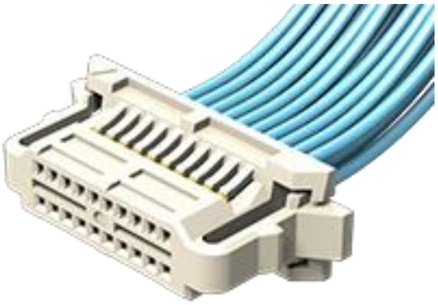
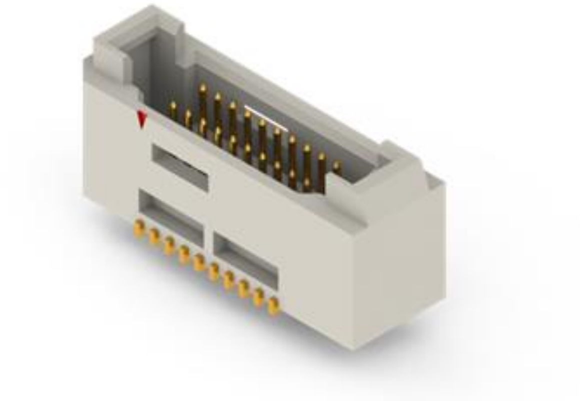
Project Number: Design Qualification Test Report	Tracking Code: 341101_Report_Rev_2
Requested by: Travis Newton	Date: 8/5/2016
Part #: SESDT-20-32-G-06.0-L/TEM-120-02-03.0-G-D-L1	Tech: Troy Cook
Part description: SESDT/TEM	Qty to test: 95
Test Start: 05/10/2014	Test Completed: 06/16/2014





DESIGN QUALIFICATION TEST REPORT

SESDT/TEM
SESDT-20-32-G-06.0-L/TEM-120-02-03.0-G-D-L1

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
10/22/2014	**1**	**Initial Issue**	**PC**
08/05/2016	**2**	**Add the ELP test data**	**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.

SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead free
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-106088-TST/ PCB-106089-TST/PCB-106090-TST.

FLOWCHARTS

Gas Tight

Group 1
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
8 Assemblies

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

---

(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
SESDT-20-32-G-06.0-L

8 Contacts Minimum
Signal Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force(1) Deflection = 0.00310 " Expected Force at Max Deflection = 28 g

Group 2
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
8 Contacts Minimum
Signal With Thermals

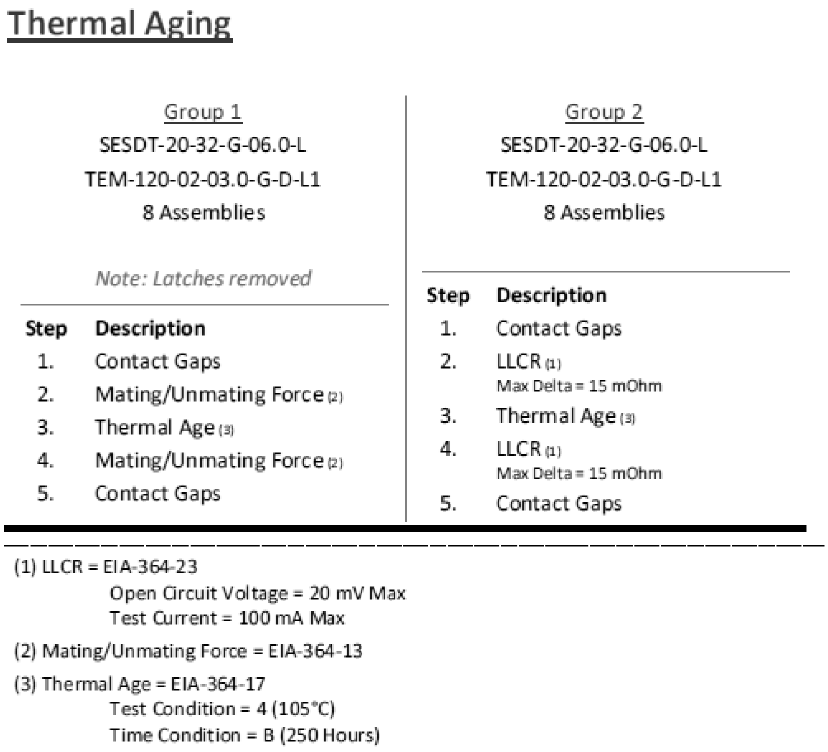
Step	Description
1.	Contact Gaps
2.	Thermal Age(2)
3.	Contact Gaps
4.	Normal Force(1) Deflection = 0.00310 " Expected Force at Max Deflection = 28 g

---

(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
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
8 Assemblies

Note: Latches removed

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force (2)
3.	Thermal Age (3)
4.	Mating/Unmating Force (2)
5.	Contact Gaps

Group 2
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
8 Assemblies

Step	Description
1.	Contact Gaps
2.	LLCR (1) Max Delta = 15 mOhm
3.	Thermal Age (3)
4.	LLCR (1) Max Delta = 15 mOhm
5.	Contact Gaps

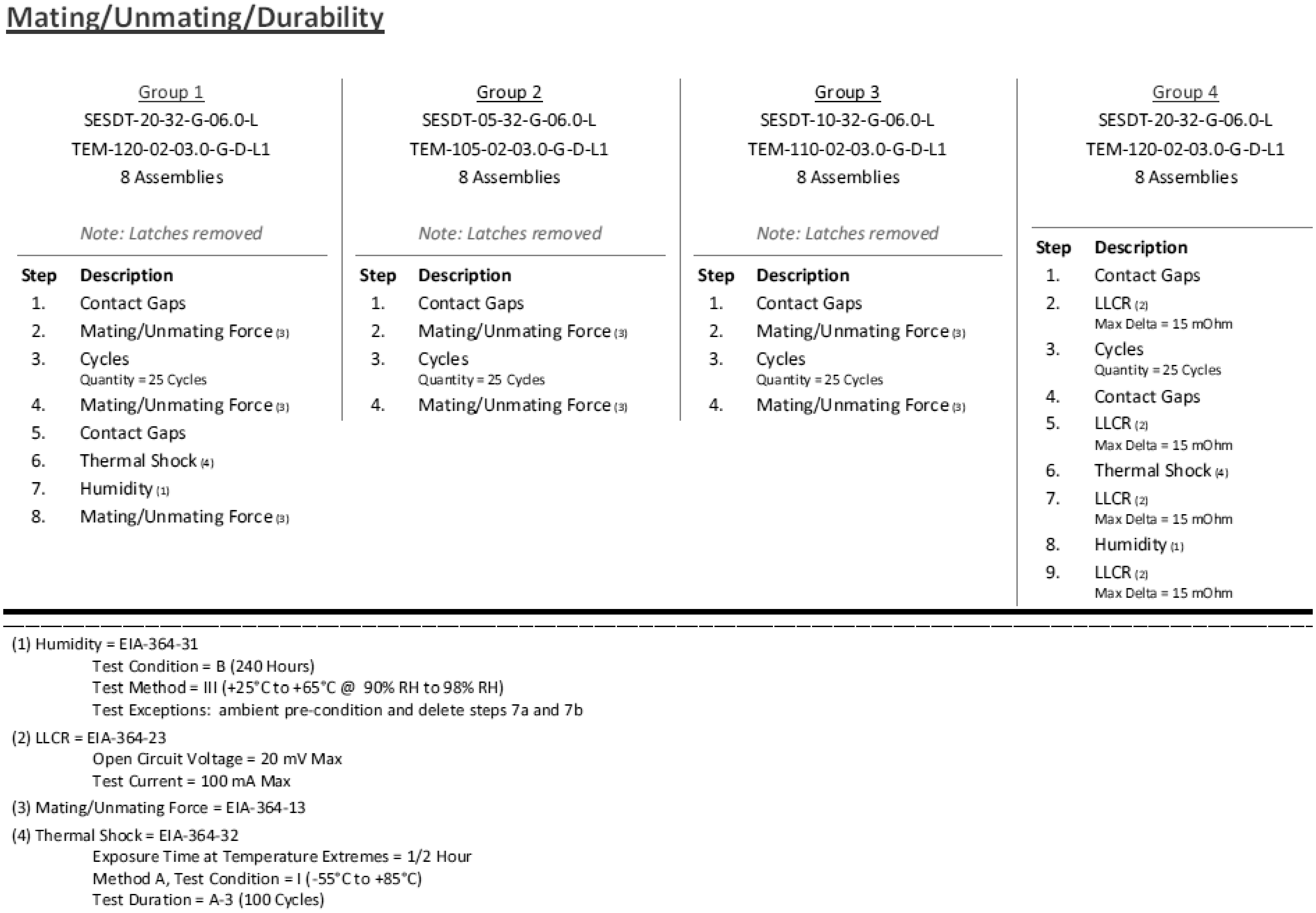
---

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

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

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

FLOWCHARTS Continued



Mating/Unmating/Durability

Group 1
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
8 Assemblies

Note: Latches removed

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

Group 2
SESDT-05-32-G-06.0-L
TEM-105-02-03.0-G-D-L1
8 Assemblies

Note: Latches removed

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force (3)
3.	Cycles Quantity = 25 Cycles
4.	Mating/Unmating Force (3)

Group 3
SESDT-10-32-G-06.0-L
TEM-110-02-03.0-G-D-L1
8 Assemblies

Note: Latches removed

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force (3)
3.	Cycles Quantity = 25 Cycles
4.	Mating/Unmating Force (3)

Group 4
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
8 Assemblies

Step	Description
1.	Contact Gaps
2.	LLCR (2) Max Delta = 15 mOhm
3.	Cycles Quantity = 25 Cycles
4.	Contact Gaps
5.	LLCR (2) Max Delta = 15 mOhm
6.	Thermal Shock (4)
7.	LLCR (2) Max Delta = 15 mOhm
8.	Humidity (1)
9.	LLCR (2) Max Delta = 15 mOhm

---

(1) Humidity = EIA-364-31
Test Condition = B (240 Hours)
Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)
Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(2) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

