Test Report： FDL-65-1550

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

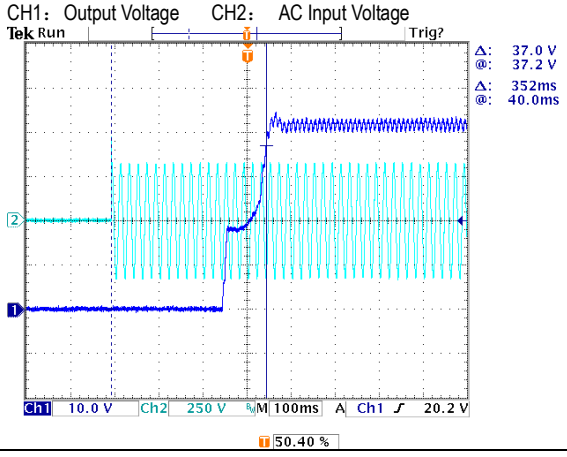
■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

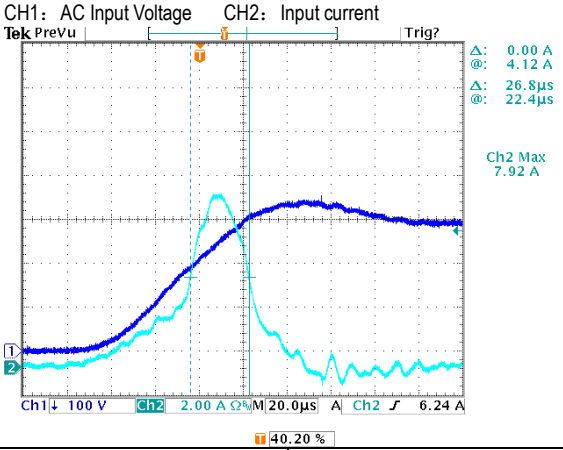
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT CURRENT ADJUST RANGE	0.77A~1.55A	I/P： 230VAC O/P：LED MODE Ta：25℃	0.728A~1.647A
2	OUTPUT CURRENT TOLERANCE	±5%	I/P： 230VAC O/P：FULL/MIN LOAD Ta：25℃	±2.40%
3	CONSTANT CURRENT REGION	25.2V~42V	I/P： 230VAC O/P：LED MODE Ta：25℃	20.5V~42V
4	OPEN CIRCUIT VOLTAGE (Max)	50V	I/P： 230VAC O/P：NO LOAD Ta：25℃	44.1V
5	OVER/UNDERSHOOT TEST	<±5 %	I/P： 230VAC O/P：FULL LOAD Ta：25℃	<5 %
6	SET UP TIME(Max)	230VAC/ 500ms	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	230VAC/ 352ms

INPUT=230VAC/50HZ @ FULL LOAD

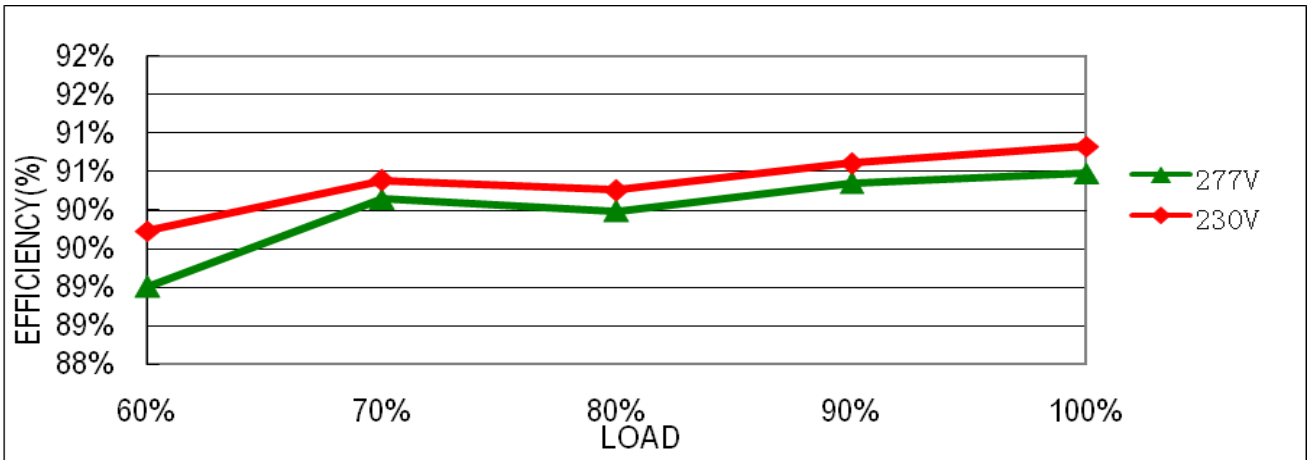
CH1：Output Voltage CH2： AC Input Voltage



