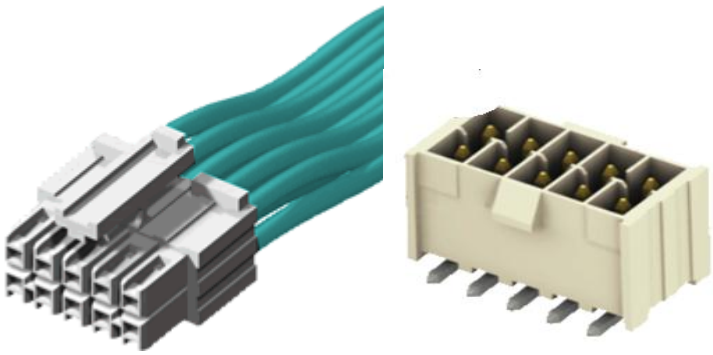
Project Number: 202109	Tracking Code: 202109 Report Rev 2		
Requested by: Eric Mings	Date: 5/28/2013	Product Rev: AE	
Part #: MMSDT-25-30-L-12.00-D-K-LUS	Lot #:	Tech: Tony Wagoner	Eng: Eric Mings
Part description: 0.100[2.54] Socket Discrete Cable Assembly			Qty to test: 15
Test Start: 6/9/2012	Test Completed: 8/14/2012		

SAMTEC POWER CHARACTERIZATION



PART DESCRIPTION:
0.100[2.54] Socket Discrete Cable Assembly

MMSDT-25-30-L-12.00-D-K-LUS
IPL1-125-01-L-D-K

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

1. Temperature Rise/Current Carrying Capacity
   1.1. To determine the amount of current the device under test (DUT) can safely carry over the operating temperature range of the DUT.
   1.2. Contact loading will also be addressed in this document which will determine how much current can be carried as the number of energized contacts is varied.

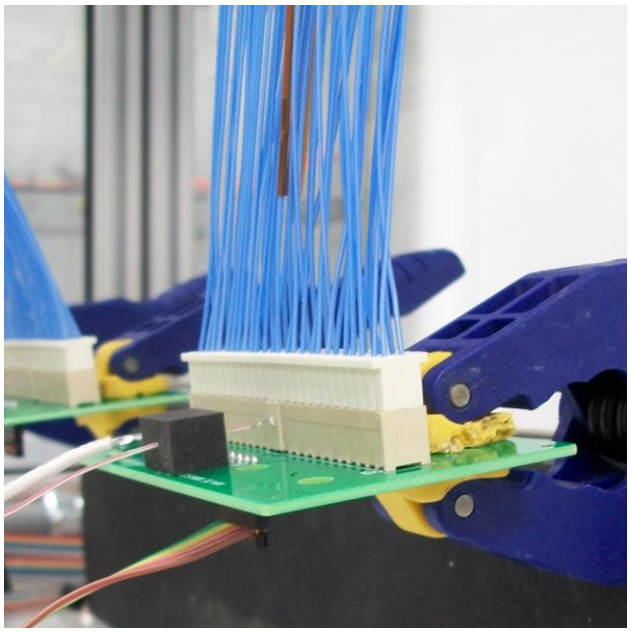
APPLICABLE DOCUMENTS

Standards: EIA Publication 364-70 Temperature Rise
EIA Publication 364-06 Contact Resistance
TLPM-032 Current Carrying Capacity
IEC 512-3 Electromechanical Components for Electronic Equipment: Basic Testing Procedures and Measuring Methods, Part 3: Current Carrying Capacity Tests

TEST SAMPLES AND PREPARATION

1. All materials shall be manufactured in accordance with the applicable product specification.
2. All test samples shall be identified and encoded to maintain traceability throughout the test sequences.
3. After soldering, the parts to be used shall be cleaned according to TLWI-0001.
4. All samples shall be visually inspected and cleaned as necessary.
5. Any additional preparation shall be noted in the individual test sequences.
6. Solder Information: Lead Free
7. Re-Flow Time/Temp: See accompanying profile.
8. All products designed to operate mounted on a printed circuits board shall be tested mounted to test boards in accordance with EIA-364-70.

PREPARED TEST SAMPLE



9. The following loading configurations shall be tested for Temperature Rise/Current Carrying Capacity testing of two row connector systems:
    - 9.1. Two by One contact energized
    - 9.2. Two by Two contacts energized adjacent to each other
    - 9.3. Two by Three contacts energized adjacent to each other
    - 9.4. Two by Four contacts energized adjacent to each other
    - 9.5. All contacts energized

Test Condition as in 10.1 above

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

✧			
✦			

FLOWCHARTS

Current Carrying Capacity **3 Mated Assemblies Each**

TEST STEP	GROUP A 3 Mated Assemblies 2 CONTACTS POWERED	GROUP B 3 Mated Assemblies 4 CONTACTS POWERED	GROUP C 3 Mated Assemblies 6 CONTACTS POWERED	GROUP D 3 Mated Assemblies 8 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

	POWER INTEGRITY TEST REPORT	202109
		Revision 2

TEST PROCEDURES

Part No.	**MMSDT-25-30-L-12.00-D-K-LUS**	**Mating Part No.**	**IPL1-125-01-L-D-K**
Sample Size	**15**	**Technician**	**Tony Wagoner**
Start Date	**6/9/2012**	**Complete Date**	**8/14/2012**
Room Ambient	**20.7°C**	**Relative Humidity**	**39%**
Equipment ID#: MO-09, PS-09, TCS-026, TCS-041, TCS-045, TCS-004, TCS-005, TCS-007, TCS-050, TCS-020, THL-11, RS-01			

TEMPERATURE RISE (Current Carrying Capacity, CCC):

