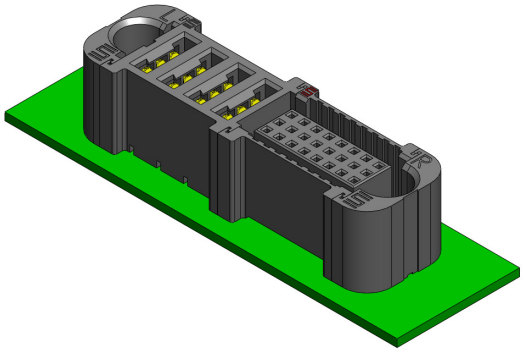
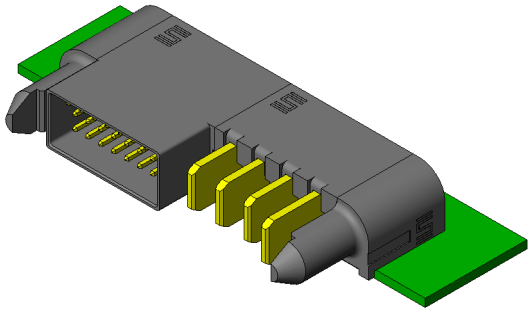
Project Number: 218435	Tracking Code: 218435 Report Rev 3	
Requested by: Eric Mings	Date: 5/20/2013	Product Rev: 0
Part #: ET60T-00-24-06-L-RT-GP	Tech: Tony Wagoner	Eng: Eric Mings
Part description: R/A Plug Ten60 Power Assembly		Qty to test: 23
Test Start: 10/08/2012	Test Completed: 10/30/2012	

SAMTEC POWER CHARACTERIZATION





PART DESCRIPTION

(R/A PLUG TEN60 POWER ASSEMBLY)

ET60T-00-24-06-L-RT1-GP /
ET60S-00-24-06-L-VT1-GP

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.

2. Current Cycling
   - 2.1. To determine the performance of the device under test (DUT) when subjected to the power-on/power-off cycling that heats and cools the DUT in normal everyday use.
   - 2.2. Contact loading will set to 100% throughout the test.

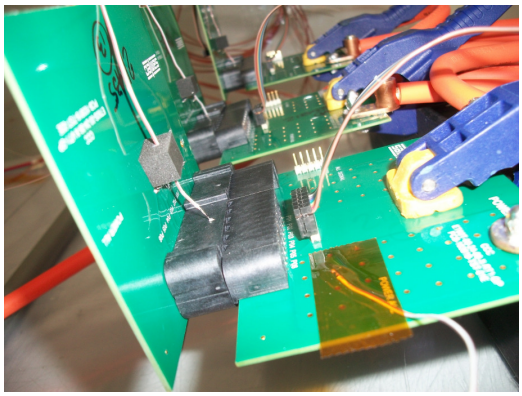
APPLICABLE DOCUMENTS

Standards: EIA Publication 364-70 Temperature Rise
EIA Publication 364-06 Contact Resistance
EIA Publication 364-55 Current Cycling
TLPM-032 Current Carrying Capacity
TLPM-084 Current Cycling
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 single row connector systems:
    - 9.1. One contact energized only
    - 9.2. Two contacts energized adjacent to each other
    - 9.3. Three contacts energized adjacent to each other
    - 9.4. Four contacts energized adjacent to each other
    - 9.5. All contacts energized

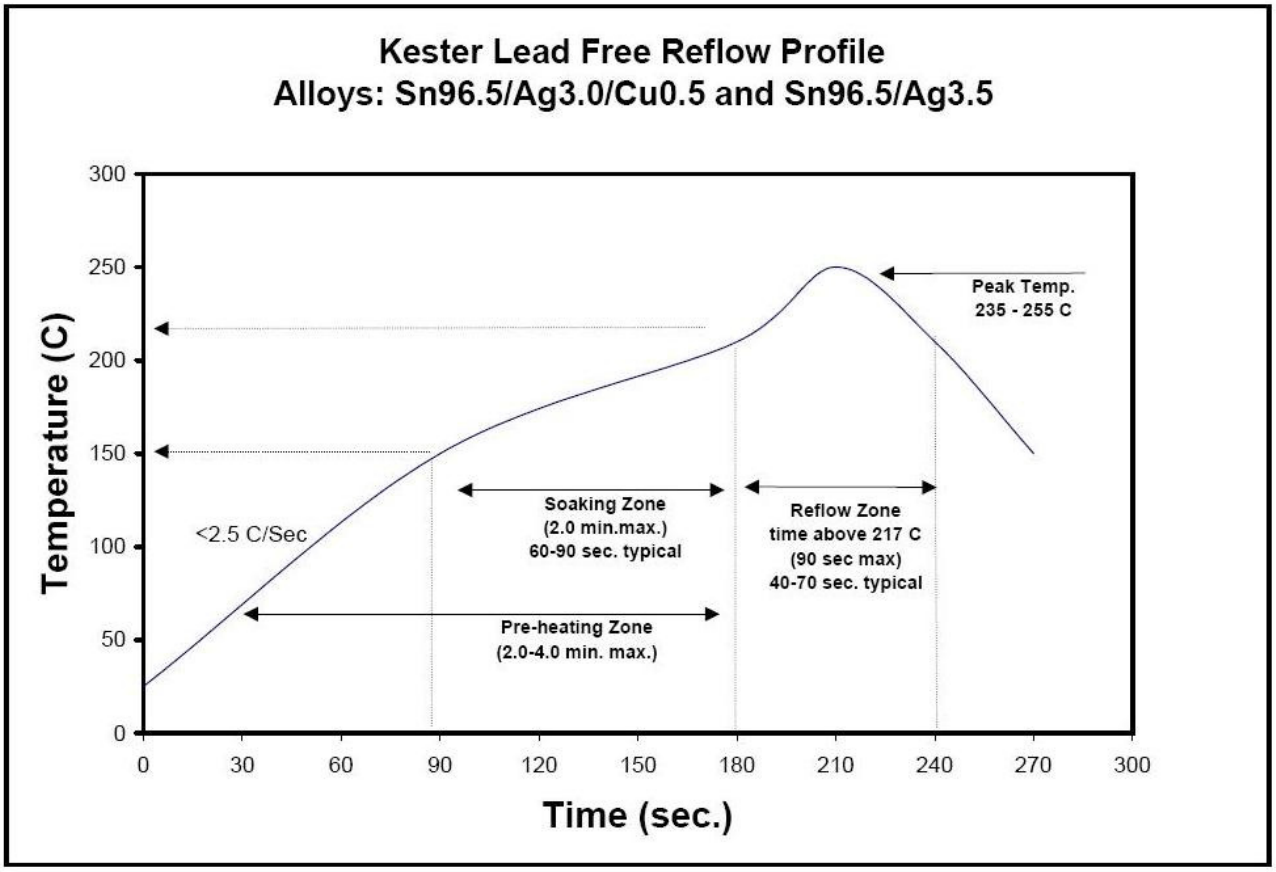
✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

Test Condition as in 9.1 above

10. For Current Cycling, only 100 % loading will be tested.

OVEN PROFILE (Soldering Parts to Test Boards)



FLOWCHARTS

Current Carrying Capacity - Power Pins

TEST STEP	GROUP A1 3 Mated Assemblies 1 Contact Powered	GROUP A2 3 Mated Assemblies 2 Contacts Powered	GROUP A3 3 Mated Assemblies 3 Contacts Powered	GROUP A4 3 Mated Assemblies 4 Contacts Powered	GROUP A5 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC	CCC

Current Carrying Capacity - Singal Pins

TEST STEP	GROUP D1 3 Mated Assemblies 1 Vertical Row Powered	GROUP D2 3 Mated Assemblies 2 Adjacent Vertical Rows Powered	GROUP D3 3 Mated Assemblies 3 Adjacent Vertical Rows Powered	GROUP D4 3 Mated Assemblies 4 Adjacent Vertical Rows Powered	GROUP D5 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC	CCC

Current Carrying Capacity - Power and Signal Pins

TEST STEP	GROUP E1 3 Mated Assemblies Signal Pins @ 1/2 rated current from Group D5 Power Pins - All Contacts Powered
01	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

Current Cycling

TEST STEP	GROUP A 8 Mated Assemblies ALL CONTACTS POWERED
01	Current Cycle, 500 cycles at 125% of Rated current

Current Cycle = EIA 364-55, Condition "B", Method #4
Test at Current 125% of Rated Current
Measure at 45 minutes into ON time of cycle
Measure Voltage Drop on 5 random contacts

TEST PROCEDURES

Part No.	ET60T-00-24-06-L-RT1-GP	Mating Part No.	ET60S-00-24-06-L-VT1-GP
Sample Size	15	Technician	Tony Wagoner
Start Date	10/5/2012	Complete Date	10/25/2012
Room Ambient	22°C	Relative Humidity	47%
Equipment ID#: MO-04, PS-07, TC111307-(001 - 017)			

TEMPERATURE RISE (Current Carrying Capacity, CCC):

11. Thermocouples shall be calibrated in accordance with Samtec documents; TLWI 0003, Thermocouple Welding Procedure and TLWI 0005, Thermocouple Calibration
12. The thermocouples shall be placed at a location to sense the maximum temperature generated during testing.
13. 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.
14. The following loading configurations shall be tested (double for two row systems):
    - 14.1. One contact energized only
    - 14.2. Two contacts energized adjacent to each other
    - 14.3. Three contacts energized adjacent to each other
    - 14.4. Four contacts energized adjacent to each other
    - 14.5. All contacts energized
15. The following loading configurations shall be tested for Temperature Rise/Current Carrying Capacity testing of two row connector systems:
    - 15.1. Two by One contact energized
    - 15.2. Two by Two contacts energized adjacent to each other
    - 15.3. Two by Three contacts energized adjacent to each other
    - 15.4. Two by Four contacts energized adjacent to each other
    - 15.5. All contacts energized
16. Three samples shall be tested for each of the above configurations for a total of eighteen assemblies.
17. Temperature Rise measurements shall be made at 5 different current levels yielding temperature rises in the 10 to 70°C range.
18. 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.

Part No.	**ET60T-00-24-06-L-RT1-GP**	**Mating Part No.**	**ET60S-00-24-06-L-VT1-GP**
Sample Size	**8**	**Technician**	**Tony Wagoner**
Start Date	**10/5/2012**	**Complete Date**	**10/26/2012**
Room Ambient	**22°C**	**Relative Humidity**	**47%**
Equipment ID#: MO-09;TCS-034;TCS-016;TCS-004;TCS-001;TCS-047;TCS-014;TCS-027;TCS-013;TCS-050;TCS-001;TCS-051;RS-01			

CURRENT CYCLING

1. Samples shall be prepared and tested as above (paragraph 14.5).
2. Current Cycling shall be performed in accordance with EIA-364-55, Test Condition
3. Testing shall be as follows:
   - 3.1. Test Current: **TEST CURRENT**(125% of 30°C Rating)
   - 3.2. "ON" Time: 45 Minutes
   - 3.3. "OFF" Time: 15 Minutes
   - 3.4. Number of Cycles: 500
   - 3.5. Measurements: 40 minutes into ON cycle
     - 3.5.1. Temperature
     - 3.5.2. Voltage Drop/Contact Resistance
4. Temperature vs. Number of Cycles and Voltage Drop vs. Number of Cycles shall be measured and recorded.

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:**

Power Pins

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise ----------67.4A per contact with 1 contacts (1 x 1) powered**
- **CCC for a 30°C Temperature Rise ----------60.3A per contact with 2 contacts (1 x 2) powered**
- **CCC for a 30°C Temperature Rise ----------53.8A per contact with 3 contacts (1 x 3) powered**
- **CCC for a 30°C Temperature Rise ----------50.2A per contact with 4 contacts (1 x 4) powered**
- **CCC for a 30°C Temperature Rise ----------44.3A per contact with 6 contacts (1 x 6) powered**

Signal Pins

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise ----------3.7A per contact with 3 contacts (3 x 1) powered**
- **CCC for a 30°C Temperature Rise ----------2.8A per contact with 6 contacts (3 x 2) powered**
- **CCC for a 30°C Temperature Rise ----------2.4A per contact with 9 contacts (3 x 3) powered**
- **CCC for a 30°C Temperature Rise ----------2.2A per contact with 12 contacts (3 x 4) powered**
- **CCC for a 30°C Temperature Rise ----------1.7A per contact with 24 contacts (3 x 8) powered**

Power Pins (with Signal Pins powered at ½ rated current at 1.05 Amps)

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise ----------43.8A per contact with 6 contacts (1 x 6) powered and 24 signal pins powered at ½ rated current at 1.05 Amps)**

CURRENT CYCLING RESULTS

Power Pins with Signal Pins powered at ½ rated current at 1.05 AMPS

Test Condition: 500 Cycles, 45 minutes ON and 15 minutes OFF

- **Test Current ----------54.7 Amps**

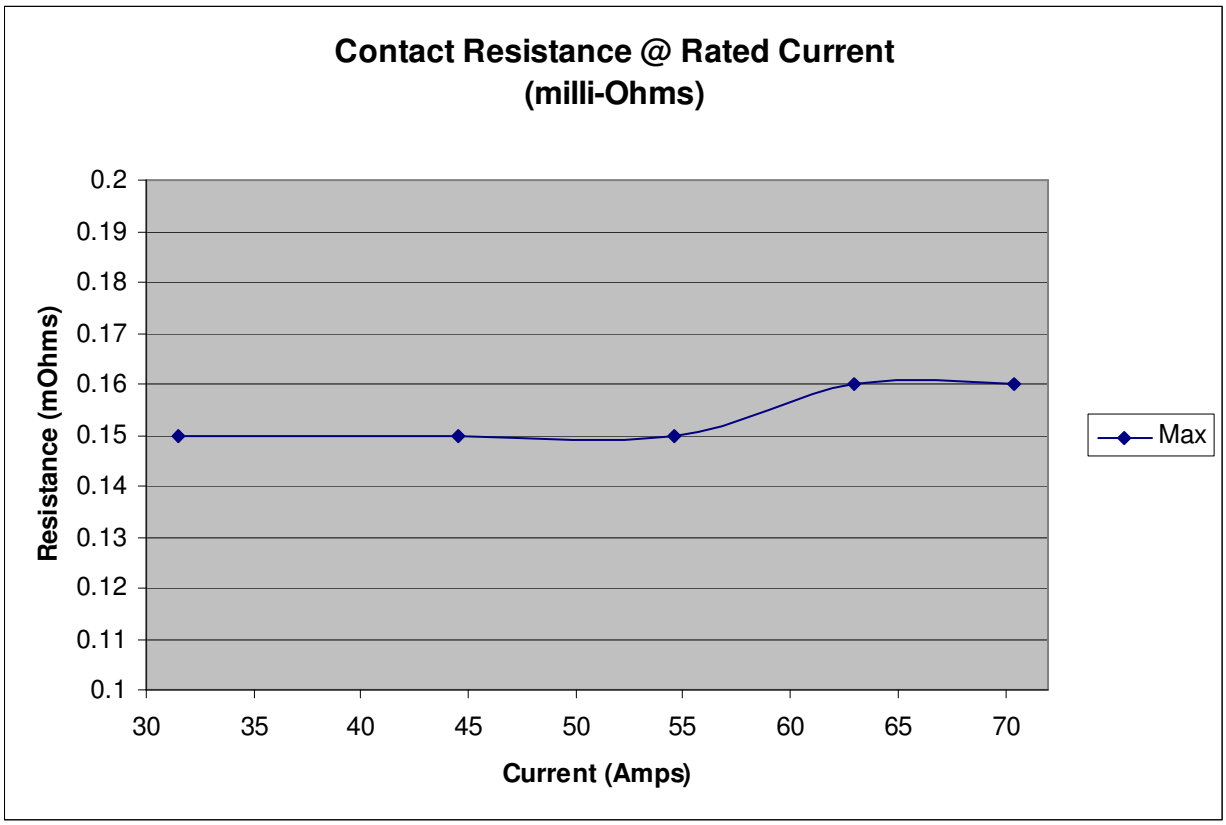
- **Contact Resistances, Measured 40 minutes into the FIRST and LAST ON cycle**
  - **Initial**
    - **Min ----------.11mOhms**
    - **Max----------.16mOhms**
  - **Final**
    - **Min ----------.11mOhms**
    - **Max----------.14mOhms**

