



# Test Report : NPF-40-24

---

40W Single Output Switching Power Supply

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection 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                                 | VERDICT |
|----|--------------------------|-----------------------------------------------|---------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------|
| 1  | RIPPLE & NOISE           | V1 : 150 mVp-p (Max )                         | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                       | V1 : 8 mVp-p (Max )                    | PASS    |
| 2  | CONSTANT CURRENT REGION  | V1: 14.4V ~ 24 V                              | I/P : 230VAC<br>O/P:LED MODE<br>Ta:25°C                                                                             | OP= 14.4V / 1.666A<br>OP= 23V / 1.667A | PASS    |
| 3  | OUTPUT VOLTAGE TOLERANCE | V1 : -3 %~ 3 % (Max)                          | I/P : 90 VAC / 305 VAC<br>O/P : FULL/ NO LOAD<br>Ta : 25°C                                                          | V1 : -0.07 %~ 0.88 %                   | PASS    |
| 4  | LINE REGULATION          | V1 : -0.5 %~ 0.5 % (Max)                      | I/P : 100 VAC ~ 305 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                             | V1 : 0 %~ 0 %                          | PASS    |
| 5  | LOAD REGULATION          | V1 : -0.5 %~ 0.5 % (Max)                      | I/P : 230 VAC<br>O/P : FULL~NO LOAD<br>Ta : 25°C                                                                    | V1 : -0.07 %~ 0.88 %                   | PASS    |
| 6  | SET UP TIME              | 230VAC : 500 ms (Max)<br>115VAC : 500 ms(Max) | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : 95% LOAD<br>Ta : 25°C                                                       | 230VAC/ 228 ms<br>115VAC/ 230 ms       | PASS    |
| 7  | RISE TIME                | 230VAC : 80 ms (Max)<br>115VAC : 80 ms (Max)  | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : 95% LOAD<br>Ta : 25°C                                                       | 230VAC/ 65 ms<br>115VAC/ 65 ms         | PASS    |
| 8  | HOLD UP TIME             | 230VAC : 16 ms (TYP)<br>115VAC : 16 ms (TYP)  | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                      | 230VAC/ 28 ms<br>115VAC/ 19 ms         | PASS    |
| 9  | OVER/UNDERSHOOT TEST     | < ±5%                                         | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                       | TEST : < 5 %                           | PASS    |
| 10 | DYNAMIC LOAD             | V1 : 2400 mVp-p                               | I/P : 230 VAC<br>(1).O/P : FULL /NO LOAD 90%DUTY/<br>1KHZ<br>(2).O/P : FULL /NO LOAD 50%DUTY/<br>120HZ<br>Ta : 25°C | (1) 252 mVp-p<br>(2) 824 mVp-p         | PASS    |

