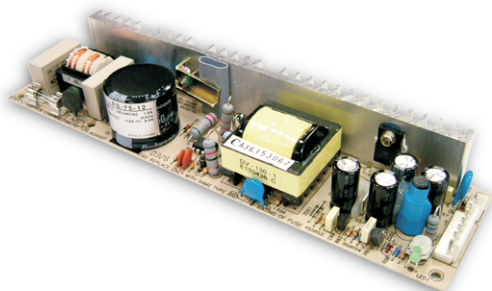




### 75W Single Output Switching Power Supply

### LPS-75 series



#### ■ Features :

- Universal AC input / Full range
- Protections: Short circuit / Overload / Over voltage
- Cooling by free air convection
- PWM control and regulated
- Small and compact size
- Built-in remote ON-OFF control
- LED indicator for power on
- 100% full load burn-in test
- 2 years warranty

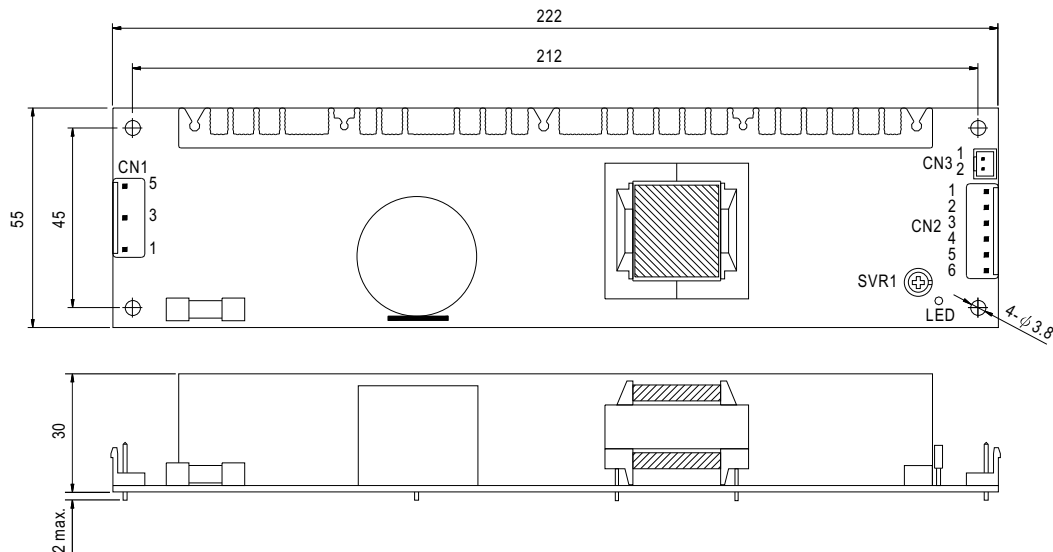


#### SPECIFICATION

| MODEL                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | LPS-75-3.3                                                                                                                                                                                        | LPS-75-5    | LPS-75-12  | LPS-75-15    | LPS-75-24 | LPS-75-48 |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|------------|--------------|-----------|-----------|
| OUTPUT                   | DC VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3.3V                                                                                                                                                                                              | 5V          | 12V        | 15V          | 24V       | 48V       |
|                          | RATED CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 15A                                                                                                                                                                                               | 15A         | 6.2A       | 5A           | 3.2A      | 1.56A     |
|                          | CURRENT RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0 ~ 16.5A                                                                                                                                                                                         | 0 ~ 16.5A   | 0 ~ 6.8A   | 0 ~ 5.5A     | 0 ~ 3.5A  | 0 ~ 1.7A  |
|                          | RATED POWER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 49.5W                                                                                                                                                                                             | 75W         | 74.4W      | 75W          | 76.8W     | 75W       |
|                          | PEAK LOAD(10sec.)    Note.4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 54.45W                                                                                                                                                                                            | 82.5W       | 81.6W      | 82.5W        | 84W       | 81.6W     |
|                          | RIPPLE & NOISE (max.)    Note.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 80mVp-p                                                                                                                                                                                           | 80mVp-p     | 100mVp-p   | 100mVp-p     | 120mVp-p  | 120mVp-p  |
|                          | VOLTAGE ADJ. RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 3 ~3.5V                                                                                                                                                                                           | 4.75 ~ 5.5V | 11 ~ 13.5V | 13.5 ~ 16.5V | 22 ~ 27V  | 45 ~ 54V  |
|                          | VOLTAGE TOLERANCE    Note.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ±3.0%                                                                                                                                                                                             | ±3.0%       | ±2.0%      | ±2.0%        | ±2.0%     | ±2.0%     |
|                          | LINE REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ±1.0%                                                                                                                                                                                             | ±1.0%       | ±1.0%      | ±1.0%        | ±1.0%     | ±1.0%     |
|                          | LOAD REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | ±3.0%                                                                                                                                                                                             | ±3.0%       | ±2.0%      | ±2.0%        | ±1.0%     | ±1.0%     |
|                          | SETUP, RISE TIME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 100ms, 35ms/230VAC      100ms, 35ms/115VAC at full load                                                                                                                                           |             |            |              |           |           |
|                          | HOLD UP TIME (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 60ms/230VAC      12ms/115VAC at full load                                                                                                                                                         |             |            |              |           |           |
| INPUT                    | VOLTAGE RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 90 ~ 264VAC      127 ~ 370VDC                                                                                                                                                                     |             |            |              |           |           |
|                          | FREQUENCY RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 47 ~ 63Hz                                                                                                                                                                                         |             |            |              |           |           |
|                          | EFFICIENCY(Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 69%                                                                                                                                                                                               | 77%         | 80%        | 81%          | 83%       | 83%       |
|                          | AC CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1.9A/115VAC      1.1A/230VAC                                                                                                                                                                      |             |            |              |           |           |
|                          | INRUSH CURRENT (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | COLD START 18A/115VAC      36A/230VAC                                                                                                                                                             |             |            |              |           |           |
