
**■ Features :**

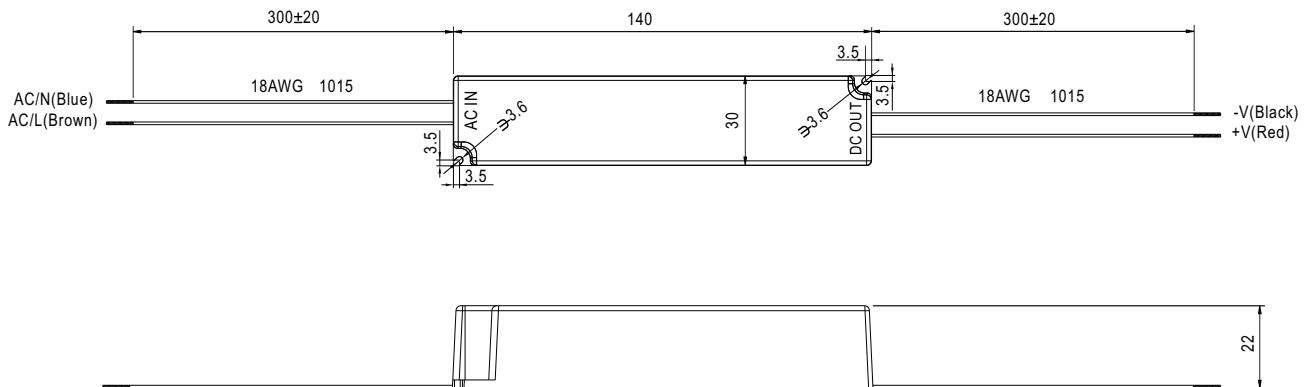
- 180-264VAC input only
- Fully encapsulated with IP67 level
- Protections: Short circuit / Overload / Over voltage / Over temperature
- Cooling by free air convection
- Pass LPS
- 100% full load burn-in test
- Suitable for LED lighting and moving sign applications
- High reliability / Low cost
- 2 years warranty

