Project Number: Design Verification Test Report	Tracking Code: 093038_Report_Rev_1		
Requested by: Mark Shireman	Date: 9/30/2010	Product Rev: 0	
Part #: HLE-150-02-G-DV/TSM-150-01-G-DV	Lot #: na	Tech: Tony Wagoner	Eng: Eric Mings
Part description: HLE/TSM		Qty to test: 15	
Test Start: 9/1/2010	Test Completed: 9/5/2010		

DESIGN VERIFICATION TEST REPORT

HLE/TSM

HLE-150-02-G-DV/TSM-150-01-G-DV

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 verification test. 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.

FLOWCHARTS

Current Carrying Capacity

DOUBLE ROW

Current Carrying Capacity **3 Mated Assemblies Each**

TEST STEP	GROUP A 3 Mated Assemblies 2 CONTACT 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 125° C

CCC, Temp rise = EIA-364-70

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 three temperature points are reported:
    a. Ambient
    b. 80^{o} C
    c. 95^{o} C
    d. 115^{o} C
8) Typically, neighboring contacts (in close proximity to maximize heat build up) 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.

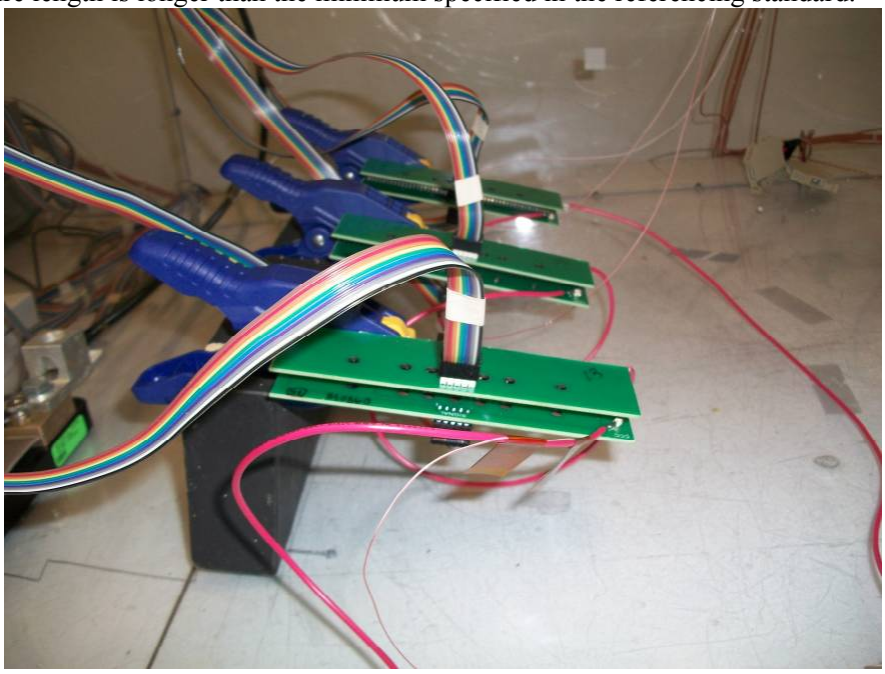


Fig 1
The set up for CCC

RESULTS

Temperature Rise, CCC at a 20% de-rating

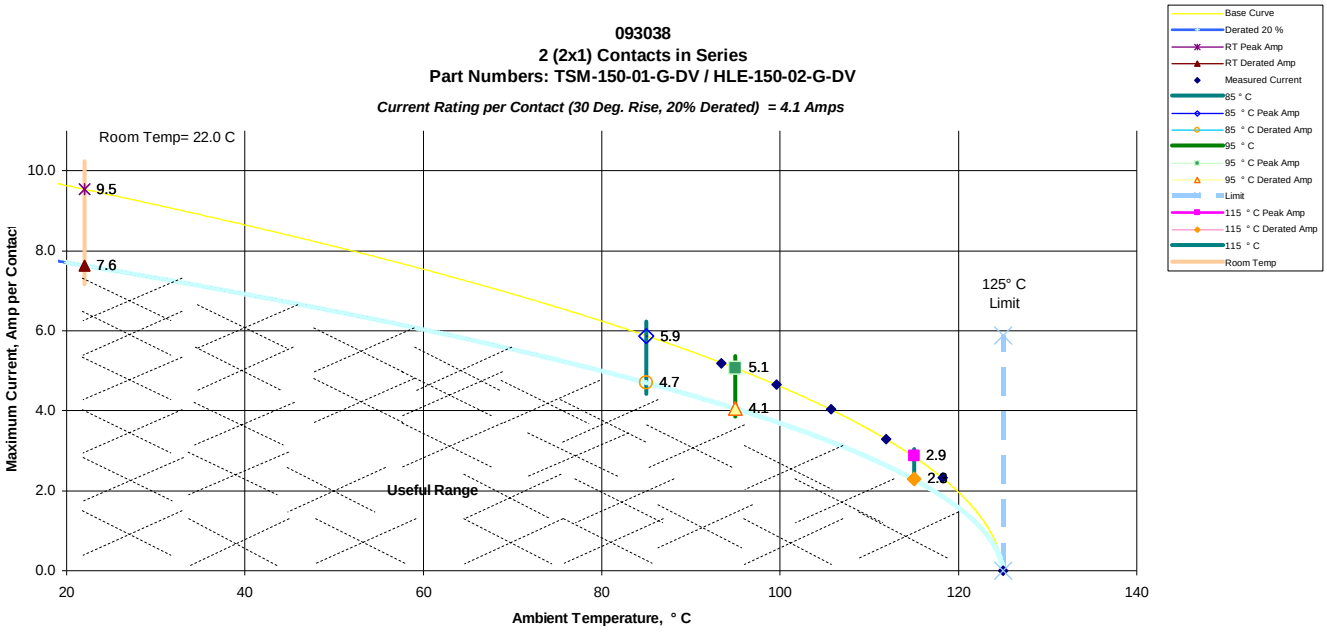
- **CCC for a 30°C Temperature Rise ----------4.1A per contact with 2 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise ----------3.2A per contact with 4 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise ----------2.6A per contact with 6 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise ----------2.5A per contact with 8 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise ----------1.7A per contact with all adjacent contacts powered**

DATA SUMMARIES

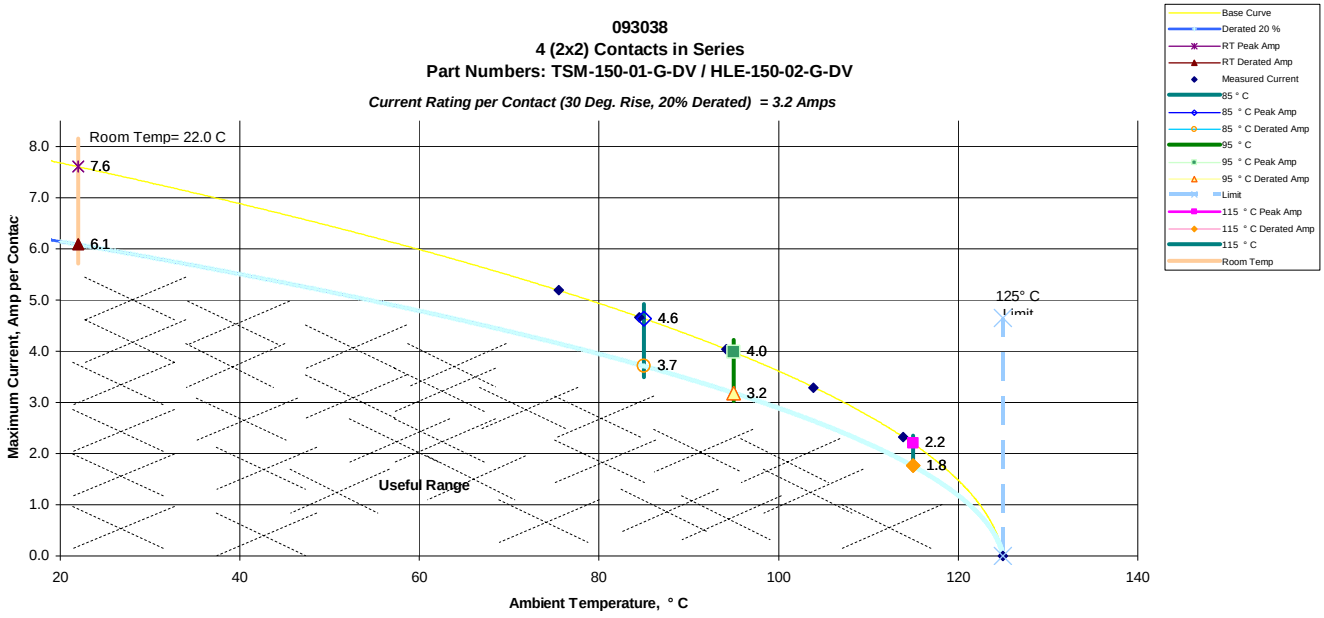
TEMPERATURE RISE - (Current Carrying Capacity, CCC):

