



# Test Report: LRS-50-48

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50W 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

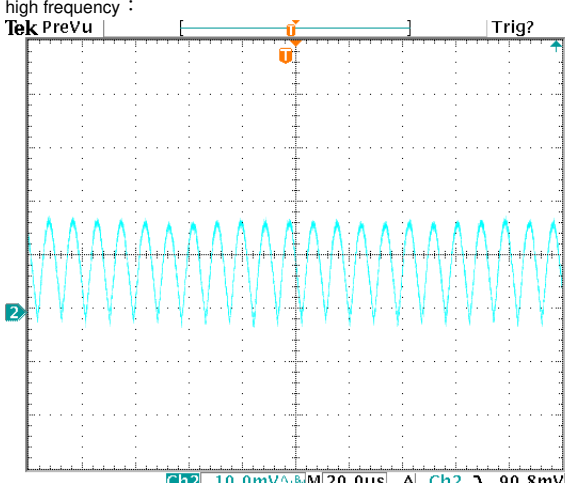
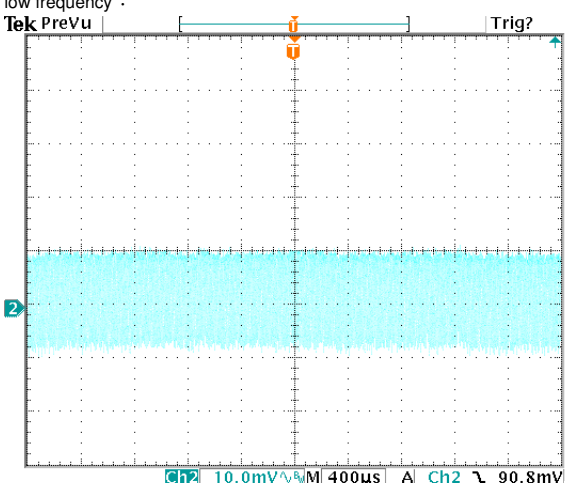
E.M.C. Test