|                          | LEAKAGE CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <1mA / 240VAC                                                                                                                                                                                     |             |            |              |           |           |
| PROTECTION               | OVERLOAD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 115 ~ 150% rated output power<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed                                                                           |             |            |              |           |           |
|                          | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3.8 ~ 4.45V      5.75 ~ 6.75V      13.8 ~ 16.2V      17.25 ~ 20.25V      27.6 ~ 32.4V      57.6 ~ 67.2V<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed |             |            |              |           |           |
| FUNCTION                 | REMOTE ON/OFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | RC+/RC- : 0 ~ 0.8V power on ; 4 ~ 10V power off                                                                                                                                                   |             |            |              |           |           |
| ENVIRONMENT              | WORKING TEMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -20 ~ +70℃ (Refer to output load derating curve)                                                                                                                                                  |             |            |              |           |           |
|                          | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 20 ~ 90% RH non-condensing                                                                                                                                                                        |             |            |              |           |           |
|                          | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | -20 ~ +85℃, 10 ~ 95% RH                                                                                                                                                                           |             |            |              |           |           |
|                          | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | ±0.04%/℃ (0 ~ 50℃ )                                                                                                                                                                               |             |            |              |           |           |
|                          | VIBRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes                                                                                                                           |             |            |              |           |           |
| SAFETY & EMC<br>(Note 5) | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | UL60950-1, TUV EN60950-1 approved                                                                                                                                                                 |             |            |              |           |           |
|                          | WITHSTAND VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | I/P-O/P:3KVAC    I/P-FG:1.5KVAC    O/P-FG:0.5KVAC                                                                                                                                                 |             |            |              |           |           |
|                          | ISOLATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | I/P-O/P, I/P-FG, O/P-FG:100M Ohms/500VDC                                                                                                                                                          |             |            |              |           |           |
|                          | EMI CONDUCTION & RADIATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Compliance to EN55011, EN55022 (CISPR22) Class B                                                                                                                                                  |             |            |              |           |           |
|                          | HARMONIC CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance to EN61000-3-2,-3                                                                                                                                                                      |             |            |              |           |           |
|                          | EMS IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024, EN61000-6-2 (EN50082-2), heavy industry level, criteria A                                                                              |             |            |              |           |           |
| OTHERS                   | MTBF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 355Khrs min.    MIL-HDBK-217F (25℃ )                                                                                                                                                              |             |            |              |           |           |
|                          | DIMENSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 222*55*30mm (L*W*H)                                                                                                                                                                               |             |            |              |           |           |
|                          | PACKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 0.3Kg; 48pcs/15.6Kg/1.12CUFT                                                                                                                                                                      |             |            |              |           |           |
| NOTE                     | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor.<br>3. Tolerance : includes set up tolerance, line regulation and load regulation.<br>4. 33.3% Duty cycle maximum within every 30 seconds. Average output power should not exceed the rated power.<br>5. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. |                                                                                                                                                                                                   |             |            |              |           |           |

