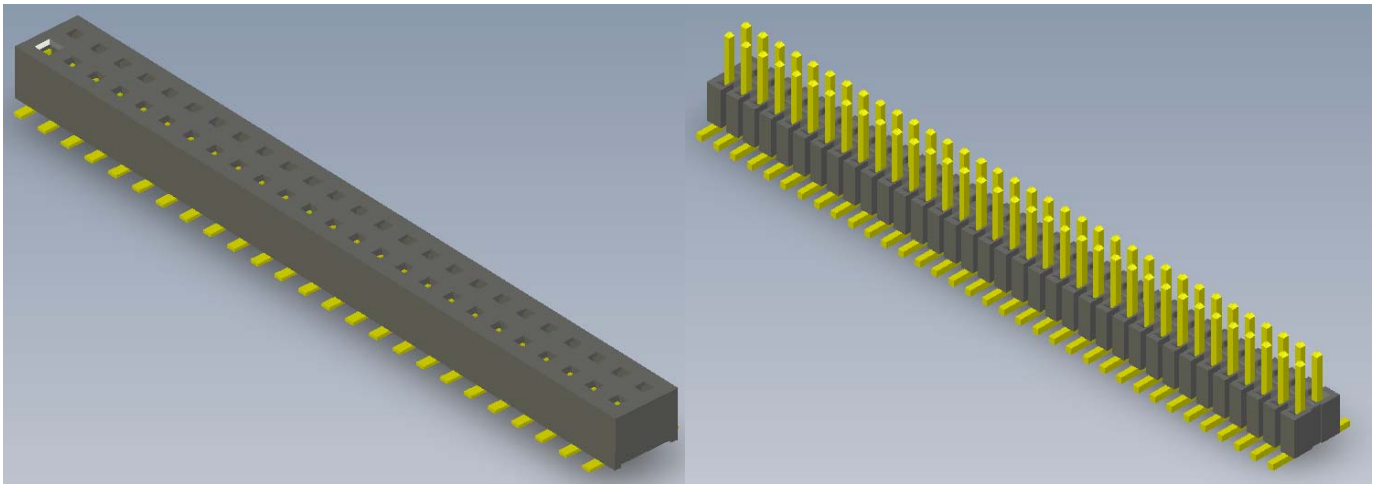
| | | | |
|---|---|---|---|
| Project Number: | Tracking Code: TC095-CLP-2209 | | |
| Requested by: Bryon Saylor | Date: 3/2/2011 | Product Rev: BT | |
| Part #: CLP-125-02-S-D-A/FTSH-125-02-S-DV-A | Lot #: 1/8/09 | Tech: Rodney Riley & Gary Lomax | Eng: Troy Cook |
| Part description: CLP | | | Qty to test: 40 |
| Test Start: 01/27/2009 | Test Completed: 3/31/2009 | | |



**EXTENDED LIFE PRODUCTS TEST REPORT**

**PART DESCRIPTION**

**CLP-125-02-S-D-A/FTSH-125-02-S-DV-A**

## 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: Test to current ELP test plan for 100 & 250 cycles.

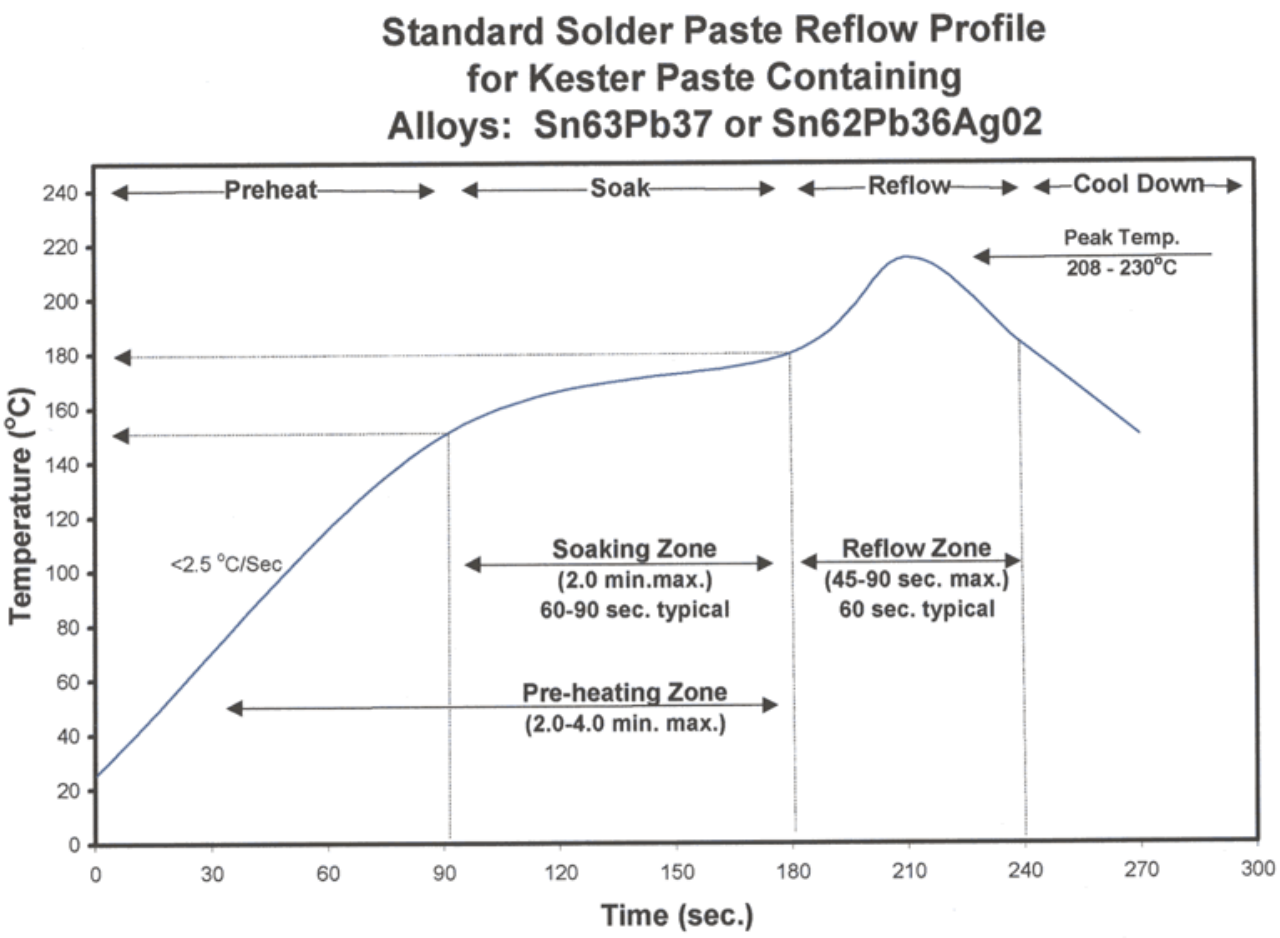
### APPLICABLE DOCUMENTS

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) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-100563-TST-XX

**TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)**



# FLOWCHARTS

## Durability

| TEST STEP | GROUP A<br>220 Points - 9 Samples<br>100 Cycles | GROUP A<br>220 Points - 9 Samples<br>250 Cycles |
| --- | --- | --- |
| 01 | LLCR-1 | LLCR-1 |
| 02 | 100 Cycles | 250 Cycles |
| 03 | LLCR-2 | LLCR-2 |
| 04 | Data Review | Data Review |
| 05 | Thermals | Thermals |
| 06 | LLCR-3 | LLCR-3 |
| 07 | Data Review | Data Review |
| 08 | Humidity | Humidity |
| 09 | LLCR-4 | LLCR-4 |

**LLCR = EIA-364-23, LLCR**
**use Keithley 580 in the dry circuit mode, 10 mA Max**
**Cycling Rate = 500 +/- 50 per hour**
**Pass Criteria for LLCR = Less than 15 m-Ohm change in resistance.**
**Thermal Aging = EIA-364-17, Test Condition 4, 105 deg C;**
**Time Condition 'B' (250 hours)**
**Humidity =EIA-364-31, Test Condition B (240 Hours)**
**and Method III (+25 ° C to +65 ° C @ 90%RH to 98% RH)**
**ambient pre-condition and delete steps 7a and 7b**

## ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

### THERMAL:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition 4 at 105° C.
3) Test Time Condition B for 250 hours.
4) All test samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

### HUMIDITY:

1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors.*
2) Test Condition B, 240 Hours.
3) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
4) All samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

### LLCR:

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- Stable
    b. +5.1 to +10.0 mOhms:---------- Minor
    c. +10.1 to +15.0 mOhms: ---------- Acceptable
    d. +15.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure

## RESULTS

**LLCR Durability (220 LLCR test points)**

- **Initial ---------- 12.0 mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 219 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 202 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 17 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 1 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ---------- 219 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 1 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

**LLCR Durability (220 LLCR test points)**

- **Initial ---------- 12.5 mOhms Max**
- **Durability, 250 Cycles**
  - **<= +5.0 mOhms ---------- 220 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 220 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ---------- 220 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

## DATA SUMMARIES

### LLCR:

1) A total of 220 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

| Date | Feb. 05 2009 | Feb. 05 2009 | Feb. 17 2009 | Feb. 27 2009 |
|---|---|---|---|---|
| Room Temp C | 20 | 23 | 24 | 23 |
| RH | 23% | 23% | 24% | 31% |
| Name | Lomax | Marshall | Marshall | RILEY |
| **mOhm values** | **Actual Initial** | **Delta 100 Cycles** | **Delta Thermal** | **Delta Humidity** |
| Average | 8.3 | -1.2 | 1.1 | -1.0 |
| St. Dev. | 0.8 | 0.8 | 2.3 | 0.8 |
| Min | 7.2 | -5.1 | -4.3 | -5.1 |
| Max | 12.0 | 0.4 | 11.2 | 1.0 |
| Count | 220 | 220 | 220 | 220 |

| Date | Feb. 05 2009 | Feb. 06 2009 | Feb. 24 2009 | Mar. 11 2009 |
|---|---|---|---|---|
| Room Temp C | 21 | 23 | 25 | 25 |
| RH | 21% | 21% | 20% | 34% |
| Name | Lomax | Marshall | RILEY | Lomax |
| **mOhm values** | **Actual Initial** | **Delta 250 Cycles** | **Delta Thermal** | **Delta Humidity** |
| Average | 8.3 | -1.1 | -0.2 | -1.0 |
| St. Dev. | 1.0 | 0.9 | 1.1 | 1.0 |
| Min | 6.5 | -4.8 | -4.4 | -4.9 |
| Max | 12.5 | 0.2 | 3.1 | 0.5 |
| Count | 220 | 220 | 220 | 220 |

# DATA

## LLCR:

| | mOhm values | Actual | Delta | Delta | Delta |
|---|---|---|---|---|---|
| Board | Position | Initial | 100 Cycles | Thermal | Humidity |
| 1 | P1 | 9.6 | -2.5 | -1.9 | -2.0 |
| 1 | P2 | 8.3 | -1.1 | -0.7 | -0.9 |
| 1 | P3 | 8.5 | -1.0 | -1.0 | -1.2 |
| 1 | P4 | 11.9 | -4.9 | -4.3 | -4.5 |
| 1 | P5 | 8.8 | -2.0 | -0.9 | -1.2 |
| 1 | P9 | 7.6 | 0.4 | 0.0 | -0.1 |
| 1 | P10 | 7.8 | 0.2 | -0.5 | -0.6 |
| 1 | P11 | 8.2 | -1.0 | -0.6 | -0.6 |
| 1 | P12 | 8.3 | -0.8 | -0.9 | -1.0 |
| 1 | P13 | 7.6 | -0.3 | -0.4 | -0.6 |
| 1 | P14 | 7.5 | -0.7 | 0.0 | 0.0 |
| 1 | P15 | 8.0 | -1.0 | -0.9 | -0.9 |
| 1 | P16 | 7.7 | -0.7 | -0.6 | -0.6 |
| 1 | P17 | 8.7 | -0.9 | -0.7 | -1.0 |
| 1 | P18 | 7.6 | -0.6 | -0.4 | -0.6 |
| 1 | P19 | 8.5 | -1.2 | -0.9 | -1.0 |
| 1 | P20 | 8.3 | -1.3 | -0.5 | -0.7 |
| 1 | P21 | 7.7 | -0.6 | 0.0 | 0.0 |
| 1 | P22 | 8.3 | -1.3 | 0.3 | 0.0 |
| 1 | P23 | 8.0 | -1.2 | 2.0 | 0.4 |
| 1 | P24 | 7.9 | -0.8 | 2.3 | 1.0 |
| 1 | P25 | 7.8 | -0.3 | -0.5 | -0.5 |
| 2 | P1 | 7.8 | -0.6 | -0.5 | -0.8 |
| 2 | P2 | 7.9 | -1.0 | 3.0 | -0.5 |
| 2 | P3 | 11.1 | -4.2 | -1.7 | -4.0 |
| 2 | P4 | 8.5 | -1.6 | -1.0 | -1.5 |
| 2 | P5 | 7.9 | -1.1 | 0.3 | -0.3 |
| 2 | P9 | 9.0 | -2.1 | -2.2 | -2.3 |
| 2 | P10 | 7.5 | -0.6 | -0.4 | -0.4 |
| 2 | P11 | 7.5 | -0.7 | 0.1 | -0.5 |
| 2 | P12 | 7.9 | -1.1 | -0.4 | -0.9 |
| 2 | P13 | 8.7 | -1.8 | -0.9 | -1.6 |
| 2 | P14 | 7.8 | -1.3 | 0.1 | -0.6 |
| 2 | P15 | 8.9 | -2.1 | -1.4 | -1.4 |
| 2 | P16 | 7.9 | -1.5 | -0.3 | -0.7 |
| 2 | P17 | 8.2 | -1.4 | 5.3 | 0.4 |
| 2 | P18 | 8.1 | -1.5 | -0.7 | -0.9 |
| 2 | P19 | 7.5 | -1.0 | -0.6 | -0.7 |
| 2 | P20 | 8.0 | -0.8 | -0.2 | -0.4 |
| 2 | P21 | 8.1 | -1.2 | -0.4 | -0.3 |
| 2 | P22 | 8.5 | -1.8 | -0.3 | -0.8 |
| 2 | P23 | 7.8 | -0.8 | -0.2 | -0.3 |