## INPUT FUNCTION TEST

| NO | TEST ITEM                 | SPECIFICATION                                                                                                                                                                                           | TEST CONDITION                                                                                                                                                                                                                           | RESULT                                                                  | VERDICT |
|----|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|---------|
| 1  | INPUT VOLTAGE RANGE       | 90 VAC~305 VAC                                                                                                                                                                                          | I/P : TESTING<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                                                                            | 87 V~305 V                                                              | PASS    |
|    |                           |                                                                                                                                                                                                         | I/P :<br>(1)LOW-LINE-3V=87 V<br>HIGH-LINE+10V=315 V<br>O/P : FULL/MIN LOAD<br>ON : 30 Sec OFF : 30 Sec 10MIN<br>(2)230VAC<br>ON : 0.5 Sec OFF : 0.5 Sec 20MIN<br>(3)230VAC<br>ON : 3Sec OFF : 3Sec 12HOURS<br>( POWER ON/OFF NO DAMAGE ) | TEST :<br>(1) OK<br>(2) OK<br>(3) OK                                    |         |
| 2  | INPUT FREQUENCY RANGE     | 47HZ ~63 HZ<br>NO DAMAGE OSC                                                                                                                                                                            | I/P : 90 VAC ~ 305 VAC<br>O/P : FULL ~NO LOAD<br>Ta : 25°C                                                                                                                                                                               | TEST : OK                                                               | PASS    |
| 3  | POWER FACTOR              | 115V/ 0.97 (TYP)<br>230V/ 0.95 (TYP)<br>277V/ 0.92 (TYP)                                                                                                                                                | I/P : 115 VAC<br>I/P : 230 VAC<br>I/P : 277 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                                          | PF= 0.996 / 115 VAC<br>PF= 0.977 / 230 VAC<br>PF= 0.941 / 277 VAC       | PASS    |
| 4  | EFFICIENCY                | 89% (TYP)                                                                                                                                                                                               | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                                                                            | 89.79%                                                                  | PASS    |
| 5  | INPUT CURRENT             | 115V/ 0.6 A (TYP)<br>230V/ 0.3 A (TYP)<br>277V/ 0.25 A (TYP)                                                                                                                                            | I/P : 115 VAC<br>I/P : 230 VAC<br>I/P : 277 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                                          | I = 0.390 A / 115 VAC<br>I = 0.198 A / 230 VAC<br>I = 0.167 A / 277 VAC | PASS    |
| 6  | INRUSH CURRENT            | 230V/ 50 A (TYP)<br>Twidth =270 us measured at 50% Ipeak<br>COLD START                                                                                                                                  | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                                                                            | I = 46.0 A<br>Twidth = 182 us                                           | PASS    |
| 7  | LEAKAGE CURRENT           | < 0.25 mA / 277 VAC                                                                                                                                                                                     | I/P : 305 VAC<br>O/P : NO LOAD<br>Ta : 25°C                                                                                                                                                                                              | L-CASE : 0.003 mA<br>N-CASE : 0.003 mA                                  | PASS    |
| 8  | NO LOAD CONSUMPTION       | < 0.15 W                                                                                                                                                                                                | I/P : 230VAC<br>O/P : NO LOAD<br>Ta : 25°C                                                                                                                                                                                               | 0.10 W                                                                  | PASS    |
| 9  | TOTAL HARMONIC DISTORTION | Total harmonic distortion will be lower than 20% when output loading is 60% or higher at 230V/115VAC<br>Total harmonic distortion will be lower than 20% when output loading is 75% or higher at 277VAC | I/P : 115 VAC<br>I/P : 230 VAC<br>O/P : 60% LOAD<br>I/P : 277 VAC<br>O/P : 75%LOAD<br>Ta : 25°C                                                                                                                                          | THD : 6.62% /115VAC<br>THD : 15.04% /230VAC<br>THD : 15.24% /277VAC     | PASS    |

### PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                          | TEST CONDITION                                                                | RESULT                                                                                                                                         | VERDICT |
|----|-----------------------------|----------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 1  | OVER LOAD PROTECTION        | 95 % ~ 108 %                           | I/P : 100 VAC<br>I/P : 230 VAC<br>I/P : 305 VAC<br>O/P : TESTING<br>Ta : 25°C | 100.0 %/ 100 VAC<br>100.0 %/ 230 VAC<br>100.0 %/ 305 VAC<br>Constant current limiting, recovers automatically after fault condition is removed | PASS    |
| 2  | OVER VOLTAGE PROTECTION     | CH1 : 28 V ~ 34 V                      | I/P : 90 VAC<br>I/P : 230 VAC<br>I/P : 305 VAC<br>O/P : NO LOAD<br>Ta : 25°C  | 29.2 V/ 90 VAC<br>29.1 V/ 230 VAC<br>29.1 V/ 305 VAC<br>Shut down o/p voltage , re-power on to recover                                         | PASS    |
| 3  | OVER TEMPERATURE PROTECTION | SPEC : O.T.P.<br>NO DAMAGE             | I/P : 230 VAC<br>O/P : FULL LOAD                                              | O.T.P. Active<br>Shut down o/p voltage , re-power on to recover                                                                                | PASS    |
| 4  | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P : 305 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                 | NO DAMAGE<br>Hiccup mode , recovers automatically after fault condition is removed                                                             | PASS    |

