



Test Report: ODLV-45-12

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

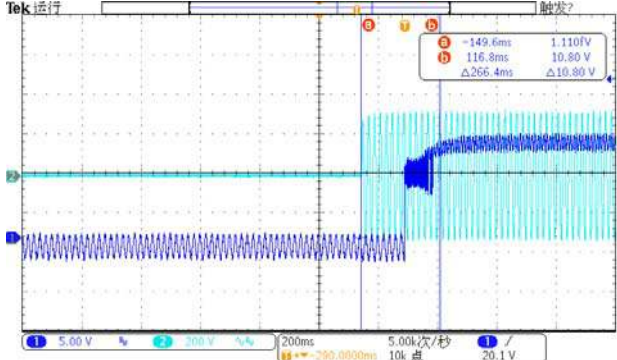
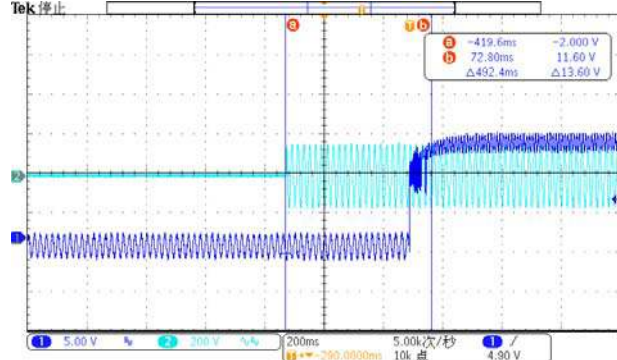
E.M.C. Test

■ RELIABILITY TEST

Environment Test

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

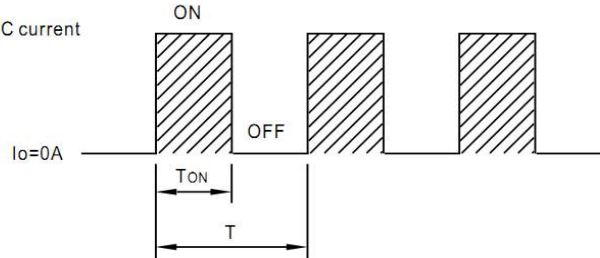
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM FREQUENCY	1KHz (±20%)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	847Hz
2	VOLTAGE TOLERANCE	±10%	I/P: 90 VAC / 295 VAC O/P: 70%/FULL/ NO LOAD Ta: 25°C	-0.51%~5.17%
3	OVER/UNDERSHOOT TEST	<±10%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<±10%
4	SET UP TIME(Max)	500ms/230VAC 1200ms/115VAC	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	266ms/230VAC 492ms/115VAC
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage  INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage 				
5	AUXILIARY DC OUTPUT (For A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P: FULL LOAD	11.94V

6 DIMMING TEST

※ Dimming principle for PWM style output

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

Output DC current

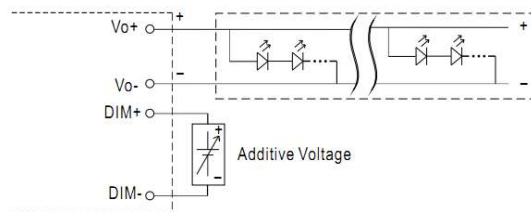


$$\text{Duty cycle(\%)} = \frac{T_{ON}}{T} \times 100\%$$

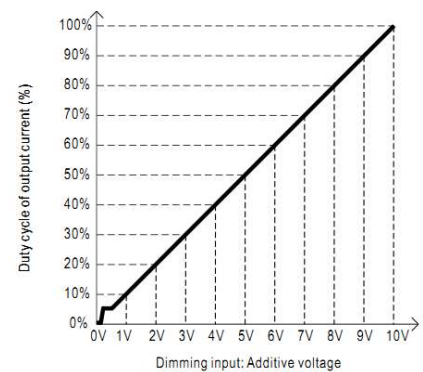
Output PWM frequency : 1KHz(±20%)

