



# Test Report: XLG-150-H

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150W Constant Power 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

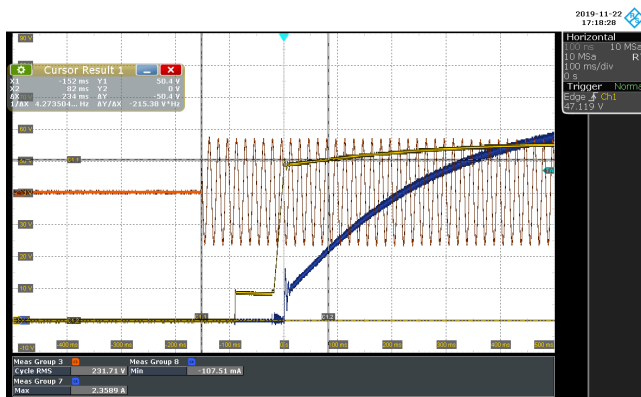
ENVIRONMENT TEST

### DESIGN VERIFY TEST

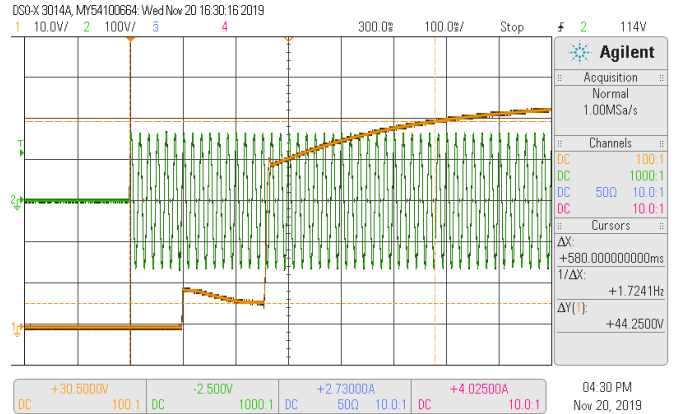
#### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±5%	I/P:230VAC O/P:LEDmax/ LEDmin CP: 2680mA & 4170mA Ta:25°C	CP2800mA: 2.801A/230VAC@CV MAX-1V 2.811A/230VAC@CV MIN  0.39% CP 4170mA: 4.223A/230VAC@CV MAX-1V 4.221A/230VAC@CV MIN 1.27%
2	FULL POWER CURRENT RANGE	2680mA~4170mA	I/P: 230VAC O/P:LEDmax CP: 2680mA & 4170mA Ta:25°C	57.72V/2680mA/230VAC 43.96V/4170mA/230VAC
3	CONSTANT POWER	O/P : 150W	I/P : 230 VAC O/P : Vo×Io	TEST : OK
4	OPEN CIRCUIT VOLTAGE (max)	60V	I/P: 230VAC O/P:NO LOAD CP: OPEN Ta:25°C	59.02V
5	CONSTANT CURRENT REGION	CP 2800mA: 27V~ 56V  CP 4170mA: 27V~ 36V	I/P: 230VAC O/P:CVmax CP: 2680mA & 4170mA Ta:25°C	CP 2800mA: 3.3V~ 56V/230VAC  CP 4170mA: 3.4V~36 V/230VAC
6	CURRENT ADJ. RANGE	1400mA~4170mA	I/P: 230VAC O/P:CVmin& CVmax-1V CP: 2680mA &4170mA Ta:25°C	0.9520mA~4.7304mA/230VAC@CV MAX-1V 0.9532mA~4.7336mA /230VAC@CV MIN
7	CURRENT RIPPLE	4.0% max.	I/P: 230VAC O/P:LEDmax CP: 2680mA & 4170mA Ta:25°C	CP 2800mA: 1.17%  CP 4170mA: 1.17%
8	SET UP TIME	230VAC/ 500 ms (Max) 115VAC/ 1200 ms (Max)	I/P: 230VAC I/P: 115VAC  O/P:LEDmax CP 2680mA Ta:25°C	230VAC/234ms 115VAC/580 ms

INPUT=230VAC/50HZ @ LEDMAX@ CP 2800mA  
CH1 : Output Voltage CH3 : AC Input Voltage



