



Test Report: ODLC-65-700

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

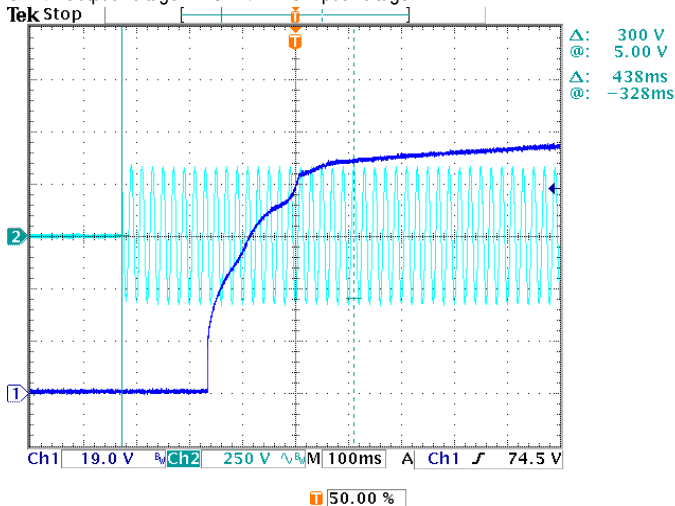
DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

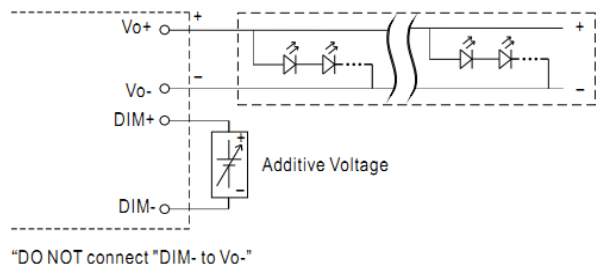
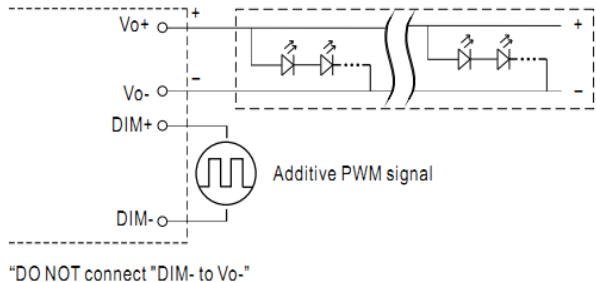
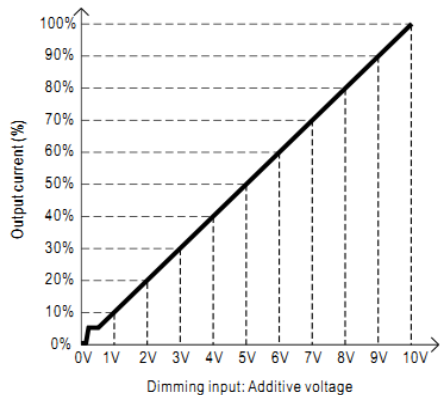
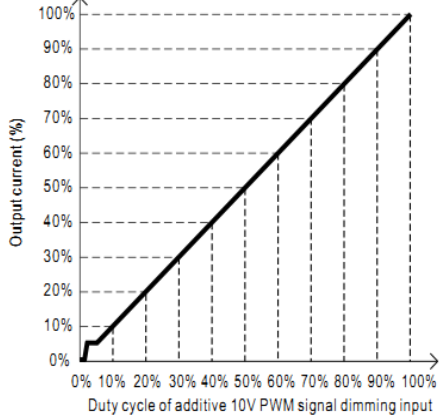
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CONSTANT CURRENT REGION	69V~93V	I/P: 230VAC O/P: LED MODE Ta: 25°C	59 V~95 V
2	CURRENT RIPPLE	5% max@rated current	I/P: 230VAC O/P: FULL/MIN LOAD Ta: 25°C	4.65%
3	CURRENT TOLERANCE	±7%	I/P: 230VAC O/P: FULL/MIN LOAD Ta: 25°C	±3.14%
4	OPEN CIRCUIT VOLTAGE (max)	118V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	113.6V
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	438 ms/230VAC

