



Project Number: MTCA		Tracking Code: TC0811-MTCA-1625	
Requested by: Corey Rose		Date: 3/11/2008	Product Rev: 0
Part #: MTCA-085-02-S-DV		Lot #: 03/11/08	Tech: Gary Lomax, Rodney Riley, & Jerry Smallwood
Part description: Micro TCA			Qty to test: 60
Test Start: 03/11/2008	Test Completed: 5/20/2008		

DESIGN VERIFICATION TESTING REPORT

PART DESCRIPTION

MTCA-085-02-S-DV

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: Test in-house DVT and Qualification at Contech Research per the supplied test plans. MTCA Test Plan (2-29-08) Contech & MTCA Test Plan (2-29-08) IN-HOUSE.

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-101165-TST-01

Tracking Code: TC0811-MTCA-1625	Part #: MTCA-085-02-S-DV
Part description: Micro TCA	

FLOWCHARTS

Gas Tight

TEST STEP	GROUP A 200 Points (min)
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36

LLCR = EIA-364-23, LLCR

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

Current Carrying Capacity

3 Mated Assemblies Each

CONTACTS

TEST STEP	GROUP A 3 Mated Assemblies 1 CONTACT POWERED	GROUP B 3 Mated Assemblies 2 CONTACTS POWERED	GROUP C 3 Mated Assemblies 3 CONTACTS POWERED	GROUP D 3 Mated Assemblies 4 CONTACTS POWERED	GROUP E 3 Mated Assemblies ALL CONTACTS POWERED
01	CCC	CCC	CCC	CCC	CCC

(TIN PLATING) - Tabulate calculated current at RT, 65° C, 75° C and 95° C
after derating 20% and based on 105° C

(GOLD PLATING) - Tabulate calculated current at RT, 85° C, 95° C and 115° C
after derating 20% and based on 105° C

CCC, Temp rise = EIA-364-70

GROUND POSITIONS

TEST STEP	GROUP A 3 Mated Assemblies 2 GROUND POSITIONS POWERED	GROUP B 3 Mated Assemblies ALL GROUND POSITIONS POWERED
01	CCC	CCC

(TIN PLATING) - Tabulate calculated current at RT, 65° C, 75° C and 95° C
after derating 20% and based on 105° C

(GOLD PLATING) - Tabulate calculated current at RT, 85° C, 95° C and 115° C
after derating 20% and based on 125° C

CCC, Temp rise = EIA-364-70

Mating/Unmating/Normal Force

TEST STEP	GROUP A 10 Boards 100 Cycles	GROUP B1 Individual Contacts (30) min	GROUP B2 Individual Contacts (30) min
01	Contact Meas.	Setup Approve	Setup Approve
02	Mating / Unmating	Normal Force	Thermal Aging (Mated)
03	Data Review	Data Review	Normal Force
04	100 Cycles		
05	Mating / Unmating		
06	Contact Meas.		
07	Data Review		
08	Thermal Aging (Mated)		
09	Mating / Unmating		
10	Contact Meas.		
11	Data Review		
12	Humidity (Mated)		
13	Mating / Unmating		
14	Contact Meas.		

Thermal Aging = EIA-364-17, Test Condition 4, 105 deg C;

Time Condition 'B' (250 hours)

Humidity = EIA-364-31, Test Condition 'B' (240 Hours)

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

ambient pre-condition and delete steps 7a and 7b

Mating/Un-Mating Forces = EIA-364-13

Normal Force = EIA-364-04

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

FLOWCHARTS Continued**IR / DWV**

TEST STEP	GROUP A 2 Boards Ambient	GROUP B1 2 Boards Ambient	GROUP B2 2 Boards Thermal	GROUP B3 2 Boards Humidity
01	IR	DWV/Working Voltage	Thermal Aging	Humidity
02	Data Review		DWV/Working Voltage	DWV/Working Voltage
03	Thermal Aging			
04	IR			
05	Data Review			
06	Humidity			
07	IR			

Thermal Aging = EIA-364-17, Test Condition 4, 105 deg C;

Time Condition 'B' (250 hours)

Humidity = EIA-364-31, Test Condition 'B' (240 Hours)

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

ambient pre-condition and delete steps 7a and 7b

IR = EIA-364-21

DWV = EIA-364-20

Durability/Thermal Age/Cyclic Humidity

TEST STEP	GROUP A 200 Points 100 Cycles
01	LLCR-1
02	Data Review
03	100 Cycles
04	LLCR-2
05	Data Review
06	Thermal Age
07	LLCR-3
08	Data Review
09	Cyclic Humidity
10	LLCR-4

Thermal Aging = EIA-364-17, Test Condition 4, 105 deg C;

Time Condition 'B' (250 hours)

Humidity = EIA-364-31, Test Condition 'B' (240 Hours)

and Method III (+25° C to +65° C @ 90%RH/98% RH)

ambient pre-condition and delete steps 7a and 7b

LLCR = EIA-364-23, LLCR

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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.

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. 80° C
 - c. 95° C
 - d. 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.

CONTACT GAPS:

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

MATING/UNMATING:

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

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

- 1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
- 2) The contacts shall be tested in the connector housing.
- 3) If necessary, a "window" shall be made in the connector body to allow a probe to engage and deflect the contact at the same attitude and distance (plus 0.05 mm [0.002"]) as would occur in actual use.
- 4) The connector housing shall be placed in a holding fixture that does not interfere with or otherwise influence the contact force or deflection.
- 5) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC², computer controlled test stand with a deflection measurement system accuracy of 5.0 µm (0.0002").
- 6) The nominal deflection rate shall be 5 mm (0.2")/minute.
- 7) Unless otherwise noted a minimum of five contacts shall be tested.
- 8) The force/deflection characteristic to load and unload each contact shall be repeated five times.
- 9) The system shall utilize the TC² software in order to acquire and record the test data.
- 10) The permanent set of each contact shall be measured within the TC² software.
- 11) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

INSULATION RESISTANCE (IR):

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

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

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).

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

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.

RESULTS

Temperature Rise, CCC at a 20% de-rating

- CCC for a 30°C Temperature Rise-----3.1A per contact with 1 contact powered
- CCC for a 30°C Temperature Rise-----2.3A per contact with 2 contacts powered
- CCC for a 30°C Temperature Rise-----2.3A per contact with 3 contacts powered
- CCC for a 30°C Temperature Rise-----1.8A per contact with 4 contacts powered
- CCC for a 30°C Temperature Rise-----0.9A per contact with 85 contacts powered
- CCC for a 30°C Temperature Rise-----3.9A per contact with 2 ground positions powered
- CCC for a 30°C Temperature Rise-----2.2A per contact with all ground positions powered

Contact Gaps

- Initial
 - Min-----0.015 in
 - Max-----0.026 in
- After 100 Cycles
 - Min-----0.020 in
 - Max-----0.031 in
- Thermal
 - Min-----0.030 in
 - Max-----0.040 in
- Humidity
 - Min-----0.029 in
 - Max-----0.039 in

Mating – Unmating Forces

- Initial
 - Mating
 - Min-----26.0
 - Max-----38.9
 - Unmating
 - Min-----4.8
 - Max-----9.6
- After 100 Cycles
 - Mating
 - Min-----26.2
 - Max-----36.2
 - Unmating
 - Min-----5.1
 - Max-----7.9
- Thermal
 - Mating
 - Min-----15.5
 - Max-----20.9
 - Unmating
 - Min-----7.1
 - Max-----10.2
- Humidity
 - Mating
 - Min-----15.3
 - Max-----20.0
 - Unmating
 - Min-----5.4
 - Max-----9.7

Signal #1**Normal Force at .004 deflection**

- **Initial**
 - o Min-----16.0 Set -----.0004
 - o Max -----28.1 Set -----.0012
- **Thermal**
 - o Min-----14.2
 - o Max -----27.5

Normal Force at .010 deflection

- **Initial**
 - o Min-----43.3 Set -----.0004
 - o Max -----69.1 Set -----.0012
- **Thermal**
 - o Min-----41.3
 - o Max -----66.8

Normal Force at .016 deflection

- **Initial**
 - o Min-----76.5 Set -----.0004
 - o Max -----108.7 Set -----.0012
- **Thermal**
 - o Min-----73.6
 - o Max -----103.8

Signal #2**Normal Force at .004 deflection**

- **Initial**
 - o Min-----17.9 Set -----.0003
 - o Max -----28.1 Set -----.0008
- **Thermal**
 - o Min-----12.9
 - o Max -----27.0

Normal Force at .010 deflection

- **Initial**
 - o Min-----46.0 Set -----.0003
 - o Max -----71.8 Set -----.0008
- **Thermal**
 - o Min-----36.1
 - o Max -----64.5

Normal Force at .016 deflection

- **Initial**
 - o Min-----81.2 Set -----.0003
 - o Max -----108.3 Set -----.0008
- **Thermal**
 - o Min-----60.8
 - o Max -----99.4

Ground**Normal Force at .009 deflection**

- **Initial**
 - Min-----37.6 Set -----.0004
 - Max -----62.6 Set -----.0012
- **Thermal**
 - Min-----42.6
 - Max -----56.6

Normal Force at .014 deflection

- **Initial**
 - Min-----74.4 Set -----.0004
 - Max -----104.6 Set -----.0012
- **Thermal**
 - Min-----81.1
 - Max -----95.7

Normal Force at .020 deflection

- **Initial**
 - Min-----104.3 Set -----.0004
 - Max -----140.0 Set -----.0012
- **Thermal**
 - Min-----106.6
 - Max -----128.8