- **Temperature Change, Measured 40 minutes into the FIRST and LAST ON cycle**
  - **Initial Temperature Change ----------29.3°C**
  - **Final Temperature Change ----------27.9°C**

TEST DATA (POWER)

CONTACT RESISTANCE @ RATED CURRENT - DC Resistance (DCR)

The following data represents the Voltage drop and Contact Resistance at Rated Current for the 100% energized samples:



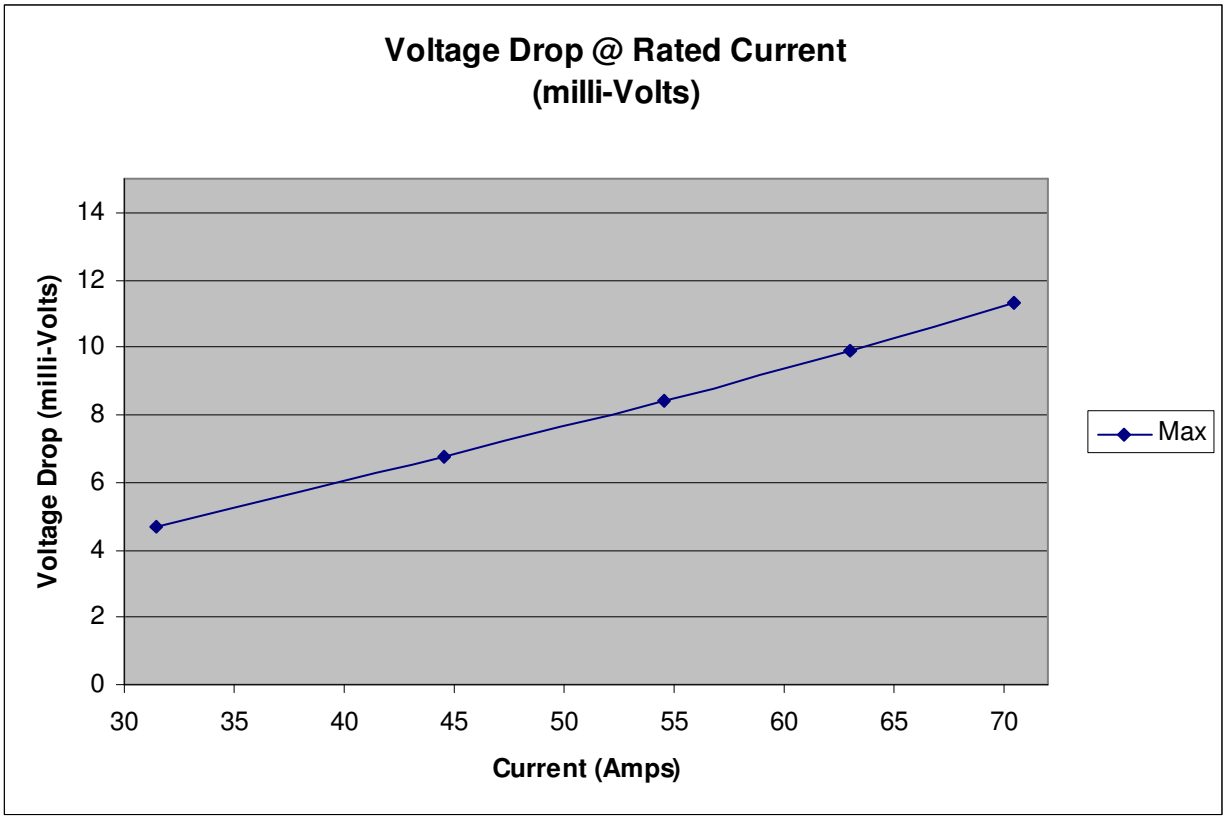
CONTACT RESISTANCE DATA
ALL CONTACTS ENERGIZED
(mΩ)

TEST CURRENT AMPS	31.47	44.51	54.55	62.97	70.43
Min	0.11	0.11	0.11	0.11	0.12
Max	0.15	0.15	0.15	0.16	0.16
Avg	0.12	0.13	0.13	0.13	0.13

TEST DATA (POWER)

VOLTAGE DROP @ RATED CURRENT

The following data represents the Voltage drop at Rated Current for the 100% energized samples:

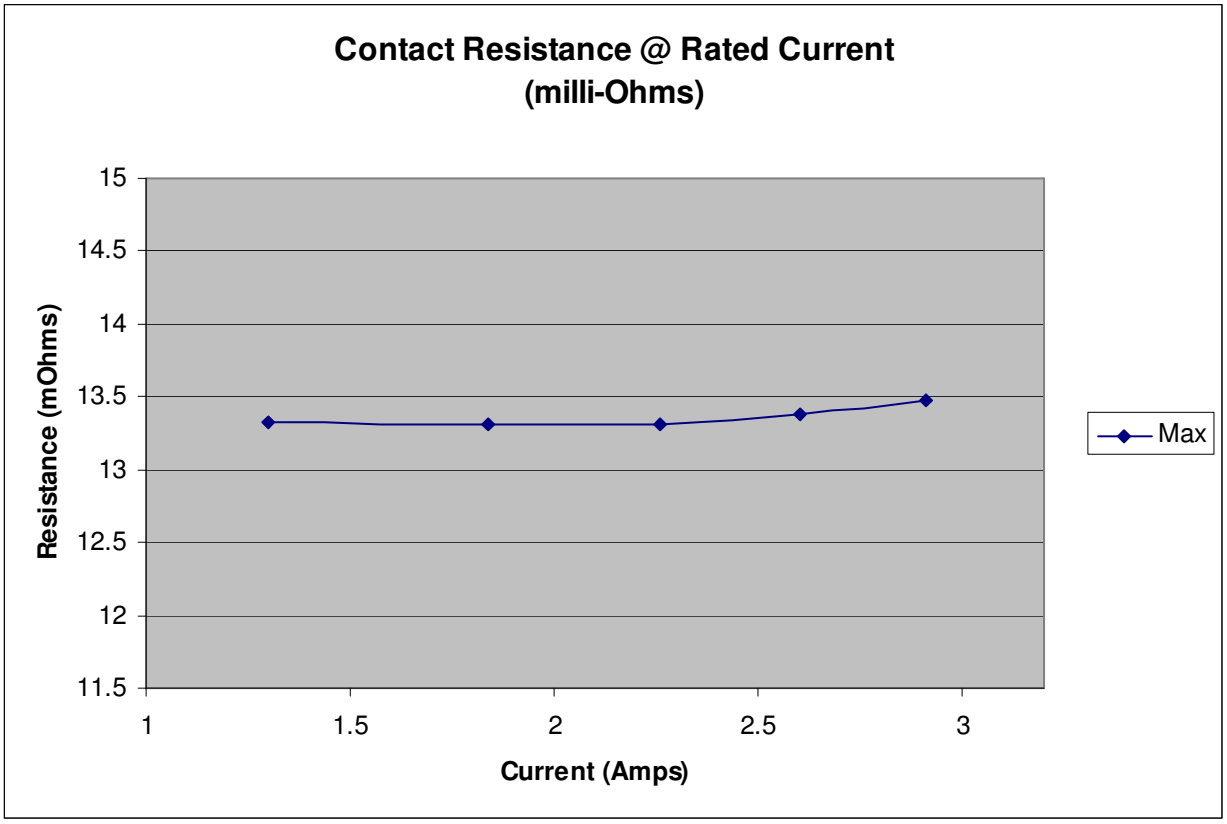


VOLTAGE DROP DATA ALL CONTACTS ENERGIZED (mV)					
TEST CURRENT AMPS	31.47	44.51	54.55	62.97	70.43
Min	3.38	4.9	6.14	7.24	8.29
Max	4.68	6.73	8.4	9.9	11.3
Avg	3.93	5.65	7.06	8.31	9.49

TEST DATA (SIGNAL)

VOLTAGE DROP @ RATED CURRENT

The following data represents the Voltage drop at Rated Current for the 100% energized samples:

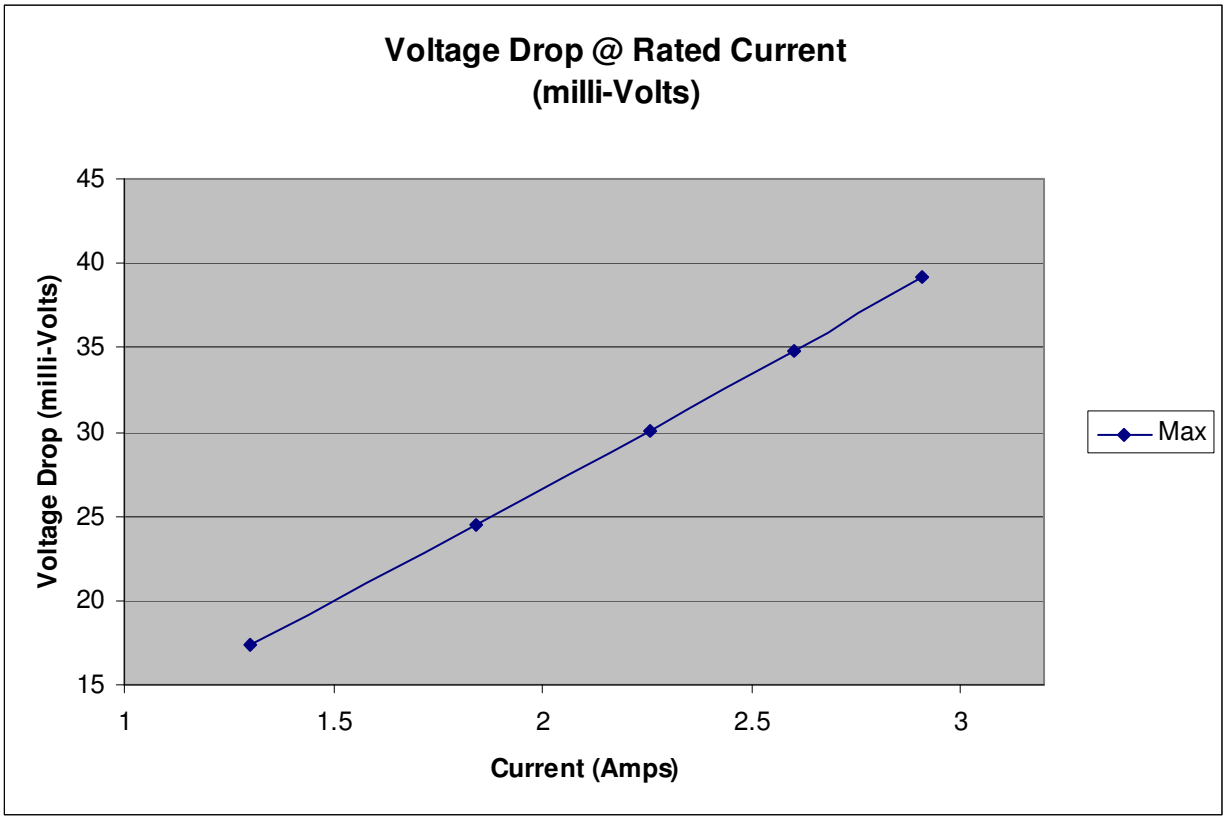


VOLTAGE DROP DATA ALL CONTACTS ENERGIZED (mV)					
TEST CURRENT AMPS	1.3	1.84	2.26	2.6	2.91
Min	9.6	9.61	9.66	9.82	9.92
Max	13.32	13.31	13.31	13.38	13.47
Avg	11.13	11.18	11.23	11.36	11.43

TEST DATA (SIGNAL)