INPUT=230VAC/50HZ @ FULL LOAD

CH1: Output Voltage CH2: AC Input Voltage



7	AUXILIARY DC OUTPUT (For A-Type only)	Nominal 12V (deviation 11.4~12.6) @50mA	I/P: 230 VAC O/P: FULL LOAD	11.98 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 $0\% < I_{out} < 8\%$. 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> <table border="1" data-bbox="295 1377 1492 1780"> <tr> <td rowspan="3">1</td> <td>V</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>0.0800A</td><td>0.1490A</td><td>0.2135A</td><td>0.2800A</td><td>0.3460A</td><td>0.4145A</td><td>0.4817A</td><td>0.5452A</td><td>0.6123A</td><td>0.6785A</td> </tr> <tr> <td>%</td> <td>0.00%</td><td>0.0800A</td><td>0.1490A</td><td>0.2135A</td><td>0.2800A</td><td>0.3460A</td><td>0.4145A</td><td>0.4817A</td><td>0.5452A</td><td>0.6123A</td><td>0.6785A</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>0.0900A</td><td>0.1540A</td><td>0.2160A</td><td>0.2800A</td><td>0.3470A</td><td>0.4150A</td><td>0.4820A</td><td>0.5440A</td><td>0.6100A</td><td>0.6758A</td> </tr> <tr> <td>%</td> <td>0.00%</td><td>12.86%</td><td>22.00%</td><td>30.86%</td><td>40.00%</td><td>49.57%</td><td>59.29%</td><td>68.86%</td><td>77.71%</td><td>87.14%</td><td>96.54%</td> </tr> </table> <p>TEST RESULT: OK</p>	1	V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	Output Current	0A	0.0800A	0.1490A	0.2135A	0.2800A	0.3460A	0.4145A	0.4817A	0.5452A	0.6123A	0.6785A	%	0.00%	0.0800A	0.1490A	0.2135A	0.2800A	0.3460A	0.4145A	0.4817A	0.5452A	0.6123A	0.6785A	2	PWM(100Hz)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Output Current	0A	0.0900A	0.1540A	0.2160A	0.2800A	0.3470A	0.4150A	0.4820A	0.5440A	0.6100A	0.6758A	%	0.00%	12.86%	22.00%	30.86%	40.00%	49.57%	59.29%	68.86%	77.71%	87.14%	96.54%
1	V		0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V																																																														
	Output Current		0A	0.0800A	0.1490A	0.2135A	0.2800A	0.3460A	0.4145A	0.4817A	0.5452A	0.6123A	0.6785A																																																														
	%	0.00%	0.0800A	0.1490A	0.2135A	0.2800A	0.3460A	0.4145A	0.4817A	0.5452A	0.6123A	0.6785A																																																															
2	PWM(100Hz)	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%																																																															
	Output Current	0A	0.0900A	0.1540A	0.2160A	0.2800A	0.3470A	0.4150A	0.4820A	0.5440A	0.6100A	0.6758A																																																															
	%	0.00%	12.86%	22.00%	30.86%	40.00%	49.57%	59.29%	68.86%	77.71%	87.14%	96.54%																																																															
<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 TEST RESULT: OK</p>																																																																										

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 =0.321A/ 230VAC I =0.271A/ 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 0.595W for A-Type 0.459W 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 =20.9A/ 230VAC Twidth =82.4 us
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1: AC Input Voltage CH2: Input current</p> <p>Ch1 100 V Ch2 5.00 A Ω 40.0μs A Ch2 10.1 A</p> <p>39.0400μs</p>				
7	EFFICIENCY(Typ)	88%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	89.68%

	<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>86.0</td><td>86.8</td></tr> <tr><td>60%</td><td>86.5</td><td>87.2</td></tr> <tr><td>70%</td><td>87.0</td><td>87.8</td></tr> <tr><td>80%</td><td>87.5</td><td>88.2</td></tr> <tr><td>90%</td><td>88.5</td><td>89.5</td></tr> <tr><td>100%</td><td>89.5</td><td>89.8</td></tr> </tbody> </table>			LOAD (%)	277V Efficiency (%)	230V Efficiency (%)	50%	86.0	86.8	60%	86.5	87.2	70%	87.0	87.8	80%	87.5	88.2	90%	88.5	89.5	100%	89.5	89.8
LOAD (%)	277V Efficiency (%)	230V Efficiency (%)																						
50%	86.0	86.8																						
60%	86.5	87.2																						
70%	87.0	87.8																						
80%	87.5	88.2																						
90%	88.5	89.5																						
100%	89.5	89.8																						
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=0.984/ 230VAC PF=0.958/ 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>0.96</td></tr> <tr><td>80%</td><td>0.94</td><td>0.96</td></tr> <tr><td>90%</td><td>0.95</td><td>0.97</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	0.96	80%	0.94	0.96	90%	0.95	0.97	100%	0.96	0.98
LOAD (%)	277V PF	230V PF																						
50%	0.91	0.95																						
60%	0.92	0.96																						
70%	0.93	0.96																						
80%	0.94	0.96																						
90%	0.95	0.97																						
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=6.30% @75% load / 230VAC THD=8.92% @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>6.2</td></tr> <tr><td>60%</td><td>8.8</td><td>6.8</td></tr> <tr><td>70%</td><td>8.6</td><td>6.7</td></tr> <tr><td>80%</td><td>8.5</td><td>6.7</td></tr> <tr><td>90%</td><td>8.4</td><td>6.8</td></tr> <tr><td>100%</td><td>8.5</td><td>6.9</td></tr> </tbody> </table>			LOAD (%)	277V THD (%)	230V THD (%)	50%	8.5	6.2	60%	8.8	6.8	70%	8.6	6.7	80%	8.5	6.7	90%	8.4	6.8	100%	8.5	6.9
LOAD (%)	277V THD (%)	230V THD (%)																						
50%	8.5	6.2																						
60%	8.8	6.8																						
70%	8.6	6.7																						
80%	8.5	6.7																						
90%	8.4	6.8																						
100%	8.5	6.9																						