※ 2 in 1 dimming function

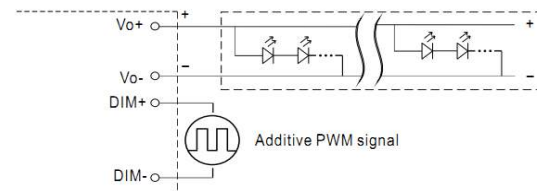
⊗ Applying additive 0 ~ 10VDC



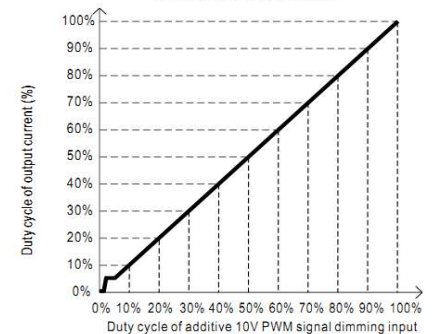
"DO NOT connect "DIM- to Vo-"



⊗ 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% < 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	0.26A	0.56A	0.85A	1.16A	1.46A	1.78A	2.09A	2.38A	2.70A	3.00A	3.08A
	Duty cycle of output current	0%	8.7 %	19.7%	28.3%	38.7%	48.7%	59.3%	69.7%	79.3%	90.0%	100.0%	102.7%
2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0	0.25A	0.55A	0.85A	1.15A	1.46A	1.76A	2.08A	2.39A	2.71A	3.02A	3.08A
	Duty cycle of output current	0%	8.3%	18.3%	28.3%	38.3%	48.7%	58.7%	69.3%	79.7%	90.3%	100.7%	102.7%

TEST RESULT: OK

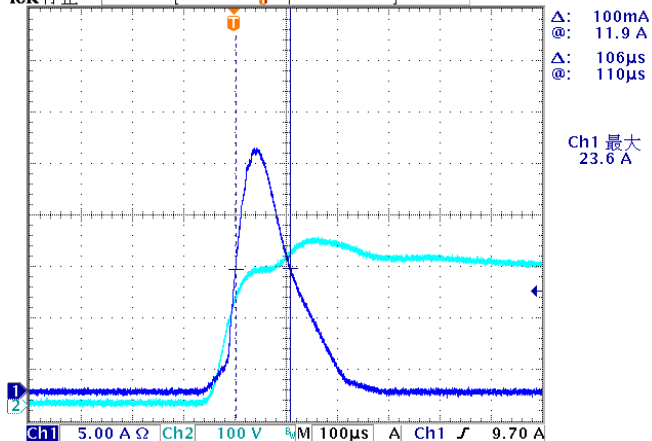
INPUT FUNCTION TEST

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: FULL LOAD Ta: 25°C	I = 0.3776A/ 115VAC I = 0.1903A/ 230VAC I = 0.1652A/ 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=23.6 A/ 230VAC Twidth = 106us

