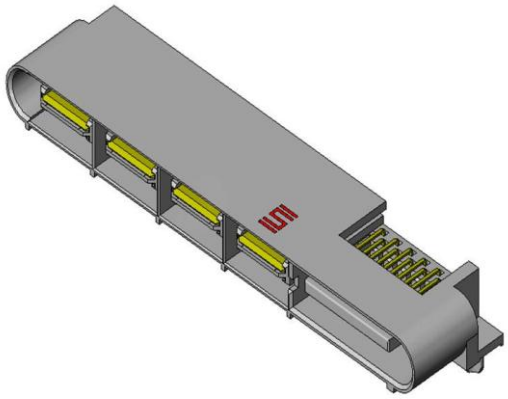
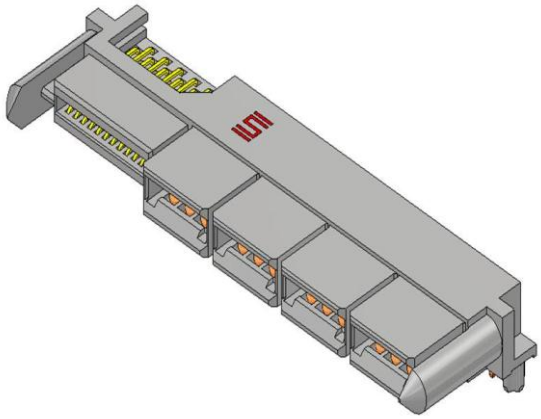
Project Number: 259834	Tracking Code: 259834_Power Test Report_Rev_2
Requested by: Leo Lee	Date: 07/23/2013
Part #: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP	
Part description: LPHS/LPHT	Technician: Tony Wagoner
Test Start: 06/20/2013	Test Completed: 07/11/2013





SAMTEC POWER CHARACTERIZATION

PART DESCRIPTION

LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-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

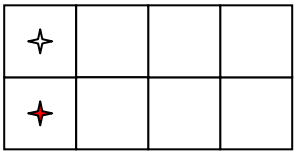
Standards: EIA Publication 364-70 Temperature Rise
EIA Publication 364-06 Contact Resistance
EIA Publication 364-55 Current Cycling
TLPM-032 Current Carrying Capacity
TLPM-084 Current Cycling
IEC 512-3 Electromechanical Components for Electronic Equipment: Basic Testing Procedures and Measuring Methods, 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

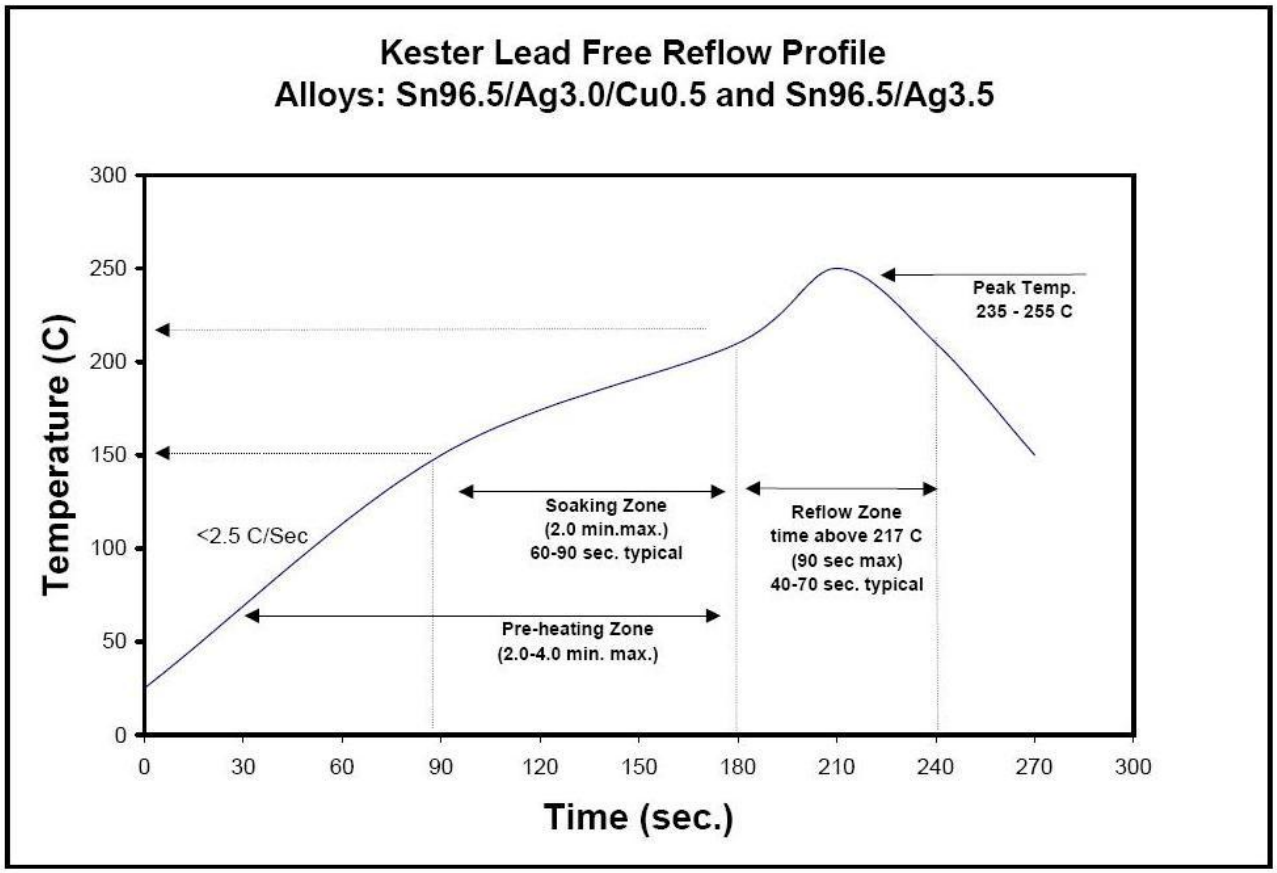
9) The following loading configurations shall be tested for Temperature Rise/Current Carrying Capacity testing of two row connector systems:
   a. Two by One contact energized
   b. Two by Two contacts energized adjacent to each other
   c. Two by Three contacts energized adjacent to each other
   d. Two by Four contacts energized adjacent to each other
   e. All contacts energized



✧ Indicates energized contacts
✦ Indicates thermocouple monitored, energized contacts

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

OVEN PROFILE (Soldering Parts to Test Boards)



FLOWCHARTS

POWER PINS

Current Carrying Capacity - Power Pins

TEST STEP	GROUP A1 3 Mated Assemblies 2 Contact Powered	GROUP A2 3 Mated Assemblies 4 Contacts Powered	GROUP A3 3 Mated Assemblies 6 Contacts Powered	GROUP A4 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC

SIGNAL PINS

Current Carrying Capacity - Singal Pins

TEST STEP	GROUP D1 3 Mated Assemblies 2 Pins Powered	GROUP D2 3 Mated Assemblies 4 Pins Powered	GROUP D3 3 Mated Assemblies 6 Pins Powered	GROUP D4 3 Mated Assemblies 8 Pins Powered	GROUP D5 3 Mated Assemblies All Contacts Powered
01	CCC	CCC	CCC	CCC	CCC

POWER & SIGNAL PINS

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 A1 8 Mated Assemblies (Power Pins Only)
01	Current Cycle, 500 cycles

Current Cycle = EIA 364-55, Condition "B", Method #4

Test at Current Listed

Each cycle is 60 minutes

ON time is 45 minutes

OFF time is 15 minutes

Measure at 40 minutes into 45 minute ON time

ON current is 125% of the rated current

TEST PROCEDURES

Part No.	**LPHS-08-32-L-RT1-GP**	**Mating Part No.**	**LPHT-08-32-L-RT1-GP**
Sample Size	**30**	**Technician**	Tony Wagoner
Start Date	06/13/2013	**Complete Date**	06/20/2013
Room Ambient	**22°C**	**Relative Humidity**	**52%**
Equipment ID#: MO-04, PS-07, 259834-(001 - 030)			

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.

Part No.	LPHS-08-32-L-RT1-GP	Mating Part No.	LPHT-08-32-L-RT1-GP
Sample Size	8	Technician	Tony Wagoner
Start Date	06/20/2013	Complete Date	07/11/2013
Room Ambient	23°C	Relative Humidity	48%
Equipment ID#: MO-09, PS-09, 259834(039 - 046)			

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:**

Temperature Rise, CCC at a 20% de-rating

Power pin

- **CCC for a 30°C Temperature Rise ----------33.0 A per contact with 2 contacts (2 x 1) powered**
- **CCC for a 30°C Temperature Rise ----------29.6 A per contact with 4 contacts (2 x 2) powered**
- **CCC for a 30°C Temperature Rise ----------28.0 A per contact with 6 contacts (2 x 3) powered**
- **CCC for a 30°C Temperature Rise ----------26.0 A per contact with 8 contacts (All) powered**

Signal pin

- **CCC for a 30°C Temperature Rise ----------2.5 A per contact with 2 contacts (2 x 1) powered**
- **CCC for a 30°C Temperature Rise ----------1.9 A per contact with 4 contacts (2 x 2) powered**
- **CCC for a 30°C Temperature Rise ----------1.6 A per contact with 6 contacts (2 x 3) powered**
- **CCC for a 30°C Temperature Rise ----------1.5 A per contact with 8 contacts (2 x 4) powered**
- **CCC for a 30°C Temperature Rise ----------0.9 A per contact with 32 contacts (All) powered**

Power pin and signal pin (signal contacts powered @ 1/2 rated current @ 0.55 AMPS.)

- **CCC for a 30°C Temperature Rise----------24.1 A per contact with all adjacent power contacts powered**

CURRENT CYCLING RESULTS

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

- **Test Current ----------30.1 Amps**

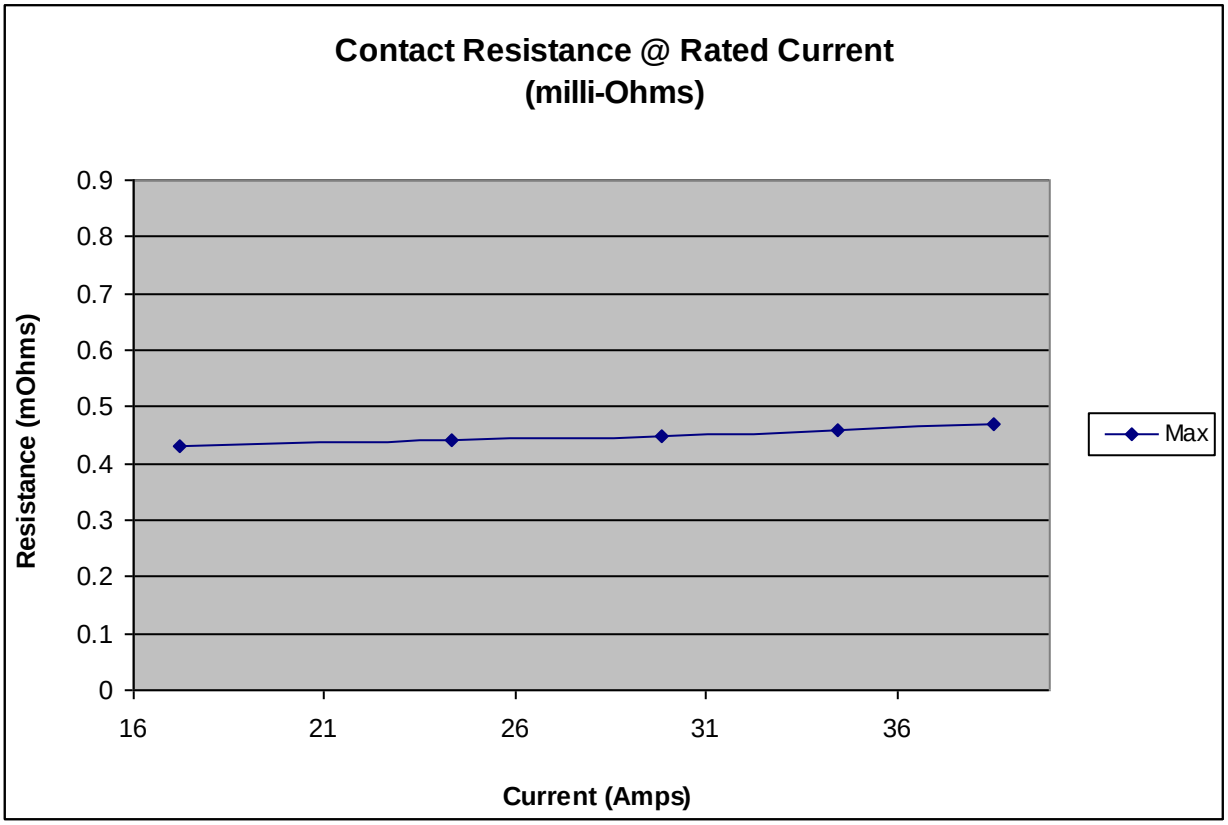
- **Contact Resistances, Measured 40 minutes into the FIRST and LAST ON cycle**
  - **Initial**
    - **Min ---------- 0.21mOhms**
    - **Max---------- 0.43mOhms**
  - **Final**
    - **Min ---------- 0.19mOhms**
    - **Max---------- 0.38mOhms**

