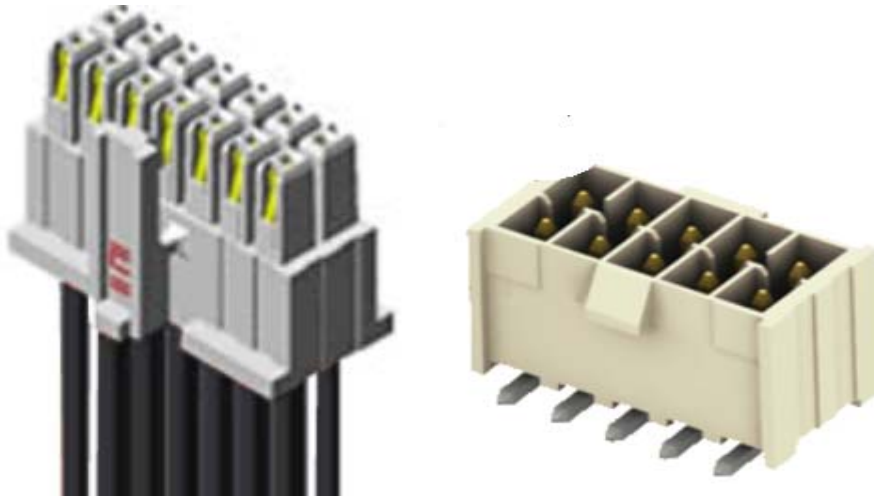


Project Number: 202015		Tracking Code: 202015 Power Report Rev 3	
Requested by: Eric Mings		Date: 3/18/2015	Product Rev: AE
Part #: MMSD-25-28-L-12.00-D-K-LUS		Lot #:	Tech: Tony Wagoner Eng: Eric Mings
Part description: 0.100[2.54] Socket Discrete Cable Assembly			Qty to test: 15
Test Start: 8/10/2012	Test Completed: 8/13/2012		

## SAMTEC POWER CHARACTERIZATION



**PART DESCRIPTION:**  
**0.100[2.54] Socket Discrete Cable Assembly**

**MMSD-25-28-L-12.00-D-K-LUS**  
**IPL1-125-01-L-D-K**



**POWER INTEGRITY TEST  
REPORT**

**202015**

**Revision 3**

**REVISION HISTORY**

<b>DATA</b>	<b>REV.NUM.</b>	<b>DESCRIPTION</b>	<b>ENG</b>
3/18/2015	3	Update CCC graph limit from 105 °C to 80 °C	VZ



**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**

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.

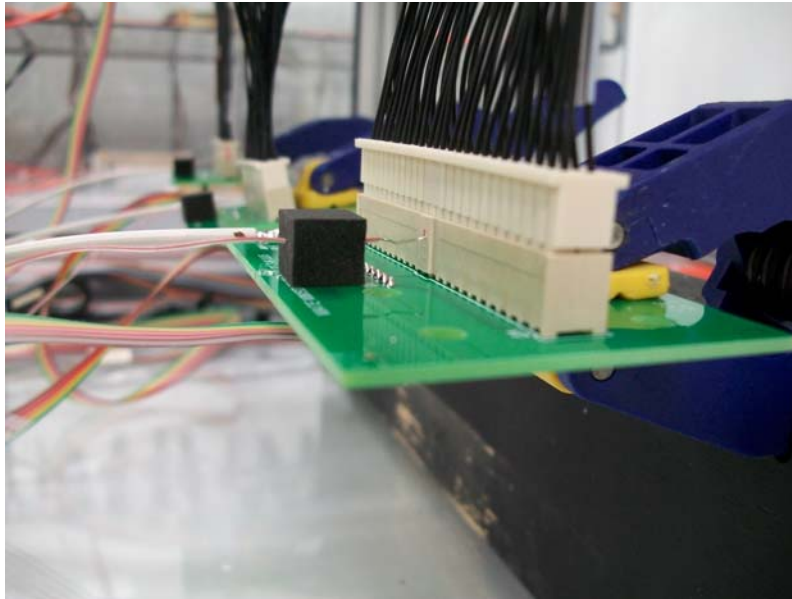
**APPLICABLE DOCUMENTS**

- 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

✦			
✦			



# POWER INTEGRITY TEST REPORT

202015

**Revision 3**

## 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

202015

**Revision 2**

## TEST PROCEDURES

<b>Part No.</b>	MMSD-25-28-L-12.00-D-K-LUS	<b>Mating Part No.</b>	IPL1-125-01-L-D-K
<b>Sample Size</b>	15	<b>Technician</b>	Tony Wagoner
<b>Start Date</b>	8/10/2012	<b>Complete Date</b>	6/19/2012
<b>Room Ambient</b>	22.3°C	<b>Relative Humidity</b>	56%
<b>Equipment ID#:</b> MO-04, PS-11, TCS-013, TCS-016, TCS-038, TCS-001, TCS-002, TCS-003, TCS-015, TCS-020, THL-11, RS-11			