**SPECIFICATION**
**LPS IP67**

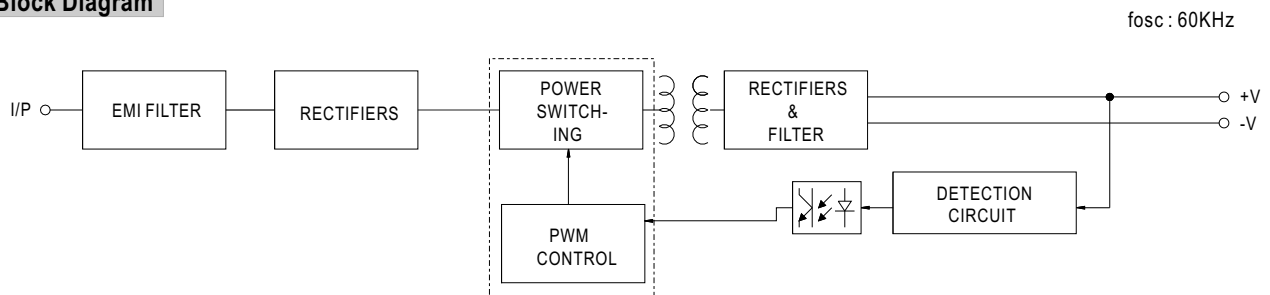

| MODEL                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | LPH-18-12                                                                                                                             |     | LPH-18-24   | LPH-18-36    |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|-----|-------------|--------------|
| OUTPUT                   | DC VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 12V                                                                                                                                   |     | 24V         | 36V          |
|                          | RATED CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1.5A                                                                                                                                  |     | 0.75A       | 0.5A         |
|                          | CURRENT RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0 ~ 1.5A                                                                                                                              |     | 0 ~ 0.75A   | 0 ~ 0.5A     |
|                          | RATED POWER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 18W                                                                                                                                   |     | 18W         | 18W          |
|                          | RIPPLE & NOISE (max.) Note.2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 120mVp-p                                                                                                                              |     | 150mVp-p    | 200mVp-p     |
|                          | VOLTAGE TOLERANCE Note.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ±3.0%                                                                                                                                 |     |             |              |
|                          | LINE REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ±1.0%                                                                                                                                 |     |             |              |
|                          | LOAD REGULATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | ±2.0%                                                                                                                                 |     |             |              |
|                          | SETUP, RISE TIME                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1500ms, 30ms / 230VAC                                                                                                                 |     |             |              |
|                          | HOLD UP TIME (Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 50ms/230VAC at full load                                                                                                              |     |             |              |
| INPUT                    | VOLTAGE RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 180 ~ 264VAC      254 ~ 370VDC                                                                                                        |     |             |              |
|                          | FREQUENCY RANGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 47 ~ 63Hz                                                                                                                             |     |             |              |
|                          | EFFICIENCY(Typ.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 78%                                                                                                                                   | 82% | 83%         |              |
|                          | AC CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 0.3A/230VAC                                                                                                                           |     |             |              |
|                          | INRUSH CURRENT(max.)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Cold start 50A/230VAC                                                                                                                 |     |             |              |
|                          | LEAKAGE CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 0.25mA / 240VAC                                                                                                                       |     |             |              |
| PROTECTION               | OVER CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Above 105% rated output power<br>Protection type : Hiccup mode, recovers automatically after fault condition is removed               |     |             |              |
|                          | OVER VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 13.8~ 16.2V                                                                                                                           |     | 27.6~ 32.4V | 41.4 ~ 48.6V |
|                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Protection type : Shut off o/p voltage, clamping by zener diode                                                                       |     |             |              |
|                          | OVER TEMPERATURE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Tj 170 t ypically (U1) Detect on main control IC<br>Protection type : Hiccup mode, recovers automatically after temperature goes down |     |             |              |
| ENVIRONMENT              | WORKING TEMP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | -30 ~ 70℃ (Refer to output load derating curve)                                                                                       |     |             |              |
|                          | WORKING HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 20 ~ 90% RH non-condensing                                                                                                            |     |             |              |
|                          | STORAGE TEMP., HUMIDITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | -40 ~ +80℃, 10 ~ 95% RH                                                                                                               |     |             |              |
|                          | TEMP. COEFFICIENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | ±0.03%/℃ (0 ~ 50℃)                                                                                                                    |     |             |              |
|                          | VIBRATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10 ~ 500Hz, 2G 10min./1cycle, period for 60min. each along X, Y, Z axes                                                               |     |             |              |
| SAFETY & EMC<br>(Note 4) | SAFETY STANDARDS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | TUV EN60950-1, IP67 approved; design refer to UL1310 Class 2, EN61347-2-13, CAN/CSA C22.2 No. 223-M91                                 |     |             |              |
|                          | WITHSTAND VOLTAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | I/P-O/P:3KVAC                                                                                                                         |     |             |              |
|                          | ISOLATION RESISTANCE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | I/P-O/P:>100M Ohms / 500VDC / 25℃ / 70% RH                                                                                            |     |             |              |
|                          | EMI CONDUCTION & RADIATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Compliance to EN55022 (CISPR22) Class B                                                                                               |     |             |              |
|                          | HARMONIC CURRENT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Compliance to EN61000-3-2 Class A,EN61000-3-3                                                                                         |     |             |              |
| OTHERS                   | EMS IMMUNITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Compliance to EN61000-4-2,3,4,5,6,8,11; ENV50204, EN55024, Light industry level, criteria A                                           |     |             |              |
|                          | MTBF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1200.6K hrs min.      MIL-HDBK-217F (25 )                                                                                             |     |             |              |
|                          | DIMENSION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 140*30*22(L*W*H)                                                                                                                      |     |             |              |
|                          | PACKING                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 0.175Kg; 70pcs/13.3Kgs/0.71CUFT                                                                                                       |     |             |              |
| 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. The power supply is considered as a component that will be operated in combination with final equipment. Since EMC performance will be affected by the complete installation, the final equipment manufacturers must re-qualify EMC Directive on the complete installation again. |                                                                                                                                       |     |             |              |

