



# Test Report: UHP-750-48

---

750W Slim Type with PFC Switching Supply

## ■ 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

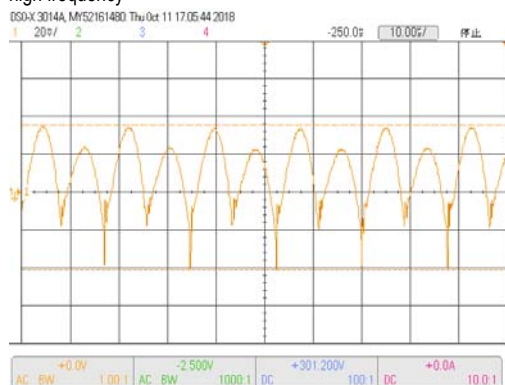
ENVIRONMENT TEST

## DESIGN VERIFY TEST

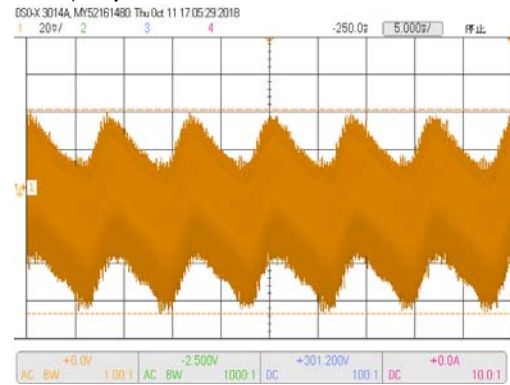
### OUTPUT FUNCTION TEST

| NO | TEST ITEM                        | SPECIFICATION   | TEST CONDITION                                                | RESULT                                       |
|----|----------------------------------|-----------------|---------------------------------------------------------------|----------------------------------------------|
| 1  | OUTPUT VOLTAGE<br>ADJUST RANGE   | CH1: 48V~ 57.6V | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : MIN LOAD<br>Ta : 25°C | 46.08V~59.11V/230VAC<br>46.08V~59.11V/115VAC |
| 2  | OUTPUT VOLTAGE(Max)<br>TOLERANCE | V1: 1%~ -1%     | I/P: 90VAC /264VAC<br>O/P:FULL/ MIN. LOAD<br>Ta:25°C          | V1: 0.02%~ 0 %                               |
| 3  | LINE REGULATION (Max)            | V1: 0.5%~ -0.5% | I/P: 180VAC~ 264VAC<br>O/P:FULL LOAD<br>Ta:25°C               | V1: 0%~ 0 %                                  |
| 4  | LOAD REGULATION(Max)             | V1: 0.5%~ -0.5% | I/P: 230VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C                  | V1: 0.02%~ 0 %                               |
| 5  | OVER/UNDERSHOOT TEST             | < $\pm 5\%$     | I/P: 230VAC<br>O/P:FULL LOAD<br>Ta:25°C                       | <5%                                          |
| 6  | RIPPLE & NOISE(Max)              | V1: 250mVp-p    | I/P:230VAC<br>O/P:FULL LOAD<br>Ta:25°C                        | V1: 108 mVp-p                                |

high frequency :



low frequency :



|   |                  |                                |                                                                                  |                                  |
|---|------------------|--------------------------------|----------------------------------------------------------------------------------|----------------------------------|
| 7 | SET UP TIME(Max) | 230VAC/1000ms<br>115VAC/1000ms | I/P : 230 VAC<br>O/P : FULL LOAD<br>I/P : 115 VAC<br>O/P : 75% LOAD<br>Ta : 25°C | 230VAC/ 222 ms<br>115VAC/ 265 ms |
|---|------------------|--------------------------------|----------------------------------------------------------------------------------|----------------------------------|

