Project Number:	Tracking Code: TC0909-SFSDT-2277_ReportRev2		
Requested by: Brian Perry	Date: 5/3/2017	Product Rev: H	
Part #: SFSDT-20-30-GF-03.00-S/ TFM-120-02-S-D-A	Lot #: 1	Tech: Tony Wagoner & Rodney Riley	Eng: Troy Cook
Part description: TEFLON CABLE ASSY			Qty to test: 16
Test Start: 02/25/2009	Test Completed: 4/21/2009		

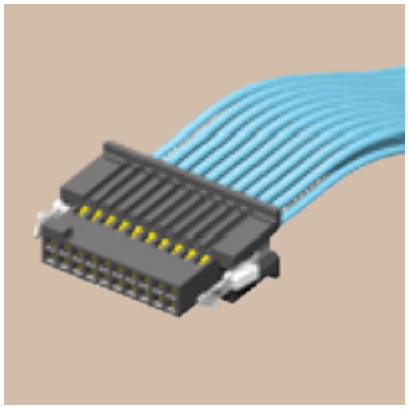
CCC & IR/DWV TESTING REPORT

PART DESCRIPTION

SFSDT-20-XX-GF-03.00-S

Mated with

TFM-120-02-S-D-A



CERTIFICATION

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

SCOPE

To perform the following tests: IR/DWV & CCC (with 30 & 28 awg wire).

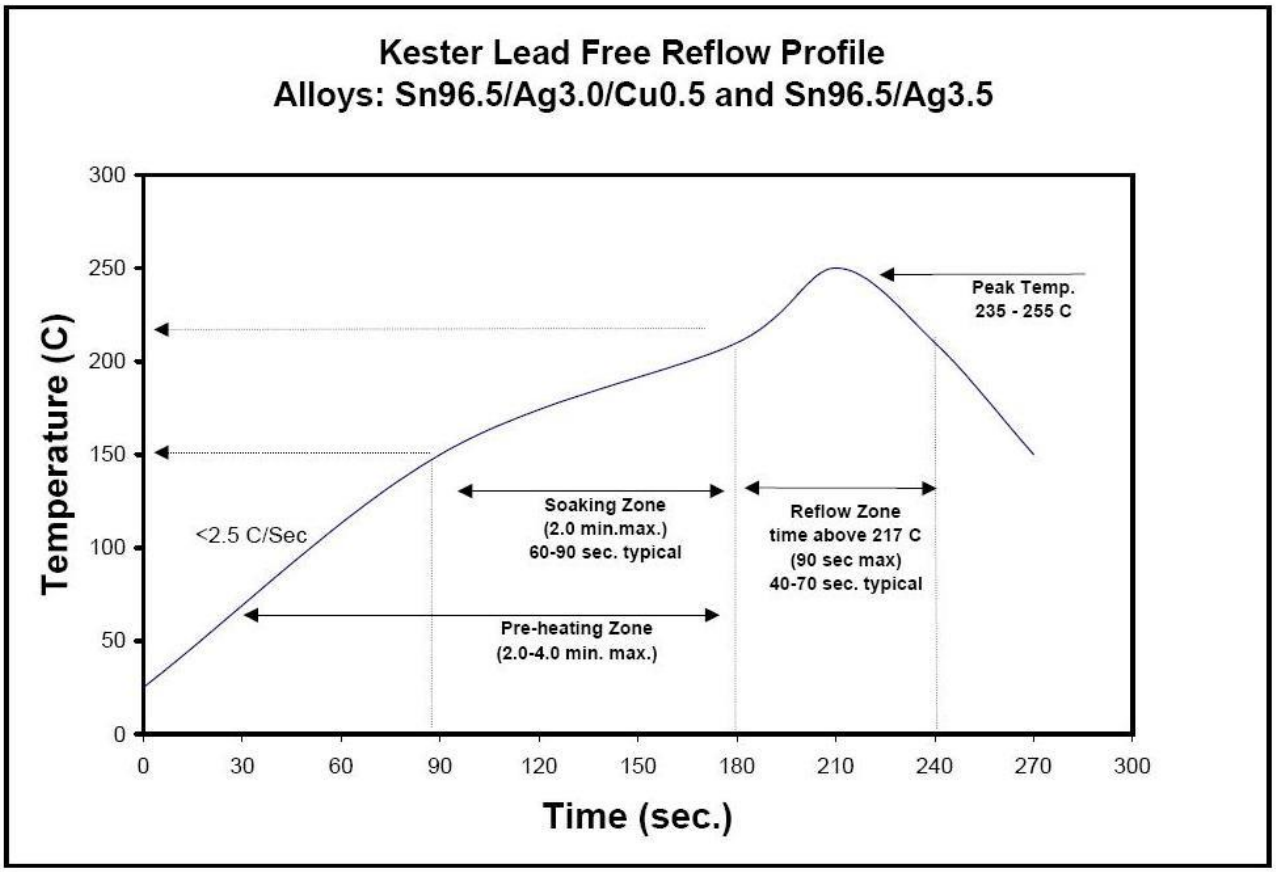
APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead Free
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-101672-TST-XX

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)



FLOWCHARTS

IR & DWV

TEST STEP	GROUP A1 2 Mated Sets Break Down	GROUP A2 2 Unmated of Part # Being Tested Break Down	GROUP A3 2 Unmated of Mating Part # Break Down	GROUP B 2 Mated Sets
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Aging (both sets unmated)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (both sets unmated)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

*** - DWV on group B to be performed at Test Voltage**
DWV test voltage is equal to 75% of the lowest break down voltage from group A1, A2 or A3
Thermal Aging = EIA-364-17, Test Condition 4 (105 °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

Current Carrying Capacity

3 Mated Assemblies Each

TEST STEP	GROUP A 3 Mated Assembies 2 CONTACT POWERED	GROUP B 3 Mated Assembies 4 CONTACTS POWERED	GROUP C 3 Mated Assembies 6 CONTACTS POWERED	GROUP D 3 Mated Assembies 8 CONTACTS POWERED	GROUP E 3 Mated Assembies 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 125° C
CCC, Temp rise = EIA-364-70

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

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

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.

