Test Report： ODLC-45-1400

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

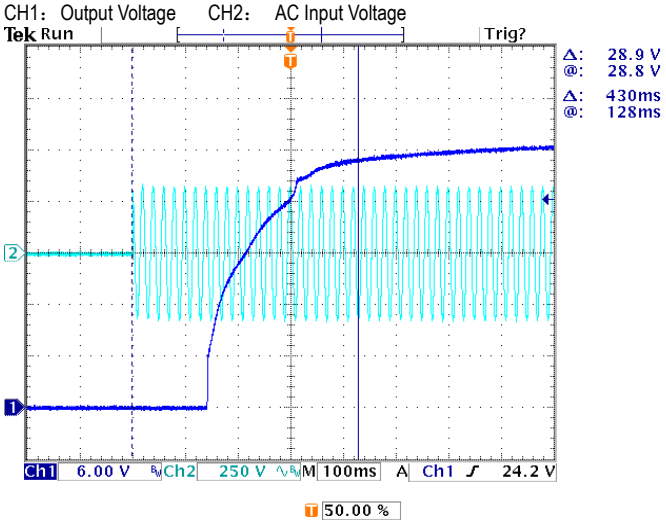
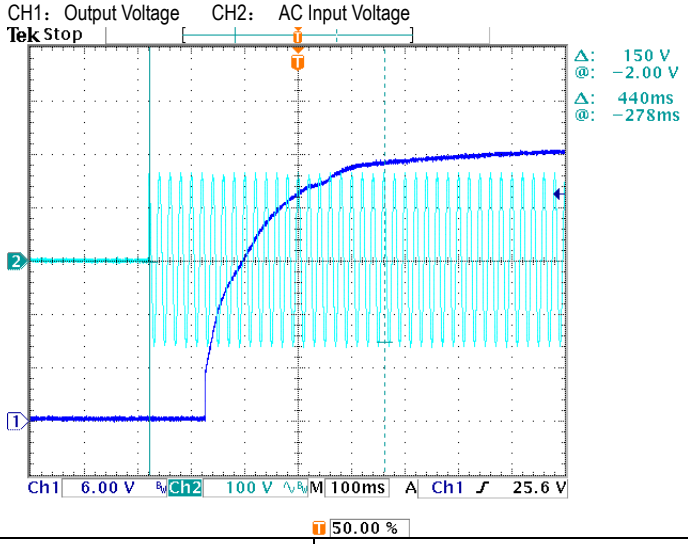
Safety Test
E.M.C. Test

■ RELIABILITY TEST

Environment Test

■ DESIGN VERIFY TEST

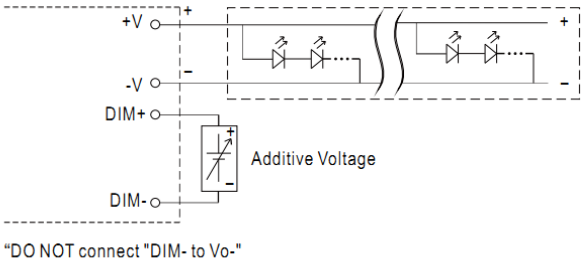
OUTPUT FUNCTION TEST

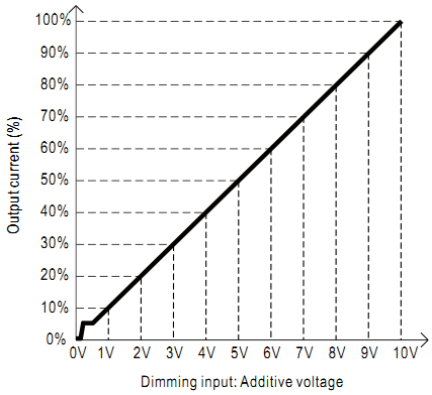
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONSTANT CURRENT REGION	19V~32V	I/P： 230VAC O/P：LED MODE Ta：25℃	17V~34V
2	CURRENT RIPPLE	5% max@rated current	I/P： 230VAC O/P：FULL/MIN LOAD Ta：25℃	2.42%
3	CURRENT TOLERANCE	±7%	I/P： 230VAC O/P：FULL/MIN LOAD Ta：25℃	±0.71%
4	OPEN CIRCUIT VOLTAGE (max)	50V	I/P： 230VAC O/P：NO LOAD Ta：25℃	44.44V
5	OVER/UNDERSHOOT TEST	<±5 %	I/P： 230VAC O/P：FULL LOAD Ta：25℃	<5 %
6	SET UP TIME	500ms/230VAC 1200ms/115VAC	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	430ms/230VAC 440ms/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 (A-Type only)	Nominal 12V（deviation 11.4~12.6）@50mA	I/P: 230 VAC O/P:FULL LOAD	11.95 V