## Mechanical Specification

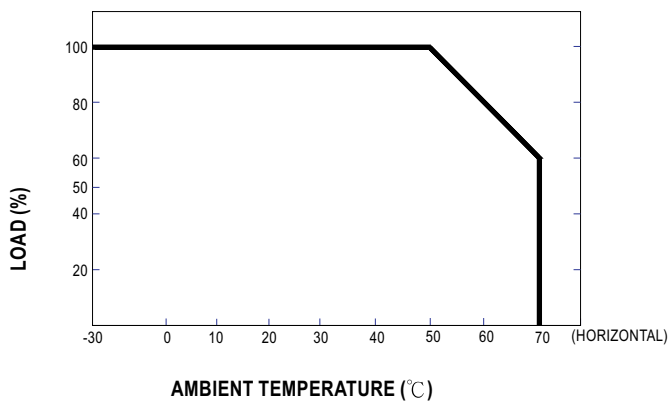
Unit:mm



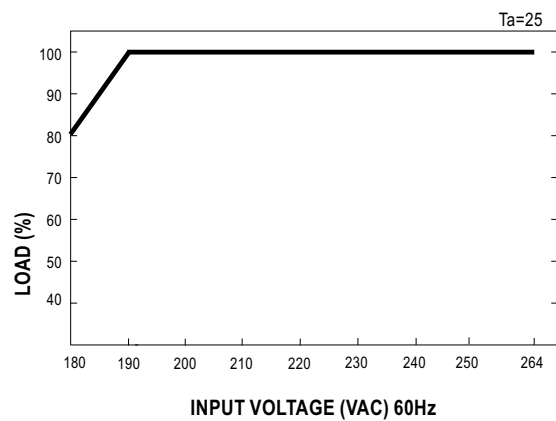
## Block Diagram



## Derating Curve



## Static Characteristics



MODEL : LPH-18-24

## OUTPUT FUNCTION TEST

| NO | TEST ITEM                | SPECICATION           | TEST CONDITION                                                                                          | RESULT                         | VERDICT |
|----|--------------------------|-----------------------|---------------------------------------------------------------------------------------------------------|--------------------------------|---------|
| 1  | RIPPLE & NOISE           | V1: 150 mVp-p (Max )  | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                | V1: 40 mVp-p (Max )            | PASS    |
| 2  | OUTPUT VOLTAGE TOLERANCE | V1: -3 %~ +3 % (Max)  | I/P: 190VAC / 264 VAC<br>O/P:FULL/ MIN LOAD<br>Ta:25°C                                                  | V1: -0.025 %~ +0.025 %         | PASS    |
| 3  | LINE REGULATION          | V1: -1 %~ +1 % (Max)  | I/P: 190 VAC ~ 264VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                       | V1: 0 %~ 0 %                   | PASS    |
| 4  | LOAD REGULATION          | V1: -2 %~ +2 % (Max)  | I/P: 230 VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C                                                           | V1: -0.025 %~ +0.025 %         | PASS    |
| 5  | SET UP TIME              | 230VAC/ 1500 ms (Max) | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                | 230 VAC/ 876.2 ms              | PASS    |
| 6  | RISE TIME                | 230VAC/ 30 ms (Max)   | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                | 230 VAC/ 11.5 ms               | PASS    |
| 7  | HOLD UP TIME             | 230VAC/ 50 ms (Typ)   | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                | 230VAC/ 62.4 ms                | PASS    |
| 8  | OVER/UNDERSHOOT TEST     | <±5%                  | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                | TEST: < 5 %                    | PASS    |
| 9  | DYNAMIC LOAD             | V1: 2400 mVp-p        | I/P: 230 VAC<br>O/P: (1)FULL /Min LOAD<br>90%DUTY/1KHZ<br>(2)FULL /Min LOAD<br>50%DUTY/120HZ<br>Ta:25°C | (1) 228 mVp-p<br>(2) 684 mVp-p | PASS    |

