



Test Report: IDLV-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

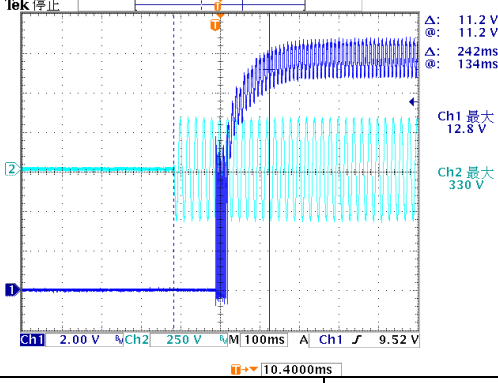
E.M.C. Test

■ RELIABILITY TEST

Environment Test

■ DESIGN VERIFY TEST

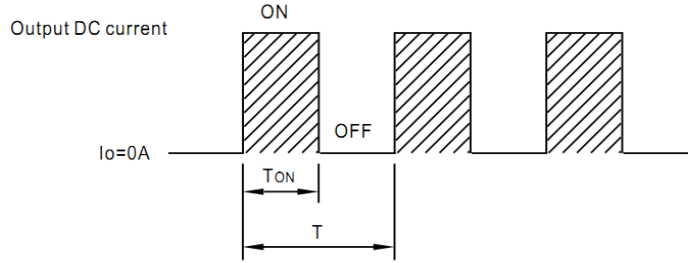
OUTPUT FUNCTION TEST

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
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage</p> 				
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.

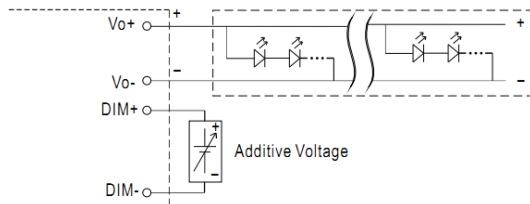


$$\text{Duty cycle(\%)} = \frac{T_{ON}}{T} \times 100\%$$

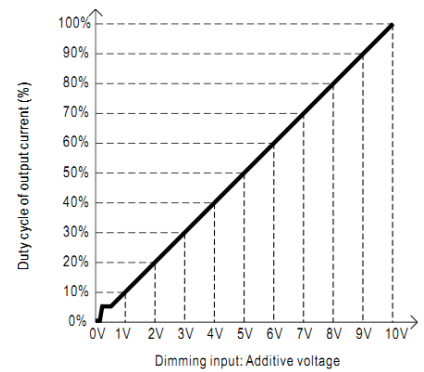
Output PWM frequency : 1KHz(±20%)

※ 2 in 1 dimming function

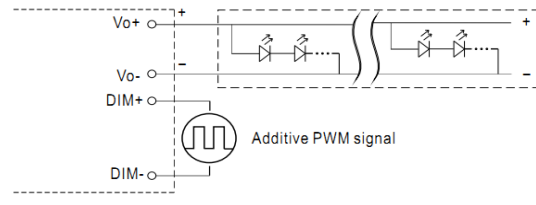
Ⓢ Applying additive 0 ~ 10VDC



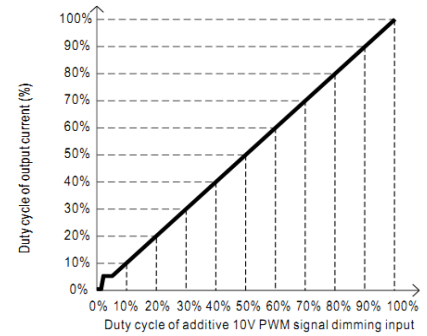
"DO NOT connect "DIM- to Vo-"



Ⓢ 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	0.37A	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%