Insulation Resistance minimums, IR

- **Initial**
 - Mated-----100,000 Meg Ω ----- Pass
 - Unmated -----100,000 Meg Ω
- **Thermal**
 - Mated-----100,000 Meg Ω
 - Unmated -----100,000 Meg Ω
- **Humidity**
 - Mated-----100,000 Meg Ω
 - Unmated -----100,000 Meg Ω

Dielectric Withstanding Voltage minimums, DWV

- **Initial**
 - **Breakdown**
 - Mated -----900 VAC
 - Unmated -----1200 VAC
 - **DWV**
 - Mated -----675 VAC
 - Unmated -----900 VAC
 - **Working voltage**
 - Mated -----225 VAC
 - Unmated -----300 VAC
- **Thermal**
 - **Breakdown**
 - Mated -----800 VAC
 - Unmated -----1200 VAC
 - **DWV**
 - Mated -----600 VAC
 - Unmated -----900 VAC

- o Working voltage
 - Mated -----200 VAC
 - Unmated-----300 VAC
- Humidity
 - o Breakdown
 - Mated -----875 VAC
 - Unmated-----1,050VAC
 - o DWV
 - Mated -----656.25 VAC
 - Unmated-----787.5 VAC
 - o Working voltage
 - Mated -----218.75 VAC
 - Unmated-----262.5 VAC

LLCR Durability (200 LLCR test points)

- Initial ----- 19.9 mOhms Max
- Durability, 100 Cycles
 - o <= +5.0 mOhms -----200 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
- Thermal
 - o <= +5.0 mOhms ----- 192 Points ----- Stable
 - o +5.1 to +10.0 mOhms -----7 Points ----- Minor
 - o +10.1 to +15.0 mOhms -----1 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
- Humidity
 - o <= +5.0 mOhms ----- 185 Points ----- Stable
 - o +5.1 to +10.0 mOhms ----- 12 Points ----- Minor
 - o +10.1 to +15.0 mOhms -----3 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

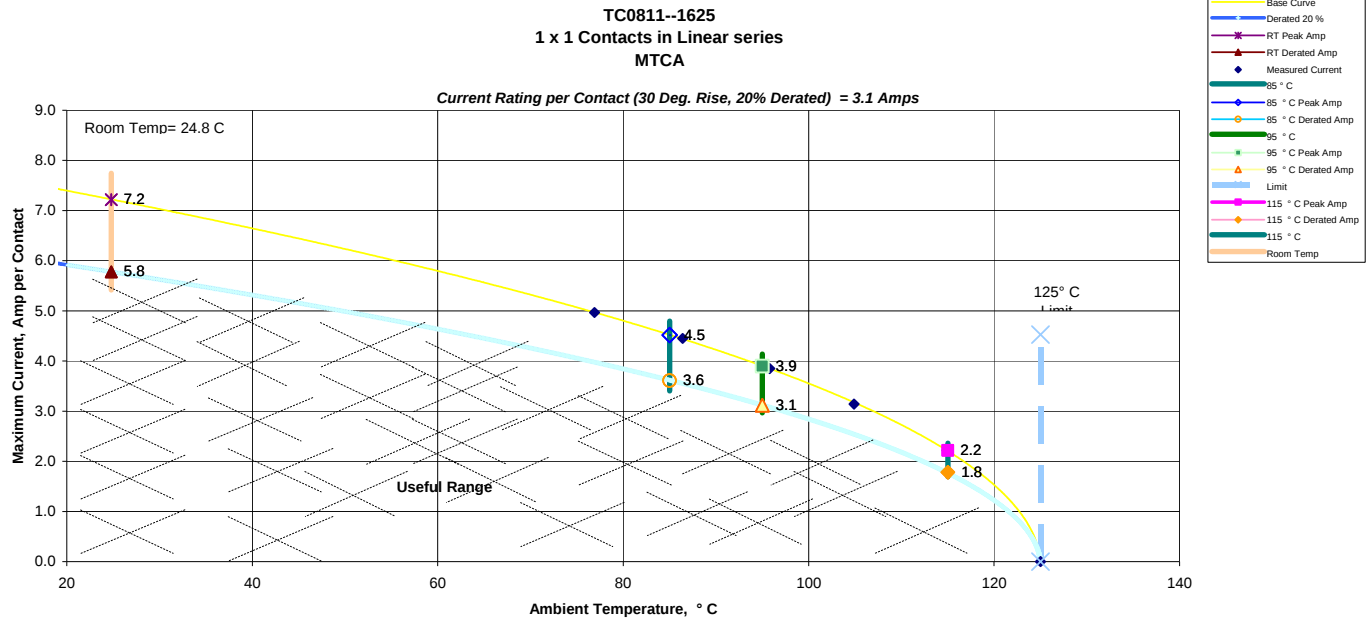
LLCR Gas Tight (125 LLCR test points)

- Initial ----- 19.8 mOhms Max
- Gas-Tight
 - o <= +5.0 mOhms ----- 123 Points ----- Stable
 - o +5.1 to +10.0 mOhms -----2 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

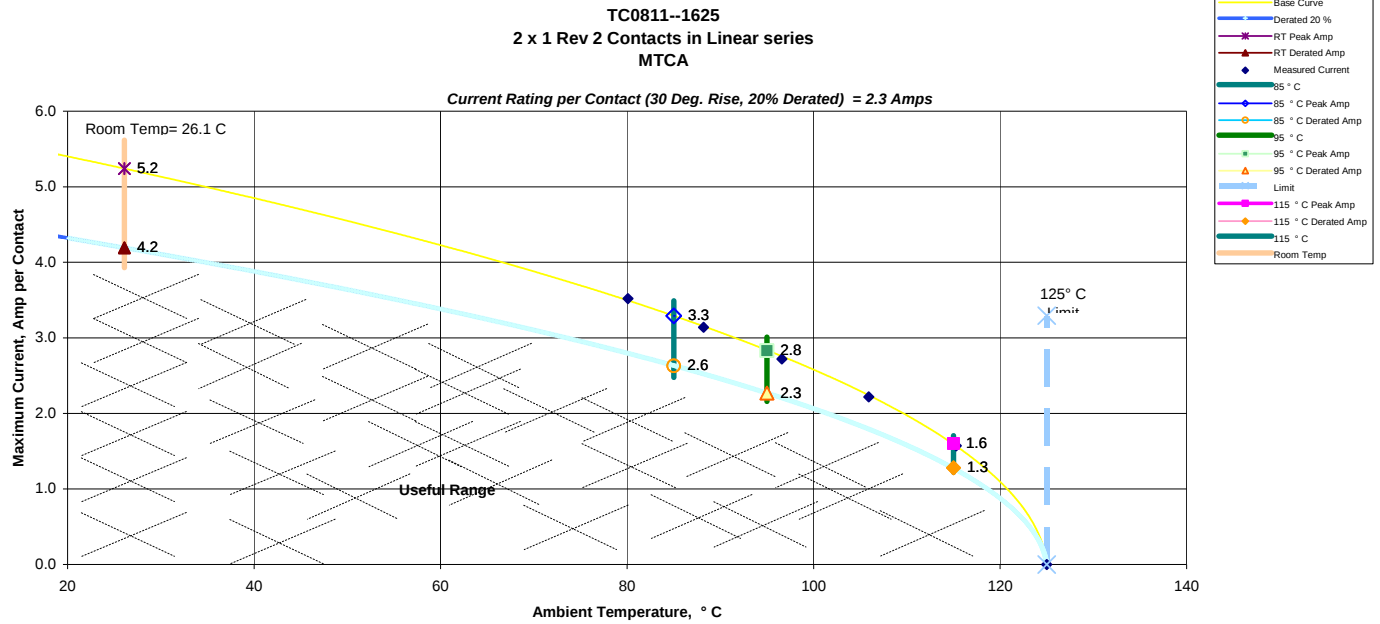
DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

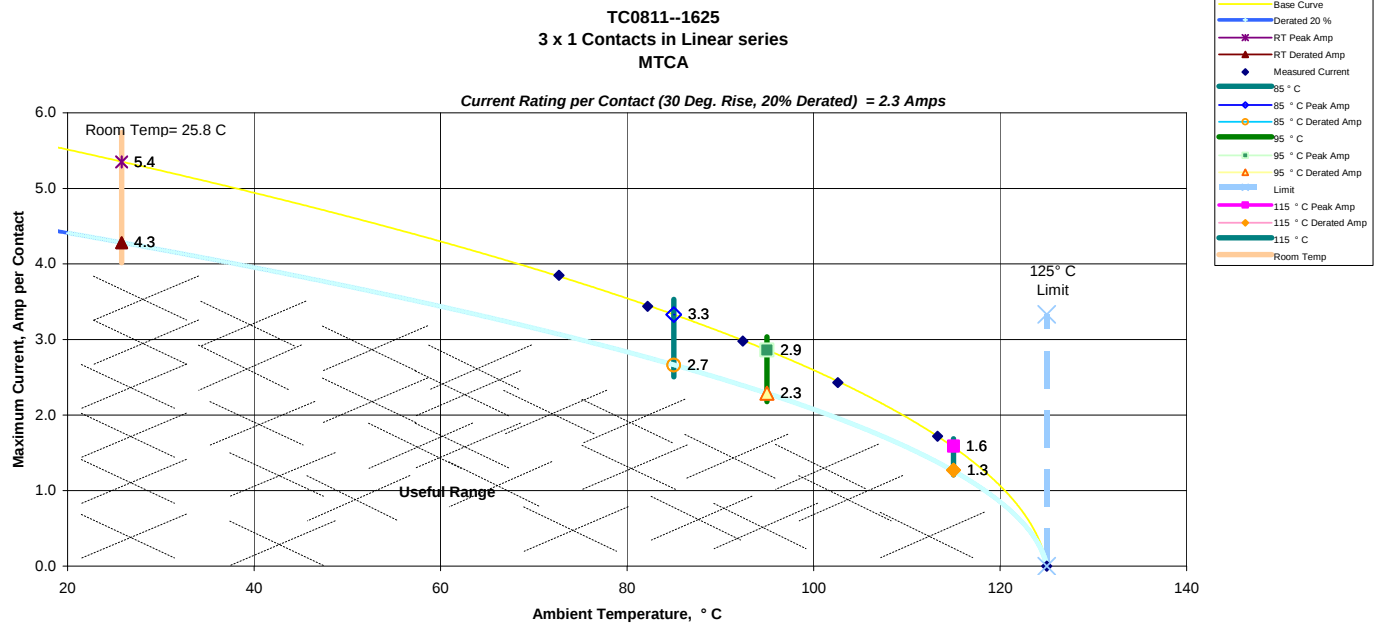
- 1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
- 2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
- 3) Temperature readings recorded are those for which three successive readings,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



