



# Test Report: ODLC-45-350

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45W Constant Current Mode 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

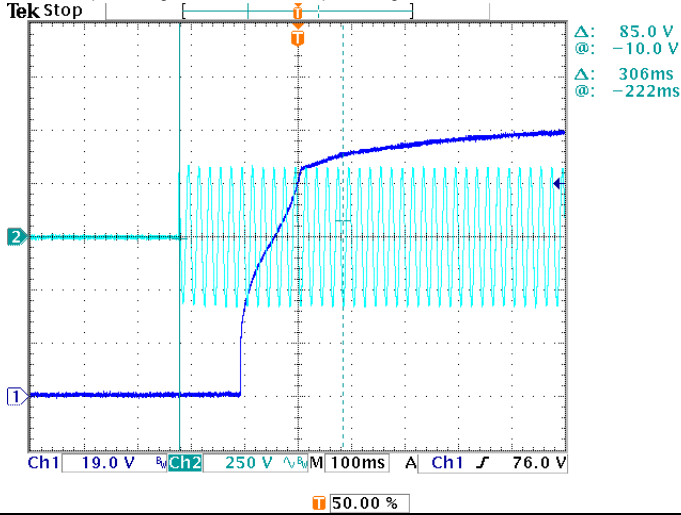
DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONSTANT CURRENT REGION	57V~95V	I/P: 230VAC O/P: LED MODE Ta: 25°C	50V~98V
2	CURRENT RIPPLE	5% max@rated current	I/P: 230VAC O/P: FULL/MIN LOAD Ta: 25°C	4.85%
3	CURRENT TOLERANCE	±7%	I/P: 230VAC O/P: FULL/MIN LOAD Ta: 25°C	±3.14%
4	OPEN CIRCUIT VOLTAGE (max)	118V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	117.6V
5	OVER/UNDERSHOOT TEST	<±5 %	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<5 %
6	SET UP TIME	500ms/230VAC 1200ms/115VAC	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	306ms/230VAC 482ms/115VAC

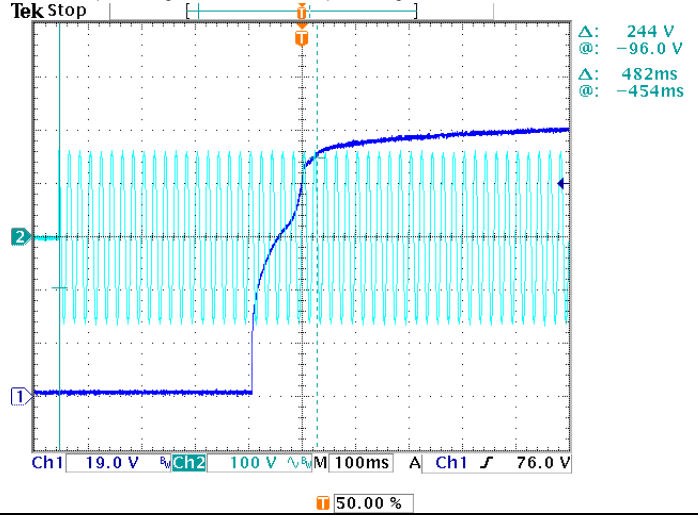
INPUT=230VAC/50HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage

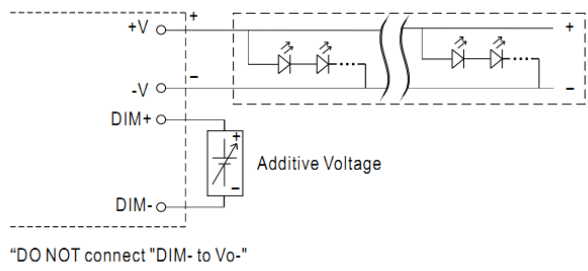
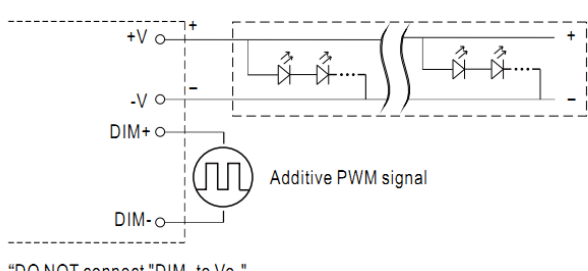
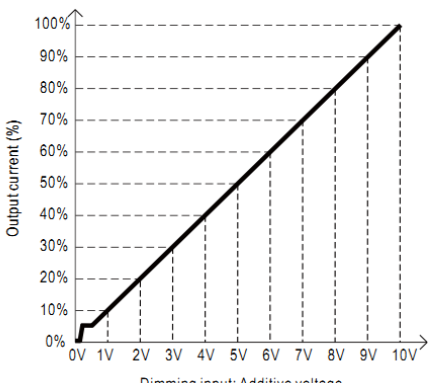
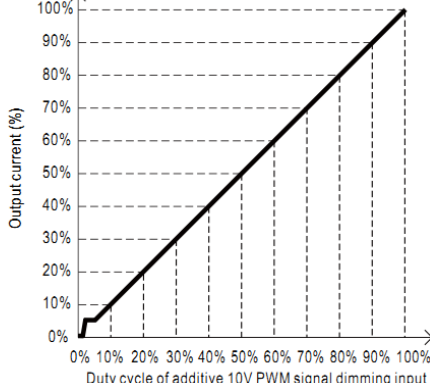


