



# Test Report: HLG-240H-15

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240W Constant Voltage + Constant Current LED Driver

## ■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Other Test

Component Stress Test

## ■ SAFETY & E.M.C. TEST

Safety Test

E.M.C. Test

## ■ RELIABILITY TEST

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

| NO | TEST ITEM                   | SPECIFICATION                                 | TEST CONDITION   | RESULT  |
|----|-----------------------------|---|--|---|
| 1  | RIPPLE & NOISE              | V1: 150 mVp-p (Max)                           | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                         | V1: 12 mVp-p (Max)                                  |
| 2  | OUTPUT VOLTAGE ADJUST RANGE | CH1: 14 V~16 V                                | I/P: 230 VAC<br>I/P:115VAC<br>O/P:MIN LOAD<br>Ta:25°C            | 13.599V~16.662 V /230VAC<br>13.601V~16.662 V/115VAC |
| 3  | CURRENT ADJ RANGE           | 7.5A~15A                                      | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                         | 1.438A~15.17 A                                      |
| 4  | CONSTANT CURRENT REGION     | 7.5V~15V                                      | I/P: 230 VAC<br>O/P:CV MODE<br>Ta:25°C                           | O/P=7.5V: 15.56 A<br>O/P=14V: 15.51 A               |
| 5  | OUTPUT VOLTAGE TOLERANCE    | V1: -2% ~ 2% (Max)                            | I/P: 100 VAC /305VAC<br>O/P:FULL/ 0% LOAD<br>Ta:25°C             | V1: 1.4% ~ -1.4%                                    |
| 6  | LINE REGULATION             | V1: -0.5% ~ 0.5% (Max)                        | I/P:100 VAC ~305 VAC<br>O/P:FULL LOAD<br>Ta:25°C                 | V1: 0% ~ 0%   |
| 7  | LOAD REGULATION             | V1: -1.5% ~ -1.5% (Max)                       | I/P: 230 VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C                    | V1: 0.71% ~ -0.71%                                  |
| 8  | SET UP TIME                 | 230VAC/ 500 ms (Max)<br>115VAC/ 1000 ms (Max) | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C         | 230VAC/ 362 ms<br>115 VAC/ 704 ms                   |
| 9  | RISE TIME                   | 230VAC/ 80 ms (Max)<br>115VAC/ 80 ms (Max)    | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C         | 230VAC/ 31 ms<br>115 VAC/ 32 ms                     |
| 10 | HOLD UP TIME                | 230VAC/ 15 ms (Typ)<br>115VAC/ 15 ms (Typ)    | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C         | 230VAC/ 27 ms<br>115 VAC/ 27 ms                     |
| 11 | OVER/UNDERSHOOT TEST        | < ±5%   | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                         | TEST:< 5%   |
| 12 | DYNAMIC LOAD                | V1: 1500 mVp-p                                | I/P: 230 VAC<br>O/P:(1)FULL /Min LOAD<br>90%DUTY/1KHZ<br>Ta:25°C | 14mVp-p   |