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) 692V (2) 614V (3) 680V
2	O/P Diode (MOSFET)	D100 Rated 10A/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) 560V (2) 568V (3) 504V
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) 15.4V (2) 14.8V (3) 15.3V
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) 530V (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°C	I/P-O/P: 1.824 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-65-700 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 33.2℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 50.7℃																																																										
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 33.2 ℃</th> <th>HIGH AMBIENT Ta=50.7 ℃</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>72.9℃</td><td>91.1℃</td></tr> <tr><td>2</td><td>C8</td><td>72.3℃</td><td>90.5℃</td></tr> <tr><td>3</td><td>Q1</td><td>78.9℃</td><td>98.2℃</td></tr> <tr><td>4</td><td>D1</td><td>78.9℃</td><td>98.6℃</td></tr> <tr><td>5</td><td>U1</td><td>75.6℃</td><td>94.2℃</td></tr> <tr><td>6</td><td>T1</td><td>81.3℃</td><td>100.8℃</td></tr> <tr><td>7</td><td>D100</td><td>70.5℃</td><td>89.1℃</td></tr> <tr><td>8</td><td>Q100</td><td>66.3℃</td><td>84.7℃</td></tr> <tr><td>9</td><td>L100</td><td>67.6℃</td><td>86.1℃</td></tr> <tr><td>10</td><td>C106</td><td>65.4℃</td><td>83.7℃</td></tr> <tr><td>11</td><td>C110</td><td>62.8℃</td><td>81.1℃</td></tr> <tr><td>12</td><td>U100</td><td>68.2℃</td><td>86.7℃</td></tr> <tr><td>13</td><td>TC</td><td>64.2℃</td><td>82.4℃</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 33.2 ℃	HIGH AMBIENT Ta=50.7 ℃	1	BD1	72.9℃	91.1℃	2	C8	72.3℃	90.5℃	3	Q1	78.9℃	98.2℃	4	D1	78.9℃	98.6℃	5	U1	75.6℃	94.2℃	6	T1	81.3℃	100.8℃	7	D100	70.5℃	89.1℃	8	Q100	66.3℃	84.7℃	9	L100	67.6℃	86.1℃	10	C106	65.4℃	83.7℃	11	C110	62.8℃	81.1℃	12	U100	68.2℃	86.7℃	13	TC	64.2℃	82.4℃		
NO	Position	ROOM AMBIENT Ta= 33.2 ℃	HIGH AMBIENT Ta=50.7 ℃																																																									
1	BD1	72.9℃	91.1℃																																																									
2	C8	72.3℃	90.5℃																																																									
3	Q1	78.9℃	98.2℃																																																									
4	D1	78.9℃	98.6℃																																																									
5	U1	75.6℃	94.2℃																																																									
6	T1	81.3℃	100.8℃																																																									
7	D100	70.5℃	89.1℃																																																									
8	Q100	66.3℃	84.7℃																																																									
9	L100	67.6℃	86.1℃																																																									
10	C106	65.4℃	83.7℃																																																									
11	C110	62.8℃	81.1℃																																																									
12	U100	68.2℃	86.7℃																																																									
13	TC	64.2℃	82.4℃																																																									
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	±0.003%/℃																																																								
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℃~ +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-65-700: 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) 677942 HRS (2) 160347 HRS (3) 144891 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