



# Test Report: ODLV-65-36

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65W 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

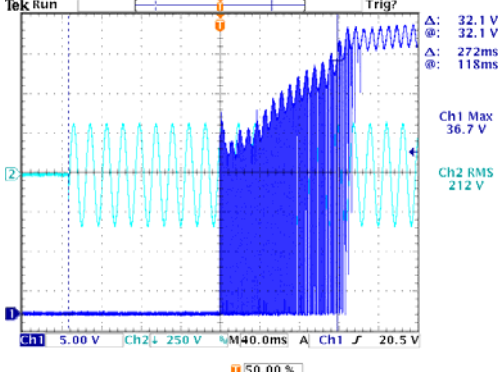
E.M.C. Test

## ■ RELIABILITY TEST

Environment Test

■ DESIGN VERIFY TEST

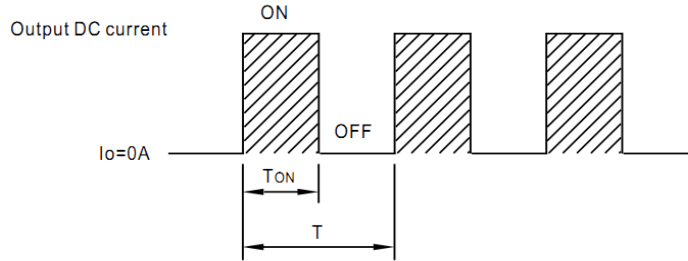
**OUTPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM FREQUENCY	1KHz (±20%)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	912Hz
2	VOLTAGE TOLERANCE	±10%	I/P: 180 VAC / 295 VAC O/P: FULL/ NO LOAD Ta: 25°C	-1.094% ~ 0.603%
3	OVER/UNDERSHOOT TEST	<±10 %	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<±10%
4	SET UP TIME(Max)	500ms/230VAC	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	272ms/230VAC
<p>INPUT=230VAC/50HZ @ FULL LOAD            CH1: Output Voltage CH2: AC Input Voltage</p> 				
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.

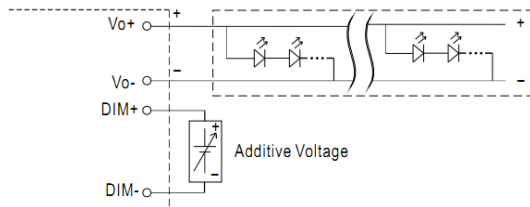


$$\text{Duty cycle(\%)} = \frac{T_{ON}}{T} \times 100\%$$

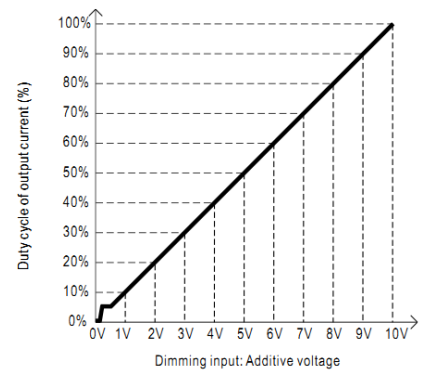
Output PWM frequency : 1KHz(±20%)

※ 2 in 1 dimming function

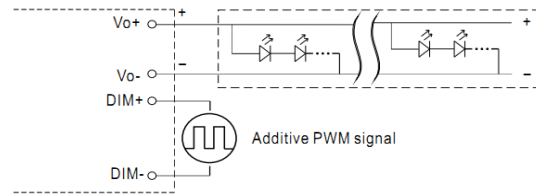
⊙ Applying additive 0 ~ 10VDC



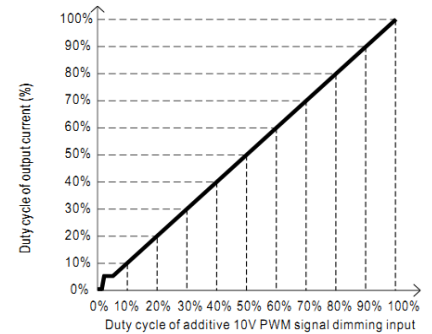
"DO NOT connect "DIM- to Vo-"



⊙ 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	0.16A	0.35A	0.52A	0.70A	0.87A	1.06A	1.24A	1.42A	1.60A	1.78A	1.78A
Duty cycle of output current	0%	8.9%	19.4%	28.9%	38.9%	48.3%	58.9%	68.9%	78.9%	88.9%	98.9%	98.9%	
2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0	0.16A	0.34A	0.52A	0.70A	0.88A	1.06A	1.25A	1.43A	1.61A	1.78A	1.79A
	Duty cycle of output current	0%	8.9%	18.9%	28.9%	38.9%	48.9%	58.9%	69.4%	79.4%	89.4%	98.9%	99.4%