INPUT FUNCTION TEST

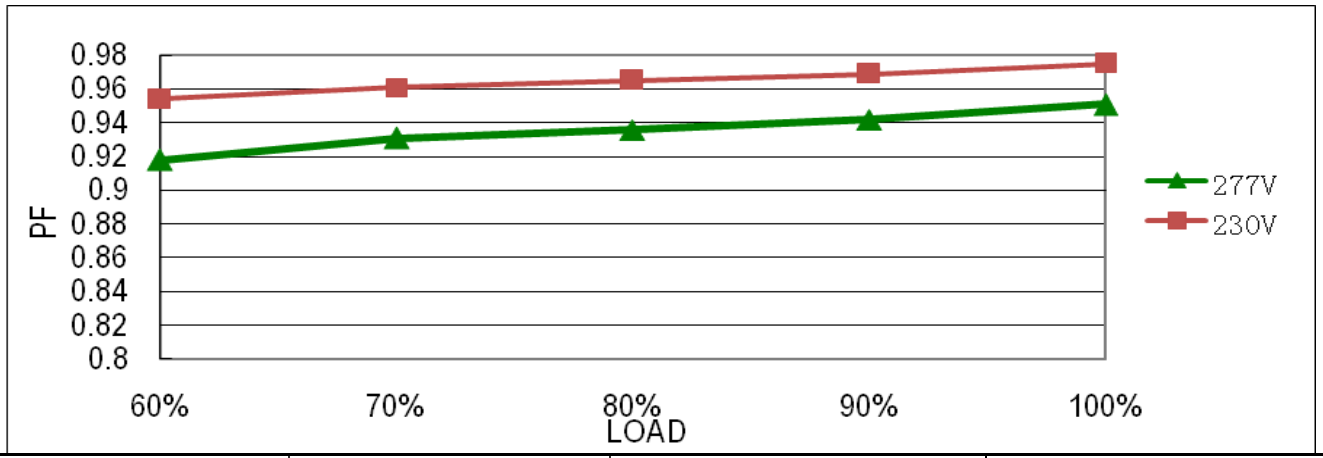
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~295VAC	I/P：TESTING O/P：FULL LOAD Ta：25℃	177V~305V
			I/P： (1)LOW-LINE-3V=177 V HIGH-LINE+10V=305 V O/P：FULL/MIN LOAD ON：30 Sec OFF：30 Sec 10MIN (2)230VAC ON：0.5 Sec OFF：0.5 Sec 20MIN (POWER ON/OFF NO DAMAGE)	TEST：OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P： 180 VAC ~295 VAC O/P：FULL~MIN LOAD Ta：25℃	TEST：OK
3	AC CURRENT	0.39A/277VAC 0.48A/230VAC	I/P： 277 VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I =0.268A/ 277VAC I =0.316A/ 230VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P： 277 VAC O/P：NO LOAD Ta：25℃	L-FG： 0.222 mA N-FG： 0.223 mA
5	NO LOAD POWER CONSUMPTION	< 0.5W	I/P：230VAC O/P：NO LOAD Ta：25℃	0.444W/ 230VAC
6	INRUSH CURRENT(Typ)	230V/ 50A ℡width =270 us measured at 50% Ipeak COLD START	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I =7.92A/ 230VAC Twidth =26.8us
	INPUT=230VAC/50HZ @ FULL LOAD CH1：AC Input Voltage CH2：Input current 			
7	EFFICIENCY(Typ)	90%	I/P： 230VAC O/P：FULL LOAD Ta：25℃	90.83%

