



# Test Report: RSDH-300-24

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300W High Reliable 250~1500Vdc Ultra Wide Input  
DC-DC Converter

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Control Function Test

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

## ■ RELIABILITY TEST

ENVIRONMENT TEST

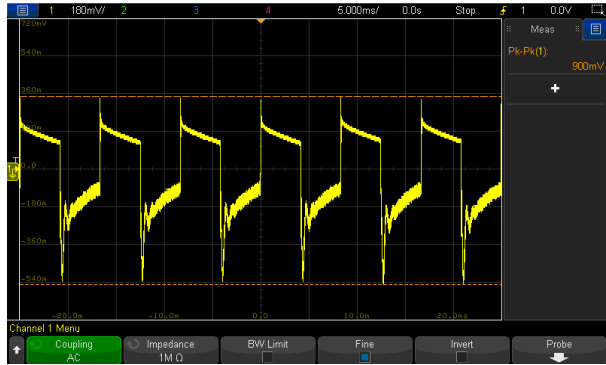
## DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

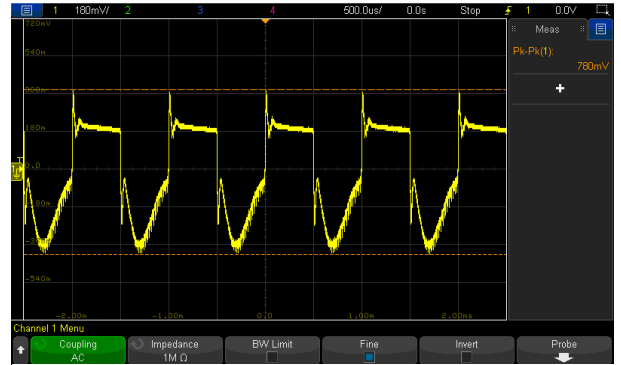
| NO | TEST ITEM                      | SPECIFICATION    | TEST CONDITION   | RESULT   |
|----|--------------------------------|------------------|--|--|
| 1  | OUTPUT VOLTAGE ADJUST RANGE    | CH1: 24V~29V     | I/P : 800 VDC<br>O/P : MIN LOAD<br>Ta : 25°C   | 22.849V~29.989V/800VDC   |
| 2  | OUTPUT VOLTAGE TOLERANCE (Max) | V1: -1.0%~ +1.0% | I/P: 1500VDC / 250 VDC<br>O/P:FULL/ MIN. LOAD<br>Ta:25°C   | V1: -0.18%~0.13%   |
| 3  | LINE REGULATION (Max)          | V1: -0.5%~+0.5 % | I/P: 1500VDC / 250 VDC<br>O/P:FULL LOAD<br>Ta:25°C   | V1: -0.16%~0.04 %  |
| 4  | LOAD REGULATION (Max)          | V1: -1.5%~+1.5 % | I/P: 800VDC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C   | V1: -0.18%~0.13%   |
| 5  | OVER/UNDERSHOOT TEST           | < ±5%            | I/P: 800 VDC<br>O/P:FULL LOAD<br>Ta:25°C   | TEST: 0.4 %  |
| 6  | RIPPLE & NOISE (Max)           | V1: 240mVp-p     | I/P: 800 VDC<br>O/P:FULL LOAD<br>Ta:25°C   | 72mVp-p  |
|    |                                | high frequency : | low frequency :  |  |
|    |                                |                  |  |  |
| 7  | DYNAMIC LOAD                   | V1: 2400mVp-p    | I/P: 800VDC<br>O/P:<br>(1)FULL /MIN LOAD 50%DUTY / 120HZ<br>(2)FULL /MIN LOAD 50%DUTY / 1KHZ<br>(3)FULL /MIN LOAD 50%DUTY / 500HZ<br>(4)FULL /MIN LOAD 50%DUTY / 3KHZ<br>(5)FULL /MIN LOAD 50%DUTY / 8KHZ<br>(6)FULL /MIN LOAD 50%DUTY / | (1) 900mVp-p<br>(2) 780mVp-p<br>(3) 730mVp-p<br>(4) 544mVp-p<br>(5) 737mVp-p<br>(6) 685mVp-p |

