



Test Report: ODLV-45-48

45W PWM Output LED Driver

■ DESIGN VERIFY TEST

Output Function Test

Input Function Test

Protection Function Test

Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test

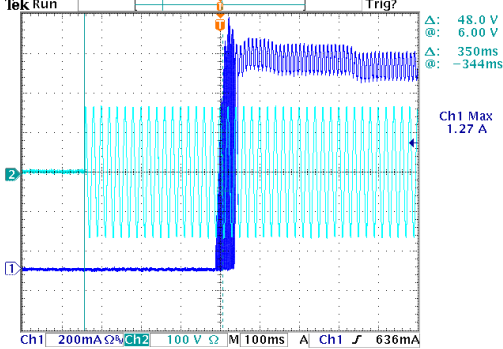
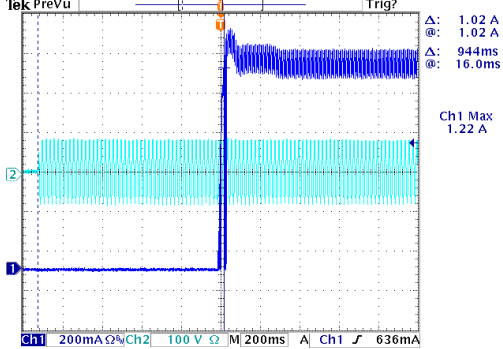
E.M.C. Test

■ RELIABILITY TEST

Environment Test

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM FREQUENCY	1KHz (±20%)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	828Hz
2	VOLTAGE TOLERANCE	± 10%	I/P: 90 VAC / 295 VAC O/P: 70%/FULL/ NO LOAD Ta: 25°C	-0.675%~1.350%
3	OVER/UNDERSHOOT TEST	<±10 %	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<±10 %
4	SET UP TIME(Max)	500ms/230VAC 1200ms/115VAC	I/P: 230 VAC I/P: 115 VAC O/P: FULL /80%LOAD Ta: 25°C	350ms/230VAC 944ms/115VAC
<div style="display: flex; justify-content: space-around;"> <div style="width: 45%;"> <p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</p>  <p>Ch1 Max 1.27 A</p> </div> <div style="width: 45%;"> <p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</p>  <p>Ch1 Max 1.22 A</p> </div> </div>				
5	AUXILIARY DC OUTPUT (For A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P: FULL LOAD	11.90V

6 DIMMING TEST

※ **Dimming principle for PWM style output**
 Dimming is achieved by varying the duty cycle of the output current.

Output DC current

$I_o=0A$

Duty cycle(%) = $\frac{T_{ON}}{T} \times 100\%$

Output PWM frequency : 1KHz(±20%)

※ **2 in 1 dimming function**

◎ Applying additive 0 ~ 10VDC

"DO NOT connect "DIM- to Vo-"

◎ Applying additive 10V PWM signal (frequency range 300~3000Hz):

"DO NOT connect "DIM- to Vo-"

Note : 1. Min. duty cycle of output current is about 8% and the output current is not defined when 0% < I_{out} < 8%.
 2. The duty cycle of output current could drop down to 0% when dimming input is about 0Vdc or 10V PWM signal with 0% duty cycle.

I/P: 230 VAC
 O/P: DIMMING TEST
 Ta: 25°C

1	Dimming voltage	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
	Output Current	0	0.09A	0.17A	0.26A	0.35A	0.44A	0.53A	0.63A	0.72A	0.81A	0.90A	0.91A
	Duty cycle of output current	0%	9.5%	18.1%	27.7%	37.2%	46.8%	56.4%	67.0%	76.6%	86.2%	95.7%	96.8%
2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0	0.08A	0.17A	0.29A	0.35A	0.44A	0.53A	0.63A	0.72A	0.81A	0.91A	0.91A
	Duty cycle of output current	0%	8.5%	18.1%	30.9%	37.2%	46.8%	56.4%	67.0%	76.6%	86.2%	96.8%	96.8%