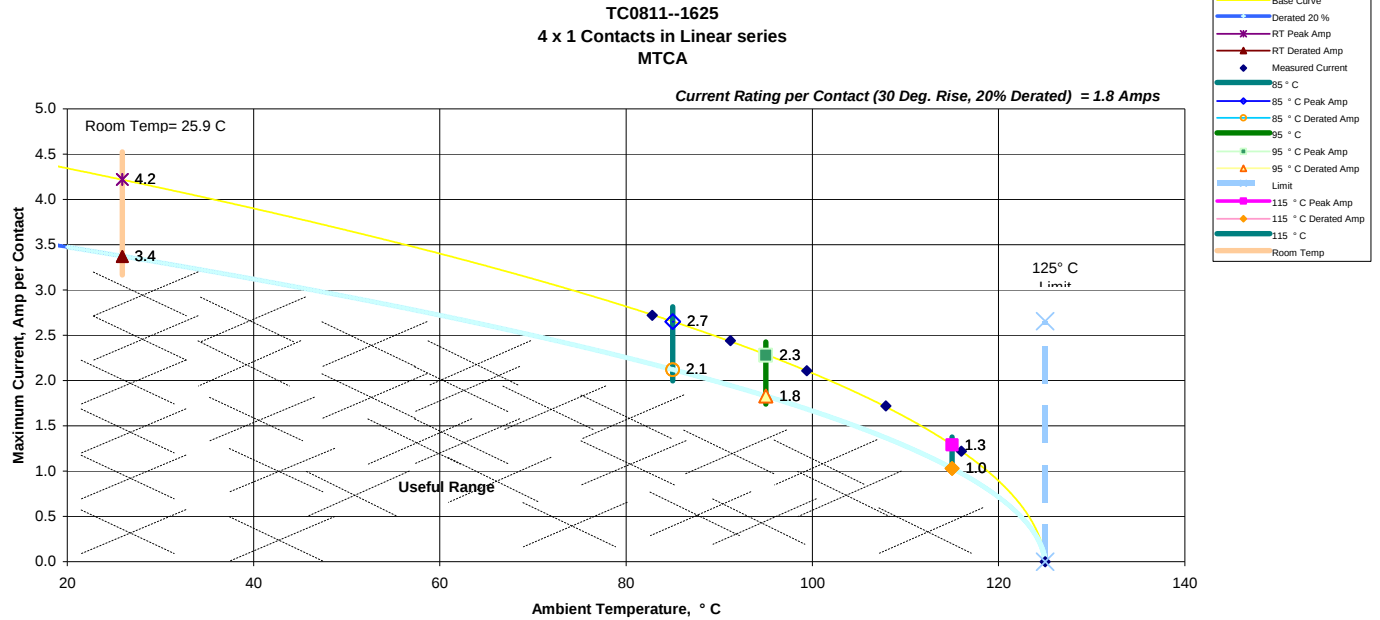
b. Linear configuration with 2 contacts powered



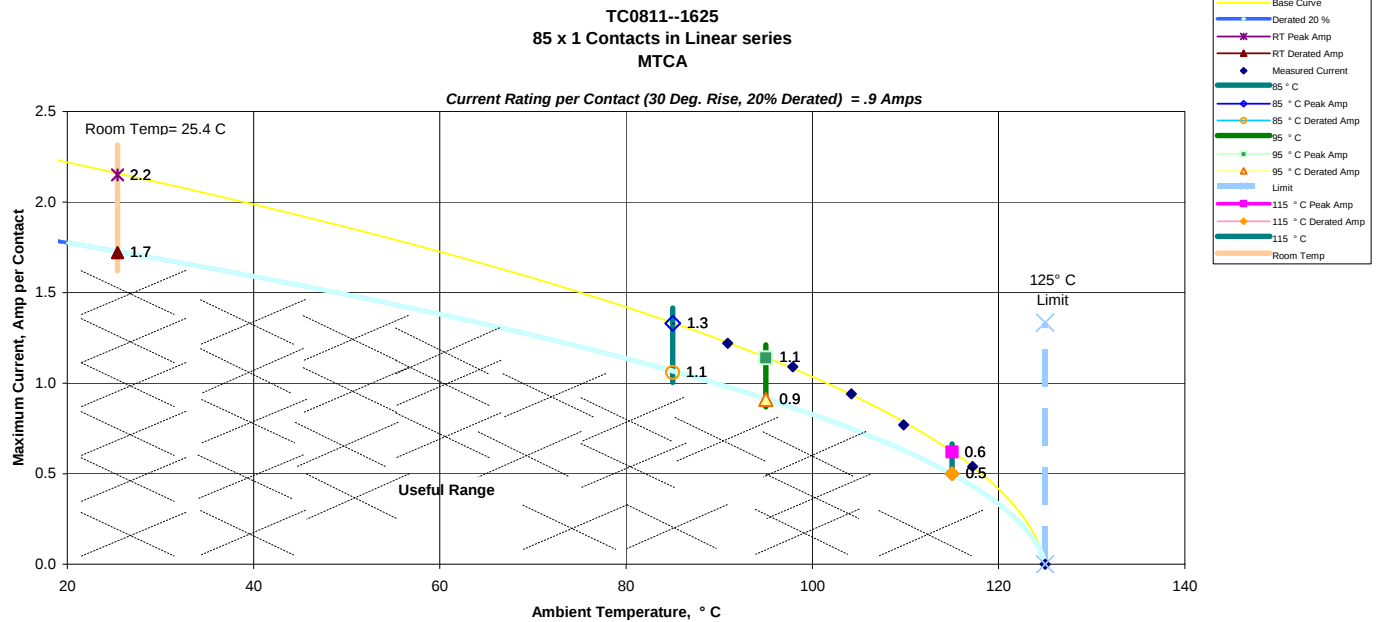
c. Linear configuration with 3 contacts powered



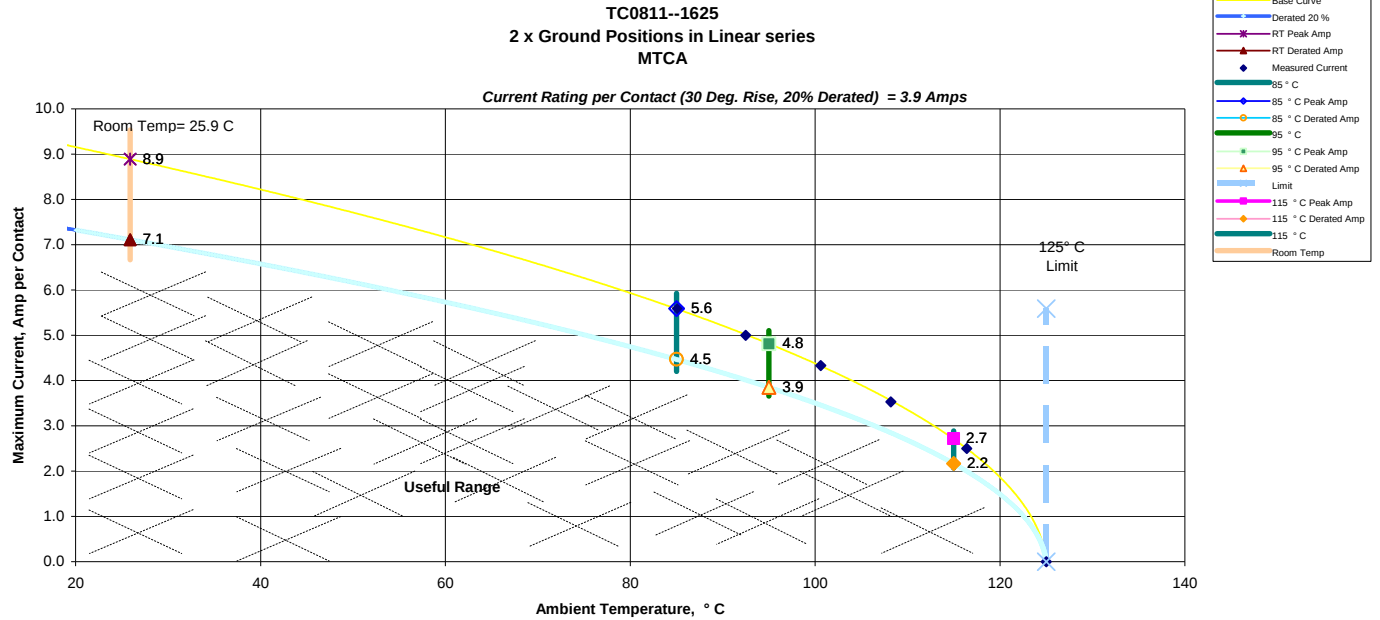
d. Linear configuration with 4 contacts powered