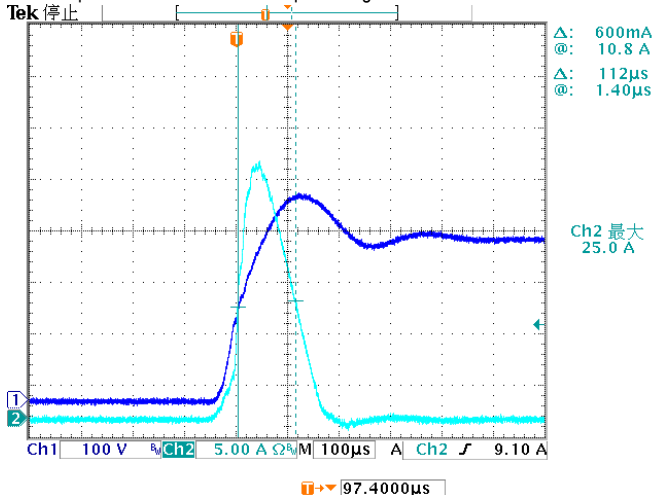
TEST RESULT: OK

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



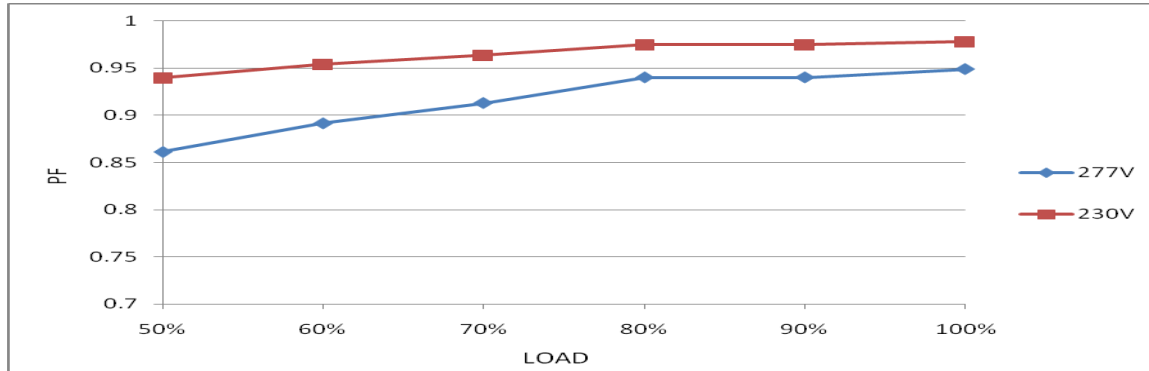


65W PWM Output LED Driver

IDLV-65 series

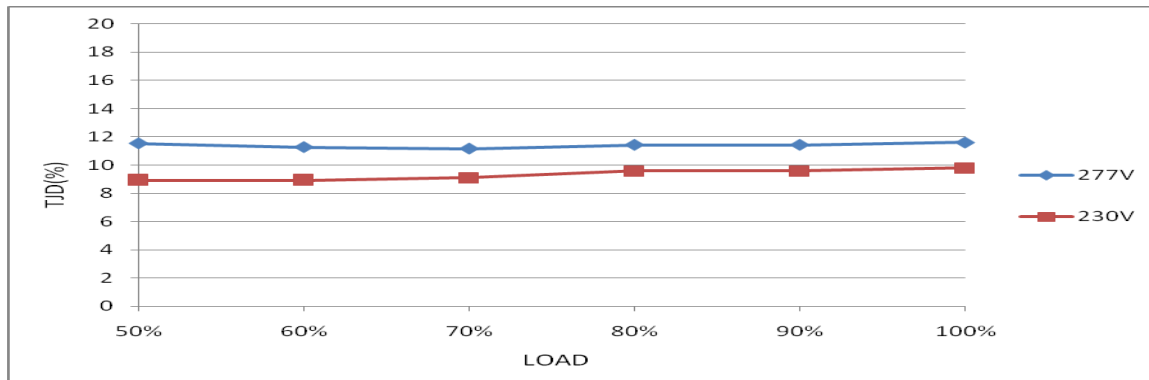
7	POWER FACTOR	0.95/230VAC 0.9/277VAC	I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	PF=0.978 /230VAC PF=0.949 /277VAC
---	--------------	---------------------------	--	--------------------------------------

PF vs LOAD



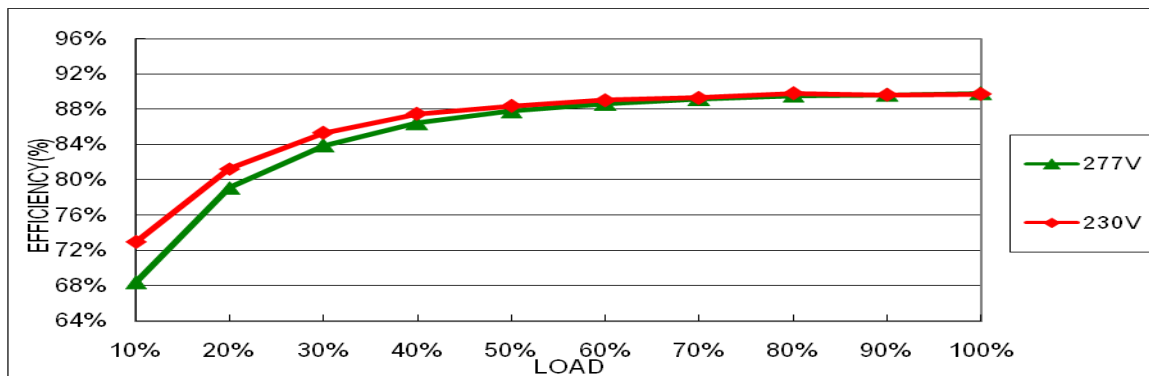
8	TOTAL HARMONIC DISTORTION	THD < 20% (@load ≥ 60%/230VAC; @load ≥ 75%/277VAC)	I/P: 230 VAC I/P: 277 VAC O/P: 60% / 75% LOAD Ta: 25°C	THD=8.93% @60% load /230VAC THD=11.17% @75% load /277VAC
---	---------------------------	--	---	---