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

(4) Thermal Shock = EIA-364-32
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = I (-55°C to +85°C)
Test Duration = A-3 (100 Cycles)

---

(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
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 2
SESDT-20-32-G-06.0-L
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 3
TEM-120-02-03.0-G-D-L1
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 4
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
2 Assemblies

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

Row-to-Row

Group 5
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 6
SESDT-20-32-G-06.0-L
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 7
TEM-120-02-03.0-G-D-L1
2 Assemblies

Step	Description
1.	DWV Breakdown (2)

Group 8
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
2 Assemblies

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

---

(1) DWV at Test Voltage = EIA-364-20
Test Condition = 1 (Sea Level)
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds

(2) DWV Breakdown = EIA-364-20
Test Condition = 1 (Sea Level)
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds

(3) Humidity = EIA-364-31
Test Condition = B (240 Hours)
Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)
Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(4) IR = EIA-364-21
Test Condition = 500 Vdc, 2 Minutes Max

(5) Thermal Shock = EIA-364-32
Exposure Time at Temperature Extremes = 1/2 Hour
Method A, Test Condition = I (-55°C to +85°C)
Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued

Current Carrying Capacity

Group 1
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
2 Pins Powered
Signal

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

Group 2
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
4 Pins Powered
Signal

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

Group 3
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
6 Pins Powered
Signal

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

Group 4
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
8 Pins Powered
Signal

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

Group 5
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
40 Pins Powered
Signal

Step	Description
1.	CCC (1) Rows = 2 Number of Positions = 20

---

(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

Mechanical Shock/Random Vibration/LLCR

Group 1
SESDT-20-32-G-12.0-L
TEM-120-02-03.0-G-D-L1
8 Assemblies

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

FLOWCHARTS Continued

Mechanical Shock/Random Vibration/Event Detection

Group 1
SESDT-20-32-G-12.0-L
TEM-120-02-03.0-G-D-L1
60 Points

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)

Cable Pull

Group 1
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
5 Assemblies
0 Degrees

Step	Description
1.	Cable Pull (1)

Group 2
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
5 Assemblies
90 Degrees

Step	Description
1.	Cable Pull (1)

Group 3
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
5 Assemblies
90 Degrees Transverse

Step	Description
1.	Cable Pull (1)

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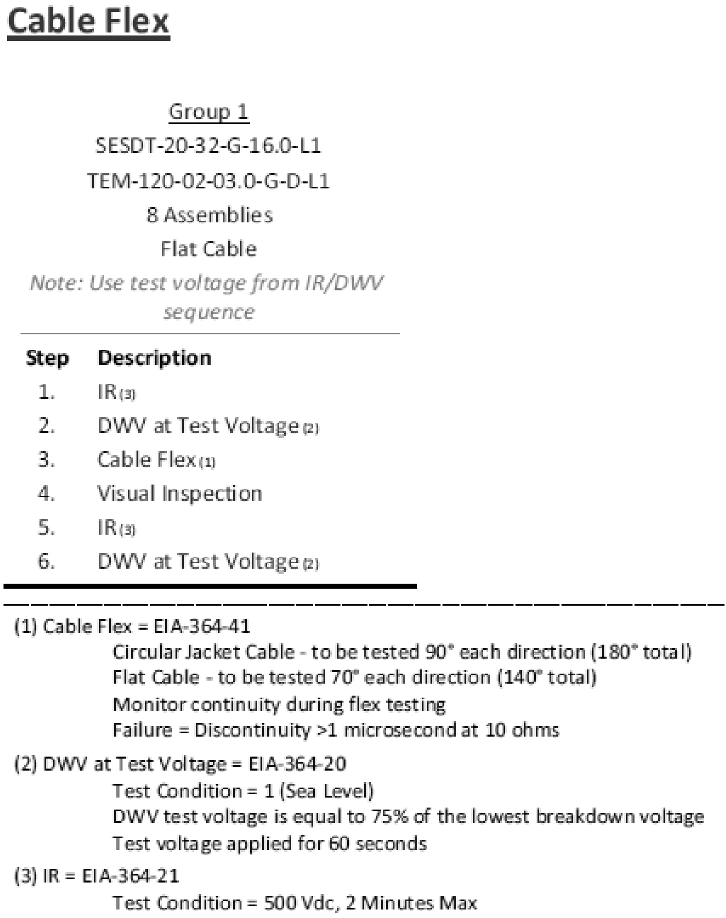
(1) Cable Pull = EIA-364-38
Measure and Record Force Required to Failure
Failure = Discontinuity >1 microsecond at 10 ohms

FLOWCHARTS Continued



Cable Flex

Group 1
SESDT-20-32-G-16.0-L1
TEM-120-02-03.0-G-D-L1
8 Assemblies
Flat Cable
Note: Use test voltage from IR/DWV sequence

Step	Description
1.	IR (3)
2.	DWV at Test Voltage (2)
3.	Cable Flex (1)
4.	Visual Inspection
5.	IR (3)
6.	DWV at Test Voltage (2)

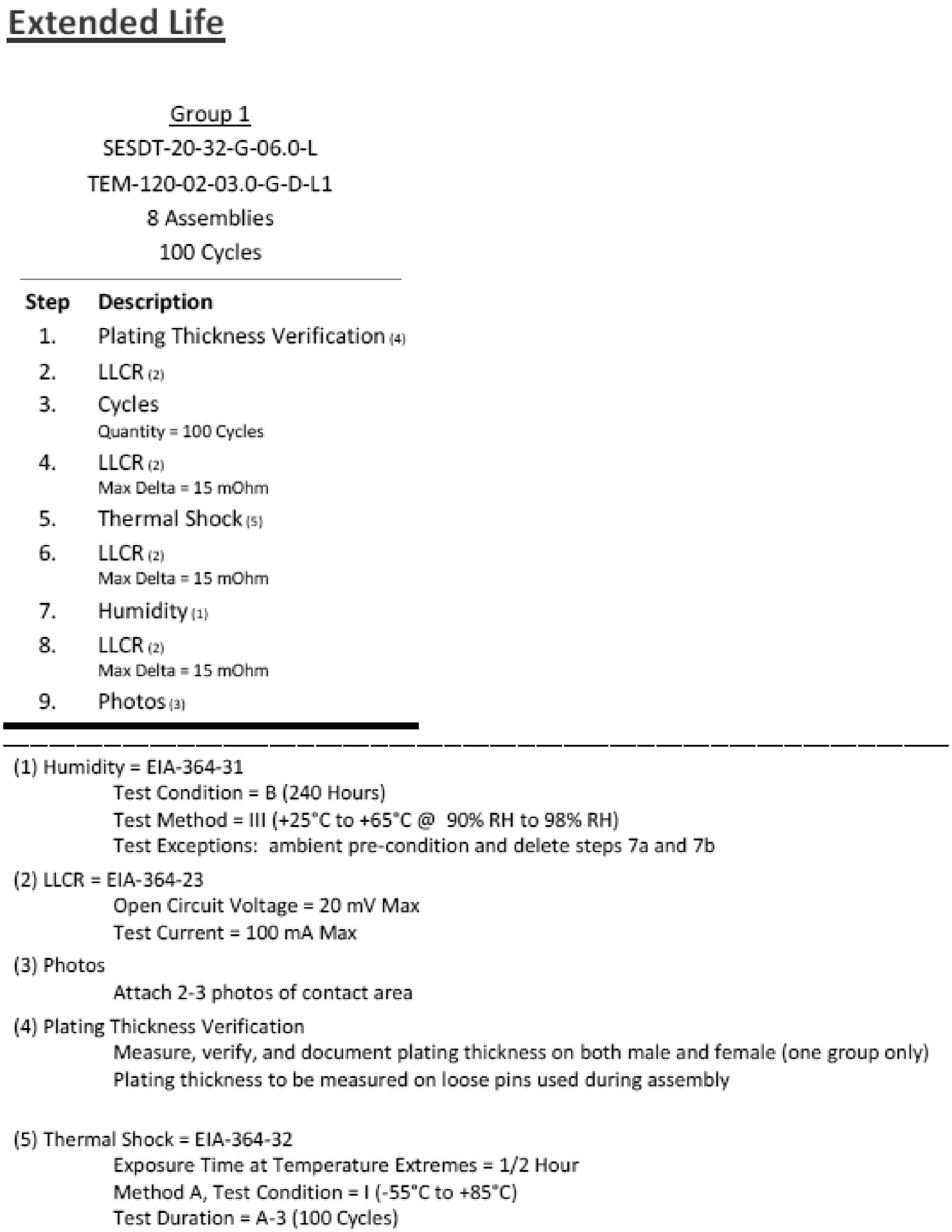
---

(1) Cable Flex = EIA-364-41
Circular Jacket Cable - to be tested 90° each direction (180° total)
Flat Cable - to be tested 70° each direction (140° total)
Monitor continuity during flex testing
Failure = Discontinuity >1 microsecond at 10 ohms

(2) 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

(3) IR = EIA-364-21
Test Condition = 500 Vdc, 2 Minutes Max

FLOWCHARTS Continued



Extended Life

Group 1
SESDT-20-32-G-06.0-L
TEM-120-02-03.0-G-D-L1
8 Assemblies
100 Cycles

Step	Description
1.	Plating Thickness Verification (4)
2.	LLCR (2)
3.	Cycles Quantity = 100 Cycles
4.	LLCR (2) Max Delta = 15 mOhm
5.	Thermal Shock (5)
6.	LLCR (2) Max Delta = 15 mOhm
7.	Humidity (1)
8.	LLCR (2) Max Delta = 15 mOhm
9.	Photos (3)

---

(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) Photos
Attach 2-3 photos of contact area

(4) Plating Thickness Verification
Measure, verify, and document plating thickness on both male and female (one group only)
Plating thickness to be measured on loose pins used during assembly

(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)

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.

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.

