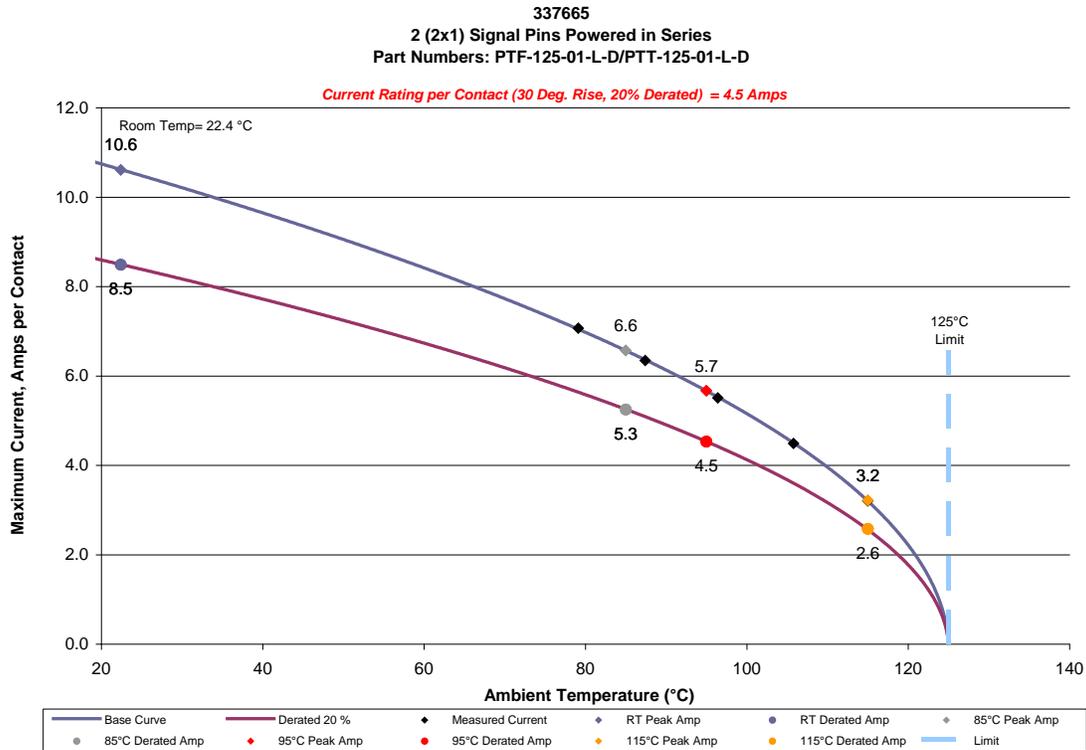
DATA SUMMARIES

337665
2 (2x1) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D
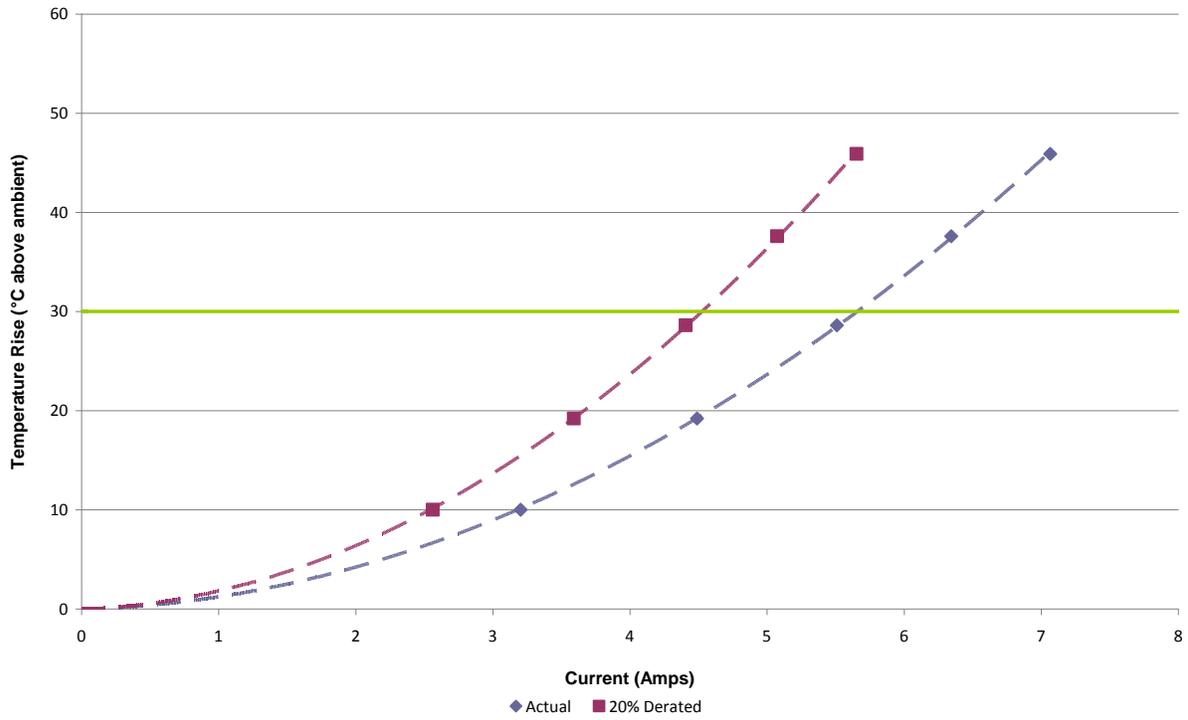
DATA SUMMARIES

