



Test Report: ODLV-65-48

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

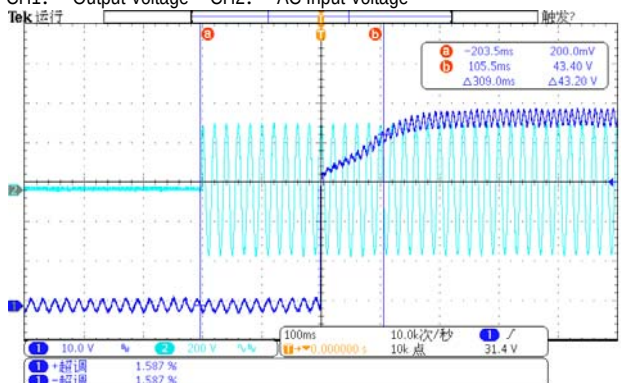
E.M.C. Test

■ RELIABILITY TEST

Environment Test

DESIGN VERIFY TEST

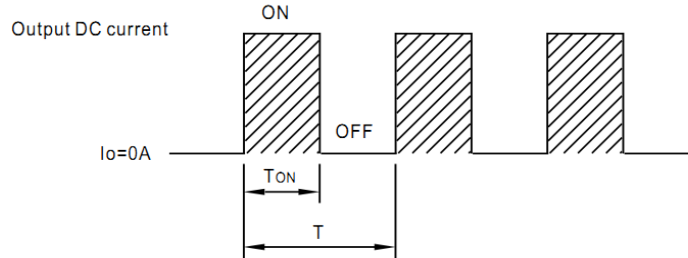
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM FREQUENCY	1KHz (±20%)	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	893Hz
2	VOLTAGE TOLERANCE	±10%	I/P: 180 VAC / 295 VAC O/P: FULL/ NO LOAD Ta: 25°C	-0.996% ~ 0.999%
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	309ms/230VAC
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage  10.0 V 200 V 100ms 10.0次/秒 10k 点 31.4 V 1 +超调 1.587 % 2 -超调 1.587 % 3 ~203.5ms 200.0mV 4 105.5ms 43.40 V 5 Δ309.0ms Δ43.20 V				
5	AUXILIARY DC OUTPUT (For A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P: FULL LOAD	11.92V

6 DIMMING TEST

※ Dimming principle for PWM style output

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

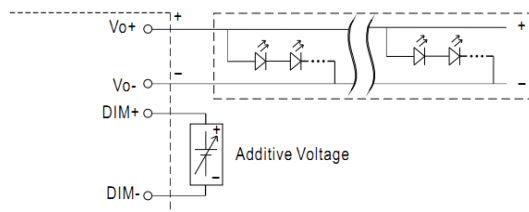


$$\text{Duty cycle(\%)} = \frac{T_{ON}}{T} \times 100\%$$

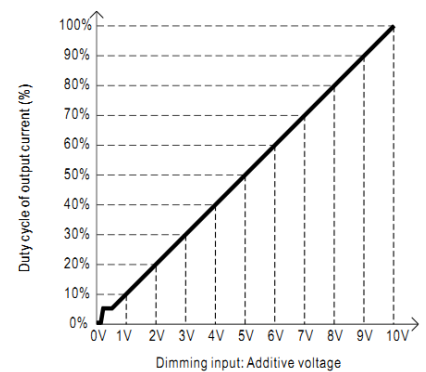
Output PWM frequency : 1KHz(±20%)

※ 2 in 1 dimming function

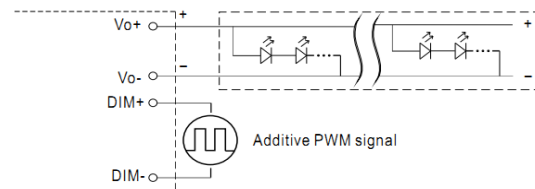
◎ Applying additive 0 ~ 10VDC



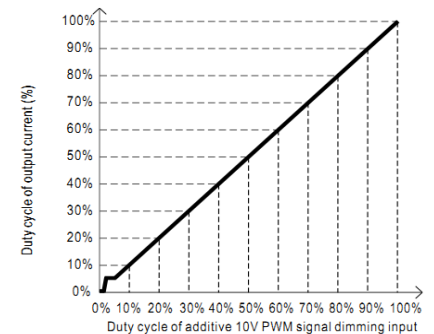
"DO NOT connect "DIM- to Vo-"



