



# Test Report: XLG-240-M

---

240W 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

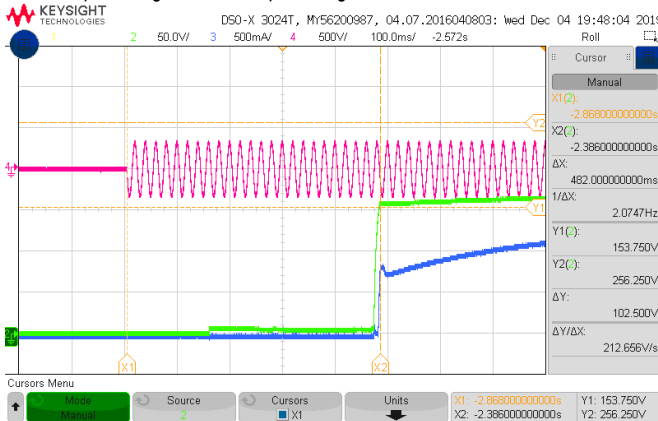
### DESIGN VERIFY TEST

#### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±4%	I/P:230VAC O/P:LEDmax:LEDmin CP: 1400mA & 2100mA Ta:25°C	CP1400mA: 1.422A/230VAC@CV MAX-1V 1.426A/230VAC@CV MIN 0.28% CP 2100mA: 2.115A/230VAC@CV MAX-1V 2.118A/230VAC@CV MIN 0.15%
2	FULL POWER CURRENT RANGE	1400~2100mA	I/P: 230VAC O/P:LEDmax CP: 1400mA & 2100mA Ta:25°C	177V/1400mA/230VAC 114V/2100mA/230VAC
3	CONSTANT POWER	O/P : 239.4W	I/P : 230 VAC O/P : Vo×Io	TEST : OK
4	OPEN CIRCUIT VOLTAGE (max)	186V	I/P: 230VAC O/P:NO LOAD CP: OPEN Ta:25°C	176V
5	CONSTANT CURRENT REGION	CP 1400mA: 90V~ 171V CP 2100mA: 90V~ 114V	I/P: 230VAC O/P:LEDmax CP: 1400mA & 2100mA Ta:25°C	CP 1400mA: 90V~ 171V/230VAC CP 2100mA: 90V~ 114V/230VAC
6	CURRENT ADJ. RANGE	CH1: 1400mA~2100mA	I/P: 230VAC O/P:CVmin& CVmax-1V CP: 1400mA & 2100mA Ta:25°C	510mA~2454mA/230VAC@CV MAX-1V 510mA~2454mA /230VAC@CV MIN
7	CURRENT RIPPLE	5.0% max.	I/P: 230VAC O/P:LEDmax CP: 1400mA & 2100mA Ta:25°C	CP 1400mA: 2.92% CP 2100mA: 1.33%
8	SET UP TIME	230VAC/ 500 ms (Max) 115VAC/ 1200 ms (Max)	I/P: 230VAC I/P: 115VAC O/P:LEDmax CP 1400mA Ta:25°C	230VAC/482ms 115VAC/ 704ms