|    |                              |   |                  |        |        |        |        |         |         |         |         |         |         |
|----|------------------------------|---|------------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
| 13 | DIMMER TEST<br>(B Type only) | SPEC:   |                  |        |        |        |        |         |         |         |         |         |         |
|    |                              | *Reference resistance value for output current adjustment (Typical) |                  |        |        |        |        |         |         |         |         |         |         |
|    |                              | Resistance value  | 10K              | 20K    | 30K    | 40K    | 50K    | 60K     | 70K     | 80K     | 90K     | 100K    |         |
|    |                              | Output current  | 10%              | 20%    | 30%    | 40%    | 50%    | 60%     | 70%     | 80%     | 90%     | 100%    |         |
|    |                              | *1 ~ 10V dimming function for output current adjustment (Typical)   |                  |        |        |        |        |         |         |         |         |         |         |
|    |                              | Dimming value   | 1V               | 2V     | 3V     | 4V     | 5V     | 6V      | 7V      | 8V      | 9V      | 10V     |         |
|    |                              | Output current  | 10%              | 20%    | 30%    | 40%    | 50%    | 60%     | 70%     | 80%     | 90%     | 100%    |         |
|    |                              | *10V PWM signal for output current adjustment (Typical)             |                  |        |        |        |        |         |         |         |         |         |         |
|    |                              | Duty value  | 10%              | 20%    | 30%    | 40%    | 50%    | 60%     | 70%     | 80%     | 90%     | 100%    |         |
|    |                              | Output current  | 10%              | 20%    | 30%    | 40%    | 50%    | 60%     | 70%     | 80%     | 90%     | 100%    |         |
|    |                              | TEST RESULT: I/P : 230 VAC ; Ta : 25°C                              |                  |        |        |        |        |         |         |         |         |         |         |
|    |                              | 1   | Resistance value | 10K    | 20K    | 30K    | 40K    | 50K     | 60K     | 70K     | 80K     | 90K     | 100K    |
|    |                              |   | Output current   | 1.624A | 3.191A | 4.681A | 6.476A | 7.695A  | 9.177A  | 10.614A | 12.122A | 13.437A | 14.255A |
| %  | 10.83%                       |   | 21.27%           | 31.21% | 43.17% | 51.30% | 61.18% | 70.76%  | 80.81%  | 89.58%  | 95.03%  |         |         |
| 2  | Dimming value                | 1V  | 2V               | 3V     | 4V     | 5V     | 6V     | 7V      | 8V      | 9V      | 10V     |         |         |
|    | Output current               | 1.649A  | 3.304A           | 4.696A | 6.215A | 7.704A | 9.197A | 10.702A | 12.242A | 13.733A | 15.035A |         |         |
|    | %                            | 10.99%  | 22.03%           | 31.31% | 41.43% | 51.36% | 61.31% | 71.35%  | 81.61%  | 91.55%  | 100.23% |         |         |
| 3  | Duty value                   | 10%   | 20%              | 30%    | 40%    | 50%    | 60%    | 70%     | 80%     | 90%     | 100%    |         |         |
|    | Output current               | 1.796A  | 3.415A           | 4.879A | 6.358A | 7.825A | 9.281A | 10.729A | 12.179A | 13.636A | 15.098A |         |         |
|    | %                            | 11.97%  | 22.77%           | 32.53% | 42.39% | 52.17% | 61.87% | 71.53%  | 81.19%  | 90.91%  | 100.65% |         |         |

INPUT FUNCTION TEST

| NO | TEST ITEM                 | SPECICATION   | TEST CONDITION  | RESULT   |
|----|---------------------------|---|---|--|
| 1  | INPUT VOLTAGE RANGE       | 90VAC~305 VAC   | I/P:TESTING<br>O/P:FULL LOAD<br>Ta:25°C   | 60V~305V   |
|    |                           |   | I/P:<br>(1)LOW-LINE-3V=87 V<br>(2)HIGH-LINE=305 V<br>O/P:FULL/MIN LOAD<br>ON: 30 Sec . OFF: 30 Sec 10MIN<br>( AC POWER ON/OFF NO DAMAGE ) | TEST: OK   |
| 2  | INPUT FREQUENCY RANGE     | 47HZ ~63 HZ<br>NO DAMAGE  | I/P: 100 VAC ~305VAC<br>O/P:FULL~MIN LOAD<br>Ta:25°C  | OK   |
| 3  | POWER FACTOR              | 0.95/ 230 VAC FULL LOAD (TYP)<br>0.98/ 115 VAC FULL LOAD (TYP)<br>0.9/ 230 VAC 65% LOAD (TYP)<br>0.9/ 115 VAC 65%LOAD (TYP) | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD / 65% LOAD<br>Ta:25°C   | PF=0.952 /230V/100%LOAD<br>PF=0.995/115V/100%LOAD<br>PF=0.92 /230V/65%LOAD<br>PF=0.993 /115V/65%LOAD |
| 4  | EFFICIENCY                | 90% (TYP)   | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C  | 90 %   |
| 5  | INPUT CURRENT             | 277V/1.2 A (Typ)<br>230 V/ 2 A (Typ)<br>115 V/ 4 A (Typ)  | I/P: 230 VAC<br>I/P: 115 VAC<br>O/P:FULL LOAD<br>Ta:25°C  | I = 1.01A/ 277VAC<br>I = 1.067 A/ 230VAC<br>I = 2.082 A/ 115VAC                                      |
| 6  | INRUSH CURRENT            | 230 V/ 75A (Typ)<br>COLD START  | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C  | I = 73 A/ 230VAC   |
| 7  | TOTAL HARMONIC DISTORTION | THD< 20% when output loading $\geq$ 50% at 115VAC/230VAC input and output loading $\geq$ 75% at 277VAC input                | I/P : 115 VAC<br>I/P : 230 VAC<br>O/P : 50% LOAD<br><br>I/P : 277 VAC<br>O/P : 75%LOAD<br>Ta : 25°C                                       | THD : 6.57 /115VAC<br>THD : 12.78 /230VAC<br><br>THD : 15.158 /277VAC                                |

