



Test Report: ODLC-65-1750

65W 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

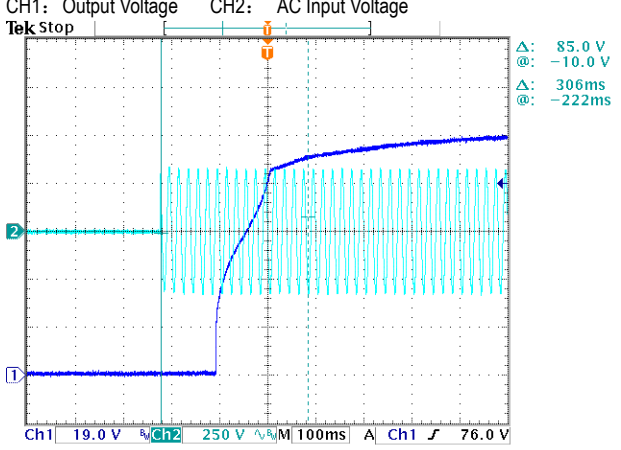
E.M.C. Test

■ RELIABILITY TEST

Environment Test

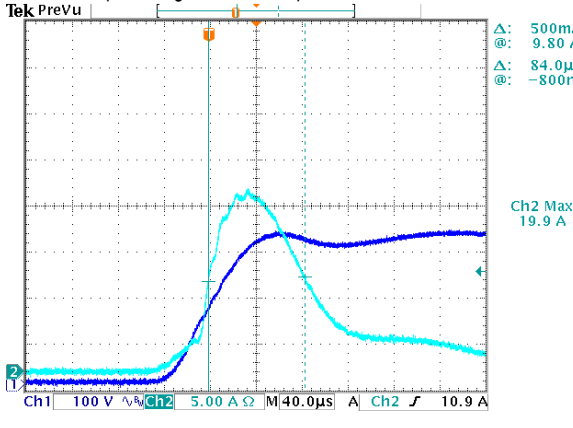
DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONSTANT CURRENT REGION	27V~36V	I/P: 230VAC O/P: LED MODE Ta: 25°C	18 V~36 V
2	CURRENT RIPPLE	5% max@rated current	I/P: 230VAC O/P: FULL/MIN LOAD Ta: 25°C	3.05%
3	CURRENT TOLERANCE	±7%	I/P: 230VAC O/P: FULL/MIN LOAD Ta: 25°C	±2.04%
4	OPEN CIRCUIT VOLTAGE (max)	53 V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	52.5 V
5	OVER/UNDERSHOOT TEST	<±5 %	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<5 %
6	SET UP TIME	500ms/230VAC	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	306 ms/230VAC
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage Tek Stop</p>  <p>△: 85.0 V @: -10.0 V △: 306ms @: -222ms</p> <p>Ch1 19.0 V 5 Ch2 250 V 50ms M 100ms A Ch1 76.0 V</p> <p>50.00 %</p>				
7	AUXILIARY DC OUTPUT (For A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P: FULL LOAD	11.94 V