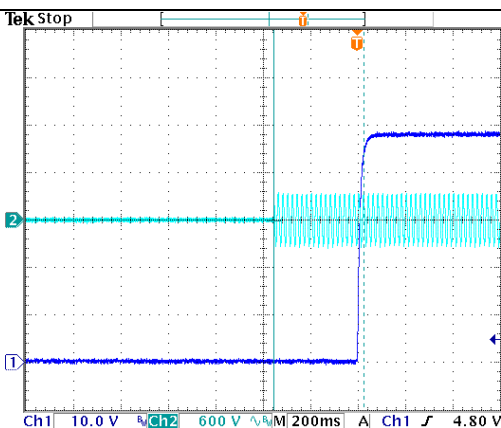
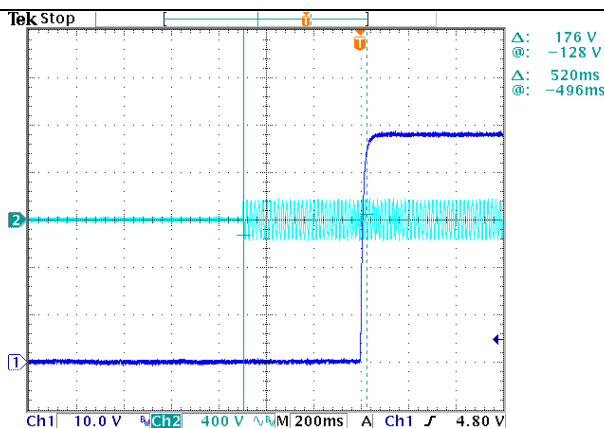
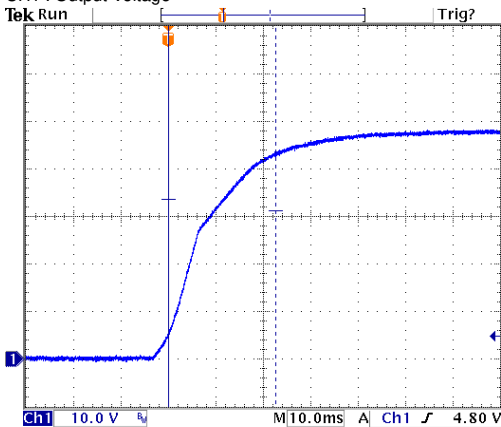
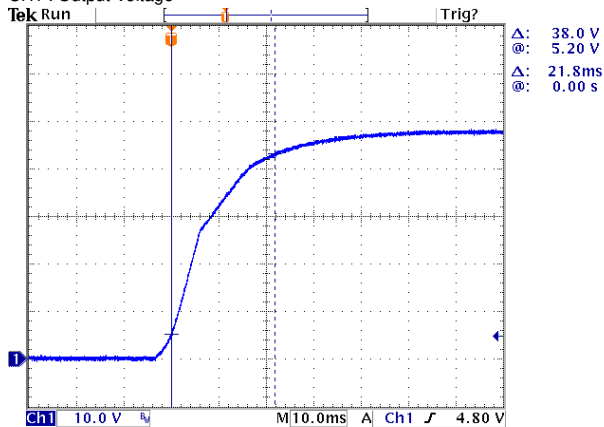
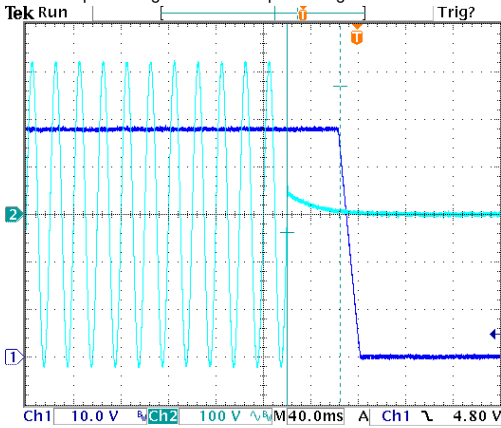
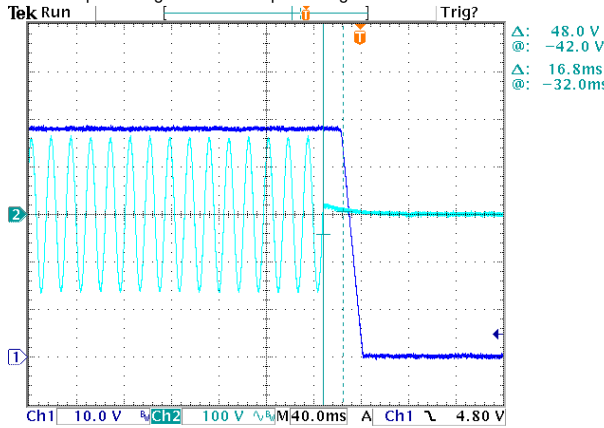
## ■ RELIABILITY TEST

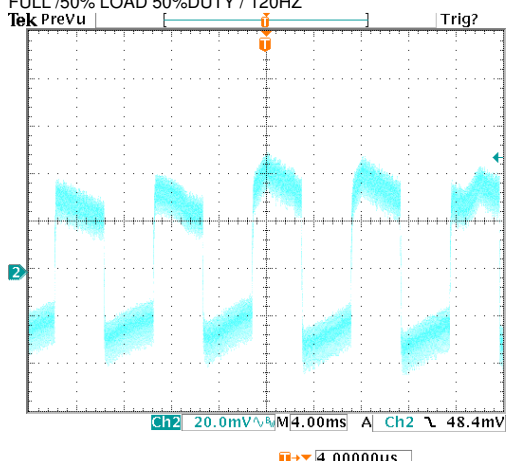
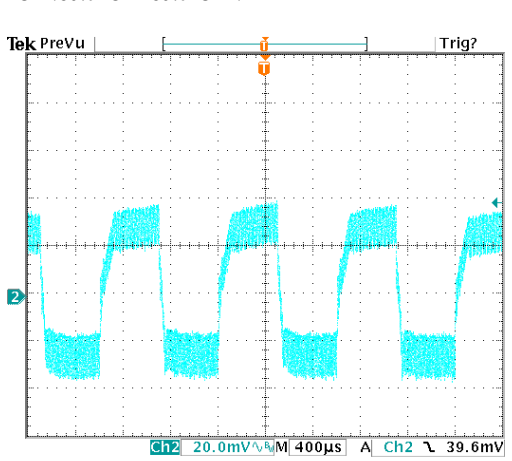
ENVIRONMENT TEST

## DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

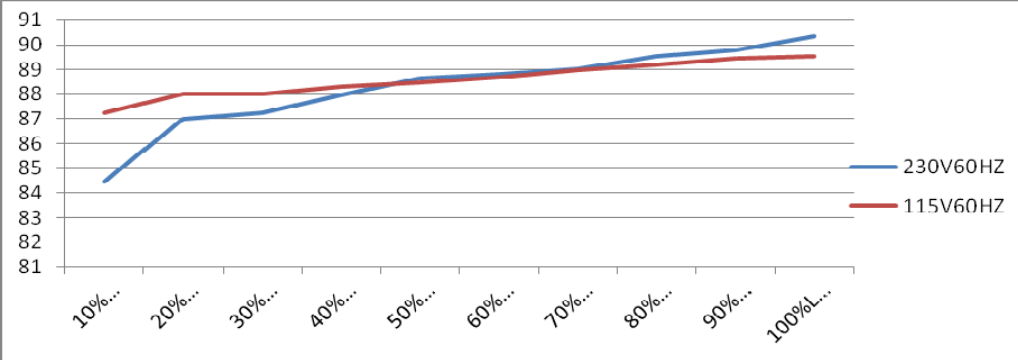
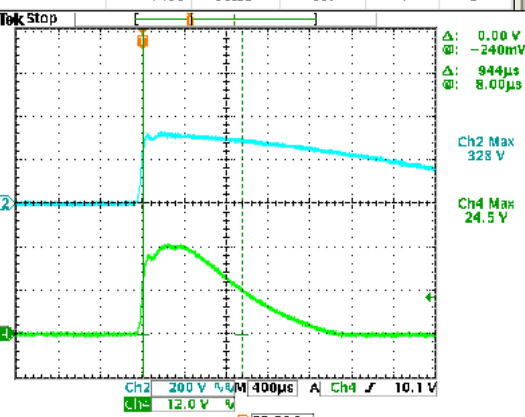
| N O                                                                                                                                                                                                                                                                                                            | TEST ITEM                        | SPECIFICATION                  | TEST CONDITION                                                               | RESULT                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|--------------------------------|------------------------------------------------------------------------------|------------------------------------------------|
| 1                                                                                                                                                                                                                                                                                                              | OUTPUT VOLTAGE<br>ADJUST RANGE   | CH1:43.2 V~ 52.8 V             | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : MIN LOAD<br>Ta : 25°C                | 41.668V~55.67V/230VAC<br>41.668V~55.66V/115VAC |
| 2                                                                                                                                                                                                                                                                                                              | OUTPUT VOLTAGE(Max)<br>TOLERANCE | V1: 1 %~ -1 %                  | I/P: 100VAC /264VAC<br>O/P:FULL/ MIN. LOAD<br>Ta:25°C                        | V1: 0 %~ 0.021 %                               |
| 3                                                                                                                                                                                                                                                                                                              | LINE REGULATION (Max)            | V1: 0.5 %~ -0.5 %              | I/P: 100VAC~ 264VAC<br>O/P:FULL LOAD<br>Ta:25°C                              | V1: 0 %~ 0.021 %                               |
| 4                                                                                                                                                                                                                                                                                                              | LOAD REGULATION(Max)             | V1: 0.5 %~ -0.5 %              | I/P: 230VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C                                 | V1: 0 %~ 0 %                                   |
| 5                                                                                                                                                                                                                                                                                                              | OVER/UNDERSHOOT TEST             | < ±5%                          | I/P: 230VAC<br>O/P:FULL LOAD<br>Ta:25°C                                      | < ±5 %                                         |
| 6                                                                                                                                                                                                                                                                                                              | RIPPLE & NOISE(Max )             | V1: 200 mVp-p                  | I/P:230VAC<br>O/P:FULL LOAD<br>Ta:25°C                                       | V1: 21.4mVp-p                                  |
| <div> <div> <p>high frequency :</p>  <p>Ch2 Pk-Pk 21.4mV</p> </div> <div> <p>low frequency :</p>  <p>Ch2 Pk-Pk 21.2mV</p> </div> </div> |                                  |                                |                                                                              |                                                |
| 7                                                                                                                                                                                                                                                                                                              | SET UP TIME(Max)                 | 230VAC/1000ms<br>115VAC/2000ms | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C               | 230VAC/ 380 ms<br>115VAC/ 520 ms               |
| INPUT=230VAC/50HZ @ FULL LOAD<br>CH1 : Output Voltage CH2 : AC Input Voltage                                                                                                                                                                                                                                   |                                  |                                | INPUT=115VAC/60HZ @ FULL LOAD<br>CH1 : Output Voltage CH2 : AC Input Voltage |                                                |