PROTECTION FUNCTION TEST

| NO | TEST ITEM               | SPECICATION      | TEST CONDITION   | RESULT   |
|----|-------------------------|------------------|--|--|
| 1  | OVER LOAD PROTECTION    | 95 %~108 %       | I/P: 305 VAC<br>I/P: 230 VAC<br>I/P: 100 VAC<br>O/P:TESTING<br>Ta:25°C | 103.8 %/305VAC<br>103.8%/ 230VAC<br>104%/100VAC<br>Constant Current Limiting |
| 2  | OVER VOLTAGE PROTECTION | V1: 17.5 ~ 21.5V | I/P: 305 VAC<br>I/P: 230 VAC<br>I/P: 90 VAC<br>O/P:MIN LOAD<br>Ta:25°C | 17.21V/305VAC<br>17.15V/ 230VAC<br>17.22V/ 90VAC<br>Shunt down Re- power ON  |

|   |                             |  |  |  |
|---|-----------------------------|--|--|--|
| 3 | OVER TEMPERATURE PROTECTION | NO DAMAGE                              | I/P: 230 VAC<br>O/P: FULL LOAD           | O.T.P. Active<br>Shut down o/p volotage , recovers automatically after temperature goes down |
| 4 | SHORT PROTECTION            | SHORT EVERY OUTPUT<br>1 HOUR NO DAMAGE | I/P: 305VAC<br>O/P: FULL LOAD<br>Ta:25°C | NO DAMAGE<br>Hiccup Mode   |

**COMPONENT STRESS TEST**

| NO | TEST ITEM  | SPECIFICATION                   | TEST CONDITION   | RESULT                                 |
|----|--|---------------------------------|--|--|
| 1  | Power Transistor<br>( D to S) or (C to E) Peak Voltage | Q4 Rated<br>16A/600V            | I/P : High-Line +3V = 308 V<br>O/P : (1)Full Load Turn on<br>(2) Output Short<br>(3)Full load continue<br>Ta : 25°C                          | (1) 470 V<br>(2) 484 V<br>(3) 446 V    |
| 2  | Diode Peak Voltage                                     | Q101 Rated<br>84A/60V           | I/P : High-Line +3V = 308 V<br>O/P : (1)Full Load Turn on<br>(2)Output Short<br>(3)Full load continue<br>Ta : 25°C                           | (1) 47.6 V<br>(2) 20.2 V<br>(3) 45 V   |
|    |  | Q102 Rated<br>84A/60V           | I/P : High-Line +3V = 308 V<br>O/P : (1)Full Load Turn on<br>(2)Output Short<br>(3)Full load continue<br>Ta : 25°C                           | (1) 56.2 V<br>(2) 36 V<br>(3) 55.2 V   |
| 3  | Input Capacitor Voltage                                | C5 Rated:<br>NCC:<br>150μ/450 V | I/P : High-Line +3V = 308 V<br>O/P : (1)Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3)Full Load /Min load<br>Change<br>Ta : 25°C | (1) 442 V<br>(2) 442 V<br>(3) 448 V    |
| 4  | Control IC Voltage Test                                | U 70 Rated<br>8.85V~16 V        | I/P : High-Line +3V = 308 V<br>O/P : (1)Full Load Turn on /Off<br>(2) Min load Turn on /Off<br>(3)Full Load /Min load<br>Change<br>Ta : 25°C | (1) 15.2 V<br>(2) 14.7 V<br>(3) 14.8 V |
| 5  | P.F.C Transistor<br>( D to S) or (C to E) Peak Voltage | Q1 Rated<br>20.7A/600V          | I/P : High-Line +3V = 308 V<br>O/P : (1)Full Load Turn on<br>(2)Output Short<br>(3)Full load continue<br>Ta : 25°C                           | (1) 546 V<br>(2) 494 V<br>(3) 522 V    |