### Mechanical Specification

Unit:mm



AC Input Connector (CN1) : JST B5P-VH or equivalent

| Pin No. | Assignment | Mating Housing        | Terminal                       |
|---------|------------|-----------------------|--------------------------------|
| 1       | AC/L       | JST VHR or equivalent | JST SVH-21T-P1.1 or equivalent |
| 2,4     | No Pin     |                       |                                |
| 3       | AC/N       |                       |                                |
| 5       | FG $\perp$ |                       |                                |

DC Output Connector (CN2) : JST B6P-VH or equivalent

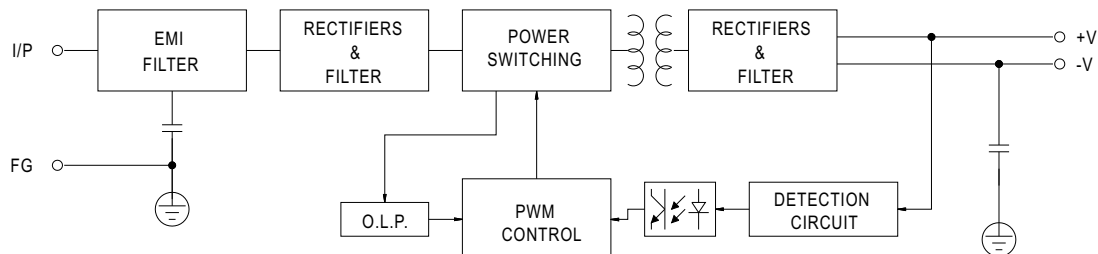
| Pin No. | Assignment | Mating Housing        | Terminal                       |
|---------|------------|-----------------------|--------------------------------|
| 1,2,3   | -V         | JST VHR or equivalent | JST SVH-21T-P1.1 or equivalent |
| 4,5,6   | +V         |                       |                                |

Remote ON/OFF Connector(CN3):JST B2B-XH or equivalent

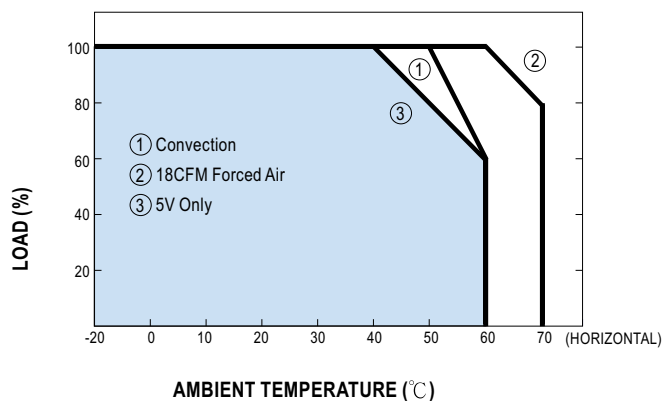
| Pin No. | Assignment | Mating Housing        | Terminal                        |
|---------|------------|-----------------------|---------------------------------|
| 1       | RC+        | JST XHP or equivalent | JST SXH-001T-P0.6 or equivalent |
| 2       | RC-        |                       |                                 |

