



# Test Report: WDR-120-48

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240W Single Output Switching Power 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                                               | VERDICT |
|----|--------------------------------|-------------------------------------------------|---------------------------------------------------------------------|------------------------------------------------------|---------|
| 1  | RIPPLE & NOISE                 | V1 : 150 mVp-p (Max )                           | I/P : 400VAC<br>O/P : FULL LOAD<br>Ta : 25°C                        | V1 : 23.4 mVp-p (Max )                               | P       |
| 2  | OUTPUT VOLTAGE<br>ADJUST RANGE | CH1 : 48 V ~ 58 V                               | I/P : 400 VAC<br>I/P : 230 VAC<br>O/P : MIN LOAD<br>Ta : 25°C       | 45.7 V ~ 60.6 V/ 400 VAC<br>45.7 V ~ 60.6 V/ 230 VAC | P       |
| 3  | OUTPUT VOLTAGE<br>TOLERANCE    | V1 : 1 %~ 1 % (Max)                             | I/P : 200 VAC / 550 VAC<br>O/P : FULL/ MIN LOAD<br>Ta : 25°C        | V1 : 0.02 %~ -0.02 %                                 | P       |
| 4  | LINE REGULATION                | V1 : 0.5 %~ 0.5 % (Max)                         | I/P : 200 VAC ~ 550 VAC<br>O/P : FULL LOAD<br>Ta : 25°C             | V1 : 0.02 %~ -0.02 %                                 | P       |
| 5  | LOAD REGULATION                | V1 : 0.5 %~ 0.5 % (Max)                         | I/P : 400 VAC<br>O/P : FULL ~MIN LOAD<br>Ta : 25°C                  | V1 : 0.02 %~ -0.02 %                                 | P       |
| 6  | SET UP TIME                    | 400VAC : 2000 ms (Max)<br>230VAC : 2000 ms(Max) | I/P : 400 VAC<br>I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C      | 400VAC/ 378 ms<br>230VAC/ 357 ms                     | P       |
| 7  | RISE TIME                      | 400VAC : 70 ms (Max)<br>230VAC : 70 ms (Max)    | I/P : 400 VAC<br>I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C      | 400VAC/ 39 ms<br>230VAC/ 28 ms                       | P       |
| 8  | HOLD UP TIME                   | 400VAC : 50 ms (TYP)<br>230VAC : 10 ms (TYP)    | I/P : 400 VAC<br>I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C      | 400VAC/ 63 ms<br>230VAC/ 12.9 ms                     | P       |
| 9  | OVER/UNDERSHOOT<br>TEST        | < ±5%                                           | I/P : 400 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                       | TEST : < 5 %                                         | P       |
| 10 | DYNAMIC LOAD                   | V1 : 4800 mVp-p                                 | I/P : 400 VAC<br>O/P : FULL /Min LOAD 90%DUTY/<br>1KHZ<br>Ta : 25°C | 201 mVp-p                                            | P       |

## INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECIFICATION                          | TEST CONDITION                                                                                                                                                                                   | RESULT                                      | VERDICT |
|----|-----------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|---------|
| 1  | INPUT VOLTAGE RANGE   | 200VAC ~ 550 VAC                       | I/P : TESTING<br>O/P : FULL LOAD<br>Ta : 25°C<br>I/P :<br>LOW-LINE-3V= 197 V<br>HIGH-LINE+10V= 560 V<br>O/P : FULL/MIN LOAD<br>ON : 30 Sec . OFF : 30 Sec 10MIN<br>( AC POWER ON/OFF NO DAMAGE ) | 165 V~550V<br><br>TEST : OK                 | P       |
| 2  | INPUT FREQUENCY RANGE | 47HZ ~63 HZ<br>NO DAMAGE               | I/P : 200 VAC ~ 550 VAC<br>O/P : FULL~MIN LOAD<br>Ta : 25°C                                                                                                                                      | TEST : OK                                   | P       |
| 3  | EFFICIENCY            | 92 % (TYP)                             | I/P : 400 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                                    | 93 %                                        | P       |
| 4  | INPUT CURRENT         | 400V/ 0.7 A (TYP)<br>230V/ 1.2 A (TYP) | I/P : 400 VAC<br>I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                   | I = 0.693 A/ 400 VAC<br>I = 0.99 A/ 230 VAC | P       |
| 5  | INRUSH CURRENT        | 400V/ 50 A (TYP)<br><br>COLD START     | I/P : 400 VAC<br>I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                   | I = 47 A/ 400 VAC                           | P       |
| 6  | LEAKAGE CURRENT       | < 3.5 mA / 530 VAC                     | I/P : 530 VAC<br>O/P : Min LOAD<br>Ta : 25°C                                                                                                                                                     | L-FG : 1.3 mA<br>N-FG : 1.3 mA              | P       |

## PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                                  | TEST CONDITION                                                | RESULT                                                                                            | VERDICT |
|----|-----------------------------|------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------|---------|
| 1  | OVER LOAD PROTECTION        | 105 % ~ 130 %                                  | I/P : 400 VAC<br>I/P : 230 VAC<br>O/P : TESTING<br>Ta : 25°C  | 119 %/ 400 VAC<br>119 %/ 230 VAC<br>Constant Current Limiting                                     | P       |
| 2  | OVER VOLTAGE PROTECTION     | CH1 : 60 V ~ 67 V                              | I/P : 400 VAC<br>I/P : 230 VAC<br>O/P : MIN LOAD<br>Ta : 25°C | 63.8 V/ 400 VAC<br>63.8 V/ 230 VAC<br>Shut down Re- power ON                                      | P       |
| 3  | OVER TEMPERATURE PROTECTION | SPEC :<br>TSW1 : 105 ± 5°C O.T.P.<br>NO DAMAGE | I/P : 400 VAC<br>O/P : FULL LOAD                              | O.T.P. Active<br>Shut down o/p voltage , recovers<br>automatically after temperature<br>goes down | P       |
| 4  | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE         | I/P : 550 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                 | NO DAMAGE<br>Constant Current Limiting                                                            | P       |

## CONTROL FUNCTION TEST

| NO | TEST ITEM    | SPECIFICATION                                      | TEST CONDITION                | RESULT | VERDICT |
|----|--------------|----------------------------------------------------|-------------------------------|--------|---------|
| 1  | DC OK SIGNAL | Relay contact rating(max.) :<br>30V / 1A resistive | I/P: 400 VAC<br>O/P:FULL LOAD | OK     | P       |

## COMPONENT STRESS TEST

| NO | TEST ITEM                                             | SPECIFICATION                      | TEST CONDITION                                                                                                                                 | RESULT                                    | VERDICT |
|----|-------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|---------|
| 1  | Power Transistor<br>(D to S) or (C to E) Peak Voltage | Q1 Rated :<br>STP7N95K3 7A/950V    | I/P : High-Line +3V = 553 V<br>O/P : (1) Full Load Turn on<br>(2) Output Short<br>(3) Full load continue<br>Ta : 25°C                          | (1) 724V<br>(2) 430V<br>(3) 478V          | P       |
| 2  | Diode Peak Voltage                                    | Q102 Rated :<br>SF10LC40 10A/400V  | I/P : High-Line +3V = 553 V<br>O/P : (1) Full Load Turn on<br>(2) Output Short<br>(3) Full load continue<br>Ta : 25°C                          | (1) 354V<br>(2) 320V<br>(3) 278V          | P       |
| 3  | Input Capacitor Voltage                               | C5 Rated :<br>120u/400V 105°C VZ   | I/P : High-Line +3V = 553 V<br>O/P : (1) Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3) Full Load /Min load<br>Change<br>Ta : 25°C | (1) 387.2 V<br>(2) 388.6 V<br>(3) 386.1 V | P       |
| 4  | Control IC Voltage Test                               | U1 Rated :<br>NCP1377DR2G 8.2V~18V | I/P : High-Line +3V = 553 V<br>O/P : (1) Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3) Full Load /Min load<br>Change<br>Ta : 25°C | (1) 14.71 V<br>(2) 14.67 V<br>(3) 14.7 V  | P       |