### 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:

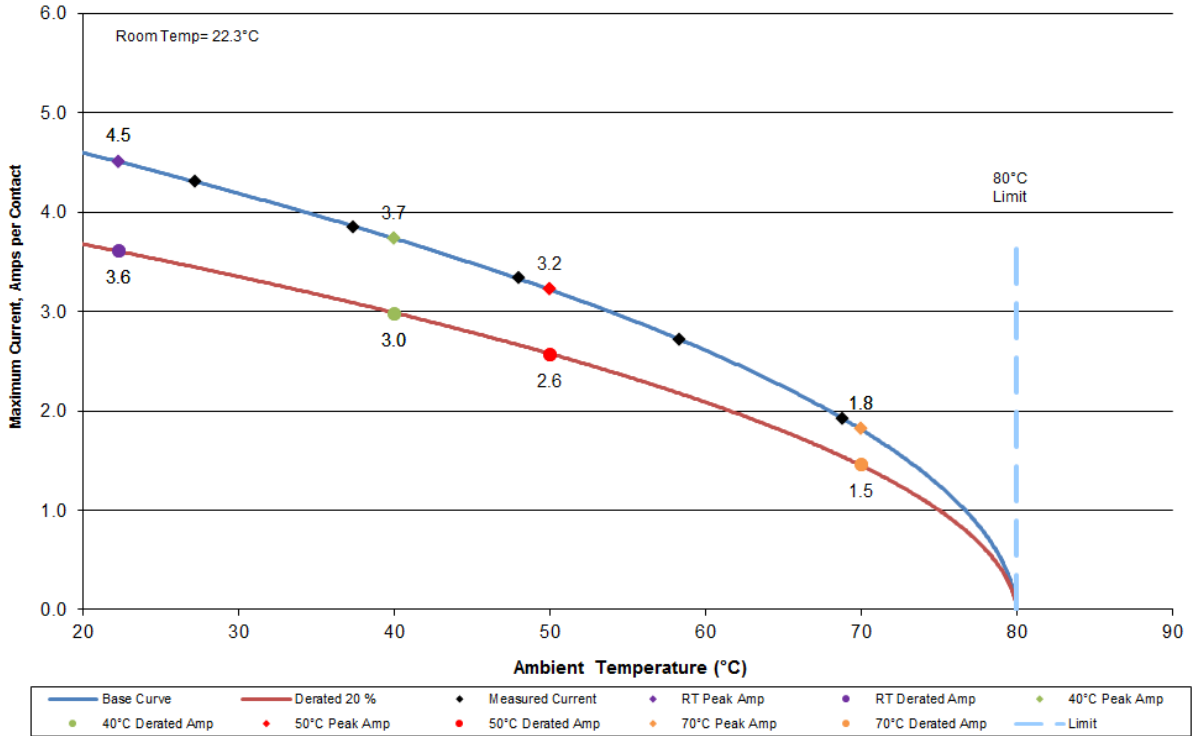
**Temperature Rise, CCC at a 20% de-rating**

- CCC for a 30°C Temperature Rise -----2.6A per contact with 2 contacts (2 x 1) powered (cable)
- CCC for a 30°C Temperature Rise -----2.2A per contact with 4 contacts (2 x 2) powered (cable)
- CCC for a 30°C Temperature Rise -----1.9A per contact with 6 contacts (2 x 3) powered (cable)
- CCC for a 30°C Temperature Rise -----1.7A per contact with 8 contacts (2 x 4) powered (cable)
- CCC for a 30°C Temperature Rise -----1.2A per contact with 50 contacts (2 x 25) powered (cable)

