



# Test Report: HLG-100H-30

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100W 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 O/P: FULL LOAD Ta: 25°C	V1: 59.2 mVp-p (Max)
2	OUTPUT VOLTAGE ADJUST RANGE	CH1: 27V-33 V	I/P: 230 VAC I/P: 115VAC O/P: MIN LOAD Ta: 25°C	26.26 V-33.58 V /230VAC 26.26 V-33.58 V/115VAC
3	CURRENT ADJ RANGE	2A-3.2A	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	1.09 A-3.59 A
4	CONSTANT CURRENT REGION	15V-30V	I/P: 230 VAC O/P: CV MODE Ta: 25°C	O/P=15V: 4.092 A O/P=29V: 4.090 A
5	OUTPUT VOLTAGE TOLERANCE	V1: -1% ~ 1% (Max)	I/P: 100 VAC /305VAC O/P: FULL / 0% LOAD Ta: 25°C	V1: -0.08 % - 0.08 %
6	LINE REGULATION	V1: -0.5% ~ 0.5% (Max)	I/P: 100 VAC ~305 VAC O/P: FULL LOAD Ta: 25°C	V1: 0 % - 0 %
7	LOAD REGULATION	V1: -0.5% ~ 0.5% (Max)	I/P: 230 VAC O/P: FULL - MIN LOAD Ta: 25°C	V1: -0.06 % - 0.06 %
8	SET UP TIME	230VAC/ 500 ms (Max) 115VAC/ 1200 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 394 ms 115 VAC/ 824 ms
9	RISE TIME	230VAC/ 50 ms (Max) 115VAC/ 50 ms (Max)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 11 ms 115 VAC/ 11 ms
10	HOLD UP TIME	230VAC/ 16 ms (Typ) 115VAC/ 16 ms (Typ)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 25 ms 115 VAC/ 24 ms
11	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	TEST: < 5 %
12	DYNAMIC LOAD	V1: 3000 mVp-p	I/P: 230 VAC O/P: (1) FULL / Min LOAD 90% DUTY / 1KHZ (2) FULL / Min LOAD 90% DUTY / 120HZ Ta: 25°C	448 mVp-p 1060 mVp-p

13	DIMMER TEST (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	0.274A	0.582A	0.913A	1.421A	1.562A	1.867A	2.181A	2.451A	2.795A	3.146A
%	8.56%		18.19%	28.53%	44.41%	48.81%	58.34%	68.16%	76.59%	87.34%	98.31%		
2	Dimming value	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V		
	Output current	0.271A	0.587A	0.910A	1.226A	1.571A	1.907A	2.232A	2.559A	2.878A	3.205A		
	%	8.47%	18.34%	28.44%	38.31%	49.09%	59.59%	69.75%	79.97%	89.94%	100.16%		
3	Duty value	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%		
	Output current	0.304A	0.622A	0.942A	1.268A	1.605A	1.941A	2.271A	2.594A	2.916A	3.237A		
	%	9.50%	19.44%	29.44%	39.63%	50.16%	60.66%	70.97%	81.06%	91.13%	101.16%		

### INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~305 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C	78 V~305V
			I/P: (1)LOW-LINE=3V=87 V (2)HIGH-LINE=305 V 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: 100 VAC ~305VAC O/P:FULL-MIN LOAD Ta:25°C	OK
3	POWER FACTOR	0.95/ 230 VAC FULL LOAD (TYP) 0.98/ 115 VAC FULL LOAD (TYP) 0.93/ 277 VAC FULL LOAD (TYP)	I/P: 230 VAC I/P: 115 VAC I/P: 277 VAC O/P:FULL LOAD Ta:25°C	PF=0.960/230V/100%LOAD PF=0.997/115V/100%LOAD PF=0.941/277V/100%LOAD
4	EFFICIENCY	93% (TYP)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	93.6 %
5	INPUT CURRENT	277V /0.5 A 230 V/ 0.55 A 115 V/ 1.2 A	I/P: 277 VAC I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25°C	I = 0.42 A/ 277VAC I = 0.47 A/ 230VAC I = 0.95 A/ 115VAC
6	INRUSH CURRENT	230 V/ 60A (Typ) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 53 A/ 230VAC
7	TOTAL HARMONIC DISTORTION	THD< 20% when output loading $\geq$ 60% at 115VAC/230VAC input and output loading $\geq$ 75% at 277VAC input	I/P : 115 VAC I/P : 230 VAC O/P : 60% LOAD  I/P : 277 VAC O/P : 75%LOAD Ta : 25°C	THD : 10.59 /115VAC THD : 16.47 /230VAC THD : 17.72 /277VAC

### PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	95 %-106 %	I/P: 305VAC I/P: 230 VAC I/P: 100 VAC O/P:TESTING Ta:25°C	102 %/305VAC 102 %/ 230VAC 102 %//100VAC Constant current limiting, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	V1: 34V~ 38V	I/P: 305VAC I/P: 230 VAC I/P: 90 VAC O/P:MIN LOAD Ta:25°C	36.10 V/ 305VAC 36.48 V/ 230VAC 36.51 V/ 100VAC Shut down o/p voltage with auto recovery or re-power on to recovery

3	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
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE Constant current limiting, recovers automatically after fault condition is removed

### COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q5 Rated 12A/500V	I/P : High-Line +3V = 308V O/P : (1)Full Load Turn on (2) Output Short (3)Full load continue Ta : 25°C	(1) 470 V (2) 454 V (3) 452 V
2	Diode Peak Voltage	Q101 Rated 57A/100V	I/P : High-Line +3V =308V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 83.2 V (2) 24.4 V (3) 73.2 V
		Q102 Rated 57A/100V	I/P : High-Line +3V = 308 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 78.2 V (2) 38.8 V (3) 73.2 V
3	Input Capacitor Voltage	C5 Rated: 82u/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°C	(1) 435.5 V (2) 436.7 V (3) 436.8 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°C	(1) 12.667 V (2) 12.453 V (3) 12.497 V
5	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 17A/600V	I/P : High-Line +3V = 308 V O/P : (1)Full Load Turn on (2)Output Short (3)Full load continue Ta : 25°C	(1) 484 V (2) 456 V (3) 458 V

## SAFETY & EMC TEST

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	IEC60950-1 I/P-O/P: 3.75KVAC/min I/P-FG:2KVAC/min<4.5mA O/P-FG:1.5KVAC/min	I/P-O/P: 4 KVAC/min I/P-FG: 2.4KVAC/min O/P-FG: 1.8KVAC/min Ta:25°C	I/P-O/P: 2.599 mA I/P-FG: 2.3327 mA O/P-FG: 3.7 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°C	I/P-O/P: 18 GΩ I/P-FG: 12.5 GΩ O/P-FG: 30 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	IEC60950-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	11 mΩ
4	LEAKAGE CURRENT	IEC60950-1 < 0.75 mA / 240VAC	I/P: 240 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.22 mA N-FG: 0.22 mA
5	APPROVAL	TUV: Certificate NO : E334940 UL: File NO : R50185176		

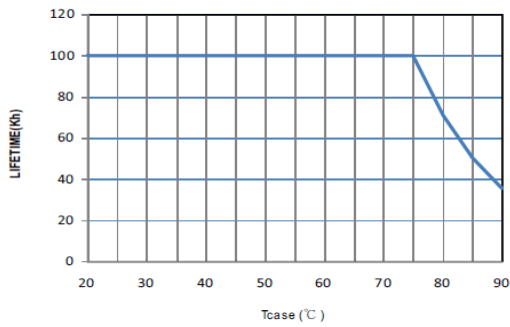
### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230VAC/50HZ LOAD:LED/ELECTRONIC LOAD O/P:100% LOAD Ta:25°C	PASS
2	CONDUCTION	EN55022 EN55015 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
3	RADIATION	EN55022 EN55015 CLASS B	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR:8KV / Contact:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV L,N-PE:4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A

**Reliability Test**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	
1	TEMPERATURE RISE TEST	MODEL : HLG-100H-24 1. ROOM AMBIENT BURN-IN : 2.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 30.7 °C 2. HIGH AMBIENT BURN-IN : 5.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=60.7 °C			
		2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 305 VAC O/P : O/P SHORT TEST Ta : 25°C
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305 VAC/230 VAC/100VAC O/P : 95% load Ta= -40 °C	TEST : OK	
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 °C NO DAMAGE	I/P : 305 VAC O/P : 95% load Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK	
5	TEMPERATURE COEFFICIENT	± 0.03 %(0-50°C)	I/P : 305 VAC O/P : FULL LOAD	± 0 %(0-50°C)	
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C ~ +90°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		OK	
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -35°C ~ +65°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : 230VAC/Full Load TURN ON/58 SEC;TURN OFF/2 SEC.		OK	



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°C	TEST : OK
9	CAPACITOR LIFE CYCLE	HLG-100H-24:SUPPOSE C102 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 60 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 60 °C LIFE TIM (4) I/P : 230VAC O/P : 50% LOAD Ta= 60 °C LIFE TIME	(1) 1380862 HRS (2) 140238 HRS (3) 161122 HRS (4) 172705 HRS
10	MTBF	M Conducted by Parts Stress Analysis Prediction 192.2 hrs min. MIL-HDBK-217F (25°C)	OK
11	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 62,000 hours @ Tcase 80°C  	<b>OK</b>

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

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