1. Thermocouples shall be calibrated in accordance with Samtec documents; TLWI 0003, Thermocouple Welding Procedure and TLWI 0005, Thermocouple Calibration
2. The thermocouples shall be placed at a location to sense the maximum temperature generated during testing.
3. Temperature stability shall be defined as the temperature at which three successive readings, 5 minutes apart, differ not more than 1° C (computer controlled data acquisition). This is the Temperature Rise that the Current Carrying Capacity and De-rating curves are based on.
4. The following loading configurations shall be tested (double for two row systems):
   a) One contact energized only
   b) Two contacts energized adjacent to each other
   c) Three contacts energized adjacent to each other
   d) Four contacts energized adjacent to each other
   e) All contacts energized
5. The following loading configurations shall be tested for Temperature Rise/Current Carrying Capacity testing of two row connector systems:
   a) Two by One contact energized
   b) Two by Two contacts energized adjacent to each other
   c) Two by Three contacts energized adjacent to each other
   d) Two by Four contacts energized adjacent to each other
   e) All contacts energized
6. Three samples shall be tested for each of the above configurations for a total of eighteen assemblies.
7. Temperature Rise measurements shall be made at 5 different current levels yielding temperature rises in the 10 to 70°C range.
8. The base curve for the Current Rating chart will be derived from the average (maximum) value of three test specimens in accordance with IEC 512-3, Test 5b.

TEST RESULTS

CURRENT CARRYING CAPACITY (CCC) RESULTS

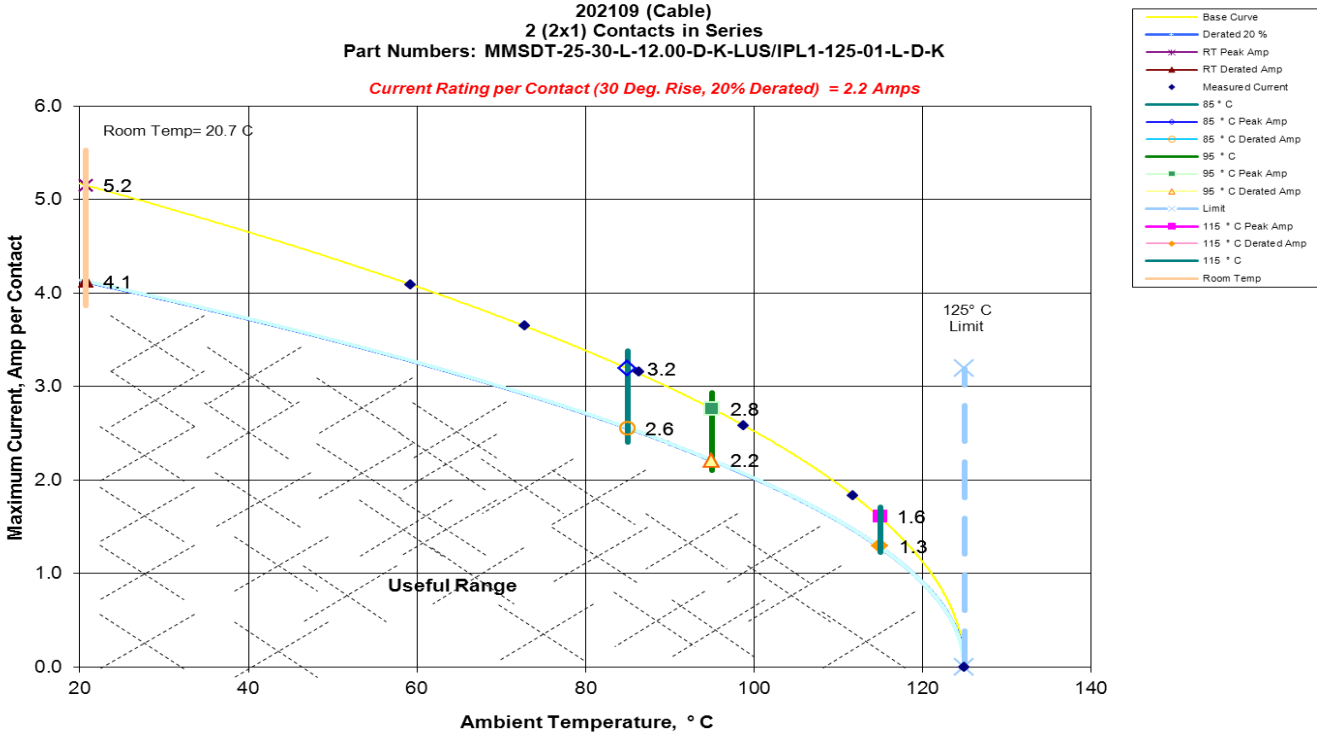
- **There was no evidence of physical damage to the test samples as tested.**
- **The following is a summary of the observed data:**