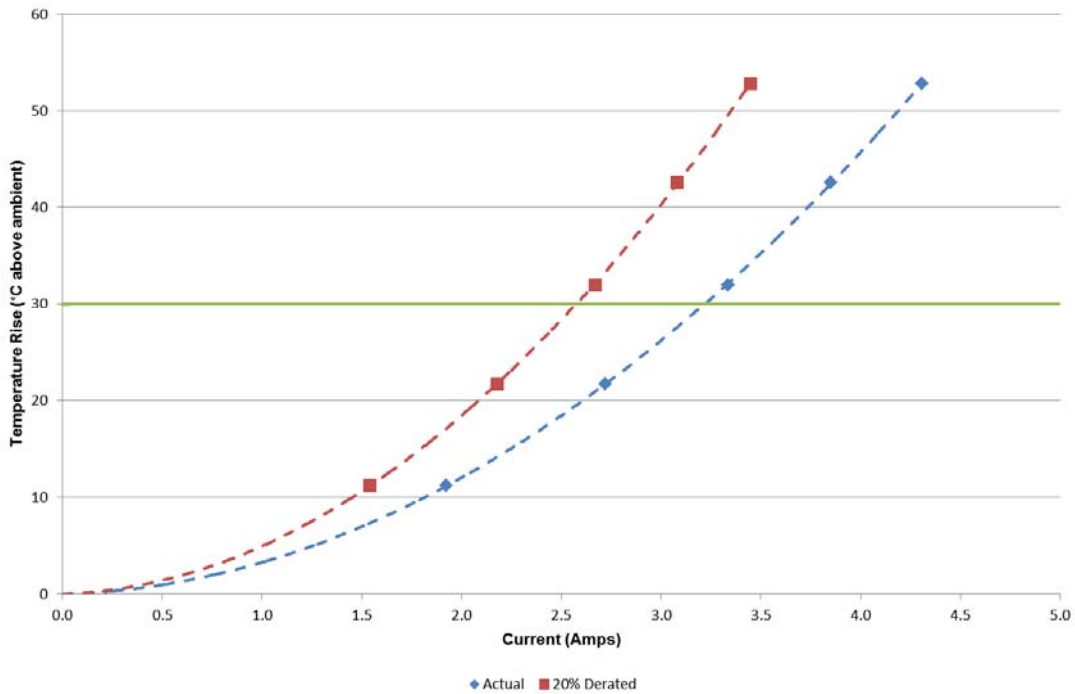
## TEST DATA CURRENT CARRYING CAPACITY DATA

202015 (Cable)  
2 (2X1) Contacts in Series  
Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/PL1-125-01-L-D-K

*Current Rating per Contact (30 Deg. Rise, 20% Derated) = 2.6 Amps*



202015 (Cable)  
2 (2X1) Contacts in Series  
Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/PL1-125-01-L-D-K





**TEMPERATURE RISE DATA  
TWO CONTACT ENERGIZED  
(Degrees Celsius above ambient)**

TEST CURRENT AMPS	1.93	2.72	3.34	3.85	4.31
Sample 1	11.7	23.1	34.4	46.1	57.5
Sample 2	10.6	20.5	30.2	40.3	49.9
Sample 3	11.3	21.6	31.5	41.4	51
Min	10.6	20.5	30.2	40.3	49.9
Max	11.7	23.1	34.4	46.1	57.5
Avg	11.2	21.73	32.03	42.6	52.8

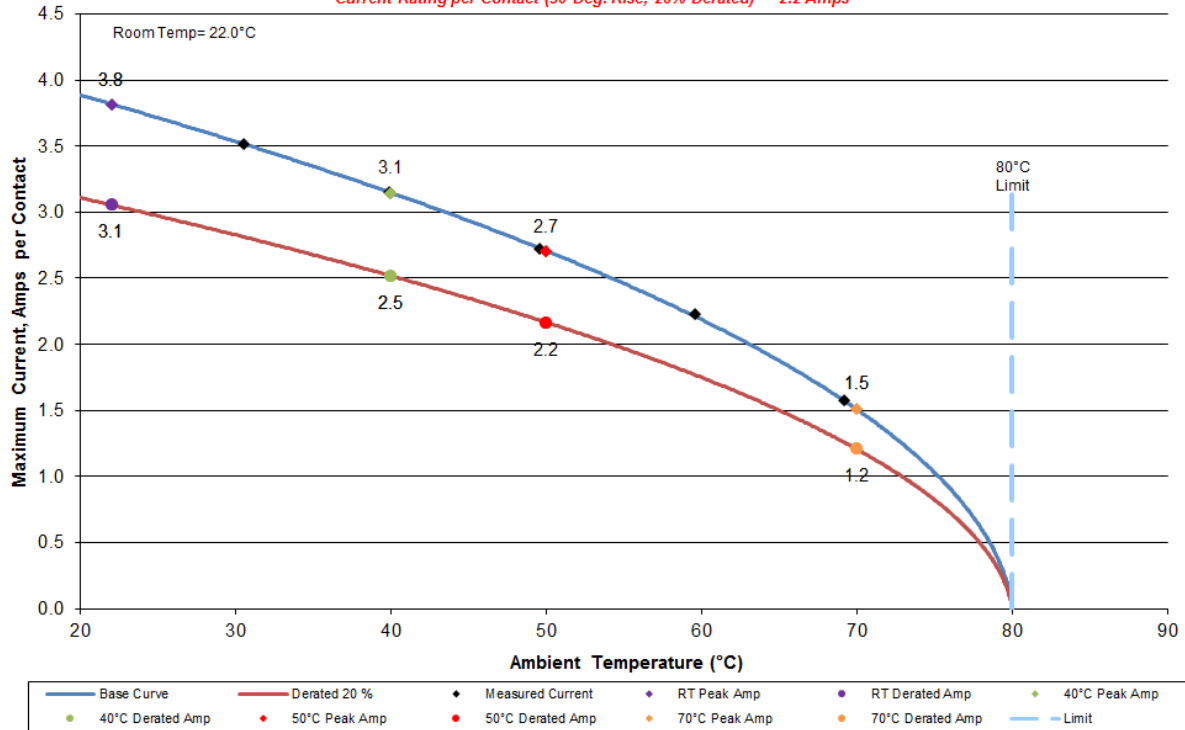
- ✦ Indicates energized contacts
- ✦ Indicates thermocouple monitored, energized contacts