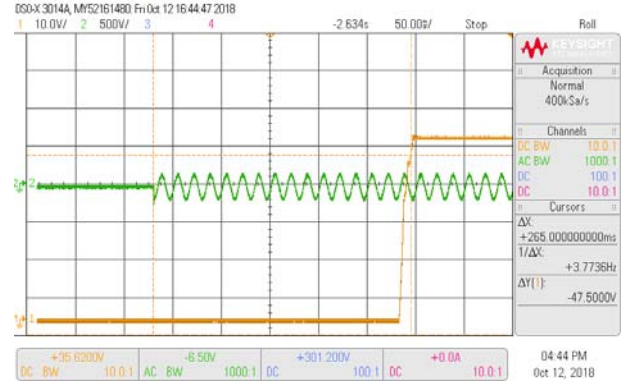
INPUT=230VAC/50HZ @ FULL LOAD

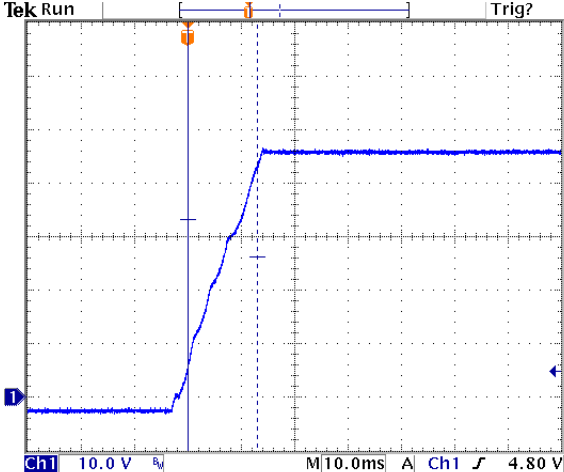
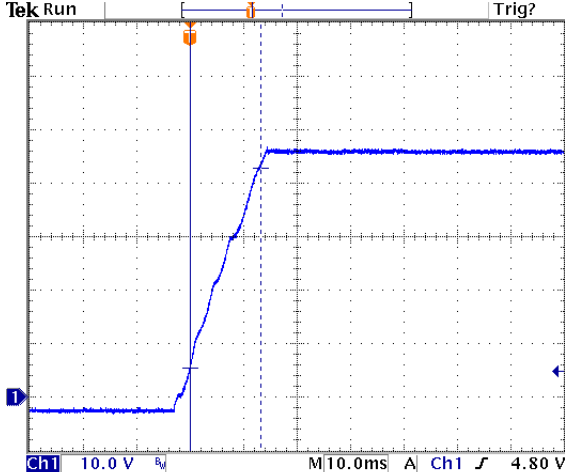
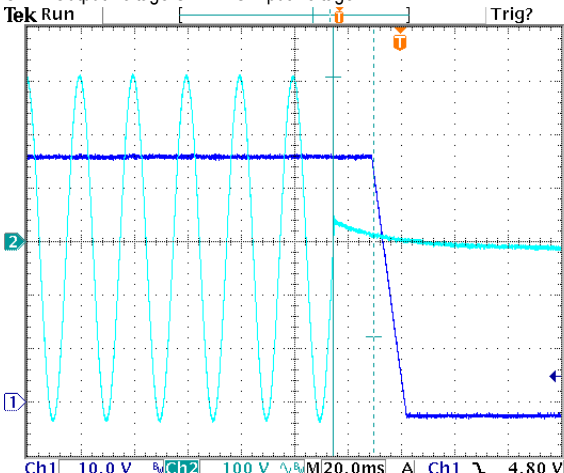
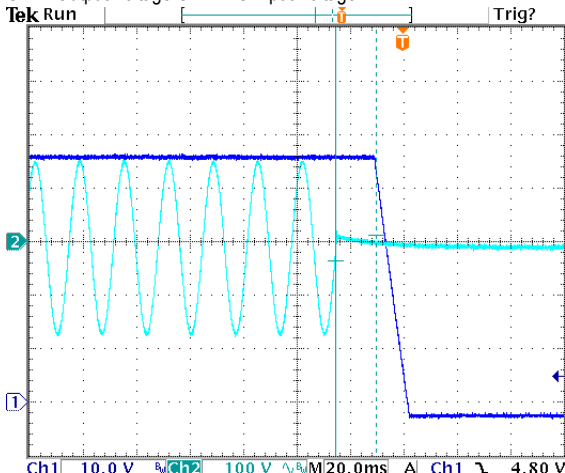
CH1 : Output Voltage CH2 : AC Input Voltage