## INPUT FUNCTION TEST

| NO | TEST ITEM             | SPECICATION                     | TEST CONDITION                                                                                                                              | RESULT             | VERDICT |
|----|-----------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------|---------|
| 1  | INPUT VOLTAGE RANGE   | 180 VAC~ 264 VAC                | I/P: TESTING<br>O/P: FULL LOAD<br>Ta: 25°C                                                                                                  | 120 V~ 264 V       | PASS    |
|    |                       |                                 | I/P:<br>LOW-LINE-3V= 177 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:<br><br>OK    |         |
| 2  | INPUT FREQUENCY RANGE | 47HZ ~63 HZ<br>NO DAMAGE OSC    | I/P: 180 VAC ~264 VAC<br>O/P: FULL~MIN LOAD<br>Ta: 25°C                                                                                     | TEST:<br><br>OK    | PASS    |
| 3  | EFFICIENCY            | 82 % (Typ)                      | I/P: 230 VAC<br>O/P: FULL LOAD<br>Ta: 25°C                                                                                                  | 84.48 %            | PASS    |
| 4  | INPUT CURRENT         | 230 V/ 0.3 A (Typ)              | I/P: 230 VAC<br>O/P: FULL LOAD<br>Ta: 25°C                                                                                                  | I = 0.14 A/ 230VAC | PASS    |
| 5  | INRUSH CURRENT        | 230 V/ 50 A (max)<br>COLD START | I/P: 230 VAC<br>O/P: FULL LOAD<br>Ta: 25°C                                                                                                  | I = 45.2 A/ 230VAC | PASS    |

## PROTECTION FUNCTION TEST

| NO | TEST ITEM                   | SPECICATION                            | TEST CONDITION                                                           | RESULT                                                                            | VERDICT |
|----|-----------------------------|----------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------|
| 1  | OVER LOAD PROTECTION        | >105%<br>RATED OUTPUT POWER            | I/P: 264 VAC<br>I/P: 230 VAC<br>I/P: 190 VAC<br>O/P: TESTING<br>Ta: 25°C | 163 %/264VAC<br>151 %/ 230VAC<br>144 %/190 VAC<br><br>Hiccup Mode                 | PASS    |
| 2  | OVER VOLTAGE PROTECTION     | CH1: 27.6 V~ 32.4 V                    | I/P: 230 VAC<br>O/P: MIN LOAD<br>Ta: 25°C                                | 30.86 V/ 230VAC<br><br>Shut off o/p voltage, clamping by zener diode              | PASS    |
| 3  | OVER TEMPERATURE PROTECTION | SPEC:<br>Tj 170°C O.T.P.<br>NO DAMAGE  | I/P: 230 VAC<br>O/P: FULL LOAD                                           | O.T.P. Active<br>Hiccup Mode , recovers automatically after temperature goes down | PASS    |
| 4  | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P: 264 VAC<br>O/P: FULL LOAD<br>Ta: 25°C                               | NO DAMAGE<br>Hiccup Mode                                                          | PASS    |

