



# Test Report: IDLC-45-1050

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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

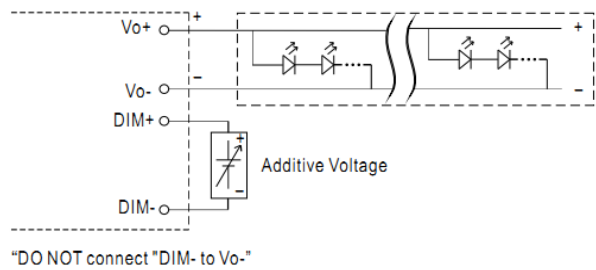
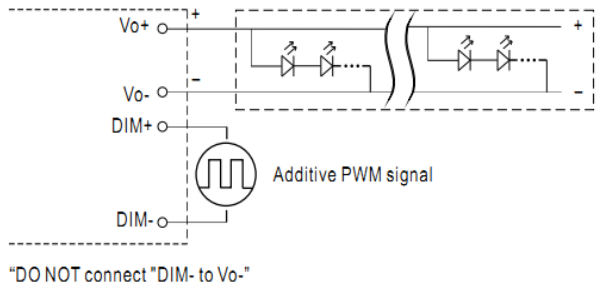
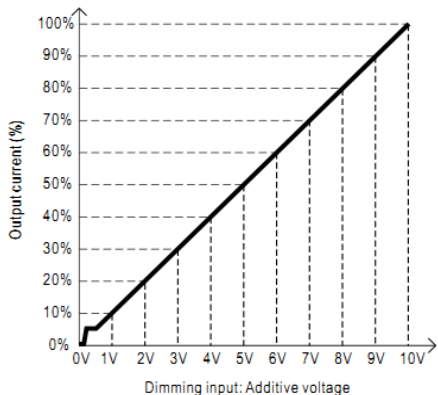
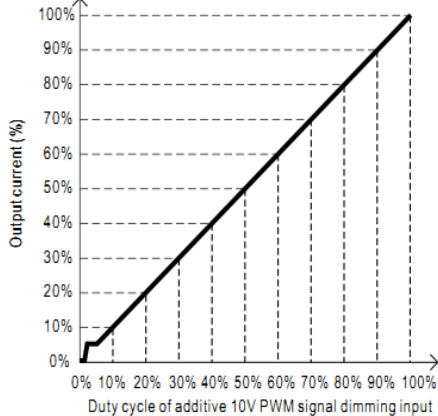
## ■ RELIABILITY TEST

Environment Test

## DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONSTANT CURRENT REGION	26V~43V	I/P: 230VAC O/P: LED MODE Ta: 25°C	10V~43V
2	CURRENT RIPPLE	5% max@rated current	I/P: 230VAC O/P: FULL/MIN LOAD Ta: 25°C	2.08%
3	CURRENT TOLERANCE	±7%	I/P: 230VAC O/P: FULL/MIN LOAD Ta: 25°C	±0.95%
4	OPEN CIRCUIT VOLTAGE (max)	63V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	44.14V
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	346ms/230VAC 388ms/115VAC
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</p>		<p>INPUT=115VAC/60HZ @ FULL LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</p>		
7	AUXILIARY DC OUTPUT (A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P:FULL LOAD	11.92 V

