



# Test Report: LDH-45B-500

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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	1700 mVp-p (Max)	I/P : 24VDC O/P : FULL LOAD Ta : 25°C	500 mVp-p (Max)	PASS
2	OUTPUT VOLTAGE RANGE	21V ~ 86V (Non-DALI) 36V ~ 86V (DALI)	I/P : 18 VDC I/P : 24 VDC I/P : 32 VDC O/P : CV MODE Ta : 25°C	21V ~ 86V (Non-DALI) 36V ~ 86V (DALI)	PASS
3	NO LOAD OUTPUT VOLTAGE	< 100 V	I/P : 24 VDC O/P : NO LOAD Ta : 25°C	TEST : < 100 V	PASS
4	CURRENT ACCURACY	± 5%	I/P : 24 VDC O/P : FULL LOAD Ta : 25°C	TEST : ±1.84 %	PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	18VDC~32VDC	I/P : TESTING O/P : FULL LOAD Ta : 25°C  I/P : LOW-LINE-0.2V=17.8 V HIGH-LINE=32 V O/P : FULL/MIN LOAD ON : 30 Sec. OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	17.8 V~ 32 V  TEST : OK	PASS
2	EFFICIENCY	94 % (TYP)	I/P : 24 VDC O/P : FULL LOAD Ta : 25°C	95.28 %	PASS
3	DC CURRENT	24VDC/ 2.1 A (TYP)	I/P : 24 VDC O/P : FULL LOAD Ta : 25°C	I = 1.849 A/ 24 VDC	PASS

**CONTROL FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																											
1	DIMMING OFF	INPUT CURRENT < 7mA	I/P:24 VDC O/P:FULL LOAD Ta:25°C	TEST : 4 mA	PASS																																											
2	ANALOG DIMMING	<p>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)</p> <p>During analog dimming operation, I<sub>O</sub> will change with DC input voltage</p> <p>tolerance:±10%</p> <p>TEST RESULT: I/P : 24 VDC ; Ta : 25°C</p> <table border="1"> <tr> <td>DIMMING</td> <td>0.2V</td> <td>0.3V</td> <td>0.4V</td> <td>0.5V</td> <td>0.6V</td> <td>0.7V</td> <td>0.8V</td> <td>0.9V</td> <td>1.0V</td> <td>1.1V</td> <td>1.2V</td> <td>1.3V</td> <td>8.0V</td> </tr> <tr> <td>O/P LOAD</td> <td>0%</td> <td>6.0%</td> <td>17%</td> <td>28%</td> <td>39%</td> <td>50%</td> <td>60%</td> <td>71%</td> <td>81%</td> <td>91%</td> <td>97%</td> <td>99%</td> <td>99%</td> </tr> </table>	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%	6.0%	17%	28%	39%	50%	60%	71%	81%	91%	97%	99%	99%		PASS																
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3	PWM DIMMING	<p>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)</p> <p>During PWM dimming operation, I<sub>O</sub> will change with the PWM duty (PWM Signal: 1K~10KHz)</p> <p>tolerance:±10%</p> <p>TEST RESULT: I/P : 24 VDC ; PWM Signal:1KHz ; Ta : 25°C</p> <table border="1"> <tr> <td>DIMMING</td> <td>10%</td> <td>20%</td> <td>30%</td> <td>40%</td> <td>50%</td> <td>60%</td> <td>70%</td> <td>80%</td> <td>90%</td> <td>100%</td> </tr> <tr> <td>O/P LOAD</td> <td>17.96%</td> <td>33.06%</td> <td>44.22%</td> <td>52.24%</td> <td>58.20%</td> <td>62.80%</td> <td>71.96%</td> <td>83.36%</td> <td>93.50%</td> <td>98.82%</td> </tr> </table> <p>I/P : 24 VDC ; PWM Signal:10KHz ; Ta : 25°C</p> <table border="1"> <tr> <td>DIMMING</td> <td>10%</td> <td>20%</td> <td>30%</td> <td>40%</td> <td>50%</td> <td>60%</td> <td>70%</td> <td>80%</td> <td>90%</td> <td>100%</td> </tr> <tr> <td>O/P LOAD</td> <td>0%</td> <td>6.82%</td> <td>21.80%</td> <td>36.38%</td> <td>51.10%</td> <td>65.24%</td> <td>78.94%</td> <td>90.24%</td> <td>96.64%</td> <td>98.86%</td> </tr> </table>	DIMMING	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	O/P LOAD	17.96%	33.06%	44.22%	52.24%	58.20%	62.80%	71.96%	83.36%	93.50%	98.82%	DIMMING	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	O/P LOAD	0%	6.82%	21.80%	36.38%	51.10%	65.24%	78.94%	90.24%	96.64%	98.86%		PASS
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4	DALI DIMMING (DA-Type)	<p>SPEC: ·DALI protocol including 16 groups and 64 addresses. ·Min.dimming level is about 8% of output.</p> <p>I/P : 24 VDC O/P : DIMMING TEST Ta : 25°C TEST RESULT : OK</p>			PASS																																											