### Block Diagram

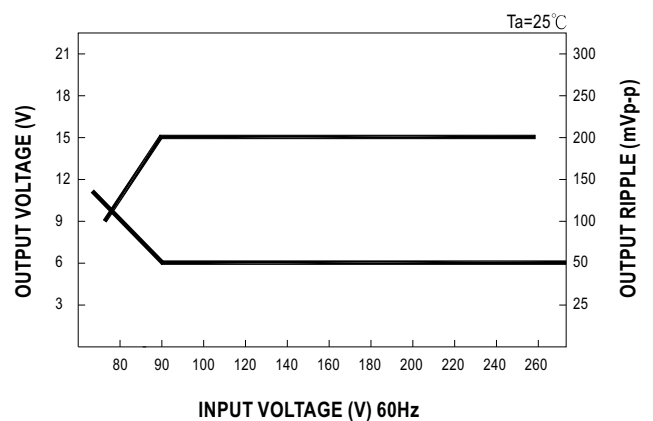
fosc : 60KHz



### Derating Curve



### Static Characteristics (15V)



# Quality Engineering Test Report

V1 : 48 V / 1.56 A

AC-DC

Single Output Switching Power Supply

## OUTPUT FUNCTION TEST

| NO | TEST ITEM                      | SPECIFICATION                                  | TEST CONDITION                                                | RESULT                       | VERDICT |
|----|--------------------------------|------------------------------------------------|---------------------------------------------------------------|------------------------------|---------|
| 1  | RIPPLE & NOISE                 | V1: 120 mVp-p (Max )                           | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                      | V1: mVp-p (Max )             |         |
| 2  | OUTPUT VOLTAGE<br>ADJUST RANGE | CH1: 45 V~ 54 V                                | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:MIN LOAD<br>Ta:25°C       | V~ V/230 VAC<br>V~ V/115 VAC |         |
| 3  | OUTPUT VOLTAGE<br>TOLERANCE    | V1: +2%~ -2 % (Max)                            | I/P: 264 VAC / 90 VAC<br>O/P:FULL/ 0 % LOAD<br>Ta:25°C        | V1: %~ %                     |         |
| 4  | LINE REGULATION                | V1: +1 %~ -1 % (Max)                           | I/P: 264 VAC ~ 90 VAC<br>O/P:FULL LOAD<br>Ta:25°C             | V1: %~ %                     |         |
| 5  | LOAD REGULATION                | V1: +1 %~ -1 % (Max)                           | I/P: 230 VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C                 | V1: %~ %                     |         |
| 6  | SET UP TIME                    | 230 VAC/ 100 ms (Max)<br>115 VAC/ 100 ms (Max) | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C      | 230 VAC/ ms<br>115 VAC/ ms   |         |
| 7  | RISE TIME                      | 230VAC/ 35 ms (Max)<br>115VAC/ 35 ms (Max)     | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C      | 230 VAC/ ms<br>115 VAC/ ms   |         |
| 8  | HOLD UP TIME                   | 230VAC/ 50 ms(TYP)<br>115VAC/ 12 ms(TYP)       | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C      | 230 VAC/ ms<br>115 VAC/ ms   |         |
| 9  | OVER/UNDERSHOOT TEST           | < ±5%                                          | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                      | TEST: < %                    |         |
| 10 | DYNAMIC LOAD                   | V1: 4800 mVp-p                                 | I/P: 230 VAC<br>O/P:FULL /Min LOAD<br>90%DUTY/1KHZ<br>Ta:25°C | mVp-p                        |         |
| 11 | TRANSIENT RECOVERY TIME        | V1: 1920 mVp-p                                 | I/P: 230 VAC<br>O/P:40% LOAD CHANGE<br>50%DUTY/120HZ 1.25A/us | 121 mVp-p                    |         |

# Quality Engineering Test Report

## INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECICATION                                        | TEST CONDITION                                                                                                                            | RESULT                           | VERDICT |
|----|-----------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|---------|
| 1  | INPUT VOLTAGE RANGE   | 264VAC~ 90VAC                                      | I/P:TESTING<br>O/P:FULL LOAD<br>Ta:25°C                                                                                                   | V~ 264 V                         |         |
|    |                       |                                                    | I/P:<br>LOW-LINE-3V= 87 V<br>HIGH-LINE+15%= 300 V<br>O/P:FULL/MIN LOAD<br>ON: 30 Sec . OFF: 30 Sec 10MIN<br>( AC POWER ON/OFF NO DAMAGE ) | TEST:                            |         |
| 2  | INPUT FREQUENCY RANGE | 47 HZ ~ 63 HZ<br>NO DAMAGE OSC                     | I/P: 264 VAC ~ 90 VAC<br>O/P:FULL~MIN LOAD<br>Ta:25°C                                                                                     | TEST:                            |         |
| 3  | EFFICIENCY            | 83 % (TYP)                                         | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                                                  | %                                |         |
| 4  | INPUT CURRENT         | 230 V/ 1.1 A(TYP)<br><u>115</u> V/ 1.9 A(TYP)      | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                                  | I = A/ 230VAC<br>I = A/ 115VAC   |         |
| 5  | INRUSH CURRENT        | 230 V/ 40 A(TYP)<br>115 V/ 24 A(TYP)<br>COLD START | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                                  | I = A/ 230 VAC<br>I = A/ 115 VAC |         |
| 6  | LEAKAGE CURRENT       | < 1 mA / 240 VAC                                   | I/P: 264 VAC<br>O/P:Min LOAD<br>Ta:25°C                                                                                                   | L-FG: mA<br>N-FG: mA             |         |