10KHZ  
Ta:25°C

FULL /50% LOAD 50%DUTY / 120HZ



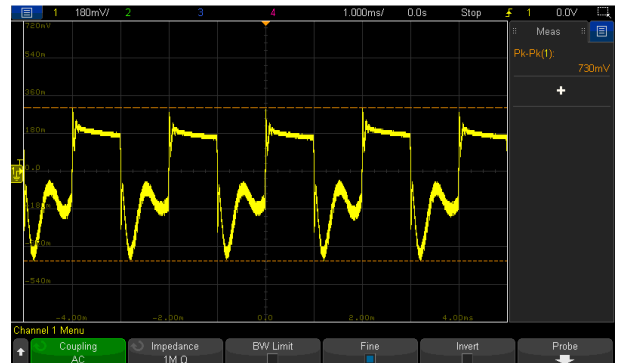
FULL /50% LOAD 50%DUTY / 1KHZ



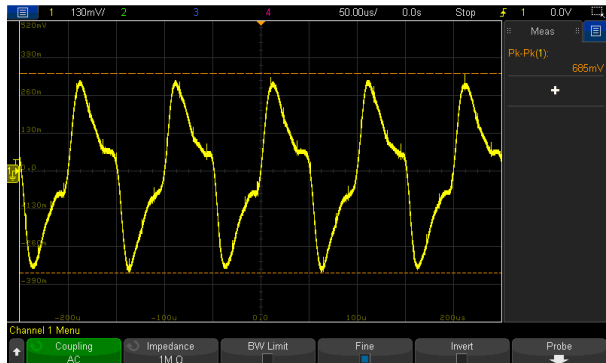
FULL /50% LOAD 50%DUTY / 3KHZ



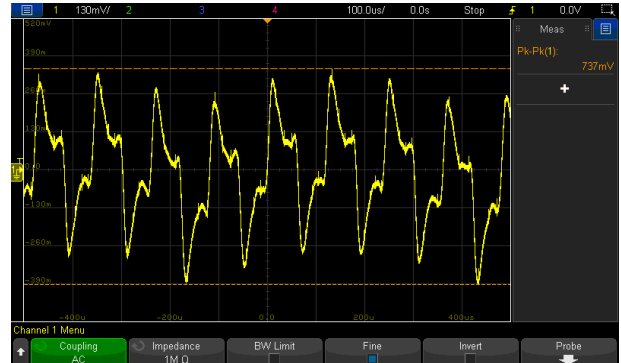
FULL /50% LOAD 50%DUTY / 500HZ



FULL /50% LOAD 50%DUTY / 10KHZ

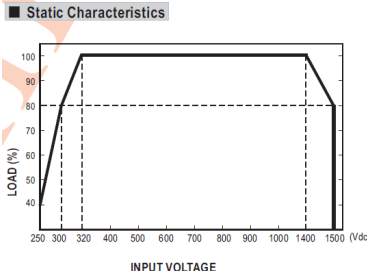


FULL /50% LOAD 50%DUTY / 8KHZ



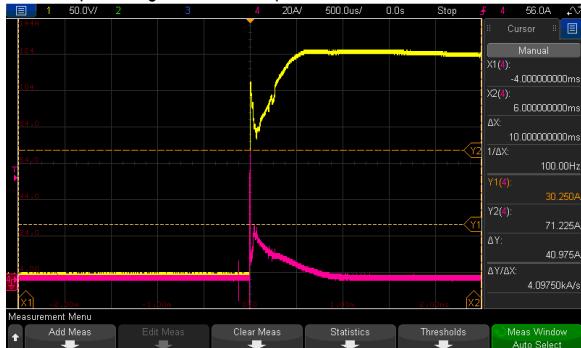
|   |                                |        |   |                 |
|---|--------------------------------|--------|---|-----------------|
| 8 | EXERNAL CAPACITANCE LOAD(Max.) | 5000uF | I/P : 800VDC<br>O/P : TESTING LOAD<br>Ta : 25°C | TEST: <u>OK</u> |
|---|--------------------------------|--------|---|-----------------|