|                                                                                      |                                                                                   |                            |                                                                                    |                                    |
|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------|------------------------------------------------------------------------------------|------------------------------------|
|                                                                                      |  |                            |  |                                    |
| 8                                                                                    | RISE TIME (Max)                                                                   | 230VAC/30ms<br>115VAC/30ms | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                     | 230VAC/ 22.6 ms<br>115VAC/ 21.8 ms |
| INPUT=230VAC/50HZ @ FULL LOAD                                                        |                                                                                   |                            |                                                                                    |                                    |
| CH1 : Output Voltage                                                                 |                                                                                   |                            |                                                                                    |                                    |
|    |                                                                                   |                            |                                                                                    |                                    |
| INPUT=115VAC/60HZ @ FULL LOAD                                                        |                                                                                   |                            |                                                                                    |                                    |
| CH1 : Output Voltage                                                                 |                                                                                   |                            |                                                                                    |                                    |
|   |                                                                                   |                            |                                                                                    |                                    |
| 9                                                                                    | HOLD UP TIME (Typ.)                                                               | 230VAC/30ms<br>115VAC/12ms | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                     | 230VAC/ 44.8 ms<br>115VAC/ 16.8 ms |
| INPUT=230VAC/50HZ @ FULL LOAD                                                        |                                                                                   |                            |                                                                                    |                                    |
| CH1 : Output Voltage CH2 : AC Input Voltage                                          |                                                                                   |                            |                                                                                    |                                    |
|   |                                                                                   |                            |                                                                                    |                                    |
| INPUT=115VAC/60HZ @ FULL LOAD                                                        |                                                                                   |                            |                                                                                    |                                    |
| CH1 : Output Voltage CH2 : AC Input Voltage                                          |                                                                                   |                            |                                                                                    |                                    |
|  |                                                                                   |                            |                                                                                    |                                    |
| Model: LRS-50-48 Test Report 3 / 9                                                   |                                                                                   |                            |                                                                                    |                                    |

|                                                                                   |              |                                                                                    |                                                                                                         |                        |
|-----------------------------------------------------------------------------------|--------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------|
| 10                                                                                | DYNAMIC LOAD | V1: 4800 mVp-p                                                                     | I/P: 230VAC<br>O/P:<br>(1)FULL /50% LOAD 50%DUTY / 120HZ<br>(2)FULL /50% LOAD 50%DUTY / 1KHZ<br>Ta:25°C | 93.6mVp-p<br>76.4mVp-p |
| FULL /50% LOAD 50%DUTY / 120HZ                                                    |              | FULL /50% LOAD 50%DUTY / 1KHZ                                                      |                                                                                                         |                        |
|  |              |  |                                                                                                         |                        |

## INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECIFICATION                 | TEST CONDITION                                                                                                                                                                                                                                                                                                       | RESULT                                         |
|----|-----------------------|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|
| 1  | INPUT VOLTAGE RANGE   | 85VAC~264VAC<br>120VDC~373VDC | I/P: TESTING<br>O/P: FULL LOAD<br>Ta: 25°C<br><br>I/P:<br>(1) LOW-LINE-3V=82 V<br>HIGH-LINE+15%=300 V<br>O/P: FULL/MIN LOAD<br>(PLEASE CHECK DERATING CURVE)<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) | 81 VAC~264VAC<br>115VDC~373VDC<br><br>TEST: OK |
| 2  | INPUT FREQUENCY RANGE | 47HZ ~63 HZ<br>NO DAMAGE      | I/P: 100 VAC ~264 VAC<br>O/P: FULL~MIN LOAD<br>Ta: 25°C                                                                                                                                                                                                                                                              | TEST: OK                                       |
| 3  | INPUT CURRENT (Typ.)  | 230V/0.56 A<br>115V/ 0.95A    | I/P : 230 VAC<br>I/P : 115 VAC<br>O/P : FULL LOAD<br>Ta : 25°C                                                                                                                                                                                                                                                       | I=0.432A/ 230VAC<br>I=0.828A/ 115VAC           |
| 4  | LEAKAGE CURRENT       | <0.75 mA / 240 VAC            | I/P : 240 VAC<br>O/P : Min LOAD<br>Ta : 25°C                                                                                                                                                                                                                                                                         | L-FG : 0.18 mA<br>N-FG : 0.18 mA               |
| 5  | NO LOAD CONSUMPTION   | < 0.2W                        | I/P : 115VAC<br>I/P : 230VAC<br>O/P : NO LOAD<br>Ta : 25°C                                                                                                                                                                                                                                                           | < 0.1026 W<br>< 0.1233 W                       |

|                                                                                                                                                                                |                      |                        |                                               |                    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------|-----------------------------------------------|--------------------|
| 6                                                                                                                                                                              | EFFICIENCY(Typ.)     | 90%                    | I/P:230 VAC<br>O/P:FULL LOAD<br>Ta:25°C       | 90.32%             |
| <p>EFFICIENCY vs LOAD</p>                                                                    |                      |                        |                                               |                    |
| 7                                                                                                                                                                              | INRUSH CURRENT(Typ.) | 230V/45A<br>COLD START | I/P : 230 VAC<br>O/P : FULL LOAD<br>Ta : 25°C | I = 24.5 A/ 230VAC |
| <p>INPUT=230VAC/50HZ @ FULL LOAD<br/>CH2 : AC Input Voltage CH4 : Input current (1V=1A)</p>  |                      |                        |                                               |                    |

## PROTECTION FUNCTION TEST

| NO | TEST ITEM               | SPECIFICATION                          | TEST CONDITION                                                       | RESULT                                                                                                                                         |
|----|-------------------------|----------------------------------------|----------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | OVER LOAD PROTECTION    | 110 %~ 150 %                           | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 100VAC<br>O/P: TESTING<br>Ta:25°C | 130.9%/ 264VAC<br>130.5%/ 230VAC<br>125.8%/100VAC<br>PROTECTION TYPE :<br>Hiccup mode, recovers automatically after fault condition is removed |
| 2  | OVER VOLTAGE PROTECTION | 55.2 V~64.8 V                          | I/P: 264VAC<br>I/P: 230VAC<br>I/P: 85VAC<br>O/P: MIN LOAD<br>Ta:25°C | 61.6V / 264VAC<br>61.6V / 230VAC<br>61.6V / 85VAC<br>PROTECTION TYPE :<br>Shut down o/p voltage, re-power on to recover                        |
| 3  | SHORT PROTECTION        | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P: 264VAC<br>I/P: 85VAC<br>O/P: FULL LOAD<br>Ta:25°C               | NO DAMAGE<br>PROTECTION TYPE : OK<br>Hiccup mode, recovers automatically after fault condition is removed                                      |