- **Temperature Change, Measured 40 minutes into the FIRST and LAST ON cycle**
  - **Initial Temperature Change ----------30.3°C**
  - **Final Temperature Change ----------29.0°C**

TEST DATA

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:

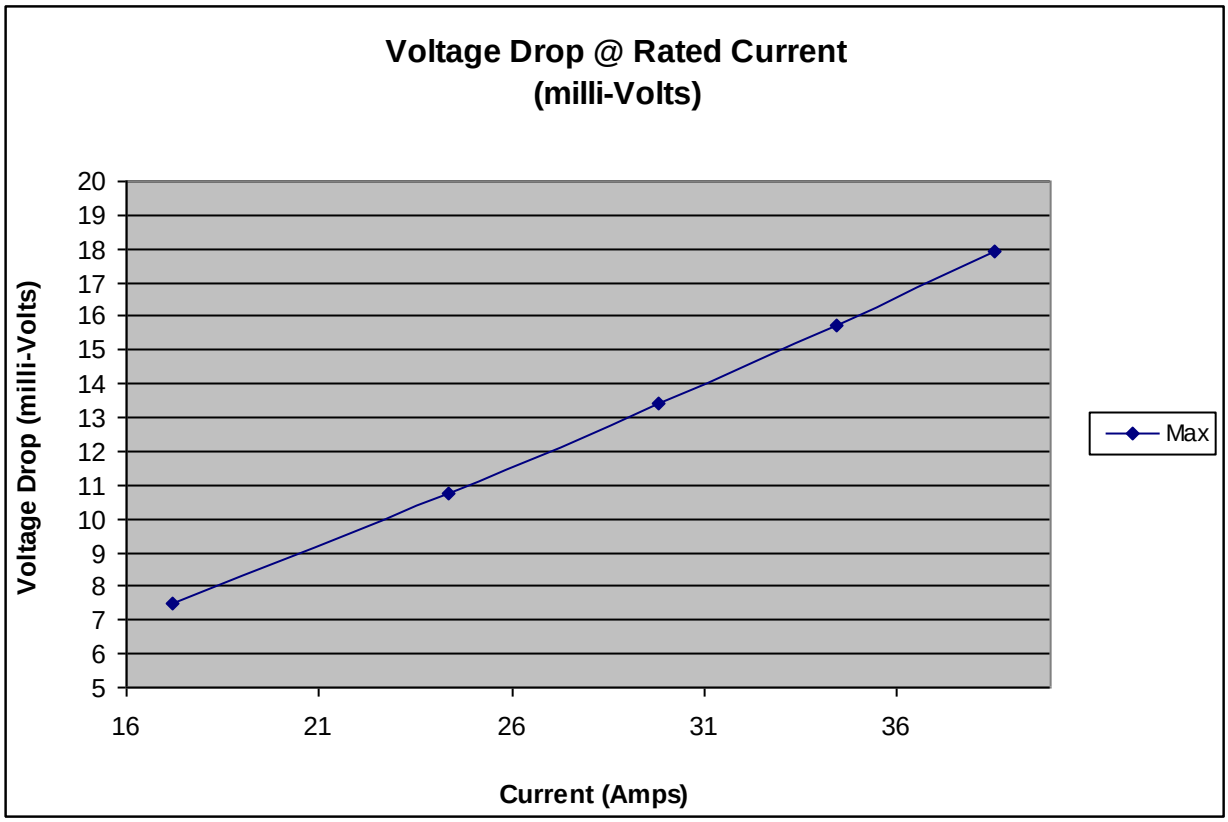


CONTACT RESISTANCE DATA ALL CONTACTS ENERGIZED (mΩ)					
TEST CURRENT AMPS	17.22	24.34	29.83	34.45	38.54
Min	0.2	0.2	0.21	0.21	0.22
Max	0.43	0.44	0.45	0.46	0.47
Avg	0.29	0.29	0.29	0.29	0.3

TEST DATA

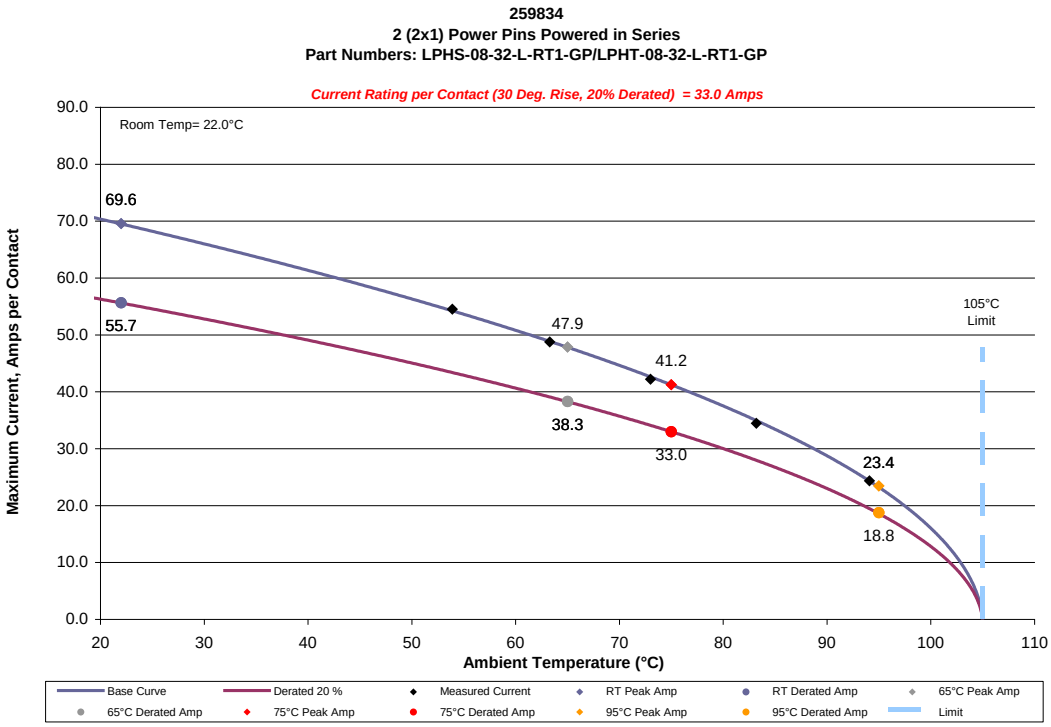
VOLTAGE DROP @ RATED CURRENT

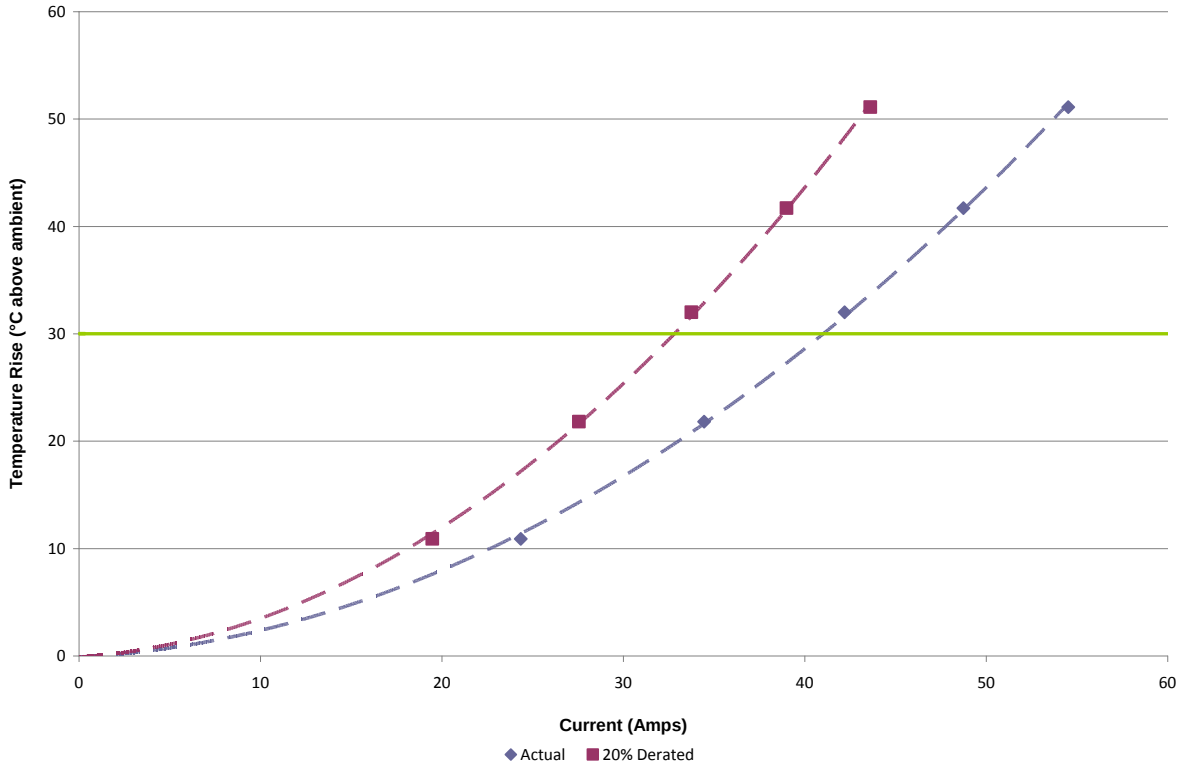
The following data represents the Voltage drop at Rated Current for the 100% energized samples:



VOLTAGE DROP DATA ALL CONTACTS ENERGIZED (mV)					
TEST CURRENT AMPS	17.22	24.34	29.83	34.45	38.54
Min	3.41	4.9	6.14	7.26	8.35
Max	7.48	10.75	13.39	15.71	17.93
Avg	4.96	6.97	8.55	9.94	11.22

CURRENT CARRYING CAPACITY DATA





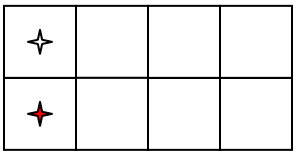
TEMPERATURE RISE DATA
TWO CONTACT ENERGIZED
(Degrees Celsius above ambient)