Double Row Configuration

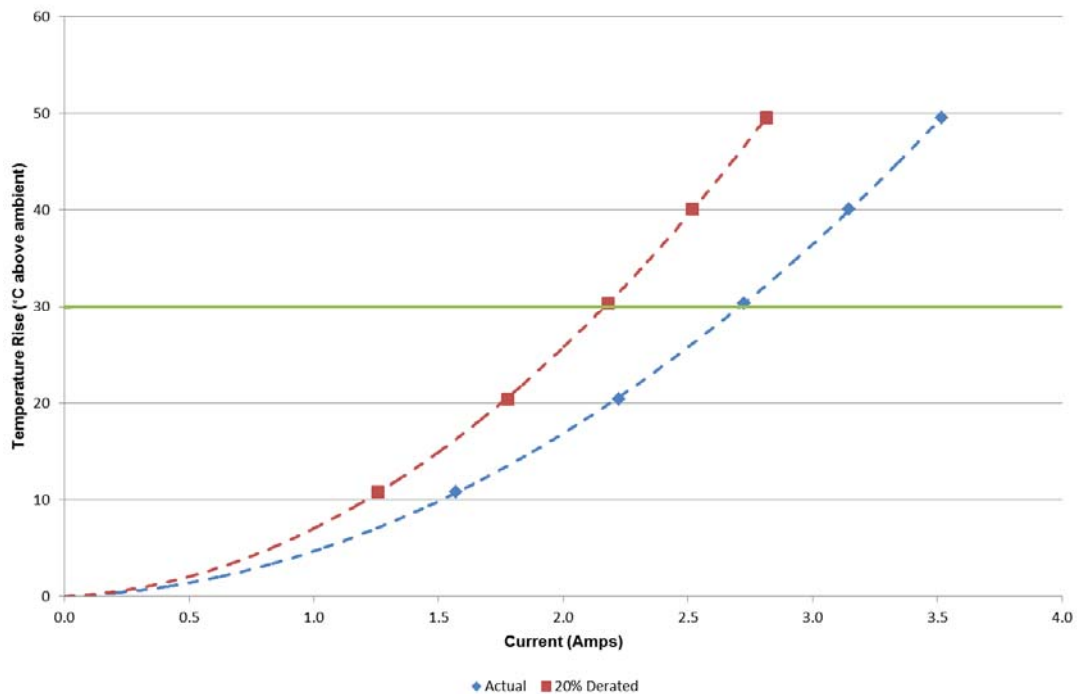
✦			
✦			

202015 (Cable)  
 4 (2X2) Contacts in Series  
 Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/IPL1-125-01-L-D-K

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 2.2 Amps



202015 (Cable)  
 4 (2X2) Contacts in Series  
 Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/IPL1-125-01-L-D-K



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

TEST CURRENT AMPS	<b>1.57</b>	<b>2.22</b>	<b>2.72</b>	<b>3.15</b>	<b>3.52</b>
<b>Sample 4</b>	11.8	22.8	33.3	43.8	54.4
<b>Sample 5</b>	9.7	17.6	26.6	35.4	43.1
<b>Sample 6</b>	10.8	20.7	31.3	41.2	51.1
<b>Min</b>	9.7	17.6	26.6	35.4	43.1
<b>Max</b>	11.8	22.8	33.3	43.8	54.4
<b>Avg</b>	10.77	20.37	30.4	40.13	49.53