INPUT=115VAC/60HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage



7	AUXILIARY DC OUTPUT (For A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P: FULL LOAD	11.97 V
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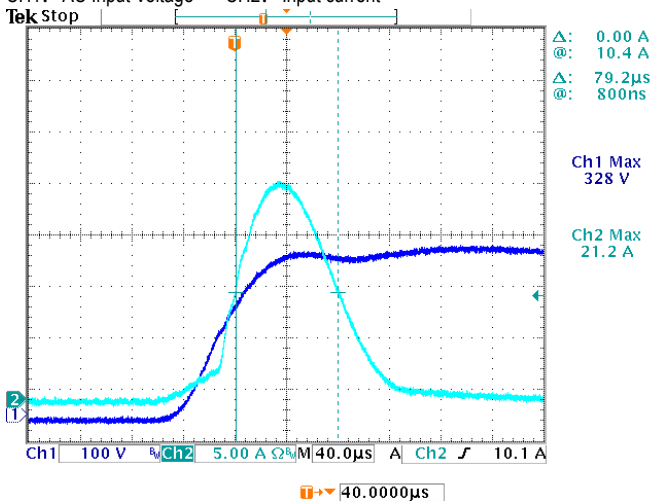
<p>8</p>	<p>DIMMING TEST(For Blank -Type)</p>	<ul style="list-style-type: none"> <li>• Output constant current level can be adjusted by applying one of the two methodologies between DIM+ and DIM-: 0 ~ 10Vdc. or 10V PWM signal.</li> <li>• Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.</li> </ul> <p>◎ Applying additive 0 ~ 10VDC</p>  <p>"DO NOT connect "DIM- to Vo-"</p> <p>◎ Applying additive 10V PWM signal (frequency range 300Hz ~ 3KHz):</p>  <p>"DO NOT connect "DIM- to Vo-"</p>   <p>Note : 1. Min. dimming level is about 8% and the output current is not defined when 0% &lt; Iout &lt; 8%.          2. The output current could drop down to 0% when dimming input is about 0Vdc or 10V PWM signal with 0% duty cycle.</p> <p>I/P: 230 VAC          O/P: DIMMING TEST          Ta: 25°C</p> <table border="1" data-bbox="343 1299 1492 1702"> <tr> <td rowspan="3">1</td> <td>V</td> <td>0V</td> <td>1V</td> <td>2V</td> <td>3V</td> <td>4V</td> <td>5V</td> <td>6V</td> <td>7V</td> <td>8V</td> <td>9V</td> <td>10V</td> </tr> <tr> <td>Output Current</td> <td>0A</td> <td>0.040</td> <td>0.074</td> <td>0.109</td> <td>0.144</td> <td>0.179</td> <td>0.215</td> <td>0.250</td> <td>0.284</td> <td>0.319</td> <td>0.353</td> </tr> <tr> <td>%</td> <td>0.00%</td> <td>11.43%</td> <td>21.14%</td> <td>31.09%</td> <td>41.03%</td> <td>51.09%</td> <td>61.29%</td> <td>71.40%</td> <td>81.20%</td> <td>91.14%</td> <td>100.86%</td> </tr> <tr> <td rowspan="3">2</td> <td>PWM(100Hz)</td> <td>0%</td> <td>10%</td> <td>20%</td> <td>30%</td> <td>40%</td> <td>50%</td> <td>60%</td> <td>70%</td> <td>80%</td> <td>90%</td> <td>100%</td> </tr> <tr> <td>Output Current</td> <td>0A</td> <td>0.038</td> <td>0.070</td> <td>0.108</td> <td>0.143</td> <td>0.177</td> <td>0.212</td> <td>0.246</td> <td>0.281</td> <td>0.316</td> <td>0.347</td> </tr> <tr> <td>%</td> <td>0.00%</td> <td>10.83%</td> <td>20.00%</td> <td>30.86%</td> <td>40.74%</td> <td>50.66%</td> <td>60.46%</td> <td>70.37%</td> <td>80.31%</td> <td>90.17%</td> <td>99.09%</td> </tr> </table>	1	V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	Output Current	0A	0.040	0.074	0.109	0.144	0.179	0.215	0.250	0.284	0.319	0.353	%	0.00%	11.43%	21.14%	31.09%	41.03%	51.09%	61.29%	71.40%	81.20%	91.14%	100.86%	2	PWM(100Hz)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Output Current	0A	0.038	0.070	0.108	0.143	0.177	0.212	0.246	0.281	0.316	0.347	%	0.00%	10.83%	20.00%	30.86%	40.74%	50.66%	60.46%	70.37%	80.31%	90.17%	99.09%
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<p>9</p>	<p>DALI DIMMING OPERATION (primary side ; for DA-Type)</p>	<p>※DALI Interface                  ·Apply DALI signal between DA+ and DA-.                  ·DALI protocol comprises 16 groups and 64 addresses.                  ·First step is fixed at 8% of output.</p> <p>I/P: 230 VAC                  O/P: DIMMING TEST                  Ta: 25°C                  TEST RESULT: OK</p>																																																																										