| | | | | | |
|---|---|---|---|---|---|
| 2 | P24 | 8.4 | -1.5 | -0.5 | -1.1 |
| 2 | P25 | 8.5 | -1.5 | -0.9 | -1.0 |
| 3 | P1 | 7.5 | -0.5 | -0.5 | -0.7 |
| 3 | P2 | 8.7 | -1.4 | 0.7 | -1.5 |
| 3 | P3 | 8.0 | -0.7 | 0.0 | -0.9 |
| 3 | P4 | 8.4 | -1.3 | 0.1 | -1.4 |
| 3 | P5 | 7.7 | -0.7 | 1.4 | -0.9 |
| 3 | P9 | 8.6 | -1.0 | -0.5 | -1.3 |
| 3 | P10 | 9.0 | -1.6 | -0.5 | -1.9 |
| 3 | P11 | 8.9 | -1.5 | 0.5 | -1.9 |
| 3 | P12 | 10.7 | -3.6 | 1.3 | -3.3 |
| 3 | P13 | 8.7 | -1.9 | 0.7 | -1.9 |
| 3 | P14 | 8.3 | -1.5 | -0.6 | -1.5 |
| 3 | P15 | 8.0 | -1.4 | 1.5 | -1.2 |
| 3 | P16 | 8.4 | -1.6 | 0.6 | -1.2 |
| 3 | P17 | 8.5 | -1.8 | -0.9 | -1.7 |
| 3 | P18 | 8.5 | -1.7 | 0.0 | -1.2 |
| 3 | P19 | 11.0 | -3.7 | -2.2 | -3.3 |
| 3 | P20 | 9.1 | -1.5 | -0.9 | -1.4 |
| 3 | P21 | 8.1 | -0.9 | 0.3 | -1.2 |
| 3 | P22 | 8.8 | -1.3 | 3.5 | -1.5 |
| 3 | P23 | 8.1 | -0.9 | 3.6 | -0.8 |
| 3 | P24 | 8.7 | -1.2 | 3.6 | -1.3 |
| 3 | P25 | 8.3 | -0.7 | -0.7 | -0.9 |
| 4 | P1 | 7.4 | -0.5 | 0.2 | -0.4 |
| 4 | P2 | 7.8 | -0.5 | 1.0 | -0.6 |
| 4 | P3 | 8.3 | -1.3 | 6.2 | -1.2 |
| 4 | P4 | 7.4 | -0.6 | 0.9 | -0.7 |
| 4 | P5 | 7.5 | -0.7 | 1.7 | -0.8 |
| 4 | P9 | 7.8 | -0.5 | -0.1 | -0.5 |
| 4 | P10 | 7.8 | -0.7 | -0.4 | -0.6 |
| 4 | P11 | 7.8 | -0.8 | 0.5 | -0.7 |
| 4 | P12 | 7.9 | -0.7 | 1.0 | -0.8 |
| 4 | P13 | 7.8 | -0.3 | 0.7 | -0.6 |
| 4 | P14 | 7.8 | -0.7 | 1.7 | -1.0 |
| 4 | P15 | 7.6 | -0.3 | 3.0 | -0.5 |
| 4 | P16 | 7.8 | -0.6 | 0.4 | -0.9 |
| 4 | P17 | 7.9 | -0.7 | 0.6 | -0.9 |
| 4 | P18 | 7.6 | -0.6 | 1.1 | -0.5 |
| 4 | P19 | 8.5 | -1.3 | 1.6 | -1.1 |
| 4 | P20 | 7.7 | -0.4 | 0.7 | -0.5 |
| 4 | P21 | 7.7 | -0.6 | 0.6 | -0.7 |
| 4 | P22 | 7.4 | -0.4 | 0.6 | -0.3 |
| 4 | P23 | 7.3 | -0.5 | 0.9 | -0.4 |
| 4 | P24 | 7.6 | -0.8 | 0.9 | -0.5 |
| 4 | P25 | 7.6 | -0.2 | 0.3 | -0.2 |
| 5 | P1 | 7.4 | -0.4 | 0.7 | -0.4 |
| 5 | P2 | 7.2 | -0.6 | 0.8 | -0.2 |
| 5 | P3 | 7.7 | -0.8 | 1.8 | -0.8 |