MECHANICAL SHOCK (Specified Pulse):

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

VIBRATION:

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

NANOSECOND-EVENT DETECTION:

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

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

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

LLCR:

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

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

GAS TIGHT:

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

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

NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):

1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
2) The contacts shall be tested in the loose state, *not* inserted in connector housing.
3) The contacts shall be prepared to allow access to the spring member at the same attitude and deflection level as would occur in actual use.
4) In the event that portions of the contact prevent insertion of the test probe and/or deflection of the spring member under evaluation, said material shall be removed leaving the appropriate contact surfaces exposed.
5) In the case of multi-tine contacts, each tine shall be tested independently on separate samples as required.
6) The connector housing shall be simulated, if required, in order to provide an accurate representation of the actual contact system performance.
7) A holding fixture shall be fashioned to allow the contact to be properly deflected.
8) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC^2, computer controlled test stand with a deflection measurement system accuracy of 5 µm (0.0002”).
9) The probe shall be attached to a Dillon P/N 49761-0105, 5 N (1.1 Lb) load cell providing an accuracy of ± 0.2%.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

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 printout 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 1000 megohms.

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

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

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

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

CONNECTOR PULL:

1) Secure cable near center and pull on connector
    a. At 90°, right angle to cable
    b. At 0°, in-line with cable

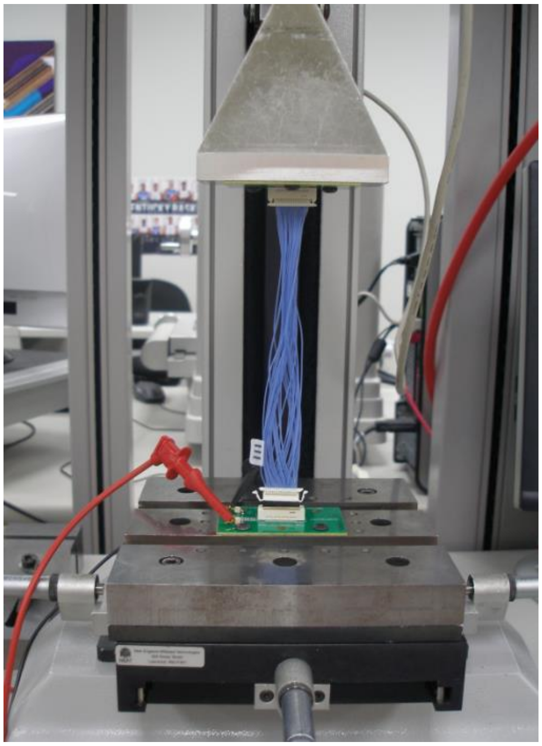


Fig. 1

0° Connector pull, notice the electrical continuity hook-up wires.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

CABLE DURABILITY:

1) Oscillate and monitor electrical continuity for open circuit indication.
    a. ± 70° Pendulum Mode, bend up to 500 cycles with 9.6 oz. load on cable end.

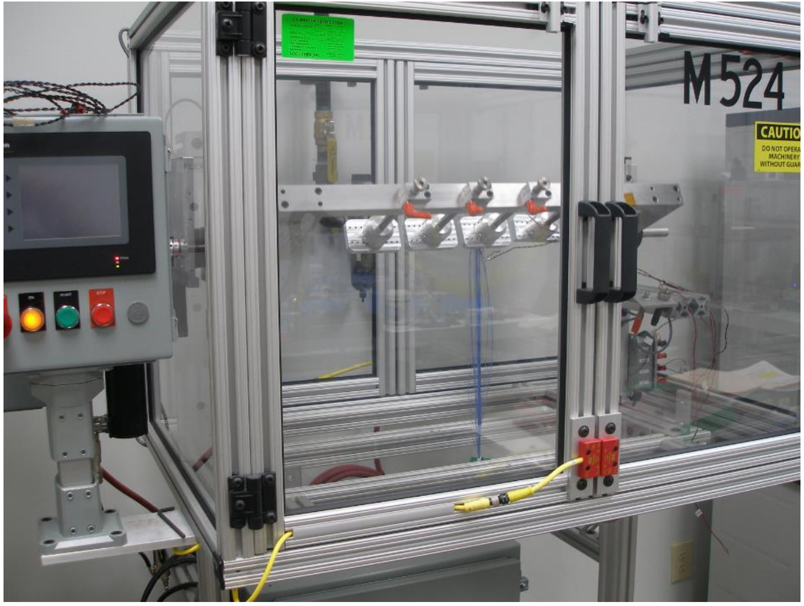


Fig. 2

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise----------1.9 A per contact with 2 contacts (2x1) powered**
- **CCC for a 30°C Temperature Rise----------1.6 A per contact with 4 contacts (2x2) powered**
- **CCC for a 30°C Temperature Rise----------1.3 A per contact with 6 contacts (2x3) powered**
- **CCC for a 30°C Temperature Rise----------1.1 A per contact with 8 contacts (2x4) powered**
- **CCC for a 30°C Temperature Rise----------0.6 A per contact with 40 contacts (2x20) powered**

Mating – Unmating Forces

Thermal Aging Group （SESDT-20-32-G-06.0-L/TEM-120-02-03.0-G-D-L1）

- **Initial**
  - **Mating**
    - **Min -------------------------------------- 2.19 Lbs**
    - **Max-------------------------------------- 3.00 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 2.02 Lbs**
    - **Max-------------------------------------- 2.58 Lbs**
- **After Thermal**
  - **Mating**
    - **Min -------------------------------------- 1.31 Lbs**
    - **Max-------------------------------------- 2.00 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 0.98 Lbs**
    - **Max-------------------------------------- 1.41 Lbs**

Mating – Unmating Forces

Mating-Unmating Durability Group（SESDT-20-32-G-06.0-L/TEM-120-02-03.0-G-D-L1）

- **Initial**
  - **Mating**
    - **Min -------------------------------------- 2.04 Lbs**
    - **Max-------------------------------------- 3.45 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 1.52 Lbs**
    - **Max-------------------------------------- 2.72 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min -------------------------------------- 2.34 Lbs**
    - **Max-------------------------------------- 3.79 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 1.64 Lbs**
    - **Max-------------------------------------- 2.37 Lbs**
- **Humidity**
  - **Mating**
    - **Min -------------------------------------- 1.67 Lbs**
    - **Max-------------------------------------- 2.05 Lbs**
  - **Unmating**
    - **Min -------------------------------------- 1.21 Lbs**
    - **Max-------------------------------------- 1.67 Lbs**

RESULTS Continued

Mating – Unmating Forces

Mating-Unmating Basic （SESDT-10-32-G-06.0-L/TEM-110-02-03.0-G-D-L1）

- **Initial**
    - **Mating**
        - **Min -------------------------------------- 1.31 Lbs**
        - **Max-------------------------------------- 1.54 Lbs**
    - **Unmating**
        - **Min -------------------------------------- 1.02 Lbs**
        - **Max-------------------------------------- 1.12 Lbs**
- **After 25 Cycles**
    - **Mating**
        - **Min -------------------------------------- 1.04 Lbs**
        - **Max-------------------------------------- 1.27 Lbs**
    - **Unmating**
        - **Min -------------------------------------- 0.87 Lbs**
        - **Max-------------------------------------- 1.06 Lbs**

Mating-Unmating Basic （SESDT-05-32-G-06.0-L/TEM-120-05-03.0-G-D-L1）

- **Initial**
    - **Mating**
        - **Min -------------------------------------- 0.56 Lbs**
        - **Max-------------------------------------- 0.62 Lbs**
    - **Unmating**
        - **Min -------------------------------------- 0.55 Lbs**
        - **Max-------------------------------------- 0.76 Lbs**
- **After 25 Cycles**
    - **Mating**
        - **Min -------------------------------------- 0.65 Lbs**
        - **Max-------------------------------------- 0.72 Lbs**
    - **Unmating**
        - **Min -------------------------------------- 0.48 Lbs**
        - **Max-------------------------------------- 0.70 Lbs**

Normal Force at 0.0112 inch deflection

- **Initial**
    - **Min---25.70 gf Set ----- 0.0001 in**
    - **Max --37.90 gf Set ----- 0.0024 in**
- **Thermal**
    - **Min---16.10 gf Set ----- 0.0000 in**
    - **Max --27.80 gf Set ----- 0.0013 in**

Cable pull force

- **0° Pull**
    - **Min-- 8.12 Lbs**
    - **Max --- 8.77 Lbs**
- **90° Pull**
    - **Min-- 9.61 Lbs**
    - **Max --10.04 Lbs**
- **90° Pull (Traverse)**
    - **Min-- 5.53 Lbs**
    - **Max --- 6.10 Lbs**

RESULTS Continued

Insulation Resistance minimums, IR

Pin to Pin

- **Initial**
  - **Mated--45000 Meg Ω ------------------------ Passed**
  - **Unmated --35000 Meg Ω ------------------------ Passed**
- **Thermal Shock**
  - **Mated--45000 Meg Ω ------------------------ Passed**
  - **Unmated --45000 Meg Ω ------------------------ Passed**
- **Humidity**
  - **Mated-- 1330 Meg Ω ------------------------ Passed**
  - **Unmated -- 1120 Meg Ω ------------------------ Passed**

Row to Row

- **Initial**
  - **Mated--45000 Meg Ω ------------------------ Passed**
  - **Unmated --45000 Meg Ω ------------------------ Passed**
- **Thermal Shock**
  - **Mated--45000 Meg Ω ------------------------ Passed**
  - **Unmated --45000 Meg Ω ------------------------ Passed**
- **Humidity**
  - **Mated-- 1090 Meg Ω ------------------------ Passed**
  - **Unmated -- 1170 Meg Ω ------------------------ Passed**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage----------------------------------830 VAC**
  - **Test Voltage --625 VAC**
  - **Working Voltage -------------------------------------205 VAC**

Pin to Pin

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

Row to Row

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

RESULTS Continued

CABLE FLEX

Insulation Resistance minimums, IR

Pin to Pin

- **Initial**
    - **Mated---23000 Meg Ω ------------------------ Passed**
- **After flex test**
    - **Mated---17800 Meg Ω ------------------------ Passed**

Pin to Ground

- **Initial**
    - **Mated---45000 Meg Ω ------------------------ Passed**
- **After flex test**
    - **Mated---27000 Meg Ω ------------------------ Passed**