**SAFETY & EMC TEST**

**SAFETY TEST**

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

|   |                      |  |   |   |
|---|----------------------|--|---|---|
| 1 | WITHSTAND VOLTAGE    | IEC60950-1<br>I/P-O/P: 3.75KVAC/min<br>I/P-FG:2 KVAC/min,4.5mA<br>O/P-FG:1.5KVAC/min | I/P-O/P: 4 KVAC/min<br>I/P-FG: 2.4KVAC/min<br>O/P-FG: 1.8 KVAC/min<br>Ta:25°C | I/P-O/P: 4.89 mA<br>I/P-FG: 4.02 mA<br>O/P-FG: 5.08 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: 22.1 GΩ<br>I/P-FG: 8.68 GΩ<br>O/P-FG: 30 GΩ<br>NO DAMAGE   |
| 3 | GROUNDING CONTINUITY | IEC60950-1<br>FG(PE) TO CHASSIS<br>OR TRACE < 100 mΩ                                 | 40A / 2min<br>Ta:25°C   | 13 mΩ   |
| 4 | LEAKAGE CURRENT      | IEC60950-1<br>< 0.75 mA / 277VAC   | I/P: 280 VAC<br>O/P:Min LOAD<br>Ta:25°C                                       | L-FG: 0.38 mA<br>N-FG: 0.46 mA                                      |
| 5 | APPROVAL             | TUV: Certificate NO : R50171244<br>UL: File NO : E127738                             |   |   |

**E.M.C TEST**

| NO | TEST ITEM   | SPECICATION  | TEST CONDITION  | RESULT                        |
|----|---|--|---|-------------------------------|
| 1  | HARMONIC  | EN61000-3-2<br>CLASS C                             | I/P: 230VAC/50HZ<br>LOAD:LED/ELECTRONIC LOAD<br>O/P:100%LOAD<br>Ta:25°C | PASS                          |
| 2  | CONDUCTION  | EN55022 EN55015<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 EN55015<br>CLASS B                         | I/P: 230 VAC (50HZ)<br>O/P:FULL LOAD<br>Ta:25°C                         | PASS<br>Test by certified Lab |
| 4  | E.S.D   | EN61000-4-2<br>INDUSTRY<br>AIR:8KV / Contact:4KV   | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                           | CRITERIA A                    |
| 5  | E.F.T   | EN61000-4-4<br>INDUSTRY<br>INPUT: 2KV              | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                           | CRITERIA A                    |
| 6  | SURGE   | IEC61000-4-5<br>INDUSTRY<br>L-N :2KV<br>L,N-PE:4KV | I/P: 230 VAC/50HZ<br>O/P:FULL LOAD<br>Ta:25°C                           | CRITERIA A                    |
| 7  | Test by certified Lab & Test Report Prepare.<br>Any contradictions of the test results, please refer to the latest EMC test report. |  |   |                               |