INSULATION RESISTANCE (IR):

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

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

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

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

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

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **30 AWG WIRE**
  - **CCC for a 30°C Temperature Rise ----------2.9A per contact with 2 adjacent contacts powered**
  - **CCC for a 30°C Temperature Rise ----------2.2A per contact with 4 adjacent contacts powered**
  - **CCC for a 30°C Temperature Rise ----------1.7A per contact with 6 adjacent contacts powered**
  - **CCC for a 30°C Temperature Rise ----------1.6A per contact with 8 adjacent contacts powered**
  - **CCC for a 30°C Temperature Rise ----------0.9A per contact with 40 adjacent contacts powered**
- **28 AWG WIRE**
  - **CCC for a 30°C Temperature Rise ----------3.1A per contact with 2 adjacent contacts powered**
  - **CCC for a 30°C Temperature Rise ----------2.4A per contact with 4 adjacent contacts powered**
  - **CCC for a 30°C Temperature Rise ----------2.0A per contact with 6 adjacent contacts powered**
  - **CCC for a 30°C Temperature Rise ----------1.8A per contact with 8 adjacent contacts powered**
  - **CCC for a 30°C Temperature Rise ----------1.1A per contact with 40 adjacent contacts powered**

Insulation Resistance minimums, IR

- **Initial**
  - **Mated----------100,000 Meg Ω ---------- Pass**
  - **SFSDT----------100,000 Meg Ω**
  - **TFM ----------100,000 Meg Ω**
- **Thermal**
  - **Mated----------100,000 Meg Ω**
  - **SFSDT----------100,000 Meg Ω**
  - **TFM ----------100,000 Meg Ω**
- **Humidity**
  - **Mated----------8,000 Meg Ω**
  - **SFSDT----------9,000 Meg Ω**
  - **TFM ----------100,000 Meg Ω**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage---------- 1,250VAC**
  - **Test Voltage ----------938VAC**
  - **Working Voltage ----------313VAC**
- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

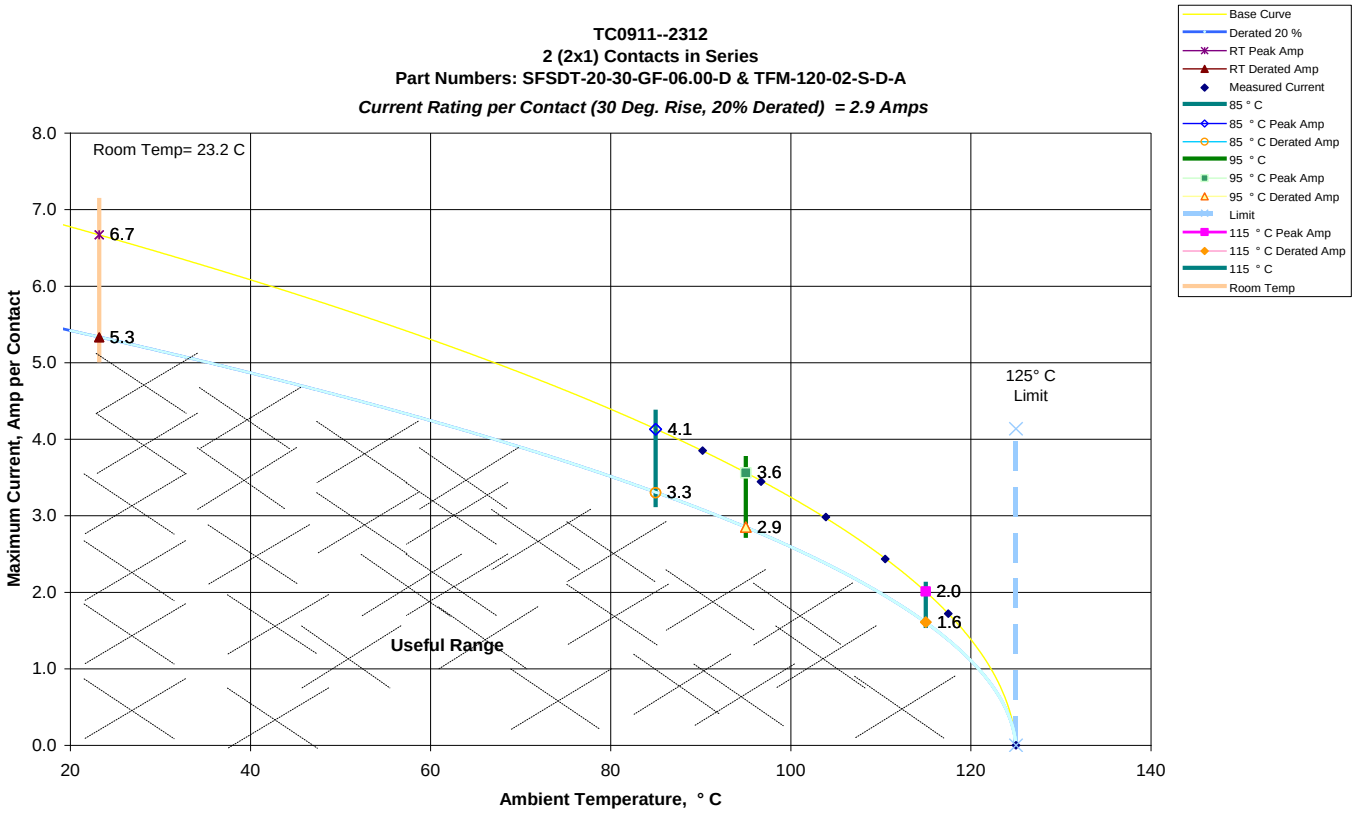
DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