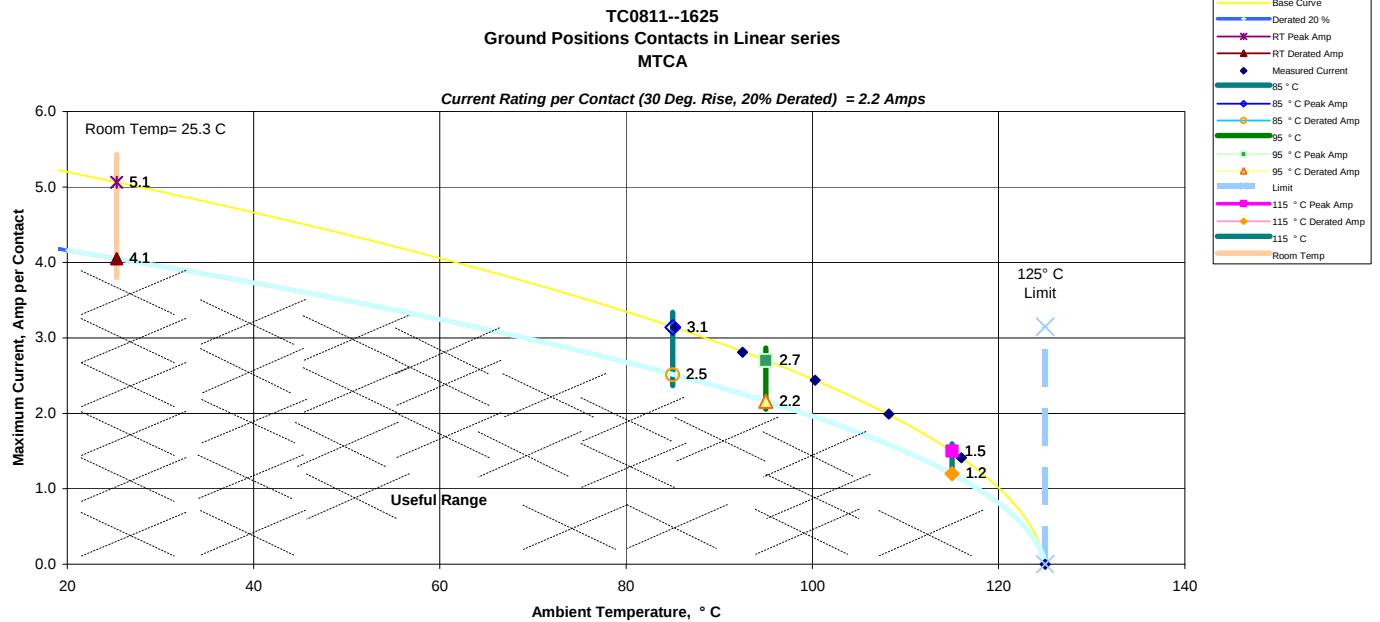
e. Linear configuration with 85 contacts powered



f. Linear configuration with 2 ground positions powered



g. Linear configuration with all ground positions powered



DATA SUMMARIES Continued**CONTACT GAPS:**

Initial		After 100 Cycles		After Thermal		After Humidity	
Measured in inches		Measured in inches		Measured in inches		Measured in inches	
<i>Minimum</i>	0.0146	<i>Minimum</i>	0.0197	<i>Minimum</i>	0.0304	<i>Minimum</i>	0.0287
<i>Maximum</i>	0.0261	<i>Maximum</i>	0.0309	<i>Maximum</i>	0.0391	<i>Maximum</i>	0.0387
<i>Average</i>	0.0213	<i>Average</i>	0.0263	<i>Average</i>	0.0350	<i>Average</i>	0.0341
<i>St. Dev.</i>	0.0026	<i>St. Dev.</i>	0.0025	<i>St. Dev.</i>	0.0020	<i>St. Dev.</i>	0.0021
<i>Count</i>	255	<i>Count</i>	255	<i>Count</i>	255	<i>Count</i>	255

MATING/UNMATING:

	Initial				After 100 Cycles			
	Mating		Unmating		Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	415.5	25.97	76.2	4.76	419.5	26.22	81.1	5.07
Maximum	621.6	38.9	154.2	9.6	579.4	36.2	125.9	7.9
Average	542.8	33.9	132.1	8.3	483.0	30.2	105.1	6.6
	After Thermal				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	248.6	15.54	114.2	7.14	245.0	15.31	87.0	5.44
Maximum	334.9	20.9	162.9	10.2	320.0	20.0	154.9	9.7
Average	297.5	18.6	139.7	8.7	282.9	17.7	123.4	7.7

DATA SUMMARIES Continued**NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):**

- 1) Calibrated force gauges are used along with computer controlled positioning equipment.
- 2) For Normal force 8-10 measurements are taken and the averages reported.

Signal #1

Initial	Def in inches Forces in Grams				Thermal	Deflections in inches, Forces in Grams			
	<u>0.004</u>	<u>0.010</u>	<u>0.016</u>	<u>SET</u>		<u>0.004</u>	<u>0.010</u>	<u>0.016</u>	<u>SET</u>
Averages	21.34	55.33	92.11	0.0006	Averages	21.81	56.95	91.46	0.0004
Min	16.00	43.30	76.50	0.0004	Min	14.20	41.30	73.60	0.0000
Max	28.10	69.10	108.70	0.0012	Max	27.50	66.80	103.80	0.0007
St. Dev	4.20	9.00	11.39	0.0002	St. Dev	4.58	8.59	10.27	0.0002
Count	10	10	10	10	Count	10	10	10	10

Signal #2

Initial	Def in inches Forces in Grams				Thermal	Deflections in inches, Forces in Grams			
	<u>0.004</u>	<u>0.010</u>	<u>0.016</u>	<u>SET</u>		<u>0.004</u>	<u>0.010</u>	<u>0.016</u>	<u>SET</u>
Averages	21.86	57.86	93.50	0.0005	Averages	20.72	54.00	86.66	0.0002
Min	17.90	46.00	81.20	0.0003	Min	12.90	36.10	60.80	0.0000
Max	28.10	71.80	108.30	0.0008	Max	27.00	64.50	99.40	0.0005
St. Dev	3.39	8.69	9.73	0.0002	St. Dev	3.89	9.36	12.17	0.0002
Count	10	10	10	10	Count	10	10	10	10

Ground

Initial	Def in inches Forces in Grams				Thermal	Deflection in inches, Forces in Grams			
	<u>0.009</u>	<u>0.014</u>	<u>0.020</u>	<u>SET</u>		<u>0.009</u>	<u>0.014</u>	<u>0.020</u>	<u>SET</u>
Averages	50.45	88.94	122.00	0.0007	Averages	50.41	87.29	116.6000	0.0004
Min	37.60	74.40	104.30	0.0004	Min	42.60	81.10	106.6000	0.0000
Max	62.60	104.60	140.00	0.0012	Max	56.60	95.70	128.8000	0.0008
St. Dev	10.00	11.14	14.07	0.0002	St. Dev	4.95	5.92	8.2056	0.0086
Count	10	10	10	10	Count	9	9	9	9

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

	Pin-Pin	
	Mated	Unmated
Minimum	MTCA/PCB	MTCA
Initial	100000	100000
Thermal	100000	Not Tested
Humidity	100000	Not Tested

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

		Pin-Pin	
		Mated	Unmated
Minimum		MTCA/PCB	MTCA
Breakdown	Initial	900	1200
	Thermal	800	1200
	Humidity	875	1050
DWV	Initial	675	900
	Thermal	600	900
	Humidity	656.25	787.5
Working	Initial	225	300
	Thermal	200	300
	Humidity	218.75	262.5

DATA SUMMARIES Continued**LLCR:**

- 1) A total of 200 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

mOhm values	Actual Initial	Delta 100 Cycles	Delta Thermal	Delta Humidity
Average	13.3	0.2	1.3	1.8
St. Dev.	3.9	0.4	1.8	2.1
Min	6.3	-1.1	-0.3	0.1
Max	19.9	1.4	14.0	13.1
Count	200	200	200	200

DATA SUMMARIES Continued

GAS TIGHT:

- 1) A total of 125 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

mOhm values	Actual Initial	Delta Gas Tight
Average	13.8	0.7
St. Dev.	4.0	1.4
Min	6.8	-2.4
Max	19.8	6.1
Count	125	125