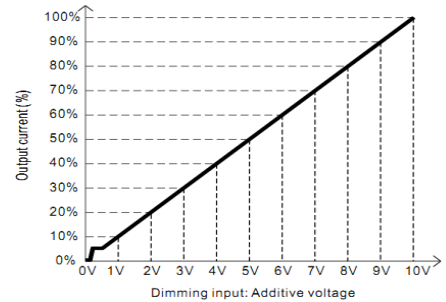
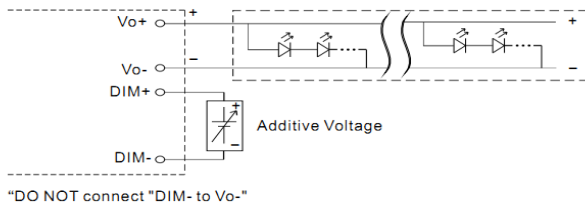
INPUT=115VAC/60HZ @ LEDMAX@ CP 2800mA  
CH1 : Output Voltage CH2 : AC Input Voltage



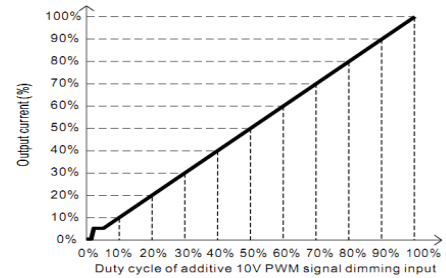
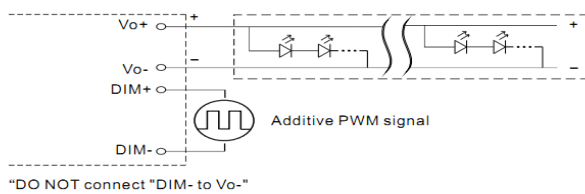
### 9 DIMMING OPERATION (for AB-Type)

- Output constant current level can be adjusted by applying one of the three methodologies between DIM+ and DIM-: 0 ~ 10Vdc , or 10V PWM signal or resistance.
- Direct connecting to LEDs is suggested. It is not suitable to be used with additional drivers.
- Dimming source current from power supply: 100uA (typ.)

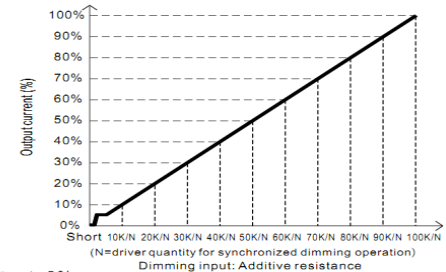
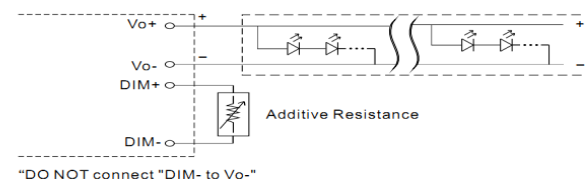
Ⓒ Applying additive 0 ~ 10VDC



Ⓒ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



Ⓒ Applying additive resistance:



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 0kΩ or 0Vdc, or 10V PWM signal with 0% duty cycle.

I/P : 230 VAC O/P : DIMMING TEST

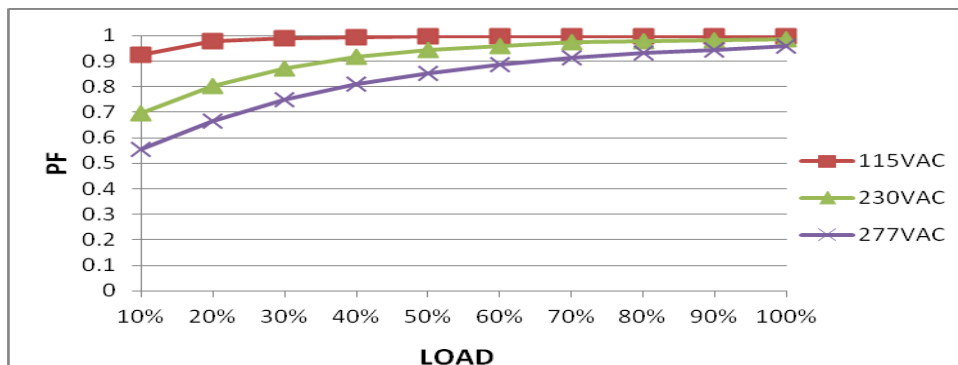
	V	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
1	Output Current	0.0000 0A	0.280 A	0.53 6A	0.819A	1.107A	1.360A	1.618A	1.924A	2.191A	2.486A	2.687A	2.690A
	%	0.00%	10.45 %	20.0 0%	30.56 %	41.31 %	50.75 %	60.37 %	71.79 %	81.75 %	92.76 %	100.26 %	100.37 %
2	PWM	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output	0.0000 0A	0.299 A	0.53 6A	0.818A	1.065A	1.337A	1.615A	1.877A	2.176A	2.468A	2.689A	2.690A