## INPUT FUNCTION TEST

| NO | TEST ITEM           | SPECIFICATION   | TEST CONDITION  | RESULT  |
|----|---------------------|---|---|---|
| 1  | INPUT VOLTAGE RANGE | 250VDC~ 1500 VDC<br> | I/P: TESTING<br>O/P:FULL LOAD<br>Ta:25°C<br><br>I/P:<br>LOW-LINE-0.2= 249.8V<br>HIGH-LINE+3V= 1503V<br>O/P:FULL/MIN LOAD<br>(PLEASE CHECK DERATING CURVE)<br>ON: 30 Sec . OFF: 30 Sec 10MIN<br>( POWER ON/OFF NO DAMAGE ) | 236V~ 1400 V/FULL LOAD<br>235V~ 1500 V/80% LOAD<br>234V~ 1500 V/40% LOAD<br><br>TEST: <u>OK</u> |
| 2  | EFFICIENCY(TYP)     | 88%/300VDC<br>90%/800VDC<br>86%/1500VDC   | I/P: 300VDC ( 80% LOAD )<br>I/P: 800VDC<br>I/P: 1500VDC ( 80% LOAD )<br>O/P:FULL LOAD<br>Ta:25°C  | 89.68%/300VDC<br>90.65%/800VDC<br>89.46%/1500VDC  |
| 3  | INRUSH CURRENT(TYP) | 120A/300VDC<br>300A/800VDC<br>500A/1500VDC<br>COLD START  | I/P: 300VDC ( 80% LOAD )<br>I/P: 800VDC<br>I/P: 1500VDC ( 80% LOAD )<br>O/P:FULL LOAD<br>Ta:25°C  | I = 30.25A/ 300VDC<br>I = 92.5A/ 800VDC<br>I =172 A/ 1500VDC                                    |