8 DIMMING TEST(For Blank -Type)

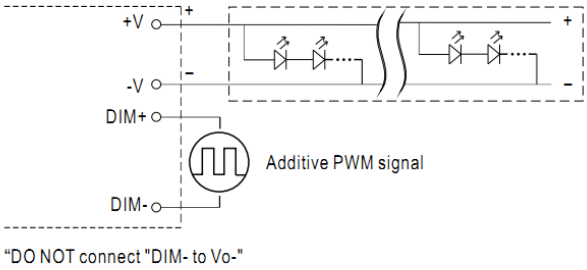
- Output constant current level can be adjusted by applying one of the two methodologies between DIM+ and DIM-: 0 ~ 10Vdc, or 10V PWM signal.
- Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.

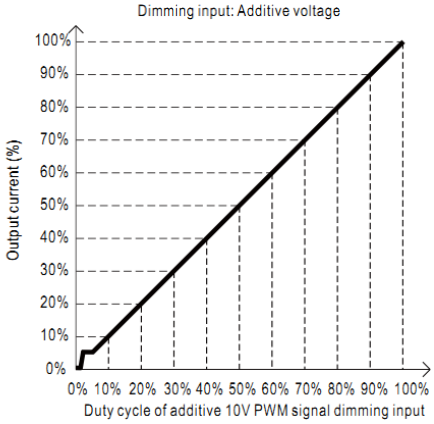
◎ Applying additive 0 ~ 10VDC





◎ Applying additive 10V PWM signal (frequency range 300Hz ~ 3KHz):





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.

I/P: 230 VAC
O/P: DIMMING TEST
Ta: 25℃

1	V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V
	Output Current	0A	0.138	0.290	0.424	0.563	0.699	0.840	0.980	1.110	1.250	1.388
	%	0.00%	9.86%	20.71%	30.29%	40.21%	49.93%	60.00%	70.00%	79.29%	89.29%	99.14%
2	PWM(100Hz)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
	Output Current	0A	0.145	0.294	0.432	0.566	0.703	0.837	0.970	1.107	1.243	1.365
	%	0.00%	10.36%	21.00%	30.83%	40.44%	50.19%	59.79%	69.29%	79.07%	88.79%	97.50%

TEST RESULT: OK

9 DALI DIMMING OPERATION (primary side; for DA-Type)

※DALI Interface
·Apply DALI signal between DA+ and DA-.
·DALI protocol comprises 16 groups and 64 addresses.
·Firse step is fixed at 8% of output.

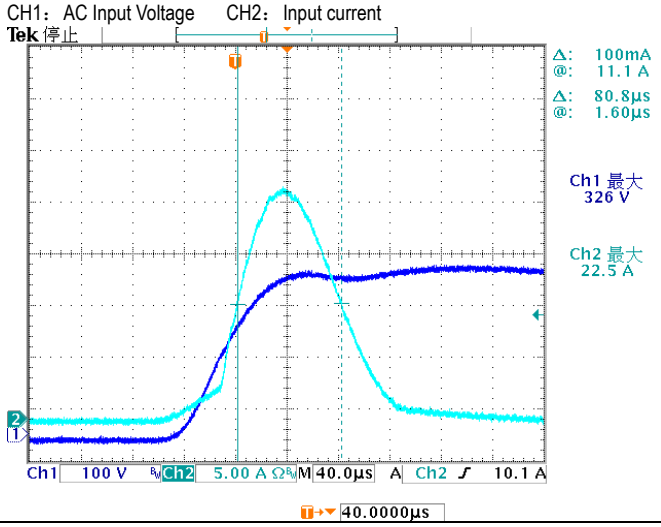
I/P: 230 VAC
O/P: DIMMING TEST
Ta: 25℃
TEST RESULT: OK

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℃	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℃	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℃	I =0.446A/ 115VAC I =0.225A/ 230VAC I =0.194A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P： 277 VAC O/P：NO LOAD Ta：25℃	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℃	0.325W for Blank-Type 0.458W for A-Type 0.443W 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℃	I =22.5A/ 230VAC Twidth =80.8us