Dielectric Withstanding Voltage minimums, DWV

Pin to Pin

- **Initial DWV ---Passed**
- **After Flex DWV--Passed**

Pin to Ground

- **Initial DWV ---Passed**
- **After Flex DWV--Passed**

LLCR Thermal Aging Group (192 LLCR test points)

- **Initial -- 94.20mOhms Max**
- **Thermal**
    - **<= +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 Mating/Unmating Durability Group (192 LLCR test points)

- **Initial -- 89.88 mOhms Max**
- **Durability, 25 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**
- **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**

RESULTS Continued

- **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**

LLCR Gas Tight Group (192 LLCR test points)

- **Initial -- 91.14 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms --------------------------------- 192 Points ------------------------ Stable**
  - **+5.1 to +10.0 mOhms ---------------------------------0 Points ------------------------ Minor**
  - **+10.1 to +15.0 mOhms --------------------------------0 Points ------------------------ Acceptable**
  - **+15.1 to +50.0 mOhms --------------------------------0 Points ------------------------ Marginal**
  - **+50.1 to +2000 mOhms--------------------------------0 Points ------------------------ Unstable**
  - **>+2000 mOhms--0 Points ------------------------ Open Failure**

LLCR Shock & Vibration Group (192 LLCR test points)

- **Initial --176.63 mOhms Max**
- **Shock &Vibration**
  - **<= +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**

Mechanical Shock & Random Vibration:

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

RESULTS Continued

LLCR Extended Life (192 LLCR test points)

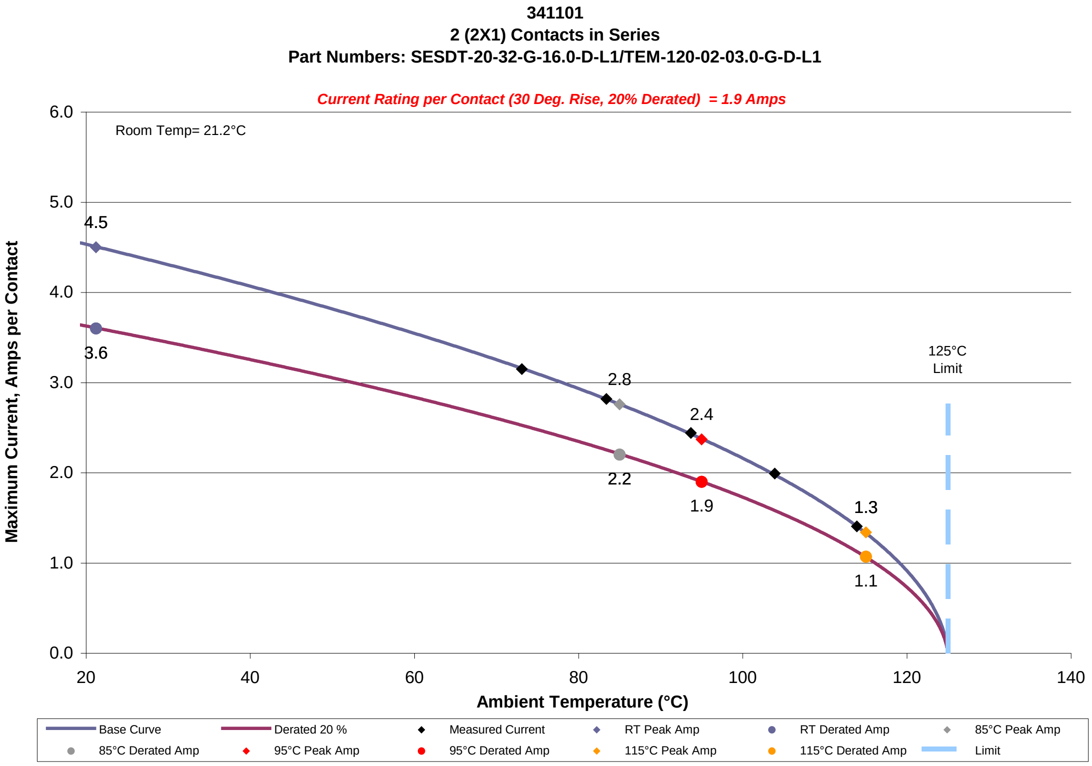
- **Initial -- 70.83 mOhms Max**
- **Durability, 100 Cycles**
    - **<= +5.0 mOhms ---------------------------------- 192 Points ------------------------ Stable**
    - **+5.1 to +10.0 mOhms ---------------------------------- 0 Points ------------------------ Minor**
    - **+10.1 to +15.0 mOhms -------------------------------- 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**
- **Thermal Shock**
    - **<= +5.0 mOhms ---------------------------------- 191 Points ------------------------ Stable**
    - **+5.1 to +10.0 mOhms ---------------------------------- 1 Points ------------------------ Minor**
    - **+10.1 to +15.0 mOhms -------------------------------- 0 Points ------------------------ Acceptable**
    - **+15.1 to +50.0 mOhms -------------------------------- 0 Points ------------------------ Marginal**
    - **+50.1 to +2000 mOhms ------------------------------- 0 Points ------------------------ Unstable**
    - **>+2000 mOhms -- 0 Points ------------------------ Open Failure**
- **Humidity**
    - **<= +5.0 mOhms ---------------------------------- 191 Points ------------------------ Stable**
    - **+5.1 to +10.0 mOhms ---------------------------------- 1 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**

DATA SUMMARIES

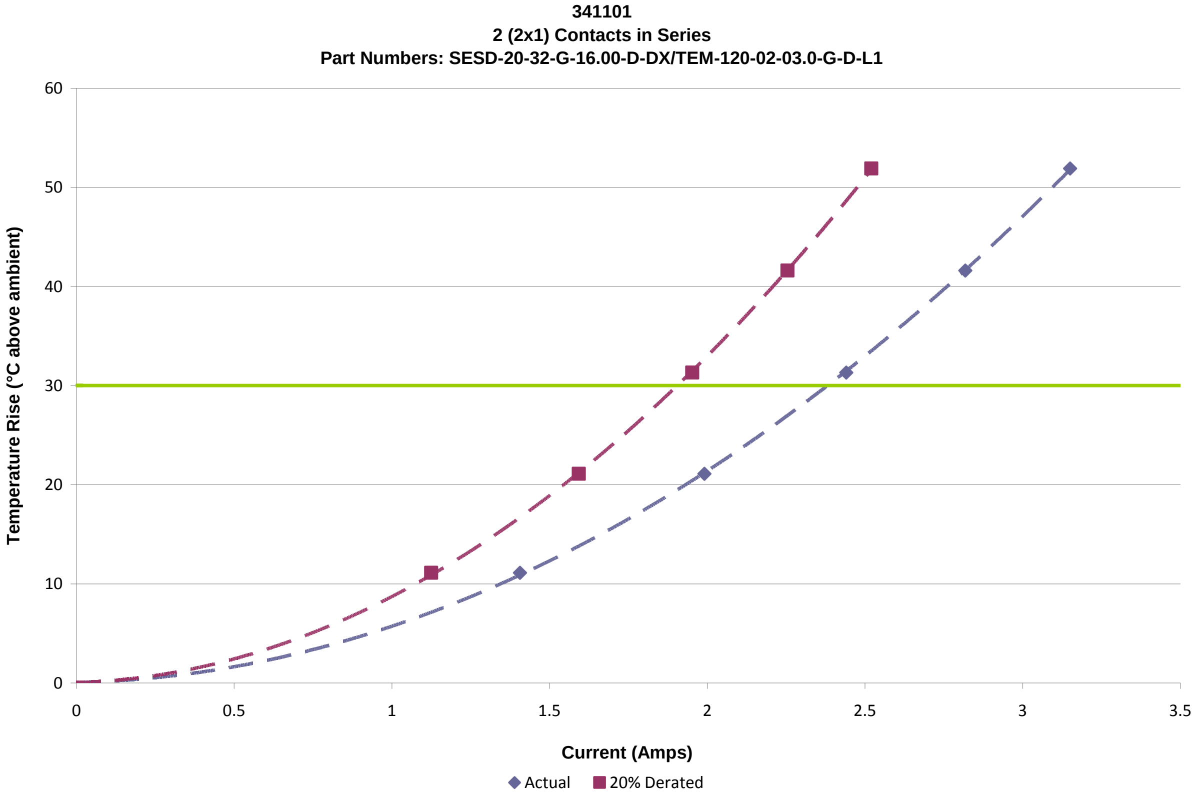
TEMPERATURE RISE (Current Carrying Capacity, CCC):

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 conductors/contacts powered