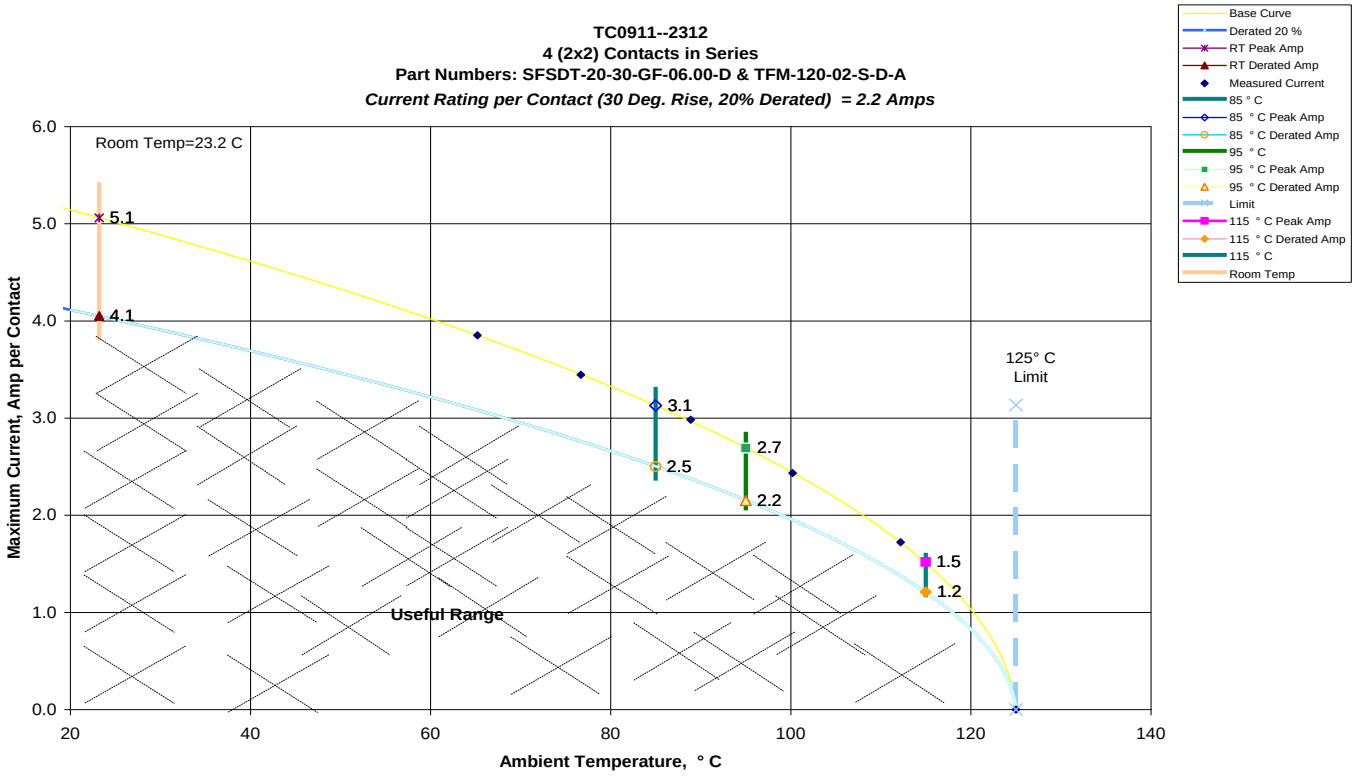
1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes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

30 AWG WIRE

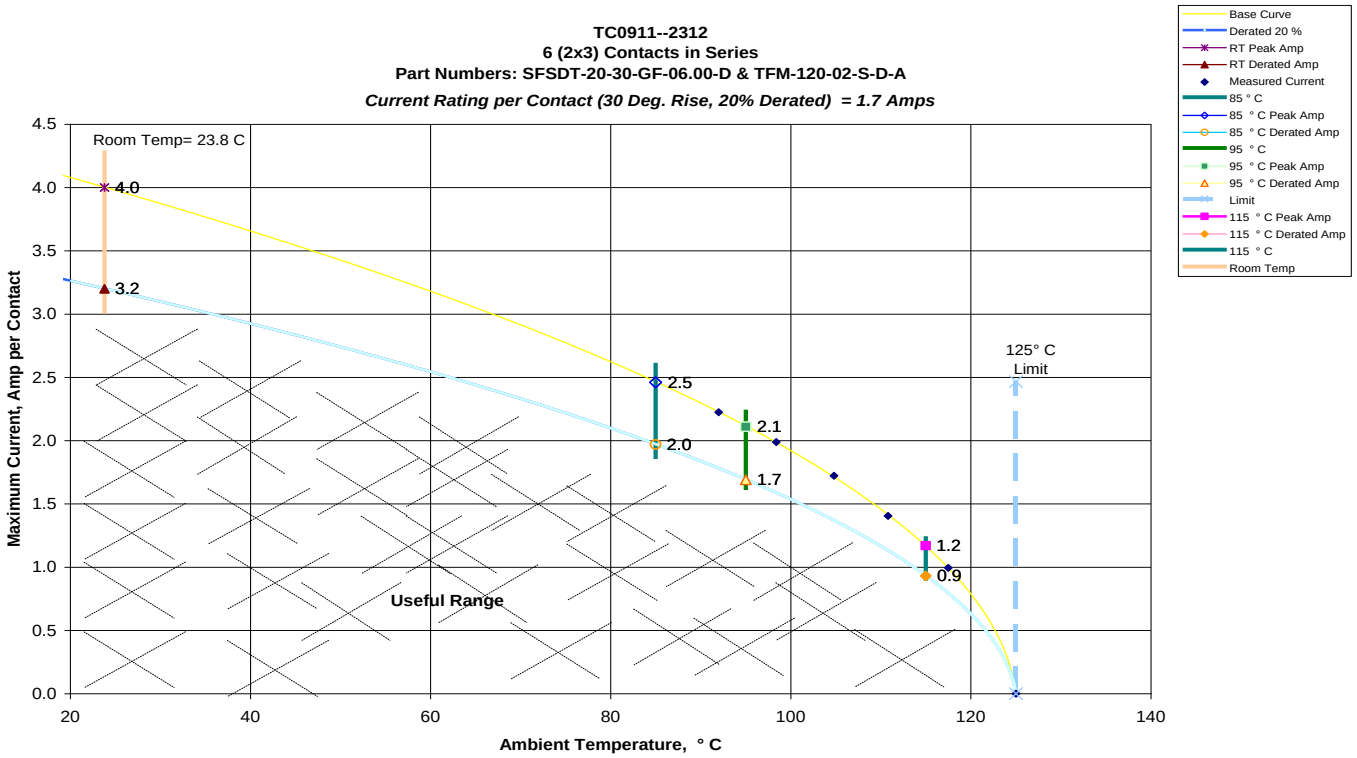
a. Linear configuration with 2 adjacent conductors/contacts powered