TEST RESULT: OK

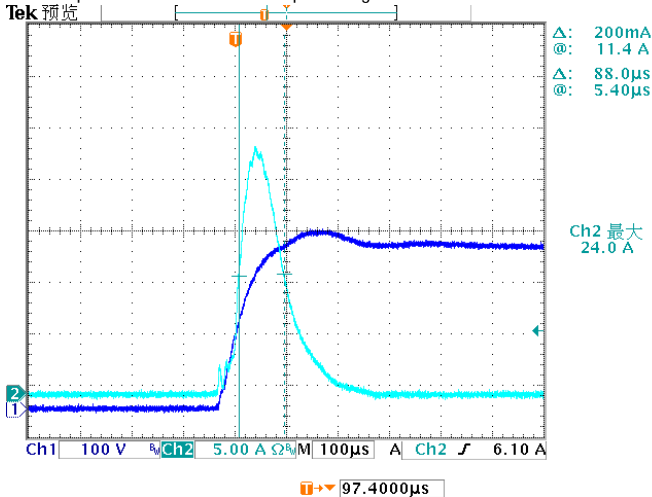


INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC-295VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	177V-305V
			I/P: (1)LOW-LINE-3V=177 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: 180 VAC ~295 VAC O/P: FULL-NO LOAD Ta: 25°C	TEST: OK
3	AC CURRENT	0.4A/230VAC 0.3A/277VAC	I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	I = 0.322A/ 230VAC I = 0.273A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.0028 mA N-FG: 0.0027 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	0.425 W for Blank-Type 0.498 W for A-Type
6	INRUSH CURRENT(Typ)	COLD START 30A/230VAC Twidth =270 us measured at 50% Ipeak	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I= 24A/ 230VAC Twidth = 88us

INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



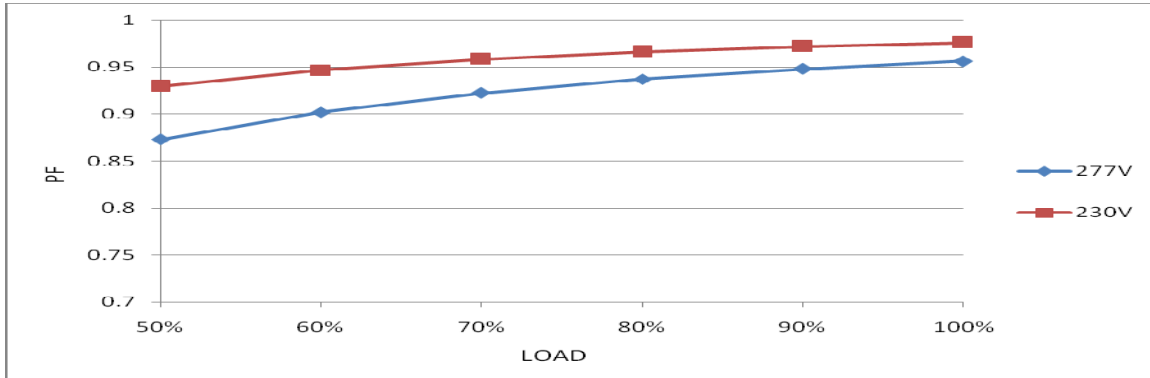


65W PWM Output LED Driver

ODLV-65 series

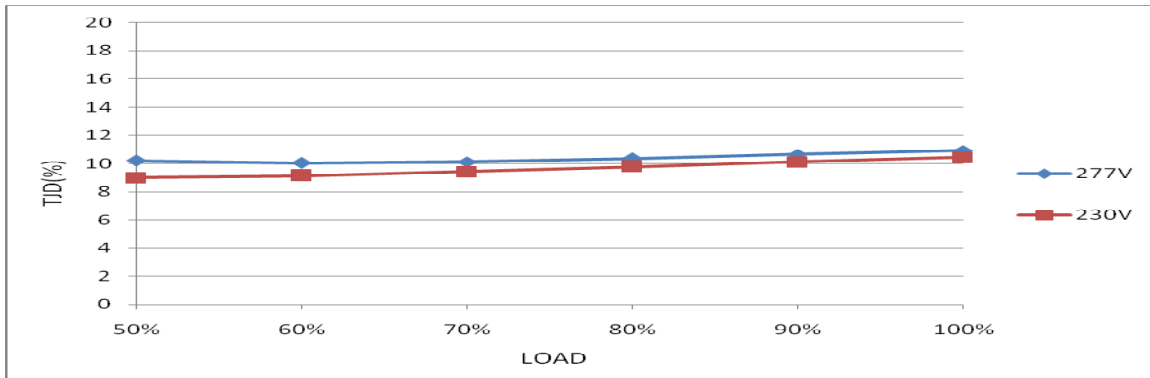
7	POWER FACTOR	0.95/ 230VAC 0.9/ 277VAC	I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	PF=0.976 /230VAC PF=0.956 /277VAC
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PF vs LOAD