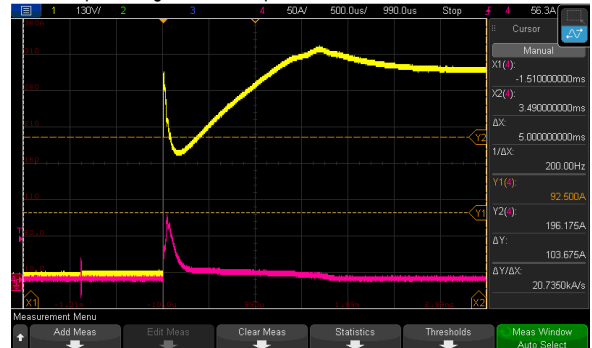
INPUT=250VDC @ TEST LOAD

CH1: DC Input Voltage CH4: Input current



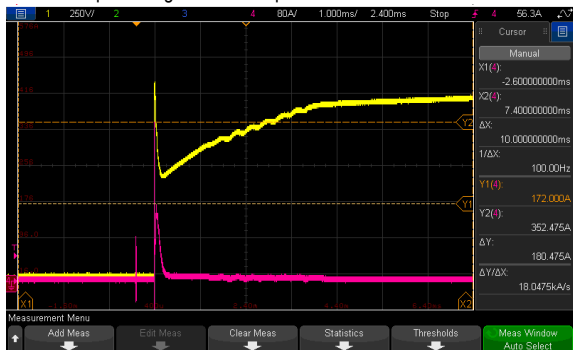
INPUT=800VDC @ FULL LOAD

CH1: DC Input Voltage CH4: Input current



INPUT=1500VDC @ TEST LOAD

CH1: DC Input Voltage CH4: Input current



## PROTECTION FUNCTION TEST

| NO | TEST ITEM                      | SPECIFICATION  | TEST CONDITION  | RESULT  |
|----|--------------------------------|--|---|---|
| 1  | OVER LOAD PROTECTION           | 105 %~ 135 %<br>RATED OUTPUT POWER<br>Protection type : Hiccup mode when output voltage<55%, recovers automatically after condition is removed;<br>Constant current limiting, recovers automatically after fault condition is removed within 55% ~ 100% rated output voltage | I/P: 1400 VDC<br>I/P: 800 VDC<br>I/P: 320 VDC<br>O/P:TESTING<br>Ta:25°C | 123.3%/ 1400 VDC<br>123.2%/ 800 VDC<br>121.8%/ 320 VDC<br>PROTECTION TYPE :<br>Hiccup mode when output voltage<55%, recovers automatically after condition is removed;<br>Constant current limiting, recovers automatically after fault condition is removed within 55% ~ 100% rated output voltage |
| 2  | OVER VOLTAGE PROTECTION        | CH: 33V~42V<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed  | I/P: 1500VDC<br>I/P: 800VDC<br>I/P: 250VDC<br>O/P:MIN LOAD<br>Ta:25°C   | 34.4V/ 1500 VDC<br>34.4V/ 800 VDC<br>34.4V/ 250 VDC<br>PROTECTION TYPE :<br>Hiccup mode, recovers automatically after fault condition is removed  |
| 3  | OVER TEMPERATURE PROTECTION    | SPEC: NO DAMAGE<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed  | I/P: 250VDC<br>I/P: 1500VDC<br>O/P:FULL LOAD                            | O.T.P Active<br>PROTECTION TYPE :<br>Hiccup mode, recovers automatically after fault condition is removed   |
| 4  | SHORT PROTECTION               | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE<br>Hiccup mode , recovers automatically after fault condition is removed  | I/P: 250VDC<br>I/P: 1500VDC<br>O/P: FULL LOAD<br>Ta:25°C                | NO DAMAGE<br>PROTECTION TYPE :<br>Hiccup mode , recovers automatically after fault condition is removed   |
| 5  | DC INPUT UNDER VOLTAGE LOCKOUT | Under voltage protection range: 200 ~ 225Vdc ,<br>Under voltage release range:225 ~ 246.5Vdc   | I/P:TESTING<br>O/P: TEST LOAD<br>Ta:25°C                                | NO DAMAGE<br>Under voltage protection range<br>TEST: <u>214</u> Vdc ,<br>Under voltage release range<br>TEST: <u>239</u> Vdc ,  |
| 6. | DC INPUT REVERSE POLARITY      | By internal Bridge Diode, no damage, recovers automatically after fault condition removed  | I/P: 1500 VDC<br>O/P: FULL LOAD<br>Ta:25°C                              | TEST: <u>OK</u><br>NO DAMAGE, recovers automatically after fault condition is removed   |

## COMPONENT STRESS TEST

| N<br>O | TEST ITEM   | SPECIFICATION                      | TEST CONDITION  | RESULT   |  |
|--------|---|------------------------------------|---|--|--|
| 1      | PWM Transistor<br>( D to S) or (C to E) Peak<br>Voltage | Q1/Q2/Q3/Q4 Rated:<br>28 A/ 650 V  | DC ON/OFF<br>I/P:High-Line +3V = 1503V<br>VDS:<br>O/P: (1)Full Load<br>(2)Output Short<br>(3)Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4)Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5)Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6)Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7)0%→400% Load.<br>Ta:25°C  | Q1<br>VDS:<br>(1) 537V<br>(2) 547V<br>(3) 543V<br>(4) 539V<br>(5) 539V<br>(6) 543V<br>(7) 555V<br><br>Q2<br>VDS:<br>(1) 523V<br>(2) 531V<br>(3) 527V<br>(4) 515V<br>(5) 515V<br>(6) 523V<br>(7) 547V | Q3<br>VDS:<br>(1) 555V<br>(2) 575V<br>(3) 567V<br>(4) 555V<br>(5) 547V<br>(6) 563V<br>(7) 587V<br><br>Q4<br>VDS:<br>(1) 559V<br>(2) 567V<br>(3) 557V<br>(4) 557V<br>(5) 553V<br>(6) 561V<br>(7) 547V |
| 2      | Diode Peak Voltage                                      | Q100 /Q103 Rated :<br>20 A/ 600V   | DC ON/OFF<br>I/P:High-Line +3V =1503 V<br>Vo=Vmax<br>O/P: (1)Full Load<br>(2)Output Short<br>(3)Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4)Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5)Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6)Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7)0%→400% Load.<br>(8).NO LOAD<br>Vo=Vnormal<br>O/P: (1)Full Load<br>Ta:25°C | Q100:<br>Vo=Vmax<br>VDS:<br>(1) 277V<br>(2) 267V<br>(3) 285V<br>(4) 275V<br>(5) 275V<br>(6) 267V<br>(7) 245V<br>(8) 245V<br>Vo=Vnormal<br>(1) 249V   | Q103:<br>Vo=Vmax<br>VDS:<br>(1) 327V<br>(2) 308V<br>(3) 294V<br>(4) 305V<br>(5) 302V<br>(6) 308V<br>(7) 274V<br>(8) 251V<br>Vo=Vnormal<br>(1) 276V   |
| 3      | Input Capacitor Voltage                                 | C5/C6/C7/C8 Rated:<br>120μ / 400 V | I/P:High-Line +3V =1503V<br>O/P: (1)Full Load input on/off<br>(2) Min load input on /Off<br>(3)Full Load /Min load<br>Change<br>(4)Full load continue   | C5<br>(1)372V<br>(2)372V<br>(3)375V<br>(4)372V   | C7<br>(1)381V<br>(2)381V<br>(3)381V<br>(4)381V   |



