



Test Report: ODLV-65-12

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

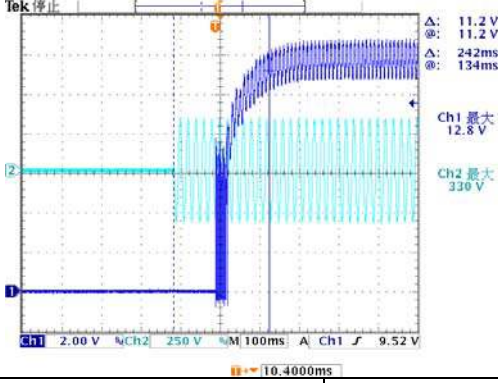
E.M.C. Test

■ RELIABILITY TEST

Environment Test

DESIGN VERIFY TEST

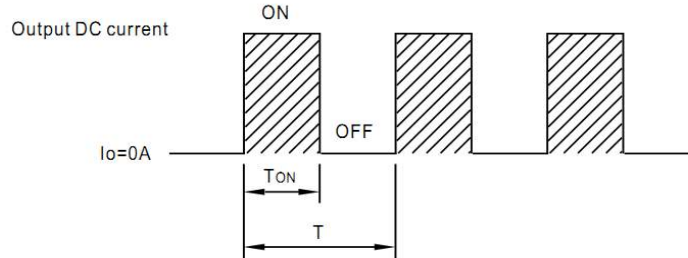
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM FREQUENCY	1KHz (±20%)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	877Hz
2	VOLTAGE TOLERANCE	±10%	I/P: 180 VAC / 295 VAC O/P: FULL/ NO LOAD Ta: 25°C	-1.5 % ~ 0.5 %
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	242ms/230VAC
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage  Δ: 11.2 V Θ: 11.2 V Δ: 242ms Θ: 134ms Ch1 最大 12.8 V Ch2 最大 330 V 2.00 V 250 V 100ms 9.52 V 10.400ms				
5	AUXILIARY DC OUTPUT (For A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P: FULL LOAD	11.88V

6 DIMMING TEST

※ Dimming principle for PWM style output

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

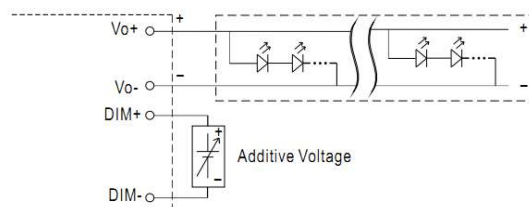


$$\text{Duty cycle(\%)} = \frac{T_{ON}}{T} \times 100\%$$

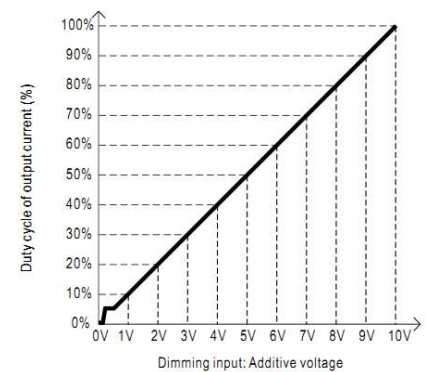
Output PWM frequency : 1KHz(±20%)

※ 2 in 1 dimming function

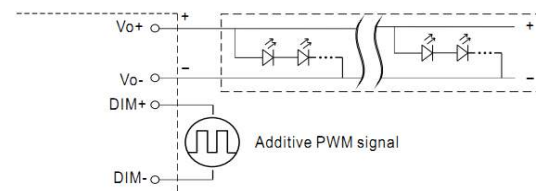
④ Applying additive 0 ~ 10VDC



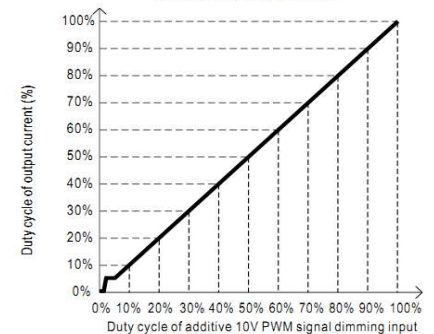
"DO NOT connect "DIM- to Vo-"



④ 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	0.37A	0.80A	1.20A	1.62A	2.04A	2.47A	2.90A	3.31A	3.74A	4.16A	4.18A
	Duty cycle of output current	0%	8.8%	19.0%	28.6%	38.6%	48.6%	58.8%	69.0%	78.8%	89.0%	99.0%	99.5%
2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0	0.37A	0.78A	1.19A	1.61A	2.03A	2.45A	2.88A	3.30A	3.73A	4.12A	4.18A
	Duty cycle of output current	0%	8.8%	18.6%	28.3%	38.3%	48.3%	58.3%	68.6%	78.6%	88.8%	98.1%	99.5%