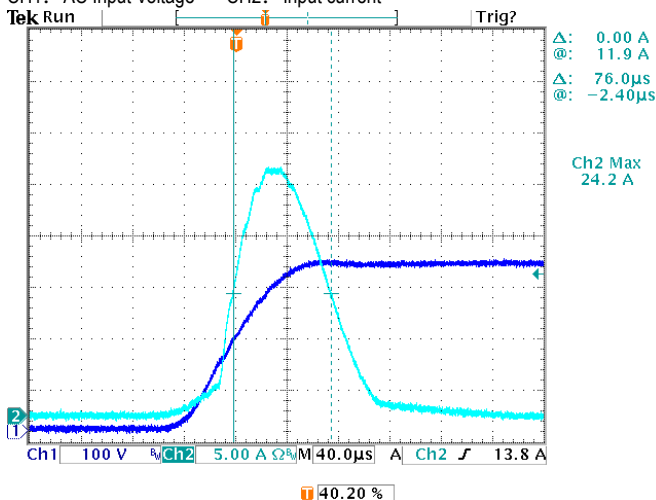
<p>8 DIMMING TEST(For Blank -Type)</p>	<ul style="list-style-type: none"> <li>Output constant current level can be adjusted by applying one of the two methodologies between DIM+ and DIM-:             <ul style="list-style-type: none"> <li>0 ~ 10Vdc, or 10V PWM signal.</li> <li>Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.</li> </ul> </li> <li>Applying additive 0 ~ 10VDC</li> </ul>  <p>“DO NOT connect "DIM- to Vo-”</p> <ul style="list-style-type: none"> <li>Applying additive 10V PWM signal (frequency range 300Hz ~ 3KHz):</li> </ul>  <p>“DO NOT connect "DIM- to Vo-”</p>   <p><b>Note :</b> 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><b>TEST RESULT:</b>          I/P: 230 VAC; Ta: 25°C</p> <table border="1" data-bbox="295 1299 1540 1758"> <tr> <td rowspan="3">1</td> <td>Dimming voltage</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>0.102</td> <td>0.217</td> <td>0.320</td> <td>0.429</td> <td>0.536</td> <td>0.647</td> <td>0.756</td> <td>0.859</td> <td>0.968</td> <td>1.057</td> </tr> <tr> <td>Percentage of rated current</td> <td>0.00%</td> <td>9.70%</td> <td>20.70%</td> <td>30.50%</td> <td>40.89%</td> <td>51.05%</td> <td>61.61%</td> <td>71.96%</td> <td>81.82%</td> <td>92.20%</td> <td>100.69%</td> </tr> <tr> <td rowspan="3">2</td> <td>Dimming Duty cycle</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>0.093</td> <td>0.206</td> <td>0.311</td> <td>0.415</td> <td>0.519</td> <td>0.624</td> <td>0.729</td> <td>0.836</td> <td>0.941</td> <td>1.035</td> </tr> <tr> <td>Percentage of rated current</td> <td>0.00%</td> <td>8.82%</td> <td>19.61%</td> <td>29.60%</td> <td>39.54%</td> <td>49.47%</td> <td>59.38%</td> <td>69.45%</td> <td>79.58%</td> <td>89.60%</td> <td>98.54%</td> </tr> </table> <p><b>TEST RESULT: OK</b></p>	1	Dimming voltage	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	Output Current	0A	0.102	0.217	0.320	0.429	0.536	0.647	0.756	0.859	0.968	1.057	Percentage of rated current	0.00%	9.70%	20.70%	30.50%	40.89%	51.05%	61.61%	71.96%	81.82%	92.20%	100.69%	2	Dimming Duty cycle	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Output Current	0A	0.093	0.206	0.311	0.415	0.519	0.624	0.729	0.836	0.941	1.035	Percentage of rated current	0.00%	8.82%	19.61%	29.60%	39.54%	49.47%	59.38%	69.45%	79.58%	89.60%	98.54%
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<p>9 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  <b>TEST RESULT: OK</b></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 =0.452A/ 115VAC I =0.229A/ 230VAC I =0.199A/ 277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-CASE: 0.0027 mA N-CASE: 0.0027 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	0.389W for Blank-Type 0.627W for A-Type 0.446W 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 =24.2A/ 230VAC Twidth =76us