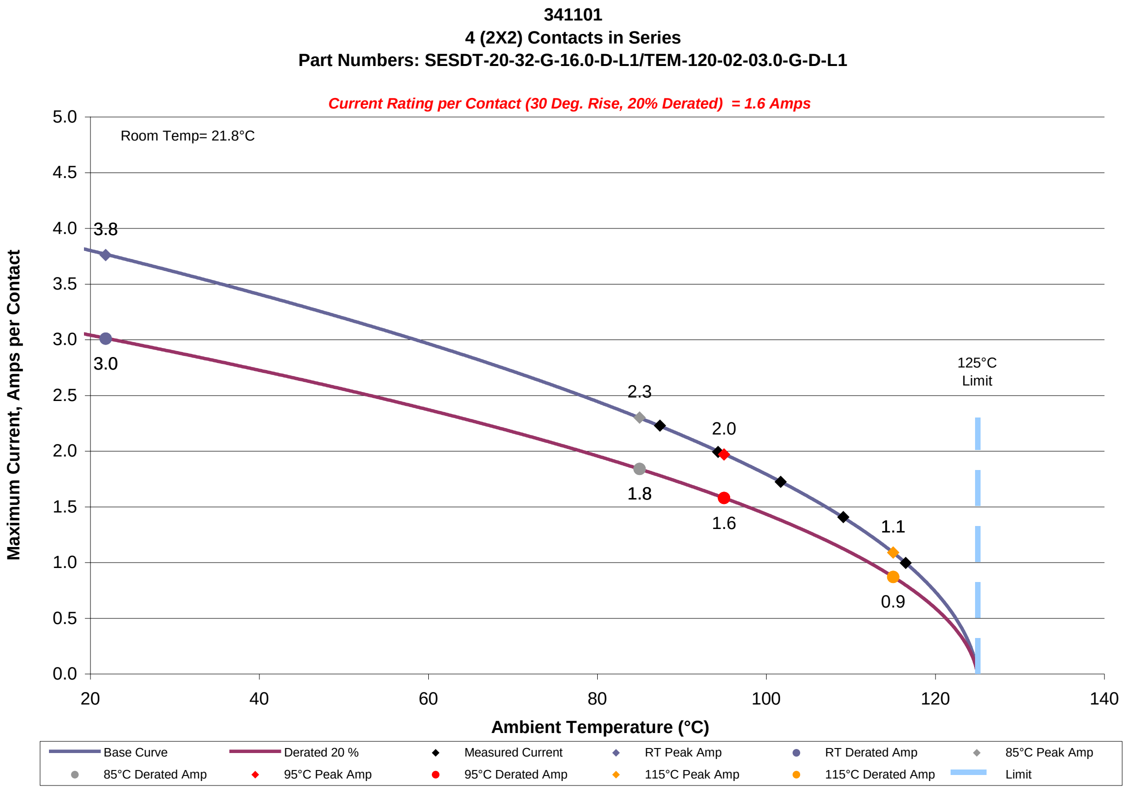


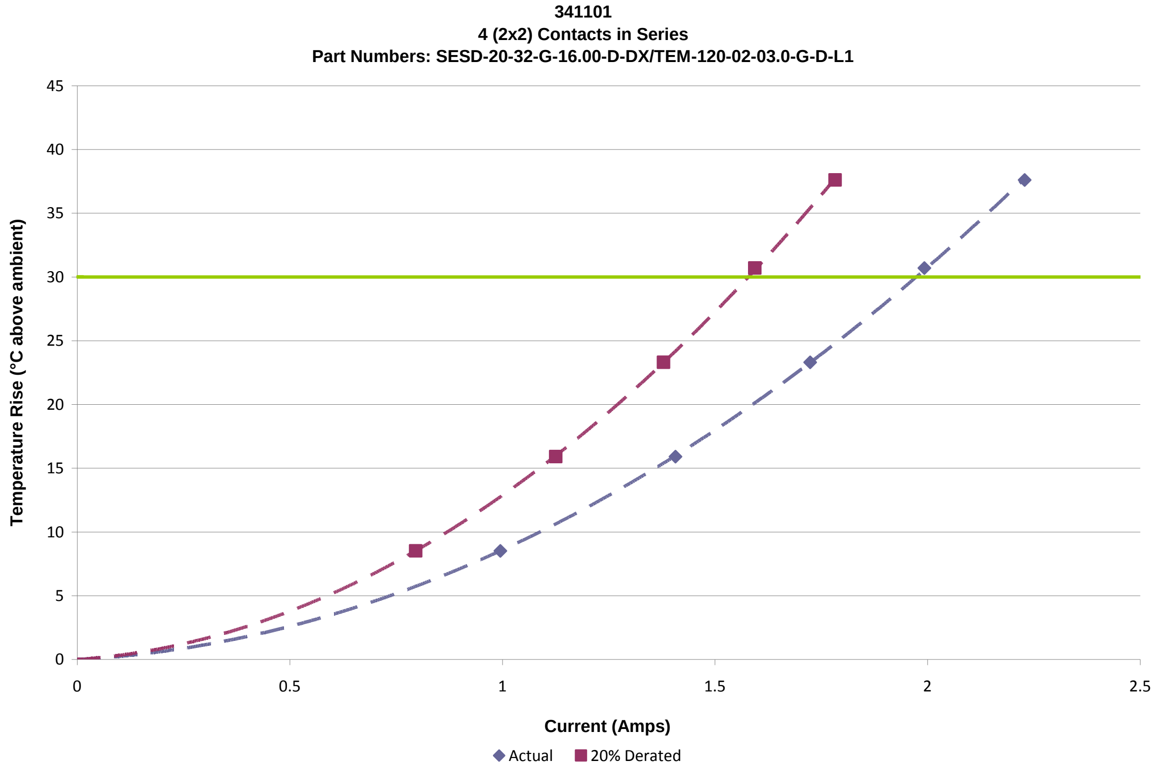
DATA SUMMARIES Continued



DATA SUMMARIES Continued

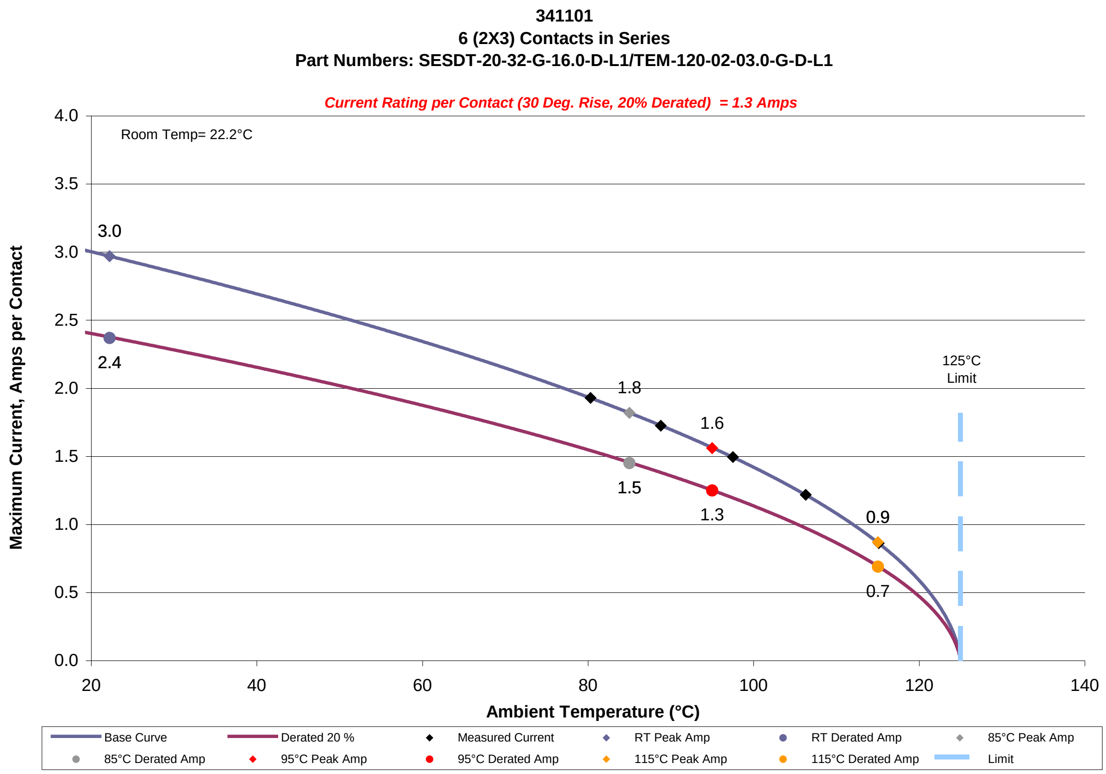
b. Linear configuration with 4 adjacent conductors/contacts powered

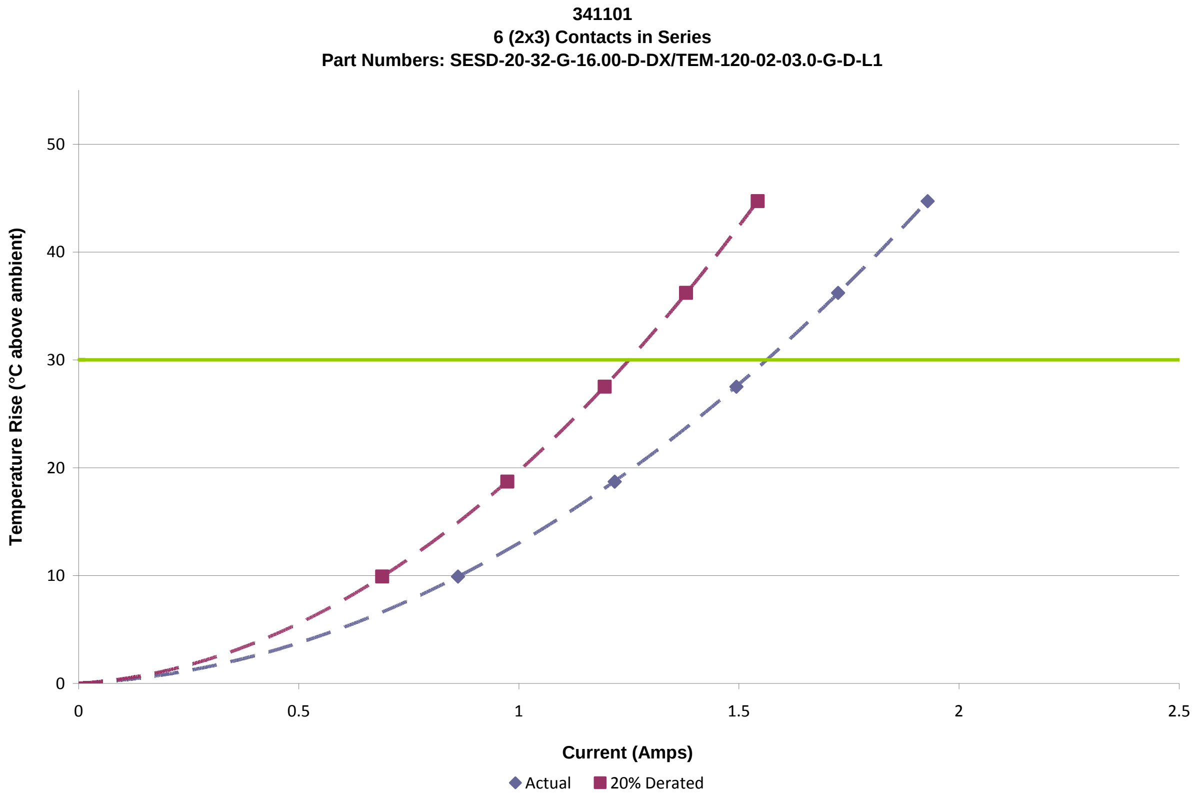

341101
4 (2X2) Contacts in Series
Part Numbers: SESDT-20-32-G-16.0-D-L1/TEM-120-02-03.0-G-D-L1