### COMPONENT STRESS TEST

| NO | TEST ITEM                                                 | SPECIFICATION            | TEST CONDITION                                                                                                                                | RESULT                                 | VERDICT |
|----|-----------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|---------|
| 1  | Power Transistor<br>( D to S ) or ( C to E ) Peak Voltage | Q2 Rated<br>800 V 9A     | I/P : High-Line +3V = 308 V<br>O/P : (1)FULL LOAD Turn on<br>(2) Output Short<br>(3) FULL LOAD continue<br>Ta : 25°C                          | (1) 590 V<br>(2) 584 V<br>(3) 590 V    | PASS    |
| 2  | Diode Peak Voltage                                        | D100 Rated<br>150 V 30 A | I/P : High-Line +3V = 308 V<br>O/P : (1) FULL LOAD Turn on<br>(2)Output Short<br>(3) FULL LOAD continue<br>Ta : 25°C                          | (1) 119 V<br>(2) 93.6 V<br>(3) 118 V   | PASS    |
| 3  | Input Capacitor Voltage                                   | C5 Rated<br>33uF / 450 V | I/P : High-Line +3V = 308 V<br>O/P : (1) FULL LOAD Turn on /Off<br>(2) NO LOAD Turn on /Off<br>(3) FULL LOAD /Min load<br>Change<br>Ta : 25°C | (1) 442 V<br>(2) 448 V<br>(3) 442 V    | PASS    |
| 4  | Control IC Voltage Test                                   | U1 Rated<br>28V          | I/P : High-Line +3V = 308 V<br>O/P : (1) FULL LOAD Turn on /Off<br>(2) NO LOAD Turn on /Off<br>(3) FULL LOAD /Min load<br>Change<br>Ta : 25°C | (1) 17.4 V<br>(2) 17.3 V<br>(3) 17.4 V | PASS    |
| 5  | PFC Transistor<br>( D to S ) or ( C to E ) Peak Voltage   | Q1 Rated<br>600 V 10A    | I/P : High-Line +3V = 308 V<br>O/P : (1)FULL LOAD Turn on<br>(2) Output Short<br>(3) FULL LOAD continue<br>Ta : 25°C                          | (1) 443 V<br>(2) 444 V<br>(3) 444 V    | PASS    |

## ■ SAFETY & E.M.C. TEST

### SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION           | TEST CONDITION                        | RESULT                          | VERDICT |
|----|----------------------|-------------------------|---------------------------------------|---------------------------------|---------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P : 3.75 KVAC/min | I/P-O/P : 4.2 KVAC/min<br>Ta : 25°C   | I/P-O/P : 2.680 mA<br>NO DAMAGE | PASS    |
| 2  | ISOLATION RESISTANCE | I/P-O/P : 500VDC>100MΩ  | I/P-O/P : 500 VDC<br>Ta : 25°C /70%RH | I/P-O/P : >9999 MΩ<br>NO DAMAGE | PASS    |