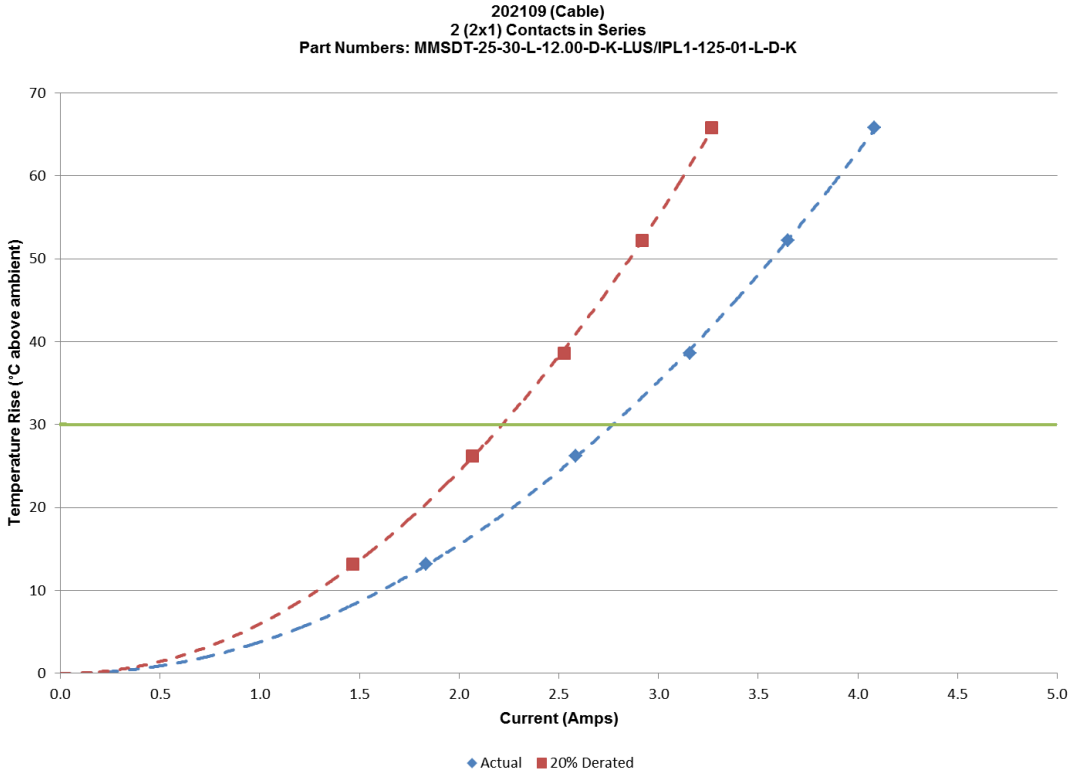
Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise ----------2.2A per contact with 2 contacts (2 x 1) powered (cable)**
- **CCC for a 30°C Temperature Rise ----------1.7A per contact with 4 contacts (2 x 2) powered (cable)**
- **CCC for a 30°C Temperature Rise ----------1.7A per contact with 6 contacts (2 x 3) powered (cable)**
- **CCC for a 30°C Temperature Rise ----------1.5A per contact with 8 contacts (2 x 4) powered (cable)**
- **CCC for a 30°C Temperature Rise ----------1.1A per contact with 50 contacts (2 x 25) powered (cable)**

TEST DATA

CURRENT CARRYING CAPACITY DATA





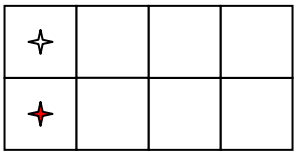
TEMPERATURE RISE DATA
TWO CONTACTS ENERGIZED
(Degrees Celsius above ambient)

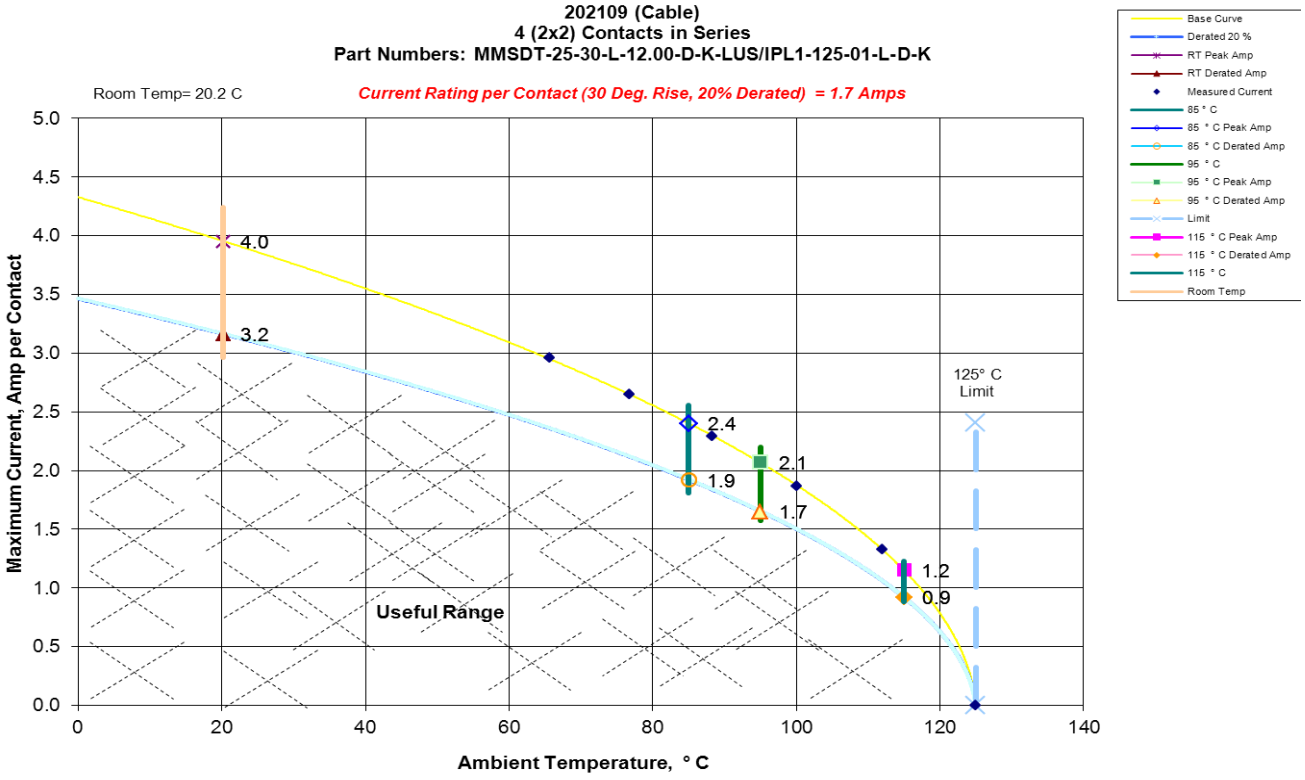
TEST CURRENT AMPS	1.83	2.58	3.16	3.65	4.08
Sample 1	13.7	27.3	40.4	53.6	66.7
Sample 2	12.3	24.5	36	47.5	60.3
Sample 3	13.5	26.7	39.5	55.6	70.5
Min	12.3	24.5	36	47.5	60.3
Max	13.7	27.3	40.4	55.6	70.5
Avg	13.17	26.17	38.63	52.23	65.83