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER VOLTAGE PROTECTION	< 100 V	I/P: 18 VDC I/P: 24VDC I/P: 32VDC O/P:MIN LOAD Ta:25°C	93.02 V /18 VDC 93.09 V /24VDC 93.16 V/32VDC Hold ON	PASS
2	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 32 VDC O/P : FULL LOAD Ta : 25°C	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 = 35 V O/P : (1)Full Load Turn on (2)Full load continue Ta : 25°C	(1) 93.6 V (2) 93.2 V	PASS
2	Diode Peak Voltage	D1 Rated 150 V/ 10 A	I/P : High-Line +3V = 35 V O/P : (1)Full Load Turn on (2)Full load continue Ta : 25°C	(1) 87.6 V (2) 86.8	PASS

**E.M.C. TEST**

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RADIATION	EN55015	I/P: 24 VDC O/P: FULL LOAD Ta:25°C	PASS Test by certified Lab	PASS
2	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR:8KV / Contact:4KV	I/P: 24 VDC O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
3	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 24 VDC O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
4	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT																																																
1	TEMPERATURE RISE TEST	MODEL : LDH-45B-500 1. ROOM AMBIENT BURN-IN : 1.0 HRS I/P : 24VDC O/P : LED LOAD=85.34V Ta=30.2 °C 2. HIGH AMBIENT BURN-IN : 1.0 HRS I/P : 24VDC O/P : LED LOAD=85.34V Ta=74.9 °C	<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 30.2 °C</th> <th>HIGH AMBIENT Ta= 74.9 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>C1</td><td>40.3°C</td><td>79.6°C</td></tr> <tr><td>2</td><td>LF1</td><td>43.0°C</td><td>82.1°C</td></tr> <tr><td>3</td><td>C3</td><td>45.3°C</td><td>84.2°C</td></tr> <tr><td>4</td><td>L1</td><td>51.2°C</td><td>90.3°C</td></tr> <tr><td>5</td><td>U1</td><td>46.2°C</td><td>85.1°C</td></tr> <tr><td>6</td><td>Q2</td><td>56.8°C</td><td>95.6°C</td></tr> <tr><td>7</td><td>R7</td><td>50.3°C</td><td>88.8°C</td></tr> <tr><td>8</td><td>R18</td><td>47.9°C</td><td>86.5°C</td></tr> <tr><td>9</td><td>D2</td><td>46.5°C</td><td>85.1°C</td></tr> <tr><td>10</td><td>C5</td><td>46.4°C</td><td>84.5°C</td></tr> <tr><td>11</td><td>D1</td><td>50.9°C</td><td>89.4°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 30.2 °C	HIGH AMBIENT Ta= 74.9 °C	1	C1	40.3°C	79.6°C	2	LF1	43.0°C	82.1°C	3	C3	45.3°C	84.2°C	4	L1	51.2°C	90.3°C	5	U1	46.2°C	85.1°C	6	Q2	56.8°C	95.6°C	7	R7	50.3°C	88.8°C	8	R18	47.9°C	86.5°C	9	D2	46.5°C	85.1°C	10	C5	46.4°C	84.5°C	11	D1	50.9°C	89.4°C		P
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 32VDC/18VDC O/P : LED LOAD=84V Ta= -45°C	TEST : OK	P																																																
3	TEMPERATURE COEFFICIENT	± 0.03 % (0~50°C)	I/P : 24VDC O/P : LED LOAD=84V	± 0.0002% (0~50°C)	P																																																
4	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	P																																																
5	THERMAL SHOCK TEST	1. Thermal shock Temperature : -45°C ~ +75°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 : 24VDC/ LED LOAD=84V DC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	P																																																
6	VIBRATION TEST	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°C		TEST : OK	P																																																



7	CAPACITOR LIFE CYCLE	LDH-45B-500:SUPPOSE C5 IS THE MOST CRITICAL COMPONENT (1) I/P : 24VDC O/P : FULL LOAD Ta=25 °C LIFE TIME (2) I/P : 24VDC O/P : FULL LOAD Ta=70 °C LIFE TIME (3) I/P : 24VDC O/P : 75% LOAD Ta=70 °C LIFE TIME	(1) 1001145.8 HRS (2) 63826.2 HRS (3) 69956.4 HRS	P
8	MTBF	Conducted by Parts Stress Analysis Prediction 12195.2K hrs min. Telcordia SR-332 (Bellcore); 1179.3K hrs min. MIL-HDBK-217F (25°C)		P
9	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 75 °C ; 50,000 hours @ Tcase 65 °C		P

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

2009/08/04 A50-G058