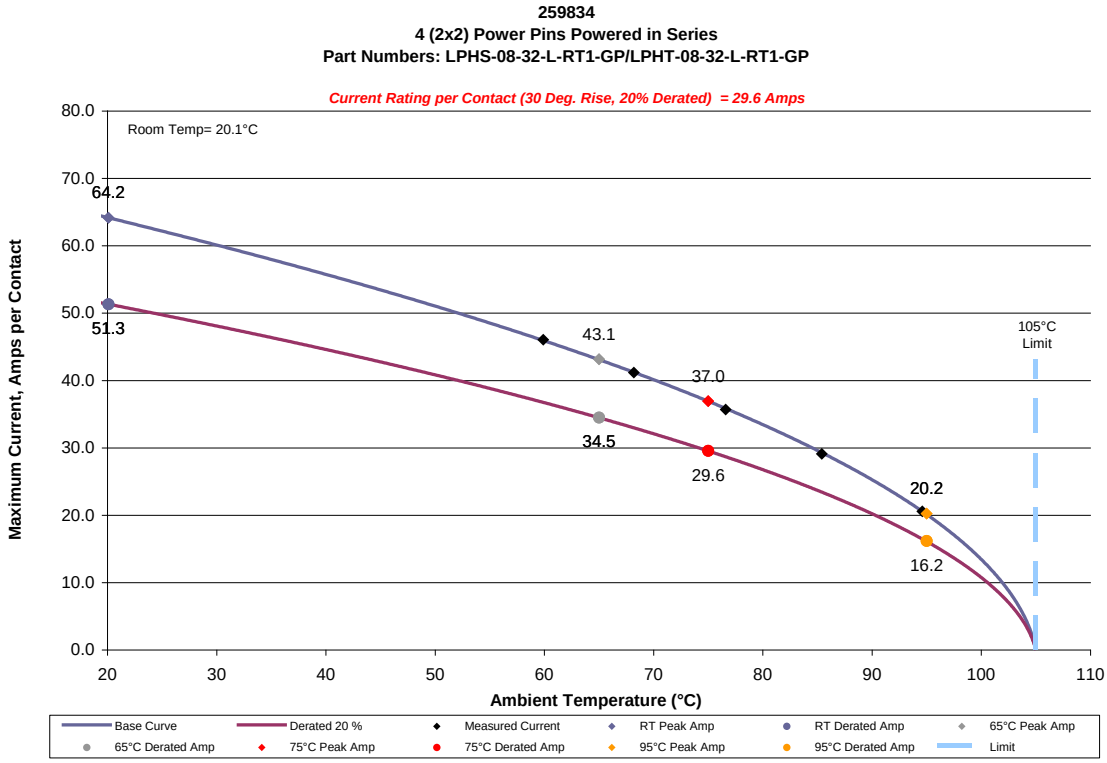
TEST CURRENT AMPS	24.35	34.45	42.2	48.74	54.52
Sample 1	10.1	21.4	31.7	40.8	49.5
Sample 2	11.5	22	32.1	41.6	50.7
Sample 3	11.2	21.9	32.3	42.6	53
Min	10.1	21.4	31.7	40.8	49.5
Max	11.5	22	32.3	42.6	53
Avg	10.93	21.77	32.03	41.67	51.07

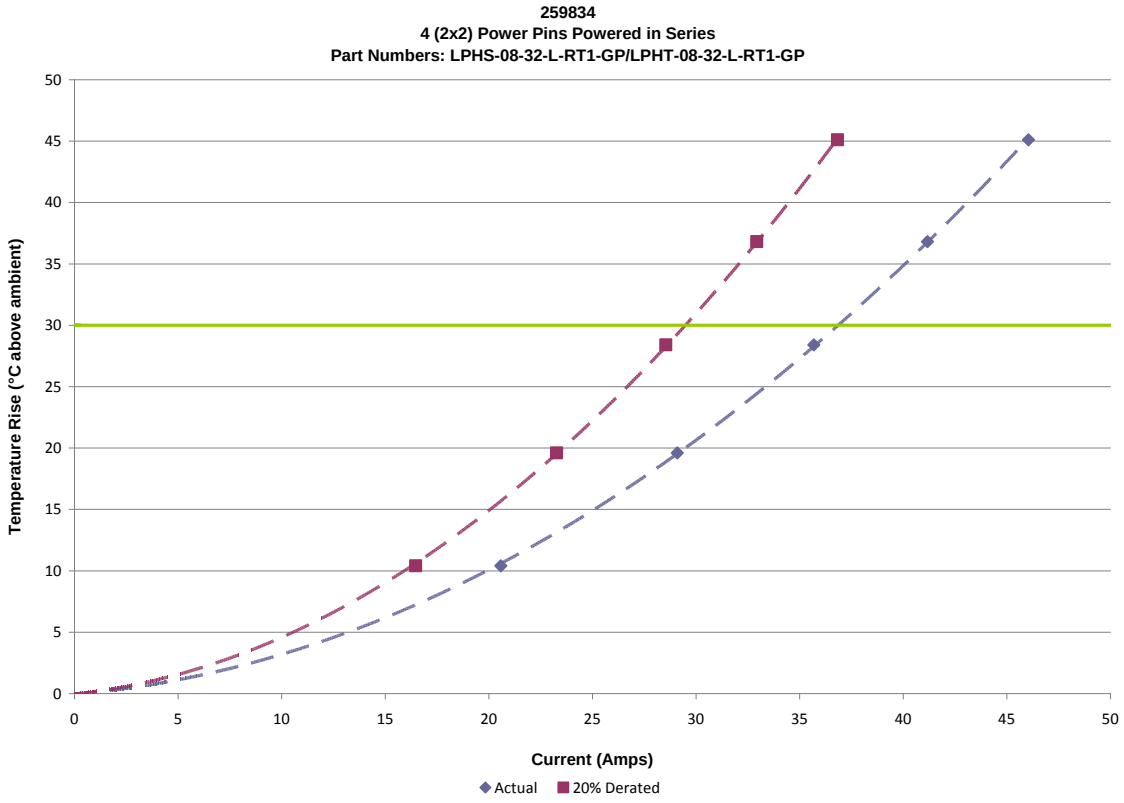
✧ Indicates energized contacts

✧ Indicates thermocouple monitored, energized contacts

Double Row Configuration




259834
4 (2x2) Power Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 29.6 Amps
Room Temp= 20.1°C
Maximum Current, Amps per Contact
Ambient Temperature (°C)
64.2
51.3
43.1
37.0
34.5
29.6
20.2
16.2
105°C Limit
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65°C Peak Amp
65°C Derated Amp
75°C Peak Amp
75°C Derated Amp
95°C Peak Amp
95°C Derated Amp
Limit

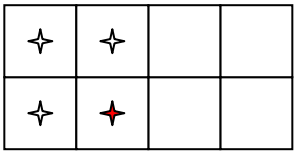

259834
4 (2x2) Power Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

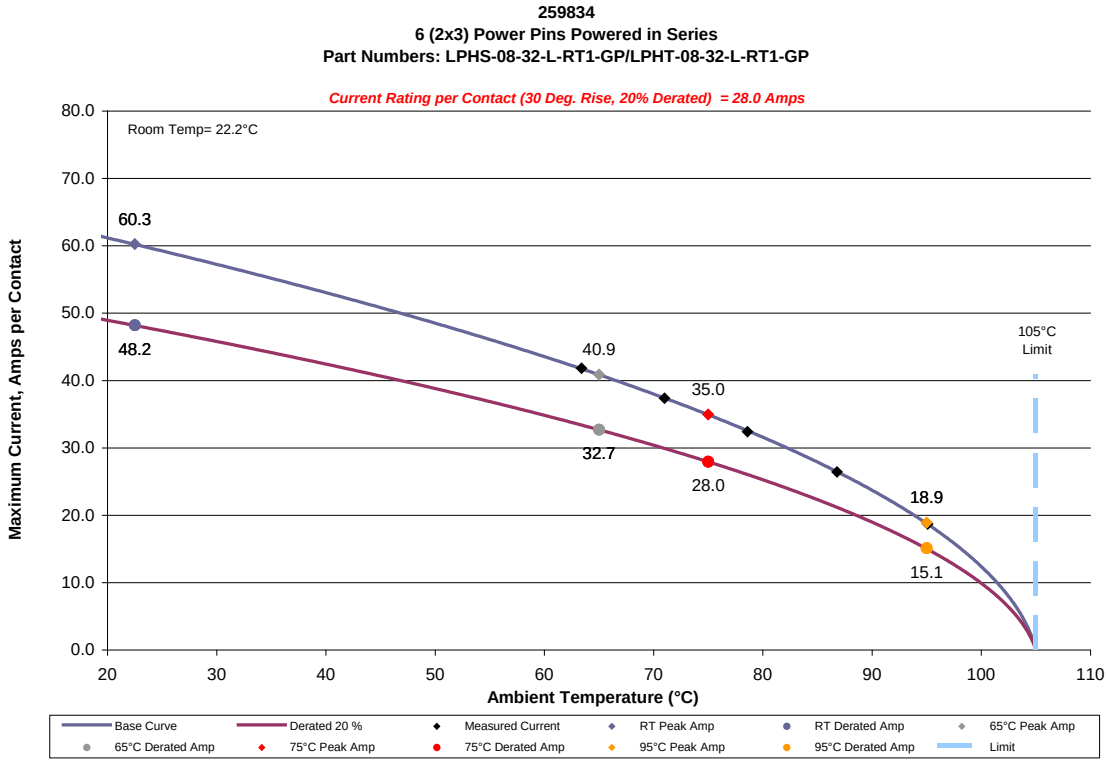
TEMPERATURE RISE DATA
FOUR CONTACTS ENERGIZED
(Degrees Celsius above ambient)

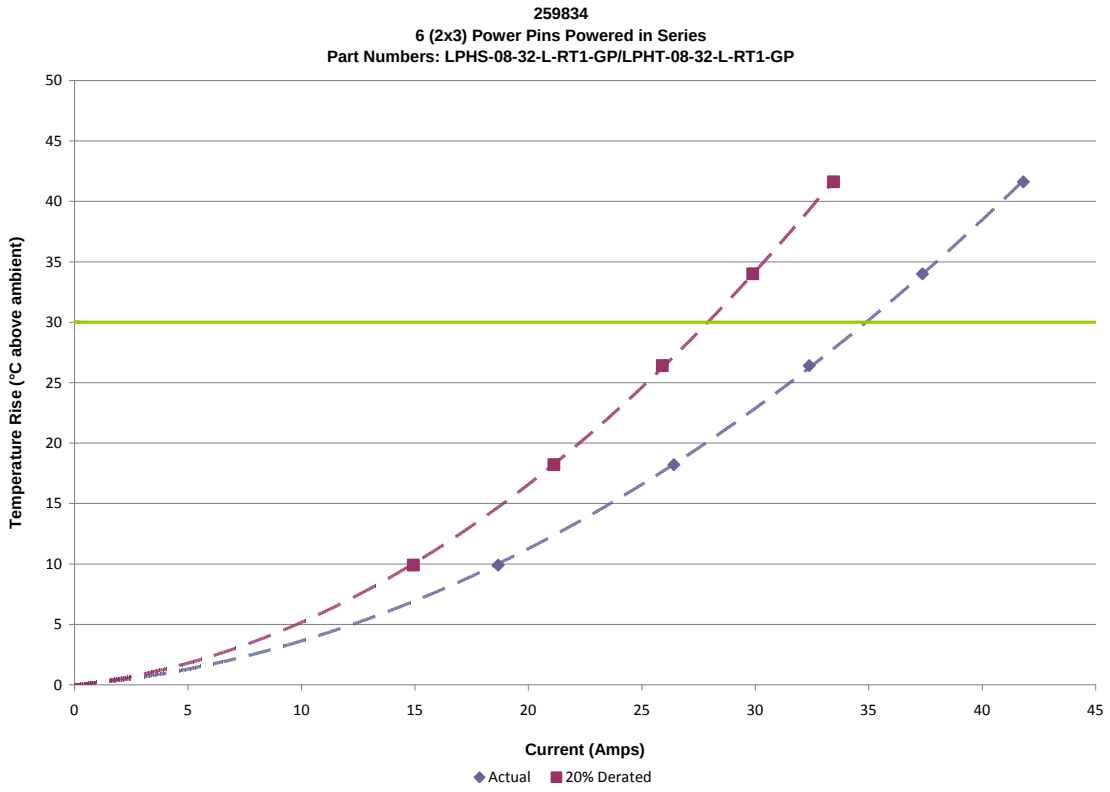
TEST CURRENT AMPS	20.59	29.1	35.69	41.18	46.04
Sample 4	9.7	18.4	26.6	34.5	42.6
Sample 5	10.7	20.3	29.7	38.5	46.9
Sample 6	10.7	20	29	37.4	45.7
Min	9.7	18.4	26.6	34.5	42.6
Max	10.7	20.3	29.7	38.5	46.9
Avg	10.37	19.57	28.43	36.8	45.07