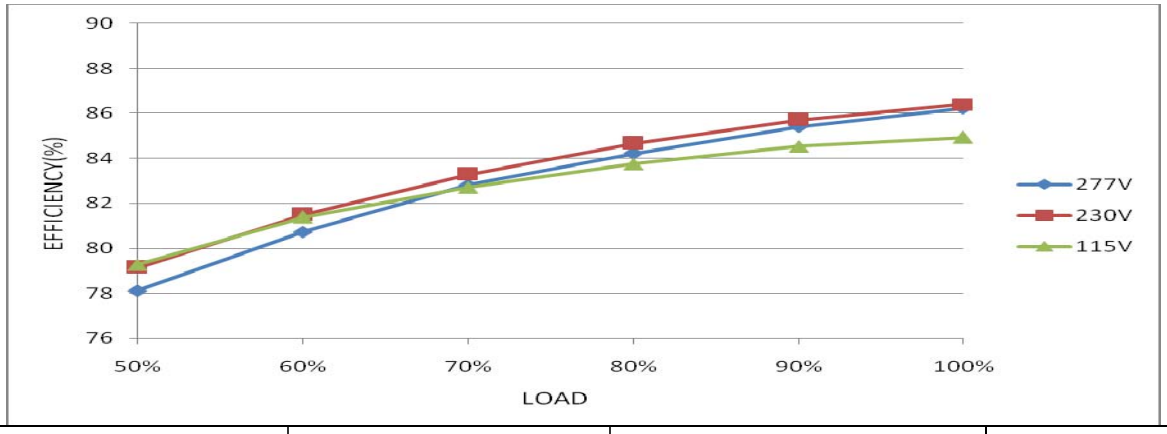
INPUT=230VAC/50HZ @ FULL LOAD

CH1：AC Input Voltage CH2：Input current



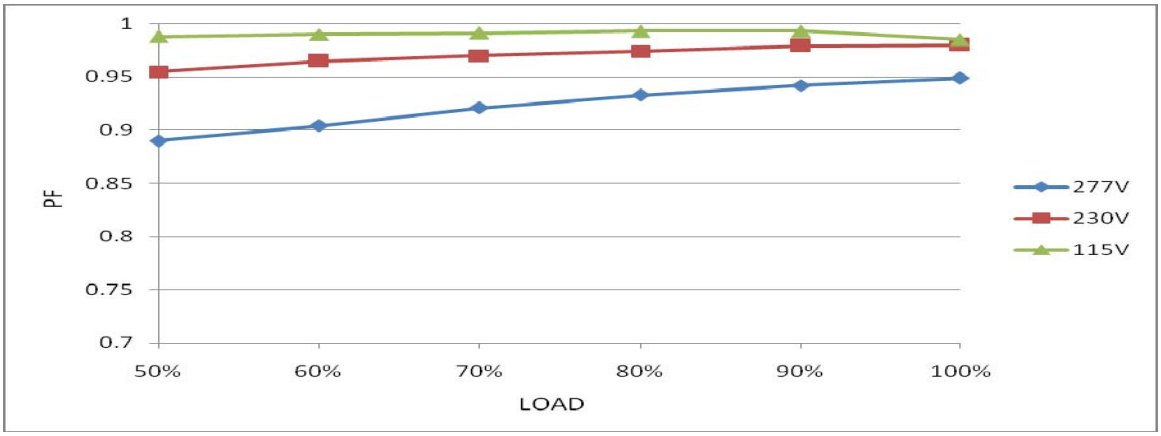
7	EFFICIENCY(Typ)	83%	I/P： 230VAC O/P：FULL LOAD Ta：25℃	86.41%

EFFICIENCY vs LOAD



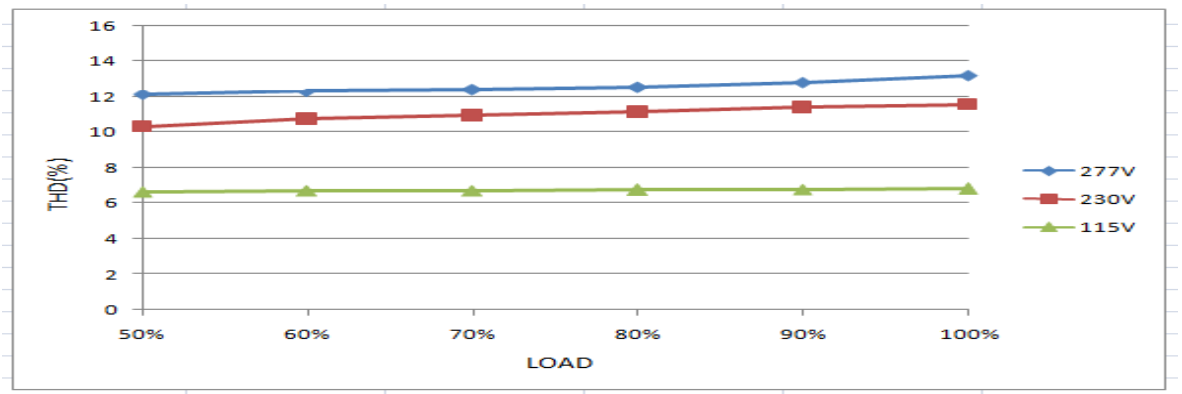
8	POWER FACTOR	0.95/ 115VAC 0.92/ 230VAC 0.90/ 277VAC	I/P： 115 VAC I/P： 230 VAC I/P： 277 VAC O/P：FULL LOAD Ta：25℃	PF=0.985/ 115VAC PF=0.980/ 230VAC PF=0.949/ 277VAC