| | | | | | |
| --- | --- | --- | --- | --- | --- |
| 5 | P4 | 7.8 | -1.2 | 1.7 | -0.9 |
| 5 | P5 | 7.2 | -0.5 | 0.2 | -0.5 |
| 5 | P9 | 8.5 | -0.6 | -0.6 | -1.0 |
| 5 | P10 | 9.1 | -1.7 | 6.9 | -1.0 |
| 5 | P11 | 9.3 | -1.8 | 0.3 | -1.7 |
| 5 | P12 | 8.0 | -0.7 | 1.7 | -0.7 |
| 5 | P13 | 8.7 | -1.2 | 5.2 | -0.8 |
| 5 | P14 | 9.9 | -2.2 | -0.5 | -2.2 |
| 5 | P15 | 9.3 | -1.9 | 1.2 | -1.6 |
| 5 | P16 | 7.8 | -0.5 | 1.4 | -0.1 |
| 5 | P17 | 8.2 | -0.8 | 1.5 | -0.6 |
| 5 | P18 | 9.6 | -2.3 | 6.4 | -1.9 |
| 5 | P19 | 8.3 | -1.0 | 2.0 | -0.6 |
| 5 | P20 | 8.6 | -1.2 | 3.8 | -0.8 |
| 5 | P21 | 7.5 | -1.0 | 6.7 | -0.5 |
| 5 | P22 | 7.8 | -1.1 | 7.5 | -0.5 |
| 5 | P23 | 7.6 | -0.9 | 2.7 | -0.7 |
| 5 | P24 | 7.6 | -0.6 | 5.7 | -0.4 |
| 5 | P25 | 8.6 | -1.4 | 1.7 | -0.6 |
| 6 | P1 | 7.9 | -0.7 | -0.3 | -0.7 |
| 6 | P2 | 7.9 | -0.7 | 0.6 | -0.6 |
| 6 | P3 | 7.9 | -0.7 | 0.2 | -0.7 |
| 6 | P4 | 8.6 | -0.9 | 0.6 | -0.9 |
| 6 | P5 | 8.1 | -0.5 | 1.4 | -0.6 |
| 6 | P9 | 8.5 | -1.2 | -0.7 | -1.4 |
| 6 | P10 | 8.6 | -1.2 | 0.1 | -1.2 |
| 6 | P11 | 9.3 | -1.5 | 2.8 | -2.1 |
| 6 | P12 | 9.2 | -2.0 | 1.0 | -1.9 |
| 6 | P13 | 8.7 | -1.7 | 0.0 | -1.8 |
| 6 | P14 | 8.5 | -1.1 | 9.1 | -1.0 |
| 6 | P15 | 8.1 | -1.2 | 4.4 | -0.9 |
| 6 | P16 | 8.9 | -1.6 | 6.3 | -0.6 |
| 6 | P17 | 8.1 | -1.2 | 0.1 | -1.1 |
| 6 | P18 | 8.9 | -1.8 | 4.8 | -1.2 |
| 6 | P19 | 7.9 | -1.0 | 0.9 | -0.4 |
| 6 | P20 | 8.0 | -1.1 | -0.6 | -1.0 |
| 6 | P21 | 8.4 | -1.3 | 0.4 | -1.1 |
| 6 | P22 | 8.0 | -1.0 | -0.4 | -1.2 |
| 6 | P23 | 8.2 | -0.8 | 0.5 | -0.9 |
| 6 | P24 | 9.2 | -1.9 | 1.4 | -2.0 |
| 6 | P25 | 7.7 | -0.7 | -0.5 | -0.4 |
| 7 | P1 | 7.4 | -0.7 | 1.6 | -0.2 |
| 7 | P2 | 7.5 | -0.6 | 7.1 | -0.2 |
| 7 | P3 | 8.0 | -1.2 | 0.4 | -0.9 |
| 7 | P4 | 7.6 | -0.9 | 0.7 | -0.8 |
| 7 | P5 | 7.6 | -0.7 | 2.0 | -0.5 |
| 7 | P9 | 8.1 | -0.8 | 0.5 | -0.1 |
| 7 | P10 | 9.0 | -1.6 | 1.1 | -0.9 |
| 7 | P11 | 8.1 | -0.7 | 1.1 | -0.6 |

| | | | | | |
|---|---|---|---|---|---|
| 7 | P12 | 8.0 | -0.6 | 2.2 | -0.3 |
| 7 | P13 | 8.1 | -0.7 | 2.9 | -0.5 |
| 7 | P14 | 7.9 | -0.6 | 4.5 | -0.5 |
| 7 | P15 | 8.2 | -1.0 | 0.3 | -0.8 |
| 7 | P16 | 8.2 | -1.3 | -0.2 | -1.0 |
| 7 | P17 | 7.8 | -0.7 | 0.1 | -0.4 |
| 7 | P18 | 8.2 | -0.9 | -0.1 | -0.7 |
| 7 | P19 | 8.5 | -1.5 | -0.3 | -1.2 |
| 7 | P20 | 8.6 | -1.2 | -0.7 | -1.1 |
| 7 | P21 | 8.2 | -1.6 | 0.5 | -1.1 |
| 7 | P22 | 7.4 | -0.8 | 0.5 | -0.5 |
| 7 | P23 | 7.9 | -0.8 | -0.4 | -0.6 |
| 7 | P24 | 7.4 | -0.5 | 3.0 | -0.4 |
| 7 | P25 | 8.7 | -1.3 | -0.8 | -1.3 |
| 8 | P1 | 11.5 | -4.6 | -3.3 | -4.0 |
| 8 | P2 | 8.5 | -1.1 | -1.0 | -0.8 |
| 8 | P3 | 8.3 | -1.3 | -1.2 | -1.2 |
| 8 | P4 | 7.6 | -1.2 | -0.3 | -0.8 |
| 8 | P5 | 8.2 | -1.5 | -0.4 | -1.2 |
| 8 | P9 | 8.0 | -0.6 | -0.1 | -0.4 |
| 8 | P10 | 8.7 | -1.1 | -0.5 | -1.1 |
| 8 | P11 | 8.7 | -1.3 | 3.7 | -0.6 |
| 8 | P12 | 7.8 | -0.9 | 1.9 | -0.7 |
| 8 | P13 | 8.0 | -0.8 | 3.6 | -0.4 |
| 8 | P14 | 11.1 | -3.8 | 8.0 | -3.9 |
| 8 | P15 | 7.8 | -0.7 | 3.8 | -0.5 |
| 8 | P16 | 8.2 | -0.9 | 1.6 | -0.7 |
| 8 | P17 | 7.9 | -0.6 | 11.2 | -0.3 |
| 8 | P18 | 9.0 | -1.2 | 9.8 | -1.6 |
| 8 | P19 | 8.2 | -0.2 | 6.6 | -0.4 |
| 8 | P20 | 7.9 | -0.3 | 1.7 | -0.6 |
| 8 | P21 | 9.2 | -2.5 | -1.4 | -2.5 |
| 8 | P22 | 12.0 | -5.1 | -1.4 | -5.1 |
| 8 | P23 | 9.5 | -2.5 | 4.7 | -2.6 |
| 8 | P24 | 9.0 | -1.9 | 6.0 | -1.8 |
| 8 | P25 | 8.7 | -0.8 | 0.9 | -1.3 |
| 9 | P1 | 7.6 | -0.5 | -0.2 | -0.4 |
| 9 | P2 | 9.0 | -1.4 | 1.5 | -1.3 |
| 9 | P3 | 8.3 | -0.8 | 2.5 | -0.4 |
| 9 | P4 | 8.3 | -1.1 | -0.7 | -1.3 |
| 9 | P5 | 10.3 | -3.0 | -2.4 | -3.2 |
| 9 | P9 | 8.0 | -0.7 | -0.6 | -0.6 |
| 9 | P10 | 8.6 | -1.4 | -0.5 | -1.2 |
| 9 | P11 | 8.1 | -0.9 | 0.3 | -0.7 |
| 9 | P12 | 8.5 | -1.2 | 0.1 | -1.3 |
| 9 | P13 | 8.5 | -1.4 | 0.6 | -1.3 |
| 9 | P14 | 7.7 | -1.2 | 0.0 | -1.1 |
| 9 | P15 | 8.5 | -1.2 | 2.0 | -1.3 |
| 9 | P16 | 8.8 | -2.2 | -0.6 | -2.0 |