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

337665
4 (2x2) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 3.5 Amps

337665
4 (2x2) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D
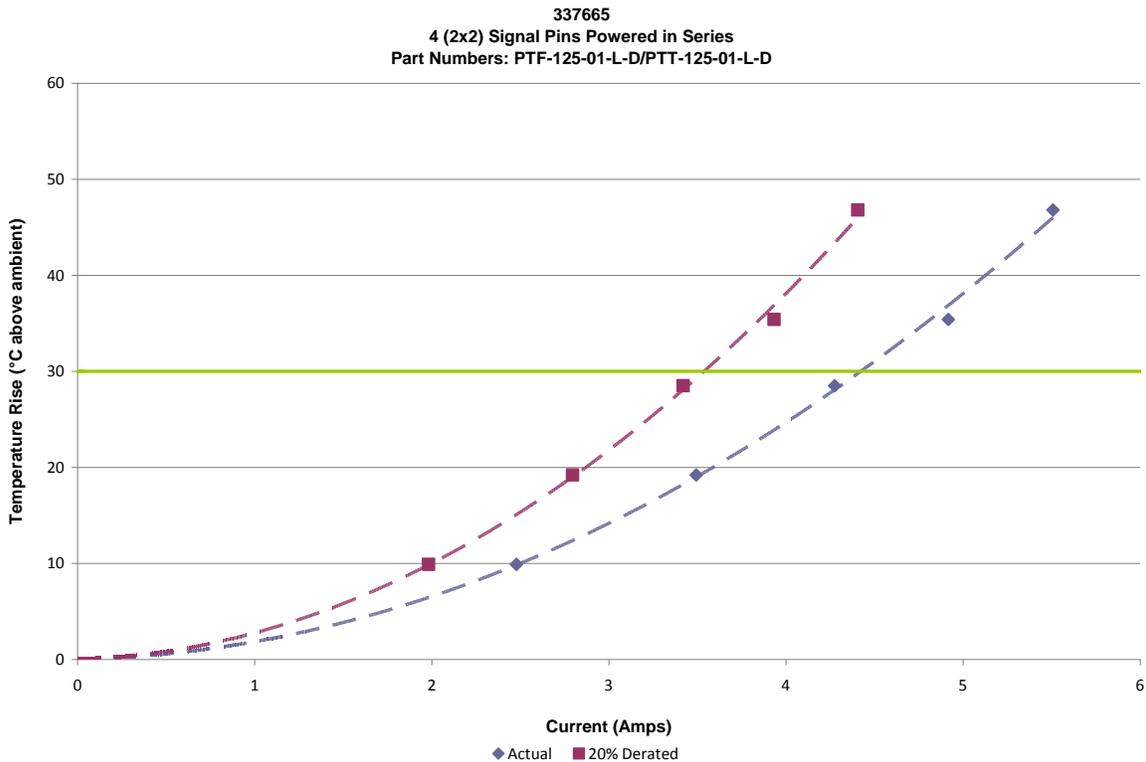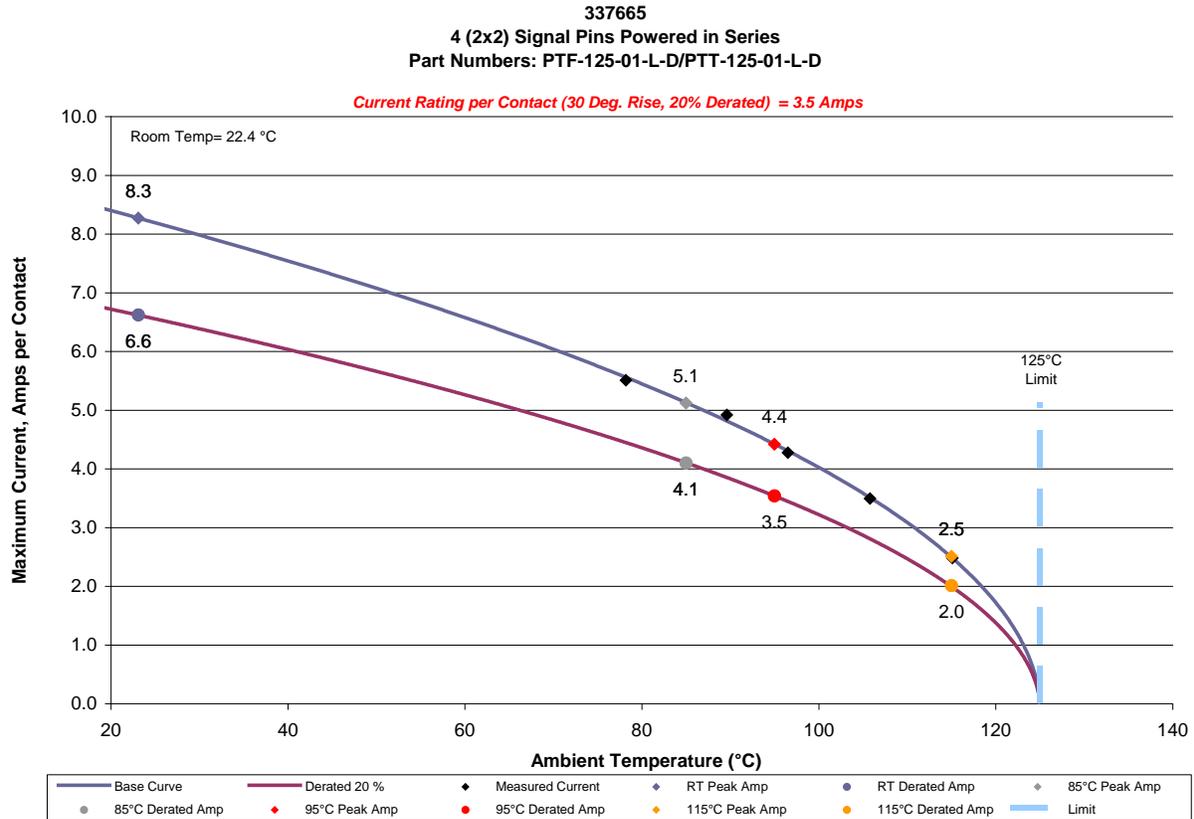
DATA SUMMARIES

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

337665
6 (2x3) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D
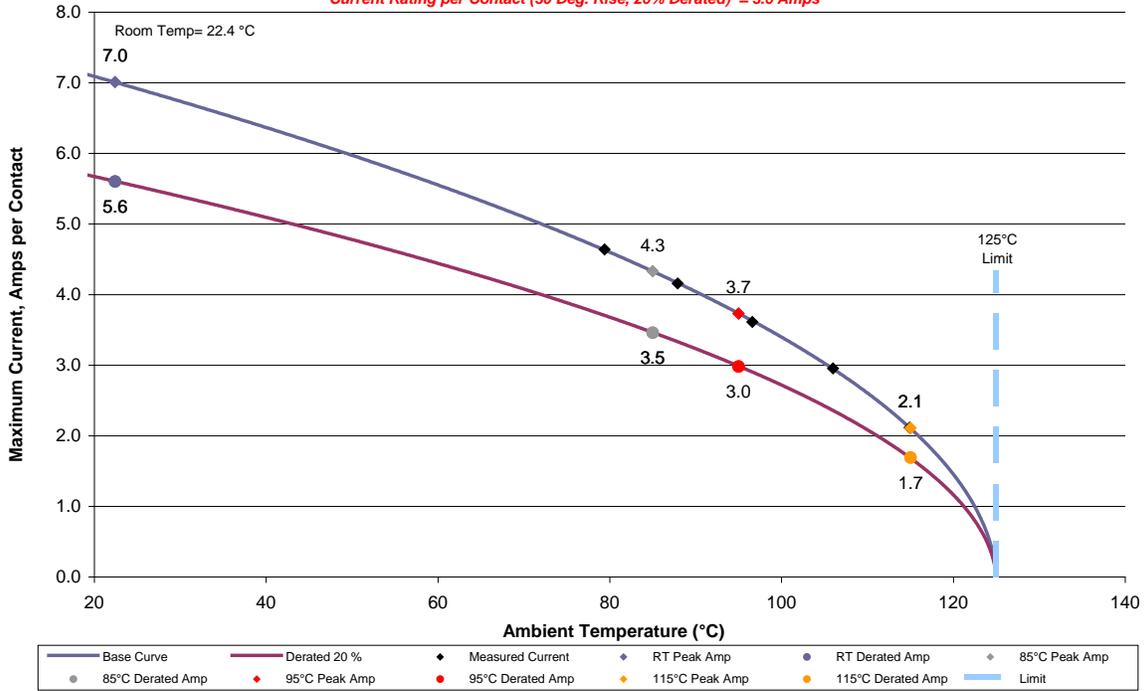
337665
6 (2x3) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D
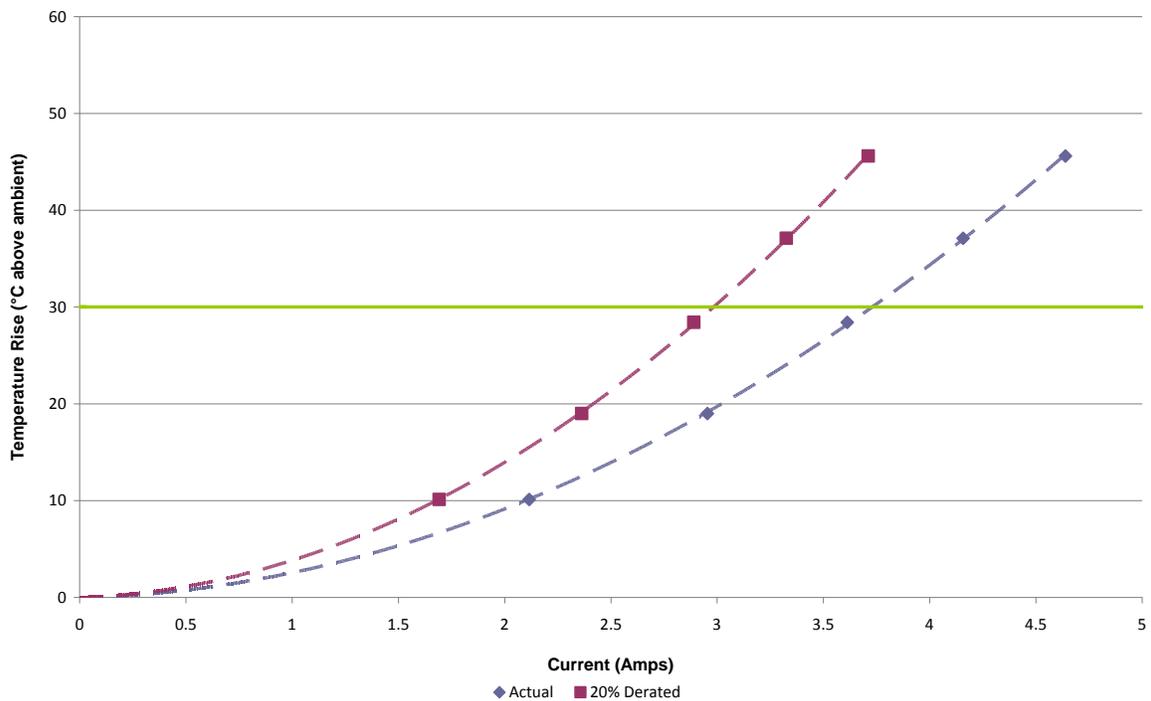
DATA SUMMARIES