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/MIN 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~MIN 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 =0.337A/ 115VAC I =0.171A/ 230VAC I =0.151A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-CASE: 0.0029 mA N-CASE: 0.0029 mA
5	NO LOAD/STANDBY POWER CONSUMPTION	< 0.5W for Blank-Type < 1.2W for A-Type < 0.5W for DA-Type	I/P: 230VAC O/P: NO LOAD Ta: 25°C	0.368W for Blank-Type 0.585W for A-Type 0.415W for DA-Type
6	INRUSH CURRENT(Typ)	230V/ 30A Twidth =100 us measured at 50% Ipeak COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I =21.2A/ 230VAC Twidth =79.2us

INPUT=230VAC/50HZ @ FULL LOAD

CH1: AC Input Voltage CH2: Input current



7	EFFICIENCY(Typ)	86%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	89.18%																												
<p><b>EFFICIENCY vs LOAD</b></p> <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>LOAD</th> <th>277V</th> <th>230V</th> <th>115V</th> </tr> </thead> <tbody> <tr> <td>50%</td> <td>79.2</td> <td>81.2</td> <td>84.0</td> </tr> <tr> <td>60%</td> <td>82.2</td> <td>83.8</td> <td>85.8</td> </tr> <tr> <td>70%</td> <td>84.5</td> <td>85.8</td> <td>87.2</td> </tr> <tr> <td>80%</td> <td>86.2</td> <td>87.5</td> <td>88.0</td> </tr> <tr> <td>90%</td> <td>87.8</td> <td>88.5</td> <td>88.8</td> </tr> <tr> <td>100%</td> <td>88.5</td> <td>89.2</td> <td>89.2</td> </tr> </tbody> </table>					LOAD	277V	230V	115V	50%	79.2	81.2	84.0	60%	82.2	83.8	85.8	70%	84.5	85.8	87.2	80%	86.2	87.5	88.0	90%	87.8	88.5	88.8	100%	88.5	89.2	89.2
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8	POWER FACTOR	0.95/ 115VAC 0.92/ 230VAC 0.90/ 277VAC	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	PF=0.996/ 115VAC PF=0.974/ 230VAC PF=0.938/ 277VAC																												
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9	TOTAL HARMONIC DISTORTION	THD<20% (@load≥60%/115VAC, 230VAC; @load≥75%/277VAC)	I/P: 115 VAC/60% LOAD I/P: 230 VAC/60% LOAD I/P: 277 VAC/75% LOAD Ta: 25°C	THD=6.72% @60% load /115VAC THD=8.30% @60% load /230VAC THD=9.92% @75% load /277VAC																												
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**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	SHORT CIRCUIT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 90VAC I/P: 295VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup mode, recovers automatically after fault condition is removed

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q 1 Rated 800V/6A	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 602V (2) 614V (3) 550V
2	O/P Diode (MOSFET)	D101 Rated 1000V/5A	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 860V (2) 868V (3) 804V
3	Control IC	U1 Rated 35V (MAX)	I/P: High-Line +3V =298V O/P: (1) FULL LOAD (2) Output Short (3) Low Line No Load Ta: 25°C	(1) 15.1V (2) 14.7V (3) 15.0V
4	Clamp Diode	D 1 Rated 1000V/1A	I/P: High-Line +3V = 298V O/P: (1) Full Load input on/off (2) Output Short Ta: 25°C	(1) 530V (2) 484V



## SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min	I/P-O/P: 4.2 KVAC/min Ta: 25°C	I/P-O/P: 1.624mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC>100MΩ	I/P-O/P: 500 VDC Ta: 25°C/70% RH	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: 230 VAC/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 Test by certified Lab
3	RADIATION	EN55015	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
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: ODL-45-700 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 32.5℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 53.7℃																																																														
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295VAC/90VAC O/P: FULL/80% 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 %/℃(0~40℃)	I/P: 230 VAC O/P: FULL LOAD	±0.001%/℃																																																												
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: AC OFF STATIC		TEST: OK																																																												





6	THERMAL SHOCK TEST	1. Thermal shock Temperature: Tcase=-25°C~ +45°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle: 16 CYCLE 5. Input/Output condition: 230VAC/Full Load AC ON/OFF TEST AC on 3 sec/AC off 1 sec TEST	TEST: OK
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	ODL-45-700: SUPPOSE C106 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: MIN LOAD Ta= 50 °C LIFE TIME	(1) 555640 HRS (2) 84189 HRS (3) 99615 HRS (4) 107091 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 408.8K 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	Carychen/ZHUOKB	SKY	LIUWY