DATA**CONTACT GAPS:**

Initial				After 100 Cycles			
Measured in inches				Measured in inches			
Pos.#	B1	B2	B3	Pos.#	B1	B2	B3
1	0.0203	0.021	0.0209	1	0.02362	0.02605	0.02422
2	0.0233	0.0236	0.0248	2	0.02785	0.02692	0.02863
3	0.0243	0.0231	0.0228	3	0.02925	0.02822	0.02908
4	0.0176	0.0181	0.0191	4	0.0226	0.024	0.02461
5	0.0231	0.022	0.0232	5	0.02718	0.02638	0.02772
6	0.0239	0.0234	0.0243	6	0.02939	0.02727	0.02889
7	0.0174	0.02	0.018	7	0.02199	0.02438	0.02286
8	0.0227	0.0217	0.023	8	0.02633	0.02548	0.02715
9	0.0239	0.0239	0.0244	9	0.03031	0.02729	0.02847
10	0.0155	0.0171	0.0173	10	0.02027	0.02184	0.02284
11	0.0207	0.0204	0.0229	11	0.02431	0.02406	0.02772
12	0.0231	0.0245	0.0246	12	0.02937	0.02808	0.02961
13	0.0187	0.0218	0.0179	13	0.02352	0.02705	0.02251
14	0.0215	0.0214	0.0227	14	0.02576	0.0252	0.02721
15	0.0236	0.0236	0.0198	15	0.02844	0.02778	0.02778
16	0.0183	0.0206	0.0189	16	0.02382	0.02656	0.02436
17	0.0219	0.0209	0.0242	17	0.02559	0.02469	0.02826
18	0.024	0.0252	0.0231	18	0.02852	0.02948	0.02928
19	0.0174	0.0229	0.0183	19	0.0225	0.02857	0.02296
20	0.0203	0.0214	0.0239	20	0.02411	0.02477	0.02881
21	0.0248	0.0246	0.0249	21	0.02919	0.02747	0.02991
22	0.0169	0.0191	0.0181	22	0.02179	0.02483	0.02288
23	0.0223	0.024	0.0236	23	0.02659	0.02709	0.02845
24	0.0227	0.0237	0.0237	24	0.02746	0.0294	0.02759
25	0.0173	0.0229	0.0181	25	0.02222	0.02833	0.02322
26	0.0217	0.022	0.0232	26	0.02525	0.02611	0.02843
27	0.0224	0.025	0.0249	27	0.02799	0.02983	0.02999
28	0.0173	0.0185	0.0175	28	0.02149	0.02455	0.02247
29	0.0229	0.0212	0.0231	29	0.02679	0.02556	0.0266
30	0.0249	0.024	0.0235	30	0.02986	0.02967	0.02942
31	0.0178	0.0208	0.0174	31	0.02232	0.02607	0.02257
32	0.022	0.0225	0.0237	32	0.02533	0.02581	0.028
33	0.0244	0.0252	0.0241	33	0.02905	0.02853	0.02902
34	0.0176	0.0228	0.0172	34	0.02193	0.028	0.02245
35	0.0238	0.0235	0.0237	35	0.027	0.02686	0.02883
36	0.0244	0.0241	0.0189	36	0.02944	0.02841	0.02849
37	0.0187	0.0223	0.0176	37	0.02336	0.02822	0.02221
38	0.0227	0.0217	0.0231	38	0.02618	0.02571	0.02662
39	0.0244	0.0245	0.0218	39	0.0295	0.02879	0.02635
40	0.0149	0.0228	0.0189	40	0.01992	0.02753	0.02426
41	0.0206	0.0238	0.0224	41	0.02645	0.02707	0.02721

42	0.0232	0.0235	0.0228	42	0.02858	0.02806	0.02902
43	0.0168	0.0242	0.018	43	0.02124	0.02879	0.02455
44	0.0228	0.0231	0.0218	44	0.02635	0.02725	0.02654
45	0.024	0.0163	0.0215	45	0.02932	0.02851	0.02932
46	0.0178	0.0192	0.0182	46	0.02338	0.0251	0.02377
47	0.022	0.0231	0.0231	47	0.02482	0.02615	0.02794
48	0.0242	0.0242	0.0226	48	0.02978	0.02835	0.02865
49	0.0167	0.0159	0.0178	49	0.02136	0.02274	0.02392
50	0.0226	0.0211	0.0231	50	0.02628	0.02597	0.02782
51	0.0224	0.0247	0.0182	51	0.02828	0.03011	0.02969
52	0.0155	0.0175	0.0187	52	0.02008	0.02316	0.02467
53	0.0233	0.0232	0.0227	53	0.02649	0.02701	0.02684
54	0.0227	0.0234	0.0194	54	0.02761	0.02774	0.02574
55	0.0186	0.0215	0.0171	55	0.02338	0.02802	0.02379
56	0.0224	0.0224	0.0216	56	0.02649	0.02682	0.02668
57	0.0237	0.024	0.0245	57	0.02919	0.03032	0.02891
58	0.018	0.0231	0.0162	58	0.02334	0.02881	0.02213
59	0.0207	0.0209	0.0236	59	0.02431	0.02469	0.02749
60	0.023	0.0232	0.0234	60	0.02757	0.02759	0.02796
61	0.0173	0.0209	0.0175	61	0.02287	0.02745	0.02331
62	0.0221	0.0213	0.0223	62	0.02604	0.02609	0.02731
63	0.0233	0.0247	0.0261	63	0.02856	0.03083	0.03093
64	0.0157	0.0212	0.018	64	0.02051	0.0266	0.02373
65	0.0206	0.0217	0.0224	65	0.02374	0.02526	0.02641
66	0.0227	0.0224	0.022	66	0.02813	0.02721	0.02832
67	0.0183	0.0231	0.018	67	0.02303	0.02918	0.02341
68	0.0233	0.0224	0.0228	68	0.02681	0.02705	0.02763
69	0.0221	0.022	0.0253	69	0.02718	0.03009	0.02922
70	0.0146	0.0186	0.0162	70	0.01968	0.02388	0.02231
71	0.0219	0.0221	0.022	71	0.02527	0.02568	0.02688
72	0.0222	0.0217	0.0226	72	0.02793	0.02788	0.02806
73	0.0175	0.0231	0.0176	73	0.02214	0.02833	0.02335
74	0.0202	0.0219	0.0217	74	0.02401	0.02583	0.02682
75	0.0216	0.0232	0.0195	75	0.0274	0.02786	0.02869
76	0.0151	0.0204	0.0168	76	0.02063	0.02605	0.02245
77	0.0211	0.0218	0.0207	77	0.02535	0.02599	0.02577
78	0.0231	0.0189	0.0228	78	0.02854	0.02808	0.02926
79	0.0148	0.0169	0.0172	79	0.02015	0.02373	0.02308
80	0.0211	0.0223	0.0208	80	0.02565	0.02605	0.02585
81	0.0227	0.0229	0.021	81	0.02817	0.02719	0.02627
82	0.0216	0.0228	0.0226	82	0.02586	0.02684	0.02749
83	0.0217	0.0202	0.0217	83	0.02927	0.02952	0.02839
84	0.0201	0.0218	0.0221	84	0.02561	0.02595	0.02727
85	0.0211	0.0213	0.0241	85	0.0287	0.02696	0.02859
After Thermal			After Humidity				
Measured in inches			Measured in inches				
Pos.#	B1	B2	B3	Pos.#	B1	B2	B3
1	0.032122	0.034484	0.033303	1	0.03149	0.03378	0.03189
2	0.036059	0.03535	0.037083	2	0.0352	0.03464	0.03598

3	0.037949	0.036846	0.037161	3	0.03732	0.03638	0.03614
4	0.031098	0.032831	0.033933	4	0.03039	0.03268	0.0337
5	0.035035	0.034878	0.035744	5	0.03378	0.03425	0.03441
6	0.037398	0.035744	0.036925	6	0.03653	0.03512	0.03582
7	0.031256	0.033854	0.032122	7	0.03039	0.03338	0.03149
8	0.034169	0.033775	0.035665	8	0.03299	0.03315	0.03504
9	0.038106	0.035429	0.035429	9	0.03748	0.03512	0.03464
10	0.030783	0.031807	0.032043	10	0.02976	0.03165	0.03142
11	0.032594	0.032358	0.035744	11	0.03189	0.03173	0.03449
12	0.037712	0.03661	0.036768	12	0.03693	0.03638	0.03582
13	0.032047	0.035587	0.031571	13	0.03149	0.03551	0.03079
14	0.033539	0.033146	0.035035	14	0.03244	0.03268	0.03449
15	0.036925	0.036059	0.036138	15	0.0359	0.03551	0.0348
16	0.032752	0.036295	0.033539	16	0.03205	0.03543	0.03275
17	0.033618	0.036374	0.036768	17	0.03275	0.03228	0.03527
18	0.037319	0.032909	0.036453	18	0.03653	0.03661	0.03567
19	0.031335	0.037161	0.031964	19	0.03071	0.03622	0.03173
20	0.032122	0.037083	0.036689	20	0.03142	0.0322	0.03559
21	0.037161	0.033146	0.036846	21	0.03606	0.03425	0.03567
22	0.031492	0.035508	0.032677	22	0.03118	0.03386	0.03244
23	0.035114	0.034405	0.036374	23	0.03449	0.03346	0.03551
24	0.03661	0.035035	0.035354	24	0.03551	0.03645	0.03464
25	0.031413	0.037319	0.032358	25	0.03047	0.03724	0.03173
26	0.033775	0.037712	0.036846	26	0.0326	0.03354	0.03622
27	0.036587	0.034327	0.038027	27	0.03559	0.03685	0.0374
28	0.030862	0.037555	0.031728	28	0.02984	0.03331	0.03086
29	0.034563	0.03409	0.035035	29	0.03362	0.03299	0.03394
30	0.037634	0.033854	0.037398	30	0.03653	0.03669	0.03685
31	0.031256	0.037398	0.031728	31	0.03071	0.03527	0.03126
32	0.033303	0.03535	0.036374	32	0.0326	0.03323	0.03567
33	0.036768	0.034012	0.038106	33	0.03567	0.03598	0.03716
34	0.031177	0.036531	0.031732	34	0.03047	0.03582	0.03142
35	0.034957	0.036531	0.037004	35	0.03409	0.03441	0.0359
36	0.037319	0.034957	0.036929	36	0.03622	0.0359	0.03614
37	0.032201	0.036138	0.032043	37	0.03157	0.03645	0.03118
38	0.034169	0.037161	0.035035	38	0.03362	0.03338	0.03409
39	0.037161	0.034405	0.034563	39	0.03653	0.03598	0.0337
40	0.037476	0.036374	0.033775	40	0.02874	0.03551	0.03315
41	0.03472	0.036059	0.03598	41	0.03401	0.03307	0.03496
42	0.036768	0.035272	0.03661	42	0.03645	0.03622	0.03598
43	0.032516	0.036846	0.033224	43	0.0322	0.03693	0.03244
44	0.03472	0.037555	0.03535	44	0.0337	0.03496	0.03496
45	0.037634	0.035429	0.038185	45	0.03669	0.03708	0.03756
46	0.031571	0.037319	0.033461	46	0.03079	0.0337	0.03268
47	0.033224	0.034563	0.035744	47	0.03228	0.03354	0.03457
48	0.037949	0.03409	0.038185	48	0.03732	0.03598	0.03748
49	0.030862	0.03661	0.033382	49	0.03031	0.03157	0.0326
50	0.034484	0.032283	0.036059	50	0.03331	0.03401	0.03441
51	0.03724	0.035035	0.038579	51	0.03645	0.03732	0.03409