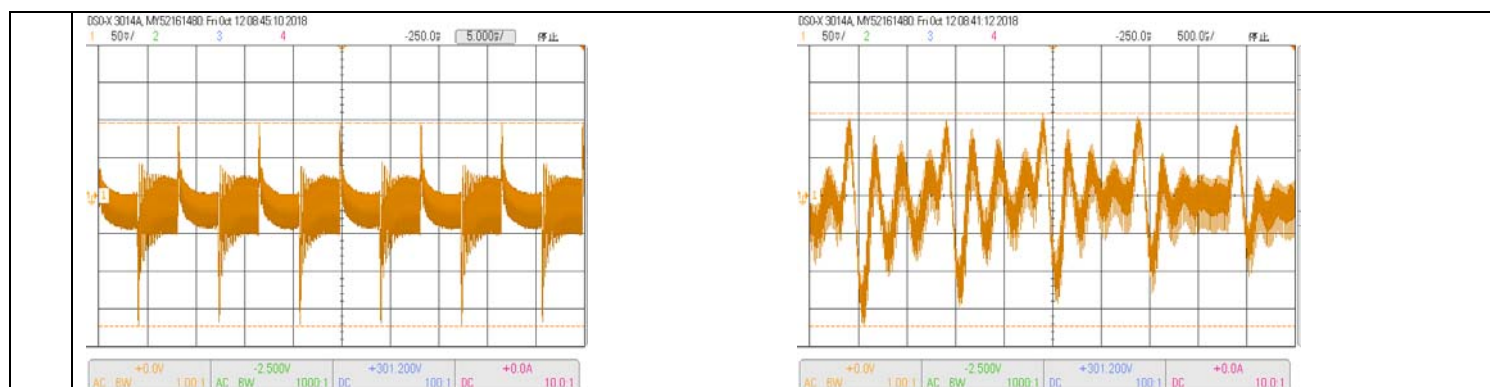


INPUT=115VAC/60HZ @ 75% LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

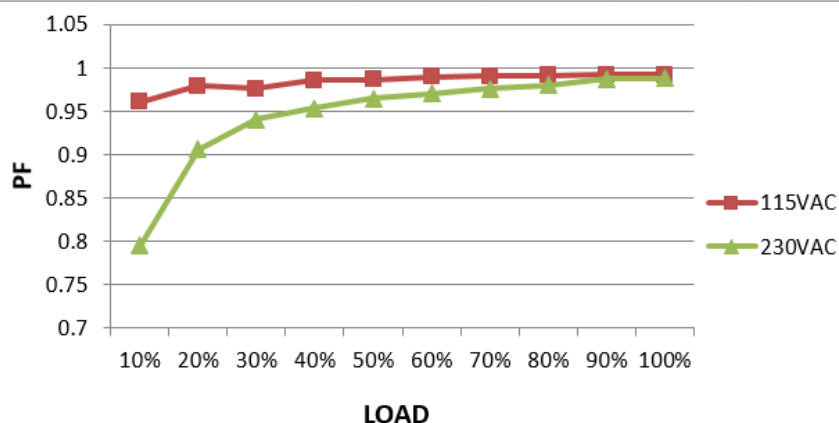


|    |                                                                                                                                                                                                                                                                                                                                                                                         |                            |                                                                                                         |                                    |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------|
| 8  | RISE TIME (Max)                                                                                                                                                                                                                                                                                                                                                                         | 230VAC/50ms<br>115VAC/50ms | I/P : 230 VAC<br>O/P : FULL LOAD<br>I/P : 115 VAC<br>O/P : 75% LOAD<br>Ta : 25°C                        | 230VAC/ 13 ms<br>115VAC/ 13.2 ms   |
|    | <div> <div> INPUT=230VAC/50HZ @ FULL LOAD<br/>CH1 : Output Voltage </div>  </div> <div> <div> INPUT=115VAC/60HZ @ 75% LOAD<br/>CH1 : Output Voltage </div>  </div>                                                   |                            |                                                                                                         |                                    |
| 9  | HOLD UP TIME (Typ.)                                                                                                                                                                                                                                                                                                                                                                     | 230VAC/12ms<br>115VAC/12ms | I/P : 230 VAC<br>O/P : FULL LOAD<br>I/P : 115 VAC<br>O/P : 75% LOAD<br>Ta : 25°C                        | 230VAC/ 15.2 ms<br>115VAC/ 15.2 ms |
|    | <div> <div> INPUT=230VAC/50HZ @ FULL LOAD<br/>CH1 : Output Voltage CH2 : AC Input Voltage </div>  </div> <div> <div> INPUT=115VAC/60HZ @ 75% LOAD<br/>CH1 : Output Voltage CH2 : AC Input Voltage </div>  </div> |                            |                                                                                                         |                                    |
| 10 | DYNAMIC LOAD                                                                                                                                                                                                                                                                                                                                                                            | V1: 4800mVp-p              | I/P: 230VAC<br>O/P:<br>(1)FULL /50% LOAD 50%DUTY / 120HZ<br>(2)FULL /50% LOAD 50%DUTY / 1KHZ<br>Ta:25°C | 269mVp-p<br>281mVp-p               |
|    | FULL /50% LOAD 50%DUTY / 120HZ                                                                                                                                                                                                                                                                                                                                                          |                            | FULL /50% LOAD 50%DUTY / 1KHZ                                                                           |                                    |