## ENVIRONMENT TEST

| NO | TEST ITEM                                                         | SPECIFICATION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TEST CONDITION                                                  | RESULT                      | VERDICT |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
|----|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------|---------|----------|-----|-----------------------------|-----------------------------|---|-----|--------|--------|--------|---|-----|---------|--------|--------|---|----|-------------|--------|--------|---|-----|----------|--------|--------|---|----|-------|--------|--------|---|----|--------|--------|--------|---|-----|-------------|--------|--------|---|----|----------|--------|--------|---|------|--------|--------|--------|----|------|-------------|--------|--------|----|------|-------------|--------|--------|----|------|--------|--------|--------|------|
| 1  | TEMPERATURE RISE TEST                                             | <div>MODEL : LPH-18-24</div> <div>1. ROOM AMBIENT BURN-IN : 2 HRS</div> <div>I/P: 230 VAC O/P: 100% LOAD Ta= 25.2 °C</div> <div>2. HIGH AMBIENT BURN-IN : 2 HRS</div> <div>I/P: 230 VAC O/P: 100% LOAD Ta= 45.3 °C</div> <table><tr><th>NO</th><th>Position</th><th>P/N</th><th>ROOM AMBIENT<br/>Ta= 25.2 °C</th><th>HIGH AMBIENT<br/>Ta= 45.3 °C</th></tr><tr><td>1</td><td>LF1</td><td>LF6006</td><td>36.6°C</td><td>60.3°C</td></tr><tr><td>2</td><td>BD1</td><td>2A/800V</td><td>34.5°C</td><td>58.2°C</td></tr><tr><td>3</td><td>C5</td><td>27u/400V KM</td><td>41.2°C</td><td>65.3°C</td></tr><tr><td>4</td><td>ZD1</td><td>P6KE200A</td><td>45.3°C</td><td>69.1°C</td></tr><tr><td>5</td><td>D1</td><td>GP20K</td><td>45.0°C</td><td>68.7°C</td></tr><tr><td>6</td><td>T1</td><td>TF6137</td><td>46.1°C</td><td>68.8°C</td></tr><tr><td>7</td><td>C36</td><td>47u/50V YXF</td><td>36.0°C</td><td>59.8°C</td></tr><tr><td>8</td><td>U1</td><td>VIPER22A</td><td>43.5°C</td><td>67.8°C</td></tr><tr><td>9</td><td>D100</td><td>HER303</td><td>46.3°C</td><td>69.6°C</td></tr><tr><td>10</td><td>C105</td><td>220u/35V GL</td><td>36.9°C</td><td>60.6°C</td></tr><tr><td>11</td><td>C106</td><td>220u/35V GL</td><td>33.1°C</td><td>57.0°C</td></tr><tr><td>12</td><td>L100</td><td>DR006C</td><td>33.2°C</td><td>57.4°C</td></tr></table> |                                                                 |                             | NO      | Position | P/N | ROOM AMBIENT<br>Ta= 25.2 °C | HIGH AMBIENT<br>Ta= 45.3 °C | 1 | LF1 | LF6006 | 36.6°C | 60.3°C | 2 | BD1 | 2A/800V | 34.5°C | 58.2°C | 3 | C5 | 27u/400V KM | 41.2°C | 65.3°C | 4 | ZD1 | P6KE200A | 45.3°C | 69.1°C | 5 | D1 | GP20K | 45.0°C | 68.7°C | 6 | T1 | TF6137 | 46.1°C | 68.8°C | 7 | C36 | 47u/50V YXF | 36.0°C | 59.8°C | 8 | U1 | VIPER22A | 43.5°C | 67.8°C | 9 | D100 | HER303 | 46.3°C | 69.6°C | 10 | C105 | 220u/35V GL | 36.9°C | 60.6°C | 11 | C106 | 220u/35V GL | 33.1°C | 57.0°C | 12 | L100 | DR006C | 33.2°C | 57.4°C | PASS |
| NO | Position                                                          | P/N                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | ROOM AMBIENT<br>Ta= 25.2 °C                                     | HIGH AMBIENT<br>Ta= 45.3 °C |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 1  | LF1                                                               | LF6006                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 36.6°C                                                          | 60.3°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 2  | BD1                                                               | 2A/800V                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 34.5°C                                                          | 58.2°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 3  | C5                                                                | 27u/400V KM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 41.2°C                                                          | 65.3°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 4  | ZD1                                                               | P6KE200A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 45.3°C                                                          | 69.1°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 5  | D1                                                                | GP20K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 45.0°C                                                          | 68.7°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 6  | T1                                                                | TF6137                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 46.1°C                                                          | 68.8°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 7  | C36                                                               | 47u/50V YXF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 36.0°C                                                          | 59.8°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 8  | U1                                                                | VIPER22A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 43.5°C                                                          | 67.8°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 9  | D100                                                              | HER303                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 46.3°C                                                          | 69.6°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 10 | C105                                                              | 220u/35V GL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 36.9°C                                                          | 60.6°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 11 | C106                                                              | 220u/35V GL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 33.1°C                                                          | 57.0°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 12 | L100                                                              | DR006C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 33.2°C                                                          | 57.4°C                      |         |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 2  | OVER LOAD BURN-IN TEST                                            | NO DAMAGE<br>1 HOUR ( MIN )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | I/P: 230 VAC<br>O/P: 130 % LOAD<br>Ta:25°C                      | TEST : OK                   | PASS    |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | I/P: 230 VAC<br>O/P: 100 % LOAD<br>Ta= -30 °C                   | TEST : OK                   | PASS    |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 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: 272 VAC<br>O/P:FULL LOAD<br>Ta= 50 °C<br>HUMIDITY= 95 %R.H | TEST : OK                   | PASS    |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 5  | TEMPERATURE<br>COEFFICIENT                                        | ± 0.03 %(0~50°C)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | I/P: 230 VAC<br>O/P:FULL LOAD                                   | ± 0.008 %(0~50°C)           | PASS    |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |
| 6  | VIBRATION TEST                                                    | 1 Carton & 1 Set Operating at I/P: VAC 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                   | PASS    |          |     |                             |                             |   |     |        |        |        |   |     |         |        |        |   |    |             |        |        |   |     |          |        |        |   |    |       |        |        |   |    |        |        |        |   |     |             |        |        |   |    |          |        |        |   |      |        |        |        |    |      |             |        |        |    |      |             |        |        |    |      |        |        |        |      |