## COMPONENT STRESS TEST

| NO | TEST ITEM                                                   | SPECIFICATION                 | TEST CONDITION                                                                                                                                                                                                                                                                                                                                                          | RESULT                                                                                                |
|----|-------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 1  | PWM Transistor<br>( D to S) or (C to E) <b>Peak Voltage</b> | Q 1 Rated<br>10A/ 600 V       | I/P:High-Line +3V =267V<br>AC ON/OFF<br>VDS:<br>O/P: (1)Full Load<br>(2)Output Short<br>(3)Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4)Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5)Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6)Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7)0%→400% Load.<br>(7)0%→400% Load.<br>Ta:25℃ | VDS:<br>(1)498V<br>(2)426V<br>(3)512V<br>(4)524V<br>(5)524V<br>(6)540V<br>(7)530V                     |
| 2  | Diode Peak <b>Voltage</b>                                   | Q100 Rate<br>20A/300 V        | I/P:High-Line +3V =267 V<br>AC ON/OFF<br>O/P: (1)Full Load<br>(2)Output Short<br>(3)Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4)Dynamic Load Full Load/<br>Min. Load 90%Duty/3KHz<br>(5)Dynamic Load Full Load/<br>Min. Load 90%Duty/5KHz<br>(6)Dynamic Load 100% Load/<br>Min. Load 50%Duty/120Hz<br>(7)0%→400% Load.<br>(8).NO LOAD<br>Ta:25℃             | Q100:<br>VDS:<br>(1)212V<br>(2)171V<br>(3)214V<br>(4)212V<br>(5)212V<br>(6)212V<br>(7)212V<br>(8)213V |
| 3  | <b>Input Capacitor Voltage</b>                              | C5 Rated:<br>100u/400V 105℃   | I/P:High-Line +3V =267 V<br>O/P: (1)Full Load input on/off<br>(2) Min load input on /Off<br>(3)Full Load /Min load Change<br>Ta:25℃                                                                                                                                                                                                                                     | (1)372V<br>(2)372V<br>(3)372V                                                                         |
| 4  | <b>Control IC Voltage Test</b>                              | PWM IC U1 Rated<br>10.8 V~30V | I/P:High-Line +3V =267 V<br>AC ON/OFF<br>O/P(1)FULL LOAD<br>(2) Output Short<br>(3)O.L.P<br>(4)O.V.P.<br>(5)NO LOAD VR Min..LOW<br>LINE<br>Ta:25℃                                                                                                                                                                                                                       | (1) 17.0V<br>(2) 15.0V<br>(3) 17.0V<br>(4) 20.3V<br>(5) 12.3V                                         |
| 5  | Clamp Diode Peak Voltage                                    | D5 Rated :<br>GP30J: 3A/600V  | I/P : High-Line +3V = 267 V<br>AC ON/OFF<br>O/P : (1) Dynamic Load<br>90%Duty/1KHz<br>(2)Full load continue<br>Ta : 25℃                                                                                                                                                                                                                                                 | (1)468<br>(2)464                                                                                      |

## SAFETY TEST



| NO | TEST ITEM            | SPECIFICATION                                                       | TEST CONDITION                                                                   | RESULT                                                                 |
|----|----------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 3.75KVAC/min<br>I/P-FG :2KVAC/min<br>O/P-FG:1.25KVAC/min   | I/P-O/P: 4.125KVAC/min<br>I/P-FG: 2.4 KVAC/min<br>O/P-FG:1.5 KVAC/min<br>Ta:25°C | I/P-O/P: 2.130 mA<br>I/P-FG : 2.125 mA<br>O/P-FG:2.067 mA<br>NO DAMAGE |
| 2  | ISOLATION RESISTANCE | I/P-O/P:500VDC>100MΩ<br>I/P-FG: 500VDC>100MΩ<br>O/P-FG:500VDC>100MΩ | I/P-O/P: 500 VDC<br>I/P-FG: 500 VDC<br>O/P-FG: 500 VDC<br>Ta:25°C                | I/P-O/P: 9999MΩ<br>I/P-FG: 9999MΩ<br>O/P-FG: 9999MΩ<br>NO DAMAGE       |
| 3  | GROUNDING CONTINUITY | FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                              | 40A / 2min<br>Ta:25°C                                                            | 8 mΩ                                                                   |

## E.M.C TEST

| NO | TEST ITEM                                   | SPECIFICATION                                         | TEST CONDITION                                           | RESULT                        |
|----|---------------------------------------------|-------------------------------------------------------|----------------------------------------------------------|-------------------------------|
| 1  | HARMONIC                                    | EN61000-3-2<br>CLASS A                                | I/P:230VAC/50HZ<br>O/P:100%LOAD<br>Ta:25°C               | PASS                          |
| 2  | CONDUCTION                                  | EN55022<br>CLASS B                                    | I/P : 230 VAC (50HZ)<br>O/P : FULL/50% LOAD<br>Ta : 25°C | PASS<br>Test by certified Lab |
| 3  | RADIATION                                   | EN55022<br>CLASS B                                    | I/P : 230 VAC (50HZ)<br>O/P : FULL LOAD<br>Ta : 25°C     | PASS<br>Test by certified Lab |
| 4  | E.S.D                                       | EN61000-4-2<br>INDUSTRY<br>AIR : 8KV / Contact : 4KV  | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | CRITERIA A                    |
| 5  | E.F.T                                       | EN61000-4-4<br>INDUSTRY<br>INPUT : 2KV                | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | CRITERIA A                    |
| 6  | SURGE                                       | IEC61000-4-5<br>INDUSTRY<br>L-N : 2KV<br>L,N-PE : 4KV | I/P : 230 VAC/50HZ<br>O/P : FULL LOAD<br>Ta : 25°C       | CRITERIA A                    |
| 7  | Test by certified Lab & Test Report Prepare |                                                       |                                                          |                               |