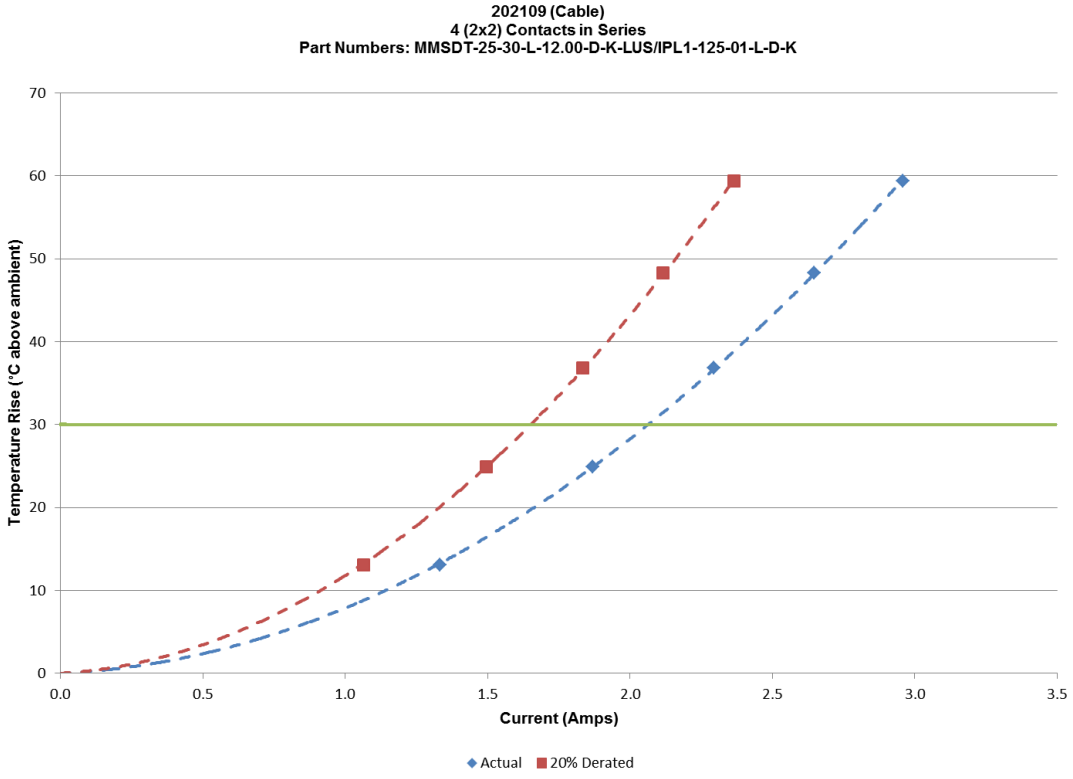
✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

Double Row Configuration




202109 (Cable)
4 (2x2) Contacts in Series
Part Numbers: MMSDT-25-30-L-12.00-D-K-LUS/IPL1-125-01-L-D-K
Room Temp= 20.2 C
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.7 Amps
Maximum Current, Amp per Contact
Ambient Temperature, ° C
Useful Range
125° C Limit
4.0
3.2
2.4
1.9
2.1
1.7
1.2
0.9
Base Curve
Derated 20 %
RT Peak Amp
RT Derated Amp
Measured Current
85 ° C
85 ° C Peak Amp
85 ° C Derated Amp
95 ° C
95 ° C Peak Amp
95 ° C Derated Amp
Limit
115 ° C Peak Amp
115 ° C Derated Amp
115 ° C
Room Temp

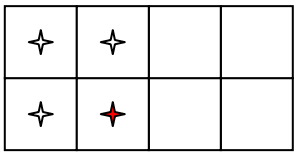

202109 (Cable)
4 (2x2) Contacts in Series
Part Numbers: MMSDT-25-30-L-12.00-D-K-LUS/IPL1-125-01-L-D-K
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