341101
4 (2x2) Contacts in Series
Part Numbers: SESD-20-32-G-16.00-D-DX/TEM-120-02-03.0-G-D-L1

DATA SUMMARIES Continued

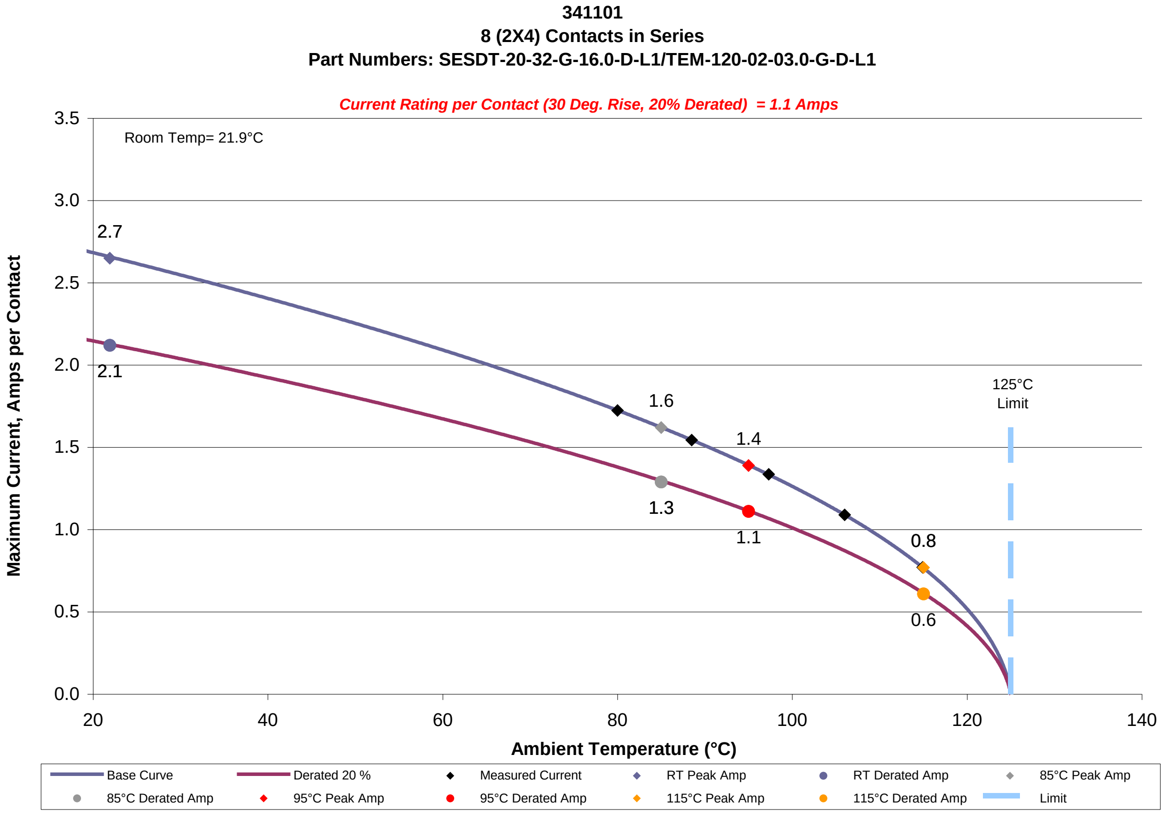
c. Linear configuration with 6 adjacent conductors/contacts powered

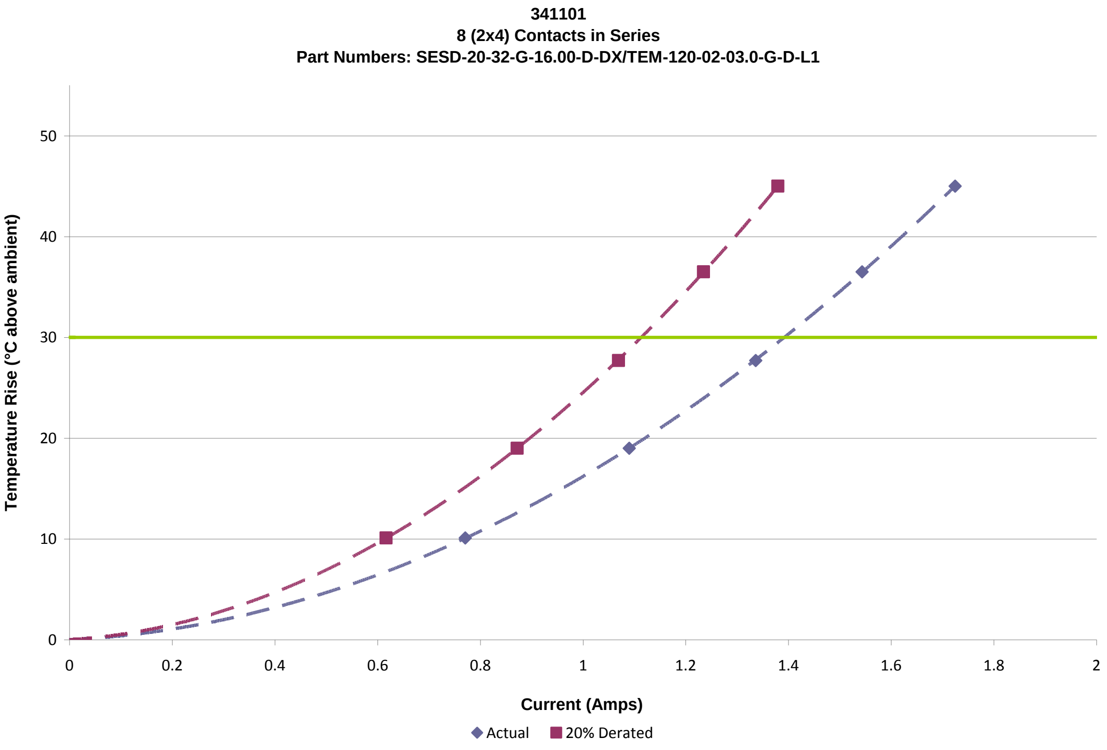




DATA SUMMARIES Continued

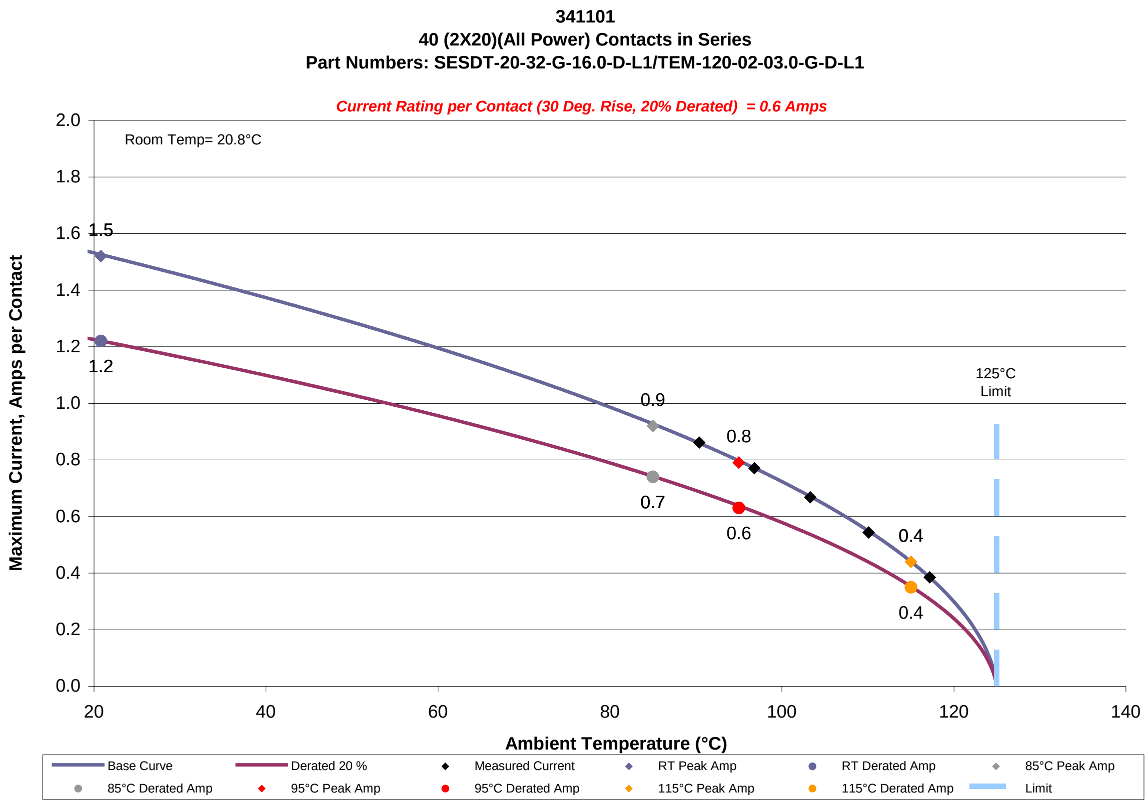
d. Linear configuration with 8 adjacent conductors/contacts powered