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:

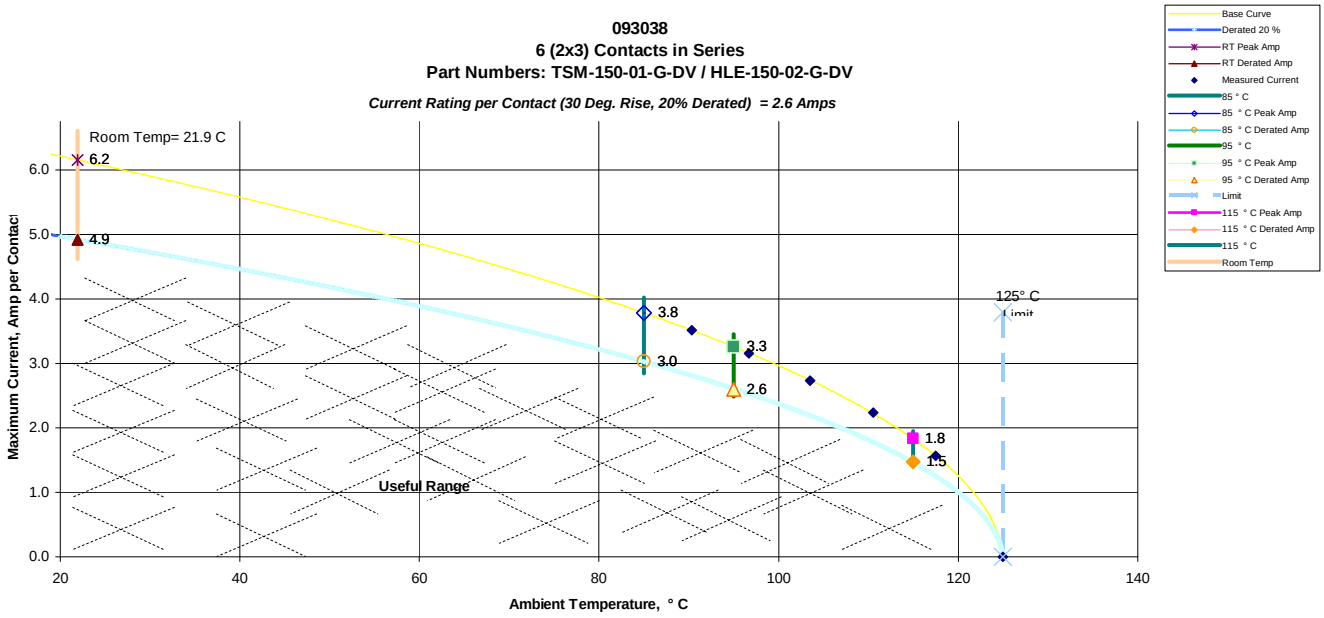
    a. Linear configuration with 2 adjacent conductors/contacts powered



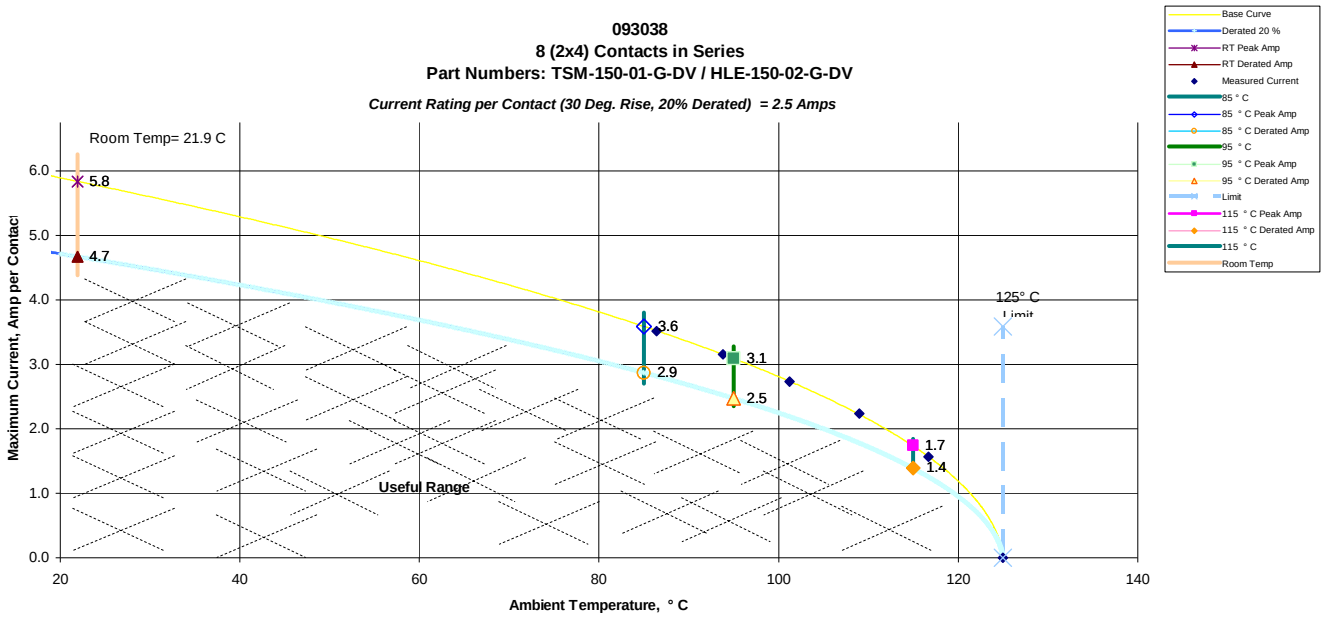
b. Linear configuration with 4 adjacent conductors/contacts powered