### E.M.C TEST

| NO | TEST ITEM                                   | SPECIFICATION                                          | TEST CONDITION                                                                                         | RESULT                      | VERDICT |
|----|---------------------------------------------|--------------------------------------------------------|--------------------------------------------------------------------------------------------------------|-----------------------------|---------|
| 1  | HARMONIC                                    | EN61000-3-2<br>CLASS C                                 | I/P : 115VAC/230VAC/50HZ<br>O/P : 60%/FULL LOAD<br>I/P : 277VAC/50HZ<br>O/P : 75%/FULL LOAD<br>Ta:25°C | OK                          | PASS    |
| 2  | CONDUCTION                                  | EN55015                                                | I/P : 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                                                         | OK<br>Test by certified Lab | PASS    |
| 3  | RADIATION                                   | EN55015                                                | I/P : 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                                                         | OK<br>Test by certified Lab | PASS    |
| 4  | E.S.D                                       | EN61000-4-2<br>LIGHT INDUSTRY<br>AIR:8KV / Contact:4KV | I/P : 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                                                         | CRITERIA A                  | PASS    |
| 5  | E.F.T                                       | EN61000-4-4<br>LIGHT INDUSTRY<br>INPUT : 1KV           | I/P : 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                                                         | CRITERIA A                  | PASS    |
| 6  | SURGE                                       | IEC61000-4-5<br>INDUSTRY<br>L-N :2KV                   | I/P : 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                                                         | CRITERIA A                  | PASS    |
| 7  | Test by certified Lab & Test Report Prepare |                                                        |                                                                                                        |                             |         |

## RELIABILITY TEST

### ENVIRONMENT TEST

| NO | TEST ITEM                                                         | SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TEST CONDITION                                                     | RESULT           | VERDICT |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
|----|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|------------------|---------|----------|-----------------------------|-----------------------------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|-----|--------|--------|---|------|--------|--------|---|------|--------|--------|----|----|--------|--------|----|----|--------|--------|----|------|--------|--------|----|------|--------|--------|----|----|--------|--------|------|
| 1  | TEMPERATURE RISE TEST                                             | <div>MODEL : NPF-40-24</div> <div>1. ROOM AMBIENT BURN-IN : 2 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta=28.4 °C</div> <div>2. HIGH AMBIENT BURN-IN : 2 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta=49.5 °C</div> <table><thead><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT<br/>Ta= 28.4 °C</th><th>HIGH AMBIENT<br/>Ta= 49.5 °C</th></tr></thead><tbody><tr><td>1</td><td>L3</td><td>46.3°C</td><td>65.1°C</td></tr><tr><td>2</td><td>Q1</td><td>53.8°C</td><td>72.7°C</td></tr><tr><td>3</td><td>Q2</td><td>55.3°C</td><td>74.2°C</td></tr><tr><td>4</td><td>D6</td><td>52.0°C</td><td>70.8°C</td></tr><tr><td>5</td><td>C5</td><td>50.7°C</td><td>69.1°C</td></tr><tr><td>6</td><td>T1</td><td>55.4°C</td><td>74.0°C</td></tr><tr><td>7</td><td>C45</td><td>50.1°C</td><td>68.7°C</td></tr><tr><td>8</td><td>D100</td><td>52.0°C</td><td>71.1°C</td></tr><tr><td>9</td><td>C105</td><td>50.8°C</td><td>69.6°C</td></tr><tr><td>10</td><td>R5</td><td>52.8°C</td><td>71.6°C</td></tr><tr><td>11</td><td>U1</td><td>50.8°C</td><td>69.8°C</td></tr><tr><td>12</td><td>U100</td><td>47.4°C</td><td>66.2°C</td></tr><tr><td>13</td><td>RTH2</td><td>49.1°C</td><td>67.7°C</td></tr><tr><td>14</td><td>Tc</td><td>46.8°C</td><td>66.0°C</td></tr></tbody></table> |                                                                    |                  | NO      | Position | ROOM AMBIENT<br>Ta= 28.4 °C | HIGH AMBIENT<br>Ta= 49.5 °C | 1 | L3 | 46.3°C | 65.1°C | 2 | Q1 | 53.8°C | 72.7°C | 3 | Q2 | 55.3°C | 74.2°C | 4 | D6 | 52.0°C | 70.8°C | 5 | C5 | 50.7°C | 69.1°C | 6 | T1 | 55.4°C | 74.0°C | 7 | C45 | 50.1°C | 68.7°C | 8 | D100 | 52.0°C | 71.1°C | 9 | C105 | 50.8°C | 69.6°C | 10 | R5 | 52.8°C | 71.6°C | 11 | U1 | 50.8°C | 69.8°C | 12 | U100 | 47.4°C | 66.2°C | 13 | RTH2 | 49.1°C | 67.7°C | 14 | Tc | 46.8°C | 66.0°C | PASS |
| NO | Position                                                          | ROOM AMBIENT<br>Ta= 28.4 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | HIGH AMBIENT<br>Ta= 49.5 °C                                        |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 1  | L3                                                                | 46.3°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 65.1°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 2  | Q1                                                                | 53.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 72.7°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 3  | Q2                                                                | 55.3°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 74.2°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 4  | D6                                                                | 52.0°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 70.8°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 5  | C5                                                                | 50.7°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 69.1°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 6  | T1                                                                | 55.4°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 74.0°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 7  | C45                                                               | 50.1°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 68.7°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 8  | D100                                                              | 52.0°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 71.1°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 9  | C105                                                              | 50.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 69.6°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 10 | R5                                                                | 52.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 71.6°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 11 | U1                                                                | 50.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 69.8°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 12 | U100                                                              | 47.4°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 66.2°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 13 | RTH2                                                              | 49.1°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 67.7°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 14 | Tc                                                                | 46.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 66.0°C                                                             |                  |         |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 2  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | I/P : 305VAC/100VAC<br>O/P : FULL LOAD<br>Ta= -45°C/-30°C          | TEST : OK        | PASS    |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 3  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 50 °C<br>NO DAMAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | I/P : 315 VAC<br>O/P : FULL LOAD<br>Ta= 50 °C<br>HUMIDITY= 95% R.H | TEST : OK        | PASS    |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 4  | TEMPERATURE<br>COEFFICIENT                                        | ±0.03 %(0~50°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | I/P : 230 VAC<br>O/P : FULL LOAD                                   | ±0.004 %(0~50°C) | PASS    |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 5  | STORAGE TEMPERATURE TEST                                          | 1. Thermal shock Temperature : -45°C~ +85°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 : 5 CYCLE<br>5. Input/Output condition : STATIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                    | OK               | PASS    |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |
| 6  | THERMAL SHOCK TEST                                                | 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 : 10 CYCLE<br>5. Input/Output condition : 230VAC/FULL LOAD AC ON/OFF TEST<br>turn on 58sec ; turn off 2sec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                    | OK               | PASS    |          |                             |                             |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |     |        |        |   |      |        |        |   |      |        |        |    |    |        |        |    |    |        |        |    |      |        |        |    |      |        |        |    |    |        |        |      |