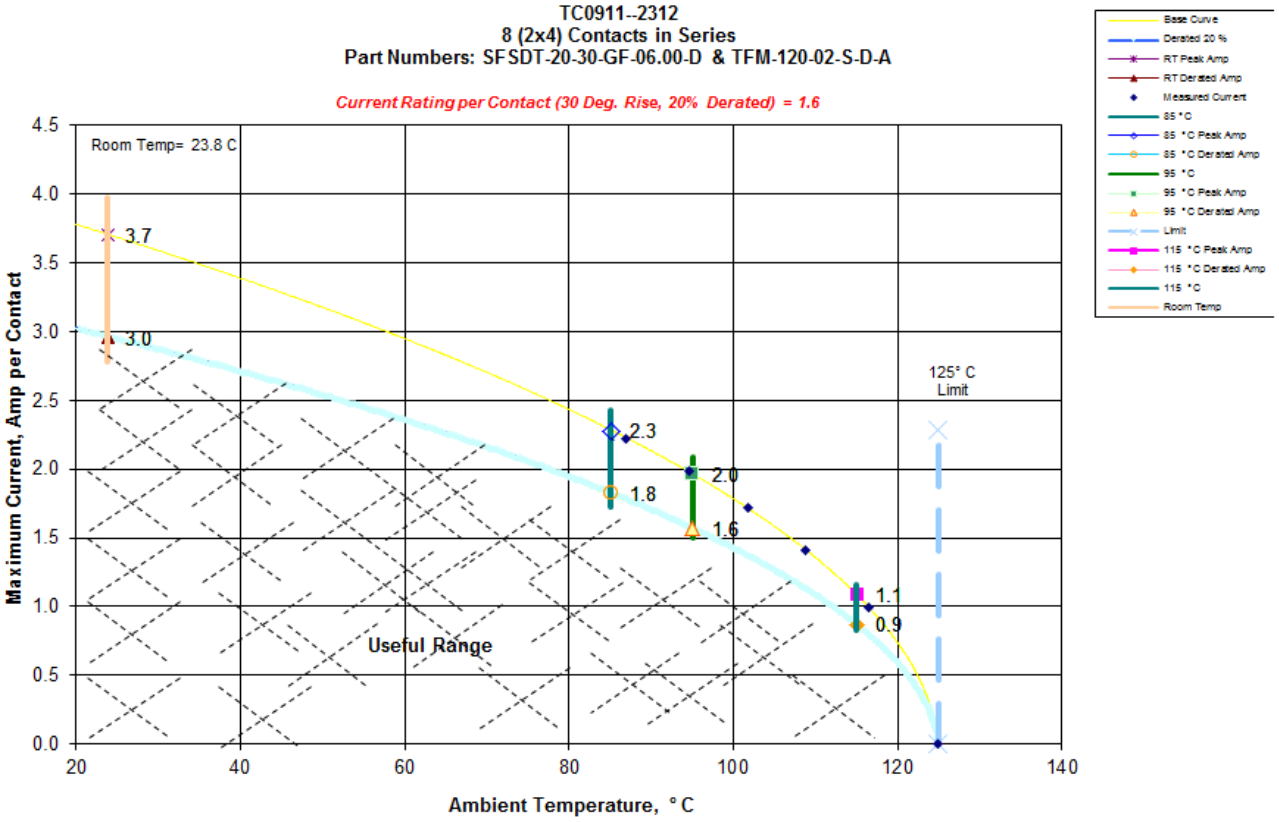
b. Linear configuration with 4 adjacent conductors/contacts powered