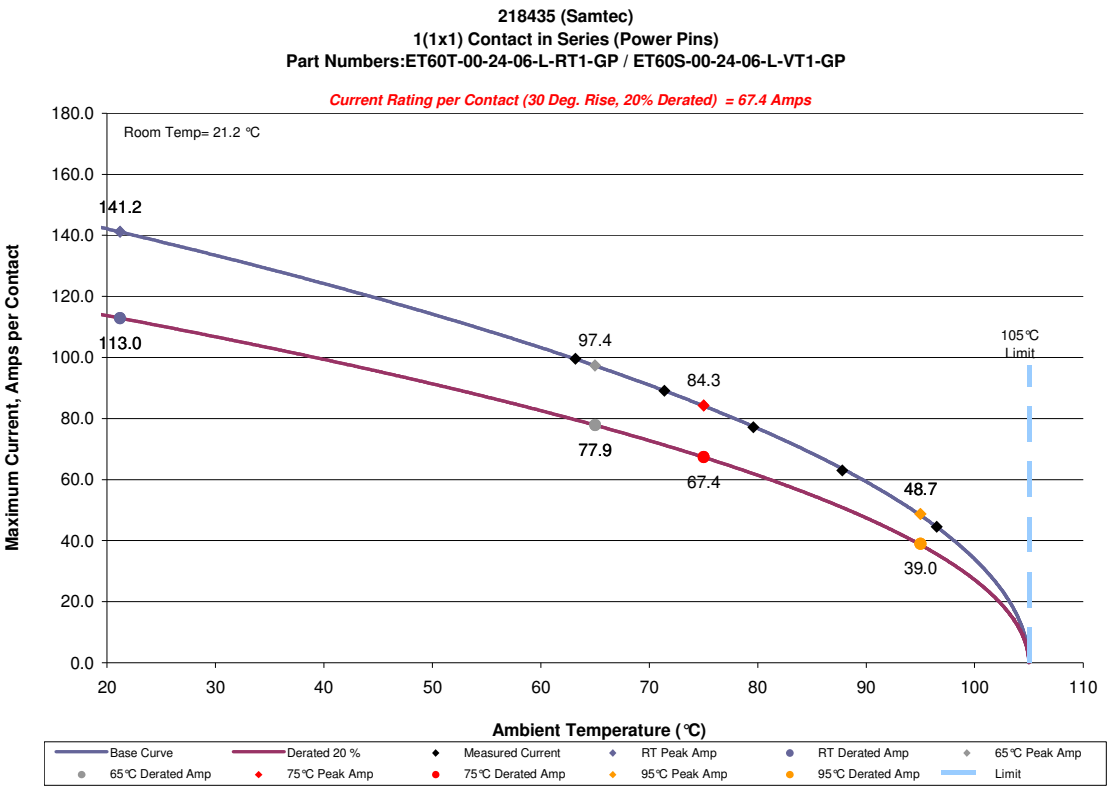
VOLTAGE DROP @ RATED CURRENT

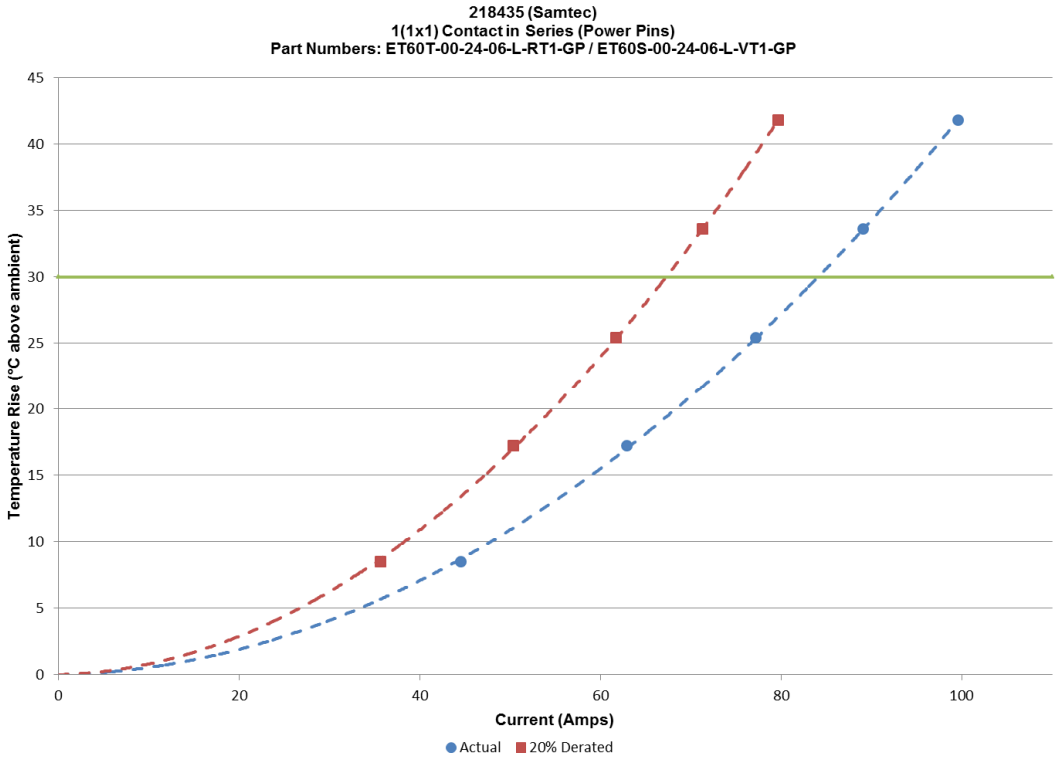
The following data represents the Voltage drop at Rated Current for the 100% energized samples:



VOLTAGE DROP DATA ALL CONTACTS ENERGIZED (mV)					
TEST CURRENT AMPS	1.3	1.84	2.26	2.6	2.91
Min	12.48	17.68	21.83	25.52	28.86
Max	17.32	24.49	30.07	34.8	39.19
Avg	14.38	20.48	25.28	29.4	33.11

CURRENT CARRYING CAPACITY DATA



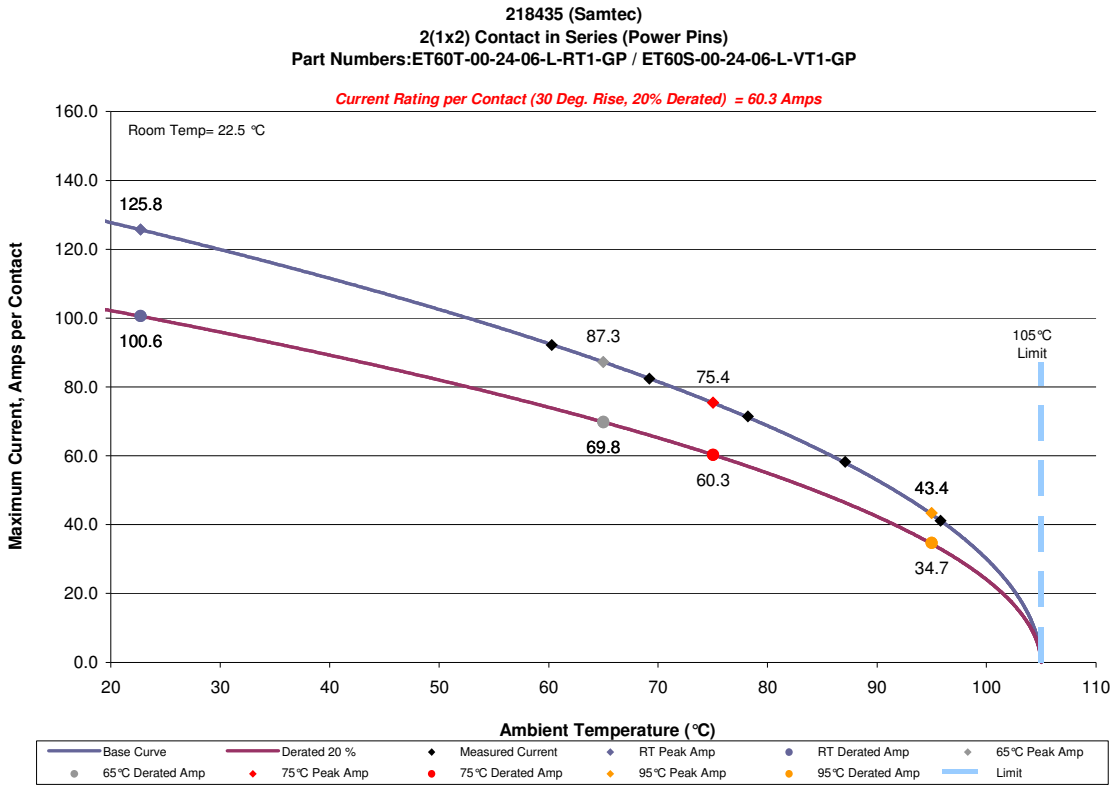


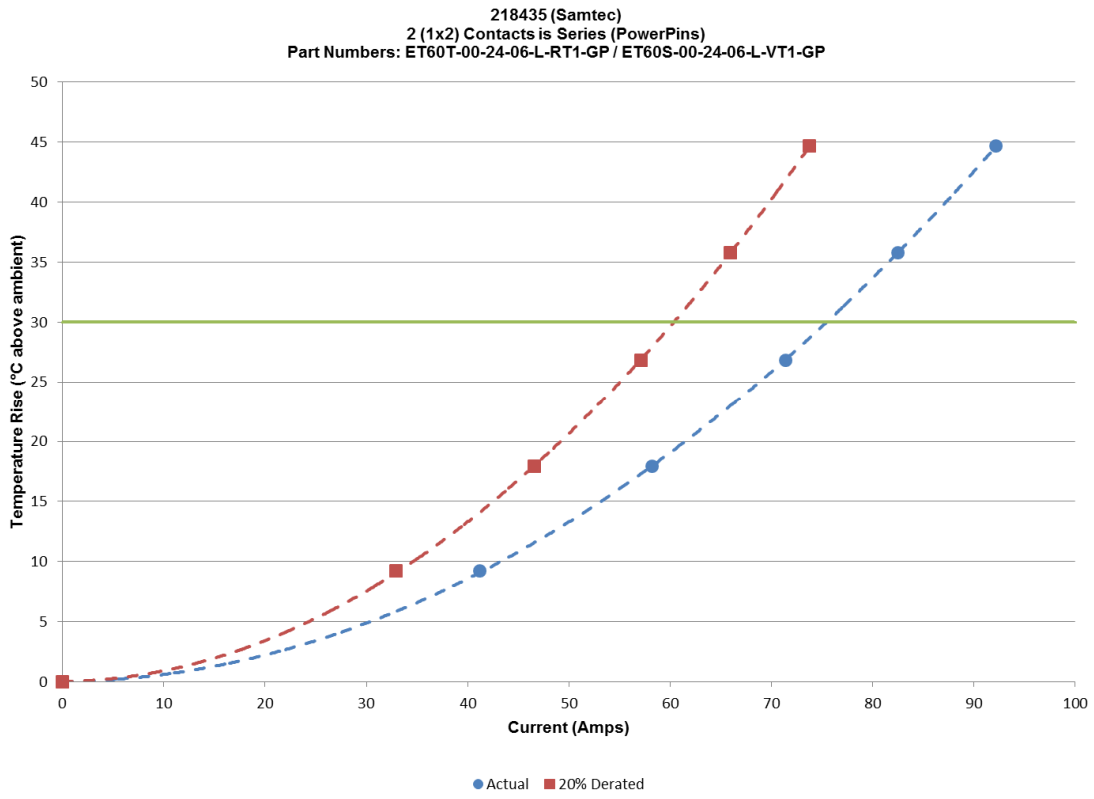
TEMPERATURE RISE DATA ONE CONTACT ENERGIZED (Degrees Celsius above ambient)					
TEST CURRENT AMPS	**44.5**	**62.93**	**77.16**	**89.11**	**99.63**
Sample 1	9	17.9	26.4	35	43.1
Sample 2	7.9	16.1	23.9	31.7	39.4
Sample 3	8.7	17.5	25.8	34.1	43
Min	7.9	16.1	23.9	31.7	39.4
Max	9	17.9	26.4	35	43.1
Avg	8.53	17.17	25.37	33.6	41.83

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

Single Row Configuration


218435 (Samtec)
2(1x2) Contact in Series (Power Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 60.3 Amps
Room Temp= 22.5 ℃
125.8
100.6
87.3
75.4
69.8
60.3
43.4
34.7
105℃ Limit
Maximum Current, Amps per Contact
Ambient Temperature (℃)
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit


218435 (Samtec)
2 (1x2) Contacts is Series (PowerPins)
Part Numbers: ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

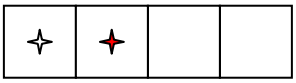
TEMPERATURE RISE DATA
TWO CONTACTS ENERGIZED
(Degrees Celsius above ambient)

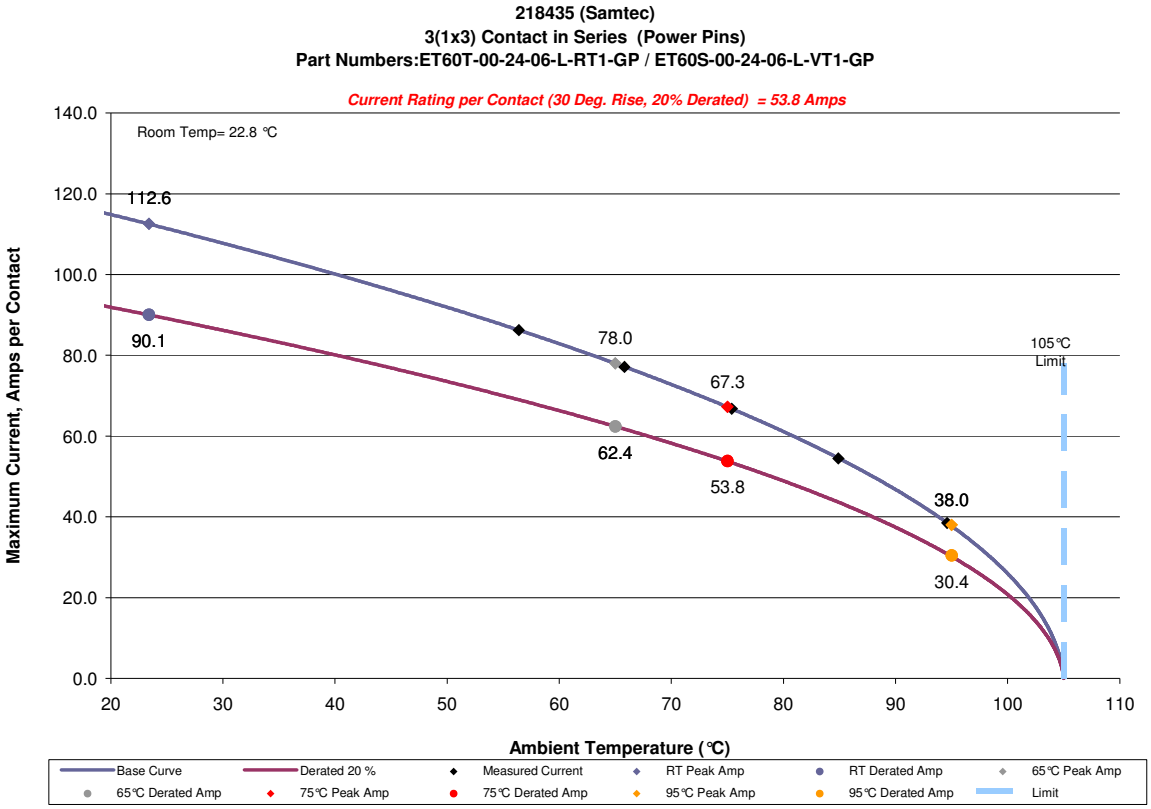
TEST CURRENT AMPS	41.19	58.25	71.39	82.45	92.19
Sample 4	9	17.4	25.9	34.8	43.4
Sample 5	9.4	18.3	27.4	36.6	45.9
Sample 6	9.3	18.1	27	35.9	44.7
Min	9	17.4	25.9	34.8	43.4
Max	9.4	18.3	27.4	36.6	45.9
Avg	9.23	17.93	26.77	35.77	44.67