|   |                          |  |  |   |   |
|---|--------------------------|--|--|---|---|
|   |                          |  | Ta:25°C  | C6<br>(1)378V<br>(2)378V<br>(3)378V<br>(4)372V                          | C8<br>(1)384V<br>(2)378V<br>(3)384V<br>(4)384V                        |
| 4 | Control IC Voltage Test  | PWM IC U1 Rated<br>8.3V~ 28 V<br><br>I/P IC U4 Rated<br>6.5V~ 30 V<br><br>IC U200 Rated<br>3.5V~ 36V | DC ON/OFF<br>I/P:High-Line +3V =1503 V<br>O/P(1)FULL LOAD<br>(2) Output Short<br>(3)O.L.P<br>(4)O.V.P.<br>(5)NO LOAD VRmin(Low<br>LINE)<br>Ta:25°C | U1/U4:<br>(1) 17.2V<br>(2) 17.2V<br>(3) 17.2V<br>(4) 17.2V<br>(5) 17.2V | U200<br>(1) 25.6V<br>(2) 25.6V<br>(3) 25.6V<br>(4) 33.9V<br>(5) 23.1V |
| 5 | Clamp Diode Peak Voltage | D1 / D2 / D3/ D4 Rated :<br>1000V /1 A   | I/P : High-Line +3V =1503V<br>DC ON/OFF<br>O/P : (1) Dynamic Load<br>90%Duty/1KHz<br>(2)Full load continue<br>Ta : 25°C                            | D1:<br>(1) 449V<br>(2) 449V<br><br>D3:<br>(1) 457V<br>(2) 457V          | D2:<br>(1) 449V<br>(2) 449V<br><br>D4:<br>(1) 457V<br>(2) 461V        |

**SAFETY TEST**

| NO | TEST ITEM               | SPECIFICATION  | TEST CONDITION   | RESULT   |
|----|-------------------------|--|--|--|
| 1  | WITHSTAND VOLTAGE       | I/P-O/P:4KVAC/min<br>I/P-FG: 2 KVAC/min<br>O/P-FG: 2KVAC/min | I/P-O/P: 4.4 KVAC/min<br>I/P-FG: 2.4 KVAC/min<br>O/P-FG: 2.4 KVAC/min<br>Ta:25°C | I/P-O/P: 9.88mA<br>I/P-FG: 7.65mA<br>O/P-FG: 8.09mA<br>NO DAMAGE |
| 2  | ISOLATION RESISTANCE    | I/P-O/P:500VDC>100MΩ   | I/P-O/P: 600 VDC<br>Ta:25°C  | I/P-O/P: 9999 MΩ<br>NO DAMAGE                                    |
| 3  | GROUNDING<br>CONTINUITY | FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                       | 40A / 2min<br>Ta:25°C  | 4mΩ  |

**E.M.C TEST**

| NO | TEST ITEM  | SPECIFICATION                     | TEST CONDITION                                  | RESULT                        |
|----|------------|-----------------------------------|---|-------------------------------|
| 1  | RADIATION  | BS EN/EN55032(CISPR32)<br>CLASS A | I/P: 400VDC/800 VDC<br>O/P:FULL LOAD<br>Ta:25°C | PASS<br>Test by certified Lab |
| 2  | CONDUCTION | BS EN/EN55032(CISPR32)<br>CLASS A | I/P: 400VDC/800 VDC<br>O/P:FULL LOAD<br>Ta:25°C | PASS<br>Test by certified Lab |