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

337665
8 (2x4) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 2.8 Amps

337665
8 (2x4) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D
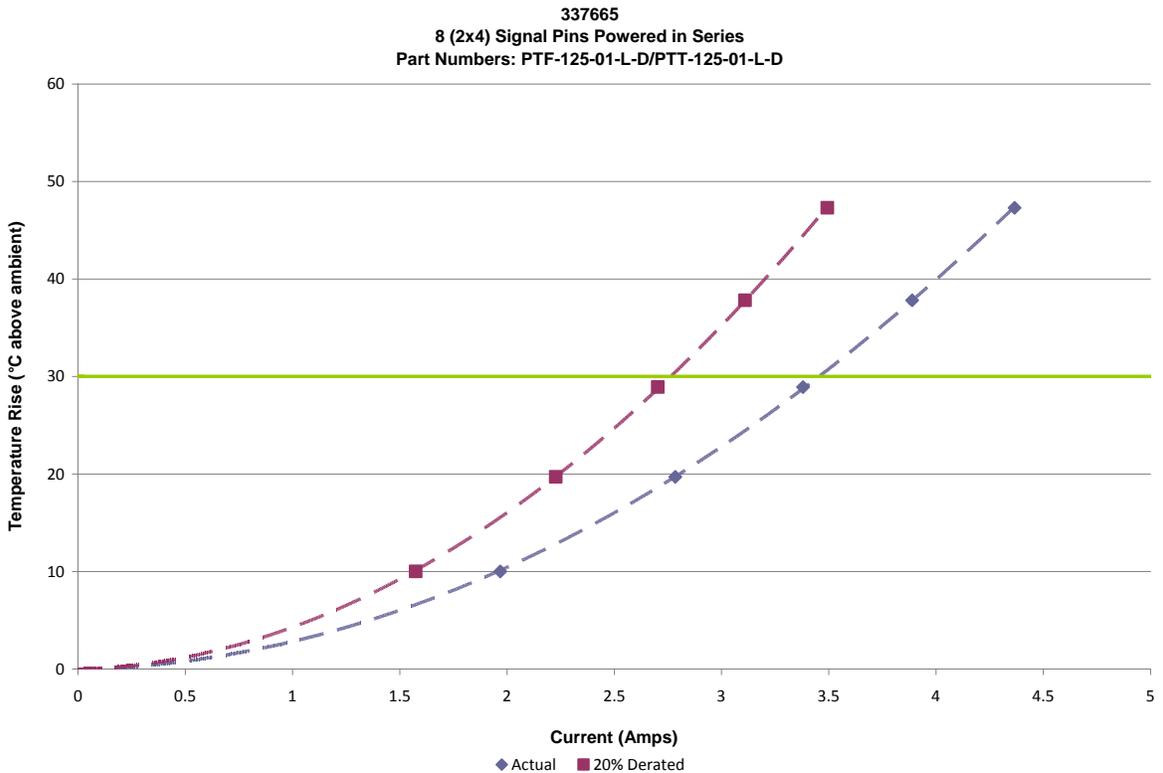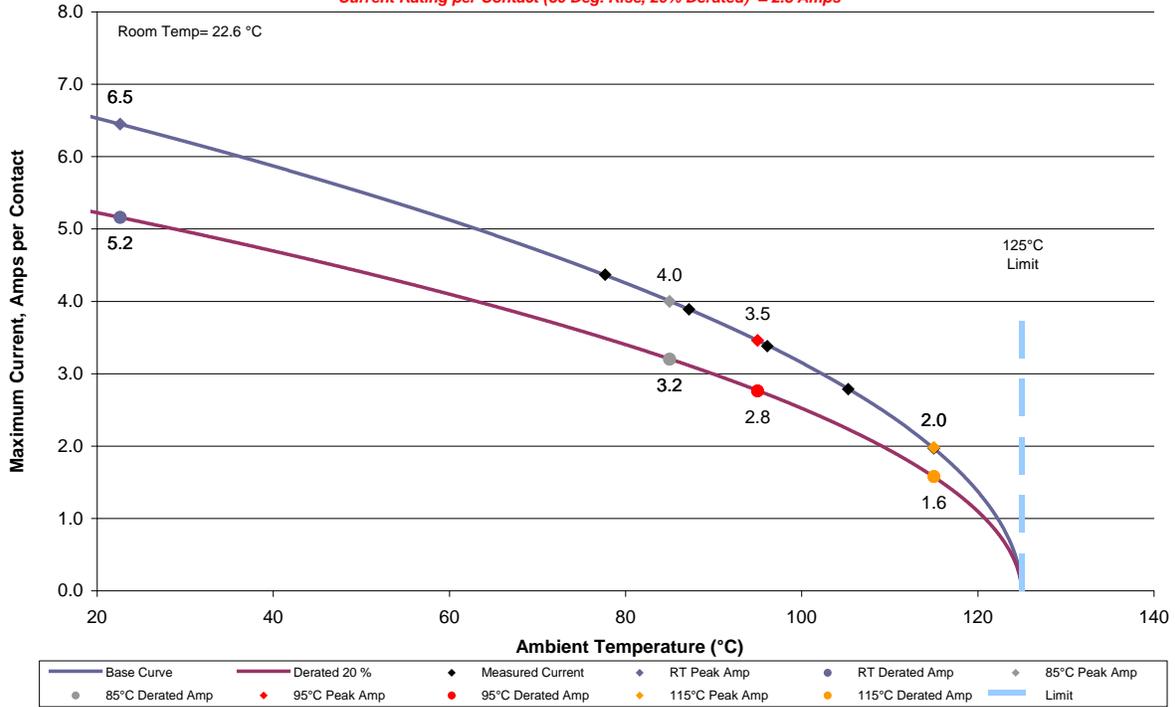
DATA SUMMARIES