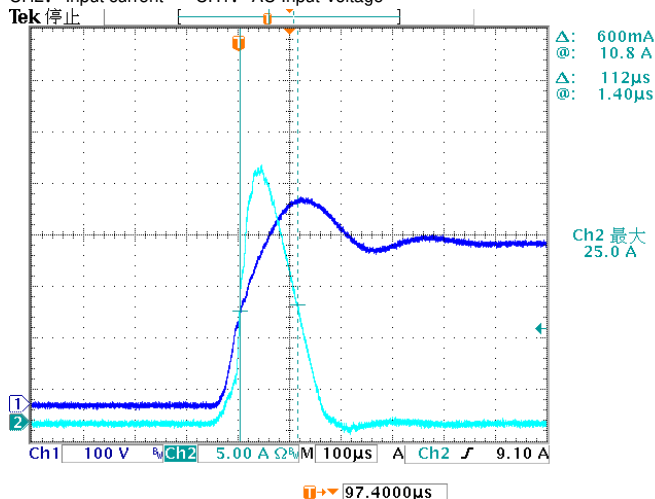
TEST RESULT: OK

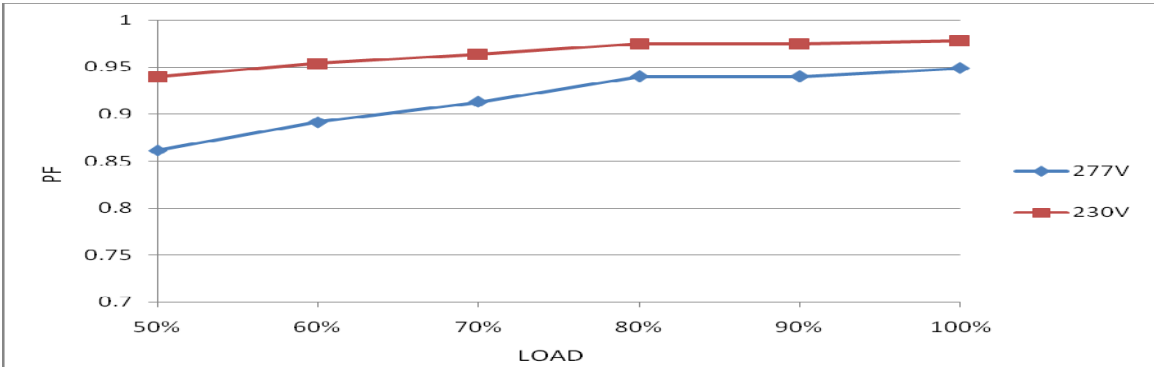
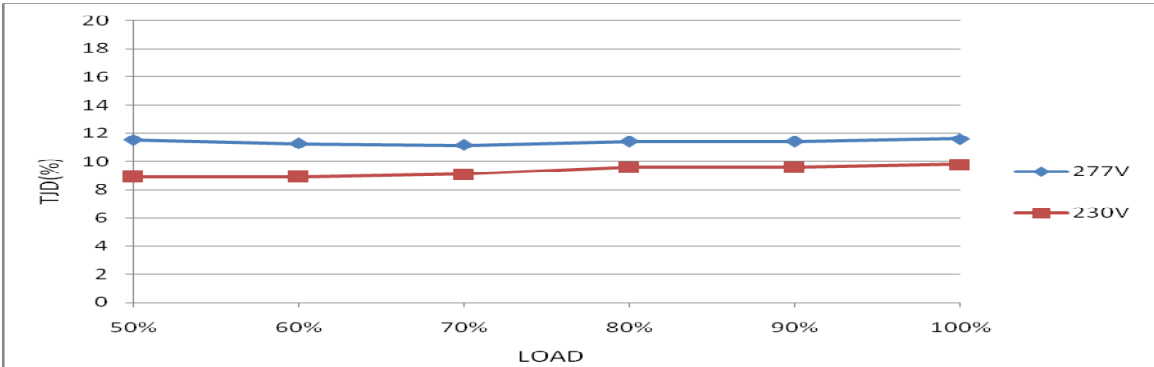
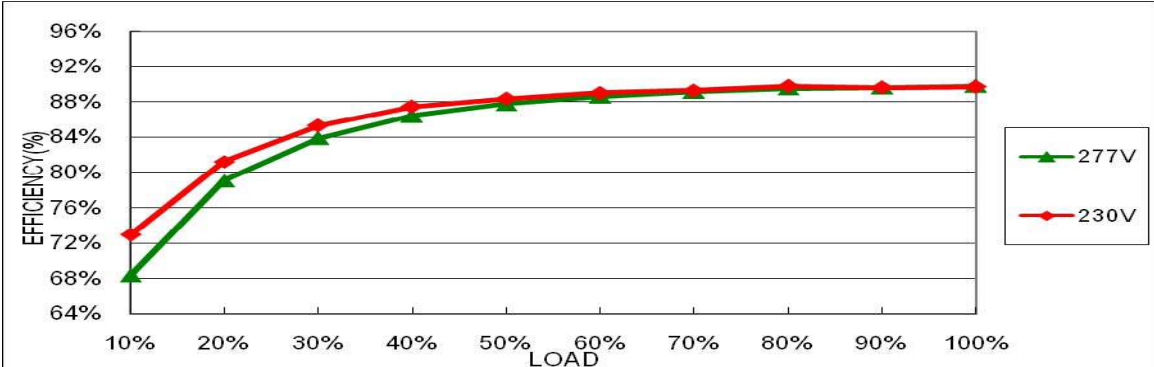
INPUT FUNCTION TEST