|   |   |   |   |   |
|---|---|---|---|---|
| 3 | E.S.D   | BS EN/EN61000-4-2<br>Level 3, 8KV air<br>Level 2, 4KV contact | I/P: 400VDC/800 VDC<br>O/P:FULL LOAD<br>Ta:25°C | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B |
| 4 | E.F.T   | BS EN/EN61000-4-4<br>INPUT: 2KV                               | I/P: 400VDC/800 VDC<br>O/P:FULL LOAD<br>Ta:25°C | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B |
| 5 | SURGE   | BS EN/EN61000-4-5<br>Level 4, 2KV/Vin+ ~ Vin-, 4KV<br>Vin~FG  | I/P: 400VDC/800 VDC<br>O/P:FULL LOAD<br>Ta:25°C | <input checked="" type="checkbox"/> CRITERIA A<br><input type="checkbox"/> CRITERIA B |
| 6 | Test by certified Lab & Test Report Prepare<br>Any contradictions of the test results, please refer to the latest EMC test report |   |   |   |

## ■ RELIABILITY TEST

### ENVIRONMENT TEST

| NO | TEST ITEM             | SPECIFICATION   | TEST CONDITION         | RESULT   |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
|----|-----------------------|---|------------------------|--|----|----------|------------------------|------------------------|---|----|--------|--------|---|------|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|----|--------|--------|----|------|--------|--------|----|----|--------|--------|----|-----|--------|--------|----|-----|--------|--------|----|----|--------|--------|----|-----|--------|--------|----|----|--------|--------|----|-----|--------|---------|----|-----|--------|--------|----|----|--------|---------|----|----|--------|--------|
| 1  | TEMPERATURE RISE TEST | MODEL : RSDH-300-24<br>1. ROOM AMBIENT BURN-IN : 2 HRS<br>I/P : 800 VDC O/P : FULL LOAD Ta= 25 °C<br>2. HIGH AMBIENT BURN-IN : 2 HRS<br>I/P : 800 VDC O/P : FULL LOAD Ta= 55 °C |                        |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
|    |                       |   |                        | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 25 °C</th> <th>HIGH AMBIENT Ta= 55 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>C2</td><td>52.6°C</td><td>77.3°C</td></tr> <tr><td>2</td><td>RTH3</td><td>61.0°C</td><td>84.3°C</td></tr> <tr><td>3</td><td>R84</td><td>64.0°C</td><td>88.8°C</td></tr> <tr><td>4</td><td>C10</td><td>57.2°C</td><td>81.6°C</td></tr> <tr><td>5</td><td>LF2</td><td>60.7°C</td><td>85.7°C</td></tr> <tr><td>6</td><td>BD1</td><td>62.3°C</td><td>88.3°C</td></tr> <tr><td>7</td><td>BD2</td><td>64.9°C</td><td>90.8°C</td></tr> <tr><td>8</td><td>R50</td><td>71.4°C</td><td>97.2°C</td></tr> <tr><td>9</td><td>C7</td><td>64.4°C</td><td>89.7°C</td></tr> <tr><td>10</td><td>ZNR5</td><td>61.0°C</td><td>86.0°C</td></tr> <tr><td>11</td><td>C5</td><td>62.4°C</td><td>88.0°C</td></tr> <tr><td>12</td><td>C13</td><td>57.0°C</td><td>82.6°C</td></tr> <tr><td>13</td><td>R45</td><td>73.4°C</td><td>99.8°C</td></tr> <tr><td>14</td><td>D1</td><td>69.1°C</td><td>95.9°C</td></tr> <tr><td>15</td><td>Q10</td><td>65.4°C</td><td>93.0°C</td></tr> <tr><td>16</td><td>D3</td><td>70.9°C</td><td>97.2°C</td></tr> <tr><td>17</td><td>R96</td><td>76.4°C</td><td>102.8°C</td></tr> <tr><td>18</td><td>C78</td><td>71.9°C</td><td>97.9°C</td></tr> <tr><td>19</td><td>U1</td><td>74.1°C</td><td>100.1°C</td></tr> <tr><td>20</td><td>U4</td><td>68.3°C</td><td>95.4°C</td></tr> </tbody> </table> | NO | Position | ROOM AMBIENT Ta= 25 °C | HIGH AMBIENT Ta= 55 °C | 1 | C2 | 52.6°C | 77.3°C | 2 | RTH3 | 61.0°C | 84.3°C | 3 | R84 | 64.0°C | 88.8°C | 4 | C10 | 57.2°C | 81.6°C | 5 | LF2 | 60.7°C | 85.7°C | 6 | BD1 | 62.3°C | 88.3°C | 7 | BD2 | 64.9°C | 90.8°C | 8 | R50 | 71.4°C | 97.2°C | 9 | C7 | 64.4°C | 89.7°C | 10 | ZNR5 | 61.0°C | 86.0°C | 11 | C5 | 62.4°C | 88.0°C | 12 | C13 | 57.0°C | 82.6°C | 13 | R45 | 73.4°C | 99.8°C | 14 | D1 | 69.1°C | 95.9°C | 15 | Q10 | 65.4°C | 93.0°C | 16 | D3 | 70.9°C | 97.2°C | 17 | R96 | 76.4°C | 102.8°C | 18 | C78 | 71.9°C | 97.9°C | 19 | U1 | 74.1°C | 100.1°C | 20 | U4 | 68.3°C | 95.4°C |
| NO | Position              | ROOM AMBIENT Ta= 25 °C  | HIGH AMBIENT Ta= 55 °C |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 1  | C2                    | 52.6°C  | 77.3°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 2  | RTH3                  | 61.0°C  | 84.3°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 3  | R84                   | 64.0°C  | 88.8°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 4  | C10                   | 57.2°C  | 81.6°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 5  | LF2                   | 60.7°C  | 85.7°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 6  | BD1                   | 62.3°C  | 88.3°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 7  | BD2                   | 64.9°C  | 90.8°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 8  | R50                   | 71.4°C  | 97.2°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 9  | C7                    | 64.4°C  | 89.7°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 10 | ZNR5                  | 61.0°C  | 86.0°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 11 | C5                    | 62.4°C  | 88.0°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 12 | C13                   | 57.0°C  | 82.6°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 13 | R45                   | 73.4°C  | 99.8°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 14 | D1                    | 69.1°C  | 95.9°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 15 | Q10                   | 65.4°C  | 93.0°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 16 | D3                    | 70.9°C  | 97.2°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 17 | R96                   | 76.4°C  | 102.8°C                |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 18 | C78                   | 71.9°C  | 97.9°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 19 | U1                    | 74.1°C  | 100.1°C                |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |
| 20 | U4                    | 68.3°C  | 95.4°C                 |  |    |          |                        |                        |   |    |        |        |   |      |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |     |        |        |   |    |        |        |    |      |        |        |    |    |        |        |    |     |        |        |    |     |        |        |    |    |        |        |    |     |        |        |    |    |        |        |    |     |        |         |    |     |        |        |    |    |        |         |    |    |        |        |





