



# Test Report: HLG-240H-30

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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: 200 mVp-p (Max )                          | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                         | V1: 55 mVp-p (Max )                              |
| 2  | OUTPUT VOLTAGE<br>ADJUST RANGE | CH1: 28V~ 32 V                                | I/P: 230 VAC<br>I/P:115VAC<br>O/P:MIN LOAD<br>Ta:25°C            | 25.79V~ 32.7 V /230VAC<br>25.79V~ 32.7 V /115VAC |
| 3  | CURRENT ADJ RANGE              | 4A~8A                                         | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                         | 0.992 A~ 8.6 A                                   |
| 4  | CONSTANT CURRENT REGION        | 15V~30V                                       | I/P: 230 VAC<br>O/P:CV MODE<br>Ta:25°C                           | O/P=15V: 8.39 A<br>O/P=29V: 8.21 A               |
| 5  | OUTPUT VOLTAGE<br>TOLERANCE    | V1: -1 % ~ 1 % (Max)                          | I/P: 100 VAC /305VAC<br>O/P:FULL/ 0 % LOAD<br>Ta:25°C            | V1: 0.23 %~-0.23 %                               |
| 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: 0.02 %~-0.02 %                               |
| 7  | LOAD REGULATION                | V1: - 0.5% ~ 0.5 % (Max)                      | I/P: 230 VAC<br>O/P:FULL ~MIN LOAD<br>Ta:25°C                    | V1: 0.23 %~-0.23 %                               |
| 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/ 36 ms<br>115 VAC/ 35 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/ 23 ms<br>115 VAC/ 23 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: 3000 mVp-p                                | I/P: 230 VAC<br>O/P:(1)FULL /Min LOAD<br>90%DUTY/1KHZ<br>Ta:25°C | 472mVp-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℃                                |                  |        |        |        |        |        |        |        |        |         |
|    |                              | 1                                                                   | Resistance value | 10K    | 20K    | 30K    | 40K    | 50K    | 60K    | 70K    | 80K    | 100K    |
|    |                              |                                                                     | Output current   | 0.522A | 1.357A | 2.216A | 3.235A | 4.048A | 4.970A | 5.707A | 6.544A | 8.005A  |
|    |                              |                                                                     | %                | 6.53%  | 16.96% | 27.70% | 40.44% | 50.60% | 62.13% | 71.34% | 81.80% | 100.06% |
|    |                              | 2                                                                   | Dimming value    | 1V     | 2V     | 3V     | 4V     | 5V     | 6V     | 7V     | 8V     | 10V     |
|    |                              |                                                                     | Output current   | 0.531A | 1.405A | 2.286A | 3.320A | 4.162A | 5.032A | 5.790A | 6.670A | 8.051A  |
|    |                              |                                                                     | %                | 6.64%  | 17.56% | 28.58% | 41.50% | 52.03% | 62.90% | 72.38% | 83.38% | 100.64% |
|    |                              | 3                                                                   | Duty value       | 10%    | 20%    | 30%    | 40%    | 50%    | 60%    | 70%    | 80%    | 100%    |
|    |                              |                                                                     | Output current   | 0.620A | 1.520A | 2.395A | 3.436A | 4.265A | 5.105A | 5.768A | 6.594A | 8.082A  |
|    |                              |                                                                     | %                | 7.75%  | 19.00% | 29.94% | 42.95% | 53.31% | 63.81% | 72.10% | 82.43% | 101.03% |

**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                                                                                                  | 71V~305V                                                                                              |
|    |                           |                                                                                                                             | I/P:<br>(1)LOW-LINE-3V=87 V<br>(2)HIGH-LINE=305V<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=0.955 /230V/100%LOAD<br>PF=0.989 /115V/100%LOAD<br>PF=0.921 /230V/65%LOAD<br>PF=0.99 /115V/65%LOAD |
| 4  | EFFICIENCY                | 92.5% (TYP)                                                                                                                 | I/P: 230 VAC<br>O/P:FULL LOAD<br>Ta:25°C                                                                                                 | 93.07 %                                                                                               |
| 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 = 67 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 : 6.53 /115VAC<br>THD : 14.23 /230VAC<br><br>THD : 15.79 /277VAC                                  |

**PROTECTION FUNCTION TEST**

| NO | TEST ITEM               | SPECICATION  | TEST CONDITION                                                         | RESULT                                                                        |
|----|-------------------------|--------------|------------------------------------------------------------------------|-------------------------------------------------------------------------------|
| 1  | OVER LOAD PROTECTION    | 95 %~108 %   | I/P: 305VAC<br>I/P: 230 VAC<br>I/P: 100 VAC<br>O/P:TESTING<br>Ta:25°C  | 105 %/305VAC<br>105.1 %/ 230VAC<br>105.3%/100VAC<br>Constant Current Limiting |
| 2  | OVER VOLTAGE PROTECTION | V1: 33V~ 39V | I/P: 305 VAC<br>I/P: 230 VAC<br>I/P: 90 VAC<br>O/P:MIN LOAD<br>Ta:25°C | 34.3V/305VAC<br>34.3V/ 230VAC<br>34.3V/ 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) 448<br>(2) 450<br>(3) 444       | V<br>V<br>V |
| 2  | Diode Peak Voltage                                     | Q101 Rated<br>40A/100V   | 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) 72<br>(2) 12<br>(3) 68.3        | V<br>V<br>V |
|    |                                                        | Q102 Rated<br>40A/100V   | 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) 79<br>(2) 25<br>(3) 70          | V<br>V<br>V |
| 3  | Input Capacitor Voltage                                | C5 Rated:<br>150μ/450 V  | I/P : High-Line +3V =308V<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) 429<br>(2) 434<br>(3) 442       | V<br>V<br>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) 12.99<br>(2) 12.89<br>(3) 12.99 | V<br>V<br>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) 514<br>(2) 498<br>(3) 480       | V<br>V<br>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: 1.8KVAC/min<br>Ta:25°C | I/P-O/P: 4.95 mA<br>I/P-FG: 4.3 mA<br>O/P-FG: 5.34 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: 30 GΩ<br>I/P-FG: 26.3 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: 0.38 mA                                     |
| 5  | APPROVAL             | TUV: Certificate NO : R50171244<br>UL: File NO :                                     |                                                                              |                                                                    |

