Test Report: HLG-120H-C1400

150W Single Output LED Power Supply

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Protection Function Test
Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	RIPPLE & NOISE	V1：1 Vp-p (Max)	I/P： 230VAC O/P：FULL LOAD Ta：25℃	V1： 572 mVp-p (Max)
2	CURRENT ACCURACY	± 5%	I/P： 230VAC O/P：CV MODE : 54V~107V Ta：25℃	± 1.1 %
3	RIPPLE CURRENT	± 5%	I/P： 230VAC O/P：LED： 54V~107V Ta：25℃	LED=54V ±3.6 % LED=107V ±0.88 %
4	OUTPUT CURRENT ADJUST RANGE	CH1 ：700mA~ 1400m A	I/P： 230VAC I/P： 115 VAC O/P：CV MODE : 106V Ta：25℃	0.5822 A~ 1.5493 A/ 230VAC 0.5828 A~ 1.5495 A/ 115 VAC
5	LINE REGULATION	V1: - 1% ~ 1 % (Max)	I/P:100 VAC ~305 VAC O/P:FULL LOAD Ta:25℃	V1: 0 %~ 0 %
6	SET UP TIME	115 VAC： 1000 ms (Max) 230VAC： 500 ms(Max)	I/P： 115 VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	115 VAC/ 712 ms 230VAC/ 359 ms
7	RISE TIME	115 VAC： 80 ms (Max) 230VAC： 80 ms (Max)	I/P： 115 VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	115 VAC/ 8.8 ms 230VAC/ 8.4 ms
8	HOLD UP TIME	115 VAC： 16 ms (TYP) 230VAC： 16 ms (TYP)	I/P： 115 VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	115 VAC/ 22.4 ms 230VAC/ 24 ms
9	OVER/UNDERSHOOT TEST	< ±5%	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	TEST： <5 %
10	DIMMING TEST ※Built-in 3 in 1 dimming function, IP67 rated. Output constant current level can be adjusted through output cable by connecting a resistance or 1 ~ 10Vdc or 10V PWM signal between DIM+ and DIM-. ※ Please DO NOT connect "DIM-" to "-V". ※Reference resistance value for output current adjustment (Typical)			

Resistance value	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
Output current	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**	**102% ~108%**

*1 ~ 10V dimming function for output current adjustment (Typical)

Dimming value	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
Output current	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**	**102% ~108%**

*10V PWM signal for output current adjustment (Typical)

Duty value	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
Output current	**10%**	**20%**	**30%**	**40%**	**50%**	**60%**	**70%**	**80%**	**90%**	**100%**	**102% ~108%**

TEST RESULT: I/P： 230 VAC ;Ta：25℃

1	Resistance value	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
	Output current	0.182A	0.336A	0.448A	0.583A	0.723A	0.875A	0.994A	1.117A	1.264A	1.398A	1.469A
	Percentage of rated current	**13.02%**	**24.00%**	**31.99%**	**41.66%**	**51.65%**	**62.52%**	**71.00%**	**79.76%**	**90.26%**	**99.87%**	**104.91%**
2	Dimming value	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
	Output current	0.184A	0.319A	0.454A	0.591A	0.727A	0.861A	0.996A	1.131A	1.266A	1.404A	1.469A
	Percentage of rated current	**13.13%**	**22.77%**	**32.39%**	**42.19%**	**51.90%**	**61.51%**	**71.13%**	**80.75%**	**90.44%**	**100.25%**	**104.91%**
3	Duty value	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output current	0.198A	0.332A	0.468A	0.603A	0.738A	0.873A	1.009A	1.144A	1.280A	1.414A	1.469A
	Percentage of rated current	**14.11%**	**23.72%**	**33.39%**	**43.04%**	**52.70%**	**62.37%**	**72.04%**	**81.72%**	**91.41%**	**101.03%**	**104.91%**