## Quality Engineering Test Report

### PROTECTION FUNCTION TEST

| NO | TEST ITEM               | SPECICATION                            | TEST CONDITION                                            | RESULT                                   | VERDICT |
|----|-------------------------|----------------------------------------|-----------------------------------------------------------|------------------------------------------|---------|
| 1  | OVER LOAD PROTECTION    | 115 %~ 150 %                           | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P: TESTING<br>Ta: 25°C  | %/ 230 VAC<br>%/ 115 VAC<br>Hiccup Mode  |         |
| 2  | OVER VOLTAGE PROTECTION | CH1: 57.6V~ 67.2 V                     | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P: MIN LOAD<br>Ta: 25°C | V/ 230 VAC<br>V/ 115 VAC<br>Hiccup Model |         |
| 3  | SHORT PROTECTION        | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P: 267 VAC<br>O/P: 100% LOAD<br>Ta: 25°C                | NO DAMAGE<br>Hiccup Mode                 |         |

### CONTROL FUNCTION TEST

| NO | TEST ITEM      | SPECICATION                                             | TEST CONDITION                             | RESULT                            | VERDICT |
|----|----------------|---------------------------------------------------------|--------------------------------------------|-----------------------------------|---------|
| 1  | REMOTE CONTROL | Rc+ / Rc-<br>0 V~ 0.8 V POWER ON<br>4 V~ 10 V POWER OFF | I/P: 230 VAC<br>O/P: FULL LOAD<br>Ta: 25°C | V ~ V POWER ON<br>V ~ V POWER OFF |         |