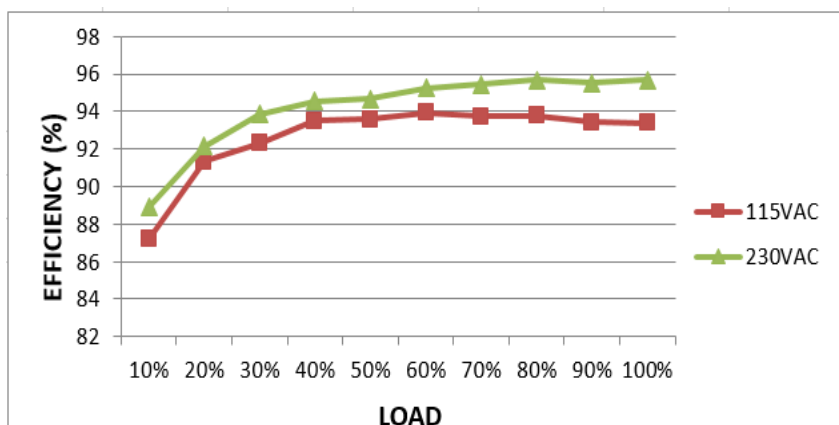
## INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECIFICATION                | TEST CONDITION                                                                                                                                                  | RESULT                               |
|----|-----------------------|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|
| 1  | INPUT VOLTAGE RANGE   | 90VAC~264VAC                 | I/P:TESTING<br>O/P:FULL LOAD<br>Ta:25°C                                                                                                                         | 80V~264V                             |
|    |                       |                              | I/P:<br>LOW-LINE-3V=87 V<br>HIGH-LINE+15%=300 V<br>O/P:FULL LOAD<br>(PLEASE CHECK DERATING CURVE)<br>ON: 30 Sec OFF: 30 Sec 10MIN<br>( POWER ON/OFF NO DAMAGE ) | TEST:OK                              |
| 2  | INPUT FREQUENCY RANGE | 47HZ ~63 HZ<br>NO DAMAGE     | I/P:90 VAC ~264 VAC<br>O/P:FULL~MIN LOAD<br>Ta:25°C                                                                                                             | TEST:OK                              |
| 3  | INPUT CURRENT (Typ.)  | 230V/ 3.8 A<br>115V/ 7.5 A   | I/P : 230 VAC<br>O/P : FULL LOAD<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                               | I =3.52A/ 230VAC<br>I =7.28A/ 115VAC |
| 4  | LEAKAGE CURRENT       | < 0.75mA / 240 VAC           | I/P : 240 VAC<br>O/P : Min LOAD<br>Ta : 25°C                                                                                                                    | L-FG : 0.39 mA<br>N-FG : 0.38 mA     |
| 5  | POWER FACTOR (Typ.)   | 0.95/ 230VAC<br>0.99/ 115VAC | I/P : 230 VAC<br>O/P : FULL LOAD<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                               | PF=0.986/230VAC<br>PF=0.99/115VAC    |
|    | P.F vs LOAD           |                              |                                                                                                                                                                 |                                      |



|   |                  |     |                                         |       |
|---|------------------|-----|-----------------------------------------|-------|
| 6 | EFFICIENCY(Typ.) | 95% | I/P:230 VAC<br>O/P:FULL LOAD<br>Ta:25°C | 95.8% |
|---|------------------|-----|-----------------------------------------|-------|