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

| NO | TEST ITEM               | SPECICATION                                                                         | TEST CONDITION                                                                                         | RESULT | VERDICT |
|----|-------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|--------|---------|
| 1  | CAPACITOR<br>LIFE CYCLE | LPH-18-24 SUPPOSE C 105<br>I/P: 230 VAC O/P:FULL LOAD<br>I/P: 230 VAC O/P:FULL LOAD | IS THE MOST CRITICAL COMPONENT<br>Ta= 25 °C LIFE TIME= 681482.3 HRS<br>Ta 50 °C LIFE TIME= 93863.3 HRS |        | PASS    |
| 2  | MTBF                    | MIL-HDBK-217F NOTICES2 PARTS COUNT<br>TOTAL FAILURE RATE: 1200.6K HRS               |                                                                                                        |        | PASS    |

## SAFETY TEST

| NO | TEST ITEM            | SPECICATION           | TEST CONDITION                         | RESULT                           | VERDICT |
|----|----------------------|-----------------------|----------------------------------------|----------------------------------|---------|
| 1  | WITHSTAND VOLTAGE    | I/P-O/P: 3.0 KVAC/min | I/P-O/P: 3.6 KVAC/min<br>Ta:25°C       | I/P-O/P: 0.791 mA<br>NO DAMAGE   | PASS    |
| 2  | ISOLATION RESISTANCE | I/P-O/P:500VDC>100MΩ  | I/P-O/P: 500 VDC<br>Ta:25°C            | I/P-O/P: >9999 MΩ<br>NO DAMAGE   | PASS    |
| 4  | LEAKAGE CURRENT      | < 0.25 mA / 240VAC    | I/P: 264 VAC<br>O/P:NO LOAD<br>Ta:25°C | L-FG: 0.081 mA<br>N-FG: 0.081 mA | PASS    |