|    |                             |                                                                                                                                                                                                                                                                           |                                                                     |      |
|----|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|------|
| 7  | 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 : 90min in each axis (X.Y.Z)<br>(6) Ta : 25℃                                                                     | TEST : OK                                                           | PASS |
| 8  | CAPACITOR<br>LIFE CYCLE     | NPF-40-24 : SUPPOSE C105 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 230VAC O/P : FULL LOAD Ta=25℃ LIFE TIME<br>(2) I/P : 230VAC O/P : FULL LOAD Ta=50℃ LIFE TIME<br>(3) I/P : 230VAC O/P : 75% LOAD Ta=50℃ LIFE TIME<br>(4) I/P : 230VAC O/P : 50% LOAD Ta=50℃ LIFE TIME | (1) 459368 HRS<br>(2) 95281 HRS<br>(3) 121390 HRS<br>(4) 129189 HRS | PASS |
| 9  | MTBF                        | MIL-HDBK-217F NOTICES2 PARTS COUNT<br>TOTAL FAILURE RATE : 368KHRS                                                                                                                                                                                                        |                                                                     | PASS |
| 10 | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure(Expected Life) :<br>50000 hours @ Tcase 70℃                                                                                                                                                                                       |                                                                     | PASS |

| TEST RESULT | TESTER          | REVIEW | APPROVAL |
|-------------|-----------------|--------|----------|
| PASS        | ZHANGZJ/ ZHUOKB | SKY    | LIUWY    |

2009/08/04 A50-G058