



Test Report: HLG-185H-C1400

200W Constant Current Mode LED Driver

■ 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	CURRENT TOLERANCE	± 5%	I/P : 230VAC O/P : CV MODE : 71V~143V Ta : 25°C	± 0.1 %
2	CURRENT RIPPLE	5.0% max. @rated current	I/P : 230VAC O/P : LED : 71V~143V Ta : 25°C	LED=71V 3.91 % LED=143V 2.6 %
3	OUTPUT CURRENT ADJUST RANGE	CH1 : 700mA~ 1400mA	I/P : 230VAC I/P : 115 VAC O/P : CV MODE : 143V Ta : 25°C	0.5993 A~ 1.5699 A/ 230VAC 0.5997 A~ 1.5699 A/ 115 VAC
4	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°C	115 VAC/ 714 ms 230VAC/ 365 ms
5	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %

6 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) Frequency range :100Hz ~ 3KHz

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°C

	Resistance value	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
1	Output current	0.193A	0.331A	0.458A	0.592A	0.734A	0.861A	0.992A	1.127A	1.274A	1.395A	1.452A
	Percentage of rated current	13.81%	23.66%	32.68%	42.26%	52.43%	61.53%	70.87%	80.46%	91.01%	99.67%	103.69%
	Dimming value	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
2	Output current	0.196A	0.331A	0.465A	0.599A	0.733A	0.868A	1.002A	1.136A	1.269A	1.404A	1.452A
	Percentage of rated current	13.99%	23.65%	33.22%	42.76%	52.37%	61.99%	71.57%	81.14%	90.65%	100.31%	103.69%
	Duty value	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
3	Output current	0.197A	0.332A	0.467A	0.625A	0.758A	0.892A	1.025A	1.159A	1.293A	1.426A	1.452A
	Percentage of rated current	14.10%	23.68%	33.35%	44.61%	54.15%	63.69%	73.24%	82.79%	92.37%	101.86%	103.69%

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°C	83 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°C	TEST : OK
3	POWER FACTOR	0.98 / 115VAC(TYP) 0.96 /230 VAC(TYP) 0.94 /277 VAC(TYP)	I/P : 115VAC	PF= 0.997 / 115VAC
			I/P : 230VAC	PF= 0.970 / 230VAC
			I/P : 277VAC	PF= 0.947 / 277VAC
			O/P : FULL LOAD Ta : 25°C	
4	EFFICIENCY	94 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	94.20 %
5	INPUT CURRENT	277V/ 0.85 A (TYP) 230V/ 1 A (TYP) 115V/ 2 A (TYP)	I/P : 277 VAC	I = 0.809 A/ 277 VAC
			I/P : 230 VAC	I = 0.95 A/ 230 VAC
			I/P : 115 VAC	I = 1.87 A/ 115 VAC
			O/P : FULL LOAD Ta : 25°C	
6	INRUSH CURRENT	230V/ 55 A (TYP) (twidth=900us measured at 50% Ipeak) COLD START	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	I = 49.5 A/ 230VAC T50= 620 us
7	LEAKAGE CURRENT	< 0.75 mA / 277 VAC	I/P : 277 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.28 mA N-FG : 0.28 mA
8	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	THD : 10.82 /115VAC
			I/P : 230 VAC	THD : 18.03 /230VAC
			O/P : 50% LOAD I/P : 277 VAC O/P : 75%LOAD Ta : 25°C	THD : 16.48 /277VAC