THD vs LOAD



9	EFFICIENCY(Typ)	85%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	89.71%
---	-----------------	-----	---	--------

EFFICIENCY vs LOAD





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



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: IDLV-65-12 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 23.4°C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 40.9°C																																																																						
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 23.4°C</th> <th>HIGH AMBIENT Ta=40.9°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>77.8°C</td><td>92.3°C</td></tr> <tr><td>2</td><td>C8</td><td>74.9°C</td><td>89.7°C</td></tr> <tr><td>3</td><td>D1</td><td>93.8°C</td><td>108.6°C</td></tr> <tr><td>4</td><td>Q1</td><td>83.8°C</td><td>97.9°C</td></tr> <tr><td>5</td><td>C20</td><td>72.1°C</td><td>86.4°C</td></tr> <tr><td>6</td><td>U1</td><td>77.0°C</td><td>91.3°C</td></tr> <tr><td>7</td><td>R17</td><td>78.7°C</td><td>93.6°C</td></tr> <tr><td>8</td><td>T1</td><td>85.9°C</td><td>99.5°C</td></tr> <tr><td>9</td><td>C205</td><td>87.7°C</td><td>100.8°C</td></tr> <tr><td>10</td><td>D100</td><td>96.8°C</td><td>109.6°C</td></tr> <tr><td>11</td><td>Q100</td><td>78.3°C</td><td>92.6°C</td></tr> <tr><td>12</td><td>C105</td><td>76.8°C</td><td>91.6°C</td></tr> <tr><td>13</td><td>C107</td><td>65.3°C</td><td>80.5°C</td></tr> <tr><td>14</td><td>U100</td><td>78.4°C</td><td>92.6°C</td></tr> <tr><td>15</td><td>RG1</td><td>88.4°C</td><td>101.8°C</td></tr> <tr><td>16</td><td>TC</td><td>70.6°C</td><td>84.1°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 23.4°C	HIGH AMBIENT Ta=40.9°C	1	BD1	77.8°C	92.3°C	2	C8	74.9°C	89.7°C	3	D1	93.8°C	108.6°C	4	Q1	83.8°C	97.9°C	5	C20	72.1°C	86.4°C	6	U1	77.0°C	91.3°C	7	R17	78.7°C	93.6°C	8	T1	85.9°C	99.5°C	9	C205	87.7°C	100.8°C	10	D100	96.8°C	109.6°C	11	Q100	78.3°C	92.6°C	12	C105	76.8°C	91.6°C	13	C107	65.3°C	80.5°C	14	U100	78.4°C	92.6°C	15	RG1	88.4°C	101.8°C	16	TC	70.6°C	84.1°C		
NO	Position	ROOM AMBIENT Ta= 23.4°C	HIGH AMBIENT Ta=40.9°C																																																																					
1	BD1	77.8°C	92.3°C																																																																					
2	C8	74.9°C	89.7°C																																																																					
3	D1	93.8°C	108.6°C																																																																					
4	Q1	83.8°C	97.9°C																																																																					
5	C20	72.1°C	86.4°C																																																																					
6	U1	77.0°C	91.3°C																																																																					
7	R17	78.7°C	93.6°C																																																																					
8	T1	85.9°C	99.5°C																																																																					
9	C205	87.7°C	100.8°C																																																																					
10	D100	96.8°C	109.6°C																																																																					
11	Q100	78.3°C	92.6°C																																																																					
12	C105	76.8°C	91.6°C																																																																					
13	C107	65.3°C	80.5°C																																																																					
14	U100	78.4°C	92.6°C																																																																					
15	RG1	88.4°C	101.8°C																																																																					
16	TC	70.6°C	84.1°C																																																																					
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 295VAC/200VAC O/P: FULL LOAD Ta= -25°C	TEST: OK																																																																				
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 40 °C NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=40 °C HUMIDITY= 95% R.H	TEST: OK																																																																				
4	TEMPERATURE COEFFICIENT	±0.03%/°C (0~40°C)	I/P: 230 VAC O/P: FULL LOAD	±0.02%/°C (0~40°C)																																																																				
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature: -45°C ~ +85°C 2. Temperature change rate : 25°C / 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°C ~ +45°C 2. Temperature change rate : 25°C / 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

IDLV-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	IDLV-65-12: 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= 40 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 40 °C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta= 40 °C LIFE TIME	(1) 88480 HRS (2) 37660 HRS (3) 112660 HRS (4) 190320 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 4136.2K hrs min. Telcordia SR-332 (Bellcore); 398.8K 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