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

337665
All (2x25) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D
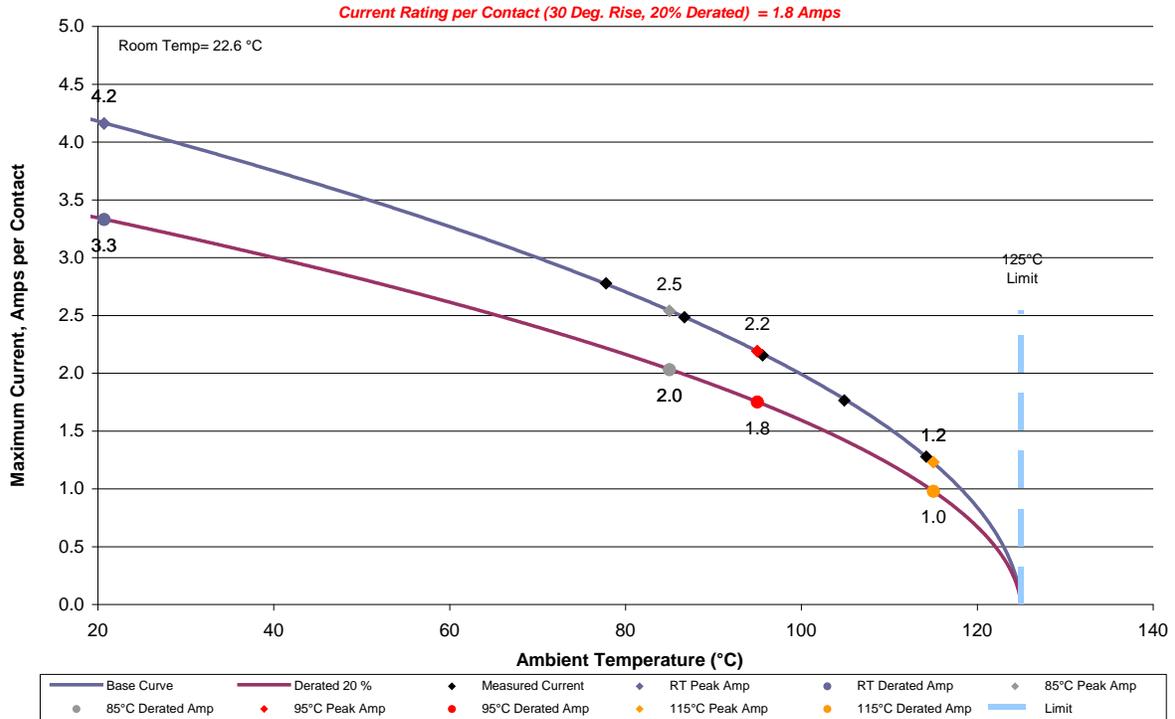
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.8 Amps

337665
All (2x25) Signal Pins Powered in Series
Part Numbers: PTF-125-01-L-D/PTT-125-01-L-D
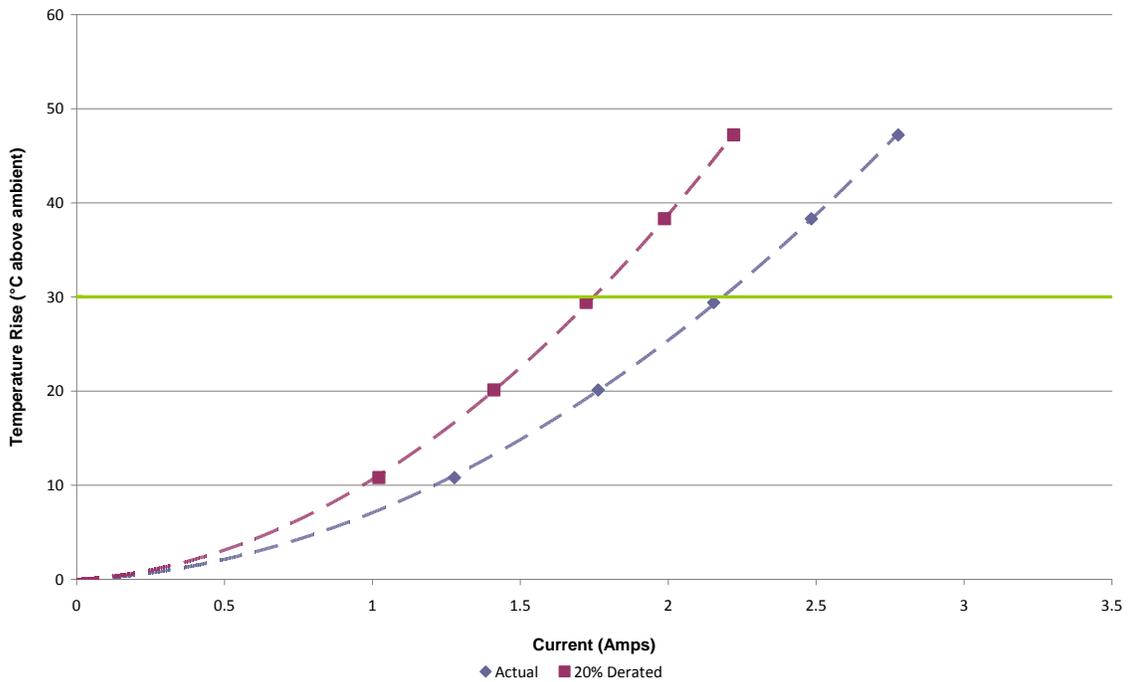
DATA SUMMARIES

MATING/UNMATING FORCE:

Thermal aging (PTF-125-01-L-D/PTT-125-01-L-D)**:**

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	34.87	7.84	35.01	7.87	27.93	6.28	23.57	5.30
Maximum	41.14	9.25	41.01	9.22	37.59	8.45	36.78	8.27
Average	37.67	**8.47**	37.55	**8.44**	33.02	**7.42**	31.29	**7.04**
St Dev	2.38	0.54	1.87	0.42	2.87	0.65	4.43	1.00
Count	8	8	8	8	8	8	8	8

Mating/Unmating durability(PTF-125-01-L-D/PTT-125-01-L-D)**:**

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	33.67	7.57	32.92	7.40	38.25	8.60	40.25	9.05
Maximum	50.66	11.39	48.75	10.96	60.27	13.55	54.58	12.27
Average	40.80	**9.17**	40.50	**9.11**	48.36	**10.87**	46.33	**10.42**
St Dev	5.29	1.19	6.10	1.37	7.92	1.78	5.08	1.14
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	48.79	10.97	46.48	10.45	53.58	12.05	50.40	11.33
Maximum	68.28	15.35	57.33	12.89	72.64	16.33	60.67	13.64
Average	55.06	**12.38**	51.21	**11.51**	59.73	**13.43**	55.54	**12.49**
St Dev	7.02	1.58	3.94	0.89	6.84	1.54	3.88	0.87
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	58.80	13.22	52.80	11.87	45.77	10.29	41.14	9.25
Maximum	76.64	17.23	65.39	14.70	50.89	11.44	49.24	11.07
Average	64.23	**14.44**	59.37	**13.35**	48.29	**10.86**	47.00	**10.57**
St Dev	6.29	1.41	4.32	0.97	1.87	0.42	2.59	0.58
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

Mating & Unmating basic:

PTF-150-01-L-D/PTT-150-01-L-D

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	82.96	18.65	64.76	14.56	73.66	16.56	72.95	16.40
Maximum	93.01	20.91	88.92	19.99	103.37	23.24	101.73	22.87
Average	88.22	**19.83**	81.30	**18.28**	94.42	**21.23**	91.27	**20.52**
St Dev	3.77	0.85	7.58	1.70	9.66	2.17	8.58	1.93
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	80.95	18.20	79.09	17.78	89.72	20.17	87.36	19.64
Maximum	112.22	25.23	110.22	24.78	118.85	26.72	115.16	25.89
Average	102.98	**23.15**	99.89	**22.46**	110.73	**24.89**	105.51	**23.72**
St Dev	10.34	2.32	9.28	2.09	9.78	2.20	8.52	1.91
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	98.52	22.15	97.90	22.01
Maximum	124.99	28.10	118.58	26.66
Average	116.92	**26.29**	111.18	**25.00**
St Dev	8.41	1.89	6.85	1.54
Count	8	8	8	8

