Test Report: LDH-45A-350

45W DC-DC Step-Up Constant Current LED Driver

■ DESIGN VERIFY TEST

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

■ E.M.C. TEST

E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

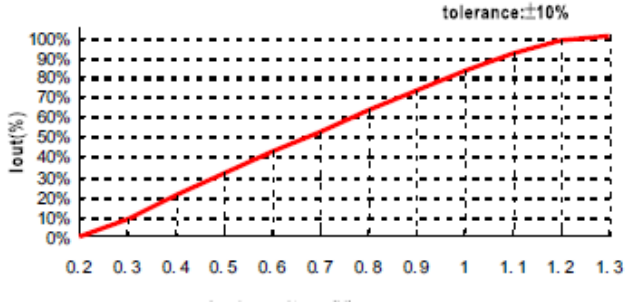
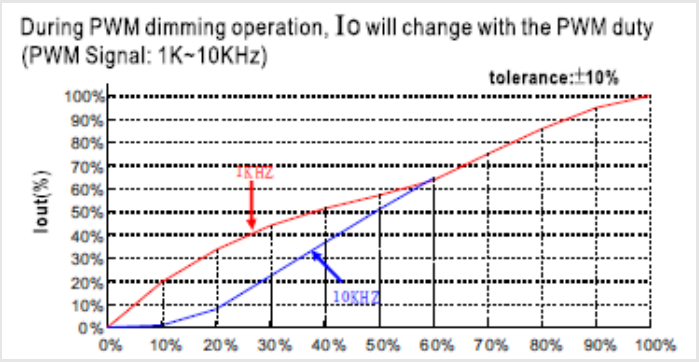
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1：2500 mVp-p (Max)	I/P： 12VDC O/P：FULL LOAD Ta：25℃	V1： 600 mVp-p (Max)	PASS
2	OUTPUT VOLTAGE RANGE	V1 = 12 V ~ 86 V	I/P： 9 VDC I/P： 12 VDC I/P： 18 VDC O/P：CV MODE Ta：25℃	O/P= 12V: 0.3560 A 9VDC O/P= 86V: 0.3438 A 9VDC O/P= 15V: 0.3562 A 12VDC O/P= 86V: 0.3459 A 12VDC O/P= 21V: 0.3564 A 18VDC O/P= 86V: 0.3487 A 18VDC	PASS
3	NO LOAD OUTPUT VOLTAGE	< 100 V	I/P： 12 VDC O/P：NO LOAD Ta：25℃	TEST： < 100 V	PASS
4	CURRENT ACCURACY	± 5%	I/P：12 VDC O/P：FULL LOAD Ta：25℃	TEST： ±1.83 %	PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	9VDC~18VDC	I/P：TESTING O/P：FULL LOAD Ta：25℃	8.8 V~ 18 V	PASS
			I/P： LOW-LINE-0.2V=8.8 V HIGH-LINE =18 V O/P：FULL/MIN LOAD ON： 30 Sec . OFF： 30 Sec 10MIN (AC POWER ON/OFF NO DAMAGE)	TEST： OK	
2	EFFICIENCY	91 % (TYP)	I/P： 12 VDC O/P：FULL LOAD Ta：25℃	92.20 %	PASS
3	DC CURRENT	12VDC/ 2.8 A (TYP)	I/P： 12 VDC O/P：FULL LOAD Ta：25℃	I = 2.685 A/ 12 VDC	PASS

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	DIMMING OFF	INPUT CURRENT＜ 7mA	I/P:12VDC O/P:FULL LOAD Ta:25℃	TEST： 4 mA	PASS
2	ANALOG DIMMING	SPEC: *Output constant current level can be adjusted through output cable by 0.2V~8Vdc DIM (+) and DIM (-). *0.2V~8V dimming function for output current adjustment (Typical) During analog dimming operation, Io will change with DC input voltage  			PASS
3	PWM DIMMING	SPEC: *Output constant current level can be adjusted through output cable by PWM signal DIM (+) and DIM (-). *2V~8V 1KHz~10KHz PWM signal for output current adjustment (Typical)  			PASS

TEST RESULT: I/P：12 VDC ;Ta：25℃

DIMMING	0.2V	0.3V	0.4V	0.5V	0.6V	0.7V	0.8V	0.9V	1.0V	1.1V	1.2V	1.3V	8.0V
O/P LOAD	0%	6.3%	18%	28%	39%	49%	60%	70%	81%	90%	96%	99%	99%

TEST RESULT:

I/P：12 VDC ;PWM Signal:1KHz ; Ta：25℃

DIMMING	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
O/P LOAD	18.80%	34.09%	45.31%	53.26%	59.11%	63.63%	71.40%	82.91%	93.20%	98.80%

I/P：12 VDC ;PWM Signal:10KHz ; Ta：25℃

DIMMING	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
O/P LOAD	0%	6.74%	22.17%	36.60%	50.97%	61.94%	78.63%	90.06%	96.60%	98.86%