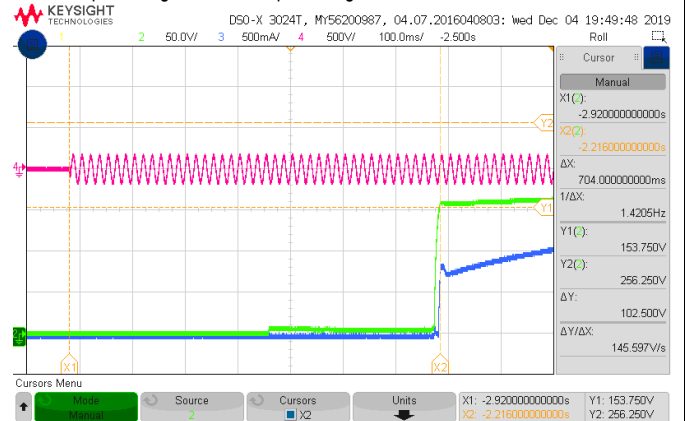
INPUT=230VAC/50HZ @ LEDMAX@ CP 1400mA

CH1 : Output Voltage CH2 : AC Input Voltage



INPUT=115VAC/60HZ @ LEDMAX@ CP 1400mA

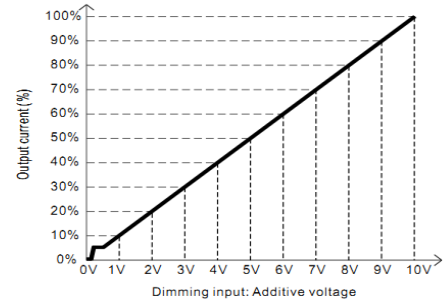
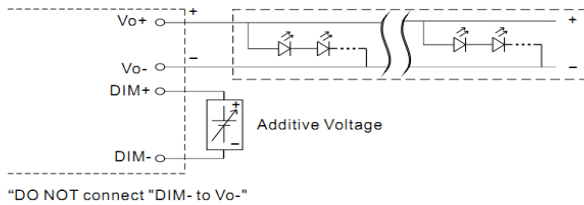
CH1 : Output Voltage CH2 : AC Input Voltage



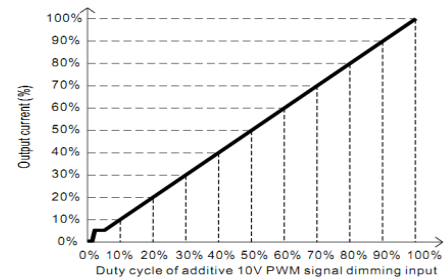
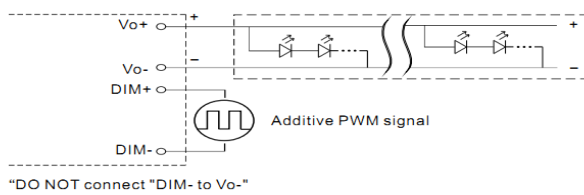
9 DIMMING OPERATION (for AB-Type)

- 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.)

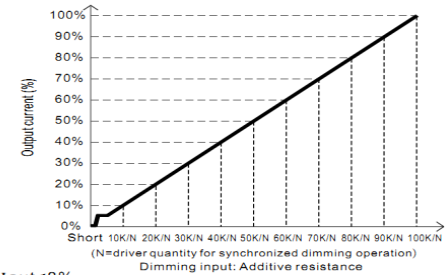
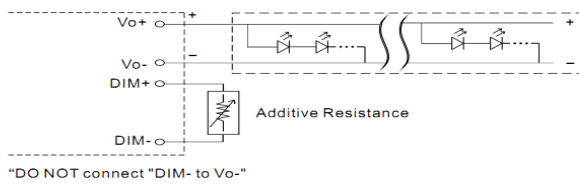
Ⓒ Applying additive 0 ~ 10VDC



Ⓒ 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

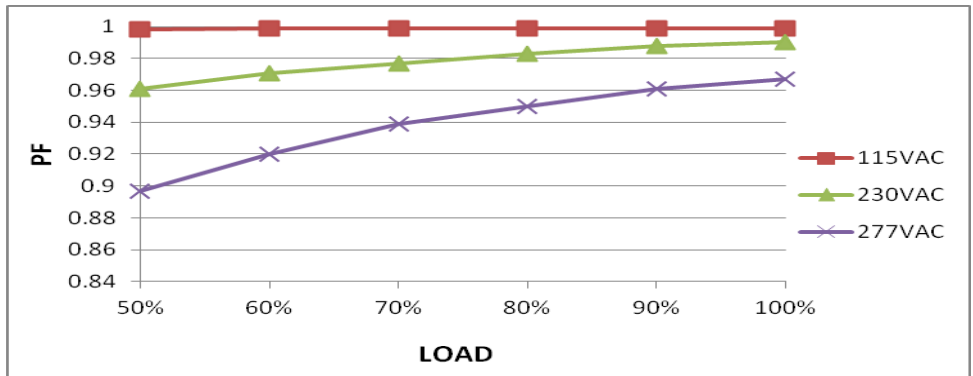
	V	SHORT	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
1	Output Current	0.0000 0A	0.180 A	0.326 A	0.454A	0.582A	0.733A	0.863A	0.996A	1.129A	1.287A	1.395A	1.395A
	%	0.00%	12.86 %	23.29 %	32.43 %	41.57 %	52.36 %	61.64 %	71.14 %	80.64 %	91.93 %	99.64%	99.64%
2	PWM	0V	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
	Output Current (100Hz)	0.0000 0A	0.181 A	0.328 A	0.455A	0.584A	0.736A	0.867A	1.022A	1.155A	1.303A	1.398A	1.399A
	%	0.00%	12.93 %	23.43 %	32.50 %	41.71 %	52.57 %	61.93 %	73.00 %	82.50 %	93.07 %	99.86%	99.93%
3	R	0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0.0000 0A	0.177 A	0.301 A	0.446A	0.577A	0.729A	0.860A	1.014A	1.148A	1.295A	1.392A	1.393A
	%	0.00%	12.64 %	21.50 %	31.86 %	41.21 %	52.07 %	61.43 %	72.43 %	82.00 %	92.50 %	99.43%	99.50%