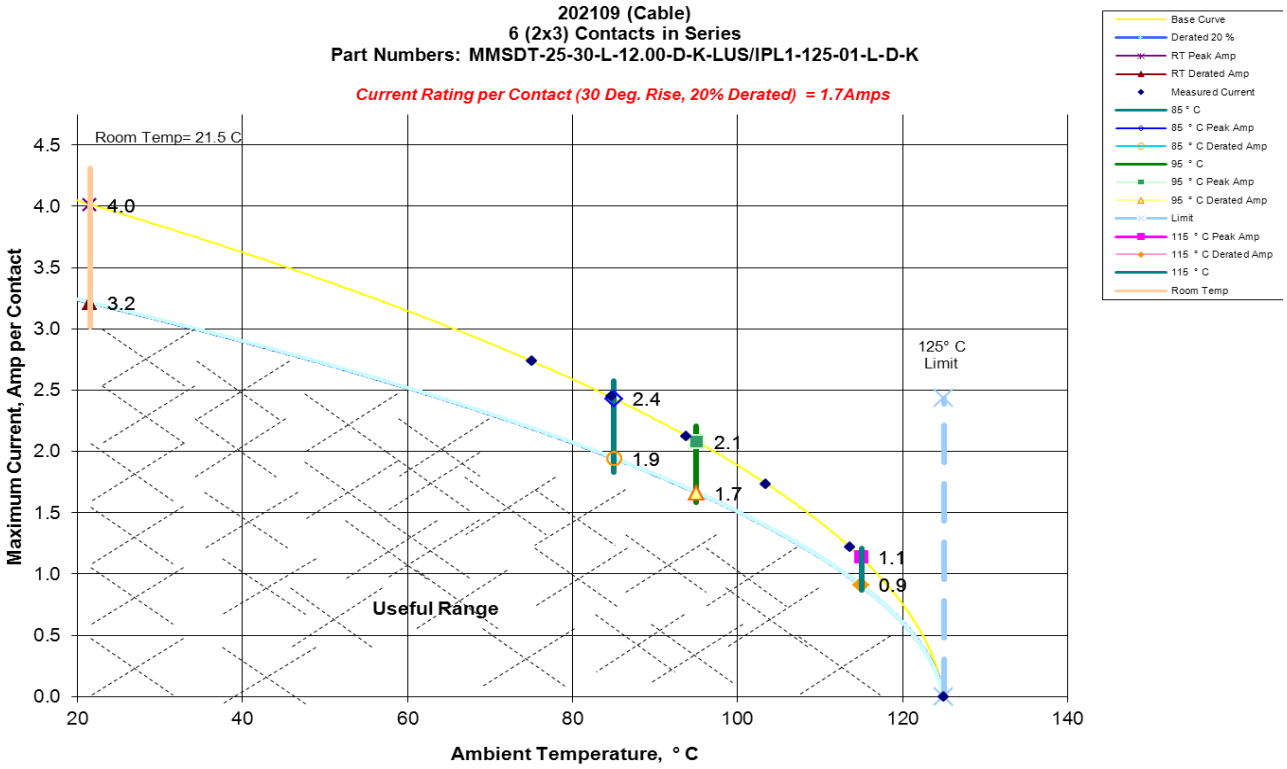
TEMPERATURE RISE DATA
FOUR CONTACTS ENERGIZED
(Degrees Celsius above ambient)

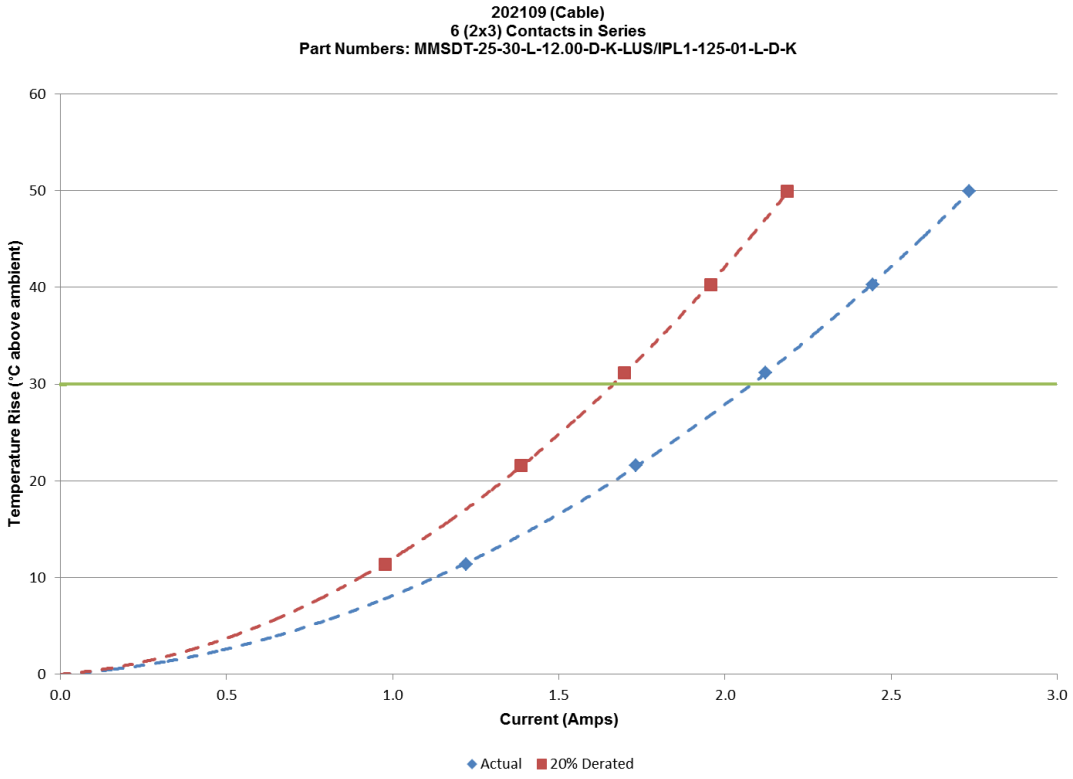
TEST CURRENT AMPS	1.33	1.87	2.29	2.65	2.96
Sample 4	12.7	24.2	35.2	46	55.8
Sample 5	13.3	24.7	36.7	47.7	59.2
Sample 6	13.4	25.8	38.6	51.1	63.1
Min	12.7	24.2	35.2	46	55.8
Max	13.4	25.8	38.6	51.1	63.1
Avg	13.13	24.9	36.83	48.27	59.37

✧ Indicates energized contacts

✧ Indicates thermocouple monitored, energized contacts




202109 (Cable)
6 (2x3) Contacts in Series
Part Numbers: MMSDT-25-30-L-12.00-D-K-LUS/IPL1-125-01-L-D-K
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.7Amps
Room Temp= 21.5 C
4.0
3.2
2.4
1.9
2.1
1.7
1.1
0.9
125° C Limit
Useful Range
Maximum Current, Amp per Contact
Ambient Temperature, ° C
Base Curve
Derated 20 %
RT Peak Amp
RT Derated Amp
Measured Current
85 ° C
85 ° C Peak Amp
85 ° C Derated Amp
95 ° C
95 ° C Peak Amp
95 ° C Derated Amp
Limit
115 ° C Peak Amp
115 ° C Derated Amp
115 ° C
Room Temp