EFFICIENCY vs LOAD



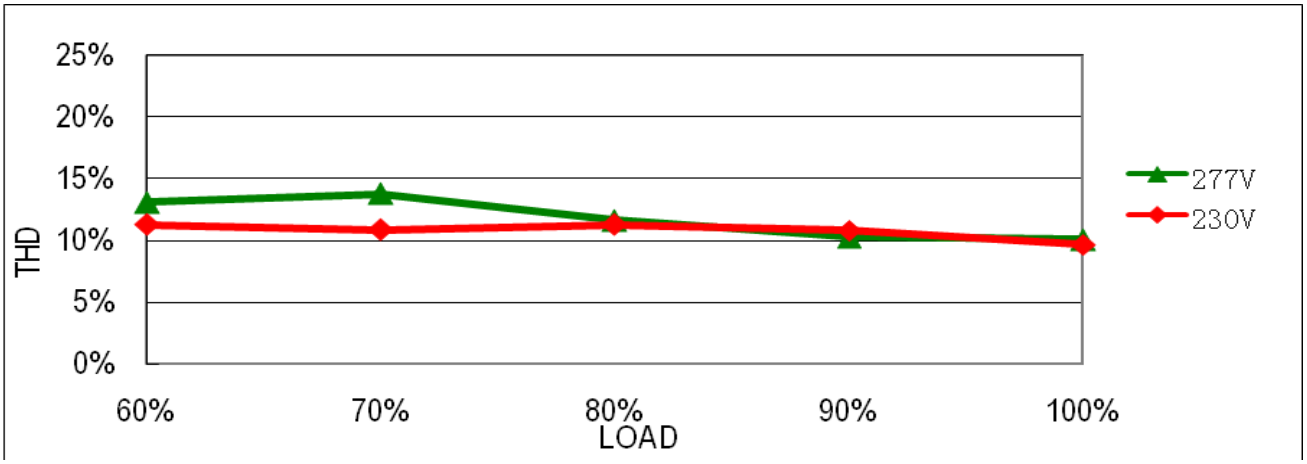
8	POWER FACTOR	0.90/ 277VAC 0.95/ 230VAC	I/P： 277 VAC I/P： 230 VAC O/P：FULL LOAD Ta：25℃	PF=0.951/ 277VAC PF=0.975/ 230VAC

P.F vs LOAD



9	TOTAL HARMONIC DISTORTION	THD＜20% when output loading ≥ 60% at 230VAC input and output loading ≥ 75% at 277VAC input	I/P： 277 VAC/75% LOAD I/P： 230 VAC/60% LOAD Ta：25℃	THD=11.64%/ 277VAC/75% LOAD THD=11.29%/ 230VAC/60% LOAD

THD vs LOAD



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	46V~56V	I/P： 180VAC I/P： 230VAC I/P： 295VAC O/P：NO LOAD Ta：25℃	52.79V/ 180VAC 52.64V/ 230VAC 52.73V/ 295VAC Shut down o/p voltage，re-power on to recover
2	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P： 180 VAC I/P： 230VAC I/P： 295VAC O/P：FULL LOAD	O.T.P. Active Hiccup mode，recovers automatically after fault condition is removed
3	SHORT CIRCUIT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P： 180VAC I/P： 295VAC O/P：FULL LOAD Ta：25℃	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/9.4A	I/P：High-Line +3V =298V O/P： (1) Full Load Turn on (2) Output Short (3) Full load continue Ta：25℃	 (1) 590V (2) 456V (3) 572V
2	O/P Diode (MOSFET)	D100 Rated 300V/10A	I/P：High-Line +3V =298V O/P： (1) Full Load Turn on (2) Output Short (3) Full load continue Ta：25℃	 (1) 204V (2) 150V (3) 202V
3	Control IC	U1 Rated 25V (MAX)	I/P：High-Line +3V =298V O/P：(1) FULL LOAD (2) Output Short (3) O.V.P (4) Low Line No Load Vo(min) Ta：25℃	 (1) 19.8V (2) 17.1V (3) 19.1V (4) 19.8V
4	Clamp Diode	D 6 Rated 800V/3A	I/P：High-Line +3V = 298V O/P: (1) Full Load input on/off (2) Output Short Ta：25℃	 (1) 522V (2) 410V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P：3.75KVAC/min I/P-FG ：2.0KVAC/min O/P-FG：1.5KVAC/min	I/P-O/P：4.2 KVAC/min I/P-FG： 2.4 KVAC/min O/P-FG：1.8 KVAC/min Ta：25℃	I/P-O/P：1.959mA I/P-FG： 1.543mA O/P-FG：2.462mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P： 500VDC>100MΩ I/P-FG： 500VDC>100MΩ O/P-FG：500VDC>100MΩ	I/P-O/P： 500 VDC I/P-FG： 500 VDC O/P-FG： 500 VDC Ta：25℃/70% RH	I/P-O/P： ＞9999MΩ I/P-FG： ＞9999MΩ O/P-FG：＞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℃	PASS
2	CONDUCTION	EN55015	I/P：230 VAC/50HZ O/P：FULL LOAD Ta：25℃	PASS Test by certified Lab
3	RADIATION	EN55015	I/P：230 VAC/50HZ O/P：FULL LOAD Ta：25℃	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℃	CRITERIA A
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT：1KV	I/P： 230VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
6	SURGE	EN61000-4-5 INDUSTRY L-N：2KV L,N-PE：4KV	I/P： 230VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
7	Test by certified Lab ＆ Test Report Prepare			