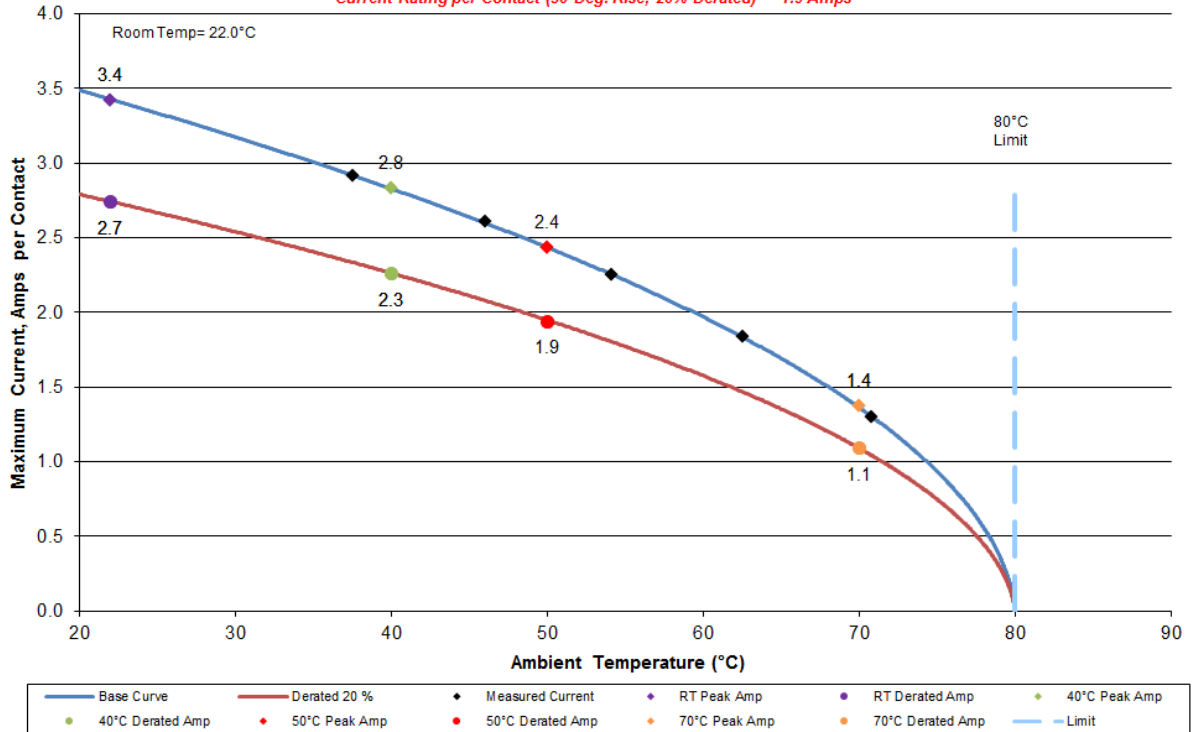
✦ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

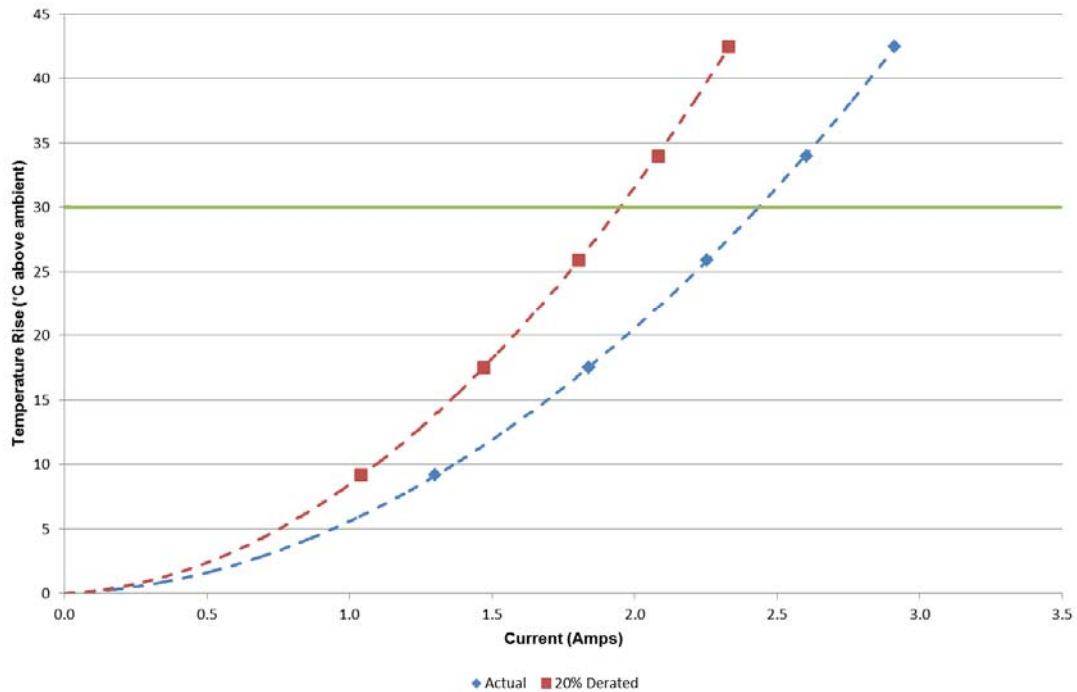
✦	✦		
✦	✦		

202015 (Cable)  
 6 (2X3) Contacts in Series  
 Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/IPL1-125-01-L-D-K