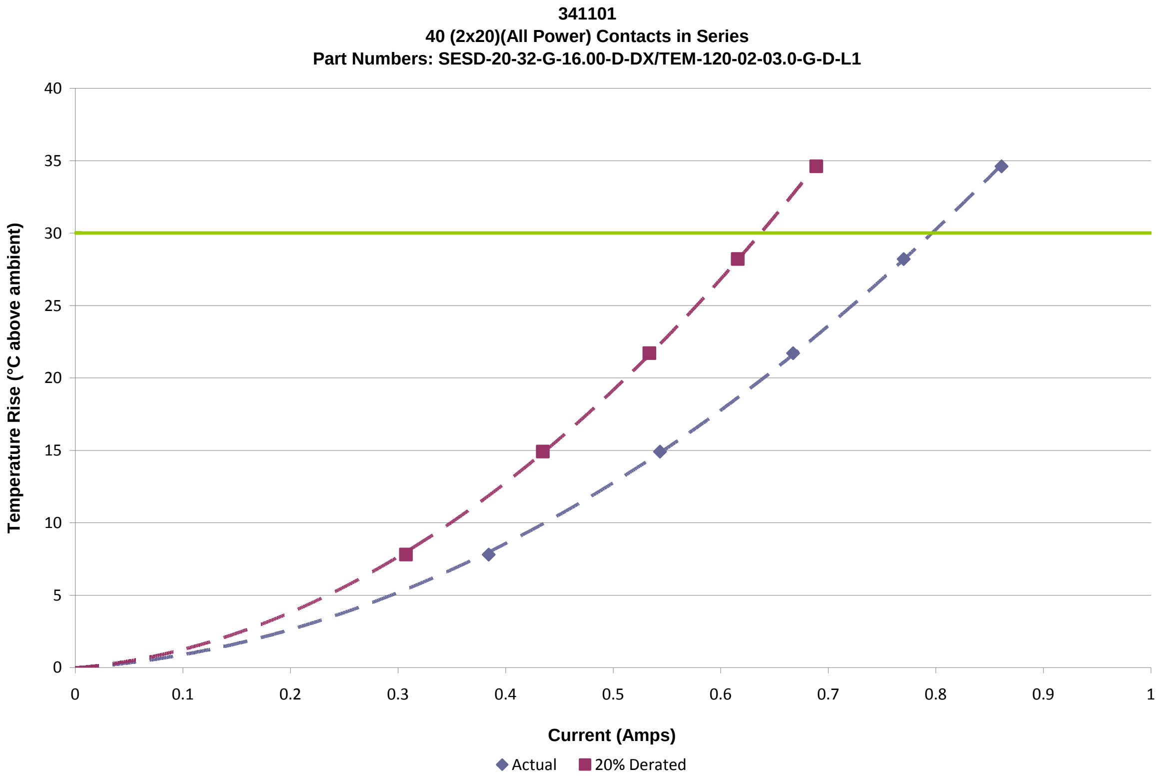


DATA SUMMARIES Continued

e. Linear configuration with all adjacent conductors/contacts powered


341101
40 (2X20)(All Power) Contacts in Series
Part Numbers: SESDT-20-32-G-16.0-D-L1/TEM-120-02-03.0-G-D-L1

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 0.6 Amps


341101
40 (2x20)(All Power) Contacts in Series
Part Numbers: SESD-20-32-G-16.00-D-DX/TEM-120-02-03.0-G-D-L1

DATA SUMMARIES Continued

MATING-UNMATING FORCE:

Thermal Aging Group（SESDT-20-32-G-06.0-L/TEM-120-02-03.0-G-D-L1）

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	9.74	2.19	8.98	2.02	5.83	1.31	4.36	0.98
Maximum	13.34	3.00	11.48	2.58	8.90	2.00	6.27	1.41
Average	11.45	**2.58**	10.40	**2.34**	7.02	**1.58**	5.38	**1.21**
St Dev	1.10	0.25	0.85	0.19	1.06	0.24	0.59	0.13
Count	8	8	8	8	8	8	8	8

Mating-Unmating Durability Group（SESDT-20-32-G-06.0-L/TEM-120-02-03.0-G-D-L1）

	Initial				25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	9.07	2.04	6.76	1.52	10.41	2.34	7.29	1.64
Maximum	15.35	3.45	12.10	2.72	16.86	3.79	10.54	2.37
Average	11.92	**2.68**	9.24	**2.08**	12.35	**2.78**	8.75	**1.97**
St Dev	1.76	0.40	1.68	0.38	2.29	0.51	1.17	0.26
Count	8	8	8	8	8	8	8	8

	After Humidity			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	7.43	1.67	5.38	1.21
Maximum	9.12	2.05	7.43	1.67
Average	8.02	**1.80**	6.31	**1.42**
St Dev	0.56	0.13	0.80	0.18
Count	8	8	8	8

DATA SUMMARIES Continued

Mating-Unmating Basic (SESDT-10-32-G-06.0-L/TEM-110-02-03.0-G-D-L1)

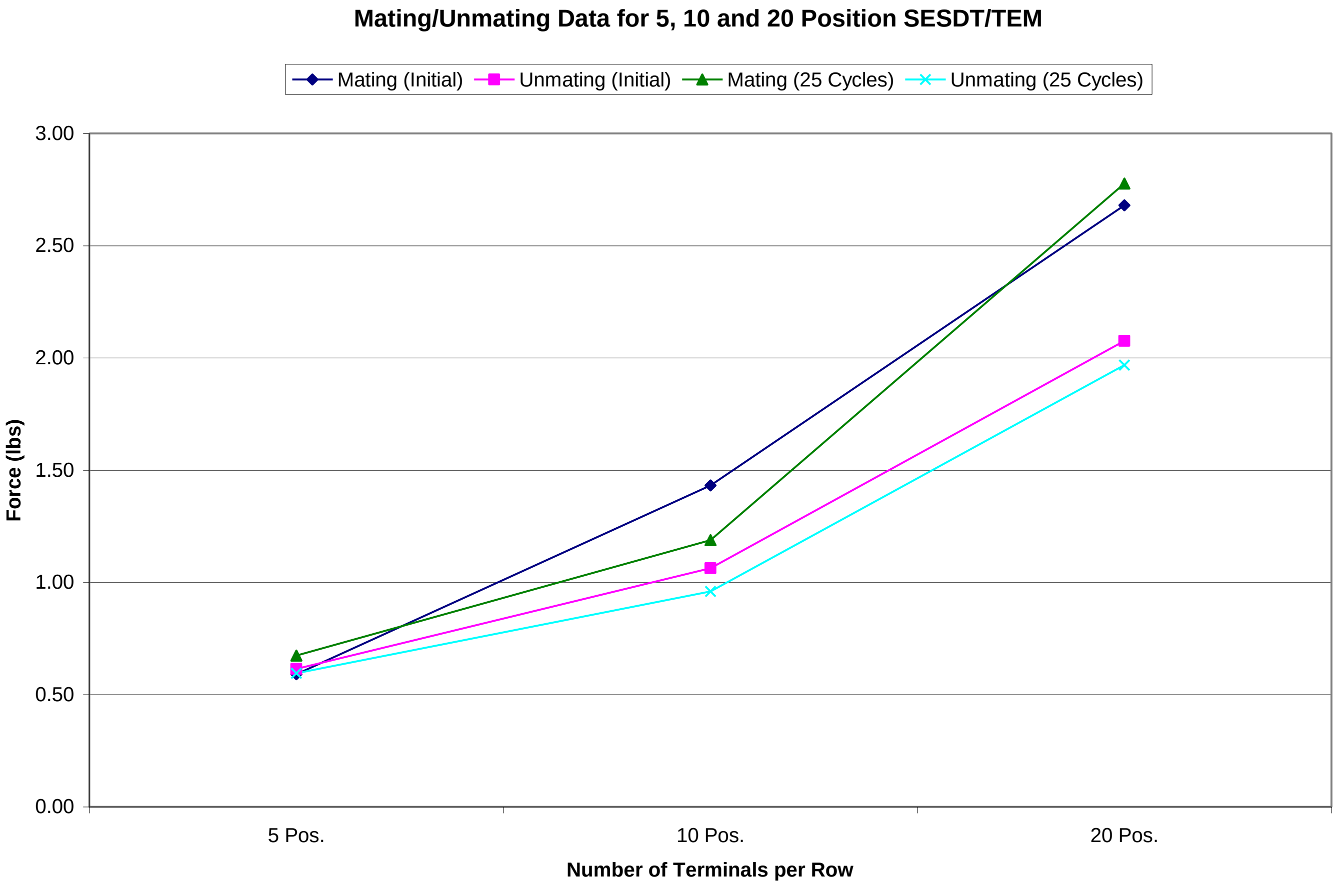
	Initial				25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.83	1.31	4.54	1.02	4.63	1.04	3.87	0.87
Maximum	6.85	1.54	4.98	1.12	5.65	1.27	4.71	1.06
Average	6.37	**1.43**	4.73	**1.06**	5.29	**1.19**	4.27	**0.96**
St Dev	0.40	0.09	0.19	0.04	0.36	0.08	0.32	0.07
Count	8	8	8	8	8	8	8	8

Mating-Unmating Basic (SESDT-05-32-G-06.0-L/TEM-105-02-03.0-G-D-L1)

	Initial				25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.49	0.56	2.45	0.55	2.89	0.65	2.14	0.48
Maximum	2.76	0.62	3.38	0.76	3.20	0.72	3.11	0.70
Average	2.63	**0.59**	2.74	**0.62**	3.00	**0.67**	2.65	**0.60**
St Dev	0.10	0.02	0.29	0.07	0.12	0.03	0.33	0.07
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