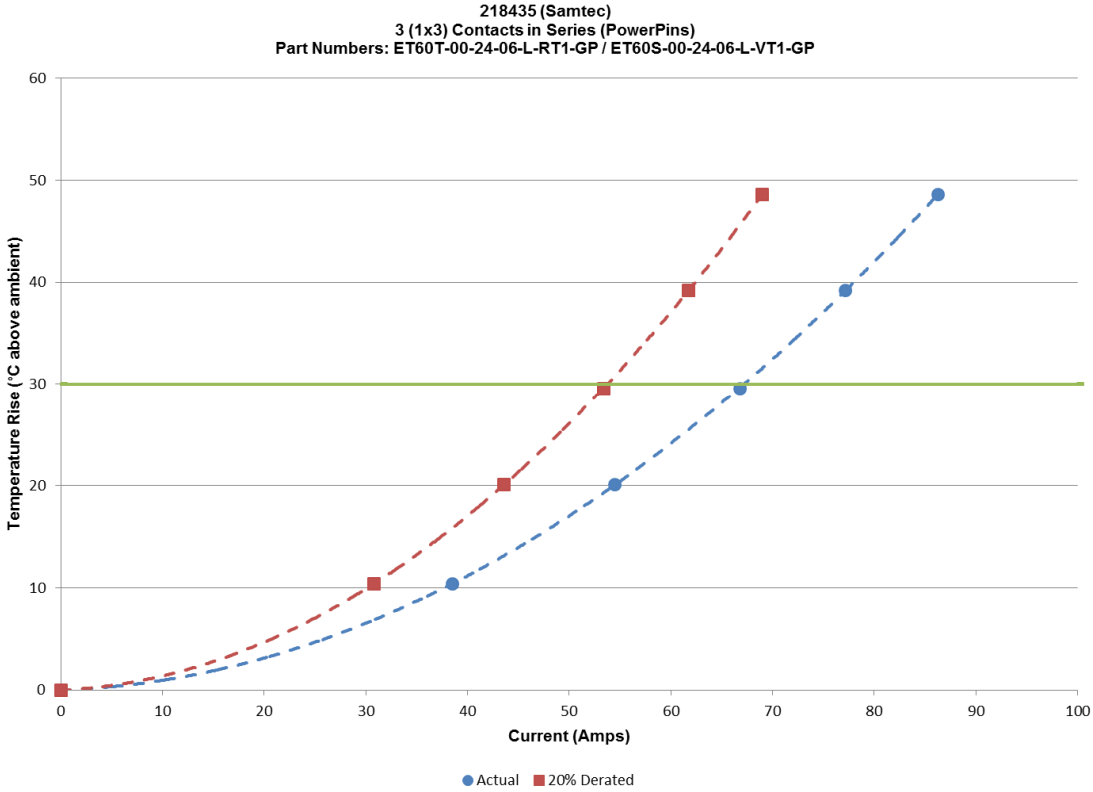
✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

Single Row Configuration




218435 (Samtec)
3(1x3) Contact in Series (Power Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 53.8 Amps
Room Temp= 22.8 ℃
112.6
90.1
78.0
67.3
62.4
53.8
38.0
30.4
105℃ Limit
Maximum Current, Amps per Contact
Ambient Temperature (℃)
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit


218435 (Samtec)
3 (1x3) Contacts in Series (PowerPins)
Part Numbers: ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

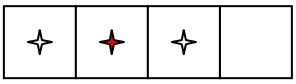
TEMPERATURE RISE DATA
THREE CONTACTS ENERGIZED
(Degrees Celsius above ambient)

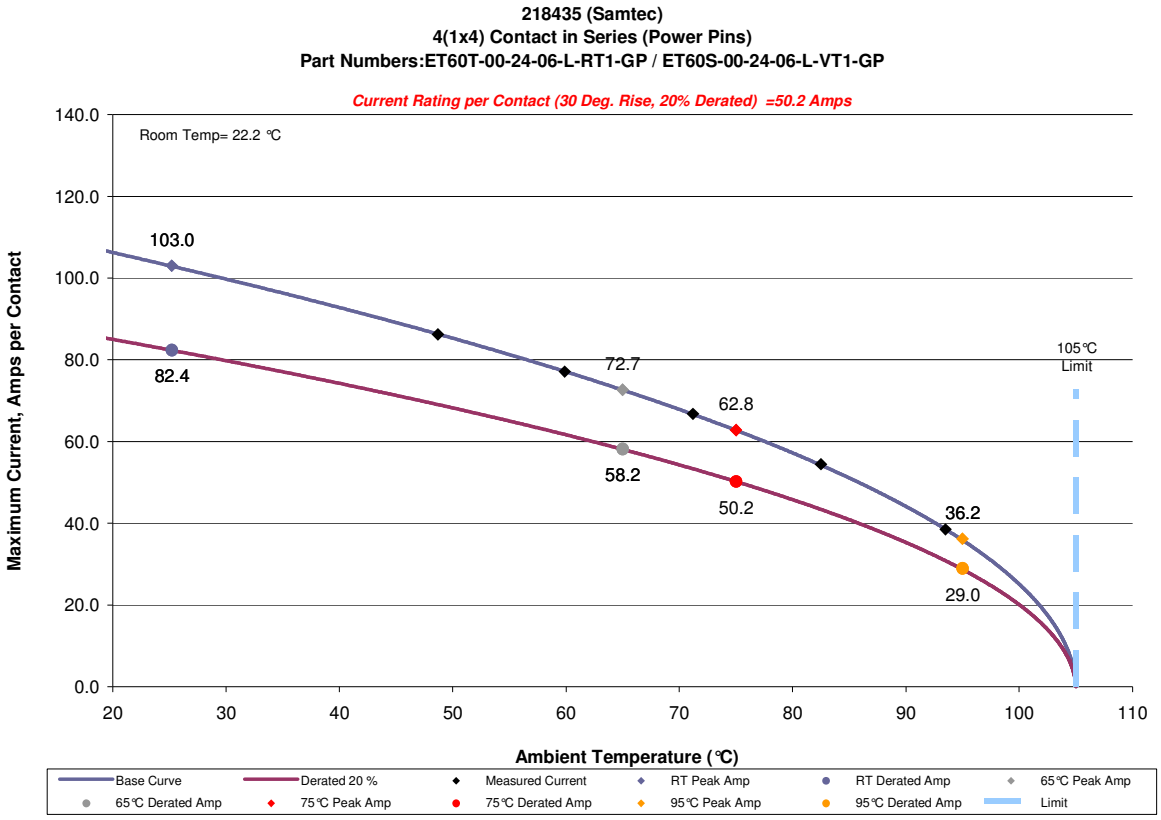
TEST CURRENT AMPS	38.51	54.47	66.79	77.13	86.24
Sample 7	10.2	19.6	28.7	37.9	46.6
Sample 8	10.9	21.1	31.1	41.1	51.2
Sample 9	10.1	19.7	29	38.6	47.9
Min	10.1	19.6	28.7	37.9	46.6
Max	10.9	21.1	31.1	41.1	51.2
Avg	10.4	20.13	29.6	39.2	48.57

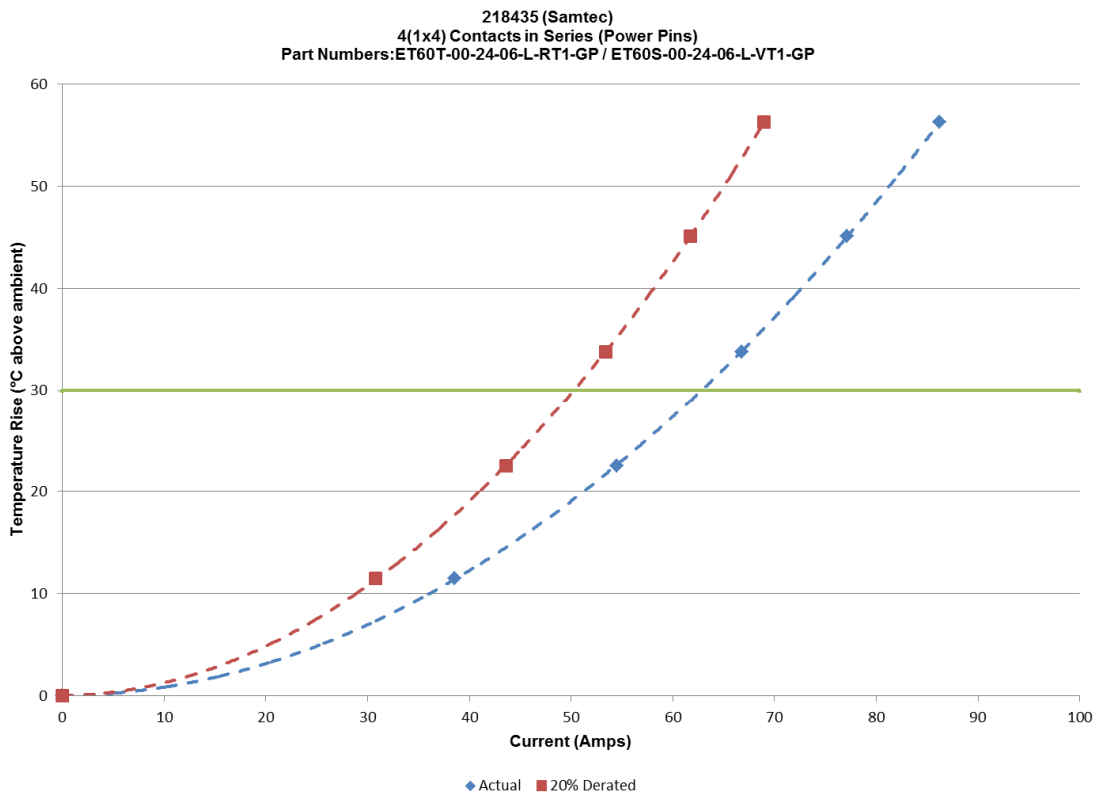
✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

Single Row Configuration




218435 (Samtec)
4(1x4) Contact in Series (Power Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) =50.2 Amps
Room Temp= 22.2 ℃
Maximum Current, Amps per Contact
Ambient Temperature (℃)
103.0
82.4
72.7
62.8
58.2
50.2
36.2
29.0
105℃ Limit
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit

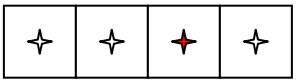

218435 (Samtec)
4(1x4) Contacts in Series (Power Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

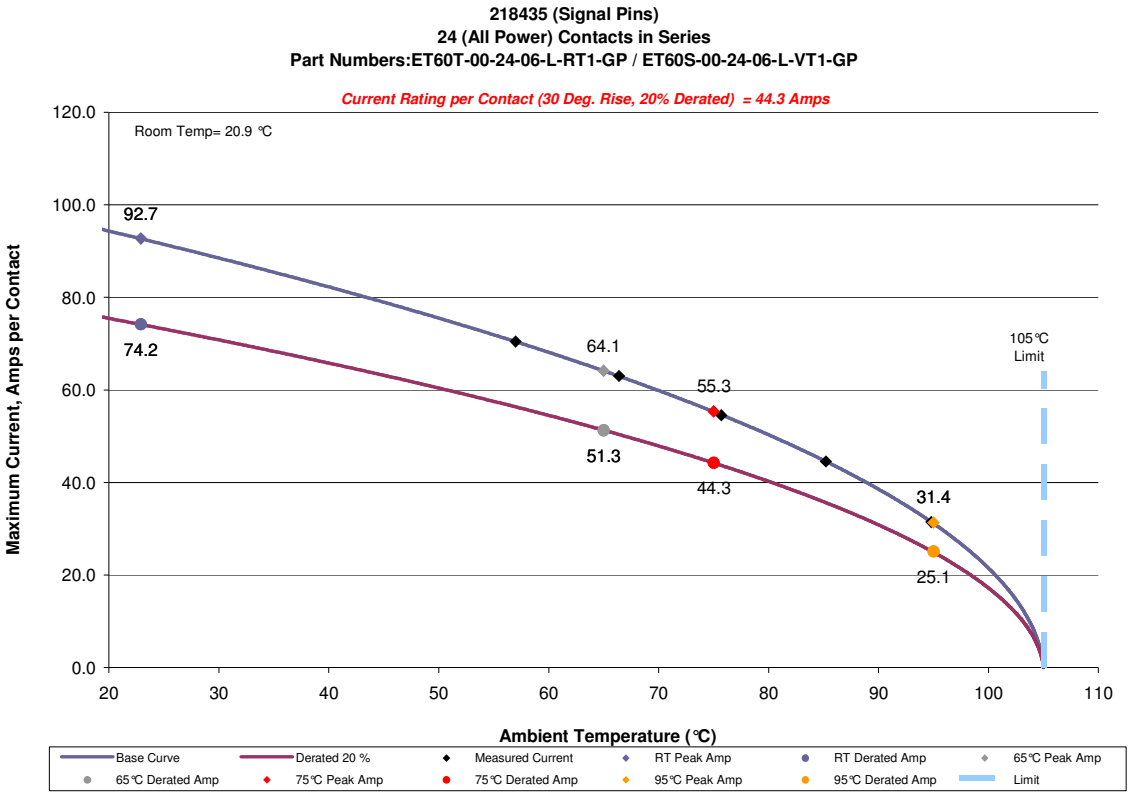
TEMPERATURE RISE DATA FOUR CONTACTS ENERGIZED (Degrees Celsius above ambient)					
TEST CURRENT AMPS	38.52	54.47	66.79	77.14	86.24
Sample 10	11.4	22.4	33.7	44.7	55.8
Sample 11	11.8	23.2	34.7	46.1	57.3
Sample 12	11.3	21.9	33.1	44.5	55.8
Min	11.3	21.9	33.1	44.5	55.8
Max	11.8	23.2	34.7	46.1	57.3
Avg	11.5	22.5	33.83	45.1	56.3