|   |   |   | NO   | Position | ROOM AMBIENT Ta= 25 °C | HIGH AMBIENT Ta= 55 °C |
|---|---|---|--|----------|------------------------|------------------------|
|   |   |   | 21   | T3       | 70.1°C                 | 96.1°C                 |
|   |   |   | 22   | C56      | 67.8°C                 | 93.4°C                 |
|   |   |   | 23   | D10      | 69.5°C                 | 95.2°C                 |
|   |   |   | 24   | TSW1     | 75.4°C                 | 101.2°C                |
|   |   |   | 25   | T2 coil  | 86.4°C                 | 113.2°C                |
|   |   |   | 26   | T2 core  | 78.5°C                 | 107.4°C                |
|   |   |   | 27   | U2       | 69.5°C                 | 95.9°C                 |
|   |   |   | 28   | R101     | 69.9°C                 | 96.0°C                 |
|   |   |   | 29   | T1 coil  | 87.4°C                 | 114.1°C                |
|   |   |   | 30   | T1 core  | 83.4°C                 | 114.3°C                |
|   |   |   | 31   | C100     | 75.4°C                 | 102.7°C                |
|   |   |   | 32   | C107     | 71.6°C                 | 98.6°C                 |
|   |   |   | 33   | C109     | 71.9°C                 | 98.6°C                 |
|   |   |   | 34   | C114     | 61.6°C                 | 90.3°C                 |
|   |   |   | 35   | LF100    | 64.0°C                 | 91.0°C                 |
|   |   |   | 36   | C111     | 68.0°C                 | 95.2°C                 |
|   |   |   | 37   | R233     | 70.1°C                 | 97.2°C                 |
|   |   |   | 38   | Q1       | 70.8°C                 | 97.8°C                 |
|   |   |   | 39   | Q2       | 71.1°C                 | 98.0°C                 |
|   |   |   | 40   | Q3       | 71.4°C                 | 97.7°C                 |
|   |   |   | 41   | D213     | 85.6°C                 | 112.5°C                |
|   |   |   | 42   | Q4       | 72.5°C                 | 99.0°C                 |
|   |   |   | 43   | D216     | 78.5°C                 | 105.1°C                |
|   |   |   | 44   | D218     | 80.8°C                 | 107.7°C                |
|   |   |   | 45   | D217     | 83.5°C                 | 110.8°C                |
|   |   |   | 46   | D214     | 80.7°C                 | 108.3°C                |
|   |   |   | 47   | D212     | 77.6°C                 | 103.8°C                |
|   |   |   | 48   | U200     | 66.8°C                 | 93.3°C                 |
| 2 | OVER LOAD BURN-IN TEST  | NO DAMAGE<br>1 HOUR ( MIN )   | I/P : 800 VDC<br>O/P : 122%LOAD<br>Ta : 25°C   |          | TEST : OK              |                        |
| 3 | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR  | I/P : 300 VDC / 1500 VDC<br>O/P : 100% LOAD<br>Ta= -5 °C<br>O/P : 50% LOAD<br>Ta= -45 °C |          | TEST : OK              |                        |
| 4 | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 55°C / 95 % R.H<br>NO DAMAGE | I/P : 1503 VDC<br>O/P : FULL LOAD<br>Ta= 55 °C<br>HUMIDITY= 95 % R.H                     |          | TEST : OK              |                        |
| 5 | TEMPERATURE<br>COEFFICIENT  | ±0.03%/°C(0 ~ 55°C)   | I/P : 800 VDC<br>O/P : FULL LOAD   |          | ± 0.008%/°C(0~55°C)    |                        |