◎ 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	0.13A	0.27A	0.41A	0.55A	0.69A	0.83A	0.98A	1.11A	1.26A	1.40A	1.41A
	Duty cycle of output current	0%	9.3%	19.3%	29.3%	39.3%	49.3%	59.3%	70.0%	79.3%	90.0%	100.0%	100.7%
2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0	0.13A	0.27A	0.41A	0.55A	0.68A	0.83A	0.97A	1.11A	1.25A	1.39A	1.41A
	Duty cycle of output current	0%	9.3%	19.3%	29.3%	39.3%	48.6%	59.3%	69.3%	79.3%	89.3%	99.3%	100.7%

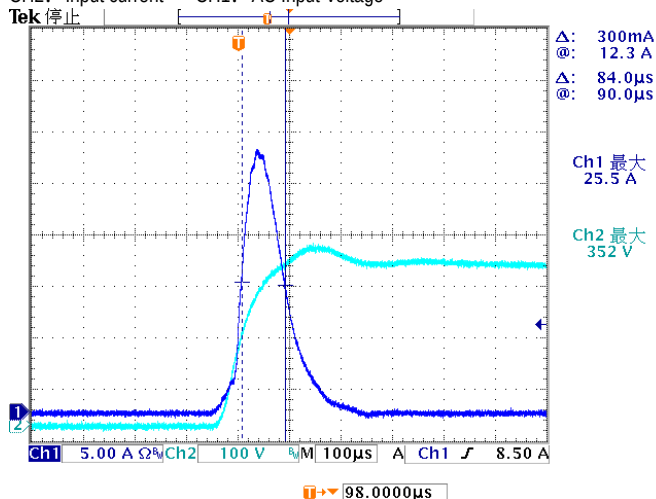
TEST RESULT: OK

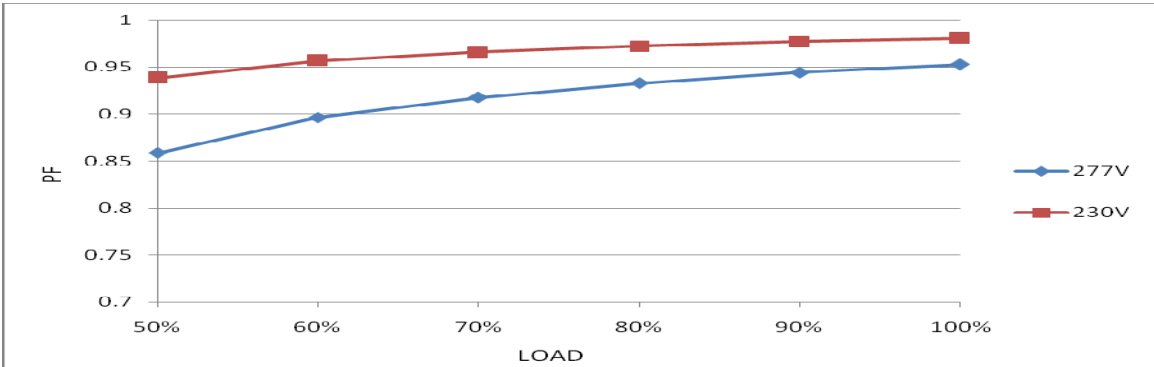
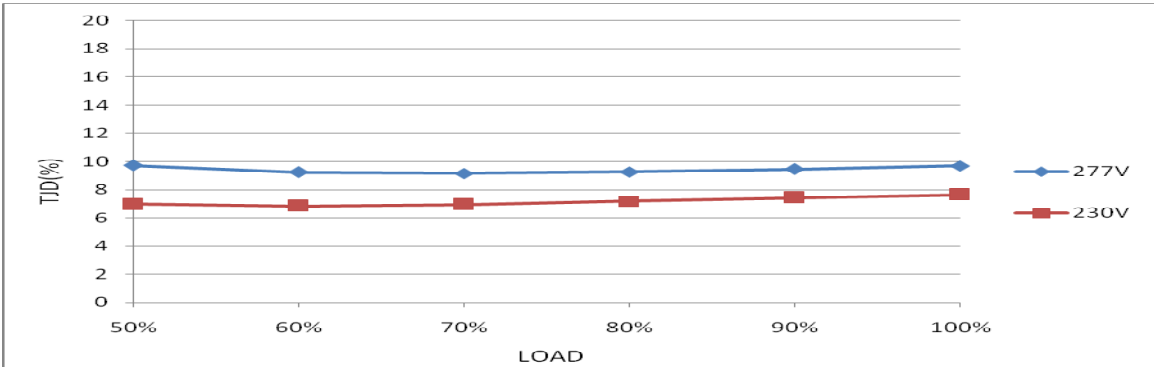
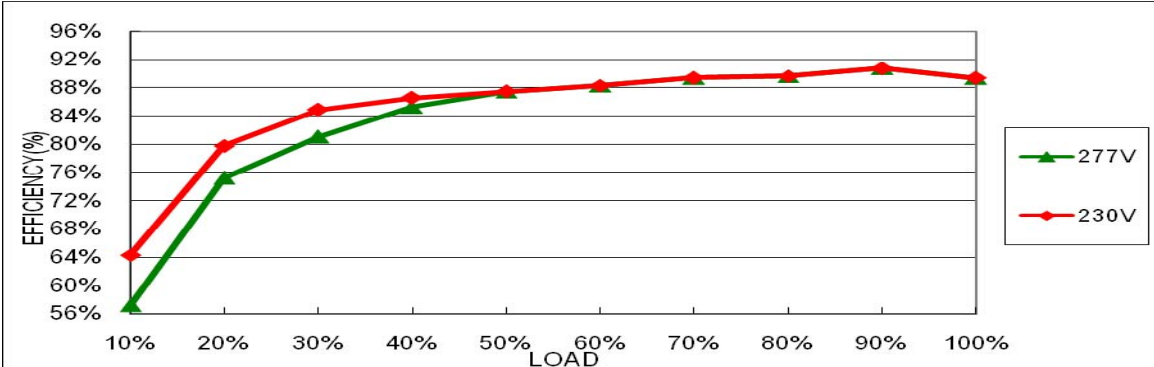
INPUT FUNCTION TEST