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	CH1 : 160V ~ 170 V	I/P : 115 VAC I/P : 230 VAC O/P : MIN LOAD Ta : 25°C	166.87 V/ 115VAC 166.37 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°C	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°C	(1) 478 V (2) 458 V (3) 456 V
2	Diode Peak Voltage	D102 Rated 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°C	(1) 328 V (2) 35.6 V (3) 324 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°C	(1) 468 V (2) 474 V (3) 472 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) 14.6 V (2) 13.8 V (3) 14 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°C	(1) 560 V (2) 472 V (3) 498 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 : 1.5KVAC/min	I/P-O/P : 4.2 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 1.8 KVAC/min Ta : 25°C	I/P-O/P : 3.67 mA I/P-FG : 2.828 mA O/P-FG : 2.055 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 /70%RH	I/P-O/P : 30 GΩ I/P-FG : 16.4 GΩ O/P-FG : 30 GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	28 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230/347VAC/60HZ O/P:100/60%ELECTRONIC LOAD O/P:100% LED LOAD Ta:25°C	PASS
2	CONDUCTION	EN55015 CLASS B	I/P: 230VAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab
3	RADIATION	EN55015 CLASS B	I/P: 230/230 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:230/230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA B
5	E.F.T	EN61000-4-4 INDUSTRY INPUT: 2KV	I/P: 230/230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA B
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°C	CRITERIA B
7	Test by certified Lab & Test Report Prepare. Any contradictions of the test results, please refer to the latest EMC test report.			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																												
1	TEMPERATURE RISE TEST	MODEL : HLG-185H-C1050 1. ROOM AMBIENT BURN-IN : 6.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=30.7°C 2. HIGH AMBIENT BURN-IN : 4.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=58.4°C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 30.7 °C</th> <th>HIGH AMBIENT Ta= 58.4 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>59.5°C</td><td>85.5°C</td></tr> <tr><td>2</td><td>L1</td><td>59.1°C</td><td>84.9°C</td></tr> <tr><td>3</td><td>D3</td><td>61.6°C</td><td>87.4°C</td></tr> <tr><td>4</td><td>Q1</td><td>61.5°C</td><td>86.7°C</td></tr> <tr><td>5</td><td>C5</td><td>59.0°C</td><td>84.6°C</td></tr> <tr><td>6</td><td>D2</td><td>67.2°C</td><td>92.0°C</td></tr> <tr><td>7</td><td>Q5</td><td>60.8°C</td><td>86.8°C</td></tr> <tr><td>8</td><td>RTH2</td><td>61.0°C</td><td>87.5°C</td></tr> <tr><td>9</td><td>T1</td><td>66.8°C</td><td>93.3°C</td></tr> <tr><td>10</td><td>LF100</td><td>58.0°C</td><td>84.1°C</td></tr> <tr><td>11</td><td>C111</td><td>62.0°C</td><td>88.4°C</td></tr> <tr><td>12</td><td>U1</td><td>59.3°C</td><td>85.4°C</td></tr> <tr><td>13</td><td>U900</td><td>58.4°C</td><td>84.4°C</td></tr> <tr><td>14</td><td>L2</td><td>60.4°C</td><td>86.4°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 30.7 °C	HIGH AMBIENT Ta= 58.4 °C	1	BD1	59.5°C	85.5°C	2	L1	59.1°C	84.9°C	3	D3	61.6°C	87.4°C	4	Q1	61.5°C	86.7°C	5	C5	59.0°C	84.6°C	6	D2	67.2°C	92.0°C	7	Q5	60.8°C	86.8°C	8	RTH2	61.0°C	87.5°C	9	T1	66.8°C	93.3°C	10	LF100	58.0°C	84.1°C	11	C111	62.0°C	88.4°C	12	U1	59.3°C	85.4°C	13	U900	58.4°C	84.4°C	14	L2	60.4°C	86.4°C	
NO	Position	ROOM AMBIENT Ta= 30.7 °C	HIGH AMBIENT Ta= 58.4 °C																																																													
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/100VAC O/P : 100 % LOAD Ta= -25°C	TEST : OK																																																												
3	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 : FULL LOAD Ta= 60 °C HUMIDITY= 95 %R.H	TEST : OK																																																												
4	TEMPERATURE COEFFICIENT	± 0.03%(0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.006 %(0~50°C)																																																												
5	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																																																												
6	THERMAL SHOCK TEST	1. Thermal shock Temperature : -30°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 AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK																																																												



7	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
8	CAPACITOR LIFE CYCLE	HLG-185H-C1050:SUPPOSE C111 IS THE MOST CRITICAL COMPONENT (2) I/P : 230VAC O/P : FULL LOAD Tc= 75 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Tc= 75 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Tc= 75 °C LIFE TIME	(1) 59235 HRS (2) 79821 HRS (3) 87261 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 651.1K hrs min. Telcordia SR-332 (Bellcore) ; 191.9K hrs min. MIL-HDBK-217F (25°C)	
10	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD Tc=50°C Demonstration Mean Time Between Failure : 62,000 hours	

RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

12.10.30 A50-F031