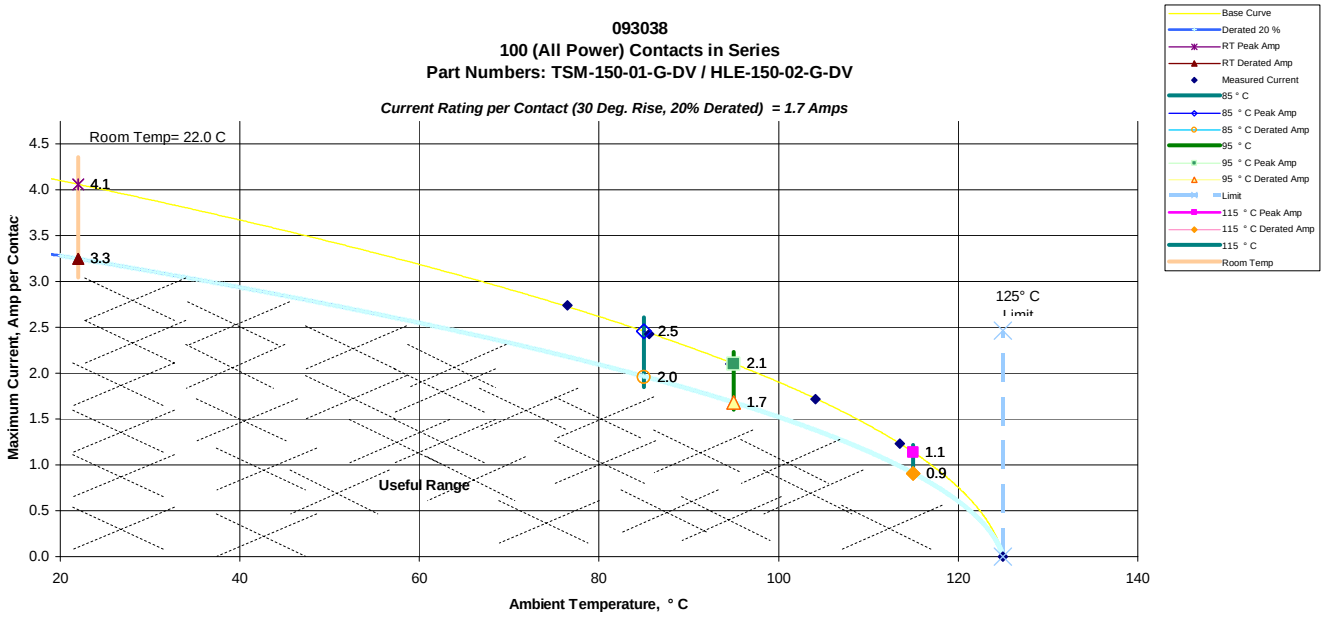
c. Linear configuration with 6 adjacent conductors/contacts powered



d. Linear configuration with 8 adjacent conductors/contacts powered



e. Linear configuration with all adjacent conductors/contacts powered



EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-03
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0791975
Accuracy: See Manual
… Last Cal: 06/16/10, Next Cal: 06/16/2011

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 Current Carrying Capacity (CCC) Chamber
… Last Cal: 06/16/2010, Next Cal: 06/16/2011