# Test Report : DDRH-45-15

45W High Reliable 150~1500Vdc Ultra Wide Input DC-DC Converter

## ■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Protection Function Test

## ■ SAFETY TEST

Safety Test

## ■ RELIABILITY TEST

Environment Test

## ■ DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

| NO | TEST ITEM | SPECICATION | TEST CONDITION | RESULT | VERDITC |
|---|---|---|---|---|---|
| 1 | VOLTAGE ACCURACY | -2.0% ~ +2.0 % | I/P:800VDC<br>O/P:FULL LOAD<br>Ta:25℃ | -0.14% | P |
| 2 | RIPPLE & NOISE | 100 mVp-p | I/P:800VDC<br>O/P:FULL LOAD<br>Ta:25℃ | 80mV | P |
| 3 | LINE REGULATION | -1.0% ~ +1.0% | I/P:150VDC~1500VDC<br>O/P: FULL LOAD<br>Ta:25℃ | +0.03% ~ -0.04% | P |
| 4 | LOAD REGULATION | -1.0% ~ +1.0% | I/P:800VDC<br>O/P:10% LOAD~FULL LOAD<br>Ta:25℃ | -0.08% ~ +0.07% | P |
| 5 | HOLD UP TIME | 20ms min. | I/P:800VDC<br>O/P:FULL LOAD<br>Ta:25℃ | 32.4ms | P |
| 6 | SETUP TIME | 2s max. | I/P:800VDC<br>O/P: FULL LOAD<br>Ta:25℃ | 134ms | P |

### INPUT FUNCTION TEST

| NO | TEST ITEM | SPECICATION | TEST CONDITION | RESULT | VERDITC |
|---|---|---|---|---|---|
| 1 | INPUT VOLTAGE RANGE | 150 VDC ~1500 VDC | I/P:TESTING<br>O/P:FULL LOAD<br>Ta:25℃ | 125.5VDC ~1500 VDC | P |
| 2 | EFFICIENCY | 85% | I/P:800VDC<br>O/P:FULL LOAD<br>Ta:25℃ | 86.80% | P |
| 3 | DC CURRENT | 75mA / FULL LOAD<br>0.2mA / NO LOAD | I/P:800VDC<br>O/P:NO / FULL LOAD<br>Ta:25℃ | 65.0mA / FULL LOAD<br>0.155 mA / NO LOAD | P |

### PROTECTION FUNCTION TEST

| NO | TEST ITEM | SPECICATION | TEST CONDITION | RESULT | VERDITC |
|---|---|---|---|---|---|
| 1 | SHORT PROTECTION | CONTINUOUS | I/P:1500VDC<br>O/P:FULL LOAD<br>Ta:25℃ | HICCUP MODE<br>AUTO-RECOVER | P |
| 2 | OVER LOAD PROTECTION | 110% ~ 200% | I/P:800VDC<br>O/P:TESTING<br>Ta:25℃ | 178.3%<br>HICCUP MODE<br>AUTO-RECOVER | P |
| 3 | OVER VOLTAGE PROTECTION | YES | I/P:800VDC<br>O/P: MIN LOAD<br>Ta:25℃ | HICCUP MODE<br>AUTO-RECOVER | P |

| | | | | | |
|---|---|---|---|---|---|
| 4 | DC INPUT REVERSE POLARITY | NO DAMAGE | I/P:800VDC<br>O/P: FULL LOAD<br>Ta:25℃ | NO DAMAGE | P |
| 5 | UNDER VOLTAGE LOCKOUT | START-UP VOLTAGE<br>132Vdc(max)<br>SHUTDOWN VOLTAGE<br>121Vdc(min) | I/P: TESTING<br>O/P: FULL LOAD<br>Ta:25℃ | 125.5VDC<br><br>119.5VDC | P |

## ■ SAFETY TEST

### SAFETY TEST

| NO | TEST ITEM | SPECICATION | TEST CONDITION | RESULT | VERDITC |
|---|---|---|---|---|---|
| 1 | WITHSTAND VOLTAGE | I/P-O/P:4.0KVAC/min | I/P-O/P:4.0KVAC/min<br>Ta:25℃ | I/P-O/P: 0.002mA<br>NO DAMAGE | P |
| 2 | ISOLATION RESISTANCE | I/P-O/P:500VDC>1000MΩ | I/P-O/P:500 VDC<br>Ta:25℃ | I/P-O/P>1000MΩ<br>NO DAMAGE | P |

## ■ RELIABILITY TEST

### ENVIRONMENT TEST

| NO | TEST ITEM | SPECICATION | TEST CONDITION | RESULT | VERDITC |
|---|---|---|---|---|---|
| 1 | TEMPERATURE RISE TEST | 1. ROOM AMBIENT BURN-IN：4HRS<br>I/P:800VDC O/P:FULL LOAD Ta=25℃<br>2. HIGH AMBIENT BURN-IN ：4HRS<br>I/P:800VDC O/P:FULL LOAD Ta=50℃<br>3. HIGH AMBIENT BURN-IN ：4HRS<br>I/P:800VDC O/P:50% LOAD Ta=70℃ | | | P |

| NO | Position | 1 | 2 | 3 |
|---|---|---|---|---|
| 1 | Ta | 25.0℃ | 50.0℃ | 70.0℃ |
| 2 | C101 | 40.6℃ | 65.6℃ | 79.7℃ |
| 3 | C102 | 41.1℃ | 66.1℃ | 79.9℃ |
| 4 | C103 | 39.4℃ | 64.4℃ | 78.8℃ |
| 5 | C104 | 38.1℃ | 63.1℃ | 78.0℃ |
| 6 | C105 | 46.1℃ | 71.1℃ | 82.6℃ |
| 7 | C108 | 42.5℃ | 67.5℃ | 80.5℃ |
| 8 | C202 | 56.0℃ | 81.0℃ | 87.3℃ |
| 9 | C203 | 55.3℃ | 80.3℃ | 86.6℃ |
| 10 | C207 | 58.2℃ | 83.2℃ | 88.4℃ |
| 11 | Q101 | 38.8℃ | 63.8℃ | 78.4℃ |
| 12 | Q102 | 58.9℃ | 83.9℃ | 90.3℃ |
| 13 | Q103 | 60.1℃ | 85.1℃ | 91.0℃ |
| 14 | T2 | 52.4℃ | 77.4℃ | 86.3℃ |
| 15 | BD1 | 37.6℃ | 62.6℃ | 77.6℃ |
| 16 | CY2 | 54.9℃ | 79.9℃ | 86.7℃ |
| 17 | T1 | 57.7℃ | 82.7℃ | 88.8℃ |
| 18 | PH1 | 44.4℃ | 69.4℃ | 81.2℃ |
| 19 | D201 | 83.2℃ | 108.2℃ | 101.7℃ |
| 20 | CASE | 49.9℃ | 74.9℃ | 84.4℃ |

| | | | | | |
|---|---|---|---|---|---|
| 2 | LOW TEMPERATURE TURN ON TEST | TURN ON AFTER 4 HOURS | I/P:800VDC<br>O/P: FULL LOAD<br>Ta= -40℃ | TEST：OK | P |

## OTHER

| NO | TEST ITEM | SPECICATION | TEST CONDITION | RESULT | VERDITC |
|---|---|---|---|---|---|
| 1 | MTBF | MIL-HDBK-217F,GB,25℃<br>TOTAL FAILURE RATE：2.3916<br>M.T.B.F：418,122 HRS | | | P |

| TEST RESULT | TESTER | APPROVAL |
|---|---|---|
| PASS | ARCHEN HSIAO | PETER CHENG |