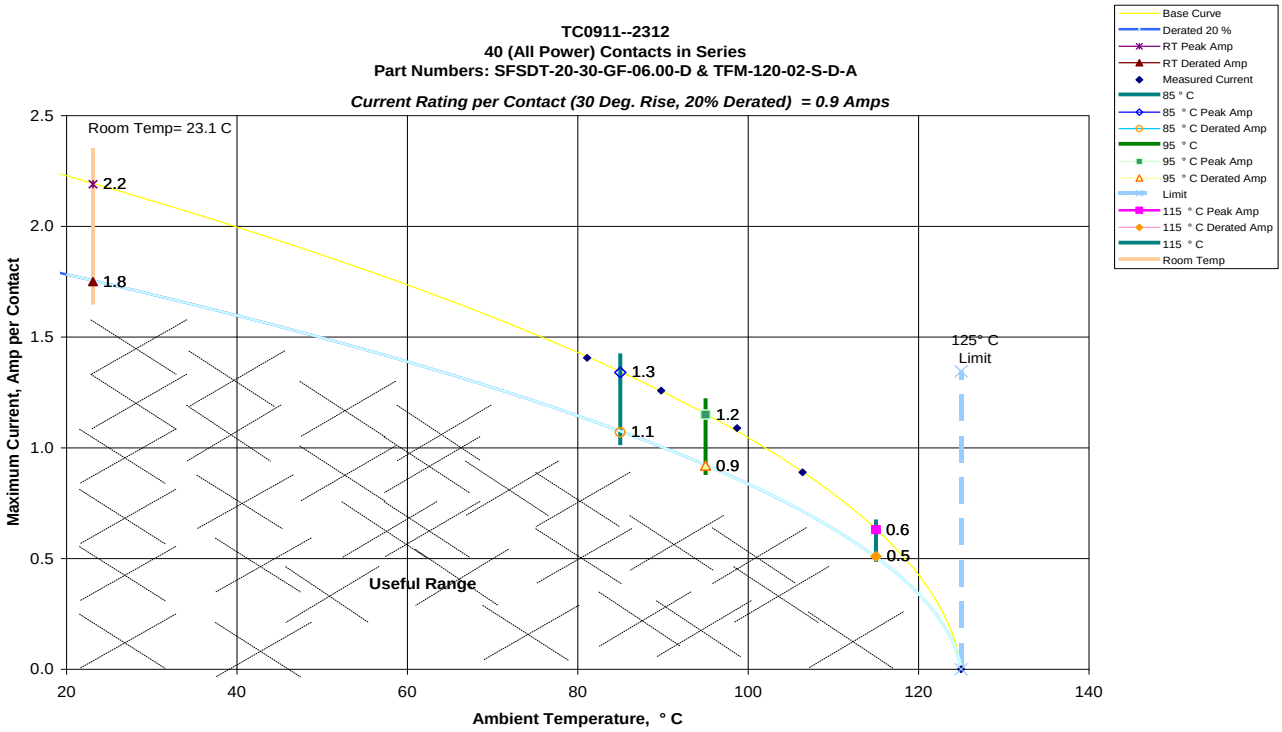
c. Linear configuration with 6 adjacent conductors/contacts powered



d. Linear configuration with 8 adjacent conductors/contacts powered



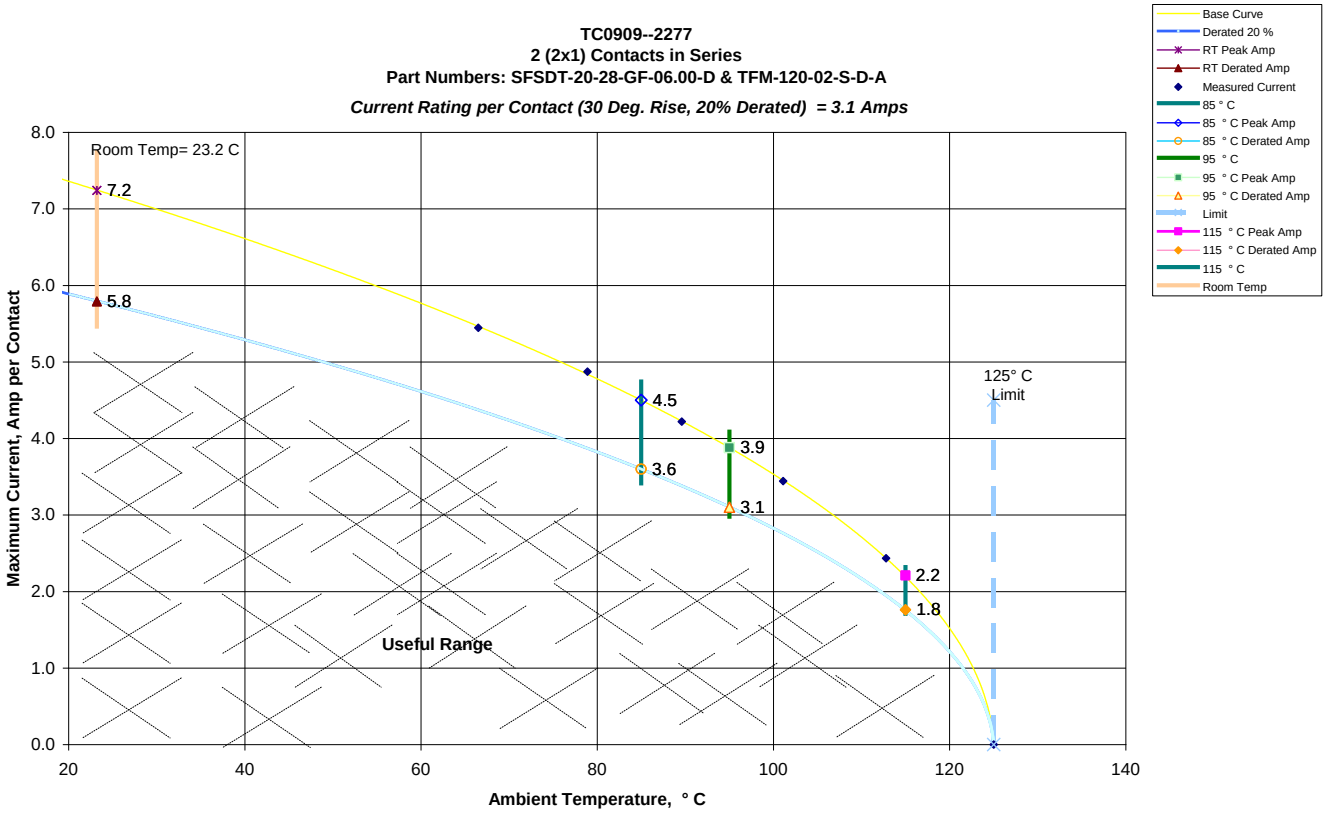
e. Linear configuration with all adjacent conductors/contacts powered