Tracking Code: TC0811-MTCA-1625	Part #: MTCA-085-02-S-DV
Part description: Micro TCA	

52	0.03039	0.038027	0.034563	52	0.03008	0.03212	0.03323
53	0.034642	0.032598	0.034957	53	0.03401	0.03441	0.03433
54	0.036374	0.035193	0.034169	54	0.03567	0.03504	0.03307
55	0.033224	0.035508	0.033382	55	0.0326	0.03598	0.0326
56	0.034957	0.036457	0.035193	56	0.03433	0.03449	0.03457
57	0.037476	0.03535	0.031728	57	0.03701	0.03827	0.03693
58	0.032594	0.038421	0.035587	58	0.03118	0.03756	0.03102
59	0.032437	0.03787	0.036138	59	0.03189	0.03197	0.03449
60	0.035823	0.032516	0.032437	60	0.03464	0.03504	0.03527
61	0.032516	0.035665	0.035823	61	0.03181	0.03535	0.03205
62	0.034169	0.036614	0.038106	62	0.03323	0.03346	0.03472
63	0.037004	0.03472	0.033461	63	0.03638	0.03874	0.03693
64	0.031886	0.03913	0.034642	64	0.03086	0.03449	0.03299
65	0.032047	0.035508	0.036689	65	0.03102	0.03236	0.03401
66	0.035823	0.033697	0.032831	66	0.03386	0.03433	0.03535
67	0.032358	0.035114	0.036138	67	0.03094	0.03669	0.03197
68	0.034799	0.037949	0.037004	68	0.03362	0.03464	0.03496
69	0.035744	0.035669	0.032279	69	0.03496	0.03874	0.03567
70	0.03165	0.03913	0.03535	70	0.03047	0.0322	0.03063
71	0.033539	0.032752	0.036216	71	0.03244	0.0322	0.03425
72	0.035901	0.033933	0.032909	72	0.03535	0.03606	0.03535
73	0.031496	0.036768	0.035665	73	0.03016	0.03653	0.03173
74	0.032205	0.037319	0.038027	74	0.03165	0.03283	0.03425
75	0.035823	0.033858	0.031964	75	0.03457	0.03606	0.03708
76	0.031964	0.036453	0.034484	76	0.03063	0.03386	0.03157
77	0.033382	0.034405	0.037161	77	0.03181	0.03354	0.03323
78	0.035823	0.034327	0.032437	78	0.03527	0.03685	0.0359
79	0.031256	0.037319	0.034169	79	0.03016	0.03236	0.03142
80	0.033539	0.033146	0.034878	80	0.03244	0.03346	0.03386
81	0.036531	0.034484	0.035429	81	0.03575	0.03464	0.03409
82	0.034248	0.03535	0.036689	82	0.0337	0.03417	0.03457
83	0.037319	0.035429	0.035984	83	0.03645	0.03677	0.03582
84	0.033539	0.034957	0.036374	84	0.03212	0.03307	0.03543
85	0.036138	0.037716	0.036701	85	0.0359	0.03433	0.03512

DATA Continued**MATING/UNMATING:**

Sample#	Initial		After 100 Cycles		After Thermal		After Humidity	
	<u>Mating</u>	<u>Unmating</u>	<u>Mating</u>	<u>Unmating</u>	<u>Mating</u>	<u>Unmating</u>	<u>Mating</u>	<u>Unmating</u>
1	31.87	8.13	29.79	6.12	16.28	7.68	15.32	5.44
2	34.75	9.42	30.82	7.84	18.40	8.77	17.08	6.38
3	31.02	7.35	29.21	5.07	15.54	7.64	15.32	7.82
4	31.75	9.43	26.60	7.87	18.93	9.00	18.15	7.56
5	25.97	4.76	28.38	6.14	17.56	9.62	15.31	8.24
6	33.33	9.64	26.22	6.93	20.12	10.18	18.71	8.80
7	34.41	8.50	31.77	7.04	18.60	8.75	18.51	8.12
8	38.71	8.41	36.21	7.48	20.93	8.83	19.24	8.06
9	38.62	8.02	36.17	6.01	18.96	9.69	20.00	9.68
10	38.85	8.91	26.72	5.20	20.64	7.14	19.20	7.00

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):**Signal #1**

Initial		Deflections in inches Forces in Grams				Thermal		Deflections in inches Forces in Grams			
Sample #		0.0041	0.0098	0.0156	SET	Sample #		0.0041	0.0098	0.0156	SET
2-A-1		26.80	69.10	108.70	0.00060	2-A-1		25.90	64.70	101.40	0.00070
2-A-2		22.80	60.40	97.70	0.00040	2-A-2		23.80	60.80	96.50	0.00030
2-A-3		16.00	51.50	89.20	0.00040	2-A-3		18.40	54.80	90.50	0.00000
2-A-4		24.00	64.70	103.60	0.00040	2-A-4		27.50	66.80	103.80	0.00050
2-A-5		21.90	60.60	100.80	0.00060	2-A-5		14.20	41.30	73.60	0.00000
2-B-1		16.60	45.00	78.60	0.00040	2-B-1		23.60	60.80	95.40	0.00060
2-B-2		20.90	59.40	95.80	0.00120	2-B-2		22.50	57.40	91.30	0.00040
2-B-3		28.10	43.30	76.50	0.00050	2-B-3		24.40	61.10	95.40	0.00040
2-B-4		17.10	54.70	92.40	0.00050	2-B-4		23.30	59.20	93.10	0.00060
2-B-5		19.20	44.60	77.80	0.00060	2-B-5		14.50	42.60	73.60	0.00040

Signal #2

Initial		Deflections in inches Forces in Grams				Thermal		Deflections in inches Forces in Grams			
Sample #		0.0041	0.0098	0.0156	SET	Sample #		0.0041	0.0098	0.0156	SET
2-A-1		28.10	71.80	107.90	0.00080	2-A-1		12.90	36.10	68.10	0.00000
2-A-2		21.10	59.80	97.00	0.00050	2-A-2		20.20	57.20	92.60	0.00040
2-A-3		19.60	57.00	91.10	0.00040	2-A-3		20.20	56.90	90.50	0.00000
2-A-4		27.60	69.50	108.30	0.00040	2-A-4		17.60	37.90	60.80	0.00000
2-A-5		20.30	60.30	96.70	0.00080	2-A-5		19.10	56.10	90.50	0.00000
2-B-1		21.10	47.50	81.80	0.00040	2-B-1		23.60	59.80	93.10	0.00040
2-B-2		19.60	48.60	83.10	0.00060	2-B-2		22.30	56.90	89.50	0.00040
2-B-3		22.60	60.20	94.70	0.00040	2-B-3		27.00	64.50	99.40	0.00050
2-B-4		17.90	46.00	81.20	0.00030	2-B-4		24.10	59.80	92.60	0.00040
2-B-5		20.70	57.90	93.20	0.00050	2-B-5		20.20	54.80	89.50	0.00030

DATA Continued**Ground**

Initial	Deflections in inches Forces in Grams				Thermal	Deflection in inches, Forces in Grams			
Sample #	0.0087	0.0144	0.0201	SET	Sample #	0.009	0.014	0.020	SET
1	52.70	90.20	128.30	0.00060	1	43.40	82.70	111.90	0.00000
2	62.60	104.60	140.00	0.00090	2	53.50	93.40	124.60	0.00060
3	54.80	92.60	130.30	0.00070	3	42.60	82.20	113.70	0.00000
4	61.90	101.20	138.90	0.00060	4	56.60	95.70	128.80	0.00040
5	58.50	97.30	131.60	0.00080	5	55.30	94.90	127.00	0.00050
1	37.60	74.40	104.30	0.00040	6	53.50	88.40	116.80	0.00080
2	38.70	77.20	105.90	0.00120	7	49.10	81.10	106.60	0.00020
3	43.90	81.10	111.30	0.00060	8	48.80	83.20	110.00	0.00070
4	37.90	75.40	105.30	0.00060	9	50.90	84.00	110.00	0.00050
5	55.90	95.40	124.10	0.00100					

INSULATION RESISTANCE (IR):

Initial Insulation Resistance
Measured In Meg Ohms

		Pin-Pin		SAMPLE#1	
		Mated	Unmated		
		X	X		
Sample#	MTCA/PCB	MTCA	PCB		
A	100000	100000	n/a		
B	100000	100000	n/a		

		Pin-Pin		SAMPLE#2	
		Mated	Unmated		
		X	X		
Sample#	MTCA/PCB	MTCA	PCB		
A	100000	100000	n/a		
B	100000	100000	n/a		

DATA Continued**Thermal Insulation Resistance****Measured In Meg Ohms****Pin-Pin****SAMPLE#1****Mated****Unmated****X**

Sample#	MTCA/PCB	MTCA	PCB
A	100000	n/a	n/a
B	100000	n/a	n/a

Pin-Pin**SAMPLE#2****Mated****Unmated****X**

Sample#	MTCA/PCB	MTCA	PCB
A	100000	n/a	n/a
B	100000	n/a	n/a

Humidity Insulation Resistance**Measured In Meg Ohms****Pin-Pin****SAMPLE#1****Mated****Unmated****X**