<p>8 DIMMING TEST (For Blank -Type)</p>	<ul style="list-style-type: none"> Output constant current level can be adjusted by applying one of the two methodologies between DIM+ and DIM-: <ul style="list-style-type: none"> 0 ~ 10Vdc, or 10V PWM signal. Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers. Applying additive 0 ~ 10VDC <p>DO NOT connect "DIM- to Vo-"</p> <ul style="list-style-type: none"> Applying additive 10V PWM signal (frequency range 300Hz ~ 3KHz): <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% < Iout < 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>																																																																												
<p>9 DALI DIMMING OPERATION (primary side; for DA-Type)</p>	<p>※DALI Interface</p> <ul style="list-style-type: none"> Apply DALI signal between DA+ and DA-. DALI protocol comprises 16 groups and 64 addresses. First step is fixed at 8% of output. <p>I/P: 230 VAC O/P: DIMMING TEST Ta: 25°C TEST RESULT: OK</p>	<table border="1"> <thead> <tr> <th></th> <th>V</th> <th>0V</th> <th>1V</th> <th>2V</th> <th>3V</th> <th>4V</th> <th>5V</th> <th>6V</th> <th>7V</th> <th>8V</th> <th>9V</th> <th>10V</th> </tr> </thead> <tbody> <tr> <td rowspan="2">1</td> <td>Output Current</td> <td>0A</td> <td>0.1960A</td> <td>0.3650A</td> <td>0.5250A</td> <td>0.6900A</td> <td>0.8500A</td> <td>1.0300A</td> <td>1.2000A</td> <td>1.3600A</td> <td>1.5300A</td> <td>1.6900A</td> </tr> <tr> <td>%</td> <td>0.00%</td> <td>11.20%</td> <td>20.86%</td> <td>30.00%</td> <td>39.43%</td> <td>48.57%</td> <td>58.86%</td> <td>68.57%</td> <td>77.71%</td> <td>87.43%</td> <td>96.57%</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>0.1950A</td> <td>0.3640A</td> <td>0.5250A</td> <td>0.6900A</td> <td>0.8500A</td> <td>1.0300A</td> <td>1.2100A</td> <td>1.3700A</td> <td>1.5400A</td> <td>1.7100A</td> </tr> <tr> <td>%</td> <td>0.00%</td> <td>11.14%</td> <td>20.80%</td> <td>30.00%</td> <td>39.43%</td> <td>48.57%</td> <td>58.86%</td> <td>69.14%</td> <td>78.29%</td> <td>88.00%</td> <td>97.71%</td> </tr> </tbody> </table>		V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	1	Output Current	0A	0.1960A	0.3650A	0.5250A	0.6900A	0.8500A	1.0300A	1.2000A	1.3600A	1.5300A	1.6900A	%	0.00%	11.20%	20.86%	30.00%	39.43%	48.57%	58.86%	68.57%	77.71%	87.43%	96.57%	2	PWM(100Hz)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Output Current	0A	0.1950A	0.3640A	0.5250A	0.6900A	0.8500A	1.0300A	1.2100A	1.3700A	1.5400A	1.7100A	%	0.00%	11.14%	20.80%	30.00%	39.43%	48.57%	58.86%	69.14%	78.29%	88.00%	97.71%
	V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V																																																																	
1	Output Current	0A	0.1960A	0.3650A	0.5250A	0.6900A	0.8500A	1.0300A	1.2000A	1.3600A	1.5300A	1.6900A																																																																	
	%	0.00%	11.20%	20.86%	30.00%	39.43%	48.57%	58.86%	68.57%	77.71%	87.43%	96.57%																																																																	
2	PWM(100Hz)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%																																																																	
	Output Current	0A	0.1950A	0.3640A	0.5250A	0.6900A	0.8500A	1.0300A	1.2100A	1.3700A	1.5400A	1.7100A																																																																	
	%	0.00%	11.14%	20.80%	30.00%	39.43%	48.57%	58.86%	69.14%	78.29%	88.00%	97.71%																																																																	

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~295VAC	I/P: TESTING O/P: 80%/FULL LOAD Ta: 25°C	177V~305V
			I/P: (1)LOW-LINE-3V=177 V HIGH-LINE+10V=305 V O/P: 80%/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: 180 VAC ~295 VAC O/P: FULL~MIN 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 =0.303A/ 230VAC I =0.241A/ 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	0.388W for Blank-Type 0.578W for A-Type 0.479W 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 =19.9A/ 230VAC Twidth =84.0 us
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1: AC Input Voltage CH2: Input current</p>  <p> Δ: 500mA $\textcircled{\Delta}$: 9.80 A Δ: 84.0μs $\textcircled{\Delta}$: -800ns Ch2 Max 19.9 A 40.8000μs </p>				
7	EFFICIENCY(Typ)	85%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	87.45%

