



# Test Report: ODLV-45-60

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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

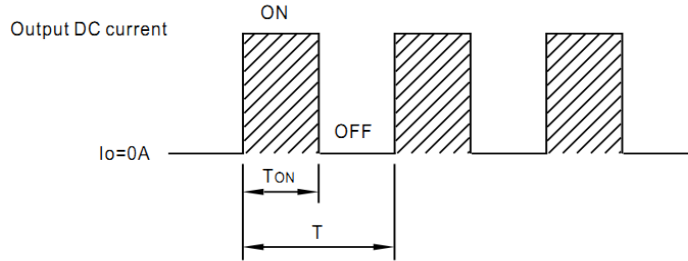
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM FREQUENCY	1KHz (±20%)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	817Hz
2	VOLTAGE TOLERANCE	±10%	I/P: 90 VAC / 295 VAC O/P: 70%/FULL/ NO LOAD Ta: 25°C	-1.806% ~-1.52%
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 716ms/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> </div> <div style="width: 45%;"> <p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</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	12.01V

6 DIMMING TEST

※ Dimming principle for PWM style output

Dimming is achieved by varying the duty cycle of the output current.

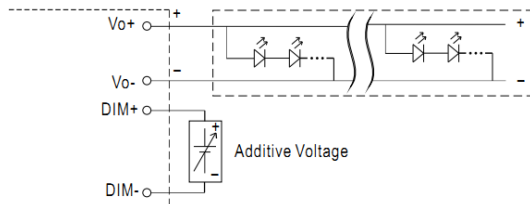


$$\text{Duty cycle(\%)} = \frac{T_{ON}}{T} \times 100\%$$

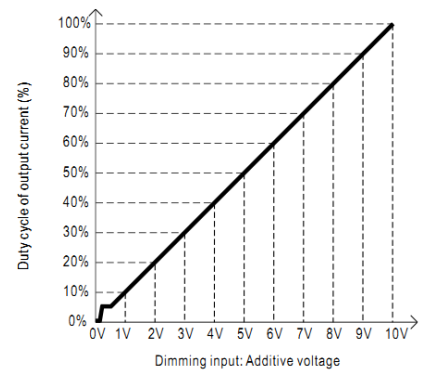
Output PWM frequency : 1KHz(±20%)

※ 2 in 1 dimming function

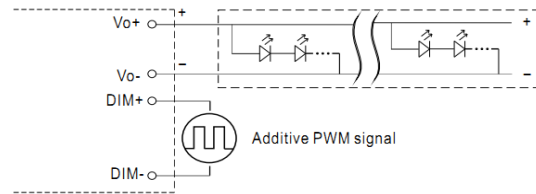
Ⓢ Applying additive 0 ~ 10VDC



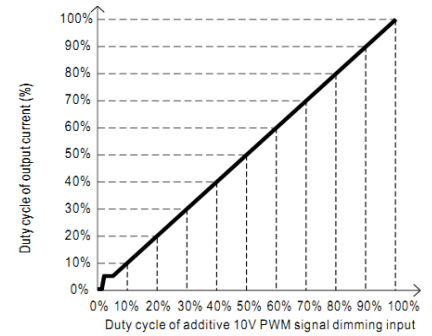
"DO NOT connect "DIM- to Vo-"



Ⓢ 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% < Iout < 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	0.07A	0.14A	0.22A	0.29A	0.36A	0.44A	0.52A	0.59A	0.66A	0.73A	0.74A
Duty cycle of output current	0%	9.3%	18.7%	29.3%	38.7%	48.0%	58.7%	69.3%	78.7%	88.0%	97.3%	98.7%	
2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0	0.07A	0.14A	0.22A	0.29A	0.37A	0.44A	0.52A	0.59A	0.67A	0.74A	0.74A
	Duty cycle of output current	0%	9.3%	18.7%	29.3%	38.7%	49.3%	58.7%	69.3%	78.7%	89.3%	98.7%	98.7%

TEST RESULT: OK

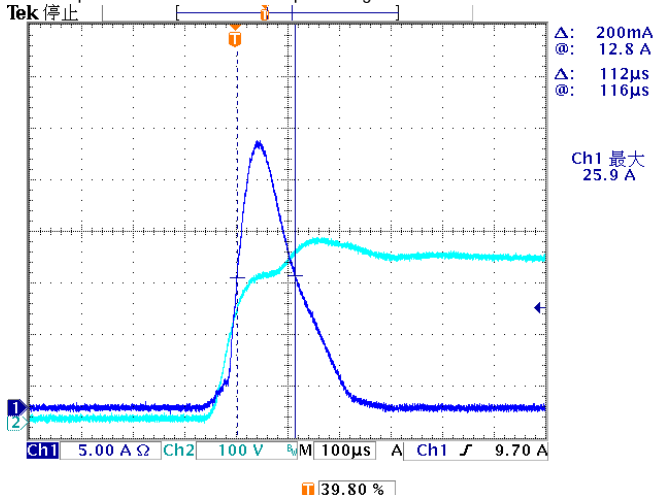


INPUT FUNCTION TEST

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 = 0.492A/ 115VAC I = 0.221A/ 230VAC I = 0.190A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.0029 mA N-FG: 0.0025 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	0.445W for Blank-Type 0.543W 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=25.9A/ 230VAC Twidth = 112us

INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



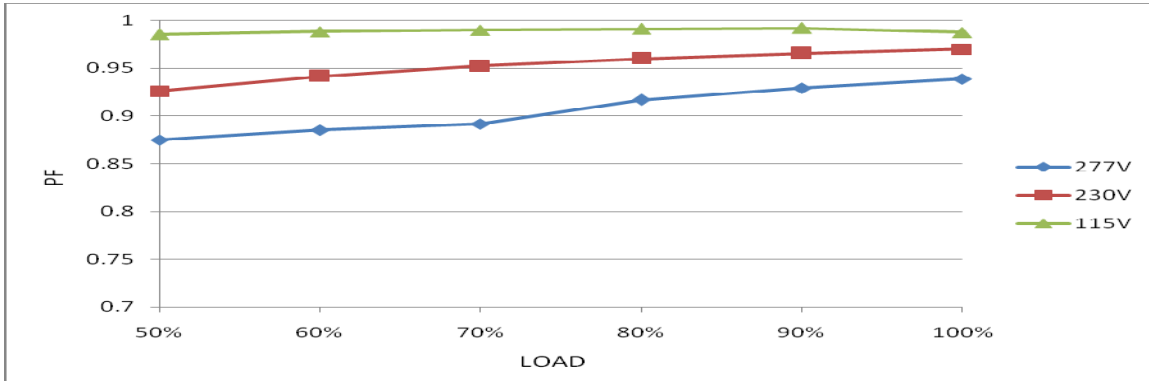


45W PWM Output LED Driver

ODLV-45 series

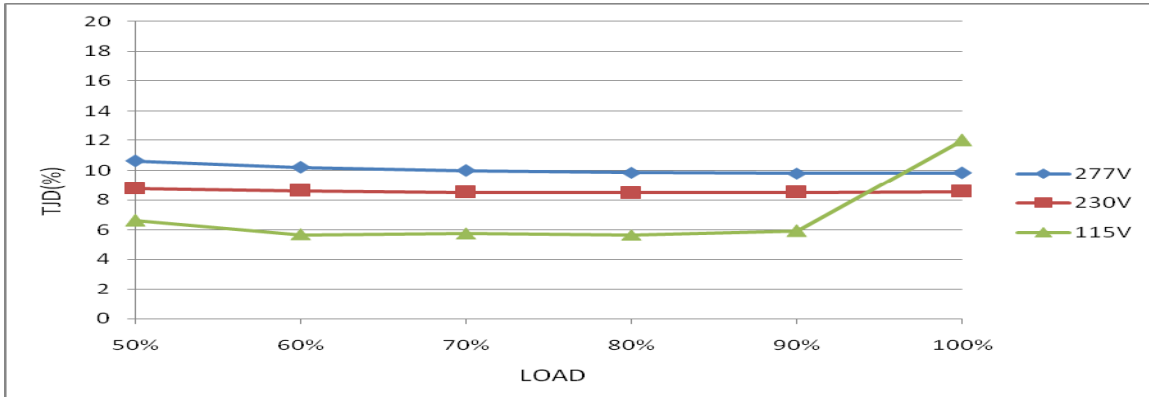
7	POWER FACTOR	0.95/ 115VAC 0.92/ 230VAC 0.9/ 277VAC	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: 80%/FULL LOAD Ta: 25°C	PF=0.991 /115VAC PF=0.970 /230VAC PF=0.939 /277VAC
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PF vs LOAD