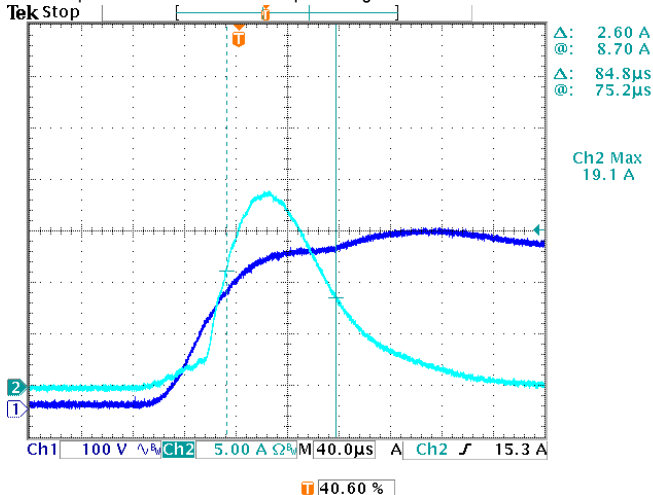
TEST RESULT: OK

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~295VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	87V~305V
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE+10V=305 V O/P: FULL/NO LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230VAC ON: 0.5 Sec OFF: 0.5 Sec 20MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 90 VAC ~295 VAC O/P: FULL~NO LOAD Ta: 25°C	TEST: OK
3	AC CURRENT	0.6A/115VAC 0.4A/230VAC 0.3A/277VAC	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: 80%/FULL LOAD Ta: 25°C	I = 0.445A/ 115VAC I = 0.222A/ 230VAC I = 0.189A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.0027 mA N-FG: 0.0029 mA
5	NO LOAD POWER CONSUMPTION	< 0.5W for Blank-Type < 1.2W for A-Type	I/P: 230VAC O/P: NO LOAD Ta: 25°C	0.3877W for Blank-Type 0.3951W for A-Type
6	INRUSH CURRENT(Typ)	COLD START 30A/230VAC Twidth =150 us measured at 50% Ipeak	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I=19.1 A / 230VAC Twidth = 84.8us

INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



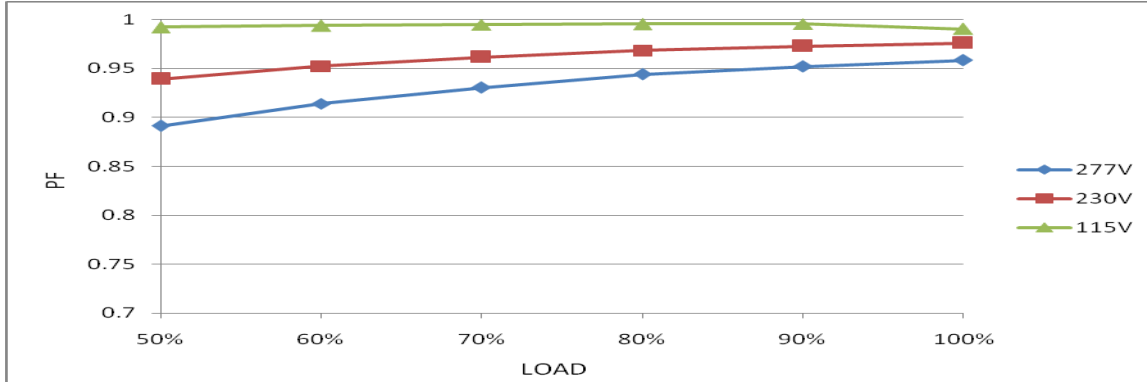


45W PWM Output LED Driver

ODLV-45 series

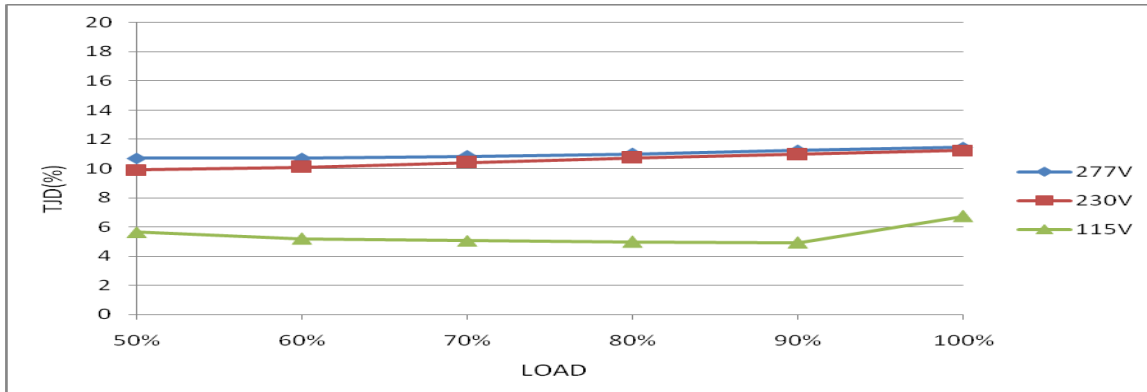
7	POWER FACTOR	0.95/ 115VAC 0.92/ 230VAC 0.9/ 277VAC	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: 80%/FULL LOAD Ta: 25°C	PF=0.995 /115VAC PF=0.976 /230VAC PF=0.959 /277VAC
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PF vs LOAD



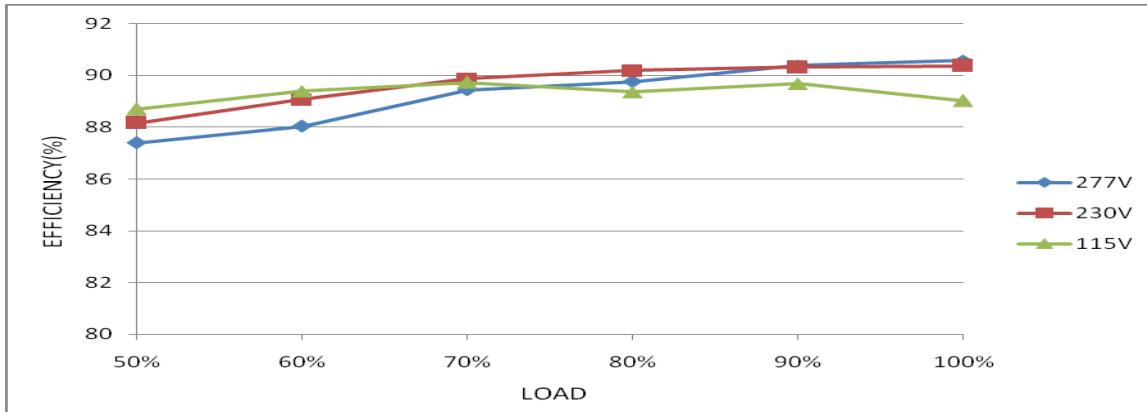
8	TOTAL HARMONIC DISTORTION	THD < 20% (@load ≥ 60%/115VAC, 230VAC; @load ≥ 75%/277VAC)	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: 60%/75% LOAD Ta: 25°C	THD=6.20% @60% load /115VAC THD=8.55% @60% load /230VAC THD=10.76% @75% load /277VAC
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THD vs LOAD



9	EFFICIENCY(Typ)	88%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	90.37%
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EFFICIENCY vs LOAD



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	105%~ 115%	I/P: 100VAC I/P: 230VAC I/P: 295VAC O/P: TESTING Ta: 25°C	113%/ 100VAC 112%/ 230VAC 113%/ 295VAC Hiccup mode, recovers automatically after fault condition is removed
2	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 90VAC I/P: 295VAC O/P: 70%/FULL LOAD Ta: 25°C	NO DAMAGE Shut down O/P voltage, re-power on to recovery

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 9 A/800V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 666V (2) 616V (3) 628V
2	Diode Peak Voltage	D100 Rated 16A/400V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 326V (2) 328V (3) 320V
3	Control IC Voltage Test	U1 Rated 35V	I/P: High-Line +3V =298V O/P: (1) Full Load input on/off (2) NO load input on /Off (3) Full Load /NO load Change Ta: 25°C	(1) 14V (2) 13.7V (3) 13.9V



SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min	I/P-O/P: 4.2KVAC/min Ta: 25°C	I/P-O/P: 1.606mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC>100MΩ	I/P-O/P: 500VDC Ta: 25°C	I/P-O/P: 6193MΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230VAC/50HZ O/P: FULL /60% LOAD Ta: 25°C	PASS
2	CONDUCTION	EN55015	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
3	RADIATION	EN55015	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	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°C	PASS
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N: 1KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS
7	Test by certified Lab & Test Report Prepare			

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																
1	TEMPERATURE RISE TEST	MODEL: ODLV-45-60 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 29.4°C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 54.2°C																																																																		
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 29.4°C</th> <th>HIGH AMBIENT Ta=54.2°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>L1</td><td>63.2°C</td><td>79.7°C</td></tr> <tr><td>2</td><td>BD1</td><td>59.7°C</td><td>75.6°C</td></tr> <tr><td>3</td><td>D1</td><td>62.5°C</td><td>79.2°C</td></tr> <tr><td>4</td><td>Q1</td><td>64.0°C</td><td>80.7°C</td></tr> <tr><td>5</td><td>U1</td><td>61.3°C</td><td>77.2°C</td></tr> <tr><td>6</td><td>T1</td><td>65.3°C</td><td>81.1°C</td></tr> <tr><td>7</td><td>C20</td><td>60.3°C</td><td>76.7°C</td></tr> <tr><td>8</td><td>D101</td><td>62.5°C</td><td>78.3°C</td></tr> <tr><td>9</td><td>C201</td><td>56.8°C</td><td>73.3°C</td></tr> <tr><td>10</td><td>Q100</td><td>49.8°C</td><td>67.1°C</td></tr> <tr><td>11</td><td>LF100</td><td>44.4°C</td><td>62.3°C</td></tr> <tr><td>12</td><td>C105</td><td>56.2°C</td><td>72.6°C</td></tr> <tr><td>13</td><td>C107</td><td>47.2°C</td><td>64.8°C</td></tr> <tr><td>14</td><td>R18</td><td>60.6°C</td><td>76.8°C</td></tr> <tr><td>15</td><td>TC</td><td>57.6°C</td><td>68.9°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 29.4°C	HIGH AMBIENT Ta=54.2°C	1	L1	63.2°C	79.7°C	2	BD1	59.7°C	75.6°C	3	D1	62.5°C	79.2°C	4	Q1	64.0°C	80.7°C	5	U1	61.3°C	77.2°C	6	T1	65.3°C	81.1°C	7	C20	60.3°C	76.7°C	8	D101	62.5°C	78.3°C	9	C201	56.8°C	73.3°C	10	Q100	49.8°C	67.1°C	11	LF100	44.4°C	62.3°C	12	C105	56.2°C	72.6°C	13	C107	47.2°C	64.8°C	14	R18	60.6°C	76.8°C	15	TC	57.6°C	68.9°C		
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295VAC/200VAC O/P: FULL LOAD Ta= -25°C	TEST: OK																																																																
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=50 °C HUMIDITY= 95% R.H	TEST: OK																																																																
4	TEMPERATURE COEFFICIENT	±0.03%/°C (0~50°C)	I/P: 230 VAC O/P: FULL LOAD	±0.0067%/°C (0~50°C)																																																																
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature: -45°C~ +85°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		TEST: OK																																																																
6	THERMAL SHOCK TEST	1. Thermal shock Temperature: -25°C~ +55°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 AC on 3 sec/AC off 1 sec TEST		TEST: OK																																																																



45W PWM Output LED Driver

ODLV-45 series

7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform: Sine Wave (2) Frequency: 10~500Hz (3) Sweep Time: 10min/sweep cycle (4) Acceleration: 2G (5) Test Time: 60min in each axis (X.Y.Z) (6) Ta: 25°C	TEST: OK
8	CAPACITOR LIFE CYCLE	ODLV-45-60: SUPPOSE C105 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= 50 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 50 °C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= 50 °C LIFE TIME	(1) 590860 HRS (2) 159759 HRS (3) 186945 HRS (4) 188913 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 4229.8K hrs min. Telcordia SR-332 (Bellcore) ; 434.9K hrs min. MIL-HDBK-217F (25°C)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 85°C ; 50,000 hours @ Tcase 75°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	CHENZH/ZHUOKB	SKY	LIUWY