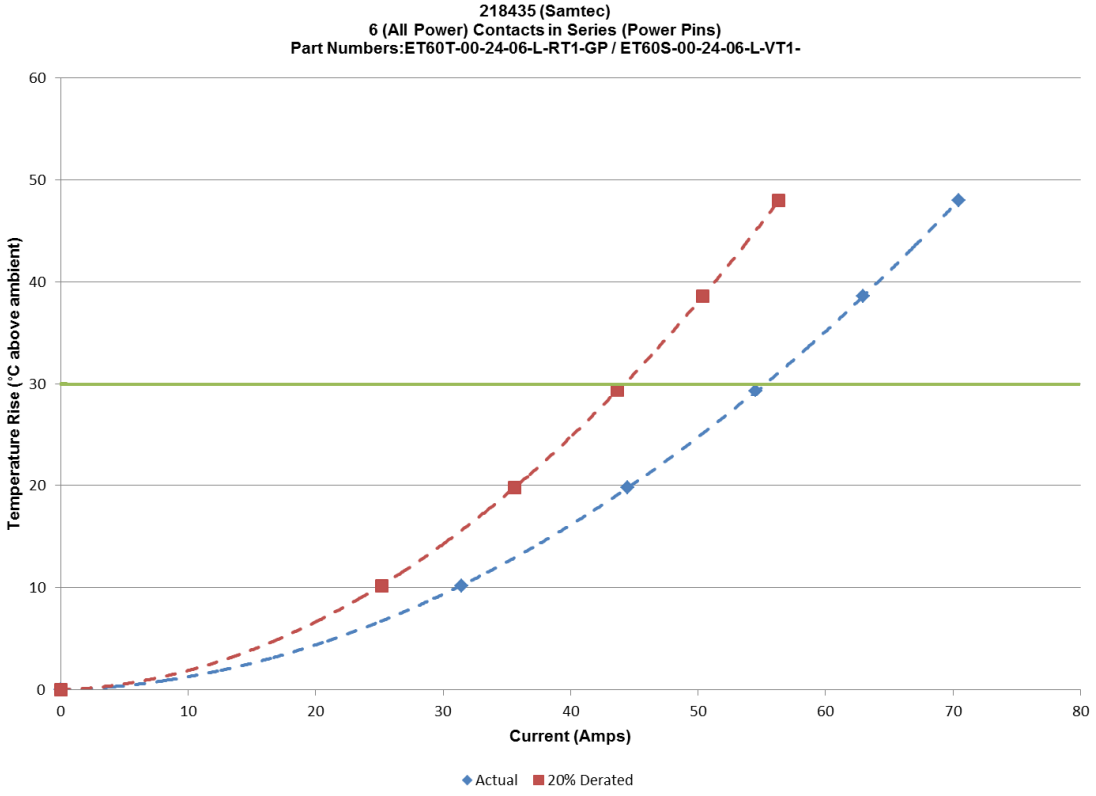
✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts

Single Row Configuration




218435 (Signal Pins)
24 (All Power) Contacts in Series
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 44.3 Amps
Room Temp= 20.9 ℃
92.7
74.2
64.1
51.3
55.3
44.3
31.4
25.1
105℃ Limit
Maximum Current, Amps per Contact
Ambient Temperature (℃)
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit

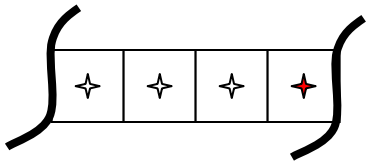

218435 (Samtec)
6 (All Power) Contacts in Series (Power Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

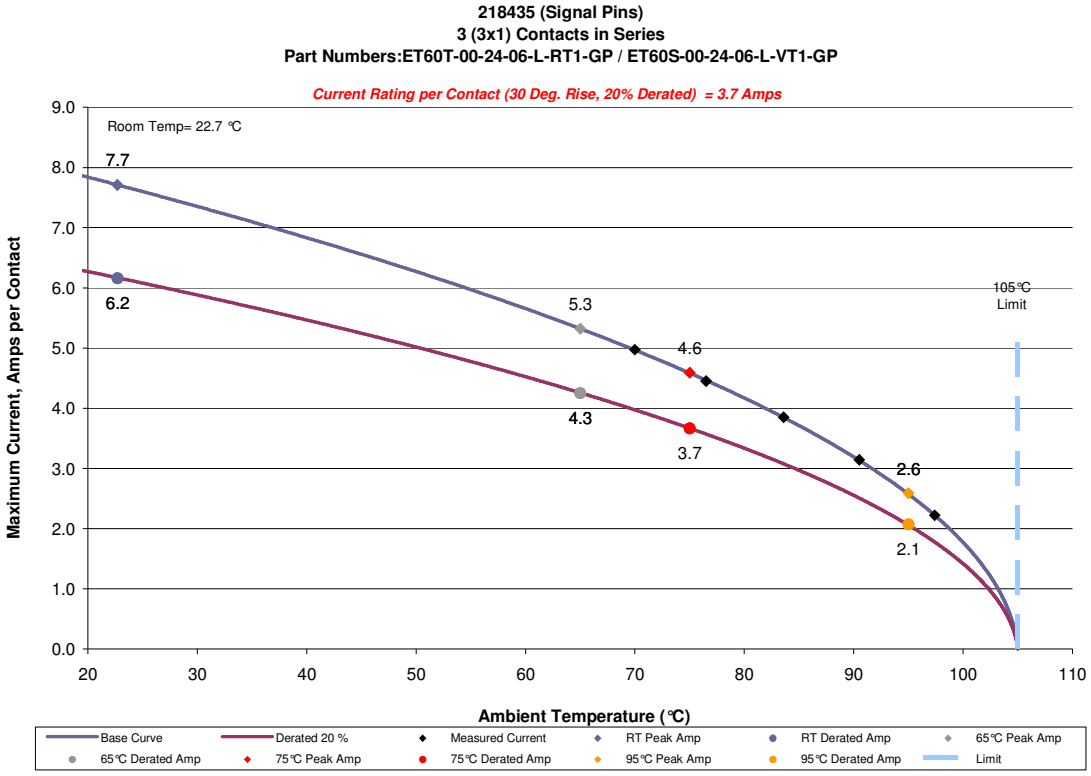
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

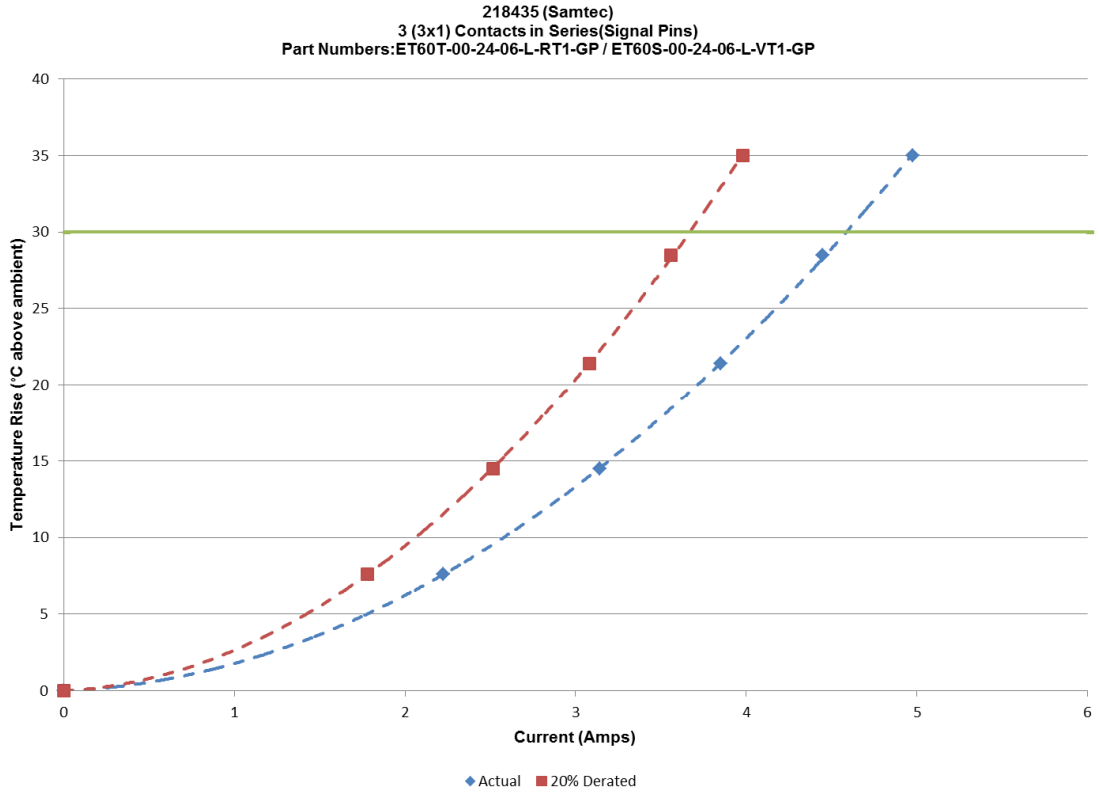
TEST CURRENT AMPS	31.47	44.51	54.55	62.97	70.43
Sample 13	10.5	20.5	30.5	40.1	50
Sample 14	10	19.5	28.8	38	47.3
Sample 15	10	19.3	28.6	37.8	46.8
Min	10	19.3	28.6	37.8	46.8
Max	10.5	20.5	30.5	40.1	50
Avg	10.17	19.77	29.3	38.63	48.03

Indicates energized contacts

Indicates thermocouple monitored, energized contacts




218435 (Signal Pins)
3 (3x1) Contacts in Series
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 3.7 Amps
Room Temp= 22.7 ℃
7.7
6.2
5.3
4.6
4.3
3.7
2.6
2.1
105℃ Limit
Maximum Current, Amps per Contact
Ambient Temperature (℃)
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit

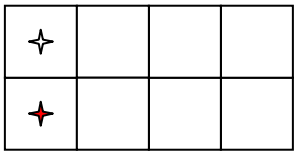

218435 (Samtec)
3 (3x1) Contacts in Series(Signal Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

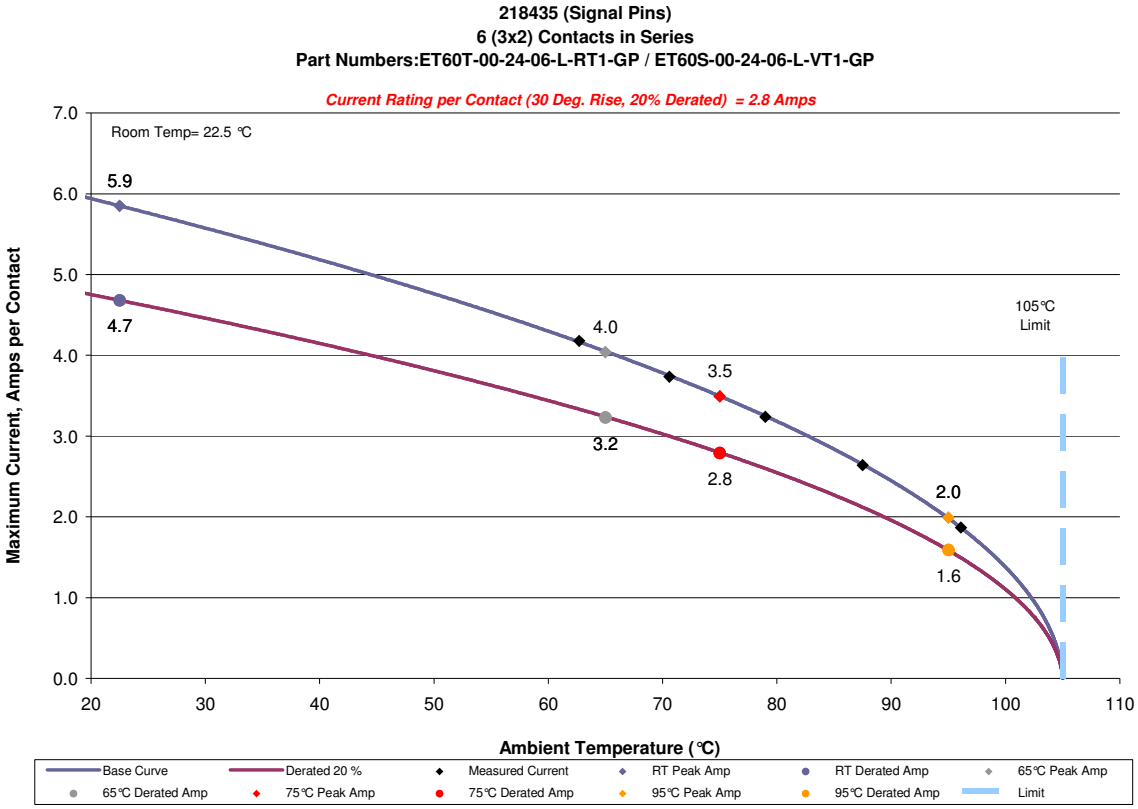
TEMPERATURE RISE DATA
3 CONTACTS ENERGIZED
(Degrees Celsius above ambient)

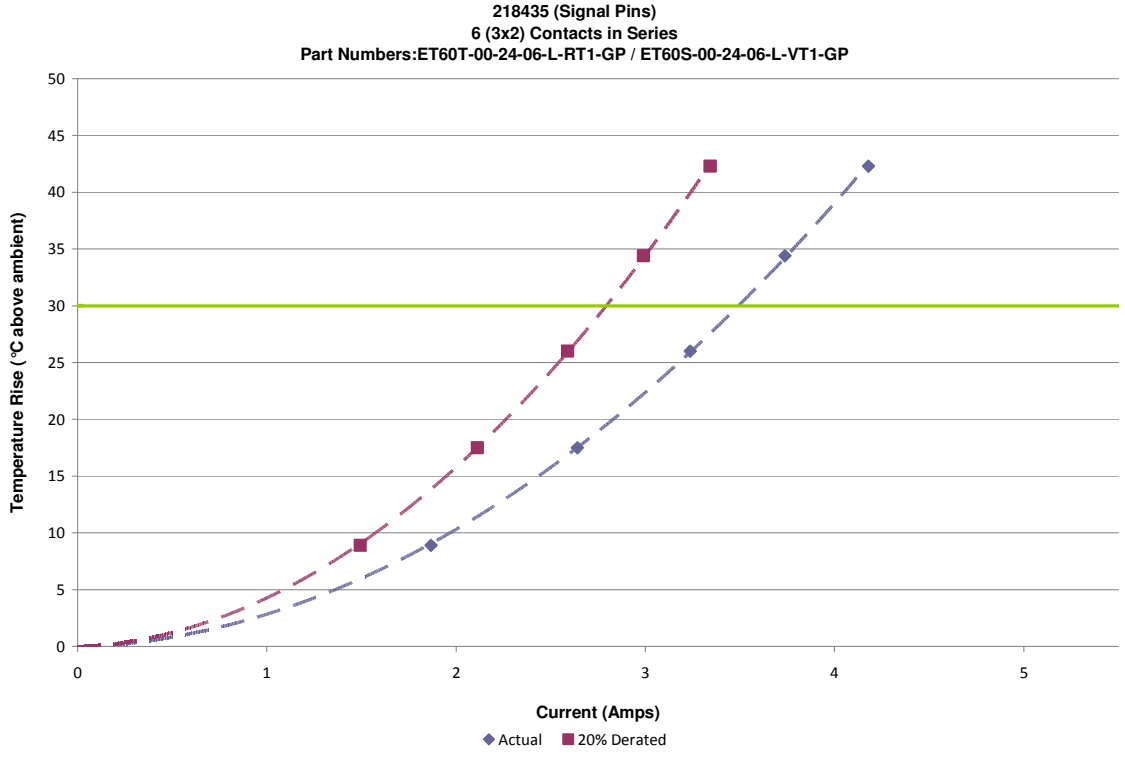
TEST CURRENT AMPS	2.22	3.14	3.85	4.45	4.97
Sample 1	7.1	13.6	20	26.8	33
Sample 2	7.8	15	22	29.2	36.1
Sample 3	7.8	15	22.2	29.4	36
Min	7.1	13.6	20	26.8	33
Max	7.8	15	22.2	29.4	36.1
Avg	7.57	14.53	21.4	28.47	35.03