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|---|---|---|---|---|---|
| 9 | P17 | 7.7 | -1.0 | 0.6 | -0.9 |
| 9 | P18 | 7.9 | -1.2 | 0.3 | -0.9 |
| 9 | P19 | 8.7 | -2.0 | 2.3 | -1.9 |
| 9 | P20 | 8.5 | -1.6 | 1.6 | -1.3 |
| 9 | P21 | 8.2 | -0.9 | 0.5 | -1.0 |
| 9 | P22 | 7.8 | -0.6 | 0.8 | -0.5 |
| 9 | P23 | 9.0 | -1.8 | 2.2 | -1.8 |
| 9 | P24 | 7.9 | -0.5 | 3.7 | -0.7 |
| 9 | P25 | 8.1 | -1.0 | -0.2 | -0.9 |
| 10 | P1 | 7.7 | -0.6 | 2.5 | -0.4 |
| 10 | P2 | 8.1 | -0.9 | 2.9 | -0.5 |
| 10 | P3 | 9.1 | -1.5 | 9.4 | -1.8 |
| 10 | P4 | 7.7 | -0.6 | 2.7 | -0.5 |
| 10 | P5 | 7.3 | -0.5 | 3.6 | -0.3 |
| 10 | P9 | 7.8 | -0.4 | 1.8 | 0.2 |
| 10 | P10 | 8.4 | -0.6 | 0.5 | -0.9 |
| 10 | P11 | 7.6 | -0.7 | 1.0 | -0.4 |
| 10 | P12 | 7.6 | -0.3 | 1.7 | -0.4 |
| 10 | P13 | 7.6 | -0.5 | 0.7 | -0.1 |
| 10 | P14 | 7.5 | -0.6 | 1.3 | -0.3 |
| 10 | P15 | 8.0 | -1.1 | 0.5 | -0.8 |
| 10 | P16 | 8.3 | -1.2 | -0.4 | -0.8 |
| 10 | P17 | 8.8 | -1.7 | 6.3 | -1.2 |
| 10 | P18 | 7.8 | -0.8 | 0.3 | -0.7 |
| 10 | P19 | 7.8 | -0.7 | 0.1 | -0.4 |
| 10 | P20 | 8.2 | -1.3 | 0.9 | -0.4 |
| 10 | P21 | 8.3 | -1.2 | -0.1 | -0.8 |
| 10 | P22 | 8.8 | -1.6 | 1.1 | -1.0 |
| 10 | P23 | 8.5 | -1.6 | 1.1 | -1.2 |
| 10 | P24 | 8.1 | -0.8 | 1.2 | -0.3 |
| 10 | P25 | 7.6 | -0.4 | 0.3 | 0.1 |

| | **mOhm values** | **Actual** | **Delta** | **Delta** | **Delta** |
|---|---|---|---|---|---|
| **Board** | **Position** | **Initial** | **250 Cycles** | **Thermal** | **Humidity** |
| 1 | P1 | 7.3 | -0.2 | 0.3 | -0.3 |
| 1 | P2 | 7.4 | -0.2 | 0.5 | 0.0 |
| 1 | P3 | 7.3 | -0.3 | 2.4 | -0.2 |
| 1 | P4 | 7.2 | -0.3 | 1.5 | -0.3 |
| 1 | P5 | 7.7 | -0.8 | 1.9 | -0.1 |
| 1 | P9 | 7.7 | 0.0 | -0.4 | -0.5 |
| 1 | P10 | 8.2 | -0.6 | -0.8 | -0.8 |
| 1 | P11 | 8.1 | -0.6 | -0.2 | -0.4 |
| 1 | P12 | 7.9 | -0.2 | 0.7 | -0.4 |
| 1 | P13 | 8.2 | -0.7 | -0.2 | -0.9 |
| 1 | P14 | 8.1 | -0.9 | 0.1 | -0.6 |
| 1 | P15 | 8.5 | -0.8 | 0.4 | -0.5 |
| 1 | P16 | 8.0 | -0.9 | 0.1 | -0.5 |