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 = 0.315A/ 230VAC I = 0.270A/ 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: 0.0029 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	0.457 W for Blank-Type 0.477 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= 25.5A/ 230VAC Twidth =84 us

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=0.981 /230VAC PF=0.953 /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>0.90</td><td>0.96</td></tr><tr><td>70%</td><td>0.92</td><td>0.97</td></tr><tr><td>80%</td><td>0.93</td><td>0.975</td></tr><tr><td>90%</td><td>0.94</td><td>0.98</td></tr><tr><td>100%</td><td>0.95</td><td>0.981</td></tr></tbody></table>					LOAD	277V	230V	50%	0.86	0.94	60%	0.90	0.96	70%	0.92	0.97	80%	0.93	0.975	90%	0.94	0.98	100%	0.95	0.981												
LOAD	277V	230V																																			
50%	0.86	0.94																																			
60%	0.90	0.96																																			
70%	0.92	0.97																																			
80%	0.93	0.975																																			
90%	0.94	0.98																																			
100%	0.95	0.981																																			
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=6.83% @60% load /230VAC THD=9.17% @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>9.17</td><td>6.83</td></tr><tr><td>60%</td><td>9.17</td><td>6.83</td></tr><tr><td>70%</td><td>9.17</td><td>6.83</td></tr><tr><td>80%</td><td>9.17</td><td>6.83</td></tr><tr><td>90%</td><td>9.17</td><td>6.83</td></tr><tr><td>100%</td><td>9.17</td><td>6.83</td></tr></tbody></table>					LOAD	277V	230V	50%	9.17	6.83	60%	9.17	6.83	70%	9.17	6.83	80%	9.17	6.83	90%	9.17	6.83	100%	9.17	6.83												
LOAD	277V	230V																																			
50%	9.17	6.83																																			
60%	9.17	6.83																																			
70%	9.17	6.83																																			
80%	9.17	6.83																																			
90%	9.17	6.83																																			
100%	9.17	6.83																																			
9	EFFICIENCY(Typ)	89%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	89.38%																																	
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>56</td><td>64</td></tr><tr><td>20%</td><td>76</td><td>80</td></tr><tr><td>30%</td><td>82</td><td>85</td></tr><tr><td>40%</td><td>85</td><td>87</td></tr><tr><td>50%</td><td>87</td><td>88</td></tr><tr><td>60%</td><td>88</td><td>89</td></tr><tr><td>70%</td><td>89</td><td>90</td></tr><tr><td>80%</td><td>89</td><td>90</td></tr><tr><td>90%</td><td>89</td><td>90</td></tr><tr><td>100%</td><td>89</td><td>90</td></tr></tbody></table>					LOAD	277V	230V	10%	56	64	20%	76	80	30%	82	85	40%	85	87	50%	87	88	60%	88	89	70%	89	90	80%	89	90	90%	89	90	100%	89	90
LOAD	277V	230V																																			
10%	56	64																																			
20%	76	80																																			
30%	82	85																																			
40%	85	87																																			
50%	87	88																																			
60%	88	89																																			
70%	89	90																																			
80%	89	90																																			
90%	89	90																																			
100%	89	90																																			