## Quality Engineering Test Report

### ENVIRONMENT TEST

| NO | TEST ITEM                                                         | SPECICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | TEST CONDITION                                               | RESULT                      | VERDICT |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
|----|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-----------------------------|---------|----------|-----|---------------------------|-----------------------------|---|-----|-------|--------|--------|---|-----|----------------|--------|--------|---|----|-----------------------|--------|--------|---|----|------------|--------|--------|---|----|-----------------|--------|--------|---|----|----------------|--------|--------|---|----|---------------|--------|--------|---|--------|-------|--------|--------|---|--------|-------|--------|--------|----|-----|----------------|--------|--------|----|-----|--------------------|--------|--------|----|-----|-------|--------|--------|----|-----|---------------|--------|--------|----|-----|---------|--------|--------|---|
| 1  | TEMPERATURE RISE TEST                                             | <div>MODEL : LPS-75-24V</div> <div>1. ROOM AMBIENT BURN-IN : 2 HRS</div> <div>I/P: 230 VAC O/P: 100% LOAD Ta=31.9 °C</div> <div>2. HIGH AMBIENT BURN-IN : HRS</div> <div>I/P: 230 VAC O/P: 100% LOAD Ta=48.6</div> <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT<br/>Ta=31.9°C</th><th>HIGH AMBIENT<br/>Ta= 48.6 °C</th></tr><tr><td>1</td><td>LF1</td><td>ET-24</td><td>45.2°C</td><td>57.9°C</td></tr><tr><td>2</td><td>BD1</td><td>D3SB60 4A/600V</td><td>54.5°C</td><td>68.0°C</td></tr><tr><td>3</td><td>C5</td><td>CAPXON 150U/400V 85°C</td><td>51.9°C</td><td>65.4°C</td></tr><tr><td>4</td><td>U1</td><td>NCP1203P60</td><td>61.0°C</td><td>72.2°C</td></tr><tr><td>5</td><td>Q1</td><td>2SK1507 9A/600V</td><td>70.4°C</td><td>86.5°C</td></tr><tr><td>6</td><td>D1</td><td>EPG20J 2A/600V</td><td>73.9°C</td><td>91.3°C</td></tr><tr><td>7</td><td>D2</td><td>FR104 1A/400V</td><td>77.5°C</td><td>85.3°C</td></tr><tr><td>8</td><td>T1CORE</td><td>TF925</td><td>73.1°C</td><td>87.4°C</td></tr><tr><td>9</td><td>T1COIL</td><td>TF925</td><td>73.7°C</td><td>85.3°C</td></tr><tr><td>10</td><td>D51</td><td>E83004 60A/40V</td><td>67.5°C</td><td>80.6°C</td></tr><tr><td>11</td><td>C54</td><td>2200U/10V GL 105°C</td><td>50.7°C</td><td>65.8°C</td></tr><tr><td>12</td><td>R52</td><td>33/2W</td><td>63.2°C</td><td>77.2°C</td></tr><tr><td>13</td><td>C12</td><td>22U/50V 105°C</td><td>81.3°C</td><td>94.3°C</td></tr><tr><td>14</td><td>R11</td><td>0.24/2W</td><td>64.4°C</td><td>79.0°C</td></tr></table> |                                                              |                             | NO      | Position | P/N | ROOM AMBIENT<br>Ta=31.9°C | HIGH AMBIENT<br>Ta= 48.6 °C | 1 | LF1 | ET-24 | 45.2°C | 57.9°C | 2 | BD1 | D3SB60 4A/600V | 54.5°C | 68.0°C | 3 | C5 | CAPXON 150U/400V 85°C | 51.9°C | 65.4°C | 4 | U1 | NCP1203P60 | 61.0°C | 72.2°C | 5 | Q1 | 2SK1507 9A/600V | 70.4°C | 86.5°C | 6 | D1 | EPG20J 2A/600V | 73.9°C | 91.3°C | 7 | D2 | FR104 1A/400V | 77.5°C | 85.3°C | 8 | T1CORE | TF925 | 73.1°C | 87.4°C | 9 | T1COIL | TF925 | 73.7°C | 85.3°C | 10 | D51 | E83004 60A/40V | 67.5°C | 80.6°C | 11 | C54 | 2200U/10V GL 105°C | 50.7°C | 65.8°C | 12 | R52 | 33/2W | 63.2°C | 77.2°C | 13 | C12 | 22U/50V 105°C | 81.3°C | 94.3°C | 14 | R11 | 0.24/2W | 64.4°C | 79.0°C | P |
| NO | Position                                                          | P/N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | ROOM AMBIENT<br>Ta=31.9°C                                    | HIGH AMBIENT<br>Ta= 48.6 °C |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 1  | LF1                                                               | ET-24                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 45.2°C                                                       | 57.9°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 2  | BD1                                                               | D3SB60 4A/600V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 54.5°C                                                       | 68.0°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 3  | C5                                                                | CAPXON 150U/400V 85°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 51.9°C                                                       | 65.4°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 4  | U1                                                                | NCP1203P60                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 61.0°C                                                       | 72.2°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 5  | Q1                                                                | 2SK1507 9A/600V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 70.4°C                                                       | 86.5°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 6  | D1                                                                | EPG20J 2A/600V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 73.9°C                                                       | 91.3°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 7  | D2                                                                | FR104 1A/400V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 77.5°C                                                       | 85.3°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 8  | T1CORE                                                            | TF925                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 73.1°C                                                       | 87.4°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 9  | T1COIL                                                            | TF925                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 73.7°C                                                       | 85.3°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 10 | D51                                                               | E83004 60A/40V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 67.5°C                                                       | 80.6°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 11 | C54                                                               | 2200U/10V GL 105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 50.7°C                                                       | 65.8°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 12 | R52                                                               | 33/2W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 63.2°C                                                       | 77.2°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 13 | C12                                                               | 22U/50V 105°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 81.3°C                                                       | 94.3°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 14 | R11                                                               | 0.24/2W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 64.4°C                                                       | 79.0°C                      |         |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 2  | OVER LOAD BURN-IN TEST                                            | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | I/P: 230VAC<br>O/P: 131% LOAD<br>Ta:25°C                     | TEST : OK                   | P       |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | I/P: 230<br>O/P: 100% LOAD<br>Ta= -21.4°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 50 °C<br>NO DAMAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | I/P: 230VAC<br>O/P:FULL LOAD<br>Ta= 51°C<br>HUMIDITY=95% R.H | TEST : OK                   | P       |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 5  | TEMPERATURE<br>COEFFICIENT                                        | ± 0.04 %(0~50°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I/P: 230 VAC<br>O/P:FULL LOAD                                | +0.01%(0~50°C)              | P       |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |
| 6  | VIBRATION TEST                                                    | 1 Carton & 1 Set Operating at I/P: 230VAC NO LOAD<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:1 hour in each axis (X.Y.Z)<br>(6) Ta:25°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                              | TEST : OK                   | P       |          |     |                           |                             |   |     |       |        |        |   |     |                |        |        |   |    |                       |        |        |   |    |            |        |        |   |    |                 |        |        |   |    |                |        |        |   |    |               |        |        |   |        |       |        |        |   |        |       |        |        |    |     |                |        |        |    |     |                    |        |        |    |     |       |        |        |    |     |               |        |        |    |     |         |        |        |   |