Reliability Test

| NO | TEST ITEM   | SPECIFICATION   | TEST CONDITION   | RESULT            |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
|----|---|---|--|-------------------|----------|-----------------------------|-----------------------------|---|-----|--------|--------|---|----|--------|--------|---|-----|--------|--------|---|-----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|---|----|--------|--------|----|------|--------|--------|----|-----|--------|--------|----|----|--------|--------|----|----|--------|---------|----|------|--------|--------|----|------|--------|--------|----|-------|--------|---------|--|
| 1  | TEMPERATURE RISE TEST   | MODEL : HLG-240H-12<br>1. ROOM AMBIENT BURN-IN : 1.5 HRS<br>I/P : 230VAC O/P : FULL LOAD Ta= 26.5 °C<br>2. HIGH AMBIENT BURN-IN : 12 HRS<br>I/P : 230VAC O/P : FULL LOAD Ta= 61.7 °C  | <table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT<br/>Ta= 26.5 °C</th> <th>HIGH AMBIENT<br/>Ta= 61.7 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>62.7°C</td><td>89.2°C</td></tr> <tr><td>2</td><td>C1</td><td>59.8°C</td><td>88.0°C</td></tr> <tr><td>3</td><td>LF2</td><td>59.7°C</td><td>87.8°C</td></tr> <tr><td>4</td><td>BD1</td><td>60.5°C</td><td>89.2°C</td></tr> <tr><td>5</td><td>L2</td><td>59.3°C</td><td>87.7°C</td></tr> <tr><td>6</td><td>L1</td><td>59.6°C</td><td>88.1°C</td></tr> <tr><td>7</td><td>Q1</td><td>60.9°C</td><td>89.6°C</td></tr> <tr><td>8</td><td>C5</td><td>61.0°C</td><td>89.4°C</td></tr> <tr><td>9</td><td>U1</td><td>59.0°C</td><td>87.2°C</td></tr> <tr><td>10</td><td>TSW1</td><td>59.9°C</td><td>88.9°C</td></tr> <tr><td>11</td><td>C35</td><td>63.8°C</td><td>92.2°C</td></tr> <tr><td>12</td><td>Q3</td><td>60.8°C</td><td>89.5°C</td></tr> <tr><td>13</td><td>T1</td><td>78.2°C</td><td>106.1°C</td></tr> <tr><td>14</td><td>Q101</td><td>67.4°C</td><td>96.5°C</td></tr> <tr><td>15</td><td>C102</td><td>69.9°C</td><td>98.3°C</td></tr> <tr><td>16</td><td>LF101</td><td>77.9°C</td><td>106.5°C</td></tr> </tbody> </table> | NO                | Position | ROOM AMBIENT<br>Ta= 26.5 °C | HIGH AMBIENT<br>Ta= 61.7 °C | 1 | LF1 | 62.7°C | 89.2°C | 2 | C1 | 59.8°C | 88.0°C | 3 | LF2 | 59.7°C | 87.8°C | 4 | BD1 | 60.5°C | 89.2°C | 5 | L2 | 59.3°C | 87.7°C | 6 | L1 | 59.6°C | 88.1°C | 7 | Q1 | 60.9°C | 89.6°C | 8 | C5 | 61.0°C | 89.4°C | 9 | U1 | 59.0°C | 87.2°C | 10 | TSW1 | 59.9°C | 88.9°C | 11 | C35 | 63.8°C | 92.2°C | 12 | Q3 | 60.8°C | 89.5°C | 13 | T1 | 78.2°C | 106.1°C | 14 | Q101 | 67.4°C | 96.5°C | 15 | C102 | 69.9°C | 98.3°C | 16 | LF101 | 77.9°C | 106.5°C |  |
| NO | Position  | ROOM AMBIENT<br>Ta= 26.5 °C   | HIGH AMBIENT<br>Ta= 61.7 °C  |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 1  | LF1   | 62.7°C  | 89.2°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 2  | C1  | 59.8°C  | 88.0°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 3  | LF2   | 59.7°C  | 87.8°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 4  | BD1   | 60.5°C  | 89.2°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 5  | L2  | 59.3°C  | 87.7°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 6  | L1  | 59.6°C  | 88.1°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 7  | Q1  | 60.9°C  | 89.6°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 8  | C5  | 61.0°C  | 89.4°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 9  | U1  | 59.0°C  | 87.2°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 10 | TSW1  | 59.9°C  | 88.9°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 11 | C35   | 63.8°C  | 92.2°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 12 | Q3  | 60.8°C  | 89.5°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 13 | T1  | 78.2°C  | 106.1°C  |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 14 | Q101  | 67.4°C  | 96.5°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 15 | C102  | 69.9°C  | 98.3°C   |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 16 | LF101   | 77.9°C  | 106.5°C  |                   |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 2  | OVER LOAD BURN-IN TEST  | NO DAMAGE<br>1 HOUR ( MIN )   | I/P : 230 VAC<br>O/P : O/P SHORT TEST<br>Ta : 25°C   | TEST : OK         |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 3  | LOW TEMPERATURE<br>TURN ON TEST                                   | TURN ON AFTER 2 HOUR  | I/P : 230 VAC/100VAC<br>O/P : CV=11V<br>Ta= -35 °C   | TEST : OK         |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 4  | HIGH HUMIDITY<br>HIGH TEMPERATURE<br>HIGH VOLTAGE<br>TURN ON TEST | AFTER 12 HOURS<br>IN CHAMBER ON<br>CONTROL 60 °C<br>NO DAMAGE   | I/P : 305 VAC<br>O/P : CV=11V<br>Ta= 60 °C<br>HUMIDITY= 95 %R.H  | TEST : OK         |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 5  | TEMPERATURE<br>COEFFICIENT  | ± 0.03 %(0~50°C)  | I/P : 230 VAC<br>O/P : FULL LOAD   | ± 0.003 %(0~50°C) |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 6  | STORAGE TEMPERATURE TEST  | 1. Thermal shock Temperature : -45°C ~ +90°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 5 CYCLE<br>5. Input/Output condition : STATIC            |  | OK                |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |
| 7  | THERMAL SHOCK TEST  | 1. Thermal shock Temperature : -35°C ~ +65°C<br>2. Temperature change rate : 25°C / MIN<br>3. Dwell time low and high temperature : 30 MIN/EACH<br>4. Total test cycle : 10 CYCLE<br>5. Input/Output condition : 230VAC/Full Load |  | OK                |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |    |      |        |        |    |     |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |  |