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	108.7%/ 200VAC 108.8%/ 230VAC 108.9%/ 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 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) 283V (2) 281V (3) 279V
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) 15.0V (2) 12.7V (3) 15.0V

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: 1.640mA 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-65-60 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>68.1℃</td><td>83.3℃</td></tr><tr><td>2</td><td>C8</td><td>65.9℃</td><td>81.1℃</td></tr><tr><td>3</td><td>C6</td><td>65.0℃</td><td>80.3℃</td></tr><tr><td>4</td><td>D1</td><td>69.9℃</td><td>85.6℃</td></tr><tr><td>5</td><td>Q1</td><td>69.3℃</td><td>84.4℃</td></tr><tr><td>6</td><td>U1</td><td>66.3℃</td><td>82.2℃</td></tr><tr><td>7</td><td>R17</td><td>67.9℃</td><td>83.5℃</td></tr><tr><td>8</td><td>T1</td><td>69.9℃</td><td>85.8℃</td></tr><tr><td>9</td><td>D100</td><td>64.1℃</td><td>79.7℃</td></tr><tr><td>10</td><td>Q100</td><td>53.3℃</td><td>68.9℃</td></tr><tr><td>11</td><td>U100</td><td>55.4℃</td><td>71.2℃</td></tr><tr><td>12</td><td>RG1</td><td>65.1℃</td><td>80.7℃</td></tr><tr><td>13</td><td>C105</td><td>54.1℃</td><td>69.3℃</td></tr><tr><td>14</td><td>C107</td><td>49.3℃</td><td>64.7℃</td></tr><tr><td>15</td><td>TC</td><td>60.0℃</td><td>74.9℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 28.8℃	HIGH AMBIENT Ta=45.1℃	1	BD1	68.1℃	83.3℃	2	C8	65.9℃	81.1℃	3	C6	65.0℃	80.3℃	4	D1	69.9℃	85.6℃	5	Q1	69.3℃	84.4℃	6	U1	66.3℃	82.2℃	7	R17	67.9℃	83.5℃	8	T1	69.9℃	85.8℃	9	D100	64.1℃	79.7℃	10	Q100	53.3℃	68.9℃	11	U100	55.4℃	71.2℃	12	RG1	65.1℃	80.7℃	13	C105	54.1℃	69.3℃	14	C107	49.3℃	64.7℃	15	TC	60.0℃	74.9℃
NO	Position	ROOM AMBIENT Ta= 28.8℃	HIGH AMBIENT Ta=45.1℃																																																																	
1	BD1	68.1℃	83.3℃																																																																	
2	C8	65.9℃	81.1℃																																																																	
3	C6	65.0℃	80.3℃																																																																	
4	D1	69.9℃	85.6℃																																																																	
5	Q1	69.3℃	84.4℃																																																																	
6	U1	66.3℃	82.2℃																																																																	
7	R17	67.9℃	83.5℃																																																																	
8	T1	69.9℃	85.8℃																																																																	
9	D100	64.1℃	79.7℃																																																																	
10	Q100	53.3℃	68.9℃																																																																	
11	U100	55.4℃	71.2℃																																																																	
12	RG1	65.1℃	80.7℃																																																																	
13	C105	54.1℃	69.3℃																																																																	
14	C107	49.3℃	64.7℃																																																																	
15	TC	60.0℃	74.9℃																																																																	
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	±0.01%/℃ (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-65-60: 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= 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) 587376 HRS (2) 125136 HRS (3) 182062 HRS (4) 223163 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