3	Current (100Hz)												
	%	0.00%	11.16%	20.00%	30.52%	39.74%	49.89%	60.26%	70.04%	81.19%	92.09%	100.34%	100.37%
	R	Short	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
	Output Current	0.0000 A	0.301 A	0.539 A	0.781 A	0.985 A	1.235 A	1.531 A	1.791 A	2.078 A	2.393 A	2.654 A	2.690 A
	%	0.00%	11.23%	20.11%	29.14%	36.75%	46.08%	57.13%	66.83%	77.54%	89.29%	99.03%	100.37%
TEST RESULT : OK													

### INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305 VAC	I/P: TESTING O/P: LEDmax CP 2680mA  Ta:25°C	80V~305 V
			I/P: LOW-LINE-3V=97V HIGH-LINE+10V=315 V O/P: LEDmax / LEDmin CP 2800mA (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	(1).TEST: OK (2).TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 100VAC ~305VAC O/P: LEDmax ~ LEDmin CP 2680mA Ta:25°C	TEST: OK
3	INPUT CURRENT (TYP)	277VAC/ 0.8A 230VAC/ 1 A 115VAC/ 1.8A	I/P: 277VAC /230VAC/115VAC O/P: LEDmax CP 2680mA Ta:25°C	I=0.607A/ 277VAC I=0.716A/ 230VAC I=1.466A/115VAC
4	POWER FACTOR(TYP)	0.92/277 VAC LEDMAX 0.95/230 VAC LEDMAX 0.97/115 VAC LEDMAX	I/P: 277VAC/230VAC/115VAC O/P: LEDmax CP 2680mA Ta:25°C	PF=0.961 /277V/100%LOAD PF=0.986/230V/100%LOAD PF=0.999/115V/100%LOAD

P.F vs LOAD



5	EFFICIENCY (TYP)	92%	I/P: 230VAC O/P: LEDmax CP 2680mA Ta: 25°C	92.25%																																												
<p>EFFICIENCY vs LOAD</p> <table border="1"> <caption>Efficiency vs Load Data</caption> <thead> <tr> <th>Load (%)</th> <th>115VAC (%)</th> <th>230VAC (%)</th> <th>277VAC (%)</th> </tr> </thead> <tbody> <tr><td>10</td><td>60</td><td>60</td><td>60</td></tr> <tr><td>20</td><td>78</td><td>78</td><td>78</td></tr> <tr><td>30</td><td>85</td><td>85</td><td>85</td></tr> <tr><td>40</td><td>88</td><td>88</td><td>88</td></tr> <tr><td>50</td><td>90</td><td>90</td><td>90</td></tr> <tr><td>60</td><td>91</td><td>91</td><td>91</td></tr> <tr><td>70</td><td>91.5</td><td>91.5</td><td>91.5</td></tr> <tr><td>80</td><td>92</td><td>92</td><td>92</td></tr> <tr><td>90</td><td>92.25</td><td>92.25</td><td>92.25</td></tr> <tr><td>100</td><td>92.25</td><td>92.25</td><td>92.25</td></tr> </tbody> </table>					Load (%)	115VAC (%)	230VAC (%)	277VAC (%)	10	60	60	60	20	78	78	78	30	85	85	85	40	88	88	88	50	90	90	90	60	91	91	91	70	91.5	91.5	91.5	80	92	92	92	90	92.25	92.25	92.25	100	92.25	92.25	92.25
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6	INRUSH CURRENT (TYP)	230V/ 50A COLD START  (twidth=500 us measured at 50% Ipeak) COLD START	I/P: 230VAC O/P: LEDmax CP 2680mA Ta: 25°C	I = 42.7 A / 230VAC  T50 = 415 $\mu$ S																																												
<p>INPUT=230VAC/ 50HZ @ LEDMAX CH2 : AC Input Voltage CH1 : Input current</p> <table border="1"> <caption>Inrush Current Waveform Data</caption> <thead> <tr> <th>Parameter</th> <th>Value</th> </tr> </thead> <tbody> <tr><td>Ch1 Max (Ipeak)</td><td>42.7 A</td></tr> <tr><td>Ch1 50% Width (twidth)</td><td>415 <math>\mu</math>S</td></tr> <tr><td>Ch2 Max (Voltage)</td><td>322 V</td></tr> </tbody> </table>					Parameter	Value	Ch1 Max (Ipeak)	42.7 A	Ch1 50% Width (twidth)	415 $\mu$ S	Ch2 Max (Voltage)	322 V																																				
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7	TOTAL HARMONIC DISTORTION	THD < 10% @ load, $\geq$ 50% at 230VAC/115VAC, load, $\geq$ 75% at 277VAC	I/P : 277VAC I/P : 230VAC I/P : 115VAC O/P : 50% LOAD CP 2680mA Ta : 25°C	THD : 7.92 % 277V 75% THD : 7.83 % 230V 50% THD : 3.89 % 115V 50%																																												
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8	LEAKAGE CURRENT	<0.75mA / 277VAC	I/P : 277 VAC O/P : NO LOAD Ta : 25°C	L-FG : 0.17mA N-FG : 0.16mA
9	STANDBY POWER CONSUMPTION	STANDBY POWER CONSUMPTION <0.5W for AB –Type(Dimming Off)	I/P : 230 VAC O/P : STANDBY(AB) Ta : 25°C	0.4074W/AB

### ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	61V~85V	I/P: 305VAC I/P: 230VAC I/P: 100VAC CP 2680mA  O/P:MIN LOAD Ta:25°C	69V / 305VAC 69V/ 230VAC 69.3V/ 100VAC PROTECTION TYPE : Shut down output voltage, re-power on to recovery
2	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305VAC I/P: 100VAC O/P:LEDmax CP 2680mA Ta:25°C	O.T.P.Active PROTECTION TYPE : Shut down output voltage, re-power on to recovery
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 100VAC O/P: LEDMAX CP: 2680mA &4170mA Ta:25°C	NO DAMAGE PROTECTION TYPE : Hiccup mode or Constant current limiting, recovers automatically after fault condition is removed
4	INPUT OVER VOLTAGE (for XLG-150I only)	320 ~ 390VAC (Shut down output voltage when the input voltage exceeds protection voltage Can survive input voltage stress of 440Vac for 48 hours	I/P : TESTING O/P: FULL LOAD Ta:25°C	PASS

### COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor ( D to S) or (C to E) Peak Voltage	Q6 Rated: 650V/11A	I/P:High-Line +3V =308V I/P:Low-Line -3V = 97V  AC ON/OFF <b>CP: 2800mA&amp;4170mA</b> VDS: O/P: (1)LEDmax (2) LEDmin (3) Output Short (4)LED min dimming on/off	308V <b>CP: 2800mA</b> <b>CP: 4170mA</b> VDS: 1) 448V                              (1) 472V 2) 460V                              (2) 464V 3) 460V                              (3) 460V 4) 492V                              (4) 472V