Sample#	MTCA/PCB	MTCA	PCB
A	100000	n/a	n/a
B	100000	n/a	n/a

Pin-Pin**SAMPLE#2****Mated****Unmated****X**

Sample#	MTCA/PCB	MTCA	PCB
A	100000	n/a	n/a
B	100000	n/a	n/a

DATA Continued**DIELECTRIC WITHSTANDING VOLTAGE (DWV):**

Initial DWV			
Test Voltage <i>Until Breakdown Occurs</i>			

Pin-Pin				SAMPLE#1
Mated		Unmated		
x				
Sample#	MTCA/PCB	MTCA	PCB	
A	900	Not Tested	Not Tested	
B	920	Not Tested	Not Tested	

Pin-Pin				SAMPLE#2
Mated		Unmated		
		x		
Sample#	MTCA/PCB	MTCA	PCB	
A	Not Tested	1200	Not Tested	
B	Not Tested	1200	Not Tested	

Thermal DWV			
Test Voltage <i>Until Breakdown Occurs</i>			

Pin-Pin				SAMPLE#1
Mated		Unmated		
x				
Sample#	MTCA/PCB	MTCA	PCB	
A	810			
B	800			

Pin-Pin				SAMPLE#2
Mated		Unmated		
		x		
Sample#	MTCA/PCB	MTCA	PCB	
A		1200		
B		1200		

DATA Continued**LLCR:**

	mOhm values	Actual	Delta	Delta	Delta
Board	Position	Initial	100 Cycles	Thermal	Humidity
1	P1	7.3	0.1	0.3	2.7
1	P2	14.4	0.8	2.9	2.1
1	P3	14.8	0.3	0.6	0.9
1	P4	7.1	0.1	0.3	0.6
1	P5	16.0	0.1	0.7	2.3
1	P6	16.4	0.4	1.7	1.7
1	P7	14.0	0.2	0.4	0.8
1	P8	7.2	0.0	0.3	0.5
1	P9	15.0	0.2	0.4	0.7
1	P10	16.3	0.0	0.1	0.3
1	P11	17.3	0.0	0.5	0.7
1	P12	17.8	-0.1	0.1	0.4
1	P13	18.6	-0.1	0.1	0.3
1	P14	18.2	-0.1	0.3	0.7
1	P15	7.0	0.0	0.2	1.0
1	P16	14.5	0.0	0.5	1.1
1	P17	14.2	0.0	0.7	3.1
1	P18	14.1	0.1	1.6	4.6
1	P19	14.2	-0.1	0.5	1.0
1	P20	17.8	0.0	0.6	0.5
1	P21	16.6	-0.1	0.1	0.7
1	P22	15.4	0.4	0.2	2.2
1	P23	14.6	-0.1	0.4	6.5
1	P24	7.0	0.0	0.3	0.9
1	P25	7.0	0.1	0.3	0.7
2	P1	6.7	0.3	0.3	2.3
2	P2	13.1	0.8	0.9	2.6
2	P3	13.4	0.6	0.9	6.0
2	P4	6.6	0.3	0.4	0.7
2	P5	14.6	0.5	0.8	3.0
2	P6	14.8	0.8	1.0	3.1
2	P7	12.4	0.8	0.9	3.4
2	P8	6.6	0.4	0.5	1.1
2	P9	12.8	0.5	0.7	1.2
2	P10	13.7	0.4	1.2	1.1
2	P11	14.2	0.9	1.4	1.4
2	P12	15.1	0.8	0.8	0.8
2	P13	14.6	0.7	1.0	1.1
2	P14	15.0	0.9	1.4	2.1
2	P15	6.7	0.2	0.6	0.7
2	P16	12.6	0.9	0.9	1.4
2	P17	12.6	0.7	0.9	0.9

2	P18	12.5	0.6	1.2	1.0
2	P19	12.3	0.6	1.3	2.2
2	P20	16.0	0.6	0.9	1.1
2	P21	15.3	0.4	1.1	0.8
2	P22	14.4	0.4	1.2	3.0
2	P23	13.7	0.3	0.9	3.8
2	P24	6.7	0.3	0.4	1.1
2	P25	6.6	0.3	1.0	0.7
3	P1	7.1	-0.1	0.2	0.2
3	P2	13.9	-0.2	0.4	0.7
3	P3	14.5	-0.3	0.6	2.8
3	P4	7.0	0.7	1.1	1.8
3	P5	15.7	-0.1	0.8	2.5
3	P6	15.5	-0.2	0.3	3.8
3	P7	13.4	0.4	0.5	0.5
3	P8	6.9	0.0	0.4	0.7
3	P9	14.5	0.6	1.8	4.8
3	P10	15.3	0.9	9.3	11.7
3	P11	16.7	0.3	6.4	3.7
3	P12	17.2	0.0	1.5	1.7
3	P13	17.2	-0.1	1.9	2.2
3	P14	17.3	0.8	4.6	9.2
3	P15	6.8	0.0	0.2	0.9
3	P16	14.0	0.2	0.9	0.8
3	P17	14.3	-0.2	0.7	0.5
3	P18	14.1	-0.1	1.1	1.2
3	P19	13.7	0.3	1.1	0.8
3	P20	16.8	-0.3	0.4	3.1
3	P21	15.7	-0.2	0.1	2.1
3	P22	15.0	-0.3	0.5	2.6
3	P23	14.5	-0.5	-0.1	3.2
3	P24	6.8	0.0	0.3	0.4
3	P25	6.7	0.0	0.0	0.2
4	P1	6.8	0.0	0.5	0.6
4	P2	13.3	0.0	3.2	6.8
4	P3	14.2	-0.5	3.1	5.7
4	P4	6.3	0.0	3.5	8.1
4	P5	15.0	-0.4	4.2	8.6
4	P6	14.3	0.3	2.0	8.8
4	P7	12.3	0.2	4.6	3.3
4	P8	6.6	0.2	0.5	0.6
4	P9	13.8	-0.8	1.4	6.6
4	P10	14.4	-0.6	8.3	7.3
4	P11	15.4	-0.7	8.6	6.7
4	P12	15.5	-0.7	4.3	3.7
4	P13	15.8	-0.7	2.8	4.3
4	P14	15.4	-0.5	8.1	2.9
4	P15	6.6	0.0	0.4	1.1
4	P16	13.4	-0.3	2.0	1.6

4	P17	13.2	-0.5	0.1	0.4
4	P18	12.9	-0.1	1.0	1.7
4	P19	12.9	-0.3	0.7	1.2
4	P20	15.8	0.0	3.9	3.0
4	P21	15.5	-0.2	2.4	5.6
4	P22	15.2	-1.1	5.5	13.1
4	P23	13.7	0.6	1.8	2.3
4	P24	6.5	0.2	0.8	1.5
4	P25	6.4	0.1	0.7	0.9
5	P1	7.2	0.0	0.2	0.1
5	P2	13.7	0.0	0.7	0.7
5	P3	14.1	0.0	0.7	0.7
5	P4	7.0	0.0	0.4	0.4
5	P5	15.4	0.1	0.6	0.7
5	P6	16.0	-0.1	0.3	0.4
5	P7	13.3	0.0	0.2	0.3
5	P8	7.0	0.1	0.4	0.3
5	P9	13.8	0.3	1.5	0.5
5	P10	14.9	0.2	1.1	0.7
5	P11	16.5	0.0	0.7	0.6
5	P12	16.9	0.1	0.8	0.6
5	P13	17.2	0.1	0.8	0.9
5	P14	17.3	0.1	0.8	0.4
5	P15	6.7	0.1	1.1	0.3
5	P16	14.0	0.5	2.2	0.7
5	P17	14.0	1.0	1.8	1.3
5	P18	13.8	1.4	4.3	1.3
5	P19	13.9	0.1	0.6	0.5
5	P20	16.8	0.4	1.2	1.2
5	P21	16.0	0.3	1.0	0.8
5	P22	14.9	0.3	0.8	0.5
5	P23	14.1	0.3	1.3	1.1
5	P24	6.9	0.1	0.5	0.4
5	P25	7.0	0.1	0.4	0.2
6	P1	7.0	0.2	0.5	0.5
6	P2	13.8	0.3	1.2	1.1
6	P3	14.4	0.5	14.0	2.5
6	P4	6.9	0.3	0.5	0.9
6	P5	15.3	0.6	1.3	2.1
6	P6	15.6	0.7	1.2	1.4
6	P7	13.7	0.1	1.1	1.1
6	P8	7.0	0.1	0.4	0.6
6	P9	14.8	-0.2	1.0	3.3
6	P10	15.6	0.4	1.2	2.6
6	P11	17.1	0.4	1.1	1.8
6	P12	17.6	0.3	1.6	2.1
6	P13	17.8	0.1	1.0	1.1
6	P14	17.9	0.6	1.3	1.7
6	P15	7.2	-0.1	0.2	0.1