TEST RESULT : OK

### INPUT FUNCTION TEST

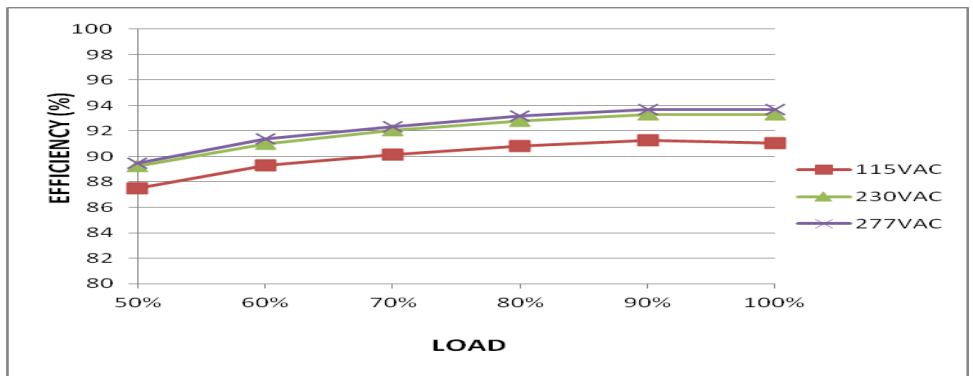
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305 VAC	I/P:TESTING O/P:LEDmax CP 1400mA  Ta:25°C	85V~305 V
			I/P: LOW-LINE-3V=97V HIGH-LINE+10V=315 V O/P: LEDmax / LEDmin CP 1400mA (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	(1).TEST:ok (2).TEST :ok
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 100VAC ~305VAC O/P: LEDmax ~ LEDmin CP 1400mA Ta:25°C	TEST:ok
3	INPUT CURRENT (TYP)	277VAC/ 1.1A 230VAC/ 1.3 A 115VAC/ 2.7A	I/P: 277VAC /230VAC/115VAC O/P:LEDmax CP 1400mA Ta:25°C	I =0.982A/ 277VAC I =1.16A/ 230VAC I =2.398A/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 1400mA Ta:25°C	PF=0.967/277V/100%LOAD PF=0.990/230V/100%LOAD PF=0.999/115V/100%LOAD