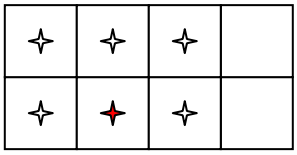

202109 (Cable)
6 (2x3) Contacts in Series
Part Numbers: MMSDT-25-30-L-12.00-D-K-LUS/IPL1-125-01-L-D-K
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

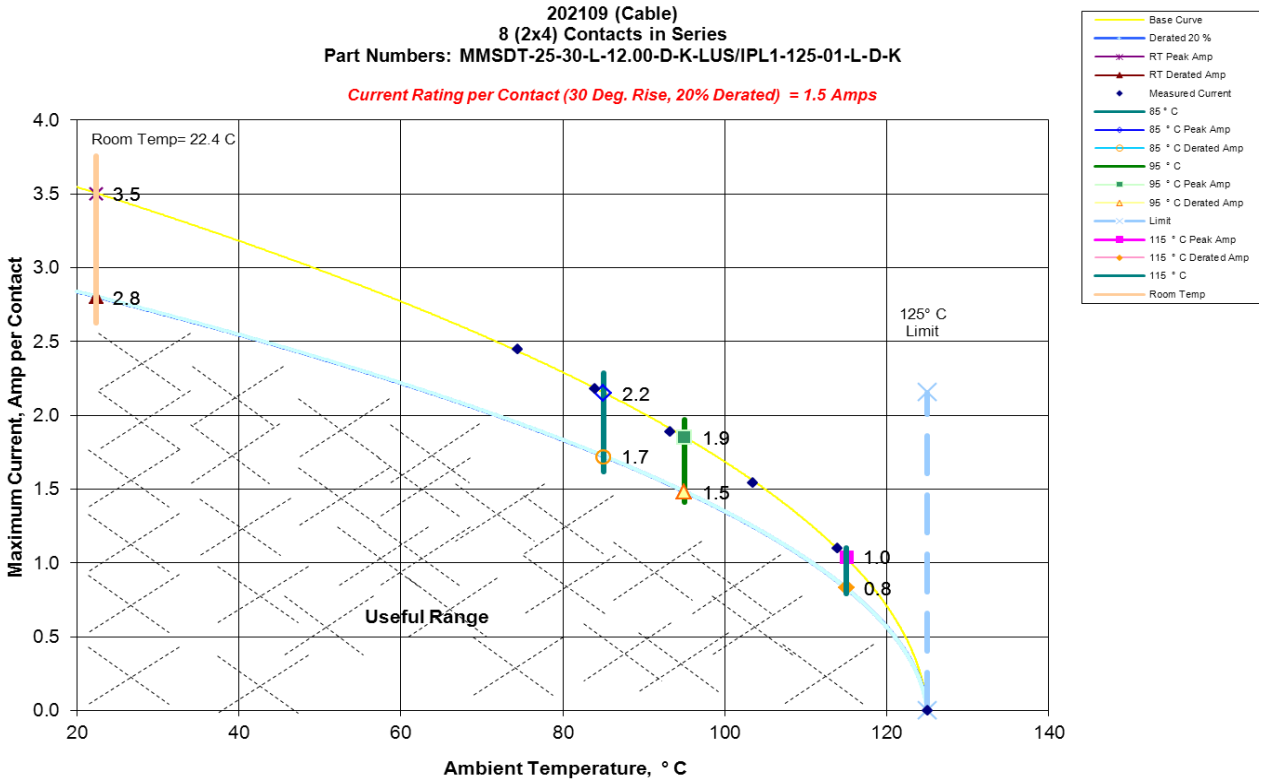
TEMPERATURE RISE DATA
SIX CONTACTS ENERGIZED
(Degrees Celsius above ambient)

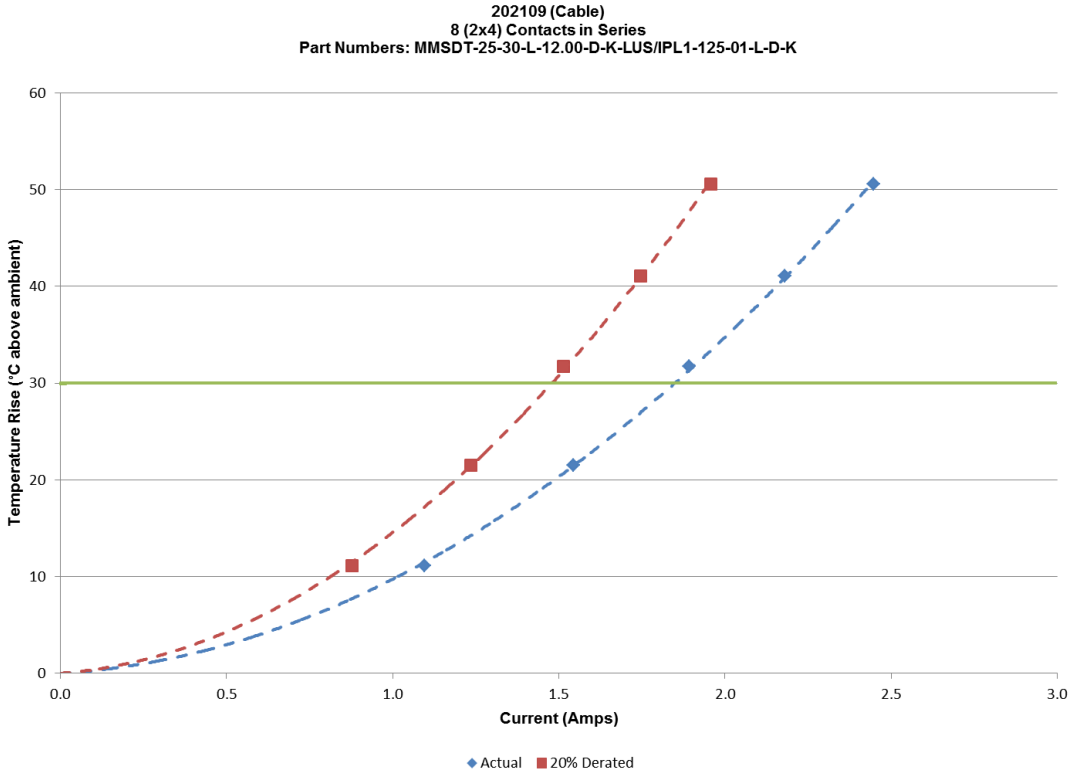
TEST CURRENT AMPS	1.22	1.73	2.12	2.45	2.74
Sample 7	11.6	22.3	32.8	40.6	54.1
Sample 8	12	22.6	31.7	38.9	51.1
Sample 9	10.5	20	29.2	34.7	44.4
Min	10.5	20	29.2	34.7	44.4
Max	12	22.6	32.8	40.6	54.1
Avg	11.37	21.63	31.23	38.07	49.87