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.9 Amps



202015 (Cable)  
 6 (2X3) Contacts in Series  
 Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/IPL1-125-01-L-D-K



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

TEST CURRENT AMPS	1.3	1.84	2.25	2.6	2.91
Sample 7	8.9	17.2	25.1	32.9	40.7
Sample 8	9.3	17.4	25.6	33.6	42.4
Sample 9	9.3	18	26.9	35.5	44.8
Min	8.9	17.2	25.1	32.9	40.7
Max	9.3	18	26.9	35.5	44.8
Avg	9.17	17.53	25.87	34	42.63

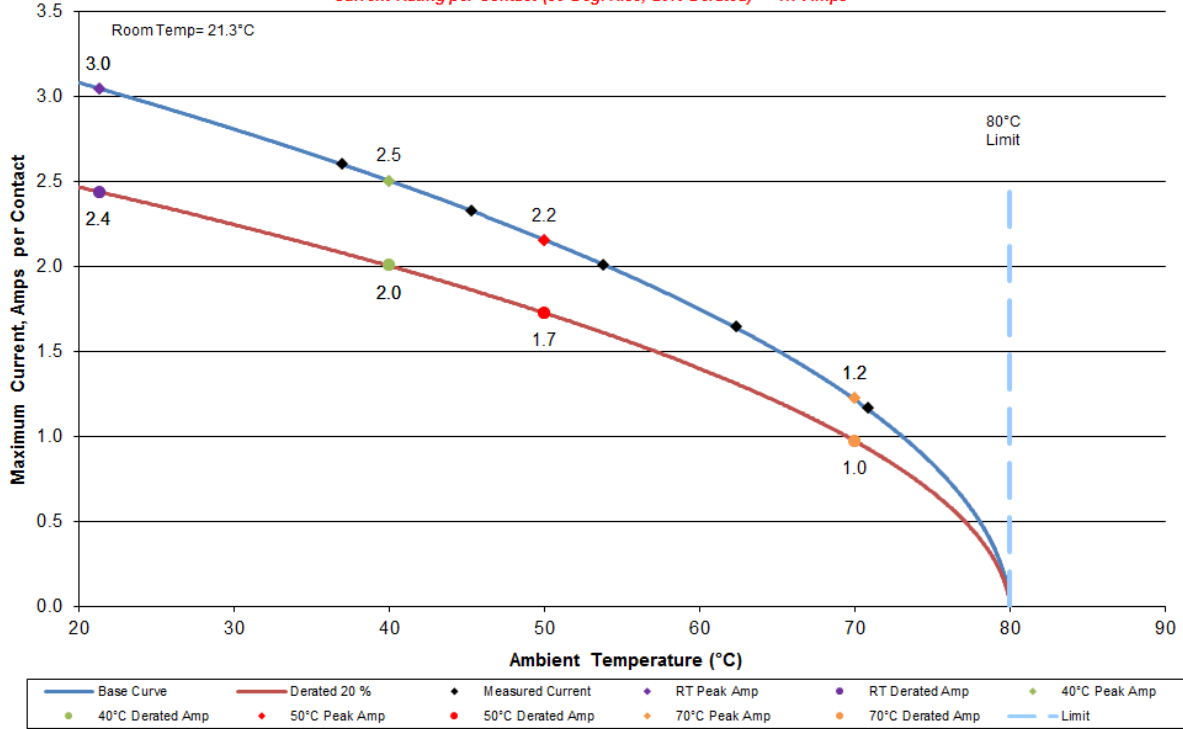
✦ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