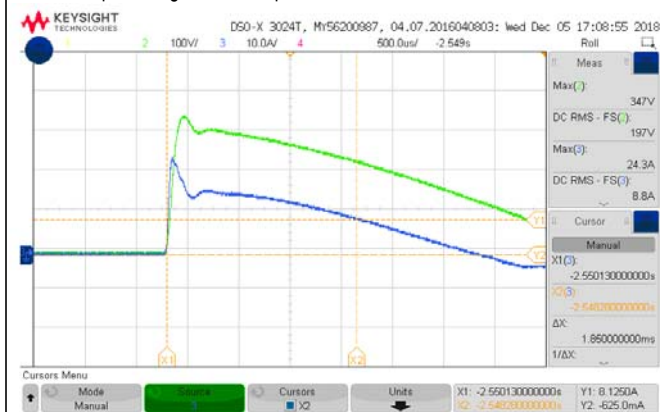
EFFICIENCY vs LOAD



|   |                      |                                    |                                                                                  |                                                        |
|---|----------------------|------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------|
| 7 | INRUSH CURRENT(Typ.) | 230V/40A<br>115V/20A<br>COLD START | I/P : 230 VAC<br>O/P : FULL LOAD<br>I/P : 115 VAC<br>O/P : 75% LOAD<br>Ta : 25°C | I=24.3A/ 230VAC<br>I=11.1A/ 115VAC<br>T50= 1850us/230V |
|---|----------------------|------------------------------------|----------------------------------------------------------------------------------|--------------------------------------------------------|

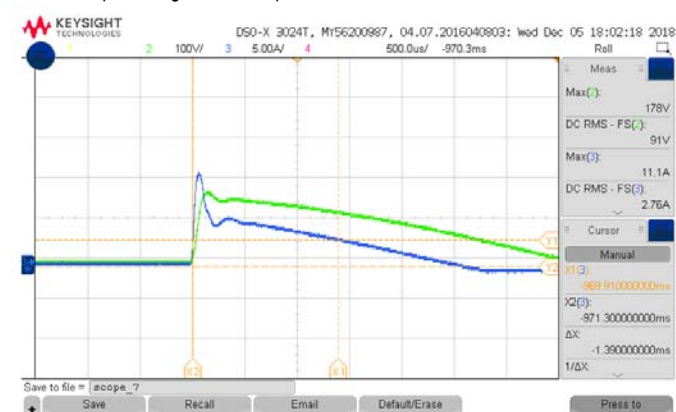
INPUT=230VAC/50HZ @ FULL LOAD

CH2 : AC Input Voltage CH4 : Input current



INPUT=115VAC/ 60HZ @ 75% LOAD

CH2 : AC Input Voltage CH4 : Input current



|   |                     |     |                                                            |                                |
|---|---------------------|-----|------------------------------------------------------------|--------------------------------|
| 8 | NO LOAD CONSUMPTION | --- | I/P : 115VAC<br>I/P : 230VAC<br>O/P : NO LOAD<br>Ta : 25°C | 3.79 W/115VAC<br>3.23 W/230VAC |
|---|---------------------|-----|------------------------------------------------------------|--------------------------------|

## PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                                                                                                                    | TEST CONDITION                                                        | RESULT                                                                                                                                           |
|----|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | OVER LOAD PROTECTION        | 105%~ 125%<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed                             | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 180VAC<br>O/P: TESTING<br>Ta: 25°C | 115.03%/ 264VAC<br>115.03%/ 230VAC<br>114.9%/180VAC<br>PROTECTION TYPE :<br>Hiccup mode, recovers automatically after fault condition is removed |
| 2  | OVER VOLTAGE PROTECTION     | 59V~66V<br>Protection type : Shut down O/P voltage, re-power on to recover                                                       | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 90VAC<br>O/P: MIN LOAD<br>Ta: 25°C | 62.75 V / 264VAC<br>62.78V / 230VAC<br>62.82 V / 90VAC<br>PROTECTION TYPE :<br>Shut down O/P voltage, re-power on to recover                     |
| 3  | OVER TEMPERATURE PROTECTION | Protection type : Shut down O/P voltage, recovers automatically after temperature goes down                                      | I/P: 264VAC<br>I/P: 90VAC<br>O/P: FULL LOAD                           | O.T.P. Active<br>Protection type :<br>Shut down O/P voltage, recovers automatically after temperature goes down                                  |
| 4  | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed | I/P: 264VAC<br>I/P: 90VAC<br>O/P: FULL LOAD<br>Ta: 25°C               | NO DAMAGE<br>PROTECTION TYPE :<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed                         |