	<p>EFFICIENCY vs LOAD</p> <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>LOAD</th> <th>277V Efficiency (%)</th> <th>230V Efficiency (%)</th> </tr> </thead> <tbody> <tr><td>50%</td><td>84.0</td><td>84.5</td></tr> <tr><td>60%</td><td>84.5</td><td>85.0</td></tr> <tr><td>70%</td><td>85.0</td><td>85.5</td></tr> <tr><td>80%</td><td>85.5</td><td>86.0</td></tr> <tr><td>90%</td><td>86.0</td><td>86.5</td></tr> <tr><td>100%</td><td>86.5</td><td>87.5</td></tr> </tbody> </table>			LOAD	277V Efficiency (%)	230V Efficiency (%)	50%	84.0	84.5	60%	84.5	85.0	70%	85.0	85.5	80%	85.5	86.0	90%	86.0	86.5	100%	86.5	87.5
LOAD	277V Efficiency (%)	230V Efficiency (%)																						
50%	84.0	84.5																						
60%	84.5	85.0																						
70%	85.0	85.5																						
80%	85.5	86.0																						
90%	86.0	86.5																						
100%	86.5	87.5																						
8	POWER FACTOR	0.95/ 230VAC 0.90/ 277VAC	I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	PF=0.982/ 230VAC PF=0.948/ 277VAC																				
	<p>P.F vs LOAD</p> <table border="1"> <caption>P.F vs Load Data</caption> <thead> <tr> <th>LOAD</th> <th>277V PF</th> <th>230V PF</th> </tr> </thead> <tbody> <tr><td>50%</td><td>0.91</td><td>0.95</td></tr> <tr><td>60%</td><td>0.92</td><td>0.96</td></tr> <tr><td>70%</td><td>0.93</td><td>0.965</td></tr> <tr><td>80%</td><td>0.94</td><td>0.97</td></tr> <tr><td>90%</td><td>0.95</td><td>0.975</td></tr> <tr><td>100%</td><td>0.96</td><td>0.98</td></tr> </tbody> </table>			LOAD	277V PF	230V PF	50%	0.91	0.95	60%	0.92	0.96	70%	0.93	0.965	80%	0.94	0.97	90%	0.95	0.975	100%	0.96	0.98
LOAD	277V PF	230V PF																						
50%	0.91	0.95																						
60%	0.92	0.96																						
70%	0.93	0.965																						
80%	0.94	0.97																						
90%	0.95	0.975																						
100%	0.96	0.98																						
9	TOTAL HARMONIC DISTORTION	THD < 20% (@load ≥ 75% / 230VAC; @load ≥ 75% / 277VAC)	I/P: 230 VAC / 75% LOAD I/P: 277 VAC / 75% LOAD Ta: 25°C	THD=6.10% @75% load / 230VAC THD=8.82% @75% load / 277VAC																				
	<p>THD vs LOAD</p> <table border="1"> <caption>THD vs Load Data</caption> <thead> <tr> <th>LOAD</th> <th>277V THD (%)</th> <th>230V THD (%)</th> </tr> </thead> <tbody> <tr><td>50%</td><td>8.5</td><td>7.0</td></tr> <tr><td>60%</td><td>8.8</td><td>6.5</td></tr> <tr><td>70%</td><td>8.5</td><td>6.2</td></tr> <tr><td>80%</td><td>8.4</td><td>5.8</td></tr> <tr><td>90%</td><td>8.3</td><td>5.4</td></tr> <tr><td>100%</td><td>8.2</td><td>5.0</td></tr> </tbody> </table>			LOAD	277V THD (%)	230V THD (%)	50%	8.5	7.0	60%	8.8	6.5	70%	8.5	6.2	80%	8.4	5.8	90%	8.3	5.4	100%	8.2	5.0
LOAD	277V THD (%)	230V THD (%)																						
50%	8.5	7.0																						
60%	8.8	6.5																						
70%	8.5	6.2																						
80%	8.4	5.8																						
90%	8.3	5.4																						
100%	8.2	5.0																						

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	SHORT CIRCUIT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 180VAC I/P: 295VAC O/P: 80%/FULL LOAD Ta: 25°C	NO DAMAGE Hiccup mode, auto-recovery after fault condition is removed for DA type; Hiccup mode, re-power on to recovery for other type