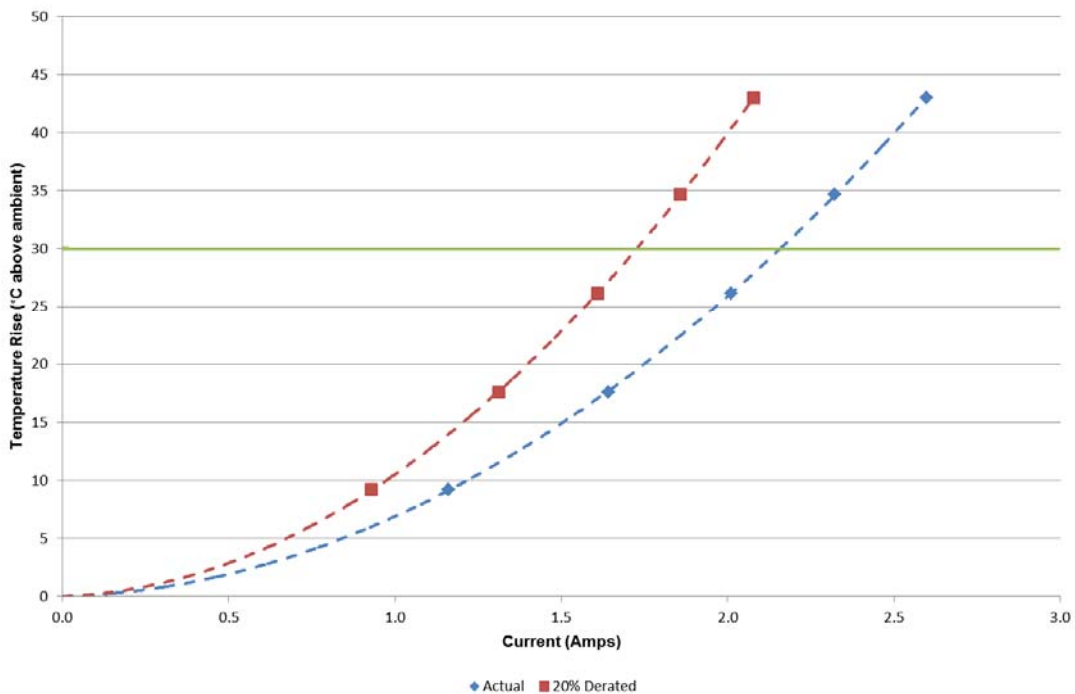
✦	✦	✦	
✦	✦	✦	

202015 (Cable)  
 8 (2X4) Contacts in Series  
 Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/IPL1-125-01-L-D-K

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.7 Amps



202015 (Cable)  
 8 (2X4) Contacts in Series  
 Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/IPL1-125-01-L-D-K



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

TEST CURRENT AMPS	<b>1.16</b>	<b>1.64</b>	<b>2.01</b>	<b>2.32</b>	<b>2.6</b>
<b>Sample 10</b>	9.1	17.7	26.6	35	43.3
<b>Sample 11</b>	9.4	18.1	26.5	35.1	43.8
<b>Sample 12</b>	9	17.1	25.5	33.9	42
<b>Min</b>	9	17.1	25.5	33.9	42
<b>Max</b>	9.4	18.1	26.6	35.1	43.8
<b>Avg</b>	9.17	17.63	26.2	34.67	43.03

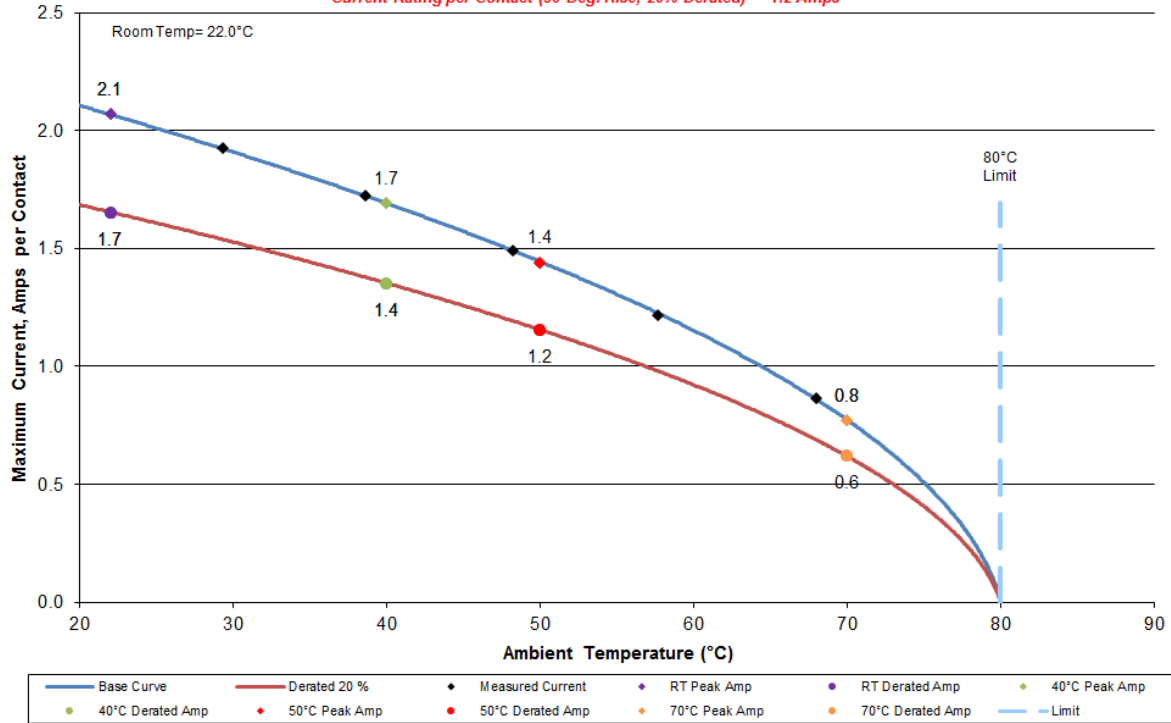
✦ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