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts




259834
6 (2x3) Power Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 28.0 Amps
Room Temp= 22.2°C
Maximum Current, Amps per Contact
Ambient Temperature (°C)
60.3
48.2
40.9
32.7
35.0
28.0
18.9
15.1
105°C Limit
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65°C Peak Amp
65°C Derated Amp
75°C Peak Amp
75°C Derated Amp
95°C Peak Amp
95°C Derated Amp
Limit

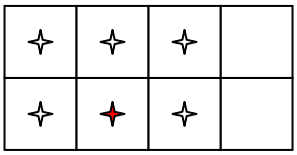

259834
6 (2x3) Power Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

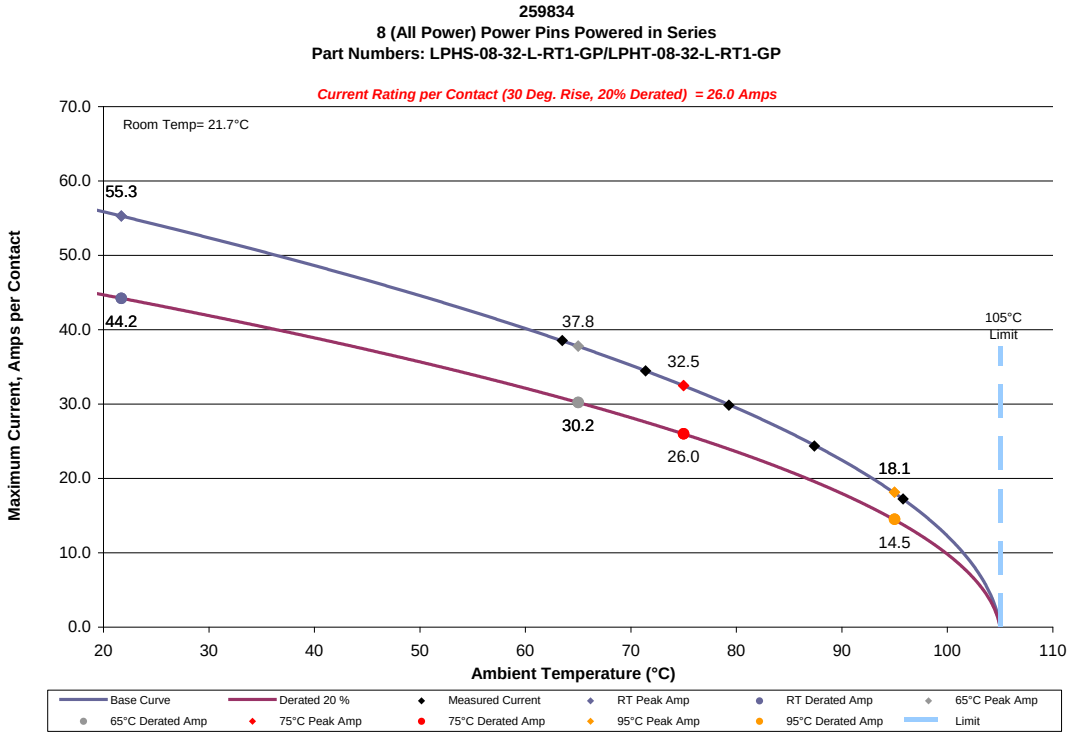
TEMPERATURE RISE DATA
SIX CONTACTS ENERGIZED
(Degrees Celsius above ambient)

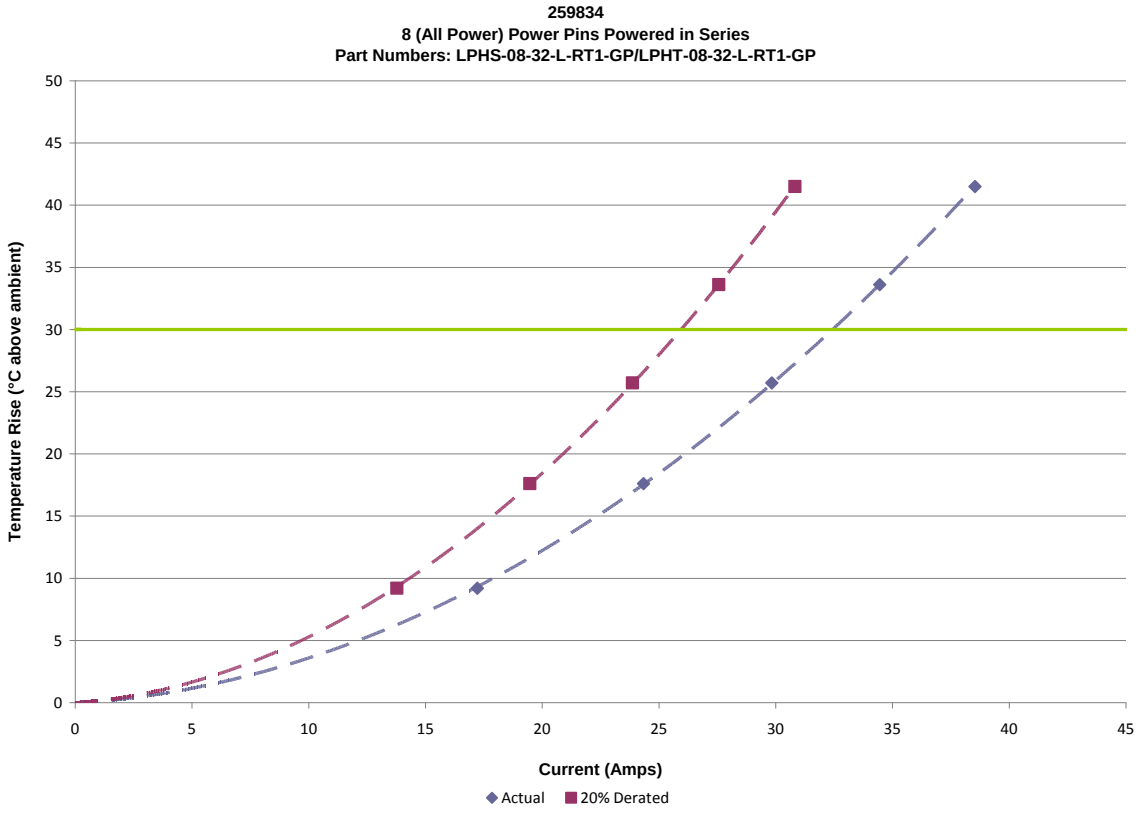
TEST CURRENT AMPS	18.67	26.41	32.38	37.37	41.81
Sample 7	9.7	17.8	26.1	34	42.1
Sample 8	10.5	19.1	26.9	33.9	40.6
Sample 9	9.5	17.8	26.1	34.2	42.1
Min	9.5	17.8	26.1	33.9	40.6
Max	10.5	19.1	26.9	34.2	42.1
Avg	9.9	18.23	26.37	34.03	41.6

Indicates energized contacts

Indicates thermocouple monitored, energized contacts




259834
8 (All Power) Power Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 26.0 Amps
Room Temp= 21.7°C
Maximum Current, Amps per Contact
Ambient Temperature (°C)
55.3
44.2
37.8
30.2
32.5
26.0
18.1
14.5
105°C Limit
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65°C Peak Amp
65°C Derated Amp
75°C Peak Amp
75°C Derated Amp
95°C Peak Amp
95°C Derated Amp
Limit

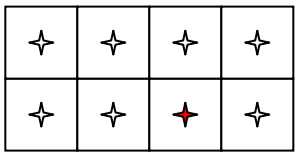

259834
8 (All Power) Power Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

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

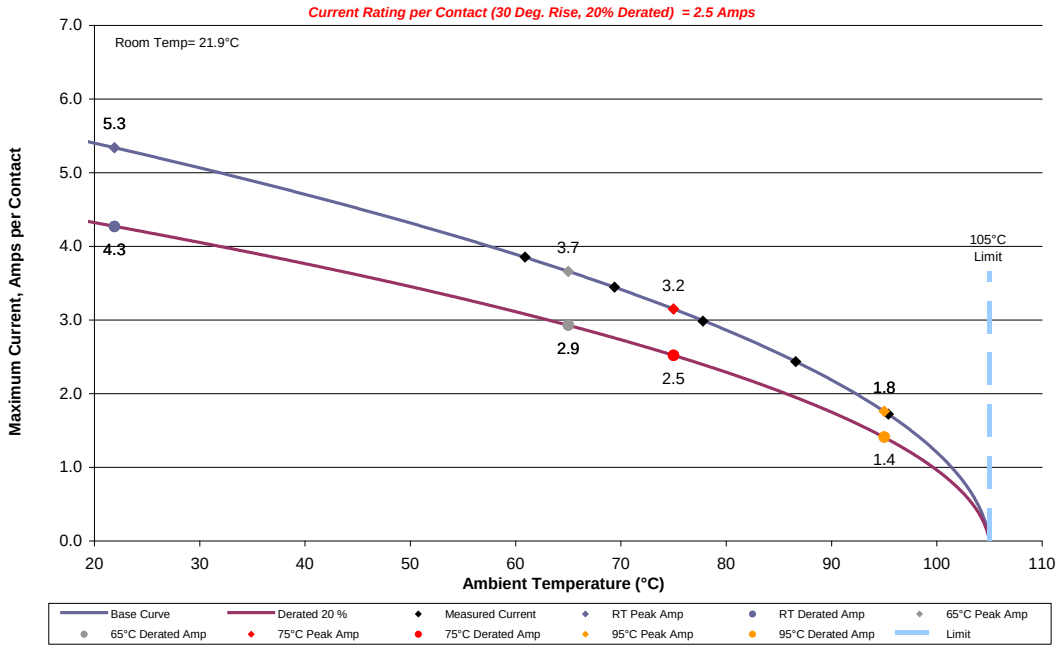
TEST CURRENT AMPS	17.22	24.34	29.83	34.45	38.54
Sample 10	9.3	18.2	26.7	35.1	43.5
Sample 11	8.9	16.9	24.9	32.7	40.5
Sample 12	9.3	17.6	25.4	33	40.4
Min	8.9	16.9	24.9	32.7	40.4
Max	9.3	18.2	26.7	35.1	43.5
Avg	9.17	17.57	25.67	33.6	41.47

Indicates energized contacts

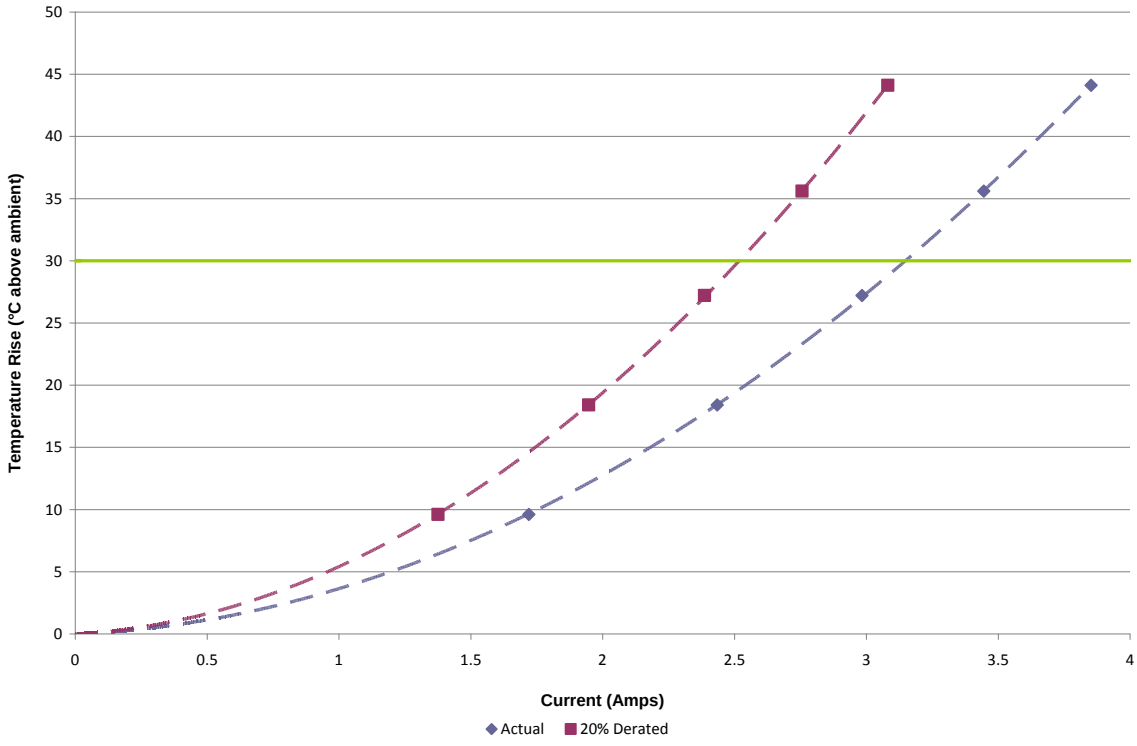
Indicates thermocouple monitored, energized contacts



259834
2 (2x1) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP



259834
2 (2x1) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP

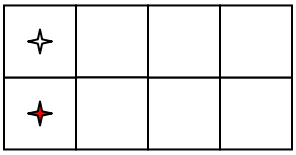


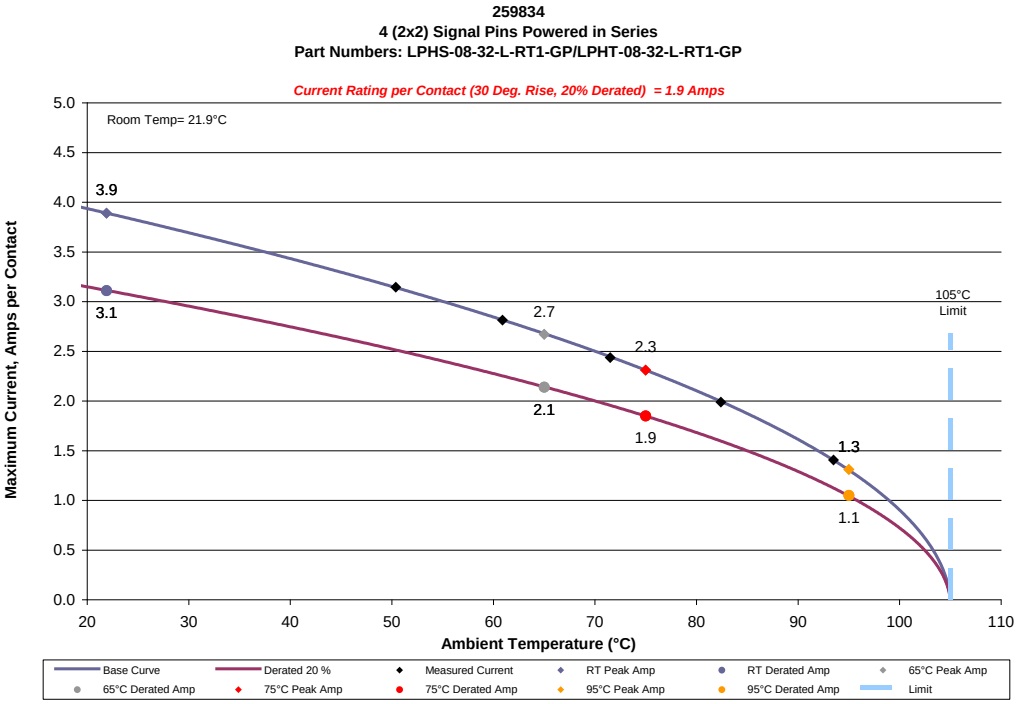
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

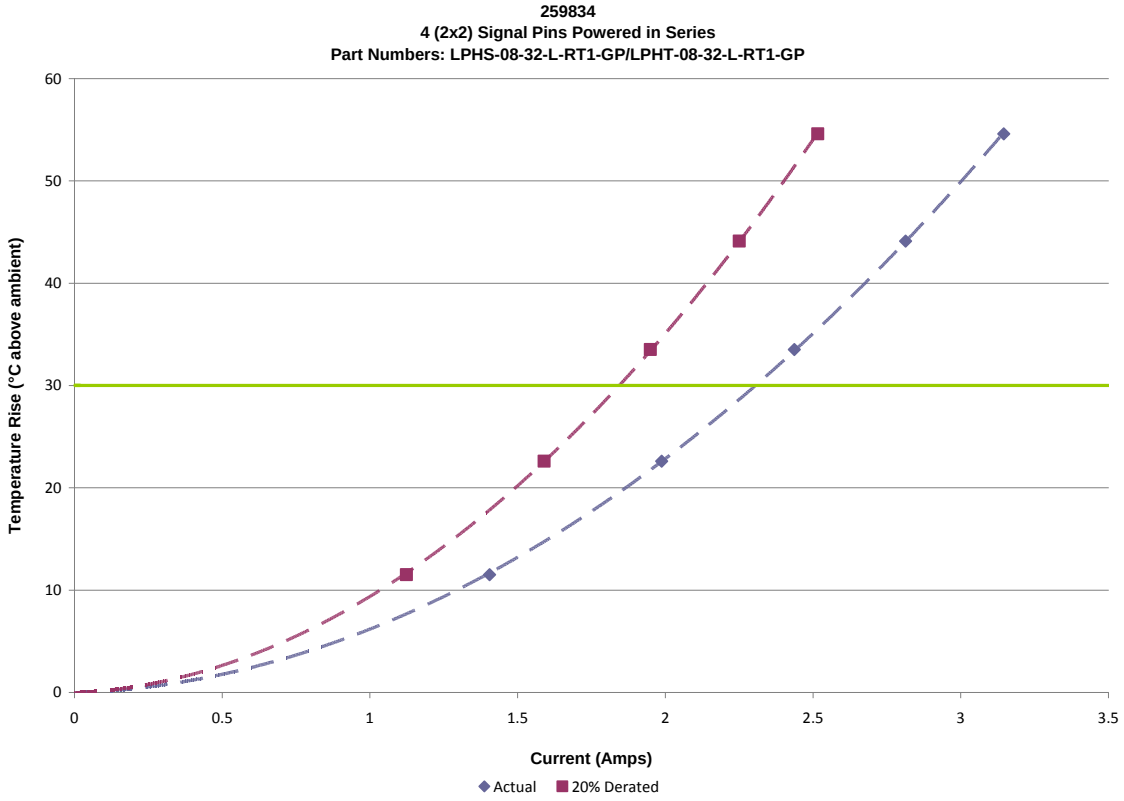
TEST CURRENT AMPS	1.72	2.43	2.98	3.45	3.85
Sample 13	9.9	19	28.2	36.7	45.3
Sample 14	9.2	17.2	25.4	33.7	41.9
Sample 15	9.7	18.9	28	36.4	45
Min	9.2	17.2	25.4	33.7	41.9
Max	9.9	19	28.2	36.7	45.3
Avg	9.6	18.37	27.2	35.6	44.07

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts




259834
4 (2x2) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.9 Amps
Room Temp= 21.9°C
Maximum Current, Amps per Contact
Ambient Temperature (°C)
105°C Limit
3.9
3.1
2.7
2.3
2.1
1.9
1.3
1.1
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65°C Peak Amp
65°C Derated Amp
75°C Peak Amp
75°C Derated Amp
95°C Peak Amp
95°C Derated Amp
Limit

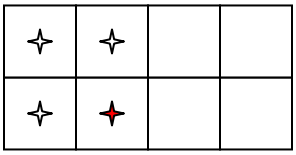

259834
4 (2x2) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

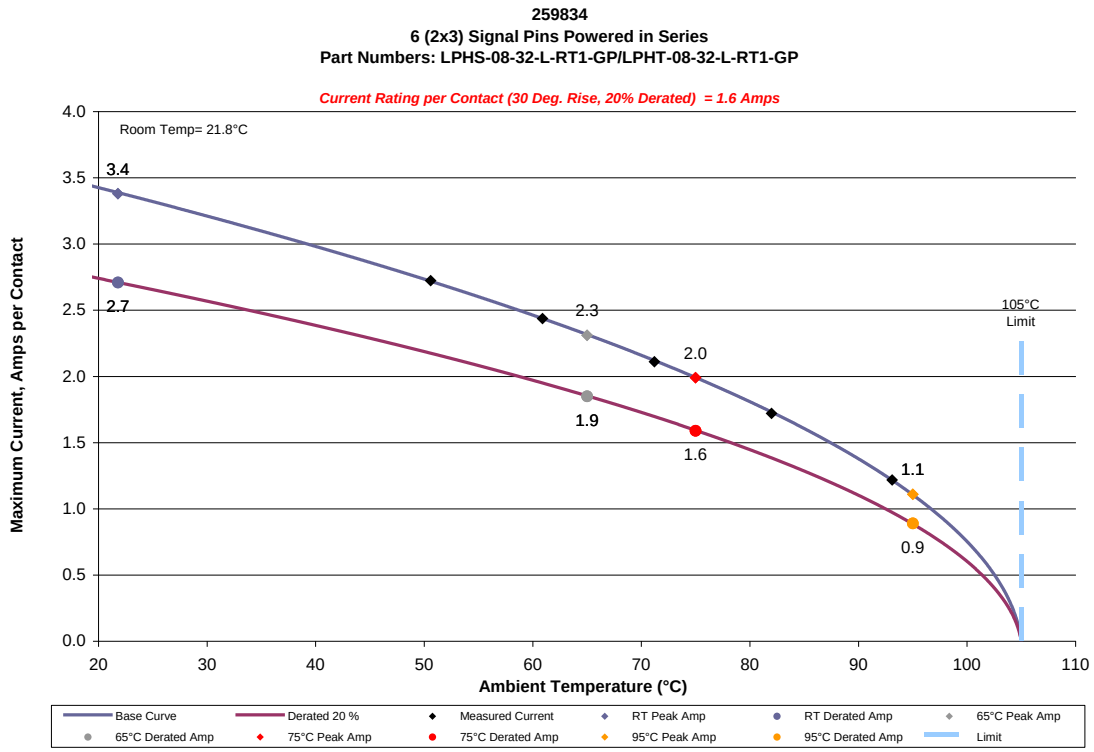
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

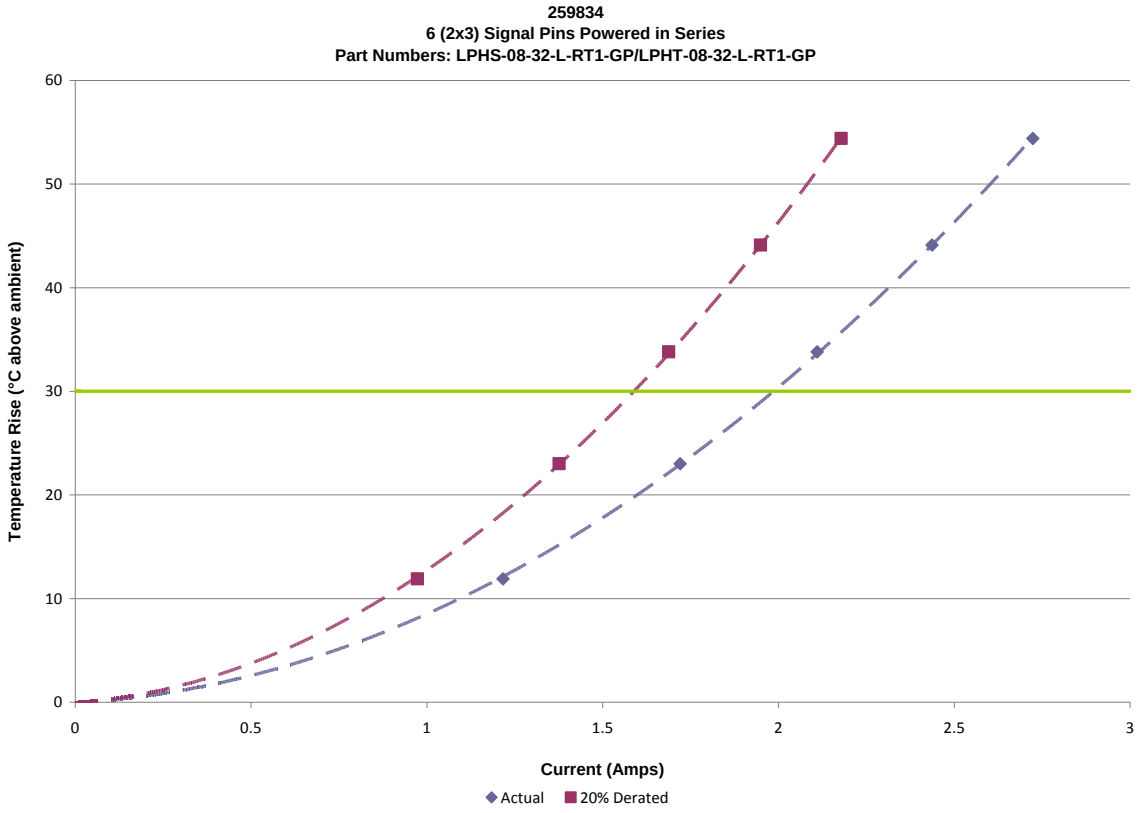
TEST CURRENT AMPS	1.41	1.99	2.44	2.81	3.15
Sample 16	11.5	22.6	33.4	43.9	53.5
Sample 17	11.8	23.2	34.2	45	56.1
Sample 18	11.3	22.1	33	43.5	54.3
Min	11.3	22.1	33	43.5	53.5
Max	11.8	23.2	34.2	45	56.1
Avg	11.53	22.63	33.53	44.13	54.63

✧ Indicates energized contacts

✧ Indicates thermocouple monitored, energized contacts




259834
6 (2x3) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.6 Amps
Room Temp= 21.8°C
Maximum Current, Amps per Contact
Ambient Temperature (°C)
3.4
2.7
2.3
2.0
1.9
1.6
1.1
0.9
105°C Limit
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65°C Peak Amp
65°C Derated Amp
75°C Peak Amp
75°C Derated Amp
95°C Peak Amp
95°C Derated Amp
Limit

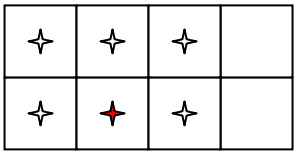

259834
6 (2x3) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

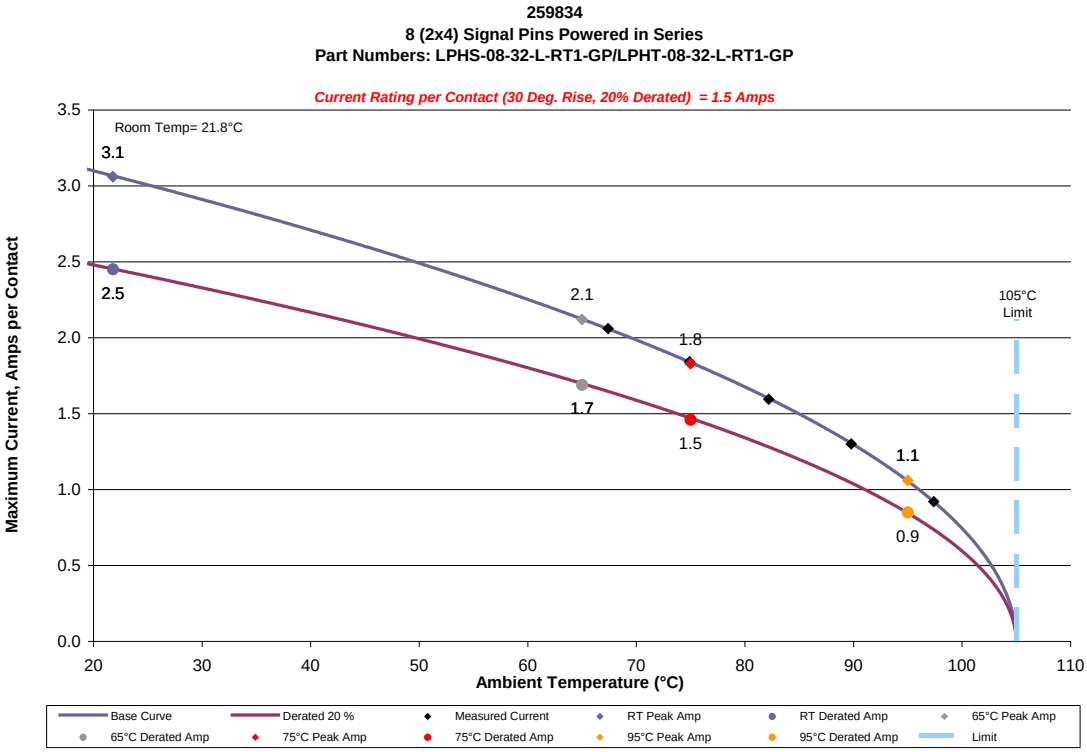
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

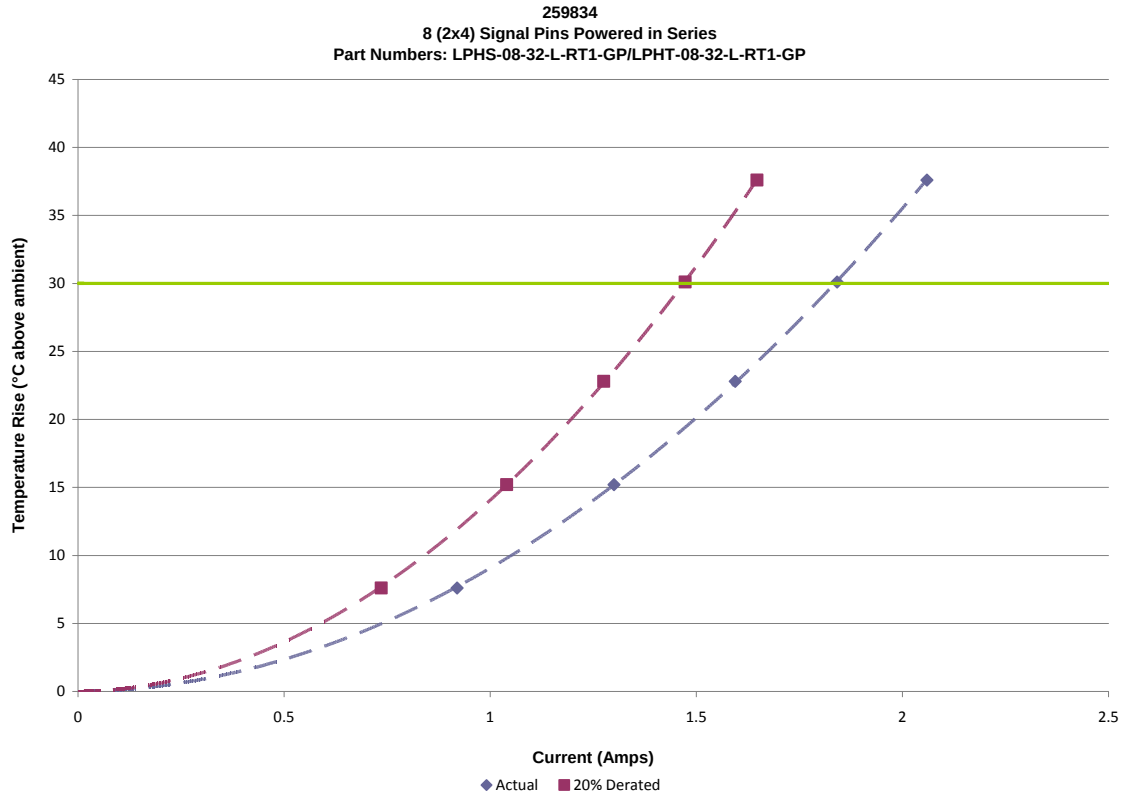
TEST CURRENT AMPS	1.22	1.72	2.11	2.44	2.72
Sample 19	12	23.4	34.8	45.8	56.4
Sample 20	11.8	23	34.3	45.1	56
Sample 21	11.8	22.7	32.4	41.4	50.8
Min	11.8	22.7	32.4	41.4	50.8
Max	12	23.4	34.8	45.8	56.4
Avg	11.87	23.03	33.83	44.1	54.4

Indicates energized contacts

Indicates thermocouple monitored, energized contacts




259834
8 (2x4) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 1.5 Amps
Room Temp= 21.8°C
3.1
2.5
2.1
1.8
1.7
1.5
1.1
0.9
105°C Limit
Maximum Current, Amps per Contact
Ambient Temperature (°C)
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65°C Peak Amp
65°C Derated Amp
75°C Peak Amp
75°C Derated Amp
95°C Peak Amp
95°C Derated Amp
Limit

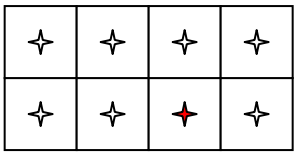

259834
8 (2x4) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

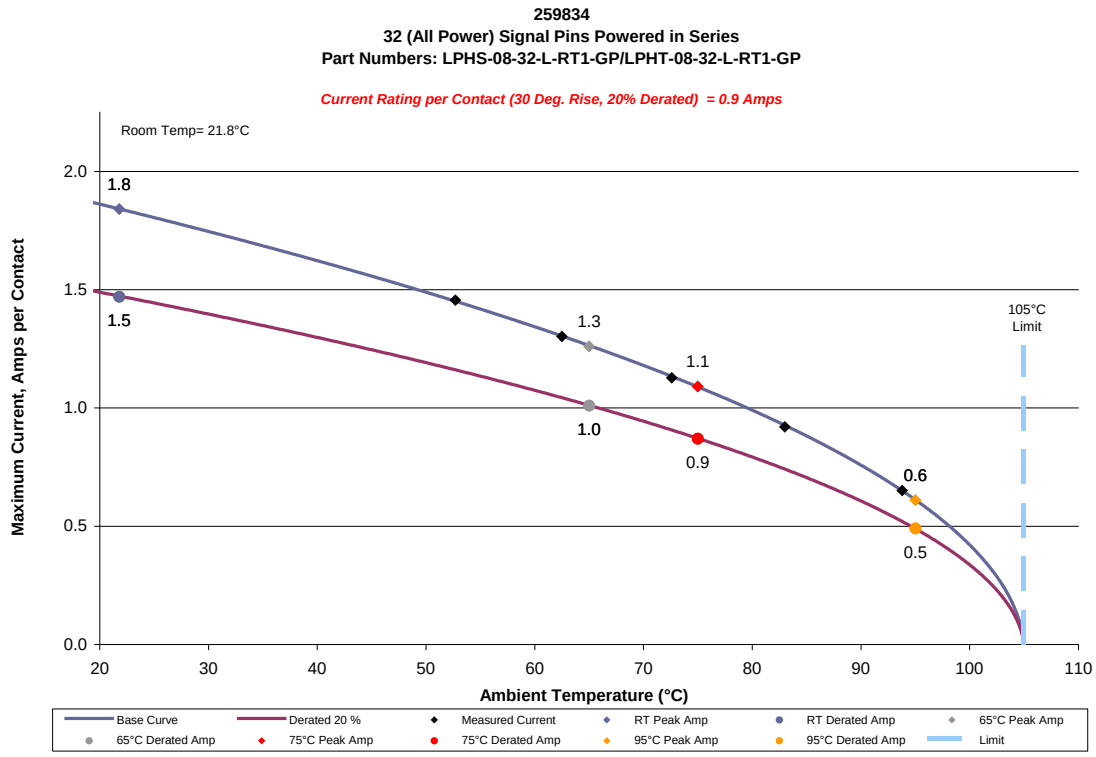
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