P.F vs LOAD



5	EFFICIENCY (TYP)	92.5%	I/P: 230VAC O/P:LEDmax CP 1400mA Ta:25°C	93.28%
---	------------------	-------	---	--------

EFFICIENCY vs LOAD



6	<b>INRUSH CURRENT (TYP)</b>	230V/ 85A COLD START  (twidth=500 usmeasured at 50% Ipeak) COLD START	I/P: 230VAC O/P: LEDmax CP 1400mA Ta:25°C	I =73A/230VAC  T50= 335 μS																												
INPUT=230VAC/ 50HZ @ LEDMAX CH2 : AC Input Voltage CH1 : Input current 																																
7	<b>TOTAL HARMONIC DISTORTION</b>	THD<10%@load,≥ 50% at 230VAC/115VAC, load,≥ 75% at 277VAC	I/P : 277VAC I/P : 230VAC I/P : 115VAC O/P : 50%/75% LOAD CP 1400mA Ta : 25°C	THD : 7.81 %277V 75% THD : 7.01 %230V 50% THD : 2.87 %115V 50%																												
<b>THD vs LOAD</b> <table border="1"> <caption>THD vs LOAD Data</caption> <thead> <tr> <th>Load (%)</th> <th>115VAC THD (%)</th> <th>230VAC THD (%)</th> <th>277VAC THD (%)</th> </tr> </thead> <tbody> <tr> <td>50%</td> <td>~2.8</td> <td>~7.0</td> <td>~10.5</td> </tr> <tr> <td>60%</td> <td>~3.0</td> <td>~6.2</td> <td>~9.2</td> </tr> <tr> <td>70%</td> <td>~2.8</td> <td>~6.5</td> <td>~8.0</td> </tr> <tr> <td>80%</td> <td>~2.7</td> <td>~5.5</td> <td>~7.5</td> </tr> <tr> <td>90%</td> <td>~2.6</td> <td>~4.0</td> <td>~6.8</td> </tr> <tr> <td>100%</td> <td>~2.5</td> <td>~3.2</td> <td>~6.5</td> </tr> </tbody> </table>					Load (%)	115VAC THD (%)	230VAC THD (%)	277VAC THD (%)	50%	~2.8	~7.0	~10.5	60%	~3.0	~6.2	~9.2	70%	~2.8	~6.5	~8.0	80%	~2.7	~5.5	~7.5	90%	~2.6	~4.0	~6.8	100%	~2.5	~3.2	~6.5
Load (%)	115VAC THD (%)	230VAC THD (%)	277VAC THD (%)																													
50%	~2.8	~7.0	~10.5																													
60%	~3.0	~6.2	~9.2																													
70%	~2.8	~6.5	~8.0																													
80%	~2.7	~5.5	~7.5																													
90%	~2.6	~4.0	~6.8																													
100%	~2.5	~3.2	~6.5																													
8	<b>LEAKAGE CURRENT</b>	<0.75mA / 277VAC	I/P : 277 VAC O/P : NO LOAD Ta : 25°C	L-FG : 0.52mA N-FG : 0.52mA																												
9	<b>STANDBY POWER CONSUMPTION</b>	STANDBY POWER CONSUMPTION <0.5W for AB –Type(Dimming Off)	I/P : 230 VAC O/P : STANDBY(AB) Ta : 25°C	0.39W/AB																												

## ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	190V~240V	I/P: 305VAC I/P: 230VAC I/P: 100VAC CP 1400mA  O/P:MIN LOAD Ta:25°C	209.9V / 305VAC 209.9V/ 230VAC 209.9V/ 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 1400mA 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: 1400mA & 2100mA 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-240I 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	Q3 Rated: 12A /600V	I/P:High-Line +3V =308V I/P:Low-Line -3V = 97V  AC ON/OFF CP: 1400mA&2100mA VDS: O/P: (1)LEDmax (2) LEDmin (3) Output Short (4)LED min dimming on/off  Ta:25°C	308V CP: 1400mA CP: 2100mA VDS: (1) 437V (1) 463V (2) 441V (2) 441V (3) 477V (3) 473V (4) 441V (4) 441V  97V CP: 1400mA CP: 2100mA VDS: (1) 453V (1) 437V (2) 445V (2) 449V (3) 477V (3) 477V (4) 445V (4) 445V

2	P.F.C DIODE	D5 Rated: 8A/600V	I/P:High-Line +3V =308V AC ON/OFF <b>CP: 1400mA</b> VDS: O/P: (1)LEDmax (2) LEDmin (3) Output Short (4)LED min dimming on/off	(1) 453V (2) 441V (3) 461V (4) 441V
3	Diode Peak Voltage	D100 Rated: 10A/300V	I/P:High-Line +3V =308V AC ON/OFF <b>CP: 1400mA&amp;2100mA</b> O/P: (1)LEDmax (2) Output Short (3) burst mode  Ta:25°C	<b>CP: 1400mA</b> (1) 156V (2) 4.39V (3) 178V
4	Control IC Voltage Test	PWM IC U2 Rated 30V  L	I/P:High-Line +3V =308V AC ON/OFF <b>CP: 1400mA</b> VDS: O/P: (1)LEDmax (2) LEDmin (3) Output Short (4)NO LOAD VRmin.LOW LINE (5)OVP  Ta:25°C	<b>U2</b> (1) 25.7V (2) 25.9V (3) 25.9V (4) 13.6V (5) 25.9V
5	PFC Transistor	Q1 Rated 26A/600 V	I/P : High-Line +3V =308V O/P: (1)Full Load (2)Output Short (3) Full Load continue	(1) 490V (2) 458V (3) 466V
6	Input Capacitor Voltage	C5 Rated : 120 $\mu$ F / 450V	I/P : High-Line +3V =308 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue Ta : 25°C	(1) 448V (2) 448V (3) 440V (4) 440V