## CONTROL FUNCTION TEST

| NO | TEST ITEM             | SPECIFICATION              | TEST CONDITION                            | RESULT    |
|----|-----------------------|----------------------------|-------------------------------------------|-----------|
| 1  | DC OK CONTACT RATINGS | 30VDC/1A<br>RESISTIVE LOAD | I/P: 230VAC<br>O/P: FULL LOAD<br>Ta: 25°C | TEST : OK |

## COMPONENT STRESS TEST

| NO | TEST ITEM                                                  | SPECIFICATION            | TEST CONDITION                                                                                                                                                                                                                                                                                                                | RESULT                                                                                   |
|----|------------------------------------------------------------|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 1  | PWM Transistor<br>(D to S) or (C to E) <b>Peak Voltage</b> | Q900 Rated<br>31A/ 650 V | I/P: High-Line +3V = 300V<br>AC ON/OFF<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 | VDS:<br>(1) 458V<br>(2) 466V<br>(3) 458V<br>(4) 458V<br>(5) 458V<br>(6) 474V<br>(7) 482V |

|   |                                                              |                                                                                                         |                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                        |
|---|--------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   |                                                              |                                                                                                         | (7)0%→400% Load.<br>Ta:25℃                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                        |
| 2 | P.F.C Transistor<br>(D to S) or (C to E) <b>Peak Voltage</b> | Q1 Rated<br>31A/ 650 V                                                                                  | I/P:High-Line +3V =300V<br>AC ON/OFF<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℃                | VDS:<br>(1)486V<br>(2)478V<br>(3)474V<br>(4)482V<br>(5)470V<br>(6)466V<br>(7)559V                                                                                                                                                      |
| 3 | P.F.C DIODE                                                  | D8 Rated<br>15 A/ 600 V                                                                                 | I/P:High-Line +3V =300V<br>AC ON/OFF<br>O/P: (1)Full Load<br>(2)Output Short<br>(3)Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(4)Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>Ta:25℃                                                                                                                                                    | (1) 470V<br>(2) 406V<br>(3) 458V<br>(4) 466V                                                                                                                                                                                           |
| 4 | Diode Peak <b>Voltage</b>                                    | Q102 Rated<br>VDS : 150V<br><br>Q100 Rated<br>VDS : 150V                                                | I/P:High-Line +3V =300V<br>AC ON/OFF<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>Ta:25℃ | Q102: VDS:<br>(1)118.2V<br>(2)114.1V<br>(3)113.3V<br>(4)113.3V<br>(5)113.3V<br>(6)113.3V<br>(7)109.3V<br>(8)111.7V<br>Q100: VDS:<br>(1)103.7V<br>(2)103.7V<br>(3)103.7V<br>(4)103.7V<br>(5)104.5V<br>(6)103.7V<br>(7)104.5V<br>(8)111V |
| 5 | Input Capacitor Voltage                                      | C5 Rated:<br>: 150μ/ 450 V<br>Surge Voltage =500V                                                       | I/P:High-Line +3V =300V<br>O/P: (1)Full Load input on/off<br>(2) Min load input on /Off<br>(3)Full Load /Min load Change<br>(4)Full load continue<br>Ta:25℃                                                                                                                                                                                                | (1)449V<br>(2)441V<br>(3)448V<br>(4)449V                                                                                                                                                                                               |
| 6 | Control IC Voltage Test                                      | PFC IC U1 Rated<br>10.5V~ 20V<br><br>PWM IC U2 Rated<br>8.85V~ 16 V<br><br>O/P IC U101 Rated<br>8V~ 24V | I/P:High-Line +3V =300V<br>AC ON/OFF<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℃                                                                                                                                                                                                            | U1<br>(1) 15.6V<br>(2) 13.8V<br>(3) 13V<br>(4) 14.2V<br>(5) 13.6V<br>U2<br>(1) 15.6V<br>(2) 12.4V<br>(3) 12.4V<br>(4) 14.4V<br>U101<br>(1) 12.35V<br>(2) 7.45V<br>(3) 7.29V<br>(4) 11.87V<br>(5) 9.45V                                 |

