Test Report： HBG-60-1050

60W 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	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	5Vp-p (Max)	I/P：230VAC O/P：100% LOAD	1.56Vp-p	PASS
2	CONSTANT CURRENT REGION	37~55V	I/P：230VAC O/P:LED MODE Ta:25℃	25.397 V~ 57.06 V	PASS
3	OUTPUT CURRENT ADJUST RANGE	680mA ~1050mA	I/P：230 VAC I/P：115 VAC O/P：SETTING Ta：25℃	0.426A~1.146A /230VAC 0.423A~1.138A /115VAC	PASS
4	CURRENT ACCURACY	±5%	I/P：230 VAC O/P：FULL LOAD Ta：25℃	2.67%	PASS
5	SET UP TIME	230VAC/ 500 ms (Max) 115VAC/ 1200 ms (Max)	I/P：230 VAC I/P：115 VAC O/P：95% LOAD Ta：25℃	230VAC/ 351 ms 115VAC/ 660 ms	PASS
6	OVER/UNDERSHOOT TEST	< ±5%	I/P：230 VAC O/P：FULL LOAD Ta：25℃	TEST： < 5 %	PASS
7	No Load O/P Voltage	60V (Max)	I/P：90~295 VAC O/P：NO LOAD	57.81V /90VAC 57.81V /230VAC 57.84V /295VAC	PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~ 295 VAC	I/P：TESTING O/P：FULL LOAD Ta：25℃	87 V~ 295 V	PASS
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE+10V=305 V O/P:FULL/MIN LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230Vac ON: 0.5 Sec OFF: 0.5 Sec 20MIN (AC POWER ON/OFF NO DAMAGE) (3)230Vac ON:3Sec OFF:3Sec 12HOURS (AC POWER ON/OFF NO DAMAGE)	TEST： OK	

2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P： 90 VAC ~ 295 VAC O/P：FULL~MIN LOAD Ta：25℃	TEST： OK	PASS
3	POWER FACTOR	0.92/ 277 VAC (TYP) 0.95/ 230 VAC (TYP) 0.97/ 115 VAC (TYP)	I/P： 277VAC/230VAC/115VAC O/P：FULL LOAD Ta：25℃	PF= 0.9444 /277V PF= 0.9732 /230V PF= 0.9974 /115V	PASS
4	EFFICIENCY	91 % (Typ)	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	91.90%	PASS
5	INPUT CURRENT	277 VAC/ 0.30 A (Typ) 230 VAC/ 0.40 A (Typ) 115 VAC/ 0.70 A (Typ)	I/P： 277VAC/230VAC/115VAC O/P：FULL LOAD Ta：25℃	I = 0.2429A /277VAC I = 0.2816A /230VAC I = 0.5457A /115VAC	PASS
6	INRUSH CURRENT	230 V/ 45A (Typ) Twidth= 100 us measured at 50% Ipeak COLD START	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I = 7.18 A / 230VAC Twidth = 27.2 us	PASS
7	LEAKAGE CURRENT	< 0.75 mA / 240VAC EN 60950-1	I/P： 295 VAC O/P：NO LOAD Ta：25℃	L-FG： 2.4 uA N-FG： 2.4 uA	PASS
8	TOTAL HARMONIC DISTORTION	Total harmonic distortion will be lower than 20% when output loading is 65% or higher at 230V/115 VAC	I/P： 115VAC I/P： 230VAC O/P：65% LOAD Ta： 25℃	THD： 9.64% /115VAC THD： 9.99% /230VAC	PASS
		Total harmonic distortion will be lower than 20% when output loading is 75% or higher at 277VAC	I/P： 277VAC O/P：75% LOAD Ta： 25℃	THD： 13.02% /277VAC	

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P： 295VAC O/P： FULL LOAD Ta：25℃	No Damage Hiccup mode , recovers automatically after fault condition is removed	PASS
2	OVER TEMPERATURE PROTECTION	SPEC： O.T.P. NO DAMAGE	I/P： 230 VAC O/P：FULL LOAD	No Damage Shut down o/p voltage , re-power on to recover	PASS

COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	PWM Power Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 650V/ 15.5A	I/P：High-Line +3V = 298 V O/P： (1)FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta：25℃	(1) 606 V (2) 568 V (3) 560 V	PASS