DATA SUMMARIES Continued

PTF-105-01-L-D/PTT-105-01-L-D

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	6.98	1.57	6.36	1.43	7.70	1.73	7.43	1.67
Maximum	8.41	1.89	8.63	1.94	12.50	2.81	12.19	2.74
Average	7.58	**1.71**	7.34	**1.65**	8.91	**2.00**	8.85	**1.99**
St Dev	0.52	0.12	0.91	0.20	1.58	0.36	1.61	0.36
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	8.50	1.91	8.01	1.80	9.43	2.12	9.03	2.03
Maximum	13.17	2.96	12.45	2.80	13.43	3.02	12.94	2.91
Average	9.87	**2.22**	9.79	**2.20**	10.89	**2.45**	10.76	**2.42**
St Dev	1.65	0.37	1.65	0.37	1.43	0.32	1.64	0.37
Count	8	8	8	8	8	8	8	8

	After 100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	10.54	2.37	9.47	2.13
Maximum	13.57	3.05	13.26	2.98
Average	11.79	**2.65**	11.56	**2.60**
St Dev	1.18	0.26	1.33	0.30
Count	8	8	8	8

DATA SUMMARIES Continued

Mating/Unmating Data for 5, 25 and 50 Position PTF/PTT
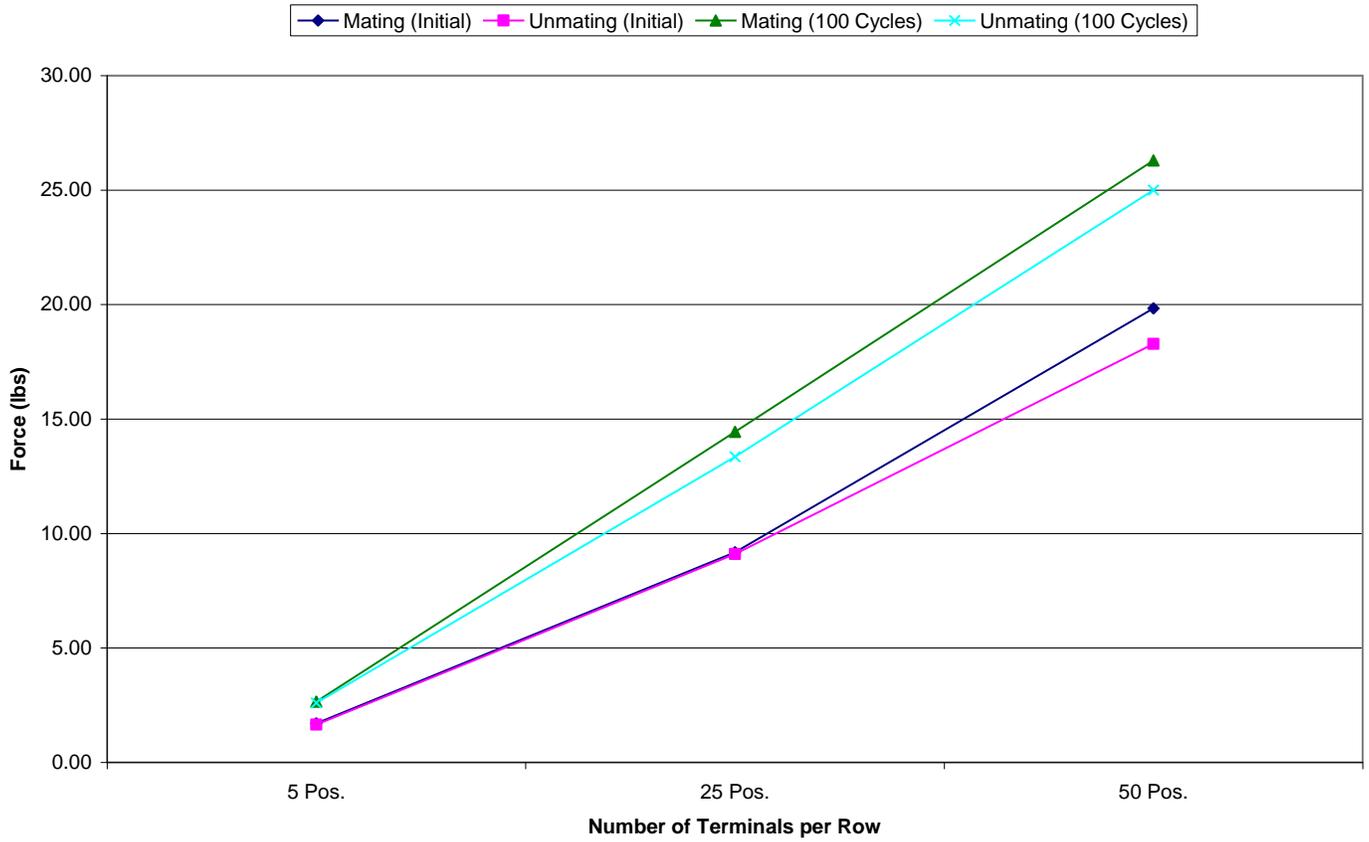
DATA SUMMARIES Continued

Normal force:

Initial	Deflections in inches Forces in Grams										
	0.0003	**0.0005**	**0.0008**	**0.0011**	**0.0014**	**0.0016**	**0.0019**	**0.0022**	**0.0024**	**0.0027**	*SET*
Averages	10.08	23.06	37.43	46.59	60.53	74.58	83.38	96.77	111.05	123.56	0.0000
Min	0.10	9.20	22.40	32.60	47.40	62.10	76.80	89.00	101.00	114.90	0.0000
Max	14.60	30.40	46.10	54.80	71.80	85.00	95.30	109.30	124.70	133.30	0.0002
St. Dev	5.101	5.767	6.922	6.125	6.299	5.781	5.252	5.448	5.633	4.791	0.0001
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflections in inches Forces in Grams										
	0.0003	**0.0005**	**0.0008**	**0.0011**	**0.0014**	**0.0016**	**0.0019**	**0.0022**	**0.0024**	**0.0027**	*SET*
Averages	0.03	0.39	1.93	4.69	21.07	36.37	47.45	61.86	77.12	91.17	0.0007
Min	-0.10	-0.10	-0.10	-0.10	11.40	25.10	38.20	49.00	66.60	78.40	0.0001
Max	0.50	4.30	15.00	22.20	37.90	50.90	59.40	75.10	86.10	100.70	0.0009
St. Dev	0.172	1.243	4.658	7.046	7.916	8.226	7.147	7.909	6.929	6.176	0.0002
Count	12	12	12	12	12	12	12	12	12	12	12