## E.M.C TEST

| NO | TEST ITEM                                   | SPECICATION                                              | TEST CONDITION                                                    | RESULT                        | VERDICT |
|----|---------------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------|-------------------------------|---------|
| 1  | HARMONIC                                    | EN61000-3-2<br>CLASS A                                   | I/P: 230/240/220 VAC/50HZ<br>O/P:100%/75%/50%/25% LOAD<br>Ta:25°C | PASS                          | PASS    |
| 2  | CONDUCTION                                  | EN55022<br>CLASS B                                       | I/P:230 VAC (50HZ) /115V(60HZ)<br>O/P:FULL/50% LOAD<br>Ta:25°C    | PASS<br>Test by certified Lab | PASS    |
| 3  | RADIATION                                   | EN55022<br>CLASS B                                       | I/P: 230 VAC (50HZ)/115V(60HZ)<br>O/P:FULL LOAD<br>Ta:25°C        | PASS<br>Test by certified Lab | PASS    |
| 4  | E.S.D                                       | EN61000-4-2<br>LIGHT INDUSTRY<br>AIR:8KV / Contact:4KV   | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                     | CRITERIA A                    | PASS    |
| 5  | E.F.T                                       | EN61000-4-4<br>LIGHT INDUSTRY<br>INPUT: 1KV              | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                     | CRITERIA A                    | PASS    |
| 6  | SURGE                                       | IEC61000-4-5<br>LIGHT INDUSTRY<br>L-N :1KV<br>L,N-PE:2KV | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                     | CRITERIA A                    | PASS    |
| 7  | Test by certified Lab & Test Report Prepare |                                                          |                                                                   |                               |         |

## COMPONENT STRESS TEST

| NO | TEST ITEM                                                    | SPECIFICATION                                            | TEST CONDITION                                                                                                                                                                                      | RESULT                                           | VERDICT |
|----|--------------------------------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|---------|
| 1  | Power Transistor<br>(D to S) or (C to E) <b>Peak Voltage</b> | U1 Rated<br>VIPER22A : 730 V                             | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load Turn on<br>(2)Output Short<br>(3)Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4)Dynamic Load 50% Load/<br>Min. Load 90%Duty/1KHz<br>Ta:25°C | (1) 510 V<br>(2) 550 V<br>(3) 524 V<br>(4) 514 V | PASS    |
| 2  | Diode Peak <b>Voltage</b>                                    | D 100 Rated<br>HER303 : 200 V 3 A                        | I/P:High-Line +3V = 267 V<br>O/P: (1)Full Load Turn on<br>(2)Output Short<br>(3)Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(4)Dynamic Load 50% Load/<br>Min. Load 90%Duty/1KHz<br>Ta:25°C | (1) 106 V<br>(2) 103 V<br>(3) 106 V<br>(4) 108 V | PASS    |
| 3  | Clamp Diode Peak <b>Voltage</b>                              | D1 Rated<br>GP20A : 800 V 2 A                            | I/P:High-Line +3V = 267 V<br>O/P: (1)Dynamic Load Full Load/<br>Min. Load 90%Duty/1KHz<br>(2)Dynamic Load 50% Load/<br>Min. Load 90%Duty/1KHz<br>Ta:25°C                                            | (1) 532 V<br>(2) 556 V                           | PASS    |
| 4  | Input Capacitor <b>Voltage</b>                               | C 5 Rated<br>CAPXON : 27 u / 400 V<br>105 °C / KM Series | I/P:High-Line +3V =267 V<br>O/P: (1)Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3)Burn-IN 0.5 Hour<br>Ta:25°C                                                                           | (1) 312 V<br>(2) 312 V<br>(3) 312 V              | PASS    |
| 5  | Control IC <b>Voltage Test</b>                               | U 1 Rated<br>VIPER22A : 50 V                             | I/P:High-Line +3V =267 V<br>O/P:(1) Output Short<br>(2)O.L.P<br>Ta:25°C                                                                                                                             | (1) 14.6 V<br>(2) 14.7 V                         | PASS    |

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| DATE      | SAMPLE                        | TEST RESULT | TESTER | APPROVAL |
|-----------|-------------------------------|-------------|--------|----------|
| 2008/2/29 | RD SAMPLE                     | PASS        | SKY    | LIUWY    |
| 2008/4/29 | PRODUCT SAMPLE<br>(W0804C312) | PASS        | SKY    | LIUWY    |
| 2008/7/11 | PRODUCT SAMPLE<br>(W0805D012) | PASS        | SKY    | LIUWY    |