6	P16	14.2	0.0	0.7	0.9
6	P17	14.0	0.6	2.5	2.5
6	P18	14.0	0.3	1.0	1.4
6	P19	14.2	0.1	1.5	1.4
6	P20	17.0	0.1	1.3	1.1
6	P21	16.4	0.2	1.8	1.2
6	P22	14.8	0.3	1.3	2.4
6	P23	14.1	0.4	1.3	1.0
6	P24	7.1	0.3	0.6	0.8
6	P25	6.8	0.3	0.7	0.8
7	P1	7.5	0.2	0.7	0.4
7	P2	15.0	1.1	0.7	0.7
7	P3	15.1	0.5	1.2	0.9
7	P4	7.4	0.3	0.6	0.4
7	P5	16.7	0.5	1.4	1.4
7	P6	17.1	0.7	1.5	1.7
7	P7	14.9	0.2	1.5	1.2
7	P8	7.2	0.2	0.4	0.6
7	P9	15.2	0.4	7.4	2.8
7	P10	16.7	0.0	2.3	1.0
7	P11	18.8	0.4	1.1	1.3
7	P12	19.3	0.2	2.0	1.3
7	P13	19.3	0.2	5.0	2.1
7	P14	19.9	0.2	0.8	0.9
7	P15	7.2	0.2	0.7	0.6
7	P16	14.7	0.6	1.5	1.2
7	P17	14.9	0.7	1.9	1.7
7	P18	15.1	0.4	1.0	1.1
7	P19	14.9	0.3	1.3	1.2
7	P20	18.4	0.5	2.3	1.3
7	P21	17.5	0.6	3.1	1.6
7	P22	15.5	0.3	1.5	0.9
7	P23	15.3	0.0	1.5	1.6
7	P24	7.2	0.1	0.9	1.1
7	P25	7.1	0.1	0.5	0.5
8	P1	7.5	0.1	0.2	11.5
8	P2	15.3	0.7	0.5	0.7
8	P3	15.5	0.6	0.9	1.2
8	P4	7.4	0.0	0.0	0.5
8	P5	16.8	0.4	0.7	0.8
8	P6	17.1	0.5	0.7	0.8
8	P7	14.9	0.0	-0.1	2.0
8	P8	7.3	0.1	-0.3	0.1
8	P9	15.0	0.4	0.3	1.0
8	P10	16.2	0.4	0.6	0.9
8	P11	18.8	0.1	0.5	1.1
8	P12	19.3	-0.1	0.1	0.4
8	P13	19.4	0.1	0.0	0.6
8	P14	19.8	0.0	0.2	0.5

Tracking Code: TC0811-MTCA-1625	Part #: MTCA-085-02-S-DV
Part description: Micro TCA	

8	P15	7.4	0.2	0.4	0.4
8	P16	15.1	0.4	0.9	0.8
8	P17	15.1	0.5	1.0	0.7
8	P18	15.2	0.4	0.5	0.3
8	P19	15.0	0.3	0.8	1.4
8	P20	18.9	0.1	0.3	0.6
8	P21	17.6	0.3	0.6	0.6
8	P22	16.1	0.3	0.8	0.9
8	P23	15.7	0.4	0.9	0.9
8	P24	7.3	0.2	0.7	0.6
8	P25	7.3	0.2	0.2	0.3

DATA Continued**GAS TIGHT:**

	mOhm values	Actual	Delta
Board	Position	Initial	Gas Tight
1	P1	7.5	0.0
1	P2	14.6	0.1
1	P3	15.5	0.1
1	P4	7.3	0.0
1	P5	16.9	0.2
1	P6	17.5	-1.0
1	P7	14.6	-0.1
1	P8	7.2	0.2
1	P9	15.5	1.0
1	P10	16.7	0.5
1	P11	18.2	-0.3
1	P12	18.8	-0.3
1	P13	19.2	0.1
1	P14	19.2	-0.5
1	P15	7.3	0.3
1	P16	15.2	1.0
1	P17	15.3	1.6
1	P18	15.1	5.8
1	P19	15.0	1.2
1	P20	18.9	-0.6
1	P21	17.8	-0.8
1	P22	16.2	2.0
1	P23	15.7	1.6
1	P24	7.2	0.0
1	P25	7.2	-0.1
2	P1	7.7	-0.5
2	P2	14.8	-0.6
2	P3	15.3	-0.1
2	P4	7.3	-0.3
2	P5	16.5	-0.3
2	P6	16.8	-0.8
2	P7	15.2	-1.4
2	P8	7.3	-0.3
2	P9	15.6	-0.1
2	P10	16.9	-0.7
2	P11	18.9	-2.0
2	P12	19.3	-2.1
2	P13	19.4	-1.4
2	P14	19.8	-2.4
2	P15	7.2	0.0
2	P16	15.0	-0.2

2	P17	15.2	1.7
2	P18	14.9	-0.4
2	P19	14.8	0.0
2	P20	18.0	-0.6
2	P21	17.5	-0.2
2	P22	15.8	-0.2
2	P23	15.4	0.3
2	P24	7.2	-0.2
2	P25	7.2	-0.1
3	P1	7.2	0.1
3	P2	14.3	0.4
3	P3	14.3	0.3
3	P4	7.1	0.0
3	P5	15.7	0.3
3	P6	16.0	0.2
3	P7	13.4	0.0
3	P8	7.0	0.0
3	P9	14.1	0.7
3	P10	15.6	0.8
3	P11	16.7	-0.1
3	P12	17.1	0.0
3	P13	17.2	0.0
3	P14	17.2	0.0
3	P15	7.1	0.2
3	P16	14.1	0.6
3	P17	13.7	0.5
3	P18	13.8	1.1
3	P19	13.8	0.7
3	P20	17.4	0.3
3	P21	17.0	0.4
3	P22	15.3	0.4
3	P23	14.7	0.4
3	P24	7.0	0.3
3	P25	7.0	0.3
4	P1	7.1	0.8
4	P2	14.2	1.7
4	P3	14.5	2.5
4	P4	6.8	0.7
4	P5	15.5	2.8
4	P6	15.9	2.3
4	P7	13.5	1.9
4	P8	6.9	0.7
4	P9	14.1	1.8
4	P10	15.1	4.4
4	P11	16.7	2.5
4	P12	16.6	3.7
4	P13	17.2	4.1
4	P14	17.1	2.5
4	P15	6.9	0.6

4	P16	13.9	2.5
4	P17	15.6	6.1
4	P18	13.9	3.2
4	P19	13.9	2.7
4	P20	17.3	2.3
4	P21	16.2	4.1
4	P22	14.9	2.4
4	P23	14.5	2.0
4	P24	6.9	0.5
4	P25	6.9	0.5
5	P1	7.3	0.6
5	P2	14.0	0.7
5	P3	14.6	0.6
5	P4	7.0	0.3
5	P5	15.8	0.8
5	P6	16.1	0.8
5	P7	13.8	1.6
5	P8	7.1	0.3
5	P9	14.6	1.3
5	P10	15.6	2.0
5	P11	17.3	1.8
5	P12	18.1	2.3
5	P13	17.8	1.9
5	P14	18.3	1.8
5	P15	6.9	0.5
5	P16	13.9	1.0
5	P17	13.9	0.9
5	P18	14.0	1.0
5	P19	14.3	1.0
5	P20	17.6	0.9
5	P21	16.4	1.0
5	P22	15.0	0.9
5	P23	14.5	0.8
5	P24	6.9	0.4
5	P25	7.0	0.4

EQUIPMENT AND CALIBRATION SCHEDULES**Equipment #:** TCT-04**Description:** Dillon Quantrol TC21 25-1000 mm/min series test stand**Manufacturer:** Dillon Quantrol**Model:** TC2 I series test stand**Serial #:** 04-1041-04**Accuracy:** Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;
... Last Cal: 05/18/2007, Next Cal: 05/18/2008**Equipment #:** OGP-02**Description:** Automatic Video Measuring System, 18" (X) x 18" (Y) x 12" (Z)**Manufacturer:** Optical Gaging Products (OGP)**Model:** Smartscope Flash**Serial #:** SVL 5001462**Accuracy:** See Manual

... Last Cal: 03/13/2007, Next Cal: 03/13/2008

Equipment #: MV-04**Description:** Micro-Vu Vector Video Measuring Microscope with InSpec Software**Manufacturer:** Micro-Vu**Model:** 301**Serial #:** 7570**Accuracy:** See Manual

... Last Cal: 02/05/07, Next Cal: 02/05/08

Equipment #: HPM-01**Description:** Hipot Megommeter**Manufacturer:** Hipotronics**Model:** H306B-A**Serial #:** M9905004**Accuracy:** 2 % Full Scale Accuracy

... Last Cal: 06/22/07, Next Cal: 06/22/08

Equipment #: STG-01**Description:** Hipot Megomter Safety Test Cage**Manufacturer:** Hipotronics**Model:** TC-25**Serial #:** M9910141**Accuracy:** N/A

... Last Cal: No Calibration Required, Next Cal:

Equipment #: MO-07**Description:** Multimeter / Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 1116559**Accuracy:** See Manual

... Last Cal: 6/22/2007, Next Cal: 6/22/2008

Equipment #: MM-01**Description:** True RMS Multimeter**Manufacturer:** Fluke**Model:** 87 III**Serial #:** 74660176**Accuracy:** See Manual See Manual

... Last Cal: 06/14/07, Next Cal: 06/14/08

Equipment #: MO-04**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0798688**Accuracy:** See Manual - DO NOT USE UNTIL CALIBRATED.

... Last Cal: 03/10/08, Next Cal: 03/10/09

Equipment #: PS-07**Description:** 20 V, 120 A DC Power Supply - AutoRanging SO/HPIB**Manufacturer:** Hewlett Packard / Agilent**Model:** AT-6031A**Serial #:** 2721A00648**Accuracy:** See Manual Current Carrying Capacity (CCC) Chamber

... Last Cal: 10/25/2007, Next Cal: 10/25/2008

Equipment #: Null**Description:****Manufacturer:****Model:****Serial #:****Accuracy:**

... Last Cal: , Next Cal:

Equipment #: Null**Description:****Manufacturer:****Model:****Serial #:****Accuracy:**

... Last Cal: , Next Cal: