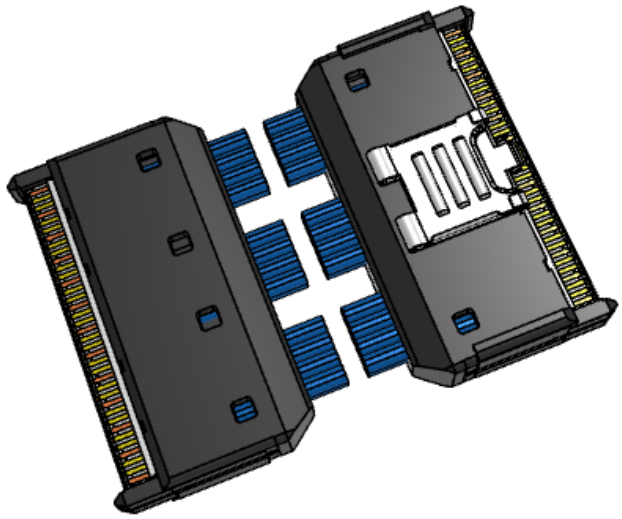
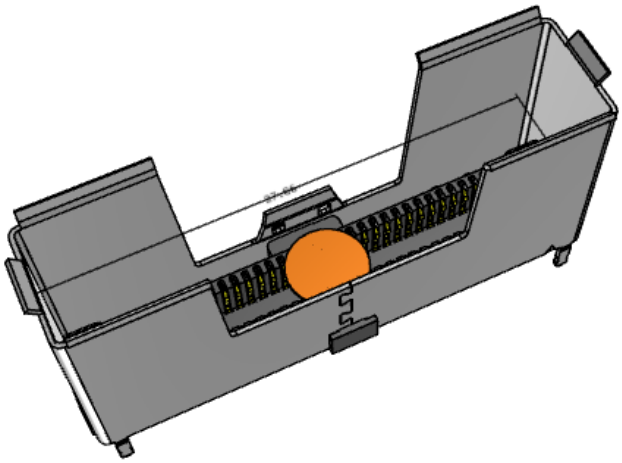
Project Number: Design Qualification Test Report	Tracking Code: CR-1054907_Report_Rev_1
Requested by: Cesar Wang	Date: 7/10/2024
Part #: ARC6-24-12.0-LU-LU-3-3/ARF6-24-S-D-A-K-TR	
Part description: ARC6/ARF6	Tech: Kason He
Test Start: 4/11/2024	Test Completed: 4/26/2024





DESIGN QUALIFICATION TEST REPORT

ARC6/ARF6
ARC6-24-12.0-LU-LU-3-3/ARF6-24-S-D-A-K-TR

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
7/10/2024	**1**	**Initial Issue**	**KH**

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
4) The automated procedure is used with aqueous compatible soldering materials.
5) Any additional preparation will be noted in the individual test sequences.
6) Solder Information: Lead free
7) Samtec Test PCBs used: PCB-110655-TST/PCB-110656-TST.

FLOWCHARTS

Current Carrying Capacity

Group 1
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
2 Pins Powered
Signal

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

Group 2
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
4 Pins Powered
Signal

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

Group 3
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
6 Pins Powered
Signal

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

Group 4
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
8 Pins Powered
Signal

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

Group 5
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
48 Pins Powered
Signal

Step	Description
1.	CCC (2) Rows = 2 Number of Positions = 24

Group 6
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
2 Pins Powered
Ground

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

Group 7
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
All Power

Step	Description
1.	CCC - All Power (1)

(1) CCC - All Power = EIA-364-70
Method 2, Temperature Rise Versus Current Curve
(TIN PLATING) - Tabulate calculated current at RT,65°C, 75°C and 95°C after derating 20% and based on 105°C
(GOLD PLATING) - Tabulate calculated current at RT,85°C, 95°C and 115°C after derating 20% and based on 125°C

(2) CCC = EIA-364-70
Method 2, Temperature Rise Versus Current Curve
(TIN PLATING) - Tabulate calculated current at RT,65°C, 75°C and 95°C after derating 20% and based on 105°C
(GOLD PLATING) - Tabulate calculated current at RT,85°C, 95°C and 115°C after derating 20% and based on 125°C

Cable Pull

Group 1
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
5 Assemblies
0 Degrees

Step	Description
1.	Cable Pull (1)

Group 2
ARC6-24-12.0-LU-LU-3-3
ARF6-24-S-D-A-K-TR
5 Assemblies
90 Degrees

Step	Description
1.	Cable Pull (1)

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
4) The size of the temperature probe can affect the measured temperature.
5) Copper traces on PC boards will contribute to temperature rise:
    a. Self-heating (resistive)
    b. Reduction in heat sink capacity affecting the heated contacts.
6) A de-rating curve, usually 20%, is calculated.
7) Calculated de-rated currents at four temperature points are reported:
    a. Ambient
    b. 85^{o} C
    c. 95^{o} C
    d. 115^{o} C
8) Typically, neighboring contacts (in close proximity to maximize heat buildup) are energized.
9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
12) Hook-up wire length is longer than the minimum specified in the referencing standard.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes.

CABLE PULL:

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

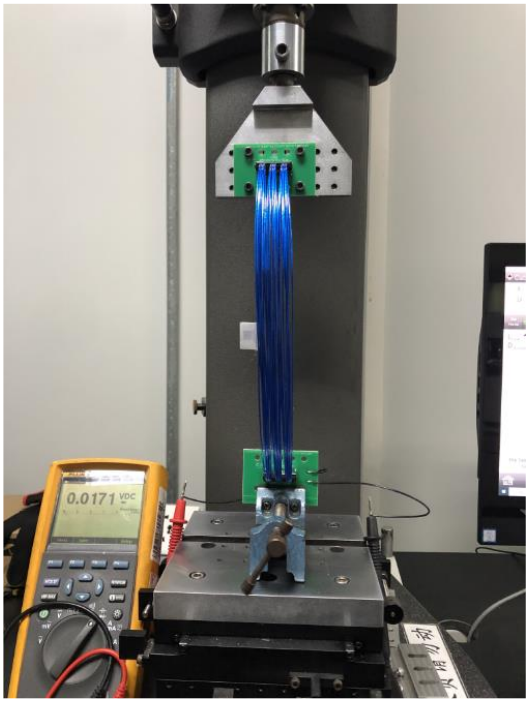


Fig. 1
90° Connector pull.

RESULTS

Temperature Rise, CCC at a 20% de-rating

Signal Pin at Cable

- **CCC for a 30°C Temperature Rise----------1.12 A per contact with 2 contacts (2x1) powered.**
- **CCC for a 30°C Temperature Rise----------0.79 A per contact with 4 contacts (2x2) powered.**
- **CCC for a 30°C Temperature Rise----------0.74 A per contact with 6 contacts (2x3) powered.**
- **CCC for a 30°C Temperature Rise----------0.72 A per contact with 8 contacts (2x4) powered.**
- **CCC for a 30°C Temperature Rise----------0.41 A per contact with 48 contacts (2x24) powered.**

Power Pin at Contact Interface

- **CCC for a 30°C Temperature Rise----------4.87 A per contact with 2 contacts (2x1) powered.**

All power positions with signal @1/2 rated current.

- **CCC for a 30°C Temperature Rise----------4.86 A per contact (2) with signal powered @ ½ rated current (0.25 A).**

Cable Pull force

- **90° Pull**
  - **Min----------13.48 lbs**
  - **Max ----------15.37 lbs**
- **0° Pull**
  - **Min----------16.15 lbs**
  - **Max ----------17.20 lbs**

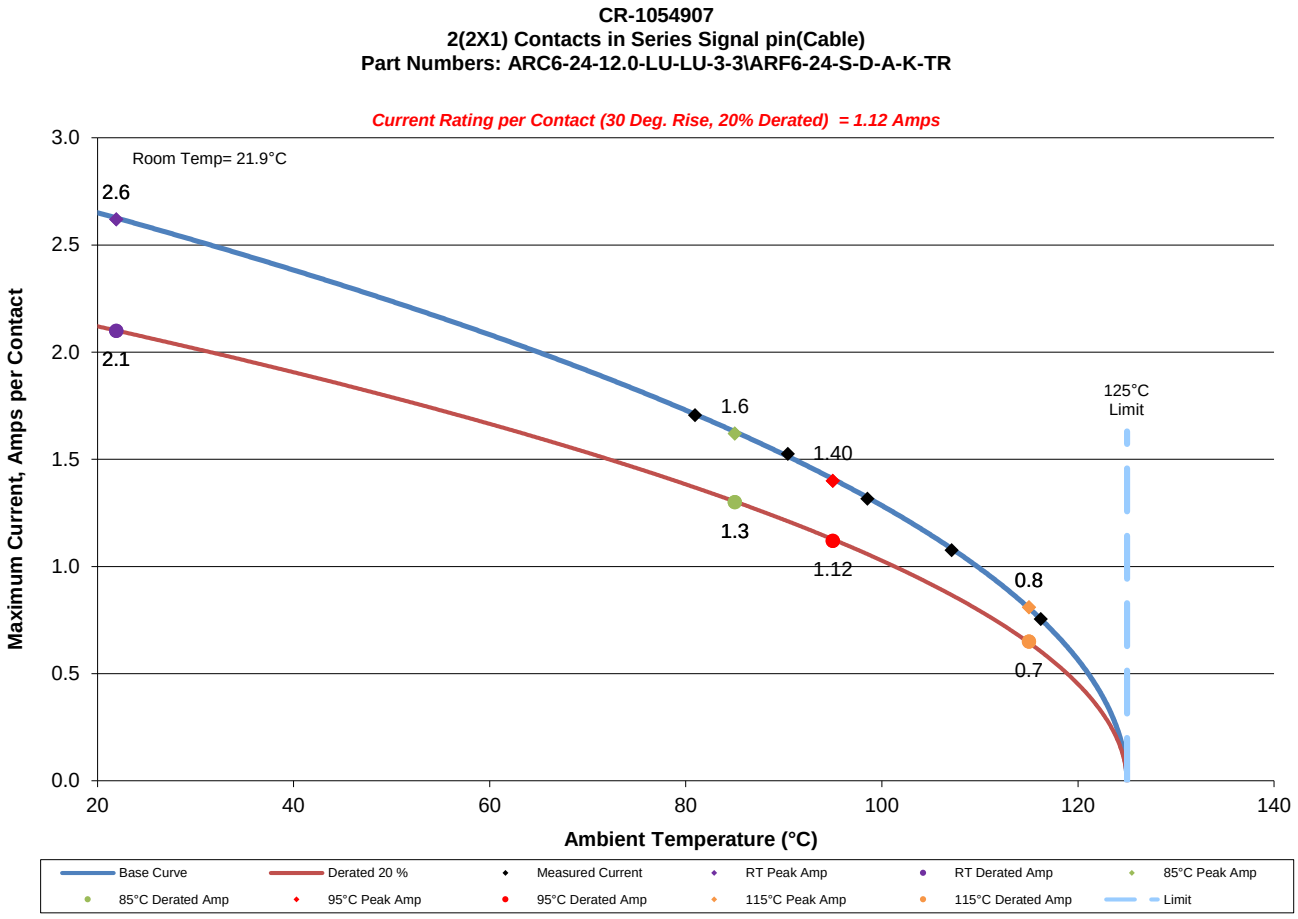
DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

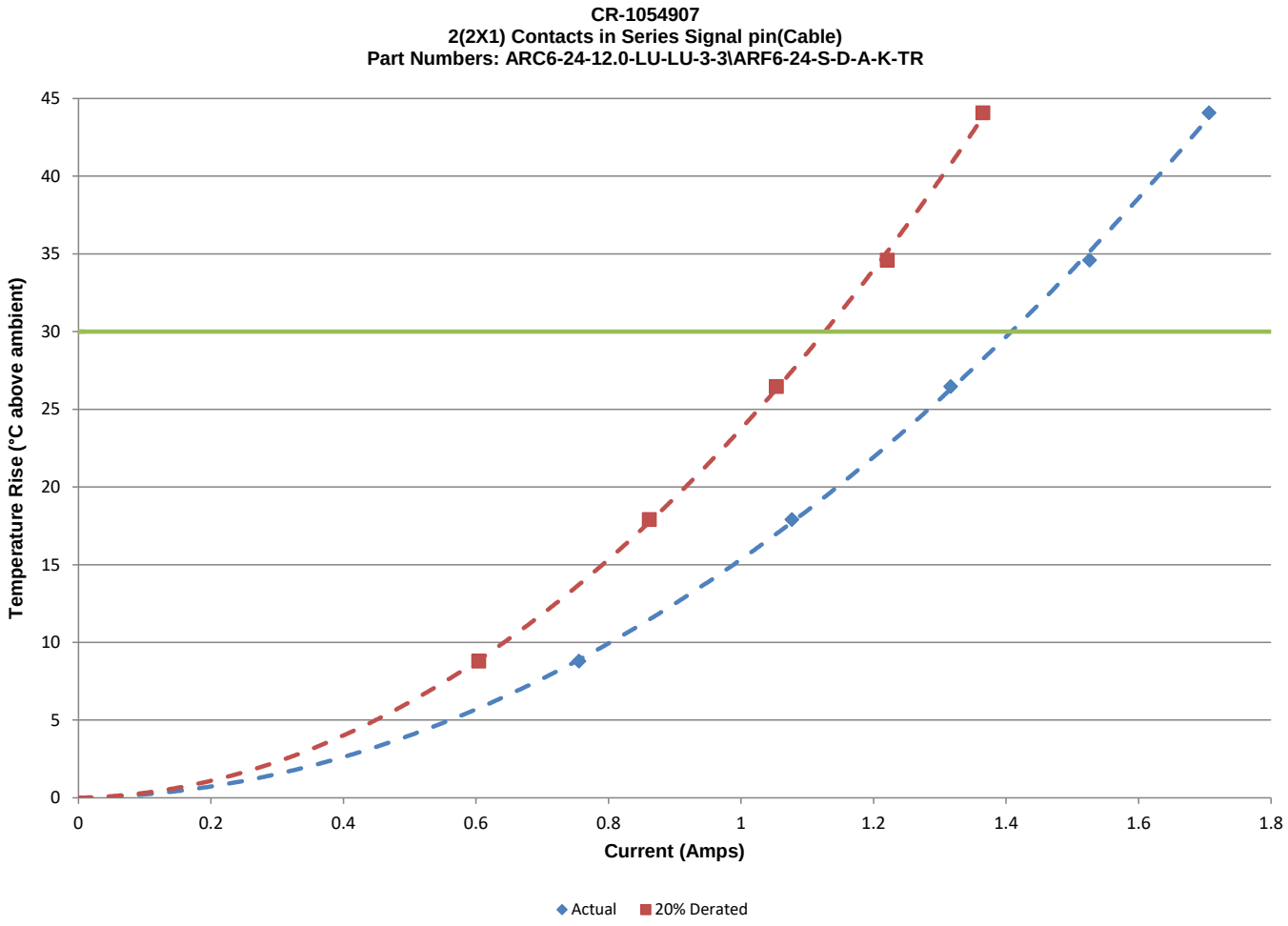
1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes apart, differ less than 1° C (computer-controlled data acquisition).
4) Adjacent contacts were powered:

Signal Pin at Cable

a. Linear configuration with 2 adjacent conductors/contacts powered.

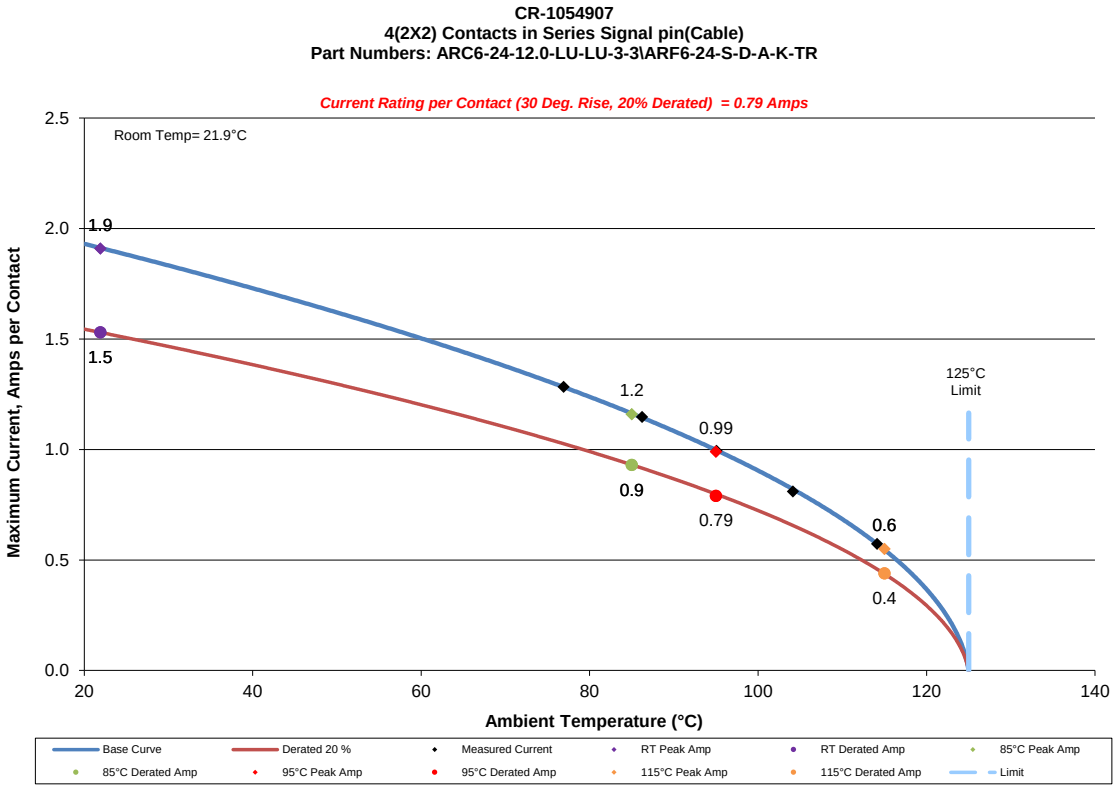


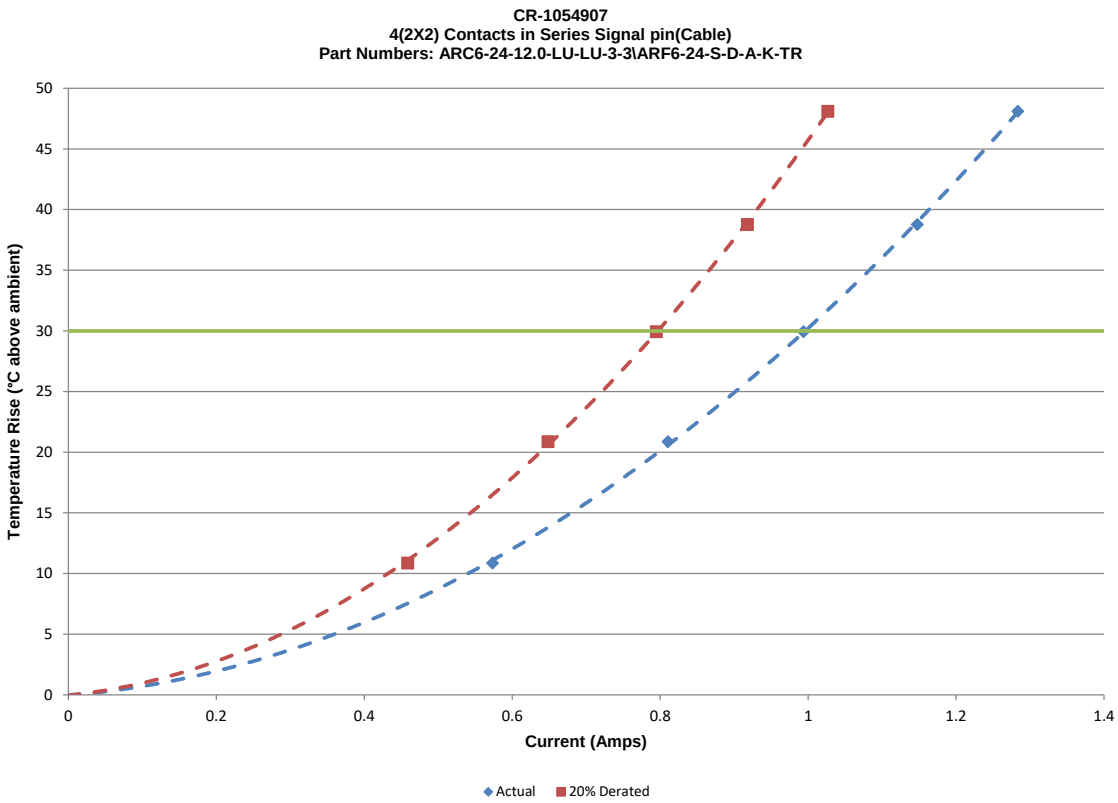
DATA SUMMARIES Continued



DATA SUMMARIES Continued

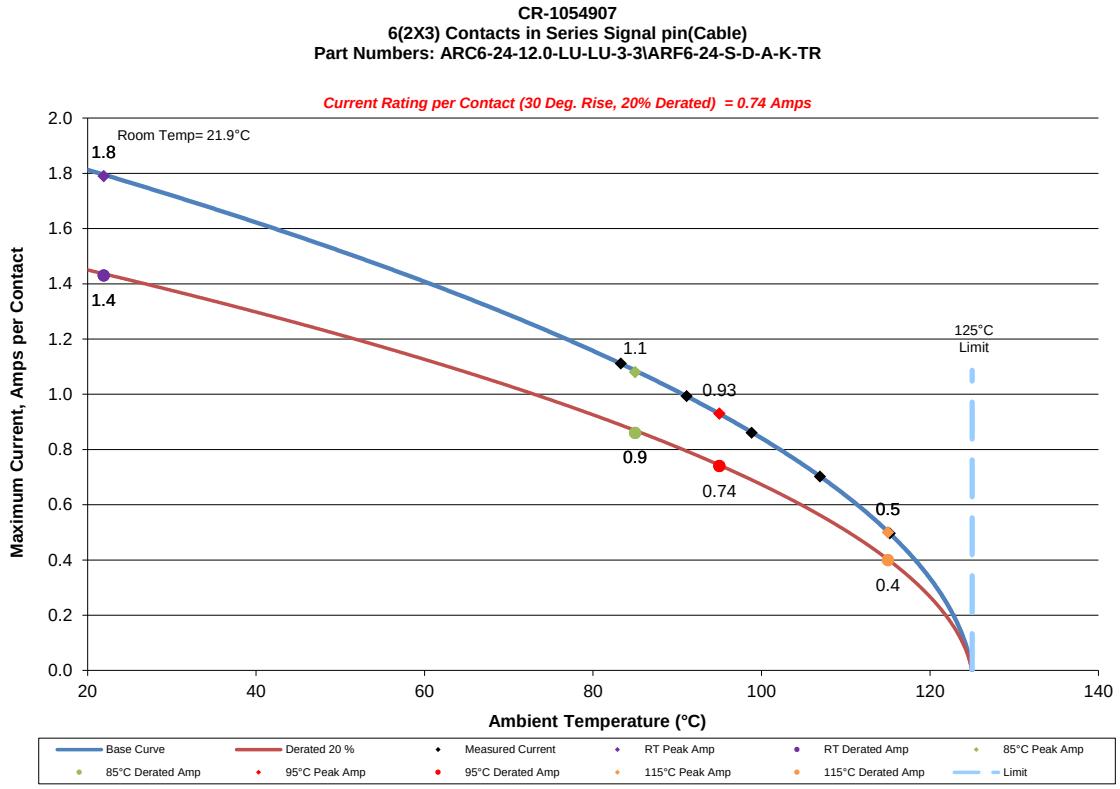
b. Linear configuration with 4 adjacent conductors/contacts powered.

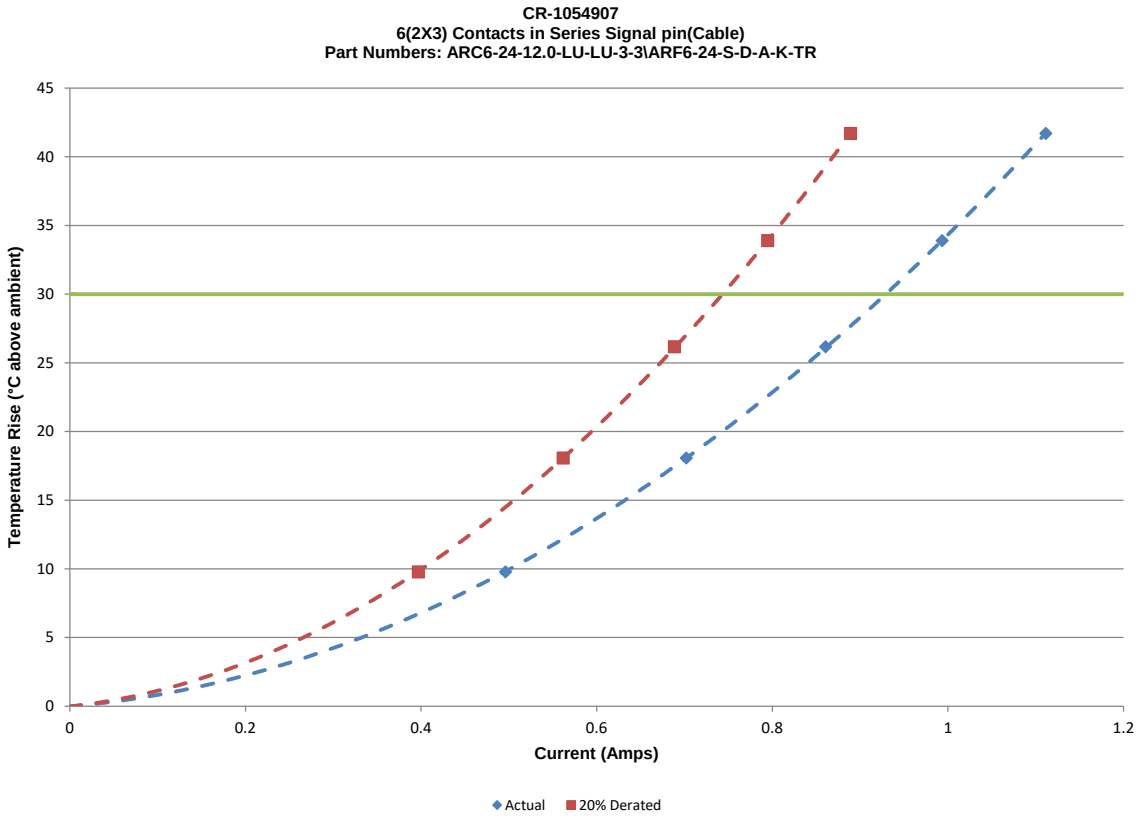




DATA SUMMARIES Continued

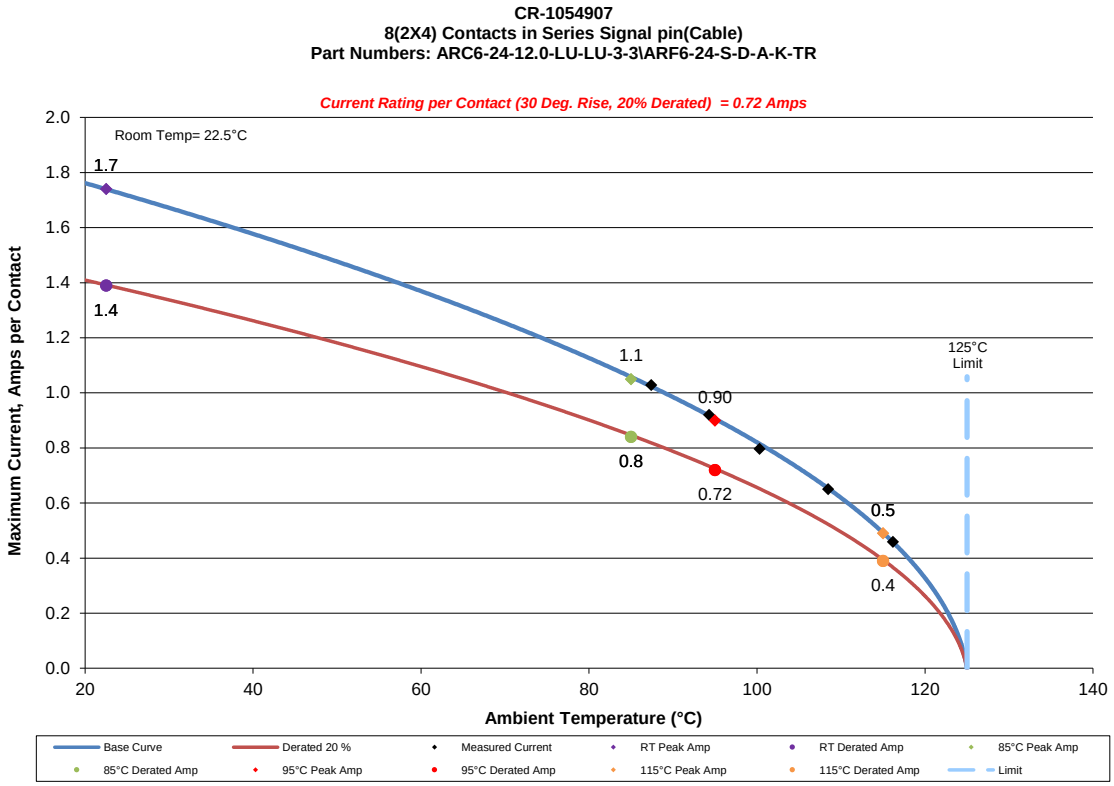
c. Linear configuration with 6 adjacent conductors/contacts powered.

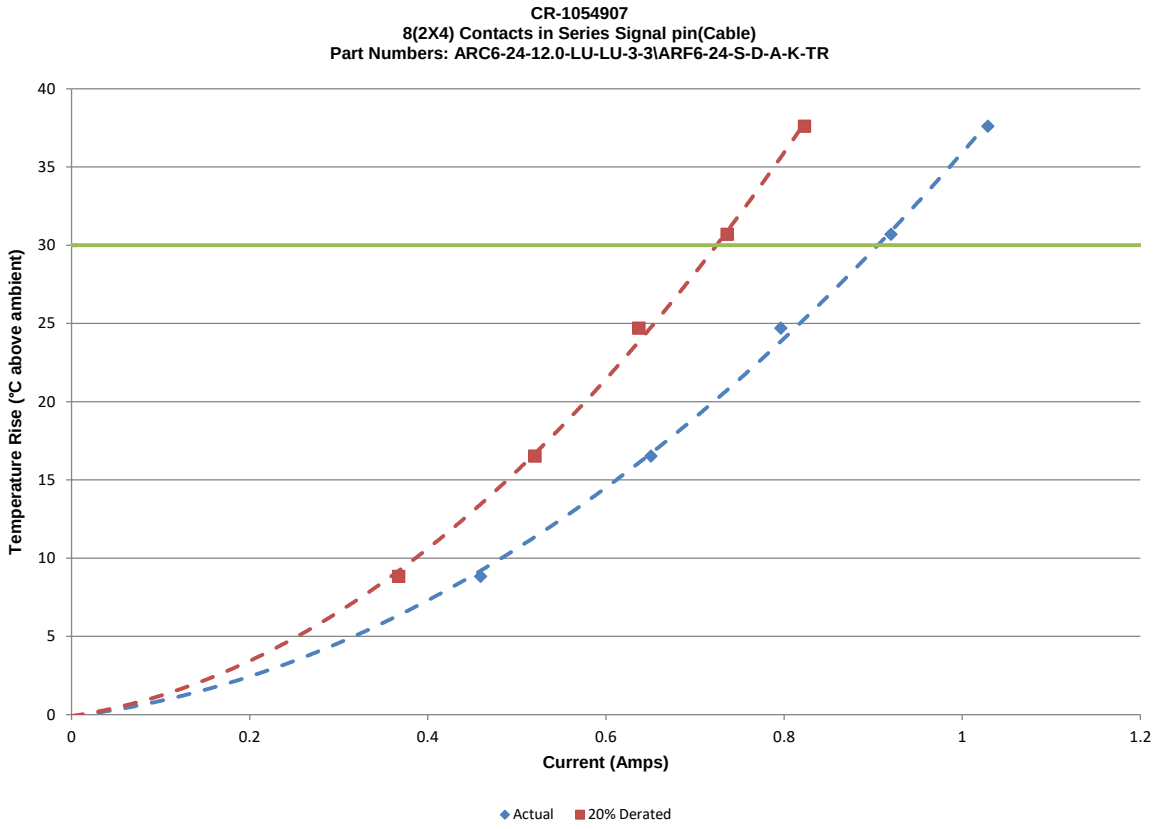




DATA SUMMARIES Continued

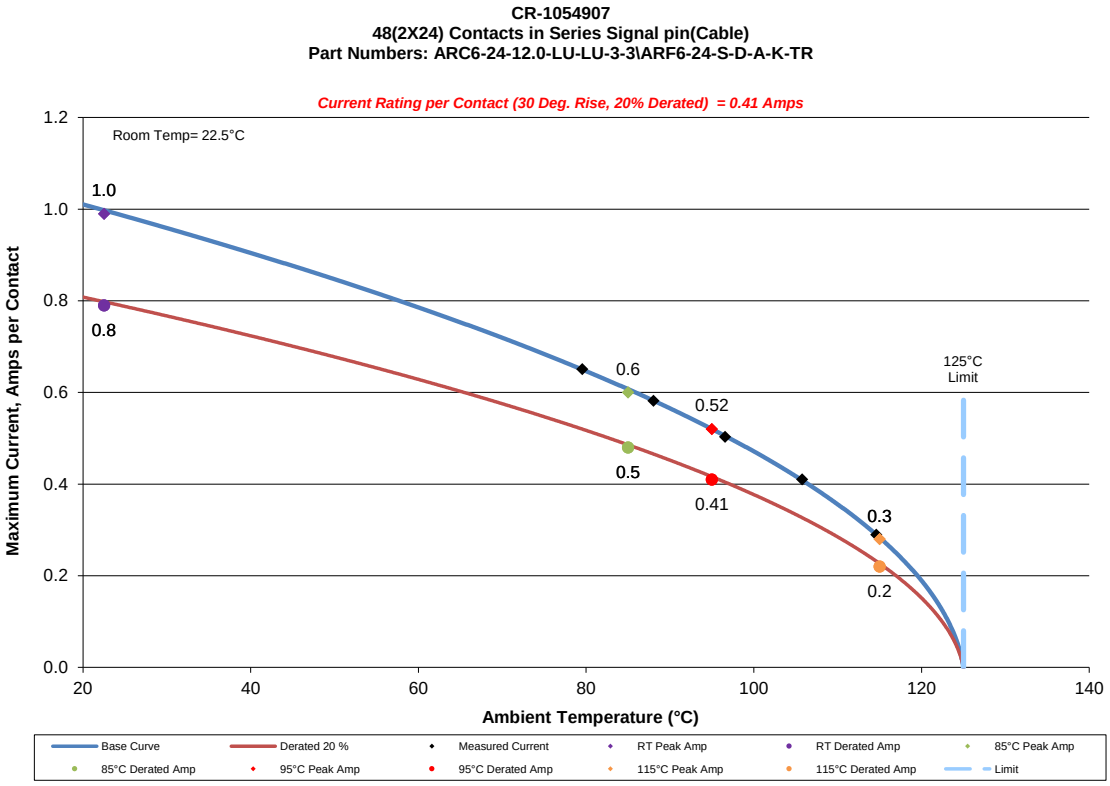
d. Linear configuration with 8 adjacent conductors/contacts powered.

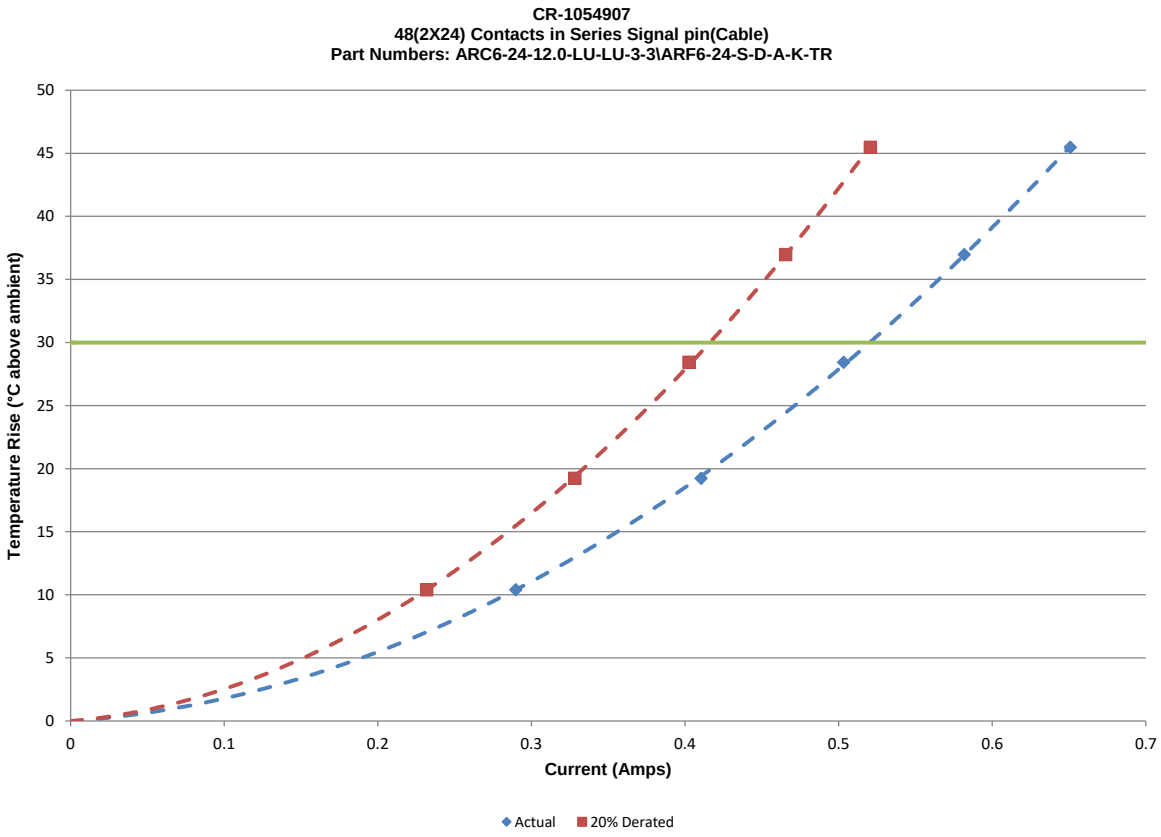




DATA SUMMARIES Continued

e. Linear configuration with all adjacent conductors/contacts powered.

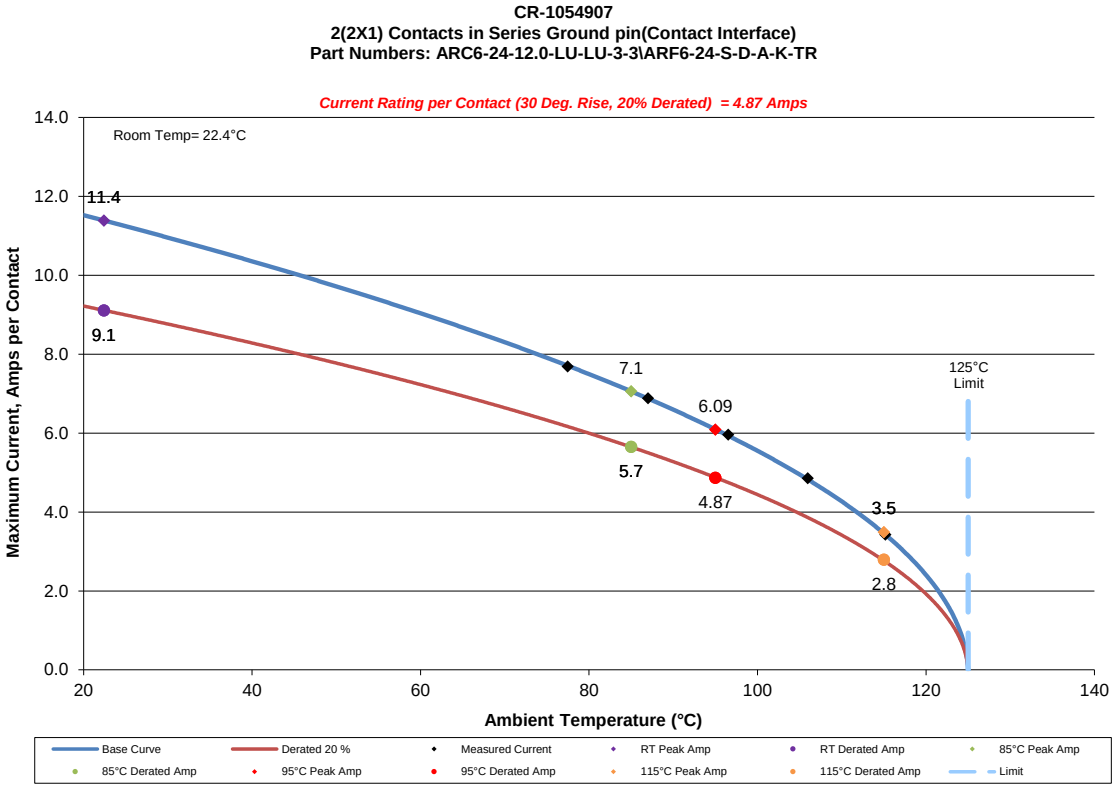


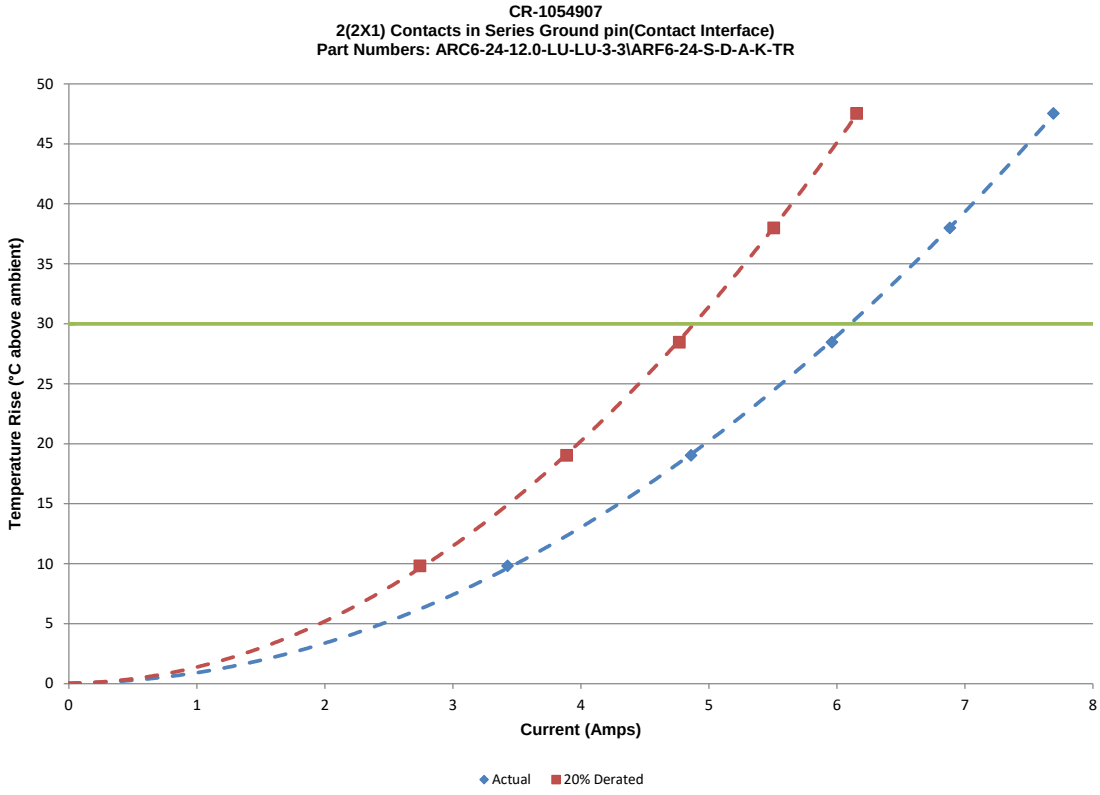


DATA SUMMARIES Continued

Ground Pin at Contact Interface

a. Linear configuration with 2 adjacent conductors/contacts powered.

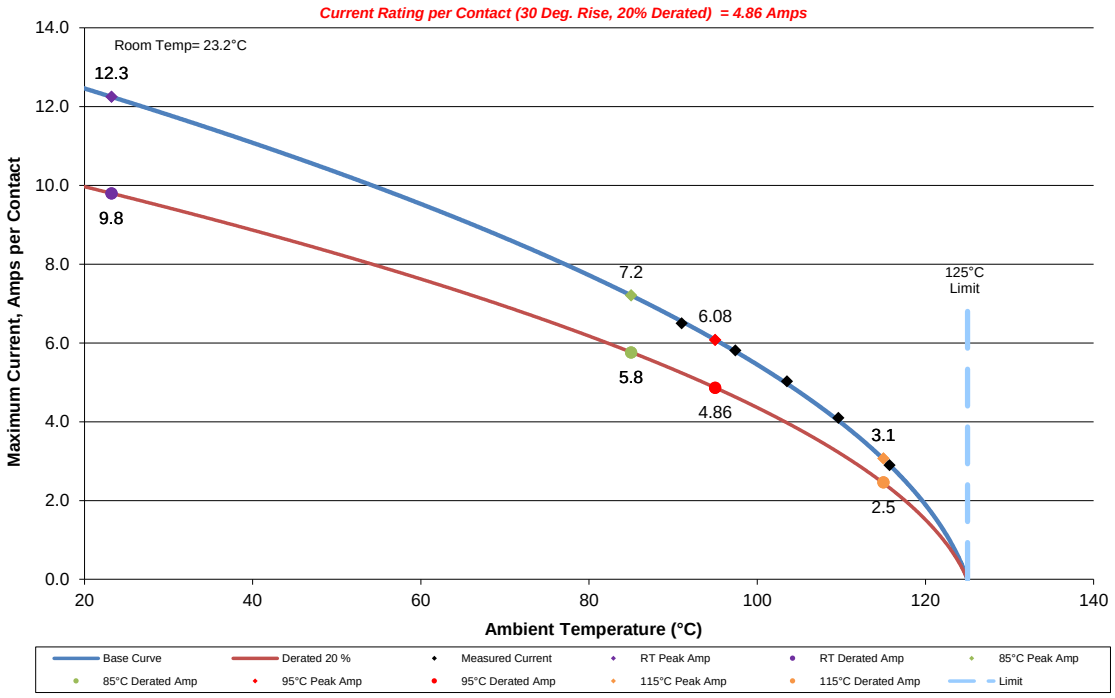




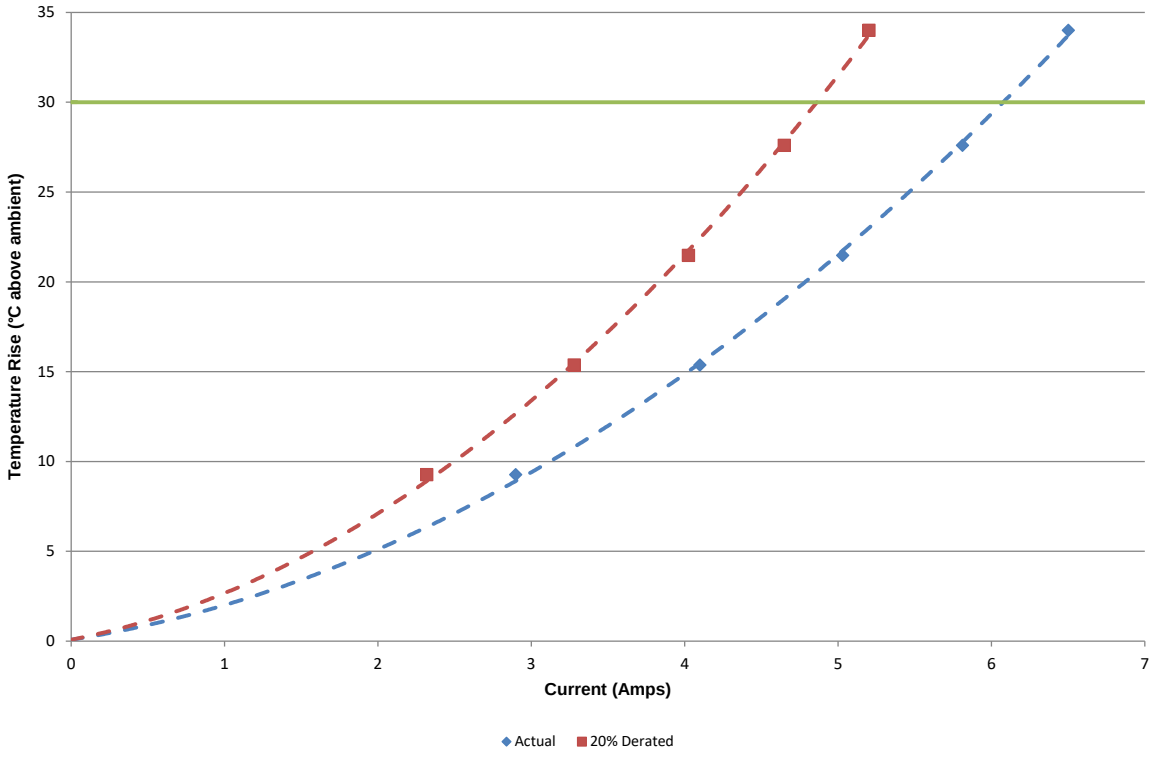
DATA SUMMARIES Continued

b. All power positions with signal @1/2 rated current.

CR-1054907
2(2X1)(All Power) Contacts in Series (Grounds)(Signals Powered at 1/2 Rated Current)(Contact Interface)
Part Numbers: ARC6-24-12.0-LU-LU-3-3\ARF6-24-S-D-A-K-TR



CR-1054907
2(2X1)(All Power) Contacts in Series (Grounds)(Signals Powered at 1/2 Rated Current)(Contact Interface)
Part Numbers: ARC6-24-12.0-LU-LU-3-3\ARF6-24-S-D-A-K-TR



DATA SUMMARIES Continued

Cable Pull Force:

90° Pull

	Force (lbs)
Minimum	**13.48**
Maximum	15.37
Average	14.76

0° Pull

	Force (lbs)
Minimum	**16.15**
Maximum	17.20
Average	16.70

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 3/5/2023, Next Cal: 3/4/2024

Equipment #: HZ-MO-01
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 2700
Serial #: 1199807
Accuracy: Last Cal: 05/19/2023, Next Cal: 05/18/2024

Equipment #: HZ-PS-01
Description: Power Supply
Manufacturer: Agilent
Model: 6031A
Serial #: MY41000982
Accuracy: Last Cal: 04/16/2023, Next Cal: 04/15/2024