## SAFETY & E.M.C. TEST

### SAFETY TEST

| NO | TEST ITEM            | SPECIFICATION                                                                                   | TEST CONDITION                                                                                                  | RESULT                                                                                        | VERDICT |
|----|----------------------|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|---------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P : 3 KVAC/min<br>I/P-FG : 2 KVAC/min<br>O/P-FG : 0.5 KVAC/min<br>O/P-DCOK : 0.5 KVAC/min | I/P-O/P : 3.6 KVAC/min<br>I/P-FG : 2.4 KVAC/min<br>O/P-FG : 0.6 KVAC/min<br>O/P-DCOK : 0.6KVAC/min<br>Ta : 25°C | I/P-O/P : 6.58 mA<br>I/P-FG : 6.07 mA<br>O/P-FG : 3.74 mA<br>O/P-DCOK : 0.021 mA<br>NO DAMAGE | P       |
| 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 / 70%RH                                  | I/P-O/P : 30 GΩ<br>I/P-FG : 30 GΩ<br>O/P-FG : 30 GΩ<br>NO DAMAGE                              | P       |
| 3  | GROUNDING CONTINUITY | FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                                                          | 40 A / 2min<br>Ta : 25°C / 70%RH                                                                                | 28 mΩ                                                                                         | P       |
| 4  | APPROVAL             | TUV : Certificate NO :<br>UL : File NO : E215312                                                |                                                                                                                 |                                                                                               | P       |

## E.M.C TEST

| NO | TEST ITEM                                   | SPECIFICATION                                         | TEST CONDITION                                                      | RESULT                        | VERDICT |
|----|---------------------------------------------|-------------------------------------------------------|---------------------------------------------------------------------|-------------------------------|---------|
| 1  | HARMONIC                                    | EN61000-3-2<br>CLASS A                                | I/P : 400/240/220 VAC/50HZ<br>O/P : 100/75/50/25% LOAD<br>Ta : 25°C | PASS                          | P       |
| 2  | CONDUCTION                                  | EN55022 EN55011<br>CLASS B                            | I/P : 400 VAC (50HZ)/115V60HZ<br>O/P : FULL/50% LOAD<br>Ta : 25°C   | PASS<br>Test by certified Lab | P       |
| 3  | RADIATION                                   | EN55022 EN55011<br>CLASS B                            | I/P : 400 VAC (50HZ)/115V60HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | PASS<br>Test by certified Lab | P       |
| 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                    | P       |
| 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                    | P       |
| 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                    | P       |
| 7  | Test by certified Lab & Test Report Prepare |                                                       |                                                                     |                               |         |