## RELIABILITY TEST

## ENVIRONMENT TEST

| NO | TEST ITEM | SPECIFICATION | TEST CONDITION | RESULT |
|----|-----------|---------------|----------------|--------|
|----|-----------|---------------|----------------|--------|

| 1  | TEMPERATURE RISE TEST                                             | MODEL : LRS-50-24<br>1. ROOM AMBIENT BURN-IN : 2 HRS<br>I/P : 230VAC O/P : FULL LOAD Ta=31.0℃<br>2. HIGH AMBIENT BURN-IN : 2 HRS<br>I/P : 230VAC O/P : FULL LOAD Ta=50.9℃ <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=31.0℃</th><th>HIGH AMBIENT Ta=50.9℃</th></tr><tr><td>1</td><td>LF1</td><td>59.5℃</td><td>76.3℃</td></tr><tr><td>2</td><td>BD1</td><td>58.9℃</td><td>74.7℃</td></tr><tr><td>3</td><td>C5</td><td>60.7℃</td><td>77.2℃</td></tr><tr><td>4</td><td>D5</td><td>78.7℃</td><td>96.0℃</td></tr><tr><td>5</td><td>Q1</td><td>73.7℃</td><td>89.8℃</td></tr><tr><td>6</td><td>C35</td><td>64.2℃</td><td>79.9℃</td></tr><tr><td>7</td><td>T1coil</td><td>67.1℃</td><td>82.6℃</td></tr><tr><td>8</td><td>T1core</td><td>69.9℃</td><td>84.7℃</td></tr><tr><td>9</td><td>C105</td><td>55.0℃</td><td>71.4℃</td></tr><tr><td>10</td><td>C106</td><td>64.2℃</td><td>80.0℃</td></tr><tr><td>11</td><td>L100</td><td>67.2℃</td><td>83.0℃</td></tr><tr><td>12</td><td>Q100</td><td>71.4℃</td><td>87.5℃</td></tr><tr><td>13</td><td>U1</td><td>54.1℃</td><td>71.1℃</td></tr><tr><td>14</td><td>D30</td><td>63.6℃</td><td>79.9℃</td></tr><tr><td>15</td><td>D40</td><td>58.2℃</td><td>74.3℃</td></tr></table> |                                                                                             |                   | NO | Position | ROOM AMBIENT Ta=31.0℃ | HIGH AMBIENT Ta=50.9℃ | 1 | LF1 | 59.5℃ | 76.3℃ | 2 | BD1 | 58.9℃ | 74.7℃ | 3 | C5 | 60.7℃ | 77.2℃ | 4 | D5 | 78.7℃ | 96.0℃ | 5 | Q1 | 73.7℃ | 89.8℃ | 6 | C35 | 64.2℃ | 79.9℃ | 7 | T1coil | 67.1℃ | 82.6℃ | 8 | T1core | 69.9℃ | 84.7℃ | 9 | C105 | 55.0℃ | 71.4℃ | 10 | C106 | 64.2℃ | 80.0℃ | 11 | L100 | 67.2℃ | 83.0℃ | 12 | Q100 | 71.4℃ | 87.5℃ | 13 | U1 | 54.1℃ | 71.1℃ | 14 | D30 | 63.6℃ | 79.9℃ | 15 | D40 | 58.2℃ | 74.3℃ |
|----|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-------------------|----|----------|-----------------------|-----------------------|---|-----|-------|-------|---|-----|-------|-------|---|----|-------|-------|---|----|-------|-------|---|----|-------|-------|---|-----|-------|-------|---|--------|-------|-------|---|--------|-------|-------|---|------|-------|-------|----|------|-------|-------|----|------|-------|-------|----|------|-------|-------|----|----|-------|-------|----|-----|-------|-------|----|-----|-------|-------|
| NO | Position                                                          | ROOM AMBIENT Ta=31.0℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | HIGH AMBIENT Ta=50.9℃                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 1  | LF1                                                               | 59.5℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 76.3℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 2  | BD1                                                               | 58.9℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 74.7℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 3  | C5                                                                | 60.7℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 77.2℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 4  | D5                                                                | 78.7℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 96.0℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 5  | Q1                                                                | 73.7℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 89.8℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 6  | C35                                                               | 64.2℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.9℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 7  | T1coil                                                            | 67.1℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 82.6℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 8  | T1core                                                            | 69.9℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 84.7℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 9  | C105                                                              | 55.0℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 71.4℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 10 | C106                                                              | 64.2℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 80.0℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 11 | L100                                                              | 67.2℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 83.0℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 12 | Q100                                                              | 71.4℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 87.5℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 13 | U1                                                                | 54.1℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 71.1℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 14 | D30                                                               | 63.6℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 79.9℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 15 | D40                                                               | 58.2℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 74.3℃                                                                                       |                   |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 2  | OVER LOAD BURN-IN TEST                                            | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | I/P : 230 VAC<br>O/P : 132% LOAD<br>Ta : 25℃                                                | TEST : OK         |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1. I/P : 264VAC/<br>O/P : 100 % LOAD<br>2. I/P : 100VAC/<br>O/P : 75 % LOAD/75%<br>Ta= -30℃ | TEST : OK         |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 40 ℃<br>NO DAMAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | I/P : 272 VAC<br>O/P : FULL LOAD<br>Ta= 40 ℃<br>HUMIDITY= 95 %R.H                           | TEST : OK         |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 5  | TEMPERATURE<br>COEFFICIENT                                        | ± 0.03 %/℃ (0~50℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | I/P : 230 VAC<br>O/P : FULL LOAD                                                            | ±0.009%/℃ (0~50℃) |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 6  | STORAGE TEMPERATURE TEST                                          | 1. Thermal shock Temperature : -40℃~ +85℃<br>2. Temperature change rate : 25℃ / 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                |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 7  | THERMAL SHOCK TEST                                                | 1. Thermal shock Temperature : -30℃~ 70℃<br>2. Temperature change rate : 25℃ / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 10 CYCLE<br>5. Input/Output condition : 230VAC/Full Load AC ON/OFF TEST<br>turn on 58sec ; turn off 2sec                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                                                             | OK                |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |
| 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 : 5G<br>(5) Test Time : 60min in each axis (X.Y.Z)<br>(6) Ta : 25℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                             | TEST : OK         |    |          |                       |                       |   |     |       |       |   |     |       |       |   |    |       |       |   |    |       |       |   |    |       |       |   |     |       |       |   |        |       |       |   |        |       |       |   |      |       |       |    |      |       |       |    |      |       |       |    |      |       |       |    |    |       |       |    |     |       |       |    |     |       |       |



# 50W Single Output Switching Power Supply

## LRS-50 series

|    |                             |                                                                                                                                                                                                                                                                         |                                                                 |
|----|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| 9  | CAPACITOR<br>LIFE CYCLE     | SUPPOSE C105 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME<br>(2) I/P : 230VAC O/P : FULL LOAD Ta=50 °C LIFE TIME<br>(3) I/P : 230VAC O/P : 75% LOAD Ta=50 °C LIFE TIME<br>(4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME | (1) 292950HRS<br>(2) 68809HRS<br>(3) 182880HRS<br>(4) 243002HRS |
| 10 | MTBF                        | MIL-HDBK-217F<br>TOTAL FAILURE RATE : 645KHRS                                                                                                                                                                                                                           |                                                                 |
| 11 | DMTBF/Accelerated Life Test | Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C                                                                                                                                                                                   |                                                                 |

| TEST RESULT | TESTER | APPROVAL |
|-------------|--------|----------|
| PASS        | FRANK  | WANGDZ   |

2007/3/20 A50-S014