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 = 0.262A/ 230VAC I = 0.224A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.024 mA N-FG: 0.024 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	0.398 W for Blank-Type 0.441 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= 25A/ 230VAC Twidth = 112us

INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



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=0.978 /230VAC PF=0.949 /277VAC																																	
PF vs LOAD  <table><caption>PF vs LOAD Data</caption><thead><tr><th>LOAD</th><th>277V</th><th>230V</th></tr></thead><tbody><tr><td>50%</td><td>0.86</td><td>0.94</td></tr><tr><td>60%</td><td>0.89</td><td>0.95</td></tr><tr><td>70%</td><td>0.91</td><td>0.96</td></tr><tr><td>80%</td><td>0.94</td><td>0.97</td></tr><tr><td>90%</td><td>0.94</td><td>0.975</td></tr><tr><td>100%</td><td>0.95</td><td>0.98</td></tr></tbody></table>					LOAD	277V	230V	50%	0.86	0.94	60%	0.89	0.95	70%	0.91	0.96	80%	0.94	0.97	90%	0.94	0.975	100%	0.95	0.98												
LOAD	277V	230V																																			
50%	0.86	0.94																																			
60%	0.89	0.95																																			
70%	0.91	0.96																																			
80%	0.94	0.97																																			
90%	0.94	0.975																																			
100%	0.95	0.98																																			
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=8.93% @60% load /230VAC THD=11.17% @75% load /277VAC																																	
THD vs LOAD  <table><caption>THD vs LOAD Data</caption><thead><tr><th>LOAD</th><th>277V</th><th>230V</th></tr></thead><tbody><tr><td>50%</td><td>11.5</td><td>9.5</td></tr><tr><td>60%</td><td>11.5</td><td>9.5</td></tr><tr><td>70%</td><td>11.5</td><td>9.5</td></tr><tr><td>80%</td><td>11.5</td><td>9.5</td></tr><tr><td>90%</td><td>11.5</td><td>9.5</td></tr><tr><td>100%</td><td>11.5</td><td>9.5</td></tr></tbody></table>					LOAD	277V	230V	50%	11.5	9.5	60%	11.5	9.5	70%	11.5	9.5	80%	11.5	9.5	90%	11.5	9.5	100%	11.5	9.5												
LOAD	277V	230V																																			
50%	11.5	9.5																																			
60%	11.5	9.5																																			
70%	11.5	9.5																																			
80%	11.5	9.5																																			
90%	11.5	9.5																																			
100%	11.5	9.5																																			
9	EFFICIENCY(Typ)	85%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	89.71%																																	
EFFICIENCY vs LOAD  <table><caption>EFFICIENCY vs LOAD Data</caption><thead><tr><th>LOAD</th><th>277V</th><th>230V</th></tr></thead><tbody><tr><td>10%</td><td>68</td><td>68</td></tr><tr><td>20%</td><td>78</td><td>80</td></tr><tr><td>30%</td><td>84</td><td>86</td></tr><tr><td>40%</td><td>87</td><td>88</td></tr><tr><td>50%</td><td>88</td><td>89</td></tr><tr><td>60%</td><td>89</td><td>90</td></tr><tr><td>70%</td><td>89.5</td><td>90.5</td></tr><tr><td>80%</td><td>90</td><td>91</td></tr><tr><td>90%</td><td>90</td><td>91</td></tr><tr><td>100%</td><td>90</td><td>91</td></tr></tbody></table>					LOAD	277V	230V	10%	68	68	20%	78	80	30%	84	86	40%	87	88	50%	88	89	60%	89	90	70%	89.5	90.5	80%	90	91	90%	90	91	100%	90	91
LOAD	277V	230V																																			
10%	68	68																																			
20%	78	80																																			
30%	84	86																																			
40%	87	88																																			
50%	88	89																																			
60%	89	90																																			
70%	89.5	90.5																																			
80%	90	91																																			
90%	90	91																																			
100%	90	91																																			