### 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 : 4.125 KVAC/min I/P-FG : 2.40 KVAC/min O/P-FG : 1.8 KVAC/min Ta : 25°C	I/P-O/P : 3.03mA I/P-FG : 2.74mA O/P-FG : 2.63mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100M $\Omega$ I/P-FG : 500VDC>100M $\Omega$ O/P-FG : 500VDC>100M $\Omega$	I/P-O/P : 500 VDC I/P-FG : 500 VDC O/P-FG : 500 VDC Ta : 25°C	I/P-O/P : >9999M $\Omega$ I/P-FG : >9999 M $\Omega$ O/P-FG : >9999M $\Omega$ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 m $\Omega$	40A / 2min Ta:25°C	11m $\Omega$

## 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	PASS
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT : 2KV	I/P : 230VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS
6	SURGE	EN61000-4-5 LIGHT INDUSTRY L-N : 4KV L-PE : 6KV	I/P : 230VAC/50HZ O/P : FULL LOAD Ta : 25°C	PASS
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	<p>MODEL : XLG-240-L-A</p> <p>1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta= 25.0°C</p> <p>2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=50.0°C</p> <table border="1" data-bbox="507 423 1382 1128"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 25.0 °C</th> <th>HIGH AMBIENT Ta=50.0 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>BD1</td><td>67.3°C</td><td>85.7°C</td></tr> <tr><td>2</td><td>ZNR1</td><td>63.1°C</td><td>81.4°C</td></tr> <tr><td>3</td><td>LF2</td><td>66.1°C</td><td>84.2°C</td></tr> <tr><td>4</td><td>Q1</td><td>72.8°C</td><td>91.7°C</td></tr> <tr><td>5</td><td>C5</td><td>70.5°C</td><td>88.8°C</td></tr> <tr><td>6</td><td>T1(wire)</td><td>82.4°C</td><td>100.5°C</td></tr> <tr><td>7</td><td>T1(core)</td><td>64.0°C</td><td>113.2°C</td></tr> <tr><td>8</td><td>L2</td><td>68.0°C</td><td>94.2°C</td></tr> <tr><td>9</td><td>C22</td><td>72.4°C</td><td>96.3°C</td></tr> <tr><td>10</td><td>C105</td><td>65.8°C</td><td>88.2°C</td></tr> <tr><td>11</td><td>C106</td><td>67.6°C</td><td>88.9°C</td></tr> <tr><td>12</td><td>D101</td><td>71.3°C</td><td>92.8°C</td></tr> <tr><td>13</td><td>D103</td><td>71.8°C</td><td>93.1°C</td></tr> <tr><td>14</td><td>U2</td><td>70.5°C</td><td>90.9°C</td></tr> <tr><td>15</td><td>R7</td><td>71.2°C</td><td>91.0°C</td></tr> <tr><td>16</td><td>Q3</td><td>77.0°C</td><td>98.5°C</td></tr> <tr><td>17</td><td>C123</td><td>68.4°C</td><td>87.7°C</td></tr> <tr><td>18</td><td>Q2</td><td>74.7°C</td><td>95.9°C</td></tr> <tr><td>19</td><td>RTH3</td><td>71.1°C</td><td>90.4°C</td></tr> <tr><td>20</td><td>TC</td><td>62.2°C</td><td>81.6°C</td></tr> </tbody> </table>			NO	Position	ROOM AMBIENT Ta= 25.0 °C	HIGH AMBIENT Ta=50.0 °C	1	BD1	67.3°C	85.7°C	2	ZNR1	63.1°C	81.4°C	3	LF2	66.1°C	84.2°C	4	Q1	72.8°C	91.7°C	5	C5	70.5°C	88.8°C	6	T1(wire)	82.4°C	100.5°C	7	T1(core)	64.0°C	113.2°C	8	L2	68.0°C	94.2°C	9	C22	72.4°C	96.3°C	10	C105	65.8°C	88.2°C	11	C106	67.6°C	88.9°C	12	D101	71.3°C	92.8°C	13	D103	71.8°C	93.1°C	14	U2	70.5°C	90.9°C	15	R7	71.2°C	91.0°C	16	Q3	77.0°C	98.5°C	17	C123	68.4°C	87.7°C	18	Q2	74.7°C	95.9°C	19	RTH3	71.1°C	90.4°C	20	TC	62.2°C	81.6°C
NO	Position	ROOM AMBIENT Ta= 25.0 °C	HIGH AMBIENT Ta=50.0 °C																																																																																					
1	BD1	67.3°C	85.7°C																																																																																					
2	ZNR1	63.1°C	81.4°C																																																																																					
3	LF2	66.1°C	84.2°C																																																																																					
4	Q1	72.8°C	91.7°C																																																																																					
5	C5	70.5°C	88.8°C																																																																																					