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts




218435 (Signal Pins)
6 (3x2) Contacts in Series
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 2.8 Amps
Room Temp= 22.5 ℃
5.9
4.7
4.0
3.5
3.2
2.8
2.0
1.6
105℃ Limit
Maximum Current, Amps per Contact
Ambient Temperature (℃)
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit

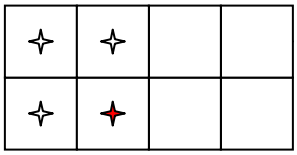

218435 (Signal Pins)
6 (3x2) Contacts in Series
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Temperature Rise (℃ above ambient)
Current (Amps)
Actual
20% Derated

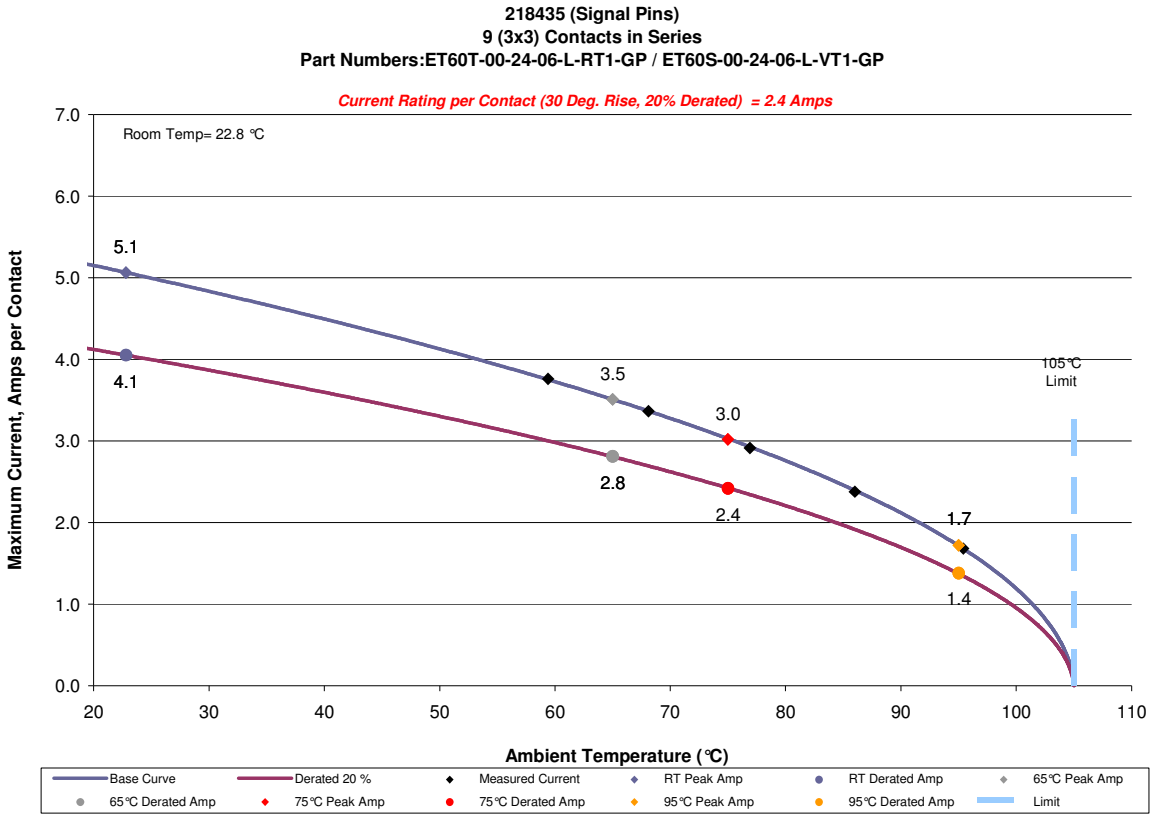
TEMPERATURE RISE DATA
SIX CONTACTS ENERGIZED
(Degrees Celsius above ambient)

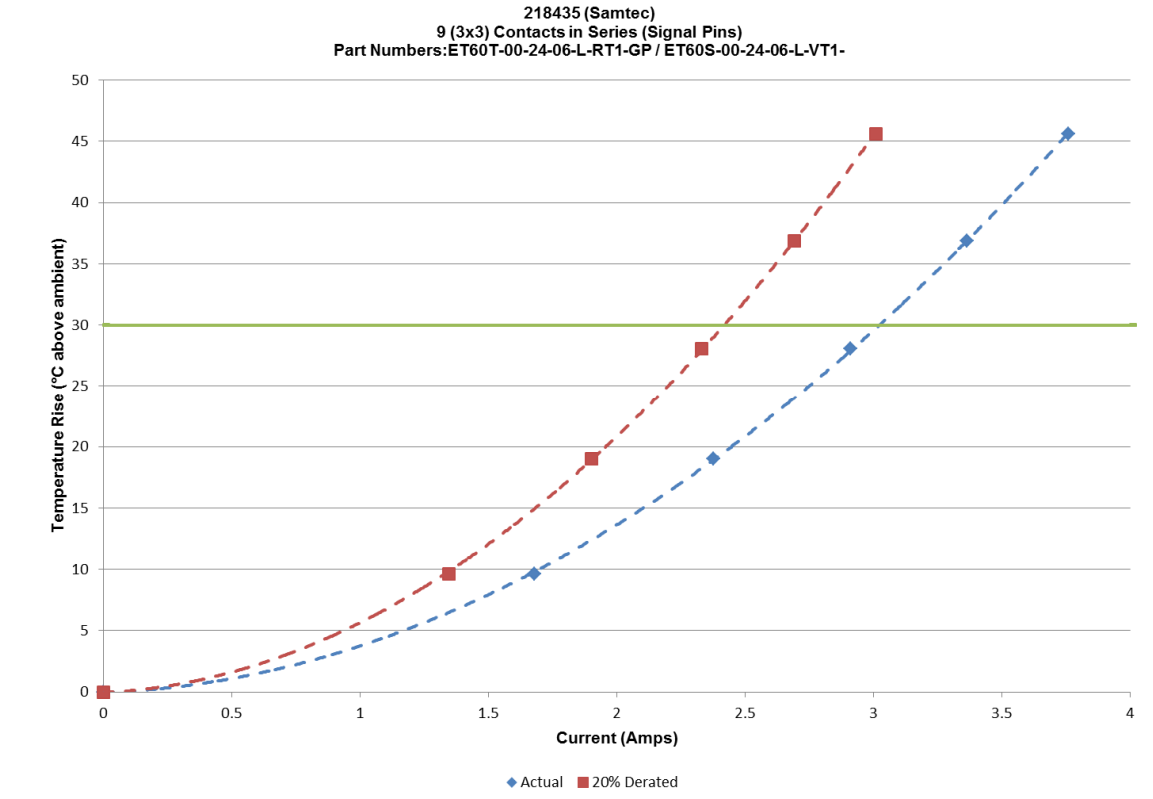
TEST CURRENT AMPS	1.87	2.64	3.24	3.74	4.18
Sample 4	8.7	17.2	25.7	33.8	41.7
Sample 5	9.2	17.8	26.3	34.8	42.9
Sample 6	8.9	17.5	26.1	34.5	42.4
Min	8.7	17.2	25.7	33.8	41.7
Max	9.2	17.8	26.3	34.8	42.9
Avg	8.93	17.5	26.03	34.37	42.33

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts



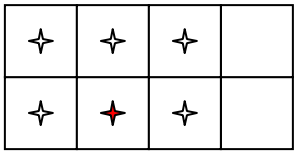

218435 (Signal Pins)
9 (3x3) Contacts in Series
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 2.4 Amps
Room Temp= 22.8 ℃
Maximum Current, Amps per Contact
Ambient Temperature (℃)
5.1
4.1
3.5
2.8
3.0
2.4
1.7
1.4
105℃ Limit
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit

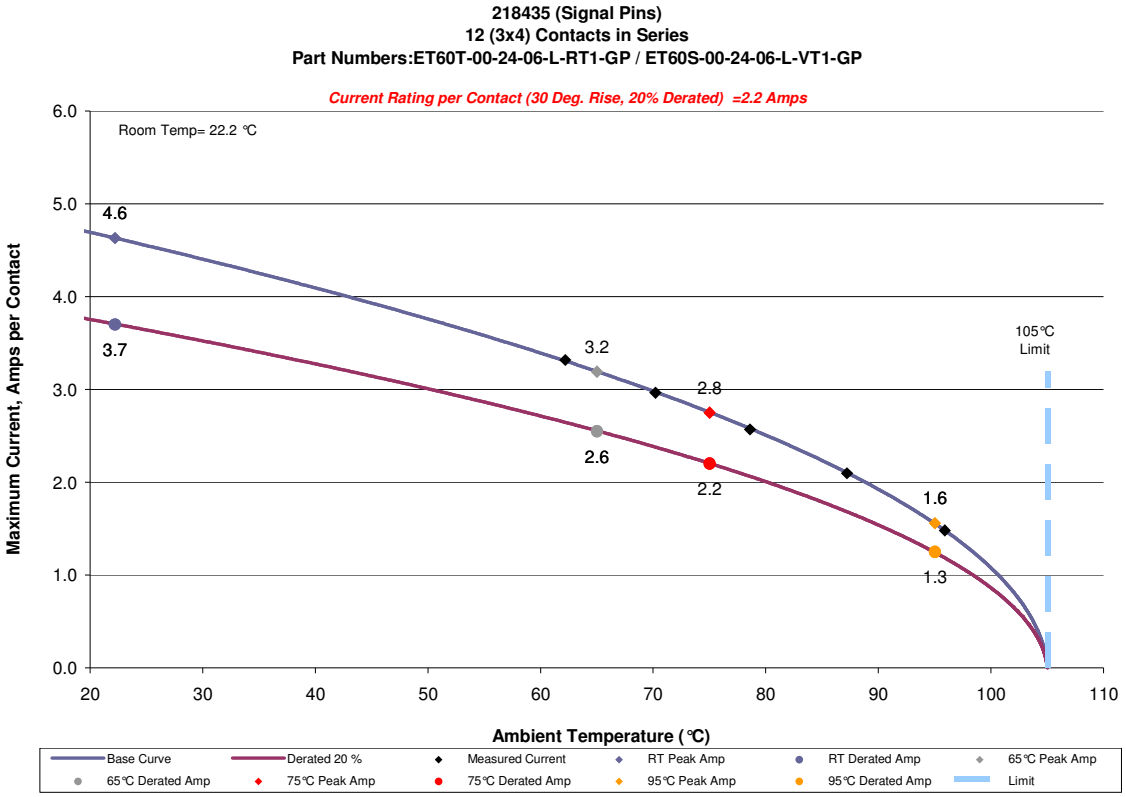

218435 (Samtec)
9 (3x3) Contacts in Series (Signal Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

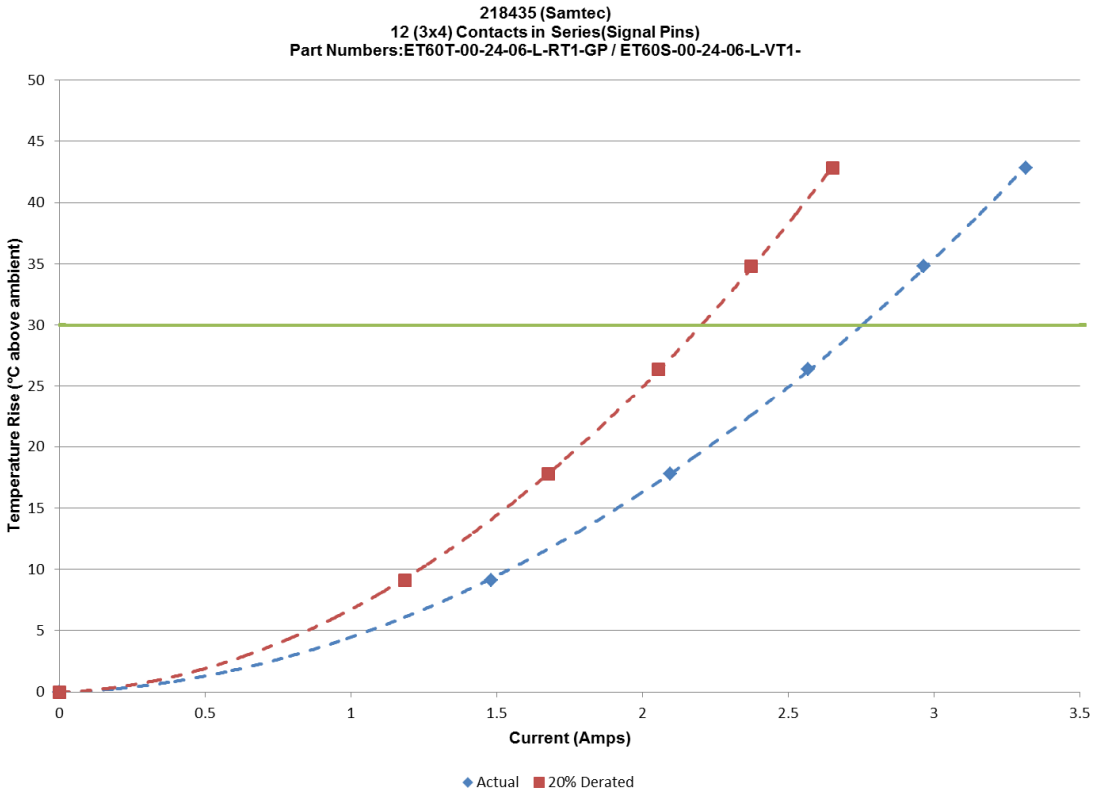
TEMPERATURE RISE DATA NINE CONTACTS ENERGIZED (Degrees Celsius above ambient)					
TEST CURRENT AMPS	1.68	2.38	2.91	3.36	3.76
Sample 7	10	19.8	29.4	38.7	47.8
Sample 8	9.2	18.1	26.8	35	43.2
Sample 9	9.6	19	28.2	37.1	45.9
Min	9.2	18.1	26.8	35	43.2
Max	10	19.8	29.4	38.7	47.8
Avg	9.6	18.97	28.13	36.93	45.63