2	Diode Peak Voltage	D100 Rated 400V / 20A	I/P：High-Line +3V = 298 V O/P： (1) FULL LOAD Turn on (2)Output Short (3) FULL LOAD continue Ta：25℃	(1) 416 V (2) 356 V (3) 394 V	PASS
3	Control IC Voltage Test	U1 Rated 28 V	I/P：High-Line +3V = 298 V O/P： (1) FULL LOAD Turn on /Off (2) NO load Turn on /Off (3) FULL LOAD /Min load Change Ta：25℃	(1) 19.1 V (2) 16.9 V (3) 18.9 V	PASS

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P：3.75 KVAC/min	I/P-O/P： 4.2 KVAC/min Ta：25℃	I/P-O/P： 2.047 mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-O/P：500VDC>100MΩ	I/P-O/P： 500 VDC Ta：25℃	I/P-O/P： > 9999 MΩ NO DAMAGE	PASS

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS C	I/P：115VAC/230VAC/50HZ O/P：65%/FULL LOAD I/P：277VAC/50HZ O/P：75%/FULL LOAD Ta:25℃	PASS	PASS
2	CONDUCTION	EN55015 CLASS B	I/P：230 VAC (50HZ) /115V(60HZ) O/P：FULL/60% LOAD Ta：25℃	PASS Test by certified Lab	PASS
3	RADIATION	EN55015 CLASS B	I/P： 230 VAC (50HZ)/115V(60HZ) O/P： FULL/60% LOAD Ta：25℃	PASS Test by certified Lab	PASS
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR：8KV / Contact：4KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	PASS
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT：1KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	PASS

6	SURGE	EN61000-4-5 INDUSTRY L-N ：2KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A	PASS
7	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL：HBG-60-1050 1. ROOM AMBIENT BURN-IN： 2.0 HRS I/P： 230VAC O/P： 100% LOAD Ta=23.0 ℃ 2. HIGH AMBIENT BURN-IN： 2.0 HRS I/P： 230VAC O/P： 100% LOAD Ta=61.6 ℃			PASS
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P：295VAC/100VAC O/P：FULL LOAD Ta= -45℃	TEST：OK	PASS
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 60 ℃ NO DAMAGE	I/P： 303 VAC O/P：100% LOAD Ta= 60 ℃ HUMIDITY= 95 %R.H	TEST：OK	PASS
4	TEMPERATURE COEFFICIENT	±0.03 %(0~60℃)	I/P： 230 VAC O/P：100% LOAD	±0.014 %(0~60℃)	PASS
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature： -45℃~ +85℃ 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		OK	PASS

NO	Position	ROOM AMBIENT Ta= 23.0 ℃	HIGH AMBIENT Ta= 61.6 ℃
1	LF2	46.5℃	83.2℃
2	L1	49.5℃	86.5℃
3	C8	54.4℃	91.2℃
4	R8	56.1℃	93.2℃
5	D2	58.1℃	95.4℃
6	Q1	55.9℃	92.8℃
7	T1	58.5℃	94.3℃
8	C47	54.5℃	92.2℃
9	U1	59.0℃	97.0℃
10	D100	53.0℃	88.7℃
11	C105	46.9℃	82.5℃
12	C108	44.2℃	80.1℃
13	LF100	40.0℃	76.4℃
14	RTH1	54.5℃	93.1℃
16	TCASE	47.9℃	84.6℃

6	THERMAL SHOCK TEST	1. Thermal shock Temperature： -45℃~ +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	OK	PASS
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：90min in each axis (X.Y.Z) (6) Ta：25℃	TEST： OK	PASS
8	CAPACITOR LIFE CYCLE	HBG-60-1050：SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：100% LOAD Ta=25℃ LIFE TIME (2) I/P： 230VAC O/P：100% LOAD Ta=60℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta=60℃ LIFE TIME	(1) 598290 HRS (2) 65047 HRS (3) 104982 HRS	PASS
9	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE：452 KHRS		PASS
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) ： 50,000 hours @ Tcase 75℃		PASS

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	ZHANGZJ/ZHUOKB	SKY	LIUWY

2009/08/04 A50-G058