Mating\Unmating Force Comparison



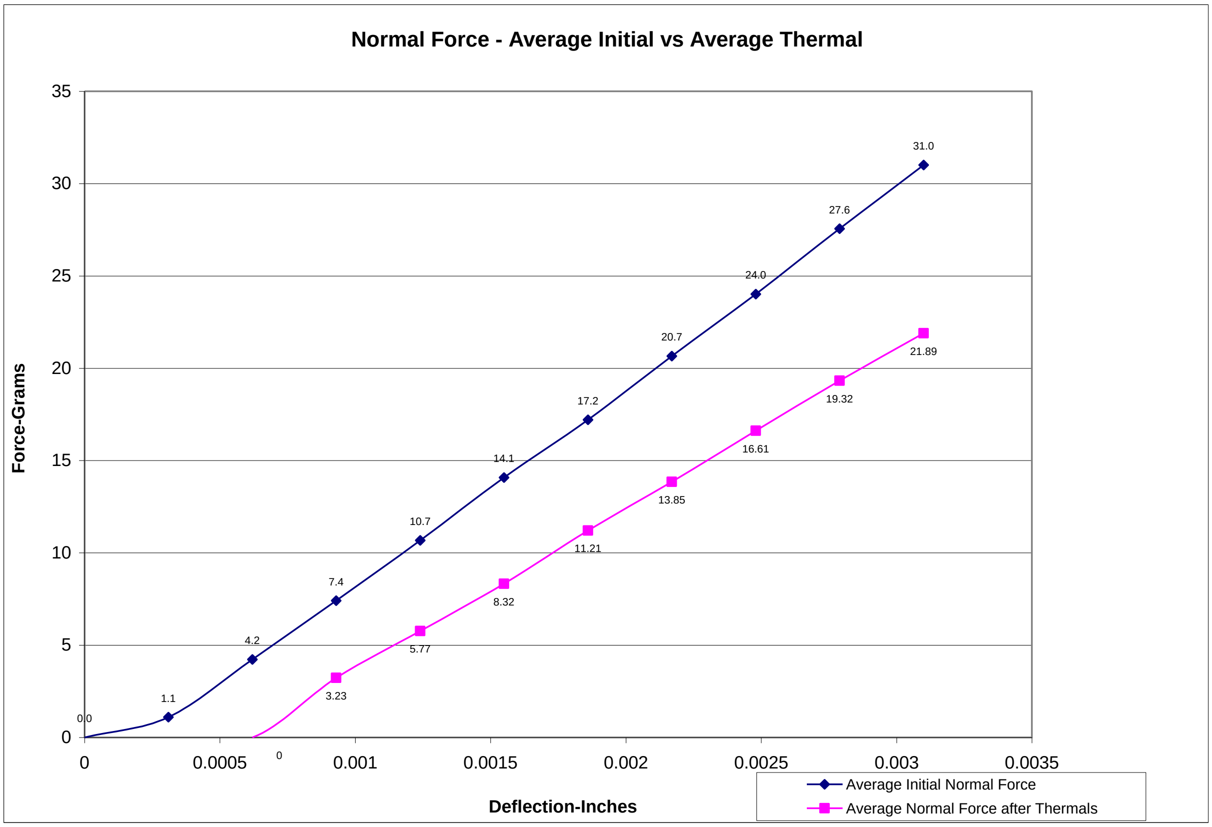
DATA SUMMARIES Continued

NORMAL FORCE (FOR CONTACTS TESTED OUT 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.

Initial	**Deflections in inches Forces in Grams**										
	0.0003	**0.0006**	**0.0009**	**0.0012**	**0.0016**	**0.0019**	**0.0022**	**0.0025**	**0.0028**	**0.0031**	***SET***
Averages	**1.10**	**4.22**	**7.41**	**10.68**	**14.08**	**17.20**	**20.66**	**24.01**	**27.56**	**31.00**	**0.0014**
Min	0.00	1.90	5.50	8.90	11.70	14.50	17.30	20.50	22.90	25.70	0.0001
Max	2.20	6.20	9.40	13.80	17.50	21.80	26.00	29.80	34.70	37.90	0.0024
St. Dev	0.837	1.419	1.371	1.768	2.107	2.534	3.057	3.364	4.163	4.581	0.0008
Count	9	9	9	9	9	9	9	9	9	9	9

After Thermals	**Deflections in inches Forces in Grams**										
	0.0003	**0.0006**	**0.0009**	**0.0012**	**0.0016**	**0.0019**	**0.0022**	**0.0025**	**0.0028**	**0.0031**	***SET***
Averages	**0.00**	**0.00**	**3.23**	**5.77**	**8.32**	**11.21**	**13.85**	**16.61**	**19.32**	**21.89**	**0.0006**
Min	0.00	0.00	0.00	0.30	2.90	6.10	9.40	11.90	14.10	16.10	0.0000
Max	0.00	0.00	9.10	11.50	13.30	15.60	17.50	21.10	24.50	27.80	0.0013
St. Dev	0.000	0.000	2.540	2.953	2.888	2.919	2.967	3.140	3.414	3.786	0.0004
Count	10	10	10	10	10	10	10	10	10	10	10



DATA SUMMARIES Continued

Cable Pull force

0° Pull

	Force (lbs)
Minimum	8.12
Maximum	8.77
Average	**8.42**

90° Pull

	Force (lbs)
Minimum	9.61
Maximum	10.04
Average	**9.86**

90° Pull (Traverse)

	Force (lbs)
Minimum	5.53
Maximum	6.10
Average	**5.86**

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	SESDT/TEM	SESDT	TEM
Initial	45000	35000	45000
Thermal	45000	45000	45000
Humidity	1330	1120	45000

	Row to Row		
	Mated	Unmated	Unmated
Minimum	SESDT/TEM	SESDT	TEM
Initial	45000	45000	45000
Thermal	45000	45000	45000
Humidity	1090	1170	45000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**SESDT/TEM**
Break Down Voltage	830
Test Voltage	623
Working Voltage	208

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

Cable Flex test

INSULATION RESISTANCE (IR):

Pin to Pin	
Mated	
Minimum	
Initial	23000
After 500 Flex Cycles	17800

Row to Row	
Mated	
Minimum	
Initial	45000
After 500 Flex Cycles	27000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	
Break Down Voltage	830
Test Voltage	625
Working Voltage	205

Pin to Pin	
Initial Test Voltage	Passed
After 500 Flex Cycles Test Voltage	Passed

Row to Row	
Initial Test Voltage	Passed
After 500 Flex Cycles Test Voltage	Passed

DATA SUMMARIES Continued

LLCR Thermal Aging Group

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

	LLCR Measurement Summaries by Pin Type			
Date	7/25/2014	8/11/2014		
Room Temp (Deg C)	22	21		
Rel Humidity (%)	38	37		
Technician	Troy Cook	Troy Cook		
mOhm values	**Actual Initial**	**Delta Thermal**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	87.24	1.48		
St. Dev.	2.01	1.05		
Min	81.46	0.00		
Max	94.22	4.62		
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

LLCR Mating/Unmating Durability Group

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

	LLCR Measurement Summaries by Pin Type			
Date	7/25/2014	7/28/2014	8/4/2014	8/15/2014
Room Temp (Deg C)	22	22	21	21
Rel Humidity (%)	37	41	41	40
Technician	Troy Cook	Troy Cook	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 25 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	87.15	0.87	1.41	1.19
St. Dev.	1.68	0.91	1.24	1.13
Min	83.58	0.00	0.01	0.00
Max	89.88	4.53	4.63	4.35
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**
25 Cycles	**192**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**192**	**0**	**0**	**0**	**0**	**0**
Humidity	**192**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Gas Tight Group

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

	LLCR Measurement Summaries by Pin Type			
Date	7/25/2014	7/28/2014		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	37	41		
Technician	Troy Cook	Troy Cook		
mOhm values	**Actual Initial**	**Delta Acid Vapor**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	87.64	0.71		
St. Dev.	1.73	0.67		
Min	83.95	0.00		
Max	91.14	3.46		
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

LLCR Shock & Vibration Group

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

	LLCR Measurement Summaries by Pin Type			
Date	7/25/2014	8/18/2014		
Room Temp (Deg C)	22	21		
Rel Humidity (%)	37	37		
Technician	Troy Cook	Troy Cook		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: Signal			
Average	169.58	1.14		
St. Dev.	1.70	0.94		
Min	163.63	0.00		
Max	176.63	4.51		
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**

Nanosecond Event Detection:

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

DATA SUMMARIES Continued

LLCR Extended Life Group

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

	LLCR Measurement Summaries by Pin Type			
Date	7/7/2016	7/8/2016	7/15/2016	7/26/2016
Room Temp (Deg C)	23	21	22	23
Rel Humidity (%)	53	51	53	54
Technician	Troy Cook	Troy Cook	Troy Cook	Troy Cook
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	65.07	0.66	0.85	0.93
St. Dev.	2.09	0.80	0.86	0.94
Min	59.19	0.00	0.00	0.01
Max	70.83	4.32	6.48	5.22
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	**191**	**1**	**0**	**0**	**0**	**0**
Humidity	**191**	**1**	**0**	**0**	**0**	**0**

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: THC-02
Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SE-1000-6-6
Serial #: 31808
Accuracy: See Manual
… Last Cal: 02/16/2014, Next Cal: 02/16/2015

Equipment #: OV-05
Description: Forced Air Oven, 5 Cu. Ft., 120 V (Chamber Room)
Manufacturer: Sheldon Mfg.
Model: CE5F
Serial #: 02008008
Accuracy: +/- 5 deg. C
… Last Cal: 02/03/2014, Next Cal: 02/03/2015

Equipment #: TSC-01
Description: Vertical Thermal Shock Chamber
Manufacturer: Cincinnatti Sub Zero
Model: VTS-3-6-6-SC/AC
Serial #: 10-VT14993
Accuracy: See Manual
… Last Cal: 05/18/2014, Next Cal: 05/18/2015

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 3706
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 04/30/2014, Next Cal: 04/30/2015

Equipment #: TCT-01
Description: Test Stand
Manufacturer: Chatillon
Model: TCD-1000
Serial #: 05 23 00 02
Accuracy: Speed Accuracy: +/-5% of max speed; Displacement: +/-.5% or +/-.005, whichever is greater.
… Last Cal: 08/24/2014, Next Cal: 08/24/2015

Equipment #: PS-01
Description: Power Supply
Manufacturer: Agilent
Model: AT-6032A
Serial #: MY41001186
Accuracy: Last Cal: 06/12/2014, Next Cal: 046/12/2015

EQUIPMENT AND CALIBRATION SCHEDULES Continued

Equipment #: MO-05
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0780546
Accuracy: See Manual
… Last Cal: 06/12/2014, Next Cal: 06/12/2015

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 11/31/2013, Next Cal: 11/31/2014

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/09/2014, Next Cal: 07/09/2015

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 06/04/2014, Next Cal: 06/04/2015