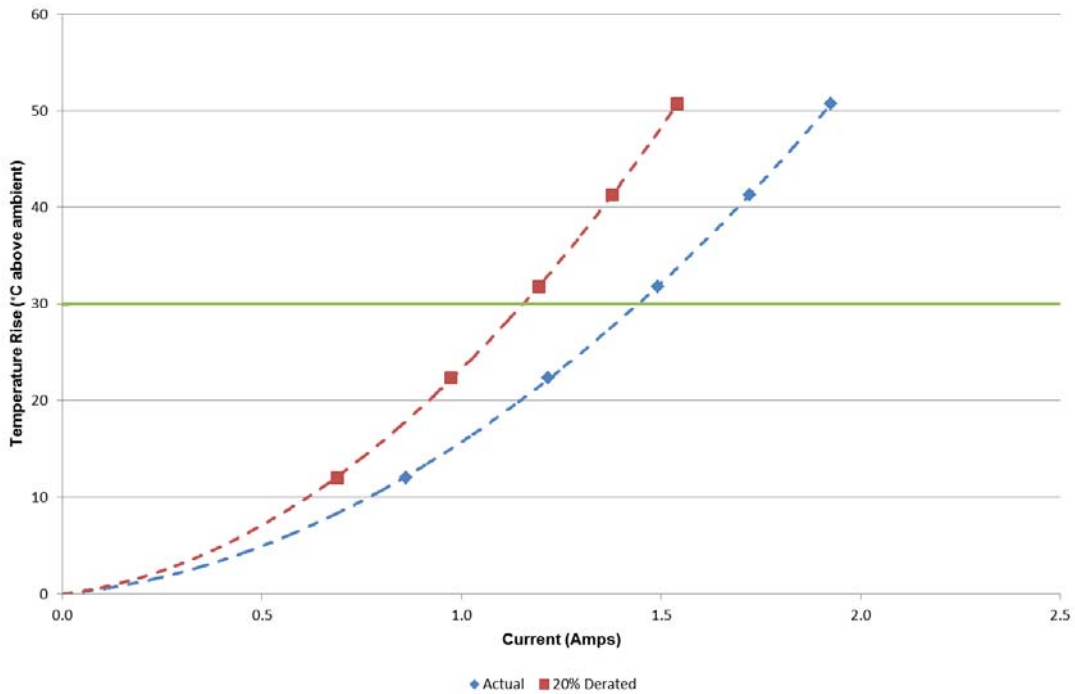
✦	✦	✦	✦
✦	✦	✦	✦

202015 (Cable)  
50 (All Power) Contacts in Series  
Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/IPL1-125-01-L-D-K

Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.2 Amps



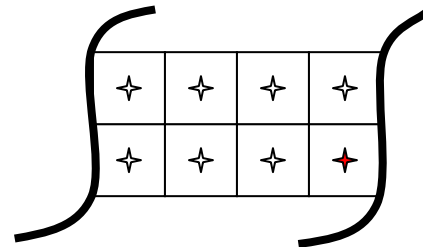
202015 (Cable)  
50 (All Power) Contacts in Series  
Part Numbers: MMSD-25-28-L-12.00-D-K-LUS/IPL1-125-01-L-D-K



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

TEST CURRENT AMPS	<b>0.86</b>	<b>1.22</b>	<b>1.49</b>	<b>1.72</b>	<b>1.93</b>
<b>Sample 13</b>	11.9	22.6	32.4	42.6	52.2
<b>Sample 14</b>	11.7	21.3	31	39.8	48.4
<b>Sample 15</b>	12.3	22.9	32	41.6	51.4
<b>Min</b>	11.7	21.3	31	39.8	48.4
<b>Max</b>	12.3	22.9	32.4	42.6	52.2
<b>Avg</b>	11.97	22.27	31.8	41.33	50.67

- ✦ Indicates energized contacts
- ✦ Indicates thermocouple monitored, energized contacts



**EQUIPMENT AND CALIBRATION SCHEDULES**

**Equipment #:** MO-04

**Description:** Model 2700 Multimeter/Data Acquisition System (Integra Series)

**Manufacturer:** Keithley

**Model:** 2700

**Serial #:** 0798688

**Accuracy:** See Manual

... Last Cal: 3/27/2012, Next Cal: 3/27/2013

**Equipment #:** PS-11

**Description:** 100V, 7.5A, 750W System DC Power Supply

**Manufacturer:** Agilent Technologies

**Model:** N57491

**Serial #:** US11M7700J

**Accuracy:** See Manual

**Equipment #:** RS-11

**Description:** Shunt

**Manufacturer:** Vishay

**Model:** VCS202

**Serial #:** VCS202

**Accuracy:**  $\pm 1\%$  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