| | | | | | |
|---|---|---|---|---|---|
| 1 | P17 | 8.0 | -0.5 | 1.0 | -0.4 |
| 1 | P18 | 8.2 | -0.4 | 0.1 | -0.6 |
| 1 | P19 | 8.3 | -0.8 | 0.3 | -0.9 |
| 1 | P20 | 8.5 | -0.5 | 0.2 | -0.5 |
| 1 | P21 | 8.8 | -2.0 | -1.2 | -1.6 |
| 1 | P22 | 8.3 | -1.5 | -0.4 | -1.3 |
| 1 | P23 | 8.6 | -1.3 | -0.8 | -1.2 |
| 1 | P24 | 7.8 | -0.9 | 0.2 | -0.5 |
| 1 | P25 | 8.0 | -0.1 | 1.1 | -0.4 |
| 2 | P1 | 8.1 | -0.7 | -0.2 | -0.8 |
| 2 | P2 | 8.5 | -1.5 | -0.5 | -1.6 |
| 2 | P3 | 10.4 | -3.4 | -2.8 | -3.5 |
| 2 | P4 | 8.9 | -1.6 | -0.1 | -1.7 |
| 2 | P5 | 11.6 | -4.6 | -3.5 | -4.6 |
| 2 | P9 | 7.7 | -0.7 | -0.3 | -0.5 |
| 2 | P10 | 7.8 | -0.7 | -0.1 | -0.6 |
| 2 | P11 | 7.8 | -1.1 | -0.3 | -0.9 |
| 2 | P12 | 7.8 | -0.8 | -0.1 | -1.0 |
| 2 | P13 | 7.5 | -0.6 | 0.8 | -0.7 |
| 2 | P14 | 11.0 | -4.2 | -3.3 | -4.2 |
| 2 | P15 | 11.0 | -4.3 | -3.4 | -4.3 |
| 2 | P16 | 11.5 | -4.8 | -3.3 | -4.6 |
| 2 | P17 | 9.3 | -2.6 | -1.4 | -2.2 |
| 2 | P18 | 7.9 | -1.3 | 0.1 | -1.1 |
| 2 | P19 | 8.0 | -1.3 | 1.5 | -0.6 |
| 2 | P20 | 7.7 | -0.8 | 1.1 | 0.5 |
| 2 | P21 | 8.3 | -1.0 | -0.6 | -1.0 |
| 2 | P22 | 8.5 | -1.0 | -0.1 | -0.7 |
| 2 | P23 | 8.8 | -1.4 | -1.1 | -1.3 |
| 2 | P24 | 9.9 | -2.8 | -2.1 | -2.1 |
| 2 | P25 | 7.6 | -0.5 | 0.7 | 0.2 |
| 3 | P1 | 7.4 | -0.5 | 0.2 | -0.4 |
| 3 | P2 | 7.1 | -0.2 | 0.4 | -0.4 |
| 3 | P3 | 7.1 | -0.5 | 0.3 | -0.5 |
| 3 | P4 | 7.3 | 0.0 | 0.0 | -0.4 |
| 3 | P5 | 7.2 | -0.4 | -0.2 | -0.6 |
| 3 | P9 | 7.4 | -0.2 | 0.4 | -0.5 |
| 3 | P10 | 8.2 | -0.6 | -0.2 | -0.6 |
| 3 | P11 | 7.9 | -0.7 | 0.1 | -0.4 |
| 3 | P12 | 8.1 | -0.6 | 0.3 | -0.8 |
| 3 | P13 | 7.8 | -0.6 | 0.0 | -0.7 |
| 3 | P14 | 8.3 | -1.3 | 0.0 | -0.9 |
| 3 | P15 | 9.2 | -2.2 | -1.5 | -2.2 |
| 3 | P16 | 8.0 | -1.0 | 0.4 | -0.7 |
| 3 | P17 | 8.1 | -0.7 | 0.7 | -0.4 |
| 3 | P18 | 7.7 | -0.7 | -0.1 | -0.2 |
| 3 | P19 | 11.1 | -3.9 | -1.7 | -3.0 |
| 3 | P20 | 7.6 | -0.2 | 0.9 | 0.2 |
| 3 | P21 | 7.7 | -1.2 | -0.8 | -1.1 |

| | | | | | |
|---|---|---|---|---|---|
| 3 | P22 | 7.4 | -0.9 | -0.2 | -0.7 |
| 3 | P23 | 7.6 | -1.0 | -0.5 | -0.6 |
| 3 | P24 | 7.8 | -1.1 | -0.7 | -0.8 |
| 3 | P25 | 7.9 | -0.2 | 0.2 | -0.3 |
| 4 | P1 | 7.6 | -0.7 | -0.3 | -0.1 |
| 4 | P2 | 8.7 | -1.3 | 0.7 | -1.4 |
| 4 | P3 | 8.7 | -1.4 | -1.3 | -2.1 |
| 4 | P4 | 7.6 | -0.7 | -0.1 | -1.0 |
| 4 | P5 | 7.6 | -0.4 | -0.2 | -0.9 |
| 4 | P9 | 8.0 | -0.5 | -0.2 | -0.5 |
| 4 | P10 | 8.0 | -0.4 | -0.2 | -0.9 |
| 4 | P11 | 7.9 | -0.8 | 0.6 | -0.7 |
| 4 | P12 | 8.1 | -1.3 | -0.5 | -1.3 |
| 4 | P13 | 8.2 | -1.1 | -0.1 | -1.1 |
| 4 | P14 | 7.8 | -0.8 | 0.3 | -0.9 |
| 4 | P15 | 7.7 | -0.8 | -0.3 | -1.0 |
| 4 | P16 | 8.0 | -1.2 | -0.3 | -1.1 |
| 4 | P17 | 7.9 | -0.5 | 0.5 | -0.6 |
| 4 | P18 | 8.4 | -1.0 | 0.9 | -0.9 |
| 4 | P19 | 7.8 | -0.7 | 0.2 | -0.5 |
| 4 | P20 | 8.0 | -0.7 | 0.2 | -0.3 |
| 4 | P21 | 7.8 | -0.6 | 0.4 | -0.5 |
| 4 | P22 | 7.7 | -1.0 | 0.6 | -0.3 |
| 4 | P23 | 10.0 | -2.2 | 1.1 | -0.2 |
| 4 | P24 | 8.3 | -1.4 | -1.4 | -1.6 |
| 4 | P25 | 7.7 | -0.3 | -0.2 | -0.4 |
| 5 | P1 | 7.7 | -0.3 | 0.5 | -0.4 |
| 5 | P2 | 8.2 | -1.0 | 1.9 | -0.6 |
| 5 | P3 | 8.4 | -1.1 | 0.0 | -1.3 |
| 5 | P4 | 8.5 | -1.4 | -0.8 | -1.4 |
| 5 | P5 | 8.6 | -1.6 | -0.7 | -1.5 |
| 5 | P9 | 7.9 | -0.9 | 0.8 | -0.5 |
| 5 | P10 | 8.4 | -1.2 | 1.5 | -0.9 |
| 5 | P11 | 8.7 | -1.0 | 1.8 | -1.1 |
| 5 | P12 | 8.3 | -1.2 | -0.5 | -1.2 |
| 5 | P13 | 8.2 | -1.1 | 0.3 | -1.0 |
| 5 | P14 | 9.0 | -1.9 | -0.8 | -2.1 |
| 5 | P15 | 10.6 | -3.2 | -2.0 | -3.5 |
| 5 | P16 | 9.6 | -2.4 | -1.5 | -2.4 |
| 5 | P17 | 10.1 | -3.1 | -2.1 | -3.1 |
| 5 | P18 | 11.1 | -4.2 | -1.5 | -4.1 |
| 5 | P19 | 8.8 | -1.9 | -0.8 | -1.2 |
| 5 | P20 | 8.5 | -1.1 | 0.0 | -0.4 |
| 5 | P21 | 8.7 | -1.4 | -0.2 | -1.5 |
| 5 | P22 | 9.4 | -2.0 | -1.4 | -1.8 |
| 5 | P23 | 8.6 | -1.2 | -0.6 | -1.0 |
| 5 | P24 | 8.6 | -1.2 | -0.9 | -0.6 |
| 5 | P25 | 8.1 | -0.6 | -0.4 | -0.2 |
| 6 | P1 | 6.9 | -0.3 | 0.8 | -0.2 |