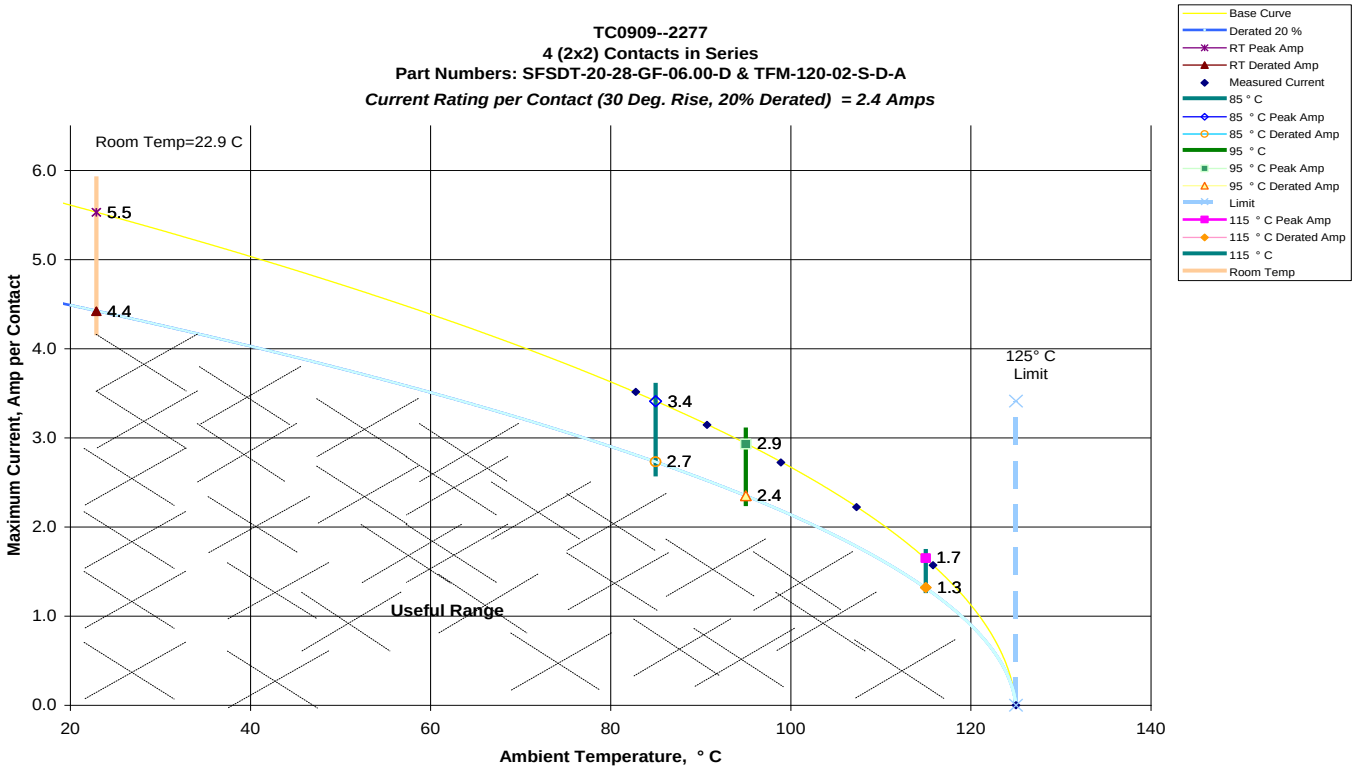
DATA SUMMARIES Continued

28 AWG WIRE

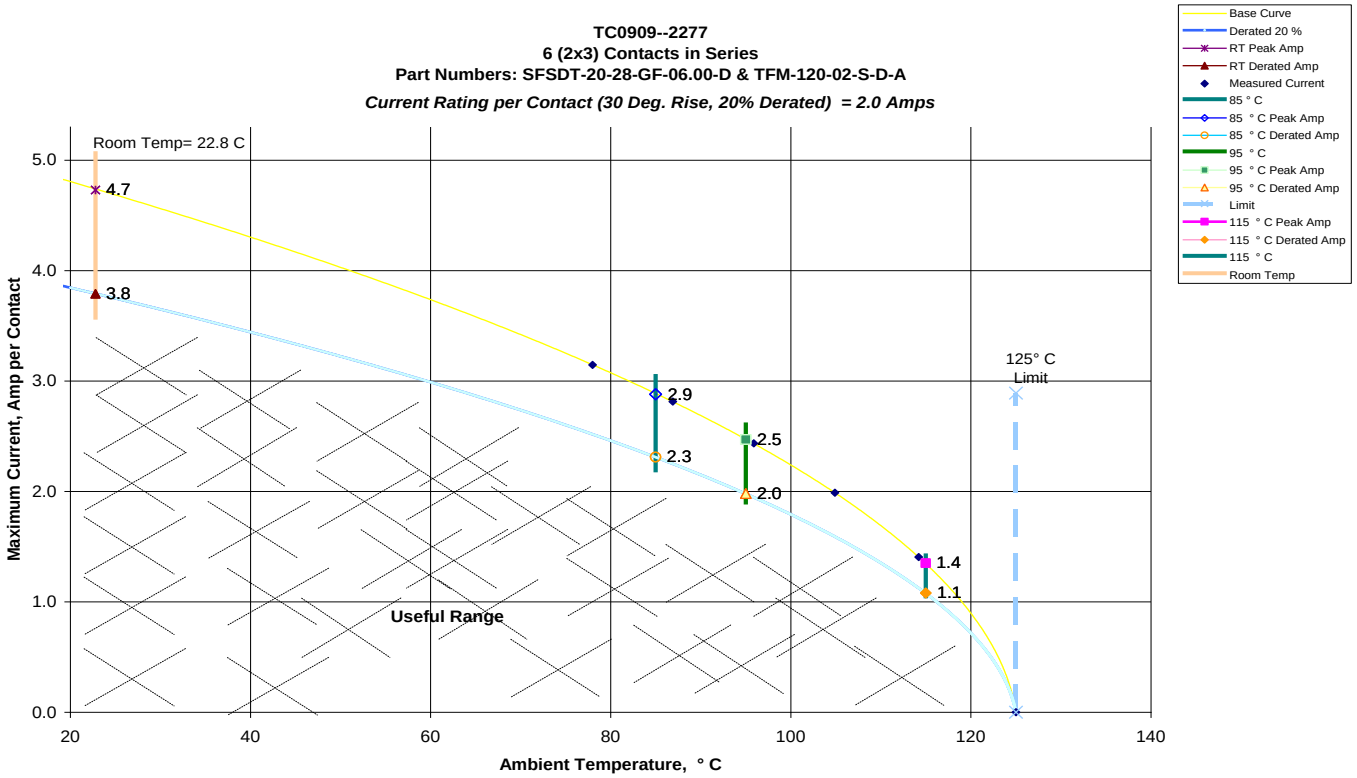
a. Linear configuration with 2 adjacent conductors/contacts powered