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts




218435 (Signal Pins)
12 (3x4) Contacts in Series
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) =2.2 Amps
Room Temp= 22.2 ℃
Maximum Current, Amps per Contact
Ambient Temperature (℃)
4.6
3.7
3.2
2.6
2.8
2.2
1.6
1.3
105℃ Limit
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit

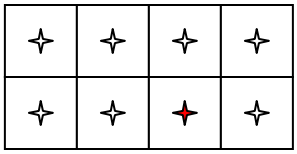

218435 (Samtec)
12 (3x4) Contacts in Series(Signal Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

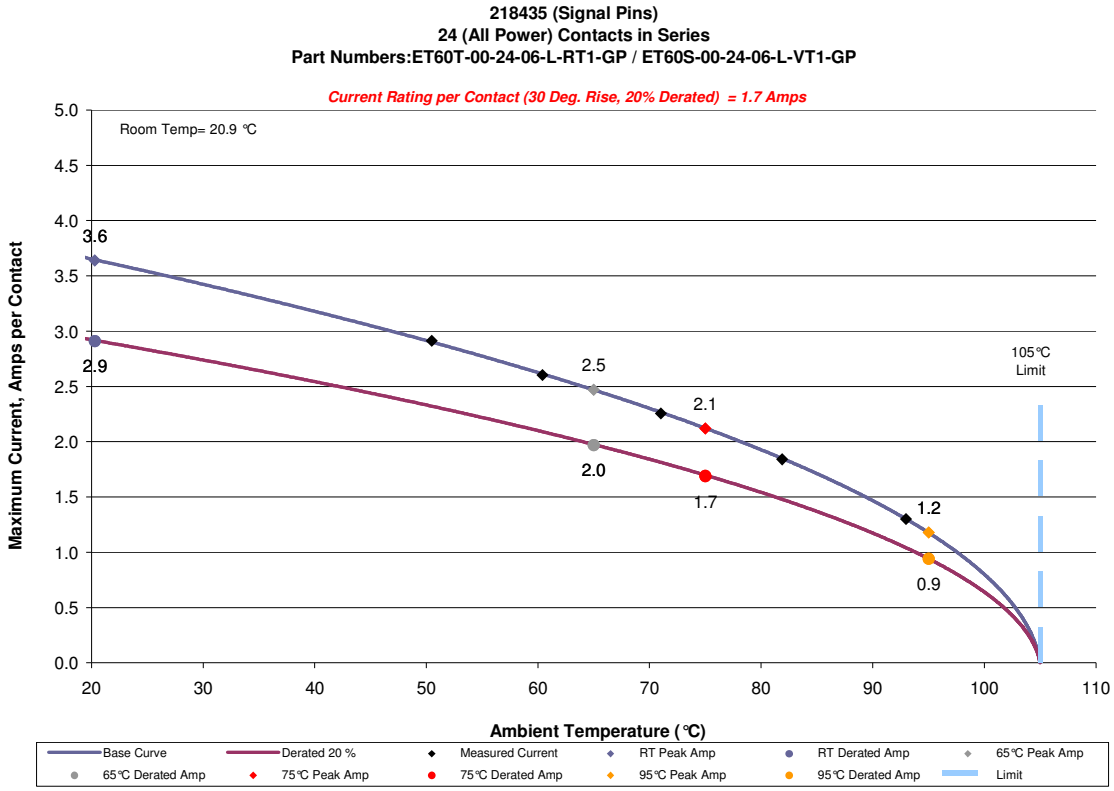
TEMPERATURE RISE DATA
TWELVE CONTACTS ENERGIZED
(Degrees Celsius above ambient)

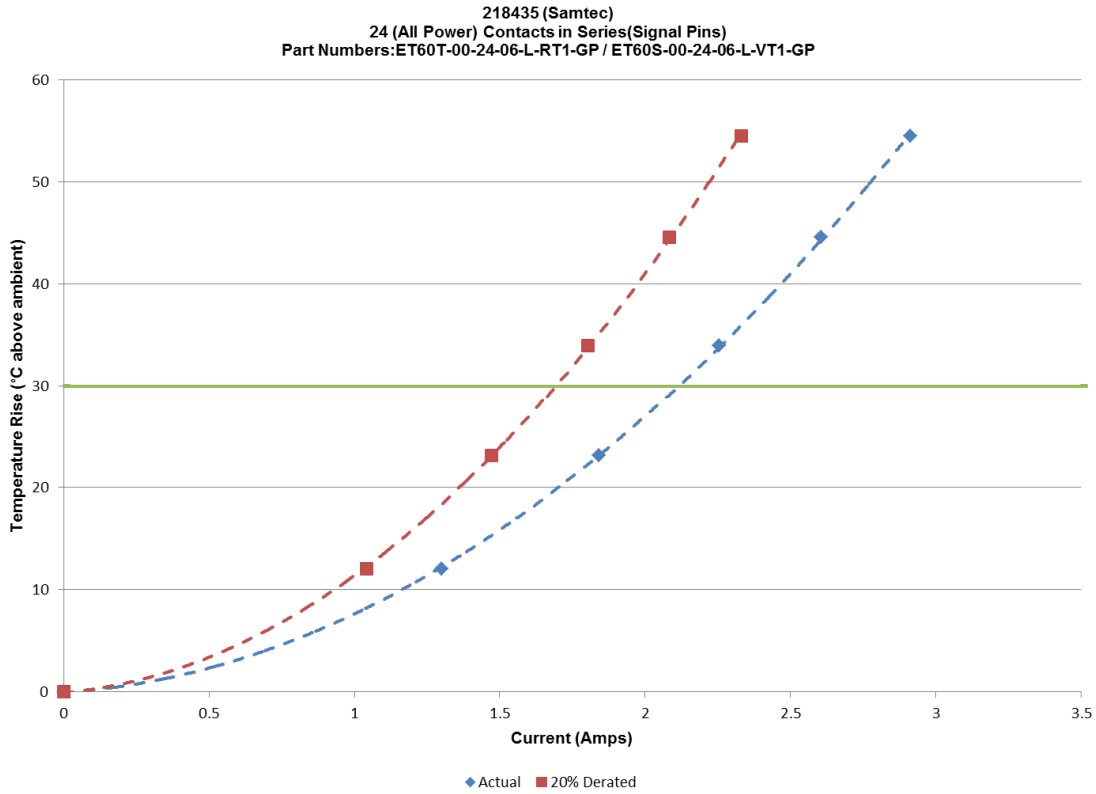
TEST CURRENT AMPS	1.48	2.1	2.57	2.97	3.32
Sample 10	8.8	17.2	25.6	33.5	41.3
Sample 11	9.3	18.2	26.9	35.5	43.6
Sample 12	9.1	17.9	26.7	35.3	43.6
Min	8.8	17.2	25.6	33.5	41.3
Max	9.3	18.2	26.9	35.5	43.6
Avg	9.07	17.77	26.4	34.77	42.83

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts




218435 (Signal Pins)
24 (All Power) Contacts in Series
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.7 Amps
Room Temp= 20.9 ℃
Maximum Current, Amps per Contact
Ambient Temperature (℃)
105℃ Limit
3.6
2.9
2.5
2.1
2.0
1.7
1.2
0.9
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit

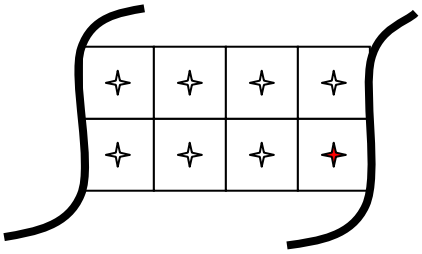

218435 (Samtec)
24 (All Power) Contacts in Series(Signal Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

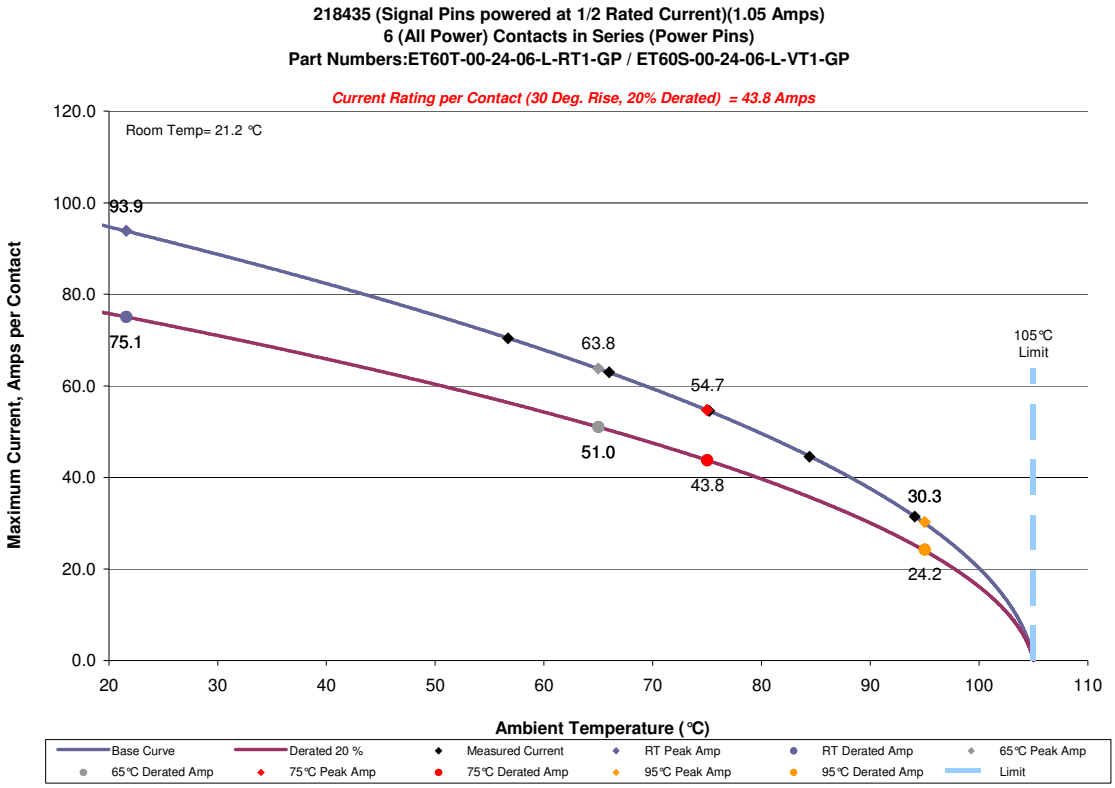
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

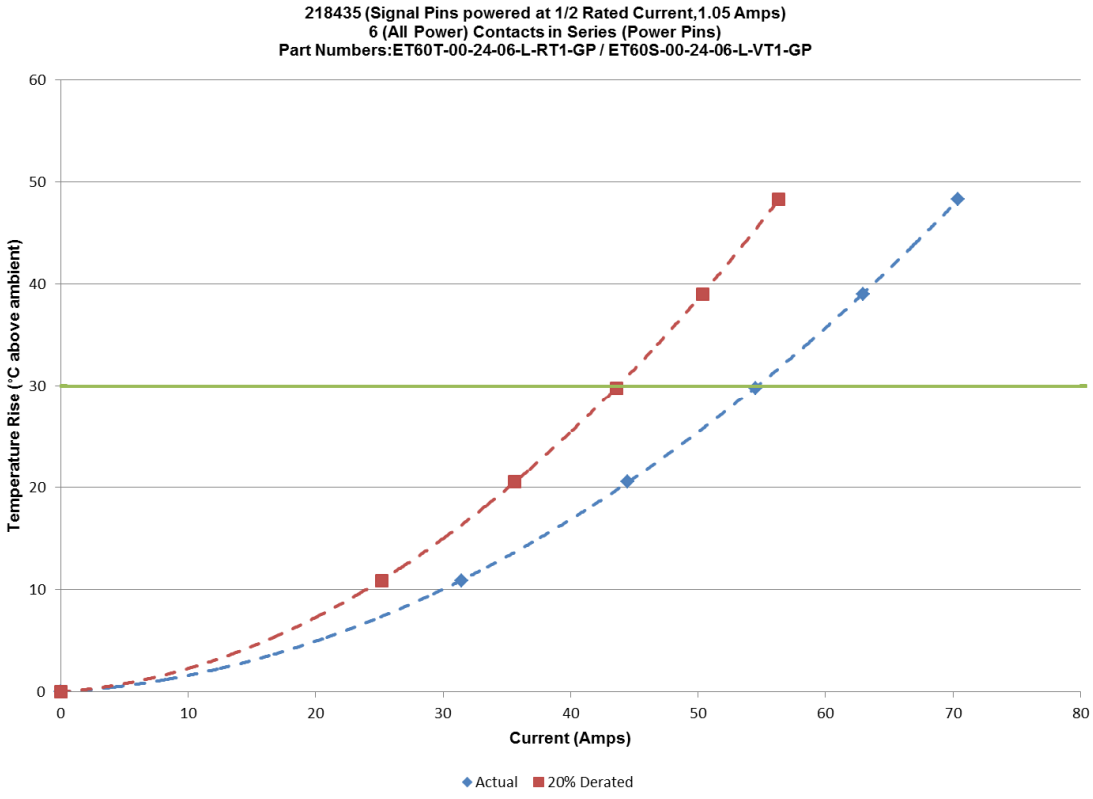
TEST CURRENT AMPS	1.3	1.84	2.26	2.6	2.91
Sample 13	12	23.4	34.5	45.1	54.7
Sample 14	12.1	23.3	34	45	55.3
Sample 15	11.8	22.7	33.4	43.6	53.4
Min	11.8	22.7	33.4	43.6	53.4
Max	12.1	23.4	34.5	45.1	55.3
Avg	11.97	23.13	33.97	44.57	54.47