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts



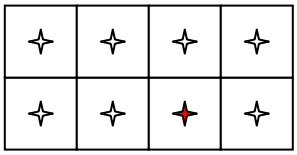

202109 (Cable)
8 (2x4) Contacts in Series
Part Numbers: MMSDT-25-30-L-12.00-D-K-LUS/IPL1-125-01-L-D-K
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.5 Amps
Room Temp= 22.4 C
3.5
2.8
2.2
1.7
1.9
1.5
1.0
0.8
125° C Limit
Useful Range
Maximum Current, Amp per Contact
Ambient Temperature, ° C
Base Curve
Derated 20 %
RT Peak Amp
RT Derated Amp
Measured Current
85 ° C
85 ° C Peak Amp
85 ° C Derated Amp
95 ° C
95 ° C Peak Amp
95 ° C Derated Amp
Limit
115 ° C Peak Amp
115 ° C Derated Amp
115 ° C
Room Temp

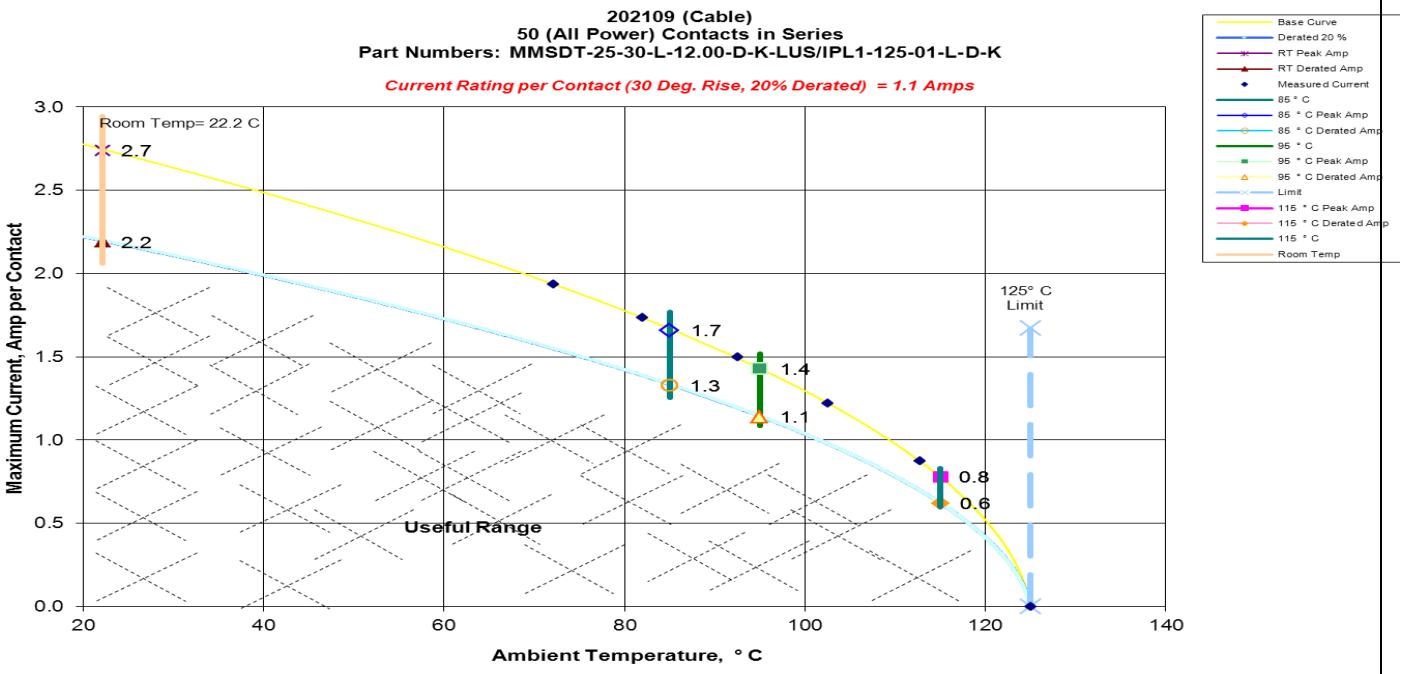

202109 (Cable)
8 (2x4) Contacts in Series
Part Numbers: MMSDT-25-30-L-12.00-D-K-LUS/IPL1-125-01-L-D-K
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