P.F vs LOAD



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℃	THD=10.35% @60% load /115VAC THD=11.62% @60% load /230VAC THD=9.04% @75% load /277VAC

THD vs LOAD



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℃	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/9A	I/P：High-Line +3V =298V O/P： (1) Full Load Turn on (2) Output Short (3) Full load continue Ta：25℃	(1) 758V (2) 752V (3) 720V
2	O/P Diode (MOSFET)	D100 Rated 400V/16A	I/P：High-Line +3V =298V O/P： (1) Full Load Turn on (2) Output Short (3) Full load continue Ta：25℃	(1) 246V (2) 253V (3) 242V
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℃	(1) 15.0V (2) 14.6V (3) 14.5V
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℃	(1) 494V (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℃	I/P-O/P：1.630mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P： 500VDC>100MΩ	I/P-O/P： 500 VDC Ta：25℃/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℃	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℃	PASS
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT：1KV	I/P： 230VAC/50HZ O/P：FULL LOAD Ta：25℃	PASS
6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N：1KV	I/P： 230VAC/50HZ O/P：FULL LOAD Ta：25℃	PASS
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：ODLC-45-1400
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℃
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 32.5 ℃</th><th>HIGH AMBIENT Ta=53.7 ℃</th></tr>
<tr><td>1</td><td>L1</td><td>66.1℃</td><td>89.1℃</td></tr>
<tr><td>2</td><td>BD1</td><td>64.0℃</td><td>86.7℃</td></tr>
<tr><td>3</td><td>Q1</td><td>69.3℃</td><td>92.1℃</td></tr>
<tr><td>4</td><td>U1</td><td>64.5℃</td><td>87.0℃</td></tr>
<tr><td>5</td><td>T1</td><td>68.4℃</td><td>87.8℃</td></tr>
<tr><td>6</td><td>C16</td><td>62.3℃</td><td>85.1℃</td></tr>
<tr><td>7</td><td>RG1</td><td>71.2℃</td><td>94.6℃</td></tr>
<tr><td>8</td><td>D100</td><td>68.3℃</td><td>91.8℃</td></tr>
<tr><td>9</td><td>C201</td><td>65.6℃</td><td>89.3℃</td></tr>
<tr><td>10</td><td>Q100</td><td>65.1℃</td><td>89.1℃</td></tr>
<tr><td>11</td><td>R138</td><td>68.3℃</td><td>91.9℃</td></tr>
<tr><td>12</td><td>L100</td><td>63.4℃</td><td>87.4℃</td></tr>
<tr><td>13</td><td>C105</td><td>62.0℃</td><td>85.5℃</td></tr>
<tr><td>14</td><td>Tc</td><td>61.1℃</td><td>83.3℃</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/90VAC
O/P：FULL/80% LOAD
Ta= -25℃</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 50 ℃
NO DAMAGE</td><td>I/P： 305VAC
O/P：FULL LOAD
Ta=50 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td></tr>
<tr><td>4</td><td>TEMPERATURE
COEFFICIENT</td><td>±0.03 %/℃(0~40℃)</td><td>I/P： 230 VAC
O/P：FULL LOAD</td><td>±0.001%/℃</td></tr>
<tr><td>5</td><td>STORAGE TEMPERATURE TEST</td><td colspan="2">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</td><td>TEST：OK</td></tr>
</table>

6	THERMAL SHOCK TEST	1. Thermal shock Temperature： Tcase=-25℃~ +45℃ 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℃	TEST：OK
8	CAPACITOR LIFE CYCLE	ODLC-45-1400：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= 50 ℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta= 50 ℃ LIFE TIME (4) I/P： 230VAC O/P：MIN LOAD Ta= 50 ℃ LIFE TIME	(1) 661156 HRS (2) 116857 HRS (3) 133360 HRS (4) 152217 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 408.8K 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	Carychen/ZHUOKB	SKY	LIUWY