INPUT=230VAC/50HZ @ FULL LOAD

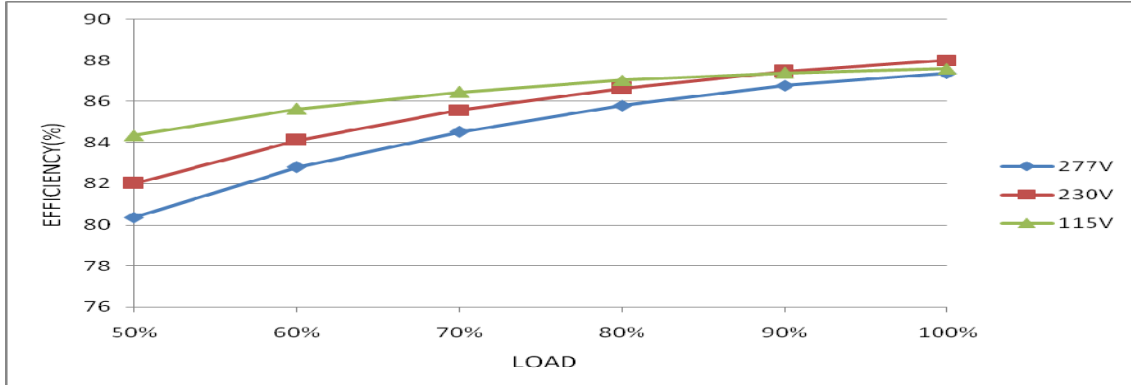
CH1: AC Input Voltage CH2: Input current





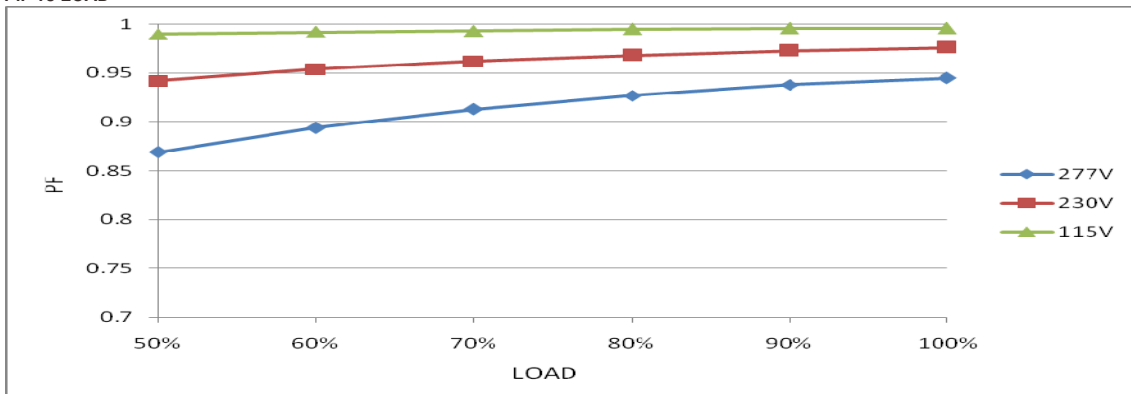
7	EFFICIENCY(Typ)	84%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	88.00%
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EFFICIENCY vs LOAD



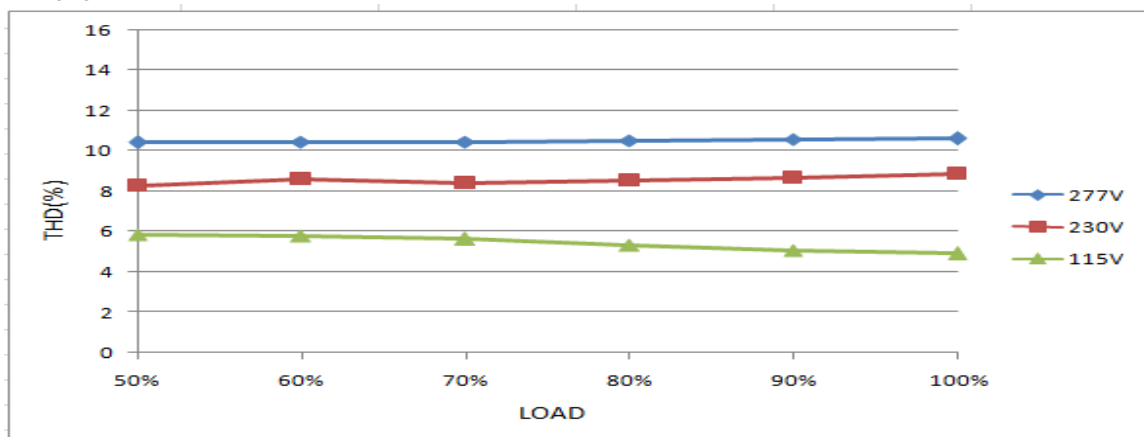
8	POWER FACTOR	0.95/ 115VAC 0.92/ 230VAC 0.90/ 277VAC	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD Ta: 25°C	PF=0.996/ 115VAC PF=0.976/ 230VAC PF=0.945/ 277VAC
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P.F vs LOAD