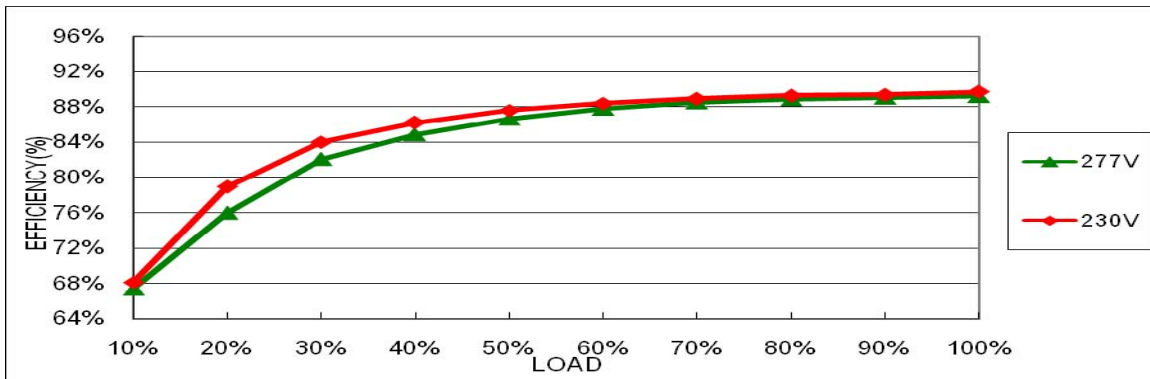
8	TOTAL HARMONIC DISTORTION	THD<20% (@load≥60%/230VAC; @load≥75%/277VAC)	I/P: 230 VAC I/P: 277 VAC O/P: 60%/75% LOAD Ta: 25°C	THD=9.17% @60% load /230VAC THD=10.23% @75% load /277VAC
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THD vs LOAD



9	EFFICIENCY(Typ)	88%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	89.54%
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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: 200VAC I/P: 230VAC I/P: 295VAC O/P: TESTING Ta: 25°C	111.6%/ 200VAC 111.6%/ 230VAC 111.6%/ 295VAC Hiccup mode, recovers automatically after fault condition is removed
2	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 180VAC I/P: 295VAC O/P: 80%/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 9A/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) 682V (2) 700V (3) 684V
2	Diode Peak Voltage	D100 Rated 20A/300V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 177V (2) 244V (3) 176V
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) 15.2V (2) 15.1V (3) 15.1V



## 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: 1.922mA 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-65-24 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 28.8°C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 45.1°C																																																																		
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 28.8°C</th> <th>HIGH AMBIENT Ta=45.1°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>68.0°C</td><td>83.5°C</td></tr> <tr><td>2</td><td>C8</td><td>65.7°C</td><td>81.1°C</td></tr> <tr><td>3</td><td>C6</td><td>64.7°C</td><td>80.3°C</td></tr> <tr><td>4</td><td>D1</td><td>70.1°C</td><td>86.3°C</td></tr> <tr><td>5</td><td>Q1</td><td>70.3°C</td><td>86.2°C</td></tr> <tr><td>6</td><td>U1</td><td>67.4°C</td><td>82.7°C</td></tr> <tr><td>7</td><td>R17</td><td>66.3°C</td><td>82.0°C</td></tr> <tr><td>8</td><td>T1</td><td>71.1°C</td><td>86.7°C</td></tr> <tr><td>9</td><td>D100</td><td>72.2°C</td><td>87.7°C</td></tr> <tr><td>10</td><td>Q100</td><td>58.5°C</td><td>74.2°C</td></tr> <tr><td>11</td><td>U100</td><td>60.9°C</td><td>76.4°C</td></tr> <tr><td>12</td><td>RG1</td><td>68.8°C</td><td>84.1°C</td></tr> <tr><td>13</td><td>C105</td><td>60.0°C</td><td>75.2°C</td></tr> <tr><td>14</td><td>C107</td><td>54.0°C</td><td>69.3°C</td></tr> <tr><td>15</td><td>TC</td><td>61.2°C</td><td>75.6°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 28.8°C	HIGH AMBIENT Ta=45.1°C	1	BD1	68.0°C	83.5°C	2	C8	65.7°C	81.1°C	3	C6	64.7°C	80.3°C	4	D1	70.1°C	86.3°C	5	Q1	70.3°C	86.2°C	6	U1	67.4°C	82.7°C	7	R17	66.3°C	82.0°C	8	T1	71.1°C	86.7°C	9	D100	72.2°C	87.7°C	10	Q100	58.5°C	74.2°C	11	U100	60.9°C	76.4°C	12	RG1	68.8°C	84.1°C	13	C105	60.0°C	75.2°C	14	C107	54.0°C	69.3°C	15	TC	61.2°C	75.6°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 45 °C NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=45 °C HUMIDITY= 95% R.H	TEST: OK																																																																
4	TEMPERATURE COEFFICIENT	±0.03%/°C (0-45°C)	I/P: 230 VAC O/P: FULL LOAD	±0.003%/°C (0-45°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 ~ +50°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																																																																





65W PWM Output LED Driver

**ODLV-65 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-65-24: 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= 45 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 45 °C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= 45 °C LIFE TIME	(1) 421135 HRS (2) 113524 HRS (3) 175061 HRS (4) 292044 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 398.7K hrs min MIL-HDBK-217F (25°C)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 80°C; 50,000 hours @ Tcase 70°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	CHENZH/ZHUOKB	SKY	LIUWY