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER VOLTAGE PROTECTION	CH1: ＜ 100 V	I/P: 9 VDC I/P: 12VDC I/P: 18VDC O/P:MIN LOAD Ta:25℃	93.3 V /9 VDC 93.4 V /12VDC 93.5 V/18VDC Hold ON	PASS
2	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P： 18 VDC O/P：FULL LOAD Ta：25℃	NO DAMAGE Fuse Open	PASS

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q2 Rated 150 V/ 33 A	I/P：High-Line +3V = 21 V O/P： (1)Full Load Turn on (2)Full load continue Ta：25℃	(1) 98.4 V (2) 97.2 V	PASS
2	Diode Peak Voltage	D1 Rated 150 V/ 10 A	I/P：High-Line +3V = 21 V O/P： (1)Full Load Turn on (2)Full load continue Ta：25℃	(1) 89.2 V (2) 88.8	PASS

■ E.M.C. TEST

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RADIATION	EN55015	I/P: 12 VDC O/P: FULL LOAD Ta:25℃	PASS Test by certified Lab	PASS
2	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 12 VDC O/P:FULL LOAD Ta:25℃	CRITERIA A	PASS
3	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 12 VDC O/P:FULL LOAD Ta:25℃	CRITERIA A	PASS
4	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th><th>VERDICT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL： LDH-45A-350
1. ROOM AMBIENT BURN-IN：1.0 HRS
I/P： 12VDC O/P： LED LOAD=85.3V Ta=30.2 ℃
2. HIGH AMBIENT BURN-IN： 1.0 HRS
I/P： 12VDC O/P： LED LOAD=85.3V Ta=64.4 ℃
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 30.2 ℃</th><th>HIGH AMBIENT Ta= 64.4 ℃</th></tr>
<tr><td>1</td><td>LF1</td><td>44.9℃</td><td>77.5℃</td></tr>
<tr><td>2</td><td>C3</td><td>47.7℃</td><td>80.1℃</td></tr>
<tr><td>3</td><td>L1</td><td>52.9℃</td><td>85.3℃</td></tr>
<tr><td>4</td><td>U1</td><td>45.4℃</td><td>77.4℃</td></tr>
<tr><td>5</td><td>Q2</td><td>61.7℃</td><td>94.4℃</td></tr>
<tr><td>6</td><td>R18</td><td>47.8℃</td><td>79.7℃</td></tr>
<tr><td>7</td><td>D2</td><td>47.6℃</td><td>79.5℃</td></tr>
<tr><td>8</td><td>D1</td><td>47.7℃</td><td>79.5℃</td></tr>
<tr><td>9</td><td>C5</td><td>53.1℃</td><td>85.3℃</td></tr>
</table></td><td>PASS</td></tr>
<tr><td>2</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P： 18VDC/9VDC
O/P：LED LOAD=84V
Ta= -45℃</td><td>TEST：OK</td><td>PASS</td></tr>
<tr><td>3</td><td>TEMPERATURE
COEFFICIENT</td><td>+ 0.03 %(0~50℃)</td><td>I/P： 12VDC
O/P：LED LOAD=84V</td><td>+ 0.0003%(0~50℃)</td><td>PASS</td></tr>
<tr><td>4</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><td>PASS</td></tr>
<tr><td>5</td><td>THERMAL SHOCK TEST</td><td colspan="2">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： 12VDC/ LED LOAD=84V DC ON/OFF TEST
turn on 58sec；turn off 2sec</td><td>OK</td><td>PASS</td></tr>
<tr><td>6</td><td>VIBRATION TEST</td><td colspan="2">1 Carton & 1 Set
(1) Waveform： Sine Wave
(2) Frequency：10~500Hz
(3) Sweep Time：10min/sweep cycle
(4) Acceleration：3G
(5) Test Time：90min in each axis (X.Y.Z)
(6) Ta：25℃</td><td>TEST：OK</td><td>PASS</td></tr>
</table>

7	CAPACITOR LIFE CYCLE	LDH-45A-350:SUPPOSE C5 IS THE MOST CRITICAL COMPONENT (1) I/P： 12VDC O/P：FULL LOAD Ta=25℃ LIFE TIME (2) I/P： 12VDC O/P：FULL LOAD Ta=60℃ LIFE TIME (3) I/P： 12VDC O/P：75% LOAD Ta=60℃ LIFE TIME	(1) 637099.5 HRS (2) 64622.7 HRS (3) 88962.7 HRS	PASS
8	MTBF	MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE：1179.3KHRS		PASS
9	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 70℃ ; 50,000 hours @ Tcase 60℃		PASS

SAMPLE	TEST RESULT	TESTER	APPROVAL
PRODUCT SAMPLE	PASS	ZHUOKB/ZOULF	LIUWY

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