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|---|---|---|---|---|---|
| 6 | P2 | 9.9 | -2.9 | -1.9 | -2.7 |
| 6 | P3 | 8.5 | -1.6 | 0.7 | -1.1 |
| 6 | P4 | 7.4 | -0.7 | 0.2 | -0.7 |
| 6 | P5 | 8.3 | -1.6 | 0.6 | -1.5 |
| 6 | P9 | 6.5 | 0.0 | 0.4 | 0.0 |
| 6 | P10 | 7.7 | -0.5 | 2.1 | -0.1 |
| 6 | P11 | 7.7 | -0.6 | 0.5 | -0.6 |
| 6 | P12 | 8.0 | -1.1 | 0.4 | -0.9 |
| 6 | P13 | 11.3 | -3.3 | -2.4 | -3.8 |
| 6 | P14 | 7.7 | -0.6 | 1.8 | -0.5 |
| 6 | P15 | 7.6 | -0.5 | 0.4 | -0.5 |
| 6 | P16 | 8.7 | -1.3 | -0.3 | -1.2 |
| 6 | P17 | 7.6 | -0.5 | 0.5 | -0.6 |
| 6 | P18 | 9.7 | -1.8 | 3.1 | -1.1 |
| 6 | P19 | 11.9 | -3.8 | -2.4 | -4.1 |
| 6 | P20 | 7.8 | -0.5 | 1.3 | 0.1 |
| 6 | P21 | 11.7 | -4.7 | -4.4 | -4.8 |
| 6 | P22 | 9.4 | -2.6 | -2.1 | -2.6 |
| 6 | P23 | 8.5 | -1.4 | -1.0 | -1.3 |
| 6 | P24 | 8.0 | -1.3 | -0.8 | -1.2 |
| 6 | P25 | 9.1 | -1.2 | -0.4 | -1.7 |
| 7 | P1 | 7.7 | -0.1 | 0.9 | -0.5 |
| 7 | P2 | 7.9 | 0.0 | 0.4 | -0.7 |
| 7 | P3 | 8.4 | -0.5 | 0.6 | -0.1 |
| 7 | P4 | 8.2 | 0.2 | -0.1 | -0.9 |
| 7 | P5 | 8.0 | -0.7 | 0.1 | -1.4 |
| 7 | P9 | 8.6 | -0.9 | -0.6 | -1.0 |
| 7 | P10 | 9.9 | -2.1 | 0.0 | -1.9 |
| 7 | P11 | 8.0 | -1.0 | -0.4 | -1.0 |
| 7 | P12 | 8.3 | -1.2 | -0.8 | -1.4 |
| 7 | P13 | 8.2 | -1.4 | -0.6 | -1.1 |
| 7 | P14 | 7.9 | -1.2 | -0.6 | -0.7 |
| 7 | P15 | 8.1 | -1.5 | -1.0 | -1.8 |
| 7 | P16 | 9.4 | -2.6 | -1.9 | -2.2 |
| 7 | P17 | 12.5 | -4.7 | -4.1 | -4.9 |
| 7 | P18 | 7.9 | -1.1 | 0.0 | -0.7 |
| 7 | P19 | 7.7 | -0.8 | -0.3 | -0.6 |
| 7 | P20 | 7.7 | -0.7 | 0.3 | 0.2 |
| 7 | P21 | 8.7 | -1.1 | -0.1 | -1.1 |
| 7 | P22 | 8.7 | -1.5 | -0.6 | -1.2 |
| 7 | P23 | 8.5 | -1.5 | 0.0 | -0.5 |
| 7 | P24 | 9.4 | -1.3 | -1.3 | -1.7 |
| 7 | P25 | 7.8 | -0.6 | 0.6 | 0.4 |
| 8 | P1 | 7.7 | -0.8 | -0.4 | -0.8 |
| 8 | P2 | 7.8 | -0.8 | -0.6 | -0.7 |
| 8 | P3 | 8.4 | -1.3 | -0.3 | -1.5 |
| 8 | P4 | 8.0 | -1.1 | -0.7 | -1.1 |
| 8 | P5 | 8.0 | -1.0 | -0.1 | -0.9 |
| 8 | P9 | 7.7 | -0.7 | -0.3 | -0.2 |