			Ta:25°C	<p>97V</p> <p><b>CP: 2800mA</b></p> <p>VDS:</p> <p>(1) 448V</p> <p>(2) 464V</p> <p>(3) 464V</p> <p>(4) 468V</p> <p><b>CP: 4170mA</b></p> <p>VDS:</p> <p>(1) 476V</p> <p>(2) 468V</p> <p>(3) 476V</p> <p>(4) 472V</p>
2	P.F.C DIODE	D1 Rated: 9A/600V	<p>I/P:High-Line +3V =308V</p> <p>AC ON/OFF</p> <p><b>CP: 2800mA</b></p> <p>VDS:</p> <p>O/P: (1)LEDmax</p> <p>(2) LEDmin</p> <p>(3) Output Short</p> <p>(4)LED min dimming on/off</p>	<p>(1) 495V</p> <p>(2) 497V</p> <p>(3)502 V</p> <p>(4)489V</p>
3	Diode Peak Voltage	Q101 Rated: 10A/150V	<p>I/P:High-Line +3V =308V</p> <p>AC ON/OFF</p> <p><b>CP: 2800mA&amp;4170mA</b></p> <p>VDS:</p> <p>O/P: (1)LEDmax</p> <p>(2) Output Short</p> <p>(3) <b>burst mode</b></p> <p>Ta:25°C</p>	<p><b>CP: 2800mA</b></p> <p>VDS:</p> <p>(1) 91.5V</p> <p>(2) 8.9V</p> <p>(3) 91.5V</p>
4	Control IC Voltage Test	PWM IC U2 Rated 30V	<p>I/P:High-Line +3V =308V</p> <p>AC ON/OFF</p> <p><b>CP: 2800mA</b></p> <p>VDS:</p> <p>O/P: (1)LEDmax</p> <p>(2) LEDmin</p> <p>(3) Output Short</p> <p>(4)NO LOAD VRmin.LOW LINE</p> <p>(5)OVP</p> <p>Ta:25°C</p>	<p><b>U2</b></p> <p>(1) 25.9 V</p> <p>(2) 25.9V</p> <p>(3) 25.9V</p> <p>(4) 19V</p> <p>(5) 25.9V</p>
5	PFC Transistor	Q1 Rated 10.6A/650V	<p>I/P : High-Line +3V =308V</p> <p>O/P: (1)Full Load</p> <p>(2)Output Short</p> <p>(3) Full Load continue</p>	<p>(1) 478V</p> <p>(2) 482V</p> <p>(3) 470V</p>
6	Input Capacitor Voltage	C5 Rated : 82 μ F/ 450V	<p>I/P : High-Line +3V =308 V</p> <p>O/P: (1)Full Load input on/off</p> <p>(2) Min load input on /Off</p> <p>(3)Full Load /Min load Change</p> <p>(4)Full load continue</p> <p>Ta : 25°C</p>	<p>(1) 448V</p> <p>(2) 448V</p> <p>(3) 448V</p> <p>(4) 440V</p>

## SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.75 KVAC/min I/P-FG : 2KVAC/min O/P-FG : 1.5KVAC/min	I/P-O/P : 4.125 KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 1.8 KVAC/min Ta : 25°C	I/P-O/P : 3.077mA I/P-FG : 3.062mA O/P-FG : 3.813mA 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°C	I/P-O/P : >9999MΩ I/P-FG : >9999MΩ O/P-FG : >9999MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	14mΩ

## 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/50% 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 : 2KV	I/P : 230VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N : 4KV L-PE : 6KV	I/P : 230VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare. Any contradictions of the test results please refer to the latest EMC test report.			



### RELIABILITY TEST

#### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																																																								
1	TEMPERATURE RISE TEST	MODEL : XLG-150-H 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 24.5°C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=56.3°C																																																																																																																										
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/100VAC O/P : FULL LOAD Ta= -45°C/-35°C	TEST : OK																																																																																																																								
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 55 °C NO DAMAGE	I/P : 305VAC O/P : FULL LOAD Ta=55 °C HUMIDITY= 95% R.H	TEST : OK																																																																																																																								
4	TEMPERATURE COEFFICIENT	±0.06%/°C (0~60°C)	I/P : 230 VAC O/P : FULL LOAD	±0.001%/°C (0~60°C)																																																																																																																								

5	STORAGE TEMPERATURE TEST	-40~+80°C	1. Thermal shock Temperature : -50°C~ +125°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 200CYCLE 5. Input/Output condition : STATIC TEST : OK
6	THERMAL SHOCK TEST	-40~+55°C	1. Thermal shock Temperature : -45°C~ +60°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16CYCLE 5. Input/Output condition : 15cycle:230VAC/ FULL LOAD AC on 3 sec/AC off 1 sec TEST 1cycle:230VAC/ FULL LOAD Burn In Test TEST : OK
7	VIBRATION TEST	10~ 500Hz, 5G 12min./1cycle, period for 72min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 6G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C TEST : OK
8	CAPACITOR LIFE CYCLE	XLG-150-H : SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Tc= 75 °C LIFE TIME (2) I/P : 230VAC O/P : 75% LOAD Tc= 75 °C LIFE TIME (3) I/P : 230VAC O/P : 50% LOAD Tc= 75 °C LIFE TIME	(1) 56966 HRS (2) 73518 HRS (3) 76786 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 2269.5K hrs min. Telcordia SR-332 (Bellcore) ; 213.3K hrs min. MIL-HDBK-217F (25°C)	
10	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 50,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/ZHOUB	WENF	LIUWY