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts




218435 (Signal Pins powered at 1/2 Rated Current)(1.05 Amps)
6 (All Power) Contacts in Series (Power Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 43.8 Amps
Room Temp= 21.2 ℃
Maximum Current, Amps per Contact
Ambient Temperature (℃)
93.9
75.1
63.8
54.7
51.0
43.8
30.3
24.2
105℃ Limit
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65℃ Peak Amp
65℃ Derated Amp
75℃ Peak Amp
75℃ Derated Amp
95℃ Peak Amp
95℃ Derated Amp
Limit


218435 (Signal Pins powered at 1/2 Rated Current,1.05 Amps)
6 (All Power) Contacts in Series (Power Pins)
Part Numbers:ET60T-00-24-06-L-RT1-GP / ET60S-00-24-06-L-VT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

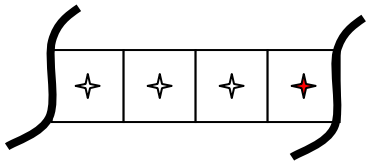
TEMPERATURE RISE DATA

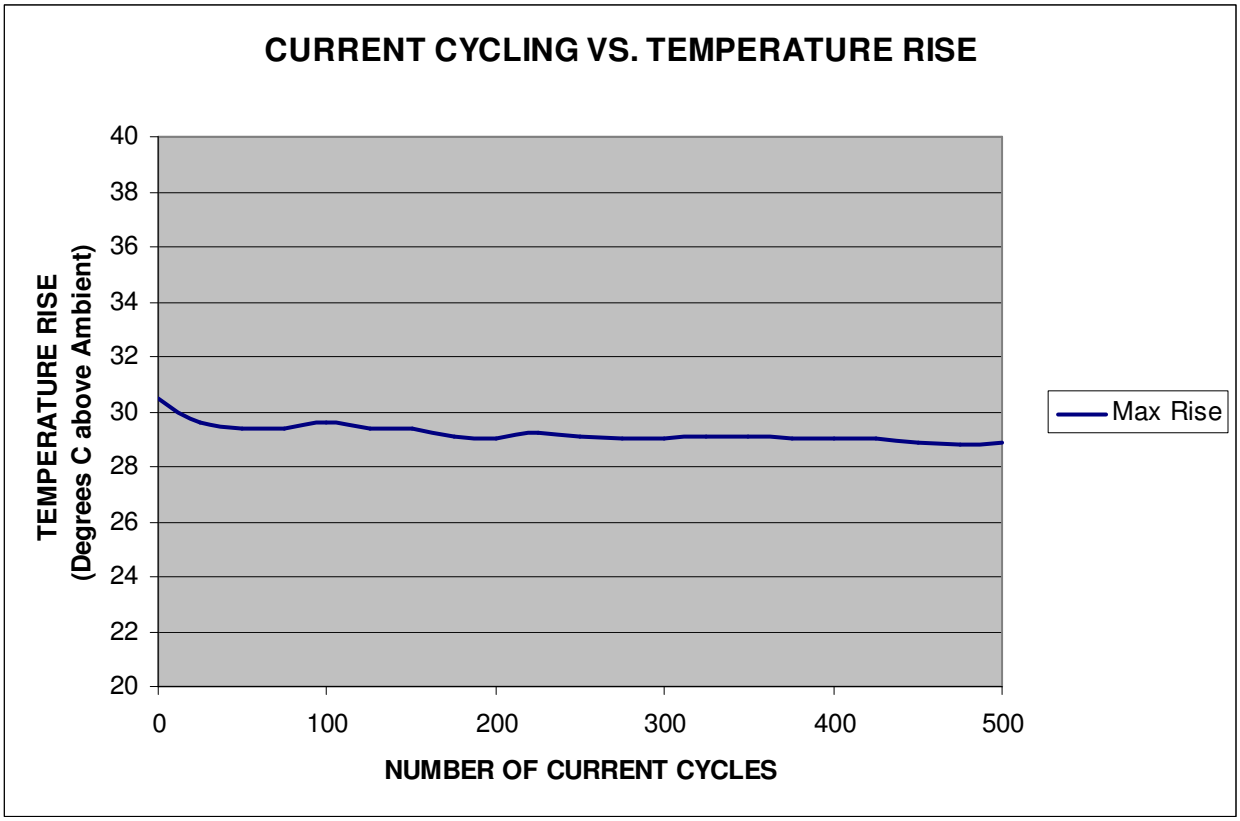
ALL POWER CONTACTS ENERGIZED (Signal Pins powered @ ½ rated current)(1.05 Amps)
(Degrees Celsius above ambient)

TEST CURRENT AMPS	31.46	44.49	54.53	62.94	70.39
Sample 13	11.5	21.6	31.4	41.1	50.8
Sample 14	10.8	20.2	29.4	38.4	47.4
Sample 15	10.5	19.9	28.7	37.5	46.7
Min	10.5	19.9	28.7	37.5	46.7
Max	11.5	21.6	31.4	41.1	50.8
Avg	10.93	20.57	29.83	39	48.3

Indicates energized contacts

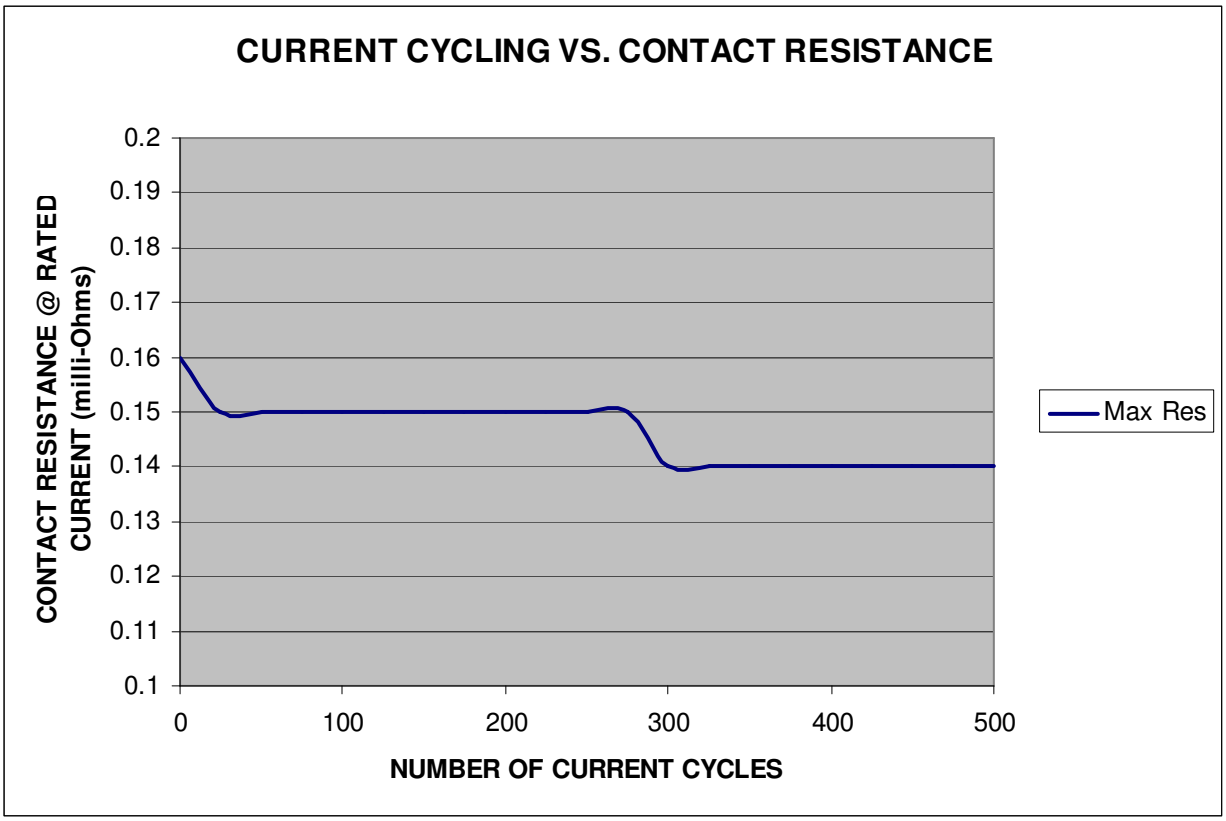
Indicates thermocouple monitored, energized contacts





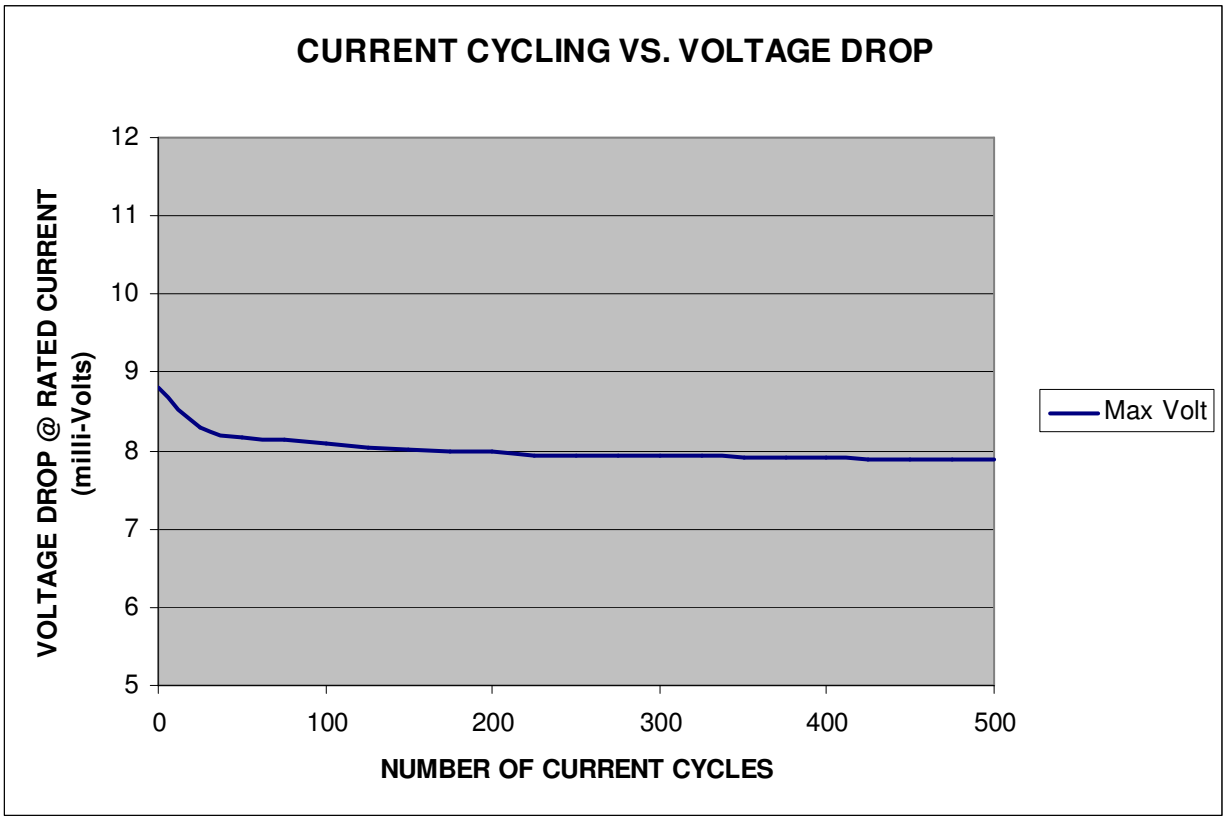
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

	INITIAL	50 CYCLES	100 CYCLES	200 CYCLES	500 CYCLES
Min	27.9	26.6	26.6	27.1	26.5
Max	30.5	29.4	29.6	29	28.9
Avg	29.3	28.3	28.2	28.2	27.9



CONTACT RESISTANCE DATA
ALL CONTACTS ENERGIZED
(mΩ)

	INITIAL	50 CYCLES	100 CYCLES	200 CYCLES	500 CYCLES
Min	0.11	0.11	0.11	0.11	0.11
Max	0.16	0.15	0.15	0.15	0.14
Avg	0.13	0.12	0.12	0.12	0.12



VOLTAGE DROP DATA
ALL CONTACTS ENERGIZED
(MV)

	INITIAL	50 CYCLES	100 CYCLES	200 CYCLES	500 CYCLES
Min	6.15	5.93	5.92	5.87	5.84
Max	8.81	8.18	8.08	7.98	7.88
Avg	7.1	6.77	6.74	6.68	6.64

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-04
Description: Model 2700 Multimeter/Switch System (Integra Series)
Manufacturer: Keithly
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal:3/27/2012, Next Cal: 3/27/2013

Equipment #: MO-09
Description: Model 2750 Multimeter/Switch System (Integra Series)
Manufacturer: Keithly
Model: 2750
Serial #: WDC-874817
Accuracy: See Manual
… Last Cal: 10/01/2012, Next Cal: 10/01/2013

Equipment #: PS-06
Description: 60V 50 A DC Power Supply-AutoRanging SO
Manufacturer: Hewlett Packard/Agilent
Model: HP 6032A
Serial #: US35420827
Accuracy: See Manual

Equipment #: PS-09
Description: 60V 50 A DC Power Supply-AutoRanging SO
Manufacturer: Hewlett Packard/Agilent
Model: HP 6032A
Serial #: US38322853
Accuracy: See Manual

Equipment #: PS-10
Description: 60V 50 A DC Power Supply-AutoRanging SO
Manufacturer: Hewlett Packard/Agilent
Model: AT-6032A
Serial #: 3440A10457
Accuracy: See Manual

Equipment #: RS-01
Description: Shunt
Manufacturer: EMPRO
Model: HA5050
Serial #: HA5050
Accuracy: ± 0.25% RDG
… Last Cal: 5/30/2012 Next Cal: 5/30/2013

Equipment #: RS-02
Description: Shunt
Manufacturer: EMPRO
Model: HA5050
Serial #: HA5050
Accuracy: ± 0.25% RDG
… Last Cal: 5/30/2012, Next Cal: 5/30/2013

Equipment #: RS-11
Description: Shunt
Manufacturer: Vishay
Model: VCS202
Serial #: VCS202
Accuracy: ± 0.25% RDG
… Last Cal: 2/01/2012, Next Cal: 2/01/2013

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