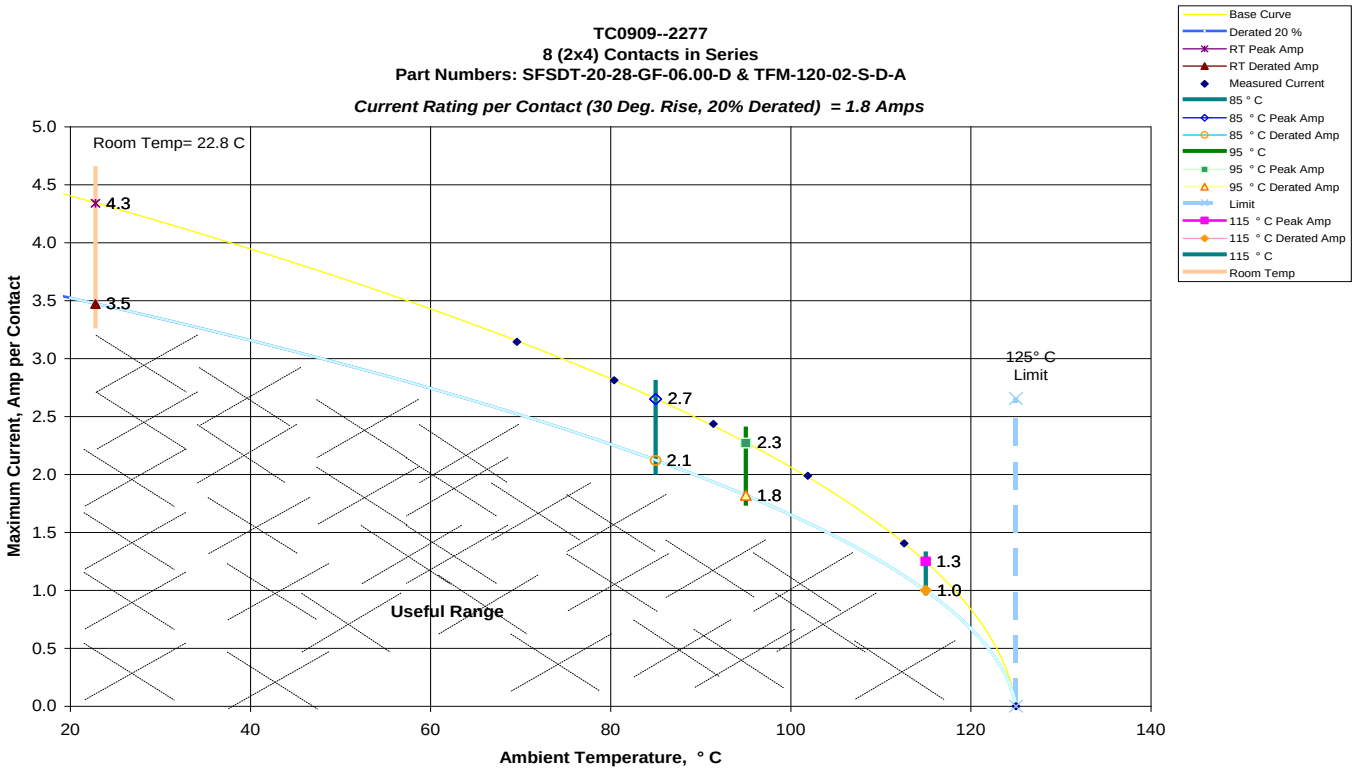
b. Linear configuration with 4 adjacent conductors/contacts powered