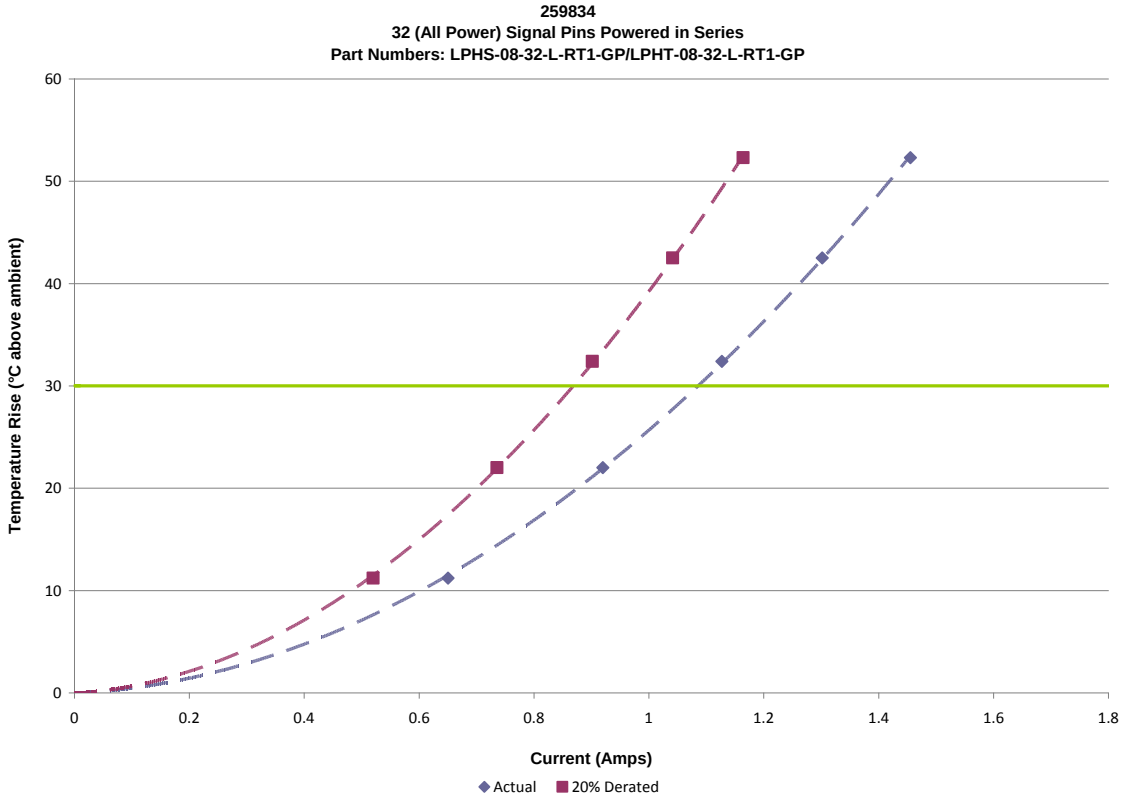
TEST CURRENT AMPS	0.92	1.3	1.59	1.84	2.06
Sample 22	8	16.1	24	31.8	39.4
Sample 23	7.7	15.5	23.2	30.7	38.1
Sample 24	7	14.1	21.1	27.9	35.2
Min	7	14.1	21.1	27.9	35.2
Max	8	16.1	24	31.8	39.4
Avg	7.57	15.23	22.77	30.13	37.57

✧ Indicates energized contacts

✦ Indicates thermocouple monitored, energized contacts




259834
32 (All Power) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 0.9 Amps
Room Temp= 21.8°C
Maximum Current, Amps per Contact
Ambient Temperature (°C)
105°C Limit
1.8
1.5
1.3
1.1
1.0
0.9
0.6
0.5
Base Curve
Derated 20 %
Measured Current
RT Peak Amp
RT Derated Amp
65°C Peak Amp
65°C Derated Amp
75°C Peak Amp
75°C Derated Amp
95°C Peak Amp
95°C Derated Amp
Limit

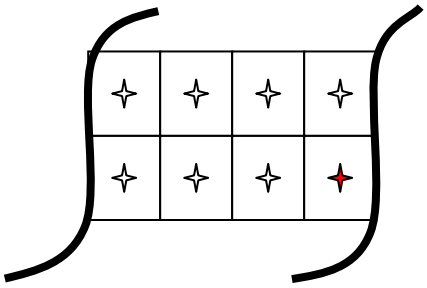

259834
32 (All Power) Signal Pins Powered in Series
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (°C above ambient)
Current (Amps)
Actual
20% Derated

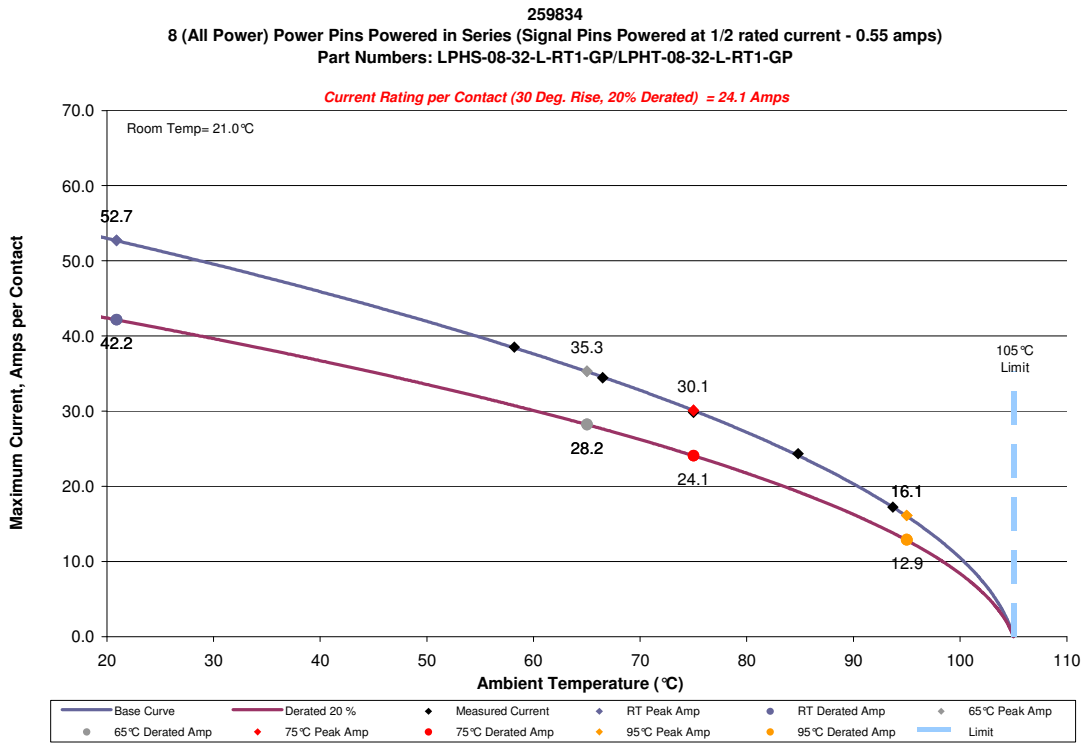
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

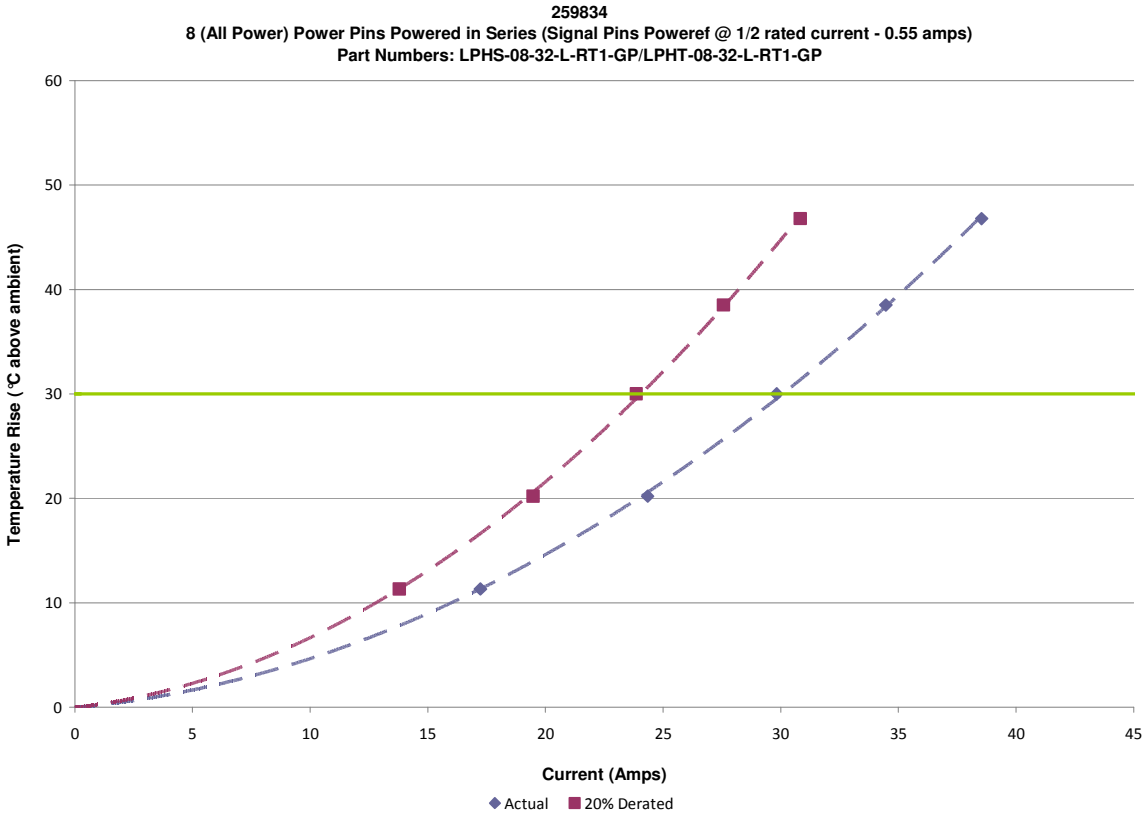
TEST CURRENT AMPS	0.65	0.92	1.13	1.3	1.46
Sample 25	11.2	22.2	32.8	43	52.7
Sample 26	11.1	21.8	32	42	51.7
Sample 27	11.3	21.9	32.3	42.5	52.4
Min	11.1	21.8	32	42	51.7
Max	11.3	22.2	32.8	43	52.7
Avg	11.2	21.97	32.37	42.5	52.27

Indicates energized contacts

Indicates thermocouple monitored, energized contacts




259834
8 (All Power) Power Pins Powered in Series (Signal Pins Powered at 1/2 rated current - 0.55 amps)
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Current Rating per Contact (30 Deg. Rise, 20% Derated) = 24.1 Amps
Room Temp= 21.0℃
Maximum Current, Amps per Contact
Ambient Temperature (℃)
52.7
42.2
35.3
28.2
30.1
24.1
16.1
12.9
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

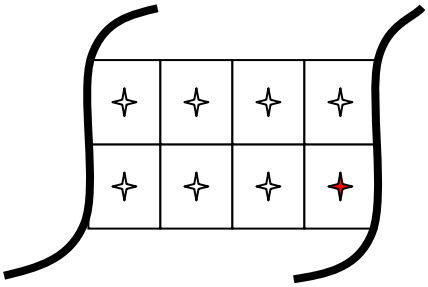

259834
8 (All Power) Power Pins Powered in Series (Signal Pins Poweref @ 1/2 rated current - 0.55 amps)
Part Numbers: LPHS-08-32-L-RT1-GP/LPHT-08-32-L-RT1-GP
Temperature Rise (℃ above ambient)
Current (Amps)
Actual
20% Derated