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°C	THD=6.08% @60% load / 115VAC THD=8.23% @60% load / 230VAC THD=10.45% @75% load / 277VAC
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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°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) 580V (2) 522V (3) 576V
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°C	(1) 316V (2) 343V (3) 312V
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) 17.7V (2) 17.7V (3) 17.6V
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) 498V (2) 478V

**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: 2.578mA 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: IDLC-45-1050 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 33.9℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 42.0℃																																																														
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 33.9℃</th> <th>HIGH AMBIENT Ta=42.0℃</th> </tr> </thead> <tbody> <tr><td>1</td><td>D1</td><td>91.2℃</td><td>98.3℃</td></tr> <tr><td>2</td><td>Q1</td><td>93.8℃</td><td>100.7℃</td></tr> <tr><td>3</td><td>U1</td><td>82.2℃</td><td>88.7℃</td></tr> <tr><td>4</td><td>T1</td><td>93.1℃</td><td>99.5℃</td></tr> <tr><td>5</td><td>C16</td><td>81.5℃</td><td>88.1℃</td></tr> <tr><td>6</td><td>RG1</td><td>104.7℃</td><td>110.9℃</td></tr> <tr><td>7</td><td>D100</td><td>97.1℃</td><td>103.4℃</td></tr> <tr><td>8</td><td>C201</td><td>92.2℃</td><td>98.5℃</td></tr> <tr><td>9</td><td>Q100</td><td>93.7℃</td><td>100.1℃</td></tr> <tr><td>10</td><td>R138</td><td>101.5℃</td><td>107.9℃</td></tr> <tr><td>11</td><td>L100</td><td>99.7℃</td><td>106.2℃</td></tr> <tr><td>12</td><td>C106</td><td>83.4℃</td><td>89.9℃</td></tr> <tr><td>13</td><td>C107</td><td>85.9℃</td><td>92.3℃</td></tr> <tr><td>14</td><td>TC</td><td>74.7℃</td><td>80.7℃</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 33.9℃	HIGH AMBIENT Ta=42.0℃	1	D1	91.2℃	98.3℃	2	Q1	93.8℃	100.7℃	3	U1	82.2℃	88.7℃	4	T1	93.1℃	99.5℃	5	C16	81.5℃	88.1℃	6	RG1	104.7℃	110.9℃	7	D100	97.1℃	103.4℃	8	C201	92.2℃	98.5℃	9	Q100	93.7℃	100.1℃	10	R138	101.5℃	107.9℃	11	L100	99.7℃	106.2℃	12	C106	83.4℃	89.9℃	13	C107	85.9℃	92.3℃	14	TC	74.7℃	80.7℃
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14	TC	74.7℃	80.7℃																																																													
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 40℃ NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=40℃ HUMIDITY= 95 %R.H	TEST: OK																																																												
4	TEMPERATURE COEFFICIENT	±0.03 %/℃(0~40℃)	I/P: 230 VAC O/P: FULL LOAD	±0.003%/℃																																																												
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℃~ +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°C	TEST: OK
8	CAPACITOR LIFE CYCLE	IDLC-45-1050: 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= 40 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta= 40 °C LIFE TIME (4) I/P: 230VAC O/P: MIN LOAD Ta= 40 °C LIFE TIME	(1) 102730 HRS (2) 40885 HRS (3) 47804 HRS (4) 48790 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 75°C ; 50,000 hours @ Tcase 65°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	Carychen/ZHUOKB	SKY	LIUWY