| | | | | | |
| --- | --- | --- | --- | --- | --- |
| 8 | P10 | 8.0 | -1.0 | -0.4 | -0.8 |
| 8 | P11 | 8.3 | -1.5 | -0.9 | -1.1 |
| 8 | P12 | 7.8 | -1.0 | -0.2 | -1.0 |
| 8 | P13 | 7.7 | -0.9 | 0.1 | -0.7 |
| 8 | P14 | 7.9 | -1.2 | -0.3 | -1.1 |
| 8 | P15 | 11.3 | -4.5 | -3.5 | -4.5 |
| 8 | P16 | 7.9 | -1.2 | -0.5 | -0.9 |
| 8 | P17 | 7.8 | -1.0 | -0.6 | -0.9 |
| 8 | P18 | 7.6 | -0.4 | 0.2 | -0.2 |
| 8 | P19 | 7.6 | -0.7 | -0.2 | -0.4 |
| 8 | P20 | 7.5 | -0.5 | 0.2 | -0.2 |
| 8 | P21 | 7.8 | -0.7 | -0.4 | -0.5 |
| 8 | P22 | 8.9 | -1.4 | -1.1 | -1.1 |
| 8 | P23 | 7.8 | -1.0 | -0.6 | -0.5 |
| 8 | P24 | 7.9 | -0.6 | -0.4 | -0.4 |
| 8 | P25 | 7.6 | -0.2 | 0.2 | 0.1 |
| 9 | P1 | 7.7 | -0.5 | 0.1 | -0.4 |
| 9 | P2 | 7.6 | -0.5 | 0.4 | -0.7 |
| 9 | P3 | 7.5 | -0.7 | 0.7 | -0.6 |
| 9 | P4 | 7.7 | -0.9 | -0.2 | -1.1 |
| 9 | P5 | 7.8 | -0.8 | 0.1 | -0.9 |
| 9 | P9 | 7.6 | -0.8 | -0.2 | -0.7 |
| 9 | P10 | 7.6 | -1.1 | 0.2 | -1.0 |
| 9 | P11 | 7.6 | -0.8 | 0.2 | -0.7 |
| 9 | P12 | 7.8 | -1.0 | 0.5 | -1.0 |
| 9 | P13 | 7.9 | -1.0 | -0.1 | -1.2 |
| 9 | P14 | 7.4 | -0.6 | 0.3 | -0.6 |
| 9 | P15 | 7.7 | -0.9 | 0.1 | -0.5 |
| 9 | P16 | 7.3 | -0.5 | 0.2 | -0.6 |
| 9 | P17 | 7.4 | -0.4 | -0.2 | -0.4 |
| 9 | P18 | 7.8 | -1.1 | -0.5 | -0.7 |
| 9 | P19 | 7.6 | -0.7 | 0.4 | -0.5 |
| 9 | P20 | 8.2 | -1.2 | -0.4 | -0.6 |
| 9 | P21 | 8.0 | -1.0 | -0.6 | -1.1 |
| 9 | P22 | 8.2 | -1.4 | -0.7 | -1.3 |
| 9 | P23 | 8.5 | -1.5 | -1.3 | -1.4 |
| 9 | P24 | 7.9 | -1.0 | -0.7 | -1.0 |
| 9 | P25 | 7.6 | -0.7 | 0.2 | 0.1 |
| 10 | P1 | 8.1 | -0.8 | 2.4 | -0.2 |
| 10 | P2 | 7.7 | -0.6 | 0.5 | 0.1 |
| 10 | P3 | 8.9 | -1.9 | 1.0 | -1.9 |
| 10 | P4 | 8.0 | -1.1 | -0.1 | -1.2 |
| 10 | P5 | 7.7 | -1.0 | -0.1 | -0.9 |
| 10 | P9 | 8.0 | -0.4 | -0.3 | -0.6 |
| 10 | P10 | 7.8 | -0.7 | 0.1 | -0.8 |
| 10 | P11 | 7.7 | -0.6 | 0.6 | -0.3 |
| 10 | P12 | 8.2 | -1.0 | 1.4 | -0.8 |
| 10 | P13 | 7.8 | -0.7 | 0.4 | -0.5 |
| 10 | P14 | 7.7 | -0.8 | 0.3 | -0.6 |

| | | | | | |
|---|---|---|---|---|---|
| 10 | P15 | 7.9 | -0.8 | 0.3 | -0.8 |
| 10 | P16 | 7.7 | -0.5 | 0.2 | -0.7 |
| 10 | P17 | 7.8 | -0.8 | 0.8 | -0.5 |
| 10 | P18 | 7.9 | -0.6 | 0.4 | -0.4 |
| 10 | P19 | 7.5 | -0.5 | 1.5 | 0.2 |
| 10 | P20 | 8.1 | -0.7 | 0.2 | -0.1 |
| 10 | P21 | 7.9 | -0.5 | -0.1 | -0.6 |
| 10 | P22 | 7.7 | -0.9 | 0.2 | -0.4 |
| 10 | P23 | 8.4 | -1.0 | -0.4 | -0.7 |
| 10 | P24 | 8.2 | -1.2 | -0.1 | -0.7 |
| 10 | P25 | 9.4 | -2.1 | -0.8 | -1.1 |

## EQUIPMENT AND CALIBRATION SCHEDULES

**Equipment #:** MO-01
**Description:** Micro-Ohmeter
**Manufacturer:** Keithley
**Model:** 580
**Serial #:** 0772740
**Accuracy:** See Manual
… Last Cal: 06/17/08, Next Cal: 06/17/09

**Equipment #:** MO-03
**Description:** Multimeter /Data Acquisition System
**Manufacturer:** Keithley
**Model:** 2700
**Serial #:** 0791975
**Accuracy:** See Manual
… Last Cal: 06/17/08, Next Cal: 06/17/09

**Equipment #:** OV-03
**Description:** Cascade Tek Forced Air Oven
**Manufacturer:** Cascade Tek
**Model:** TFO-5
**Serial #:** 0500100
**Accuracy:** Temp. Stability: +/-.1C/C change in ambient
… Last Cal: 06/17/2009, Next Cal: 06/17/2010

**Equipment #:** MO-06
**Description:** Micro-Ohmeter
**Manufacturer:** Keithley
**Model:** 580
**Serial #:** 1110525
**Accuracy:** See Manual
… Last Cal: 06/17/2008, Next Cal: 06/17/2009

**Equipment #:** TCT-04
**Description:** Dillon Quantrol TC21 25-1000 mm/min series test stand
**Manufacturer:** Dillon Quantrol
**Model:** TC2 I series test stand
**Serial #:** 04-1041-04
**Accuracy:** Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;
… Last Cal: 5/6/2008, Next Cal: 5/6/2009

**Equipment #:** THC-04
**Description:** Temperature/Humidity Chamber
**Manufacturer:** Thermotron
**Model:** SM-8-3800
**Serial #:** 37782
**Accuracy:** See Manual
… Last Cal: 04/07/2009, Next Cal: 04/07/2010

**Equipment #:** MO-07
**Description:** Multimeter / Data Acquistion System
**Manufacturer:** Keithley
**Model:** 2700
**Serial #:** 1116559
**Accuracy:** See Manual See Manual
… Last Cal: 6/17/2008, Next Cal: 6/17/2009