■ RELIABILITY TEST

ENVIRONMENT TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL： FDL-65-1550
1. ROOM AMBIENT BURN-IN：2 HRS
I/P： 230VAC O/P： FULL LOAD Ta= 21.6℃
2. HIGH AMBIENT BURN-IN： 2 HRS
I/P： 230VAC O/P： FULL LOAD Ta= 58.4℃
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 21.6 ℃</th><th>HIGH AMBIENT Ta=58.4 ℃</th></tr>
<tr><td>1</td><td>BD1</td><td>51.9℃</td><td>83.2℃</td></tr>
<tr><td>2</td><td>LF2</td><td>48.6℃</td><td>80.4℃</td></tr>
<tr><td>3</td><td>C9</td><td>50.7℃</td><td>82.3℃</td></tr>
<tr><td>4</td><td>C34</td><td>50.7℃</td><td>81.4℃</td></tr>
<tr><td>5</td><td>Q1</td><td>52.6℃</td><td>84.8℃</td></tr>
<tr><td>6</td><td>D6</td><td>52.3℃</td><td>83.5℃</td></tr>
<tr><td>7</td><td>T1</td><td>54.9℃</td><td>85.2℃</td></tr>
<tr><td>8</td><td>U1</td><td>51.7℃</td><td>82.4℃</td></tr>
<tr><td>9</td><td>D30</td><td>50.7℃</td><td>81.0℃</td></tr>
<tr><td>10</td><td>D100</td><td>64.1℃</td><td>92.6℃</td></tr>
<tr><td>11</td><td>R100</td><td>55.3℃</td><td>85.9℃</td></tr>
<tr><td>12</td><td>C205</td><td>47.3℃</td><td>78.5℃</td></tr>
<tr><td>13</td><td>C106</td><td>51.7℃</td><td>82.5℃</td></tr>
<tr><td>14</td><td>LF100</td><td>48.6℃</td><td>79.8℃</td></tr>
<tr><td>15</td><td>R10</td><td>49.2℃</td><td>80.2℃</td></tr>
<tr><td>16</td><td>TSW1</td><td>48.7℃</td><td>79.8℃</td></tr>
<tr><td>17</td><td>TC</td><td>45.1℃</td><td>77.4℃</td></tr>
</table></td></tr>
<tr><td>2</td><td>LOW TEMPERATURE
TURN ON TEST</td><td>TURN ON AFTER 2 HOUR</td><td>I/P： 295VAC/180VAC
O/P：FULL LOAD
Ta= -45℃</td><td>TEST：OK</td></tr>
<tr><td>3</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 60 ℃
NO DAMAGE</td><td>I/P： 305VAC
O/P：FULL LOAD
Ta=60 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td></tr>
<tr><td>4</td><td>TEMPERATURE
COEFFICIENT</td><td>±0.03 %/℃ (0~60℃)</td><td>I/P： 230 VAC
O/P：FULL LOAD</td><td>±0.01%/℃</td></tr>
<tr><td>5</td><td>STORAGE TEMPERATURE TEST</td><td colspan="2">1. Thermal shock Temperature： -45℃~ +90℃
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</td><td>TEST：OK</td></tr>
<tr><td>6</td><td>THERMAL SHOCK TEST</td><td colspan="2">1. Thermal shock Temperature： -45℃~ +65℃
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</td><td>TEST：OK</td></tr>
</table>

7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform： Sine Wave (2) Frequency：10~500Hz (3) Sweep Time：12min/sweep cycle (4) Acceleration：5G (5) Test Time：72min in each axis (X.Y.Z) (6) Ta：25℃	TEST：OK
8	CAPACITOR LIFE CYCLE	FDL-65-1550：SUPPOSE C106 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta= 60 ℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta= 60 ℃ LIFE TIME (4) I/P： 230VAC O/P：60% LOAD Ta= 60 ℃ LIFE TIME	(1) 416318 HRS (2) 55806 HRS (3) 71101 HRS (4) 72914 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 594.9K hrs min. MIL-HDBK-217F (25℃)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) ： 30,000 hours @ Tcase 85℃； 50,000 hours @ Tcase 75℃	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	ZHANGZJ/ZHUOKB	SKY	LIUWY