Normal Force - Average Initial vs Average Thermal
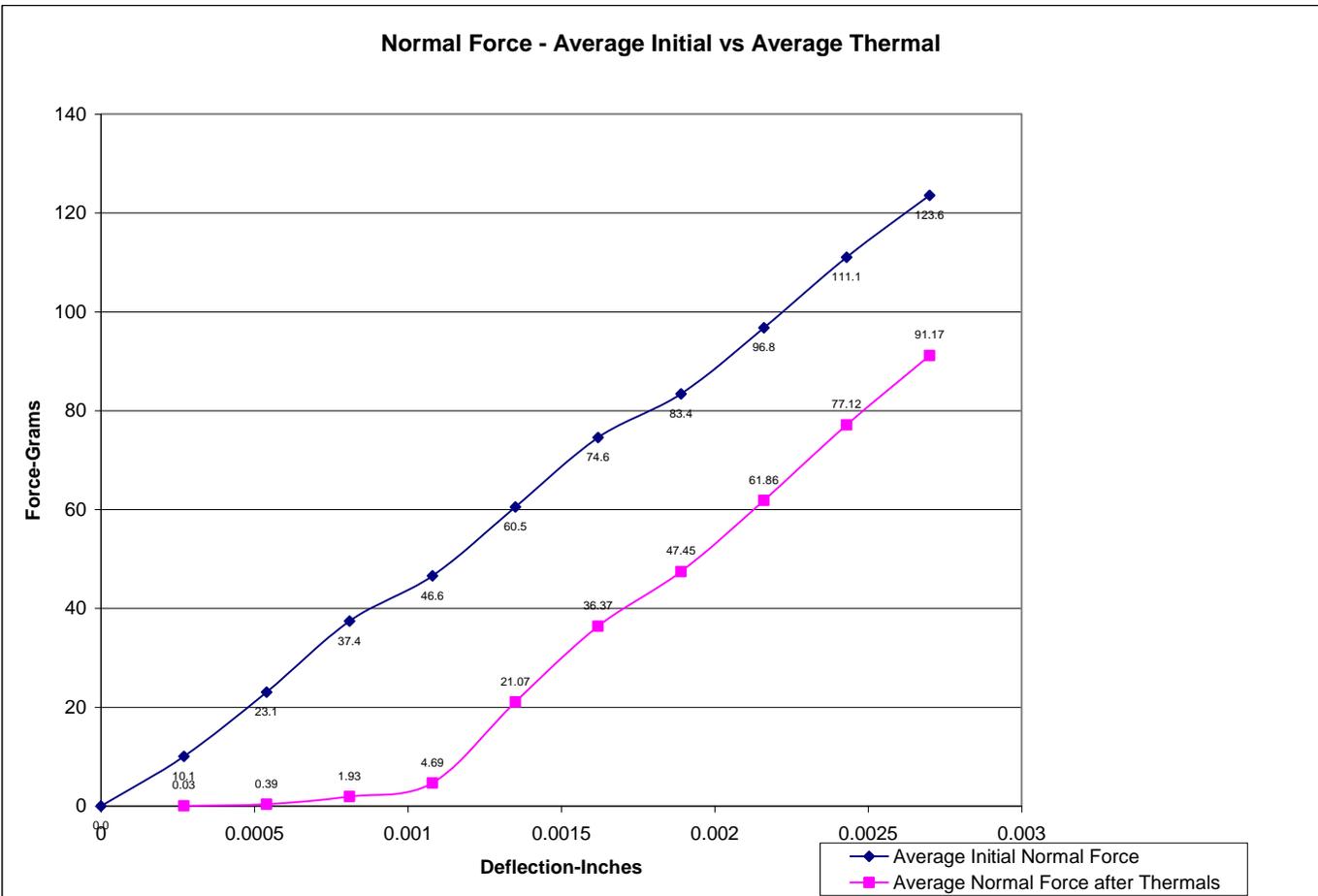
DATA SUMMARIES Continued

Compliant pin Insertion/withdraw force:
PTF- HASL 0.027" C-159

Cycle 1		Cycle 3	
Insertion Force Summary		**Insertion Force Summary**	
Minimum	7.58	Minimum	5.78
Maximum	8.89	Maximum	9.71
Average	8.27	Average	7.10
St. Dev.	0.33	St. Dev.	0.67

Cycle 1		Cycle 3	
Retention Force Summary		**Retention Force Summary**	
Minimum	3.53	Minimum	3.52
Maximum	5.51	Maximum	5.01
Average	4.76	Average	4.41
St. Dev.	0.48	St. Dev.	0.39

PTF- HASL 0.033" C-159

Cycle 1		Cycle 3	
Insertion Force Summary		**Insertion Force Summary**	
Minimum	4.25	Minimum	4.23
Maximum	5.89	Maximum	5.34
Average	5.11	Average	4.71
St. Dev.	0.38	St. Dev.	0.25

Cycle 1		Cycle 3	
Retention Force Summary		**Retention Force Summary**	
Minimum	3.00	Minimum	2.68
Maximum	3.70	Maximum	3.54
Average	3.31	Average	3.13
St. Dev.	0.19	St. Dev.	0.21

PTF- ENIG 0.033" C-159

Cycle 1		Cycle 3	
Insertion Force Summary		**Insertion Force Summary**	
Minimum	4.91	Minimum	4.37
Maximum	5.90	Maximum	5.01
Average	5.32	Average	4.69
St. Dev.	0.23	St. Dev.	0.17

Cycle 1		Cycle 3	
Retention Force Summary		**Retention Force Summary**	
Minimum	1.15	Minimum	2.68
Maximum	3.37	Maximum	4.84
Average	2.40	Average	3.54
St. Dev.	0.60	St. Dev.	0.47

DATA SUMMARIES Continued

Compliant pin summary graph- PTF

Single Compliant Termination and Retention Force For Various Finishes

Linear regression used to generate ENIG upper and lower limits
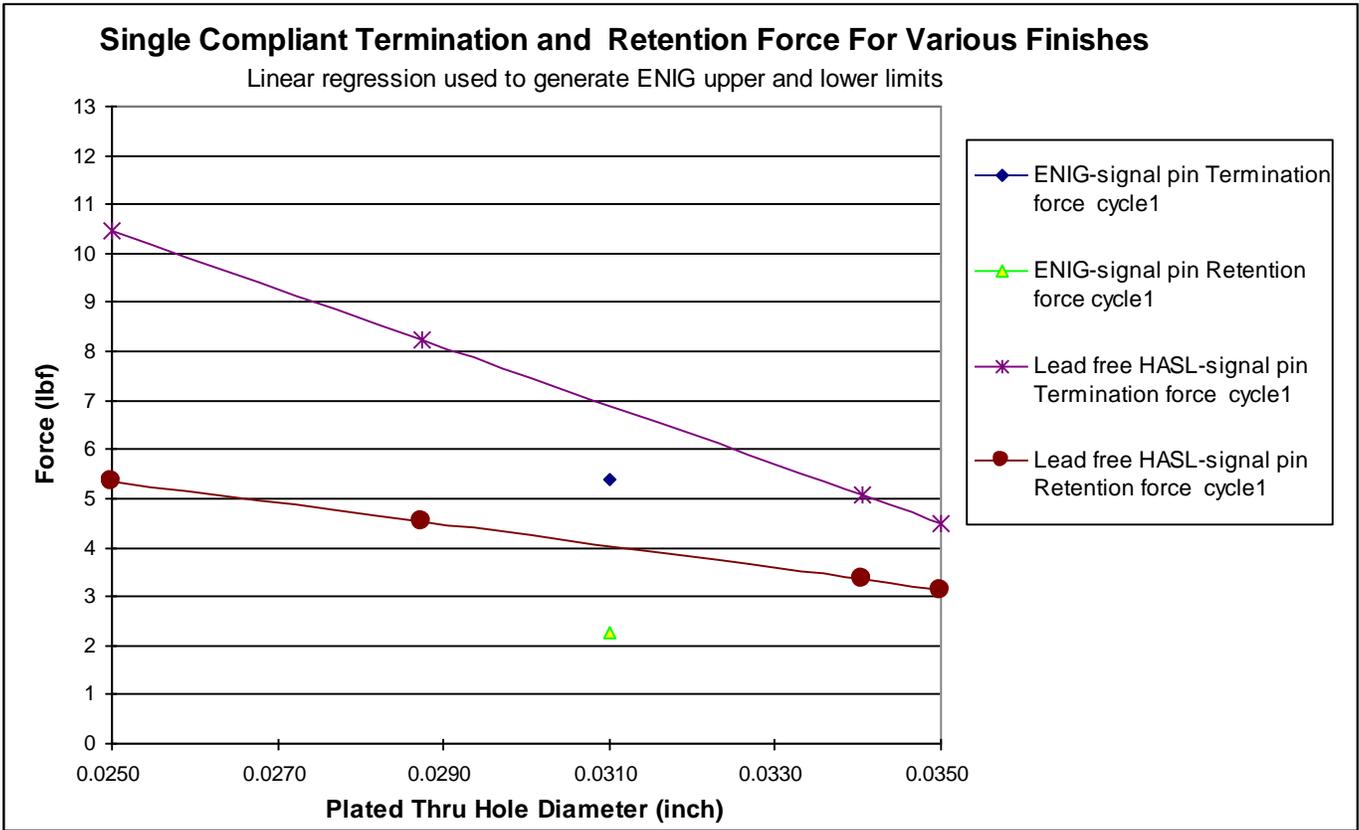
DATA SUMMARIES Continued