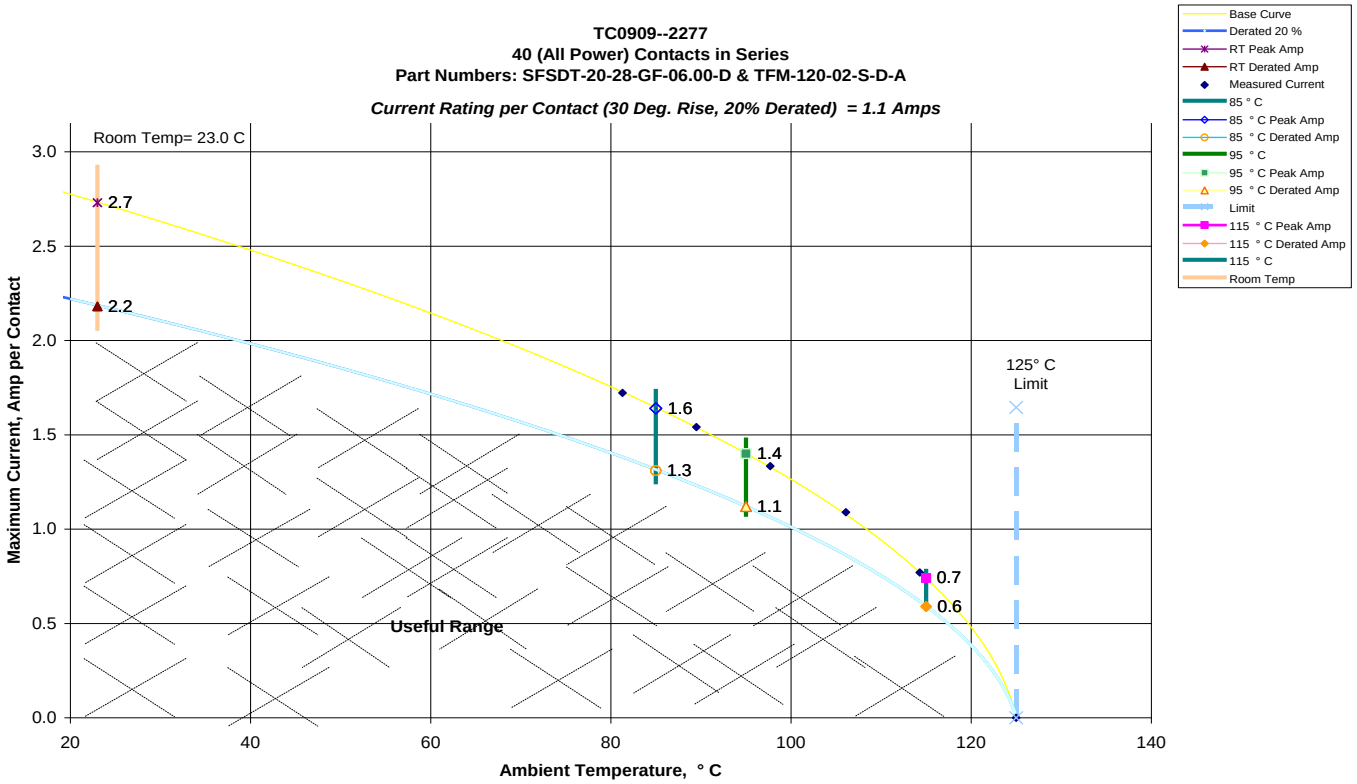
c. Linear configuration with 6 adjacent conductors/contacts powered



d. Linear configuration with 8 adjacent conductors/contacts powered



e. Linear configuration with all adjacent conductors/contacts powered



DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	**SFSDT/TFM**	**SFSDT**	**TFM**
Initial	100000	100000	100000
Thermal	100000	100000	100000
Humidity	8000	9000	100000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**SFSDT/TFM**
Break Down Voltage	1250
Test Voltage	938
Working Voltage	313

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

DATA

INSULATION RESISTANCE (IR):

Initial Insulation Resistance
Measured In Meg Ohms

	Pin to Pin		
	Mated	Unmated	
	X	X	X
Sample#	SFSDT/TFM	SFSDT	TFM
1	100000	100000	100000
2	100000	100000	100000
3	100000	100000	100000
4	100000	100000	100000

Thermal Insulation Resistance
Measured In Meg Ohms

	Pin to Pin		
	Mated	Unmated	
	X	X	X
Sample#	SFSDT/TFM	SFSDT	TFM
1	100,000	100,000	100,000
2	100,000	100,000	100,000
3	100,000	100,000	100,000
4	100,000	100,000	100,000

Humidity Insulation Resistance
Measured In Meg Ohms

	Pin to Pin		
	Mated	Unmated	
	X	X	X
Sample#	SFSDT/TFM	SFSDT	TFM
1	35,000	100,000	100,000
2	15,000	100,000	100,000
3	15,000	12,000	100,000
4	8,000	9,000	100,000

DATA Continued

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Initial Breakdown Voltage
Test Voltage *Until Breakdown Occurs*

	Pin to Pin		
	Mated	Unmated	
	X		
Sample#	SFSDT/TFM	SFSDT	TFM
1	1400	1250	1300
2	1300	1300	1350
3	1400	1350	1450
4	1300	1300	1300

Initial DWV
Test Voltage= 938

	Pin to Pin		
	Mated	Unmated	
Sample#	SFSDT/TFM	SFSDT	TFM
1	938	938	938
2	938	938	938
3	938	938	938
4	938	938	938

Thermal Test Voltage
Test Voltage= 938

	Pin to Pin		
	Mated	Unmated	
Sample#	SFSDT/TFM	SFSDT	TFM
1	938	938	938
2	938	938	938
3	938	938	938
4	938	938	938

DATA Continued

Humidity Test Voltage
Test Voltage= 938

	Pin to Pin		
	Mated	Unmated	
Sample#	SFSDT/TFM	SFSDT	TFM
1	938	938	938
2	938	938	938
3	938	938	938
4	938	938	938

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 06/22/08, Next Cal: 06/22/09

Equipment #: STG-01
Description: Hipot Megometer Safety Test Cage
Manufacturer: Hipotronics
Model: TC-25
Serial #: M9910141
Accuracy: N/A
… Last Cal: No Calibration Required

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: 06/16/2008, Next Cal: 06/16/2009

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 03/10/09, Next Cal: 03/10/10