|    |                          |   |   |
|----|--------------------------|---|---|
| 6  | STORAGE TEMPERATURE TEST | -40~80°C  | 1. Thermal shock Temperature : -45°C~ +90°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 10 CYCLE<br>5. Input/Output condition : STATIC  |
| 7  | THERMAL SHOCK TEST       | -40~55°C  | 1. Thermal shock Temperature : -45°C~ +55°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 16 CYCLE<br>5. Input/Output condition :<br>15cycle: 800 VDC / FULL LOAD DC ON 3sec/DC OFF 1sec TEST<br>1cycle: 800 VDC / FULL LOAD Burn In Test |
| 8  | VIBRATION TEST           | 10 ~ 500Hz, 3G 10min./1cycle, 60min. each along X, Y, Z axes  | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(3) Sweep Time : 10min/sweep cycle<br>(4) Acceleration : 4G<br>(5) Test Time : 180min in each axis (X.Y.Z)<br>(6) Ta : 25°C   |
| 9  | CAPACITOR LIFE CYCLE     | SUPPOSE C107 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 800VDC O/P : FULL LOAD Ta= 25 °C LIFE TIME<br>(2) I/P : 800VDC O/P : FULL LOAD Ta= 55 °C LIFE TIME<br>(3) I/P : 800VDC O/P : 75% LOAD Ta= 55 °C LIFE TIME<br>(4) I/P : 800VDC O/P : 50% LOAD Ta= 55 °C LIFE TIME | (1) 132261HRS<br>(2) 21071.8HRS<br>(3) 37545.3HRS<br>(4) 79235.2HRS   |
| 10 | MTBF                     | Conducted by Parts Stress Analysis Prediction<br>277.9K hrs min. Telcordia SR-332 (Bellcore) ; 99.1K hrs min. MIL-HDBK-217F (25°C)  |   |
| 11 | Ongoing Reliability Test | I/P : 800VDC O/P : FULL LOAD TA=50°C<br>Demonstration Mean Time Between Failure : 30000 hours   |   |

| TEST RESULT | TESTER | REVIEW | APPROVAL |
|-------------|--------|--------|----------|
| PASS        | Yuwei  | Liutt  | Wangdz   |

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