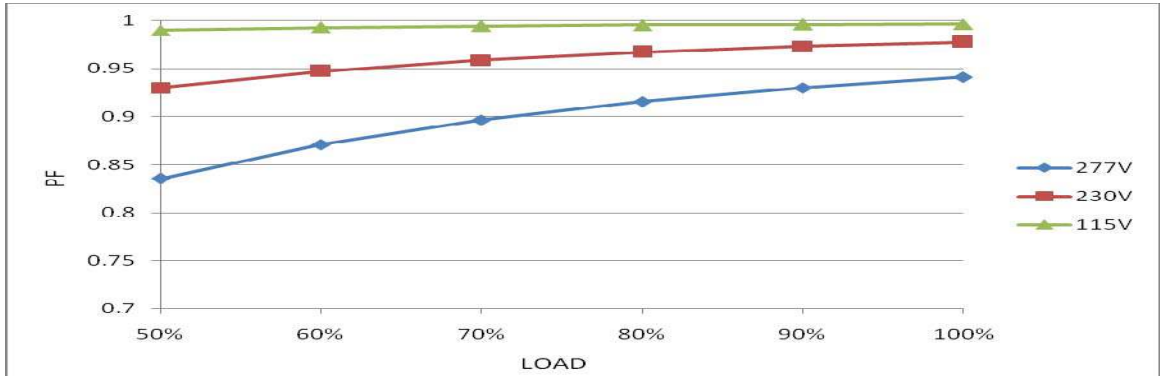
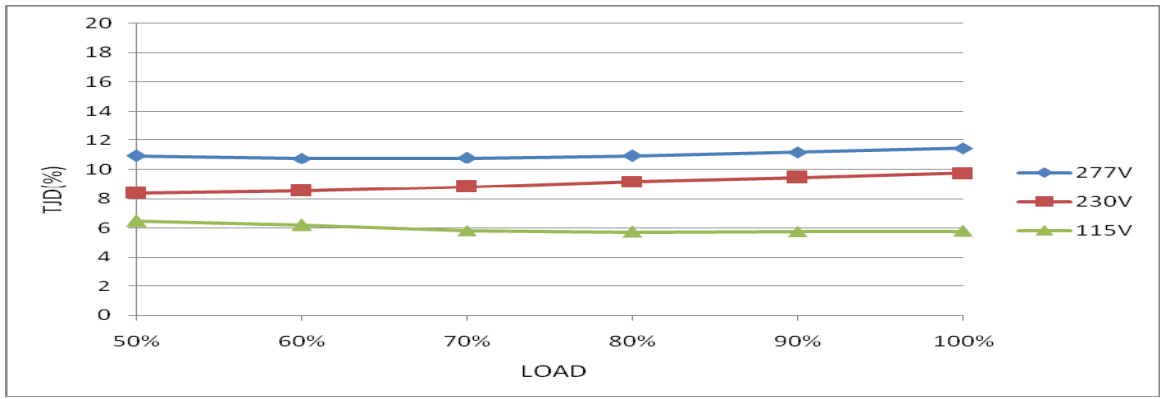
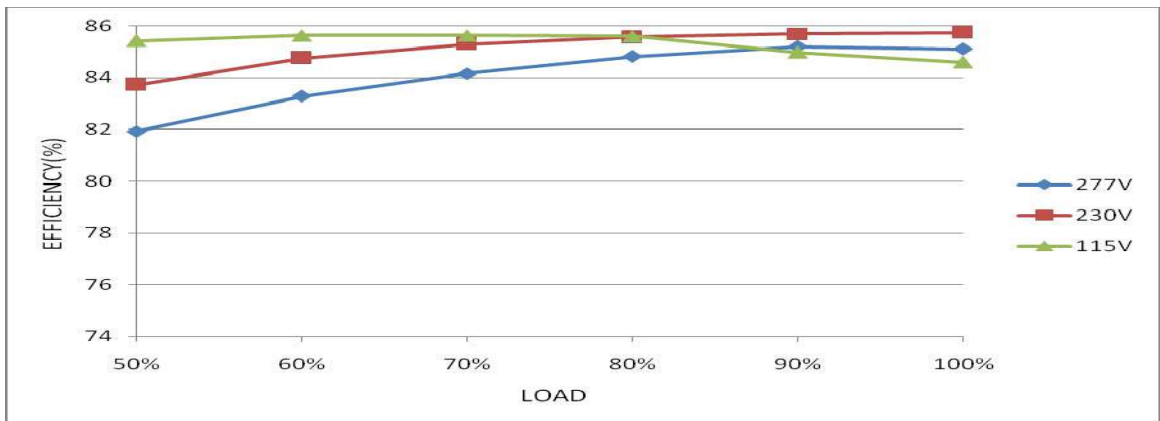
INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage

Tek 停止



39.80 %

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: FULL LOAD Ta: 25°C	PF=0.997 /115VAC PF=0.973 /230VAC PF=0.942 /277VAC																											
	PF vs LOAD  <table><caption>PF vs LOAD Data</caption><thead><tr><th>LOAD</th><th>115V</th><th>230V</th><th>277V</th></tr></thead><tbody><tr><td>50%</td><td>0.99</td><td>0.93</td><td>0.84</td></tr><tr><td>60%</td><td>0.99</td><td>0.95</td><td>0.87</td></tr><tr><td>70%</td><td>0.99</td><td>0.96</td><td>0.90</td></tr><tr><td>80%</td><td>0.99</td><td>0.97</td><td>0.92</td></tr><tr><td>90%</td><td>0.99</td><td>0.98</td><td>0.93</td></tr><tr><td>100%</td><td>0.99</td><td>0.98</td><td>0.94</td></tr></tbody></table>				LOAD	115V	230V	277V	50%	0.99	0.93	0.84	60%	0.99	0.95	0.87	70%	0.99	0.96	0.90	80%	0.99	0.97	0.92	90%	0.99	0.98	0.93	100%	0.99	0.98
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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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9	EFFICIENCY(Typ)	84%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	85.74%																											
	EFFICIENCY vs LOAD  <table><caption>EFFICIENCY vs LOAD Data</caption><thead><tr><th>LOAD</th><th>115V</th><th>230V</th><th>277V</th></tr></thead><tbody><tr><td>50%</td><td>85.5</td><td>83.8</td><td>82.0</td></tr><tr><td>60%</td><td>85.5</td><td>84.8</td><td>83.2</td></tr><tr><td>70%</td><td>85.2</td><td>85.2</td><td>84.2</td></tr><tr><td>80%</td><td>85.0</td><td>85.5</td><td>84.8</td></tr><tr><td>90%</td><td>84.8</td><td>85.8</td><td>85.0</td></tr><tr><td>100%</td><td>84.5</td><td>85.8</td><td>85.2</td></tr></tbody></table>				LOAD	115V	230V	277V	50%	85.5	83.8	82.0	60%	85.5	84.8	83.2	70%	85.2	85.2	84.2	80%	85.0	85.5	84.8	90%	84.8	85.8	85.0	100%	84.5	85.8
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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 111%/ 230VAC 111%/ 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) 702V (2) 658V (3) 650V
2	Diode Peak Voltage	D100 Rated 40A/100V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 62V (2) 62.8V (3) 60.4V
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) 14.3V (2) 14.1V (3) 14.3V



45W PWM Output LED Driver

ODLV-45 series

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: 1.839mA 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-45-12 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><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 29.4 ℃</th><th>HIGH AMBIENT Ta=54.2 ℃</th></tr><tr><td>1</td><td>L1</td><td>60.9℃</td><td>77.3℃</td></tr><tr><td>2</td><td>BD1</td><td>58.9℃</td><td>75.1℃</td></tr><tr><td>3</td><td>D1</td><td>62.6℃</td><td>79.5℃</td></tr><tr><td>4</td><td>Q1</td><td>62.4℃</td><td>78.9℃</td></tr><tr><td>5</td><td>U1</td><td>59.2℃</td><td>74.1℃</td></tr><tr><td>6</td><td>T1</td><td>62.9℃</td><td>78.3℃</td></tr><tr><td>7</td><td>C20</td><td>57.7℃</td><td>73.4℃</td></tr><tr><td>8</td><td>D100</td><td>62.8℃</td><td>78.3℃</td></tr><tr><td>9</td><td>C201</td><td>59.5℃</td><td>75.5℃</td></tr><tr><td>10</td><td>Q100</td><td>57.4℃</td><td>74.0℃</td></tr><tr><td>11</td><td>LF100</td><td>55.2℃</td><td>71.7℃</td></tr><tr><td>12</td><td>C105</td><td>57.6℃</td><td>73.6℃</td></tr><tr><td>13</td><td>C107</td><td>54.1℃</td><td>71.0℃</td></tr><tr><td>14</td><td>R18</td><td>59.4℃</td><td>76.0℃</td></tr><tr><td>15</td><td>TC</td><td>54.8℃</td><td>67.6℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 29.4 ℃	HIGH AMBIENT Ta=54.2 ℃	1	L1	60.9℃	77.3℃	2	BD1	58.9℃	75.1℃	3	D1	62.6℃	79.5℃	4	Q1	62.4℃	78.9℃	5	U1	59.2℃	74.1℃	6	T1	62.9℃	78.3℃	7	C20	57.7℃	73.4℃	8	D100	62.8℃	78.3℃	9	C201	59.5℃	75.5℃	10	Q100	57.4℃	74.0℃	11	LF100	55.2℃	71.7℃	12	C105	57.6℃	73.6℃	13	C107	54.1℃	71.0℃	14	R18	59.4℃	76.0℃	15	TC	54.8℃	67.6℃
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295VAC/100VAC 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	±0.01%/℃ (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℃	TEST: OK
8	CAPACITOR LIFE CYCLE	ODLV-45-12: SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P: 230VAC O/P: FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P: 230VAC O/P: FULL LOAD Ta= 50 ℃ LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 50 ℃ LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= 50 ℃ LIFE TIME	(1) 502062 HRS (2) 154046 HRS (3) 163291 HRS (4) 188486 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 388.02K hrs min MIL-HDBK-217F (25℃)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Tcase 85℃; 50,000 hours @ Tcase 75℃	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	CHENZH/ZHUOKB	SKY	LIUWY