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~305 VAC	I/P：TESTING O/P：FULL LOAD Ta：25℃	67.7 V~305V
			I/P： LOW-LINE-3V=87V HIGH-LINE+10V=315V O/P：FULL/MIN LOAD ON： 30 Sec . OFF： 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST： OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P：90VAC ~ 305VAC O/P：FULL~MIN LOAD Ta：25℃	TEST： OK
3	POWER FACTOR	0.98 / 115VAC(TYP) 0.96 /230 VAC(TYP) 0.93 /277 VAC(TYP)	I/P： 115VAC I/P： 230VAC I/P： 277VAC O/P：FULL LOAD Ta：25℃	PF= 0.966 / 115VAC PF= 0.966 / 230VAC PF= 0.941 / 277VAC
4	EFFICIENCY	93.5 % (TYP)	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	93.94 %
5	INPUT CURRENT	277V/ 0.7 A (TYP) 230V/ 0.8 A (TYP) 115V/ 1.6 A (TYP)	I/P： 277 VAC I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I = 0.61 A/ 277 VAC I = 0.71 A/ 230 VAC I = 1.41 A/ 115 VAC
6	INRUSH CURRENT	230V/ 50 A (TYP) (t_{width}=600us measured at 50% I_{peak}) COLD START	I/P： 230VAC O/P：FULL LOAD Ta：25℃	I = 42 A/ 230VAC T50= 580 us
7	LEAKAGE CURRENT	< 0.75 mA / 277 VAC	I/P： 277 VAC O/P：Min LOAD Ta：25℃	L-FG： 0.28 mA N-FG： 0.28 mA

8	TOTAL HARMONIC DISTORTION	THD< 20% when output loading ≧ 50% at 115VAC/230VAC input and output loading≧75% at 277VAC input	I/P： 115 VAC I/P： 230 VAC O/P：50% LOAD I/P： 277 VAC O/P：75%LOAD Ta：25℃	THD： 11.2 /115VAC THD： 17.73 /230VAC THD： 17.4 /277VAC

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	CH1：120V ~ 130 V	I/P： 115 VAC I/P： 230 VAC O/P：MIN LOAD Ta：25℃	125.97 V/ 115VAC 125.97 V/ 230 VAC Shut down o/p voltage with auto-recovery or re-power on to recovery
2	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P： 230 VAC O/P：FULL LOAD	O.T.P. Active Shut down o/p voltage，recovers automatically after temperature goes down
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P： 305 VAC O/P：FULL LOAD Ta：25℃	NO DAMAGE Constant Current Limiting

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q5 Rated 11A/600V	I/P：High-Line +3V = 308V O/P： (1)Full Load Turn on (2) Output Short (3)Full load continue Ta：25℃	(1) 476 V (2) 458 V (3) 458 V
2	Diode Peak Voltage	D103 Rated 0 3A/400V	I/P：High-Line +3V = 308 V O/P： (1)Full Load Turn on (2)Output Short (3)Full load continue Ta：25℃	(1) 240 V (2) 14.8 V (3) 236 V
3	Input Capacitor Voltage	C5 Rated: 100u/450V	I/P：High-Line +3V = 308V O/P： (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta：25℃	(1) 458 V (2) 458 V (3) 466 V
4	Control IC Voltage Test	U 900 Rated 8.85V~16V	I/P：High-Line +3V = 308V O/P： (1)Full Load Turn on /Off (2) Min load Turn on /Off (3)Full Load /Min load Change Ta：25℃	(1) 13.9 V (2) 13.7 V (3) 13.8 V
5	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 20A/600V	I/P：High-Line +3V = 308 V O/P： (1)Full Load Turn on (2)Output Short (3)Full load continue Ta：25℃	(1) 580 V (2) 456 V (3) 456 V

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P： 3.75 KVAC/min I/P-FG： 2 KVAC/min<4.5mA O/P-FG： 1.5 KVAC/min	I/P-O/P： 4 KVAC/min I/P-FG： 2.4 KVAC/min O/P-FG： 1.8KVAC/min Ta：25℃	I/P-O/P： 3.47 mA I/P-FG： 2.802 mA O/P-FG： 1.958 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P：500VDC>100MΩ I/P-FG： 500VDC>100MΩ O/P-FG：500VDC>100MΩ	I/P-O/P： 500 VDC I/P-FG： 500 VDC O/P-FG： 500 VDC Ta：25℃/70%RH	I/P-O/P： 30 GΩ I/P-FG： 26.3 GΩ O/P-FG： 30 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta：25℃ / 70%RH	19 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A CLASS C	I/P: 230/347VAC/60HZ O/P:100/60%ELECTRONIC LOAD O/P:100% LED LOAD Ta:25℃	PASS
2	CONDUCTION	EN55015 CLASS B	I/P: 230VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P: 230/230 VAC (50HZ) O/P:FULL LOAD Ta:25℃	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR:8KV / Contact:4KV	I/P:230/230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230/230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230/230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A