|  |  |  |           |  |
|--|--|--|-----------|--|
|  |  |  | (5) 12.7V |  |
|--|--|--|-----------|--|

## SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION                                                         | TEST CONDITION                                                                     | RESULT                                                           |
|----|----------------------|-----------------------------------------------------------------------|------------------------------------------------------------------------------------|------------------------------------------------------------------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 3.75KVAC/min<br>I/P-FG: 2KVAC/min<br>O/P-FG: 1.25KVAC/min    | I/P-O/P: 4.125 KVAC/min<br>I/P-FG: 2.4 KVAC/min<br>O/P-FG: 1.5KVAC/min<br>Ta: 25°C | I/P-O/P: 5.41mA<br>I/P-FG: 4.98mA<br>O/P-FG: 4.33mA<br>NO DAMAGE |
| 2  | ISOLATION RESISTANCE | I/P-O/P: 500VDC>100MΩ<br>I/P-FG: 500VDC>100MΩ<br>O/P-FG: 500VDC>100MΩ | I/P-O/P: 500 VDC<br>I/P-FG: 500 VDC<br>O/P-FG: 500 VDC<br>Ta: 25°C                 | I/P-O/P: 12.5GΩ<br>I/P-FG: 6.5GΩ<br>O/P-FG: 1.3GΩ<br>NO DAMAGE   |
| 3  | GROUNDING CONTINUITY | FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                                | 40A / 2min<br>Ta: 25°C                                                             | 18 mΩ                                                            |

## E.M.C TEST

| NO | TEST ITEM                                                                                                                        | SPECIFICATION                                         | TEST CONDITION                                           | RESULT                        |
|----|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------|-------------------------------|
| 1  | HARMONIC                                                                                                                         | EN61000-3-2<br>CLASS A                                | I/P: 230VAC/50HZ<br>O/P: FULL LOAD<br>Ta: 25°C           | PASS                          |
| 2  | CONDUCTION                                                                                                                       | EN55032<br>CLASS B                                    | I/P : 230 VAC (50HZ)<br>O/P : FULL/50% LOAD<br>Ta : 25°C | PASS<br>Test by certified Lab |
| 3  | RADIATION                                                                                                                        | EN55032<br>CLASS B                                    | I/P : 230 VAC (50HZ)<br>O/P : FULL LOAD<br>Ta : 25°C     | PASS<br>Test by certified Lab |
| 4  | E.S.D                                                                                                                            | EN61000-4-2<br>INDUSTRY<br>AIR: 8KV / Contact: 4KV    | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | CRITERIA A                    |
| 5  | E.F.T                                                                                                                            | EN61000-4-4<br>INDUSTRY<br>INPUT : 2KV                | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | CRITERIA A                    |
| 6  | SURGE                                                                                                                            | IEC61000-4-5<br>INDUSTRY<br>L-N : 2KV<br>L,N-PE : 4KV | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | CRITERIA A                    |
| 7  | Test by certified Lab & Test Report Prepare. 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 : UHP-750-48 (Operate with additional aluminum plate)<br>1. ROOM AMBIENT BURN-IN : 1.5 HRS<br>I/P : 230VAC O/P : FULL LOAD Ta=25°C<br>2. HIGH AMBIENT BURN-IN : 1.5 HRS<br>I/P : 230VAC O/P : FULL LOAD Ta= 50 °C |                |        |