6	T1(wire)	82.4°C	100.5°C																																																																																					
7	T1(core)	64.0°C	113.2°C																																																																																					
8	L2	68.0°C	94.2°C																																																																																					
9	C22	72.4°C	96.3°C																																																																																					
10	C105	65.8°C	88.2°C																																																																																					
11	C106	67.6°C	88.9°C																																																																																					
12	D101	71.3°C	92.8°C																																																																																					
13	D103	71.8°C	93.1°C																																																																																					
14	U2	70.5°C	90.9°C																																																																																					
15	R7	71.2°C	91.0°C																																																																																					
16	Q3	77.0°C	98.5°C																																																																																					
17	C123	68.4°C	87.7°C																																																																																					
18	Q2	74.7°C	95.9°C																																																																																					
19	RTH3	71.1°C	90.4°C																																																																																					
20	TC	62.2°C	81.6°C																																																																																					
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 305VAC/110VAC 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 50 °C NO DAMAGE	I/P : 305VAC O/P : FULL LOAD Ta=50 °C HUMIDITY= 95% R.H	TEST : OK																																																																																				
4	TEMPERATURE COEFFICIENT	±0.03%/°C (0~60°C)	I/P : 230 VAC O/P : FULL LOAD	±0.0008%/°C (0~60°C)																																																																																				
5	STORAGE TEMPERATURE TEST	-40~+80°C	<p>1. Thermal shock Temperature : -50°C~ +125°C</p> <p>2. Temperature change rate : 25°C / MIN</p> <p>3. Dwell time low and high temperature : 30 MIN/EACH</p> <p>4. Total test cycle : 200CYCLE</p> <p>5. Input/Output condition : STATIC</p> <p>TEST : OK</p>																																																																																					
6	THERMAL SHOCK TEST	-40~+50°C	<p>1. Thermal shock Temperature : -45°C~ +55°C</p> <p>2. Temperature change rate : 25°C / MIN</p> <p>3. Dwell time low and high temperature : 30 MIN/EACH</p> <p>4. Total test cycle : 16CYCLE</p> <p>5. Input/Output condition :</p> <p>15cycle:230VAC/ FULL LOAD AC on 3 sec/AC off 1 sec TEST</p> <p>1cycle:230VAC/ FULL LOAD Burn In Test</p> <p>TEST : OK</p>																																																																																					
7	VIBRATION TEST	10~ 500Hz, 5G 12min./1cycle, period for 72min. each along X, Y, Z axes	<p>1 Carton &amp; 1 Set</p> <p>(1) Waveform : Sine Wave</p> <p>(2) Frequency : 10~500Hz</p> <p>(3) Sweep Time : 10min/sweep cycle</p>																																																																																					

			(4) Acceleration : 6G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C TEST : OK
8	CAPACITOR LIFE CYCLE	XLG-240I-L-AB : SUPPOSE C106 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) 109167 HRS (2) 116947 HRS (3) 123905 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 2496.2K hrs min. Telcordia SR-332 (Bellcore) ; 219.8K 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