PTT-HASL 0.027" T-1S47

Cycle 1		Cycle 3	
Insertion Force Summary		**Insertion Force Summary**	
Minimum	10.70	Minimum	9.00
Maximum	12.48	Maximum	11.92
Average	11.87	Average	10.37
St. Dev.	0.45	St. Dev.	0.65
Cycle 1		Cycle 3	
Retention Force Summary		**Retention Force Summary**	
Minimum	7.10	Minimum	5.30
Maximum	8.88	Maximum	7.67
Average	8.06	Average	6.78
St. Dev.	0.51	St. Dev.	0.56

PTT-HASL 0.033" T-1S47

Cycle 1		Cycle 3	
Insertion Force Summary		**Insertion Force Summary**	
Minimum	7.35	Minimum	5.68
Maximum	9.63	Maximum	8.38
Average	8.45	Average	7.17
St. Dev.	0.47	St. Dev.	0.61
Cycle 1		Cycle 3	
Retention Force Summary		**Retention Force Summary**	
Minimum	5.09	Minimum	3.28
Maximum	7.82	Maximum	5.92
Average	6.23	Average	4.99
St. Dev.	0.74	St. Dev.	0.53

PTT-ENIG 0.033" T-1S47

Cycle 1		Cycle 3	
Insertion Force Summary		**Insertion Force Summary**	
Minimum	7.79	Minimum	6.08
Maximum	9.09	Maximum	7.89
Average	8.30	Average	7.10
St. Dev.	0.37	St. Dev.	0.45
Cycle 1		Cycle 3	
Retention Force Summary		**Retention Force Summary**	
Minimum	3.37	Minimum	2.14
Maximum	6.57	Maximum	4.09
Average	4.51	Average	3.27
St. Dev.	0.57	St. Dev.	0.50

DATA SUMMARIES Continued

Compliant pin summary graph- PTT

Single Compliant Termination and Retention Force For Various Finishes
Linear regression used to generate ENIG upper and lower limits
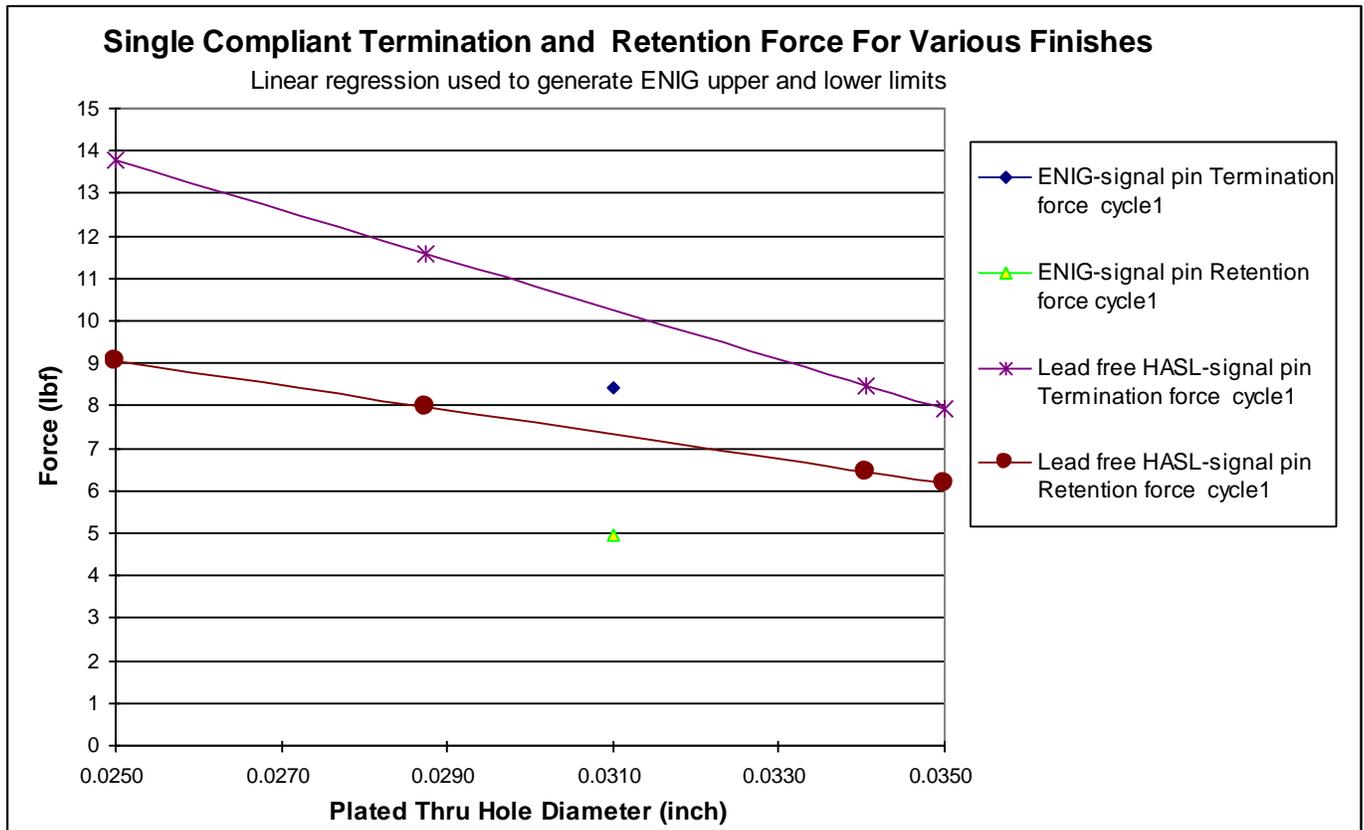
DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	PTF/PTT	PTF	PTT
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

	Row to Row		
	Mated	Unmated	Unmated
Minimum	PTF/PTT	PTF	PTT
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	PTF/PTT
Break Down Voltage	1000
Test Voltage	750
Working Voltage	250

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

DATA SUMMARIES Continued

LLCR Durabiltiy:

1) A total of 192 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:----------------------------- Stable
   b. +5.1 to +10.0 mOhms:--------------------- Minor
   c. +10.1 to +15.0 mOhms: -------------------- Acceptable
   d. +15.1 to +50.0 mOhms: -------------------- Marginal
   e. +50.1 to +2000 mOhms -------------------- Unstable
   f. >+2000 mOhms:----------------------------- Open Failure
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only
   a. <= +1.0 mOhms:----------------------------- Stable
   b. > +1.0 mOhms: ----------------------------- Unstable

	LLCR Measurement Summaries by Pin Type			
Date	11/4/2014	11/6/2014	11/26/2014	12/10/2014
Room Temp (Deg C)	22	22	22	23
Rel Humidity (%)	56	47	52	54
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	4.07	0.11	0.15	0.16
St. Dev.	0.14	0.10	0.15	0.16
Min	3.82	0.00	0.00	0.00
Max	4.53	0.56	1.07	0.82
Summary Count	192	192	192	192
Total Count	192	192	192	192

	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

PTF Compliant LLCR (ENIG 0.033"):

	LLCR Measurement Summaries by Pin Type			
Date	11/4/2014		11/26/2014	12/10/2014
Room Temp (Deg C)	22		21	22
Rel Humidity (%)	56		51	54
Technician	Peter Chen		Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	0.12		0.04	0.05
St. Dev.	0.33		0.03	0.03
Min	0.07		0.00	0.01
Max	0.18		0.09	0.11
Summary Count	30		30	30
Total Count	30		30	30

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Therm Shck	30	0	0	0	0	0
Humidity	30	0	0	0	0	0

PTT Compliant LLCR (ENIG 0.033"):