|   |                                                                   |                                                                                                                                                                                                                     |    |          |                                                                   |                      |  |
|---|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|----------|-------------------------------------------------------------------|----------------------|--|
|   |                                                                   |                                                                                                                                                                                                                     | NO | Position | ROOM AMBIENT Ta=25℃                                               | HIGH AMBIENT Ta= 50℃ |  |
|   |                                                                   |                                                                                                                                                                                                                     | 1  | BD1      | 60.1℃                                                             | 83.3℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 2  | LF3      | 49.8℃                                                             | 73.7℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 3  | ZR1      | 42.8℃                                                             | 66.7℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 4  | C10      | 55.3℃                                                             | 79.2℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 5  | L2       | 70.0℃                                                             | 94.6℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 6  | Q1       | 49.6℃                                                             | 73.9℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 7  | Q900     | 66.4℃                                                             | 94.4℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 8  | C426     | 51.4℃                                                             | 76.9℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 9  | T1-1     | 69.6℃                                                             | 96.0℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 10 | T1-2     | 65.0℃                                                             | 91.1℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 11 | T2-1     | 68.2℃                                                             | 94.5℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 12 | T2-2     | 66.3℃                                                             | 93.1℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 13 | C120     | 42.7℃                                                             | 68.5℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 14 | C126     | 38.6℃                                                             | 64.0℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 15 | C251     | 47.4℃                                                             | 73.3℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 16 | RY11     | 41.4℃                                                             | 66.2℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 17 | TSW1     | 51.5℃                                                             | 75.8℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 18 | C5       | 47.8℃                                                             | 72.3℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 19 | RY1      | 51.5℃                                                             | 75.6℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 20 | C920     | 51.7℃                                                             | 77.0℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 21 | U1       | 44.0℃                                                             | 68.5℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 22 | U101     | 51.8℃                                                             | 78.1℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 23 | Q101     | 43.8℃                                                             | 69.4℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 24 | Q103     | 44.6℃                                                             | 70.0℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 25 | Q200     | 43.3℃                                                             | 68.4℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 26 | Q202     | 44.4℃                                                             | 70.8℃                |  |
|   |                                                                   |                                                                                                                                                                                                                     | 27 | C410     | 59.9℃                                                             | 85.9℃                |  |
| 2 | OVER LOAD BURN-IN TEST                                            | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                         |    |          | I/P : 230 VAC<br>O/P : 110% LOAD<br>Ta : 25℃                      | TEST : OK            |  |
| 3 | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                |    |          | I/P : 264VAC/180VAC<br>O/P : 100 % LOAD<br>Ta= -35 ℃              | TEST : OK            |  |
| 4 | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 50 ℃<br>NO DAMAGE                                                                                                                                                        |    |          | I/P : 272 VAC<br>O/P : FULL LOAD<br>Ta= 50 ℃<br>HUMIDITY= 95 %R.H | TEST : OK            |  |
| 5 | TEMPERATURE<br>COEFFICIENT                                        | ± 0.03 %/℃ (0~50℃)                                                                                                                                                                                                  |    |          | I/P : 230 VAC<br>O/P : FULL LOAD                                  | ± 0.001%/℃ (0~50℃)   |  |
| 6 | STORAGE TEMPERATURE TEST                                          | 1. Thermal shock Temperature : -45℃~ +90℃<br>2. Temperature change rate : 25℃ / 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 |    |          |                                                                   | OK                   |  |

|    |                          |                                                                                                                                                                                                                                                                                                            |                                                                   |
|----|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 7  | THERMAL SHOCK TEST       | 1. Thermal shock Temperature : -35℃~ +50℃<br>2. Temperature change rate : 25℃ / 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:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST<br>1cycle:230V/ FULL LOAD Burn In Test | OK                                                                |
| 8  | VIBRATION TEST           | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(3) Sweep Time : 12min/sweep cycle<br>(4) Acceleration : 5G<br>(5) Test Time : 60min in each axis (X.Y.Z)<br>(6) Ta : 25℃                                                                                                      | TEST : OK                                                         |
| 9  | CAPACITOR LIFE CYCLE     | SUPPOSE C120 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME<br>(2) I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME<br>(3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME<br>(4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME                                  | (1) 1007305HRS<br>(2) 168421HRS<br>(3) 215514HRS<br>(4) 262703HRS |
| 10 | MTBF                     | Conducted by Parts Stress Analysis Prediction<br>279.97K hrs min. Telcordia SR-332 (Bellcore) ; 104.86K hrs min. MIL-HDBK-217F (25℃)                                                                                                                                                                       |                                                                   |
| 11 | Ongoing reliability test | I/P : 230VAC O/P : FULL LOAD TA=50 °C<br>Demonstration Mean Time Between Failure : 30,000 hours                                                                                                                                                                                                            |                                                                   |

| TEST RESULT | TESTER     | REVIEW     | APPROVAL      |
|-------------|------------|------------|---------------|
| PASS        | DANIEL GAO | SANFORD SU | VINCENT TSENG |

2018.4.30 GP-A50-F010