■ RELIABILITY TEST

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL：HLG-120H-C1050
1. ROOM AMBIENT BURN-IN： 4 HRS
I/P： 230VAC O/P： FULL LOAD Ta= 34.8 ℃
2. HIGH AMBIENT BURN-IN：2 HRS
I/P： 230VAC O/P： FULL LOAD Ta= 59.2℃
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=34.8℃</th><th>HIGH AMBIENT Ta= 59.2℃</th></tr>
<tr><td>1</td><td>BD1</td><td>58.5℃</td><td>81.9℃</td></tr>
<tr><td>2</td><td>L1</td><td>56.4℃</td><td>80.2℃</td></tr>
<tr><td>3</td><td>D3</td><td>60.9℃</td><td>84.1℃</td></tr>
<tr><td>4</td><td>Q1</td><td>57.0℃</td><td>81.0℃</td></tr>
<tr><td>5</td><td>C5</td><td>62.4℃</td><td>85.9℃</td></tr>
<tr><td>6</td><td>D2</td><td>59.6℃</td><td>83.7℃</td></tr>
<tr><td>7</td><td>Q5</td><td>57.6℃</td><td>81.9℃</td></tr>
<tr><td>8</td><td>RTH2</td><td>63.4℃</td><td>88.3℃</td></tr>
<tr><td>9</td><td>T1</td><td>59.6℃</td><td>83.6℃</td></tr>
<tr><td>10</td><td>LF100</td><td>54.4℃</td><td>78.6℃</td></tr>
<tr><td>11</td><td>C110</td><td>55.9℃</td><td>80.2℃</td></tr>
<tr><td>12</td><td>U1</td><td>57.0℃</td><td>81.2℃</td></tr>
<tr><td>13</td><td>U900</td><td>57.0℃</td><td>81.3℃</td></tr>
<tr><td>14</td><td>L2</td><td>59.3℃</td><td>83.3℃</td></tr>
</table></td></tr>
<tr><td>2</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P： 305VAC/100VAC
O/P： 100 % LOAD
Ta= -25℃</td><td>TEST：OK</td></tr>
<tr><td>3</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 60℃
NO DAMAGE</td><td>I/P： 305 VAC
O/P：FULL LOAD
Ta= 60 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td></tr>
<tr><td>4</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03%(0~50℃)</td><td>I/P： 230 VAC
O/P：FULL LOAD</td><td>± 0.0026 %(0~50℃)</td></tr>
<tr><td>5</td><td>STORAGE TEMPERATURE TEST</td><td colspan="2">1. Thermal shock Temperature： -45℃~ +90℃
2. Temperature change rate ：25℃ / MIN
3. Dwell time low and high temperature ： 30 MIN/EACH
4. Total test cycle：5 CYCLE
5. Input/Output condition： STATIC</td><td>OK</td></tr>
<tr><td>6.</td><td>THERMAL SHOCK TEST</td><td colspan="2">1. Thermal shock Temperature： -30℃~ +65℃
2. Temperature change rate ：25℃ / MIN
3. Dwell time low and high temperature ： 30 MIN/EACH
4. Total test cycle：10 CYCLE
5. Input/Output condition： 230VAC/Full Load AC ON/OFF TEST
turn on 58sec；turn off 2sec</td><td>OK</td></tr>
</table>

8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform： Sine Wave (2) Frequency：10~500Hz (3) Sweep Time：12min/sweep cycle (4) Acceleration：5G (5) Test Time：72min in each axis (X.Y.Z) (6) Ta：25℃	TEST：OK
9	CAPACITOR LIFE CYCLE	HLG-120H-C1050:SUPPOSE C110 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta= 60 ℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta= 60 ℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta= 60 ℃ LIFE TIME	(1) 873844 HRS (2) 77806 HRS (3) 99762 HRS (4) 100499 HRS
10	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE：191.1 KHRS	
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure (Expected Life): Above 62,000 hours @ Tcase 75℃	

DATE	SAMPLE	TESTER	REVIEW	APPROVAL
2013/4/26	RD SAMPLE	DANIEL GAO	SANFORD SU	VINCENT TSENG
2013/5/27	PRODUCT SAMPLE	DANIEL GAO	SANFORD SU	VINCENT TSENG

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