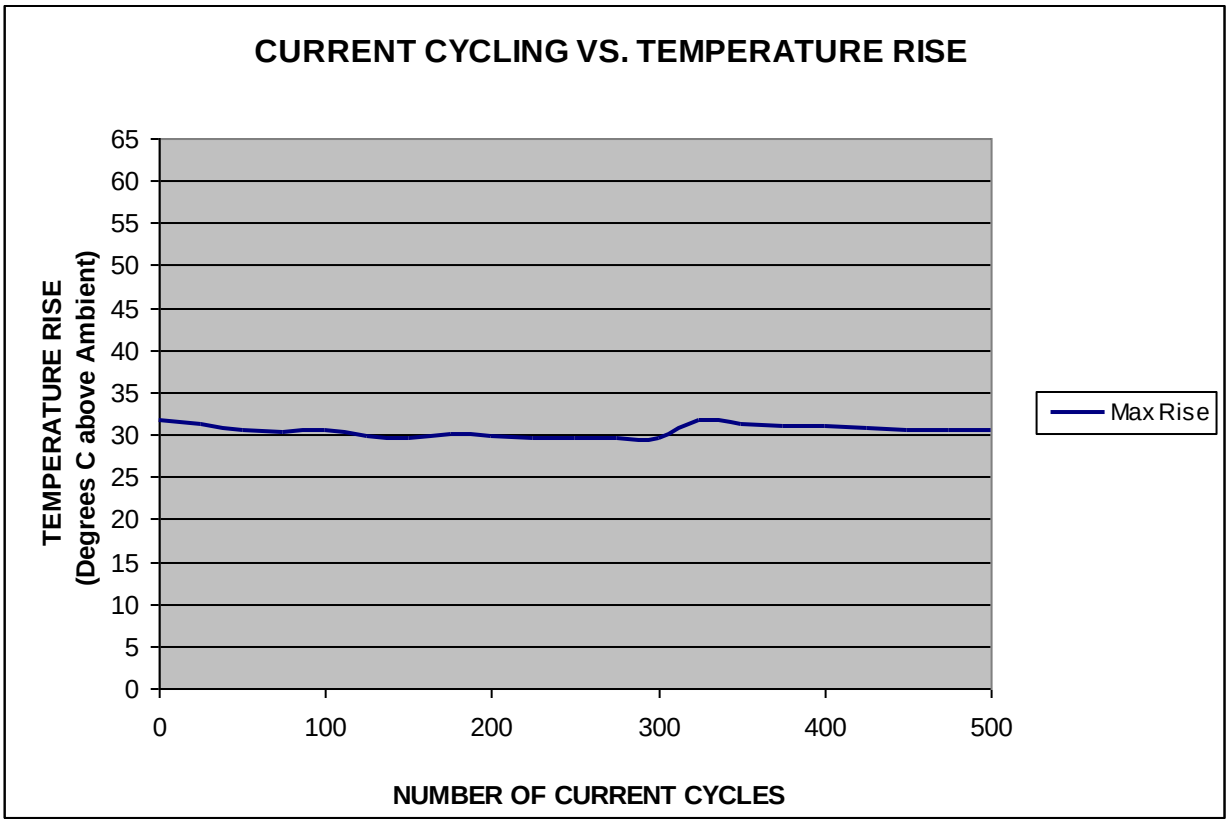
TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

TEST CURRENT AMPS	17.23	24.34	29.83	34.46	38.54
Sample 28	11.4	21	30.3	39.6	48.1
Sample 29	11.2	19.2	30.7	39	47.3
Sample 30	11.2	20.3	29	36.9	45
Min	11.2	19.2	29	36.9	45
Max	11.4	21	30.7	39.6	48.1
Avg	11.27	20.17	30	38.5	46.8

Indicates energized contacts

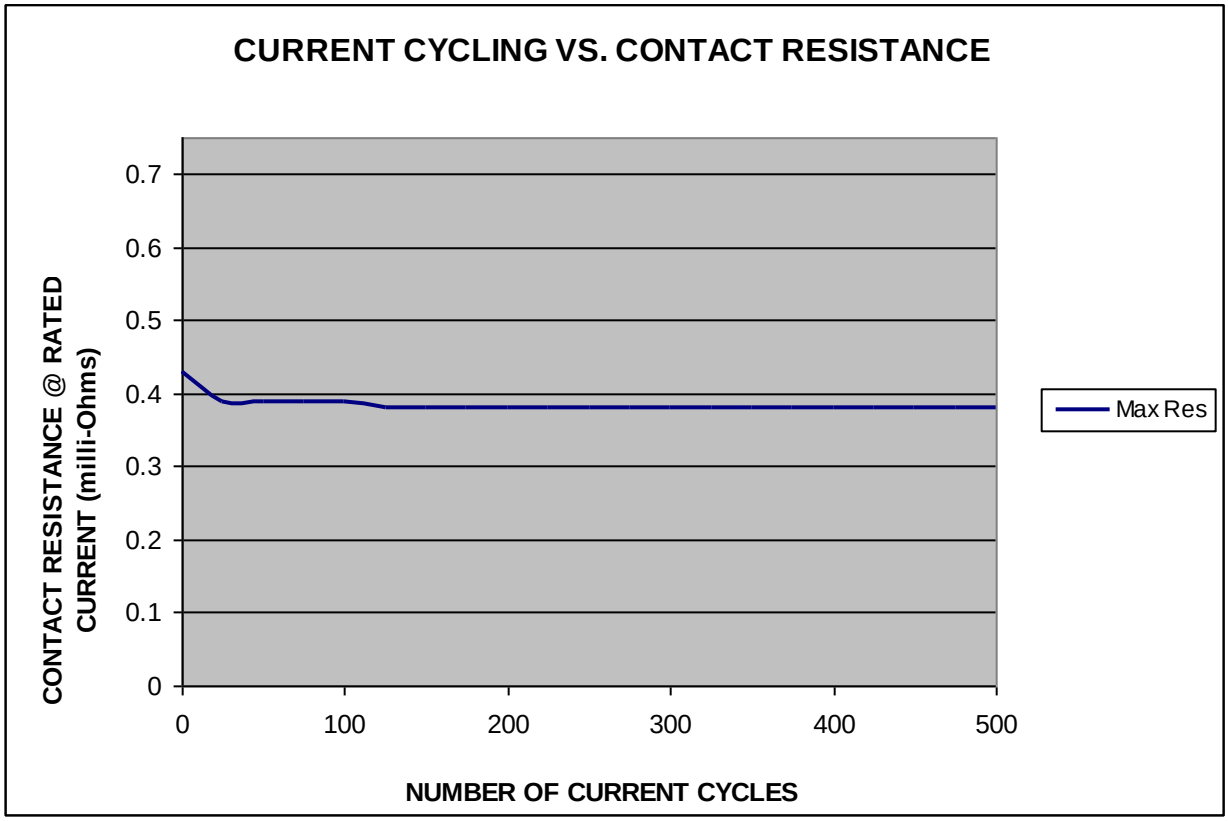
Indicates thermocouple monitored, energized contacts



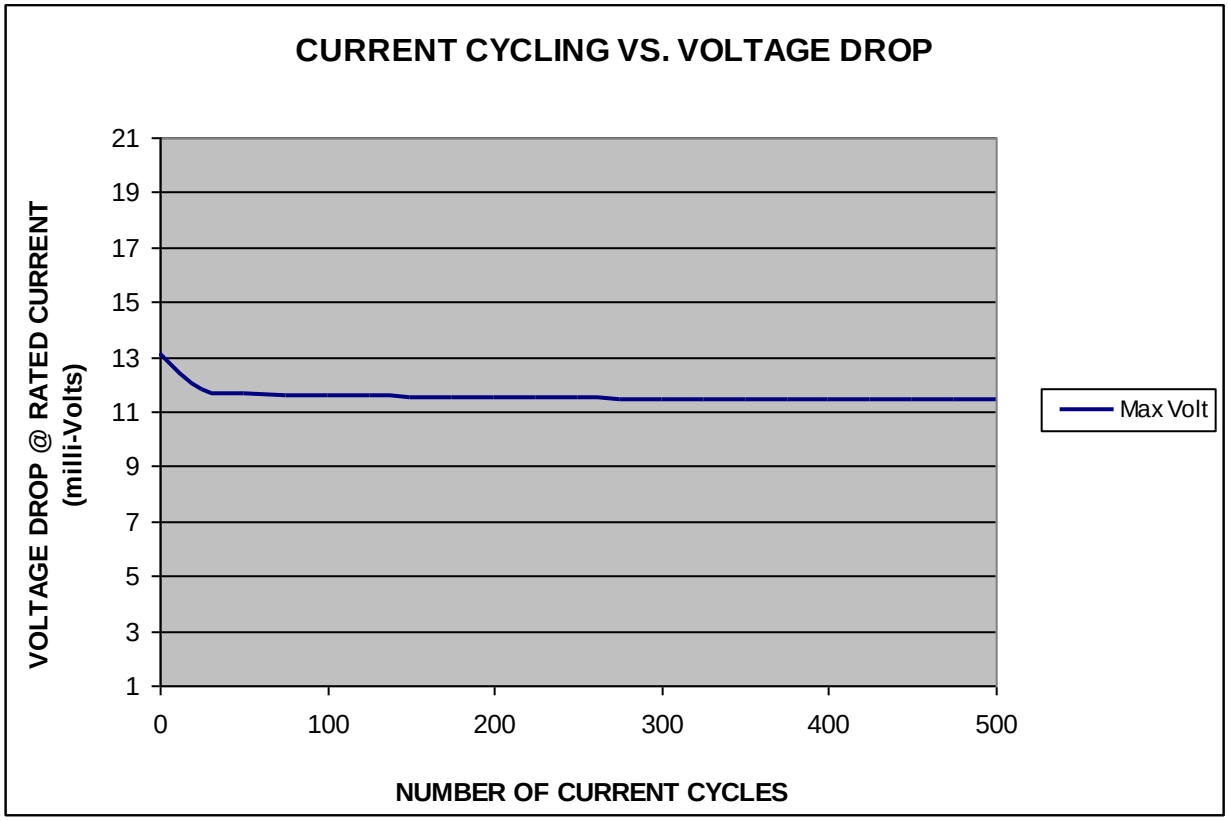


TEMPERATURE RISE DATA
ALL CONTACTS ENERGIZED
(Degrees Celsius above ambient)

	INITIAL	50 CYCLES	100 CYCLES	200 CYCLES	500 CYCLES
Min	29.5	25.8	28	27.8	27.1
Max	31.7	30.5	30.6	29.7	30.5
Avg	30.3	28.1	29	28.5	29



CONTACT RESISTANCE DATA ALL CONTACTS ENERGIZED (mΩ)					
	INITIAL	50 CYCLES	100 CYCLES	200 CYCLES	500 CYCLES
Min	0.21	0.2	0.2	0.19	0.19
Max	0.43	0.39	0.39	0.38	0.38
Avg	0.28	0.25	0.25	0.25	0.24



VOLTAGE DROP DATA ALL CONTACTS ENERGIZED (MV)					
	INITIAL	50 CYCLES	100 CYCLES	200 CYCLES	500 CYCLES
Min	6.42	5.9	5.88	5.82	5.75
Max	13.09	11.67	11.6	11.53	11.43
Avg	8.38	7.55	7.54	7.44	7.33

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 04/30/2013, Next Cal: 04/30/2014

Equipment #: PS-07
Description: 20 V, 120 A DC Power Supply - AutoRanging SO/HPIB
Manufacturer: Hewlett Packard / Agilent
Model: AT-6031A
Serial #: 2721A00648
Accuracy: See Manual
… Last Cal: Reference Only, Next Cal: Reference Only

Equipment #: MO-09
Description: Model 2750 Multimeter/Switch System
Manufacturer: Keithley
Model: 2750
Serial #: WDC-874817
Accuracy: See Manual
… Last Cal: 10/20/2012, Next Cal: 10/20/2013

Equipment #: PS-09
Description: 60 V, 50 A DC Power Supply - AutoRanging SO
Manufacturer: Hewlett Packard / Agilent
Model: AT-6032A
Serial #: US38322853
Accuracy: See Manual
… Last Cal: Reference Only, Next Cal: Reference Only