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	110.0%/ 200VAC 110.0%/ 230VAC 110.1%/ 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) 732V (2) 728V (3) 698V
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) 62.6V (2) 59.8V (3) 62.8V
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) 15.3V (2) 15.2V (3) 15.2V



65W PWM Output LED Driver

ODLV-65 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: 1.883mA 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℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 45.1℃ <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 28.8℃</th><th>HIGH AMBIENT Ta=45.1℃</th></tr><tr><td>1</td><td>BD1</td><td>68.0℃</td><td>83.5℃</td></tr><tr><td>2</td><td>C8</td><td>65.7℃</td><td>81.1℃</td></tr><tr><td>3</td><td>C6</td><td>64.7℃</td><td>80.3℃</td></tr><tr><td>4</td><td>D1</td><td>70.1℃</td><td>86.3℃</td></tr><tr><td>5</td><td>Q1</td><td>70.3℃</td><td>86.2℃</td></tr><tr><td>6</td><td>U1</td><td>67.4℃</td><td>82.7℃</td></tr><tr><td>7</td><td>R17</td><td>66.3℃</td><td>82.0℃</td></tr><tr><td>8</td><td>T1</td><td>71.1℃</td><td>86.7℃</td></tr><tr><td>9</td><td>D100</td><td>72.2℃</td><td>87.7℃</td></tr><tr><td>10</td><td>Q100</td><td>58.5℃</td><td>74.2℃</td></tr><tr><td>11</td><td>U100</td><td>60.9℃</td><td>76.4℃</td></tr><tr><td>12</td><td>RG1</td><td>68.8℃</td><td>84.1℃</td></tr><tr><td>13</td><td>C105</td><td>60.0℃</td><td>75.2℃</td></tr><tr><td>14</td><td>C107</td><td>54.0℃</td><td>69.3℃</td></tr><tr><td>15</td><td>TC</td><td>61.2℃</td><td>75.6℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 28.8℃	HIGH AMBIENT Ta=45.1℃	1	BD1	68.0℃	83.5℃	2	C8	65.7℃	81.1℃	3	C6	64.7℃	80.3℃	4	D1	70.1℃	86.3℃	5	Q1	70.3℃	86.2℃	6	U1	67.4℃	82.7℃	7	R17	66.3℃	82.0℃	8	T1	71.1℃	86.7℃	9	D100	72.2℃	87.7℃	10	Q100	58.5℃	74.2℃	11	U100	60.9℃	76.4℃	12	RG1	68.8℃	84.1℃	13	C105	60.0℃	75.2℃	14	C107	54.0℃	69.3℃	15	TC	61.2℃	75.6℃
NO	Position	ROOM AMBIENT Ta= 28.8℃	HIGH AMBIENT Ta=45.1℃																																																																	
1	BD1	68.0℃	83.5℃																																																																	
2	C8	65.7℃	81.1℃																																																																	
3	C6	64.7℃	80.3℃																																																																	
4	D1	70.1℃	86.3℃																																																																	
5	Q1	70.3℃	86.2℃																																																																	
6	U1	67.4℃	82.7℃																																																																	
7	R17	66.3℃	82.0℃																																																																	
8	T1	71.1℃	86.7℃																																																																	
9	D100	72.2℃	87.7℃																																																																	
10	Q100	58.5℃	74.2℃																																																																	
11	U100	60.9℃	76.4℃																																																																	
12	RG1	68.8℃	84.1℃																																																																	
13	C105	60.0℃	75.2℃																																																																	
14	C107	54.0℃	69.3℃																																																																	
15	TC	61.2℃	75.6℃																																																																	
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 45 ℃ NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=45 ℃ HUMIDITY= 95% R.H	TEST: OK																																																																
4	TEMPERATURE COEFFICIENT	±0.03%/℃ (0~45℃)	I/P: 230 VAC O/P: FULL LOAD	±0.003/℃ (0~45℃)																																																																
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℃ ~ +50℃ 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																																																																



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