	LLCR Measurement Summaries by Pin Type			
Date	11/4/2014		11/26/2014	12/10/2014
Room Temp (Deg C)	22		21	23
Rel Humidity (%)	56		51	54
Technician	Peter Chen		Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	0.13		0.04	0.04
St. Dev.	0.24		0.03	0.03
Min	0.10		0.00	0.00
Max	0.18		0.09	0.12
Summary Count	30		30	30
Total Count	30		30	30

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Therm Shck	30	0	0	0	0	0
Humidity	30	0	0	0	0	0

Tracking Code: 337665_Report_Rev_1	Part #: PTF-125-01-L-D/PTT-125-01-L-D
Part description: PTF/PTT	

DATA SUMMARIES Continued

LLCR thermal aging

1) A total of 192 points were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   - a. <= +5.0 mOhms:----------------------------- Stable
   - b. +5.1 to +10.0 mOhms:---------------------- Minor
   - c. +10.1 to +15.0 mOhms: -------------------- Acceptable
   - d. +15.1 to +50.0 mOhms: -------------------- Marginal
   - e. +50.1 to +2000 mOhms -------------------- Unstable
   - f. >+2000 mOhms:----------------------------- Open Failure
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only
   - a. <= +1.0 mOhms:----------------------------- Stable
   - b. > +1.0 mOhms: ----------------------------- Unstable

	LLCR Measurement Summaries by Pin Type			
Date	11/7/2014	11/24/2014		
Room Temp (Deg C)	22	21		
Rel Humidity (%)	48	54		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	4.06	0.18		
St. Dev.	0.24	0.24		
Min	3.43	0.00		
Max	5.73	1.69		
Summary Count	192	192		
Total Count	192	192		

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

PTF Compliant LLCR (ENIG 0.033"):

	LLCR Measurement Summaries by Pin Type			
Date	11/6/2014	11/24/2014		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	56	53		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.12	0.03		
St. Dev.	0.03	0.02		
Min	0.07	0.00		
Max	0.18	0.07		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category					
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Thermal	30	0	0	0	0	0

PTT Compliant LLCR (ENIG 0.033"):

	LLCR Measurement Summaries by Pin Type			
Date	11/6/2014	11/24/2014		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	56	52		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.12	0.03		
St. Dev.	0.02	0.02		
Min	0.08	0.00		
Max	0.17	0.09		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category					
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Thermal	30	0	0	0	0	0

Tracking Code: 337665_Report_Rev_1	Part #: PTF-125-01-L-D/PTT-125-01-L-D
Part description: PTF/PTT	

DATA SUMMARIES Continued

LLCR GAS TIGHT:

1) A total of 192 points were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   - a. <= +5.0 mOhms:----------------------------- Stable
   - b. +5.1 to +10.0 mOhms:---------------------- Minor
   - c. +10.1 to +15.0 mOhms: -------------------- Acceptable
   - d. +15.1 to +50.0 mOhms: -------------------- Marginal
   - e. +50.1 to +2000 mOhms: ------------------- Unstable
   - f. >+2000 mOhms:----------------------------- Open Failure
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only
   - a. <= +1.0 mOhms:----------------------------- Stable
   - b. > +1.0 mOhms: ----------------------------- Unstable

	LLCR Measurement Summaries by Pin Type			
Date	11/13/2014	11/20/2014		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	54	54		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual**	**Delta**	**Delta**	**Delta**
	Initial	**Acid Vapor**		
	Pin Type 1: Signal			
Average	4.05	0.28		
St. Dev.	0.17	0.15		
Min	3.64	0.01		
Max	4.67	0.77		
Summary Count	192	192		
Total Count	192	192		

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

PTF Compliant LLCR (ENIG 0.033" C-159):

	LLCR Measurement Summaries by Pin Type			
Date	11/13/2014	11/20/2014		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	54	51		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.12	0.03		
St. Dev.	0.02	0.02		
Min	0.08	0.00		
Max	0.17	0.09		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**30**	**0**	**0**	**0**	**0**	**0**

PTT Compliant LLCR (ENIG 0.033" T-1S47):

	LLCR Measurement Summaries by Pin Type			
Date	11/13/2014	11/20/2014		
Room Temp (Deg C)	23	21		
Rel Humidity (%)	54	51		
Technician	Peter Chen	Peter Chen		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.12	0.04		
St. Dev.	0.03	0.02		
Min	0.07	0.00		
Max	0.18	0.09		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Acid Vapor	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock Vib:
1) A total of 192 points were measured
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   - a.   <= +5.0 mOhms:----------------------------- Stable
   - b.   +5.1 to +10.0 mOhms:---------------------- Minor
   - c.   +10.1 to +15.0 mOhms: -------------------- Acceptable
   - d.   +15.1 to +50.0 mOhms: -------------------- Marginal
   - e.   +50.1 to +2000 mOhms: ------------------- Unstable
   - f.   >+2000 mOhms:----------------------------- Open Failure
5) The following guidelines are used to categorize the changes in LLCR for compliant pin only
   - c.   <= +1.0 mOhms:----------------------------- Stable
   - d.   > +1.0 mOhms: ----------------------------- Unstable

	LLCR Measurement Summaries by Pin Type			
Date	2/26/2015	3/5/2015		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	36	36		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	4.00	0.05		
St. Dev.	0.14	0.05		
Min	3.60	0.00		
Max	4.75	0.31		
Summary Count	192	192		
Total Count	192	192		

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

DATA SUMMARIES Continued

PTF Compliant LLCR (ENIG 0.033"):

	LLCR Measurement Summaries by Pin Type			
Date	2/26/2015	3/5/2015		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	36	36		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.05	0.02		
St. Dev.	0.02	0.01		
Min	0.02	0.00		
Max	0.13	0.05		
Summary Count	29	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**30**	**0**	**0**	**0**	**0**	**0**

PTT Compliant LLCR (ENIG 0.033"):

	LLCR Measurement Summaries by Pin Type			
Date	2/26/2015	3/5/2015		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	36	36		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	0.04	0.01		
St. Dev.	0.03	0.01		
Min	0.01	0.00		
Max	0.10	0.05		
Summary Count	30	30		
Total Count	30	30		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**30**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Shock Vibration Event Detection:

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

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-HPM-01
Description: IR/DWV Tester
Manufacturer: AN9636H
Model: AN9636H
Serial #: 089601091
Accuracy: Last Cal: 2014-7-6, Next Cal: 2015-7-5

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 2014-4-28, Next Cal: 2015-4-27

Equipment #: HZ-OV-01
Description: Oven
Manufacturer: Huida
Model: CS101-1E
Serial #: CS101-1E-B
Accuracy: Last Cal: 2014-12-14, Next Cal: 2015-12-13

Equipment #: HZ-THC-01
Description: Humidity transmitter
Manufacturer: Thermtron
Model: HMM30C
Serial #: D0240037
Accuracy: Last Cal: 2014-3-3, Next Cal: 2015-3-2

Equipment #: HZ-TSC-01
Description: Thermal Shock transmitter
Manufacturer: CSZ
Model: 10-VT14994
Serial #: VTS-3-6-6-SC/AC
Accuracy: Last Cal: 2014-11-1, Next Cal: 2015-11-1

Equipment #: HZ-MO-05
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 3706
Serial #: 297288
Accuracy: Last Cal: 2014-8-6, Next Cal: 2015-8-5

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-02
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0780546
Accuracy: Last Cal: 2014-6-16, Next Cal: 2015-6-16

Equipment #: PS-01
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 3329A-07330
Accuracy: Last Cal: 2014-6-12, Next Cal: 2015-6-12

Equipment #: PS-02
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 2847A-04167
Accuracy: Last Cal: 2014-6-12, Next Cal: 2015-6-12

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 2014-11-31, Next Cal: 2015-11-31

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 2014-07-9, Next Cal: 2015-7-9

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 2014-06-4, Next Cal: 2015-06-4