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q 1 Rated 800V/9A	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 695V (2) 640V (3) 685V
2	O/P Diode (MOSFET)	D100 Rated 20A/350V	I/P: High-Line +3V =298V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 260V (2) 268V (3) 204V
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) 15.8V (2) 15.5V (3) 15.7V
4	Clamp Diode	D 1 Rated 800V/2A	I/P: High-Line +3V = 298V O/P: (1) Full Load input on/off (2) Output Short Ta: 25°C	(1) 560V (2) 494V

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: 1.762 mA 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: > 9999 MΩ

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/75% 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	CRITERIA A
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N: 1KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare			

■ **RELIABILITY TEST**

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																								
1	TEMPERATURE RISE TEST	MODEL: ODLC-65-1750 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 31.3℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 47.0℃																																																										
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 31.3℃</th> <th>HIGH AMBIENT Ta=47.0 ℃</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>75.2℃</td><td>96.0℃</td></tr> <tr><td>2</td><td>C8</td><td>74.2℃</td><td>95.1℃</td></tr> <tr><td>3</td><td>Q1</td><td>81.8℃</td><td>106.0℃</td></tr> <tr><td>4</td><td>D1</td><td>80.8℃</td><td>105.1℃</td></tr> <tr><td>5</td><td>U1</td><td>78.8℃</td><td>100.6℃</td></tr> <tr><td>6</td><td>T1</td><td>83.2℃</td><td>106.8℃</td></tr> <tr><td>7</td><td>RG1</td><td>80.9℃</td><td>100.6℃</td></tr> <tr><td>8</td><td>D100</td><td>78.5℃</td><td>98.2℃</td></tr> <tr><td>9</td><td>Q100</td><td>77.8℃</td><td>97.2℃</td></tr> <tr><td>10</td><td>L100</td><td>77.5℃</td><td>96.8℃</td></tr> <tr><td>11</td><td>C106</td><td>73.4℃</td><td>92.4℃</td></tr> <tr><td>12</td><td>U100</td><td>84.0℃</td><td>103.8℃</td></tr> <tr><td>13</td><td>TC</td><td>68.8℃</td><td>85.9℃</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 31.3℃	HIGH AMBIENT Ta=47.0 ℃	1	BD1	75.2℃	96.0℃	2	C8	74.2℃	95.1℃	3	Q1	81.8℃	106.0℃	4	D1	80.8℃	105.1℃	5	U1	78.8℃	100.6℃	6	T1	83.2℃	106.8℃	7	RG1	80.9℃	100.6℃	8	D100	78.5℃	98.2℃	9	Q100	77.8℃	97.2℃	10	L100	77.5℃	96.8℃	11	C106	73.4℃	92.4℃	12	U100	84.0℃	103.8℃	13	TC	68.8℃	85.9℃		
NO	Position	ROOM AMBIENT Ta= 31.3℃	HIGH AMBIENT Ta=47.0 ℃																																																									
1	BD1	75.2℃	96.0℃																																																									
2	C8	74.2℃	95.1℃																																																									
3	Q1	81.8℃	106.0℃																																																									
4	D1	80.8℃	105.1℃																																																									
5	U1	78.8℃	100.6℃																																																									
6	T1	83.2℃	106.8℃																																																									
7	RG1	80.9℃	100.6℃																																																									
8	D100	78.5℃	98.2℃																																																									
9	Q100	77.8℃	97.2℃																																																									
10	L100	77.5℃	96.8℃																																																									
11	C106	73.4℃	92.4℃																																																									
12	U100	84.0℃	103.8℃																																																									
13	TC	68.8℃	85.9℃																																																									
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295VAC/180VAC 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 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	±0.001%/℃																																																								
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℃~ +85℃ 2. Temperature change rate : 25℃ / 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	ODLC-65-1750: 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= 45 °C LIFE TIME (3) I/P: 230VAC O/P: MIN LOAD Ta= 45 °C LIFE TIME	(1) 120611 HRS (2) 48312 HRS (3) 110009 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 380.7K 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