# Quality Engineering Test Report

## SAFETY TEST

| NO | TEST ITEM            | SPECICATION                                                         | TEST CONDITION                                                                   | RESULT                                                  | VERDICT |
|----|----------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------|---------------------------------------------------------|---------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 3 KVAC/min<br>I/P-FG: 1.5 KVAC/min<br>O/P-FG: 0.5 KVAC/min | I/P-O/P: 3.6 KVAC/min<br>I/P-FG: 1.8 KVAC/min<br>O/P-FG: 0.6 KVAC/min<br>Ta:25°C | I/P-O/P: mA<br>I/P-FG: mA<br>O/P-FG: 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: G Ω<br>I/P-FG: G Ω<br>O/P-FG: G Ω<br>NO DAMAGE |         |
| 4  | APPROVAL             | TUV: Certificate NO :<br>UL: File NO :                              |                                                                                  |                                                         |         |

## E.M.C TEST

| NO | TEST ITEM                                     | SPECICATION                                        | TEST CONDITION                                      | RESULT                        | VERDICT |
|----|-----------------------------------------------|----------------------------------------------------|-----------------------------------------------------|-------------------------------|---------|
| 1  | HARMONIC                                      | EN61000-3-2<br>CLASS A                             | I/P: 230 VAC/50HZ<br>O/P:FULL 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 Certificate Lab & Test Report Prepare |                                                    |                                                     |                               |         |

## Quality Engineering Test Report

### M.T.B.F & LIFE CYCLE CALCULATION

| NO | TEST ITEM               | SPECICATION                                                                                                                                                           | TEST CONDITION | RESULT | VERDICT |
|----|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------|---------|
| 1  | CAPACITOR<br>LIFE CYCLE | SUPPOSE C 54 IS THE MOST CRITICAL COMPONENT<br>I/P:230 VAC O/P:FULL LOAD Ta= 25 °C LIFE TIME= 380786 HRS<br>I/P: 230 VAC O/P:FULL LOAD Ta= 50 °C LIFE TIME= 75226 HRS |                |        | P       |
| 2  | MTBF                    | MIL-HDBK-217F NOTICES2 PARTS COUNT<br>TOTAL FAILURE RATE: 335000 HRS                                                                                                  |                |        | P       |

### COMPONENT STRESS TEST

| NO | TEST ITEM                                                     | SPECICATION                    | TEST CONDITION                                                                                       | RESULT                           | VERDICT |
|----|---------------------------------------------------------------|--------------------------------|------------------------------------------------------------------------------------------------------|----------------------------------|---------|
| 1  | Power Transistor<br>( D to S) or (C to E) <b>Peak Voltage</b> | Q Rated<br>K2645: 600V 9A      | I/P:High-Line +3V = 267V<br>O/P: (1)Full Load Turn on<br>(2) Full Load<br>(3)Output Short<br>Ta:25°C | (1) 506V<br>(2) 464V<br>(3) 532V | P       |
| 2  | Diode Peak <b>Voltage</b>                                     | D51 Rated<br>F10LC40: 400V 10A | I/P:High-Line +3V = 267V<br>O/P: (1)Full Load Turn on<br>(2) Full Load<br>(3)Output Short<br>Ta:25°C | (1) 274V<br>(2) 311V<br>(3) 326V | P       |
| 3  | Clamp Diode Peak <b>Voltage</b>                               | D1 Rated<br>EGP20J: 600V 2A    | I/P:High-Line +3V = 267V<br>O/P: (1)Full Load<br>(2) Dynamic Load<br>90%Duty/1KHz<br>Ta:25°C         | (1) 460V<br>(2) 458V             | P       |

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