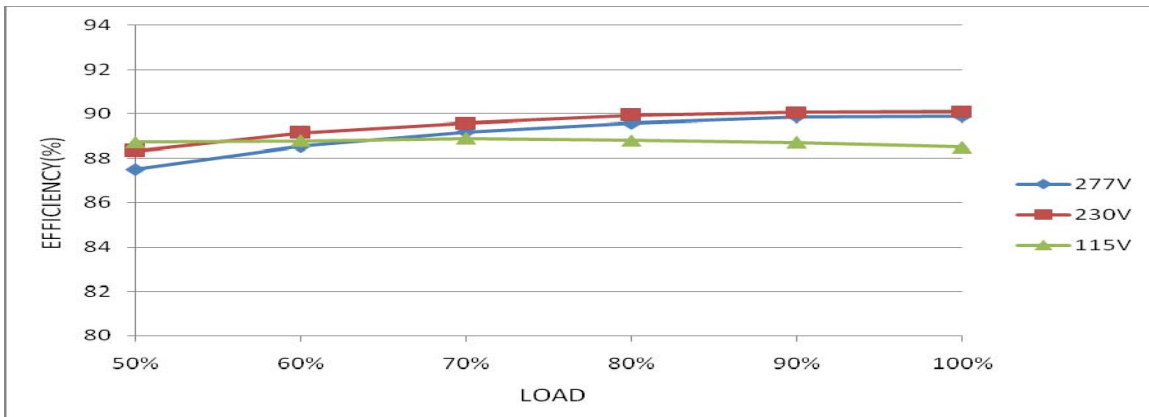
8	TOTAL HARMONIC DISTORTION	THD < 20% (@load ≥ 60%/115VAC, 230VAC; @load ≥ 75%/277VAC)	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: 60%/75% LOAD Ta: 25°C	THD=5.67% @60% load /115VAC THD=8.61% @60% load /230VAC THD=9.92% @75% load /277VAC
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THD vs LOAD



9	EFFICIENCY(Typ)	90%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	90.10%
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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	110%/ 100VAC 112%/ 230VAC 112%/ 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) 586V (2) 556V (3) 594V
2	Diode Peak Voltage	D101 Rated 5A/1000V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 420V (2) 418V (3) 428V
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) 14.0V (2) 14.0V (3) 14.1V



## 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: 1.874mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC>100MΩ	I/P-O/P: 500VDC Ta: 25°C	I/P-O/P: >9999MΩ

## 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℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 54.2℃																																																																		
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 29.4℃</th> <th>HIGH AMBIENT Ta=54.2℃</th> </tr> </thead> <tbody> <tr><td>1</td><td>L1</td><td>63.2℃</td><td>79.7℃</td></tr> <tr><td>2</td><td>BD1</td><td>59.7℃</td><td>75.6℃</td></tr> <tr><td>3</td><td>D1</td><td>62.5℃</td><td>79.2℃</td></tr> <tr><td>4</td><td>Q1</td><td>64.0℃</td><td>80.7℃</td></tr> <tr><td>5</td><td>U1</td><td>61.3℃</td><td>77.2℃</td></tr> <tr><td>6</td><td>T1</td><td>65.3℃</td><td>81.1℃</td></tr> <tr><td>7</td><td>C20</td><td>60.3℃</td><td>76.7℃</td></tr> <tr><td>8</td><td>D101</td><td>62.5℃</td><td>78.3℃</td></tr> <tr><td>9</td><td>C201</td><td>56.8℃</td><td>73.3℃</td></tr> <tr><td>10</td><td>Q100</td><td>49.8℃</td><td>67.1℃</td></tr> <tr><td>11</td><td>LF100</td><td>44.4℃</td><td>62.3℃</td></tr> <tr><td>12</td><td>C105</td><td>56.2℃</td><td>72.6℃</td></tr> <tr><td>13</td><td>C107</td><td>47.2℃</td><td>64.8℃</td></tr> <tr><td>14</td><td>R18</td><td>60.6℃</td><td>76.8℃</td></tr> <tr><td>15</td><td>TC</td><td>57.6℃</td><td>68.9℃</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 29.4℃	HIGH AMBIENT Ta=54.2℃	1	L1	63.2℃	79.7℃	2	BD1	59.7℃	75.6℃	3	D1	62.5℃	79.2℃	4	Q1	64.0℃	80.7℃	5	U1	61.3℃	77.2℃	6	T1	65.3℃	81.1℃	7	C20	60.3℃	76.7℃	8	D101	62.5℃	78.3℃	9	C201	56.8℃	73.3℃	10	Q100	49.8℃	67.1℃	11	LF100	44.4℃	62.3℃	12	C105	56.2℃	72.6℃	13	C107	47.2℃	64.8℃	14	R18	60.6℃	76.8℃	15	TC	57.6℃	68.9℃		
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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℃	TEST: OK																																																																
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃ NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=50 ℃ HUMIDITY= 95% R.H	TEST: OK																																																																
4	TEMPERATURE COEFFICIENT	±0.03%/℃(0-50℃)	I/P: 230 VAC O/P: FULL LOAD	±0.0067%/℃(0-50℃)																																																																
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		TEST: OK																																																																
6	THERMAL SHOCK TEST	1. Thermal shock Temperature: -25℃ ~ +55℃ 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 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 388.02K 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