**E.M.C TEST**

| NO | TEST ITEM                                                                                                                           | SPECIFICATION                                      | 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                                             | <div>MODEL : HLG-240H-24</div> <div>1. ROOM AMBIENT BURN-IN : 1.5 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 26.5 °C</div> <div>2. HIGH AMBIENT BURN-IN : 12 HRS</div> <div>I/P : 230VAC O/P : FULL LOAD Ta= 61.7 °C</div> <table><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><tr><td>1</td><td>LF1</td><td>64.0°C</td><td>91.1°C</td></tr><tr><td>2</td><td>C1</td><td>61.3°C</td><td>89.3°C</td></tr><tr><td>3</td><td>LF2</td><td>63.4°C</td><td>91.2°C</td></tr><tr><td>4</td><td>BD1</td><td>64.0°C</td><td>92.7°C</td></tr><tr><td>5</td><td>L2</td><td>62.7°C</td><td>90.9°C</td></tr><tr><td>6</td><td>L1</td><td>61.5°C</td><td>89.9°C</td></tr><tr><td>7</td><td>Q1</td><td>64.7°C</td><td>93.2°C</td></tr><tr><td>8</td><td>U1</td><td>61.5°C</td><td>90.2°C</td></tr><tr><td>9</td><td>TSW1</td><td>64.1°C</td><td>92.7°C</td></tr><tr><td>10</td><td>Q3</td><td>65.1°C</td><td>93.3°C</td></tr><tr><td>11</td><td>T1</td><td>79.0°C</td><td>106.6°C</td></tr><tr><td>12</td><td>Q101</td><td>69.6°C</td><td>98.3°C</td></tr><tr><td>13</td><td>C102</td><td>66.5°C</td><td>94.9°C</td></tr><tr><td>14</td><td>LF101</td><td>71.8°C</td><td>100.1°C</td></tr></table> |                                                                   |                   | NO | Position | ROOM AMBIENT<br>Ta= 26.5 °C | HIGH AMBIENT<br>Ta= 61.7 °C | 1 | LF1 | 64.0°C | 91.1°C | 2 | C1 | 61.3°C | 89.3°C | 3 | LF2 | 63.4°C | 91.2°C | 4 | BD1 | 64.0°C | 92.7°C | 5 | L2 | 62.7°C | 90.9°C | 6 | L1 | 61.5°C | 89.9°C | 7 | Q1 | 64.7°C | 93.2°C | 8 | U1 | 61.5°C | 90.2°C | 9 | TSW1 | 64.1°C | 92.7°C | 10 | Q3 | 65.1°C | 93.3°C | 11 | T1 | 79.0°C | 106.6°C | 12 | Q101 | 69.6°C | 98.3°C | 13 | C102 | 66.5°C | 94.9°C | 14 | LF101 | 71.8°C | 100.1°C |
| NO | Position                                                          | ROOM AMBIENT<br>Ta= 26.5 °C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | HIGH AMBIENT<br>Ta= 61.7 °C                                       |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 1  | LF1                                                               | 64.0°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 91.1°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 2  | C1                                                                | 61.3°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 89.3°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 3  | LF2                                                               | 63.4°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 91.2°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 4  | BD1                                                               | 64.0°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 92.7°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 5  | L2                                                                | 62.7°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 90.9°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 6  | L1                                                                | 61.5°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 89.9°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 7  | Q1                                                                | 64.7°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 93.2°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 8  | U1                                                                | 61.5°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 90.2°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 9  | TSW1                                                              | 64.1°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 92.7°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 10 | Q3                                                                | 65.1°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 93.3°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 11 | T1                                                                | 79.0°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 106.6°C                                                           |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 12 | Q101                                                              | 69.6°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 98.3°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 13 | C102                                                              | 66.5°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 94.9°C                                                            |                   |    |          |                             |                             |   |     |        |        |   |    |        |        |   |     |        |        |   |     |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |    |        |        |   |      |        |        |    |    |        |        |    |    |        |         |    |      |        |        |    |      |        |        |    |       |        |         |
| 14 | LF101                                                             | 71.8°C                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 100.1°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=23V<br>Ta= -40 °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=23V<br>Ta= 61.7 °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 : -40°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-24: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) 62604 HRS<br>(2) 62730 HRS<br>(3) 73012 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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