|    |                          |   |   |
|----|--------------------------|---|---|
| 8  | VIBRATION TEST           | 1 Carton & 1 Set<br>(1) Waveform : Sine Wave<br>(2) Frequency : 10~500Hz<br>(3) Sweep Time : 12min/sweep cycle<br>(4) Acceleration : 5G<br>(5) Test Time : 72min in each axis (X.Y.Z)<br>(6) Ta : 25°C                        | TEST : OK                                       |
| 9  | CAPACITOR LIFE CYCLE     | HLG-240H-12:SUPPOSE C102 IS THE MOST CRITICAL COMPONENT<br>(1) I/P : 230VAC O/P : FULL LOAD Tc= 75 °C LIFE TIME<br>(2) I/P : 230VAC O/P : 75% LOAD Tc= 75 °C LIFE TIME<br>(3) I/P : 230VAC O/P : 50% LOAD Tc= 75 °C LIFE TIME | (1) 57702 HRS<br>(2) 62076 HRS<br>(3) 96922 HRS |
| 10 | MTBF                     | Conducted by Parts Stress Analysis Prediction<br>207.9K hrs min. MIL-HDBK-217F (25°C)   |   |
| 11 | Ongoing Reliability Test | I/P : 230VAC O/P : FULL LOAD TA=50°C<br>Demonstration Mean Time Between Failure : 62,000 hours  |   |

| TEST RESULT | TESTER     | REVIEW     | APPROVAL      |
|-------------|------------|------------|---------------|
| PASS        | DANIEL GAO | SANFORD SU | VINCENT TSENG |

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