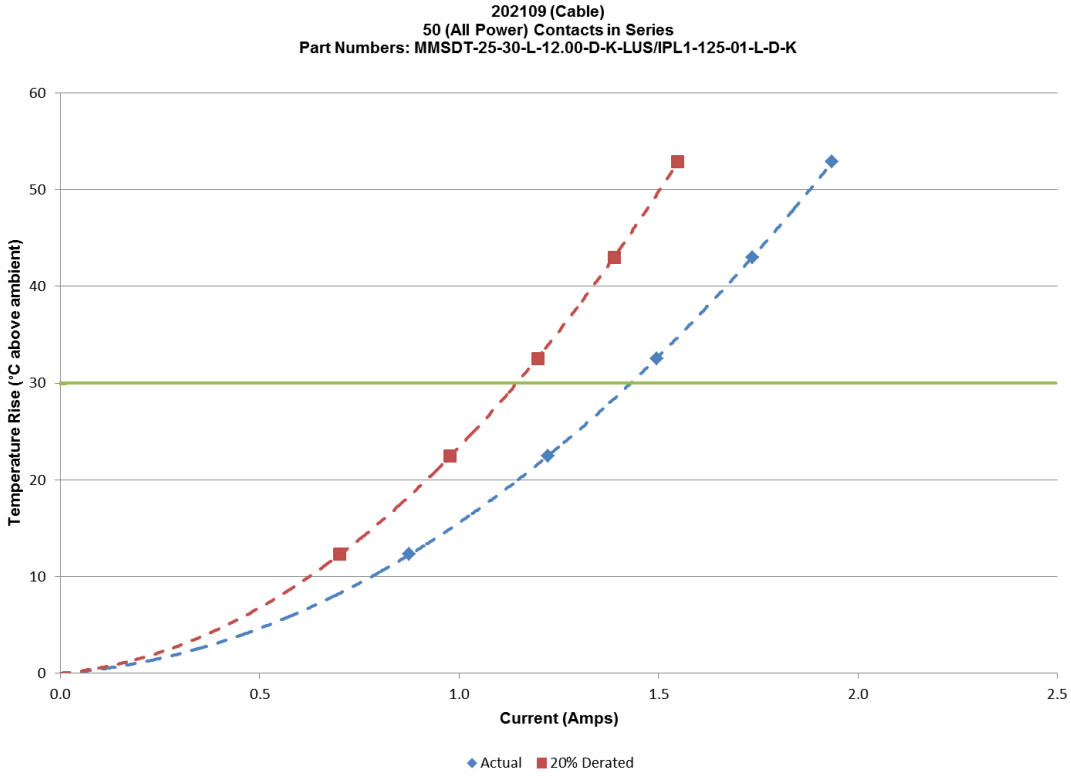
TEMPERATURE RISE DATA EIGHT CONTACTS ENERGIZED (Degrees Celsius above ambient)					
TEST CURRENT AMPS	1.1	1.54	1.89	2.18	2.45
Sample 10	11.4	22.5	33.6	44.4	55.7
Sample 11	10.5	19.6	28.5	35.4	41.7
Sample 12	11.4	22.3	33	43.5	54.4
Min	10.5	19.6	28.5	35.4	41.7
Max	11.4	22.5	33.6	44.4	55.7
Avg	11.1	21.47	31.7	41.1	50.6

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts




202109 (Cable)
50 (All Power) Contacts in Series
Part Numbers: MMSDT-25-30-L-12.00-D-K-LUS/IPL1-125-01-L-D-K
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.1 Amps
Maximum Current, Amp per Contact
Ambient Temperature, ° C
Room Temp= 22.2 C
2.7
2.2
1.7
1.3
1.4
1.1
0.8
0.6
125° C Limit
Useful Range
Base Curve
Derated 20 %
RT Peak Amp
RT Derated Amp
Measured Current
85 ° C
85 ° C Peak Amp
85 ° C Derated Amp
95 ° C
95 ° C Peak Amp
95 ° C Derated Amp
Limit
115 ° C Peak Amp
115 ° C Derated Amp
115 ° C
Room Temp

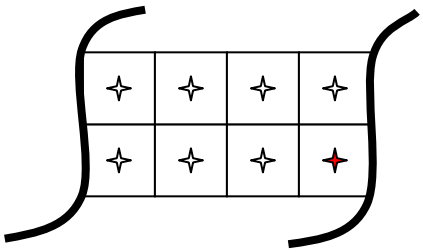

202109 (Cable)
50 (All Power) Contacts in Series
Part Numbers: MMSDT-25-30-L-12.00-D-K-LUS/IPL1-125-01-L-D-K
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

TEST CURRENT AMPS	0.88	1.22	1.5	1.74	1.94
Sample 13	12.8	24	35.4	47.5	59.3
Sample 14	12	21.8	30.5	39.5	47.9
Sample 15	12.2	21.8	31.7	42.1	51.5
Min	12	21.8	30.5	39.5	47.9
Max	12.8	24	35.4	47.5	59.3
Avg	12.33	22.53	32.53	43.03	52.9

Indicates energized contacts

Indicates thermocouple monitored, energized contacts



EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-09
Description: Model 2700 Multimeter/Data Acquisition System (Integra Series)
Manufacturer: Keithley
Model: 2700
Serial #: 0916761
Accuracy: See Manual
… Last Cal: 10/1/2012, Next Cal: 10/1/2013

Equipment #: PS-09
Description: 60V, 50A, 1000W System DC Power Supply
Manufacturer: Agilent Technologies
Model: 6032A
Serial #: US38322853
Accuracy: See Manual

Equipment #: RS-01
Description: Shunt
Manufacturer: Vishay
Model: VCS202
Serial #: VCS202
Accuracy: ± 1% RDG
… Last Cal: 5/30/2012, Next Cal: 5/30/2013

Equipment #: TC111307-(TCS-005-048)
Description: Calibrated Thermocouples
Manufacturer: Samtec, Inc.
Model:
Serial #:
Accuracy:
… Last Cal: 5/16/2012, Next Cal: 5/16/2013