## RELIABILITY TEST

### ENVIRONMENT TEST

| NO | TEST ITEM                                                         | SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | TEST CONDITION                                                     | RESULT                      | VERDICT |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
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| 1  | TEMPERATURE RISE TEST                                             | <div>MODEL : WDR-120-24</div> <div>1. ROOM AMBIENT BURN-IN : 0.5 HRS</div> <div>I/P : 400VAC O/P : FULL LOAD Ta= 25.6 °C</div> <div>2. HIGH AMBIENT BURN-IN : 4 HRS</div> <div>I/P : 400VAC O/P : FULL LOAD Ta= 61.1 °C</div> <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT<br/>Ta= 25.6 °C</th><th>HIGH AMBIENT<br/>Ta= 61.1 °C</th></tr><tr><td>1</td><td>LF1</td><td>TR560</td><td>48.3°C</td><td>80.1°C</td></tr><tr><td>2</td><td>BD1</td><td>BD 8A/1000V GLASS GBU810</td><td>58.5°C</td><td>88.7°C</td></tr><tr><td>3</td><td>Q2</td><td>STP7N95K3 7A/950V</td><td>52.1°C</td><td>87.2°C</td></tr><tr><td>4</td><td>C5</td><td>100u/400V 105°C 18*31.5 KMG</td><td>52.6°C</td><td>85.8°C</td></tr><tr><td>5</td><td>C51</td><td>47u/50V UL10Kh 6.3*11 YXM</td><td>59.4°C</td><td>93.7°C</td></tr><tr><td>6</td><td>T1 COIL</td><td>TF1952</td><td>78.4°C</td><td>112.0°C</td></tr><tr><td>7</td><td>C200</td><td>47u/50V UL10Kh 6.3*11 YXM</td><td>63.5°C</td><td>97.0°C</td></tr><tr><td>8</td><td>Q102</td><td>STP75NF20 75A/200V</td><td>72.7°C</td><td>111.2°C</td></tr><tr><td>9</td><td>C106</td><td>680u/35V UL10Kh 10*23 ZLH</td><td>59.6°C</td><td>94.2°C</td></tr><tr><td>10</td><td>U1</td><td>NCP1377</td><td>54.8°C</td><td>87.7°C</td></tr><tr><td>11</td><td>TSW1</td><td>ST-22W-R3 105°C 60mm</td><td>65.9°C</td><td>102.8°C</td></tr><tr><td>12</td><td>C111</td><td>103/2KV EPOXY 80,-20%</td><td>49.7°C</td><td>83.1°C</td></tr><tr><td>13</td><td>LF100</td><td>TR847-R2</td><td>52.5°C</td><td>86.1°C</td></tr><tr><td>14</td><td>LF2</td><td>TR368</td><td>48.7°C</td><td>81.4°C</td></tr><tr><td>15</td><td>D20</td><td>BYV26EGP 1A/1KV</td><td>52.8°C</td><td>88.4°C</td></tr></table> |                                                                    |                             | NO      | Position | P/N | ROOM AMBIENT<br>Ta= 25.6 °C | HIGH AMBIENT<br>Ta= 61.1 °C | 1 | LF1 | TR560 | 48.3°C | 80.1°C | 2 | BD1 | BD 8A/1000V GLASS GBU810 | 58.5°C | 88.7°C | 3 | Q2 | STP7N95K3 7A/950V | 52.1°C | 87.2°C | 4 | C5 | 100u/400V 105°C 18*31.5 KMG | 52.6°C | 85.8°C | 5 | C51 | 47u/50V UL10Kh 6.3*11 YXM | 59.4°C | 93.7°C | 6 | T1 COIL | TF1952 | 78.4°C | 112.0°C | 7 | C200 | 47u/50V UL10Kh 6.3*11 YXM | 63.5°C | 97.0°C | 8 | Q102 | STP75NF20 75A/200V | 72.7°C | 111.2°C | 9 | C106 | 680u/35V UL10Kh 10*23 ZLH | 59.6°C | 94.2°C | 10 | U1 | NCP1377 | 54.8°C | 87.7°C | 11 | TSW1 | ST-22W-R3 105°C 60mm | 65.9°C | 102.8°C | 12 | C111 | 103/2KV EPOXY 80,-20% | 49.7°C | 83.1°C | 13 | LF100 | TR847-R2 | 52.5°C | 86.1°C | 14 | LF2 | TR368 | 48.7°C | 81.4°C | 15 | D20 | BYV26EGP 1A/1KV | 52.8°C | 88.4°C | P |
| NO | Position                                                          | P/N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | ROOM AMBIENT<br>Ta= 25.6 °C                                        | HIGH AMBIENT<br>Ta= 61.1 °C |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 1  | LF1                                                               | TR560                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 48.3°C                                                             | 80.1°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 2  | BD1                                                               | BD 8A/1000V GLASS GBU810                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 58.5°C                                                             | 88.7°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 3  | Q2                                                                | STP7N95K3 7A/950V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 52.1°C                                                             | 87.2°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 4  | C5                                                                | 100u/400V 105°C 18*31.5 KMG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 52.6°C                                                             | 85.8°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 5  | C51                                                               | 47u/50V UL10Kh 6.3*11 YXM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 59.4°C                                                             | 93.7°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 6  | T1 COIL                                                           | TF1952                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 78.4°C                                                             | 112.0°C                     |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 7  | C200                                                              | 47u/50V UL10Kh 6.3*11 YXM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 63.5°C                                                             | 97.0°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 8  | Q102                                                              | STP75NF20 75A/200V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 72.7°C                                                             | 111.2°C                     |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 9  | C106                                                              | 680u/35V UL10Kh 10*23 ZLH                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 59.6°C                                                             | 94.2°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 10 | U1                                                                | NCP1377                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 54.8°C                                                             | 87.7°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 11 | TSW1                                                              | ST-22W-R3 105°C 60mm                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 65.9°C                                                             | 102.8°C                     |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 12 | C111                                                              | 103/2KV EPOXY 80,-20%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 49.7°C                                                             | 83.1°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 13 | LF100                                                             | TR847-R2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 52.5°C                                                             | 86.1°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 14 | LF2                                                               | TR368                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 48.7°C                                                             | 81.4°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 15 | D20                                                               | BYV26EGP 1A/1KV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 52.8°C                                                             | 88.4°C                      |         |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 2  | OVER LOAD BURN-IN TEST                                            | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | I/P : 400 VAC<br>O/P : 114 % LOAD<br>Ta : 25°C                     | TEST : OK                   | P       |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | I/P : 550VAC/100VAC<br>O/P : 100 % LOAD<br>Ta= -30 °C              | TEST : OK                   | P       |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 60 °C<br>NO DAMAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | I/P : 567 VAC<br>O/P : FULL LOAD<br>Ta= 60 °C<br>HUMIDITY= 95 %R.H | TEST : OK                   | P       |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 5  | TEMPERATURE<br>COEFFICIENT                                        | ± 0.03 %(0~50°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | I/P : 400 VAC<br>O/P : FULL LOAD                                   | ± 0.003 %(0~50°C)           | P       |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 6  | STORAGE TEMPERATURE TEST                                          | 1. Thermal shock Temperature : -45°C~ +90°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 5 CYCLE<br>5. Input/Output condition : STATIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                    | OK                          | P       |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |
| 7  | THERMAL SHOCK TEST                                                | 1. Thermal shock Temperature : -30°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 : 400VAC/Full Load AC ON/OFF TEST<br>turn on 58sec ; turn off 2sec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                    | OK                          | P       |          |     |                             |                             |   |     |       |        |        |   |     |                          |        |        |   |    |                   |        |        |   |    |                             |        |        |   |     |                           |        |        |   |         |        |        |         |   |      |                           |        |        |   |      |                    |        |         |   |      |                           |        |        |    |    |         |        |        |    |      |                      |        |         |    |      |                       |        |        |    |       |          |        |        |    |     |       |        |        |    |     |                 |        |        |   |

|    |                         |                                                                                                                                                                                                                            |                                                     |   |
|----|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|---|
| 8  | VIBRATION TEST          | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(3) Sweep Time : 10min/sweep cycle<br>(4) Acceleration : 2G<br>(5) Test Time : 60min in each axis (X.Y.Z)<br>(6) Ta : 25℃                      | TEST : OK                                           | P |
| 9  | CAPACITOR<br>LIFE CYCLE | WDR-120-24:SUPPOSE C106 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 400VAC O/P : FULL LOAD Ta= 25 ℃ LIFE TIME<br>(2) I/P : 400VAC O/P : FULL LOAD Ta= 60 ℃ LIFE TIME<br>(3) I/P : 400VAC O/P : 75% LOAD Ta= 60 ℃ LIFE TIME | (1) 289302.5HRS<br>(2) 27200.4HRS<br>(3) 48077.9HRS | P |
| 10 | MTBF                    | MIL-HDBK-217F NOTICES2 PARTS COUNT<br>TOTAL FAILURE RATE : 268K HRS                                                                                                                                                        |                                                     | P |

| DATE       | SAMPLE    | TEST RESULT | TESTER     | APPROVAL      |
|------------|-----------|-------------|------------|---------------|
| 2009/11/3  | RD SAMPLE | PASS        | SANFORD SU | VINCENT TSENG |
| 2009/12/17 | W0911C65  | PASS        | SANFORD SU | VINCENT TSENG |

2009/08/04 A50-F023