Test Report: XLG-320-M

315W 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

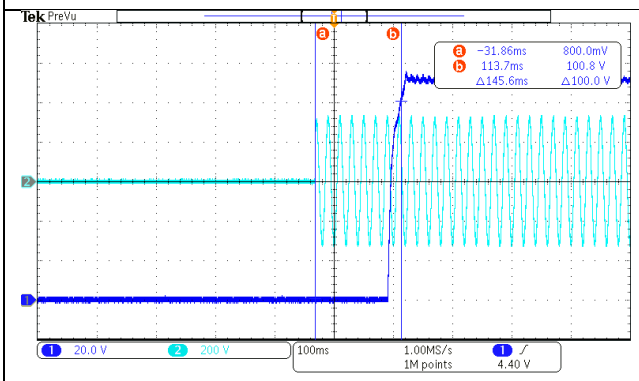
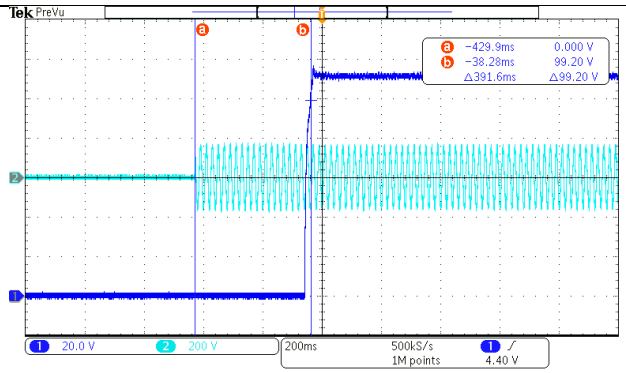
■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

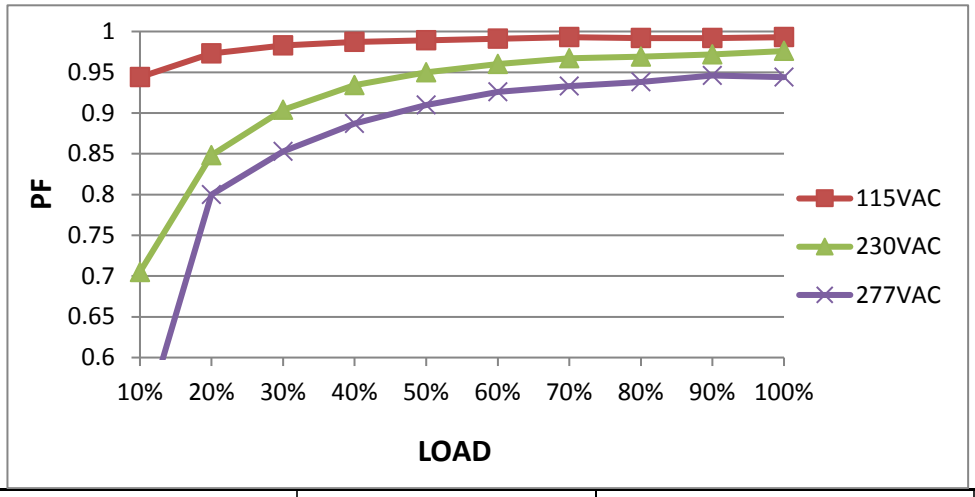
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±5%	I/P:230VAC O/P:LEDmax CP: 2.1A & 2.8A Ta:25℃	CP 2.1A: 2.086A/230VAC@CV MAX-1V 2.092A/230VAC@CV MIN -0.29%~0.76% CP 2.8A: 2.785A/230VAC@CV MAX-1V 2.831A/230VAC@CV MIN -0.54%~1.21%
2	FULL POWER CURRENT RANGE	2100-2800 mA	I/P: 230VAC O/P:LEDmax CP: 2.1A & 2.8A Ta:25℃	148V/2.11A/230VAC 111V/2.82A/230VAC
3	OPEN CIRCUIT VOLTAGE (max)	180V	I/P: 230VAC O/P:NO LOAD CP: OPEN Ta:25℃	157V
4	CONSTANT CURRENT REGION	CP 2.1A: CH1: 74V~ 148V CP 2.8A: CH1: 74V~ 111V	I/P: 230VAC O/P:LEDmax CP: A &A Ta:25℃	CP A:2.1A 56V~148 V/230VAC CP A:2.8A 62V~118 V/230VAC
5	CURRENT ADJ. RANGE	CH1: 1050mA~2800mA	I/P: 230VAC O/P:CVmin& CVmax-1V CP: 2.1A & 2.8A Ta:25℃	731mA~2257mA/230VAC@CV MAX-1V 912mA~3120mA/230VAC@CV MIN
6	CURRENT RIPPLE	5.0% max.	I/P: 230VAC O/P:LEDmax CP: 2.1A & 2.8A Ta:25℃	CP A:2.1 3.38% CP 2.8A: 3.9%

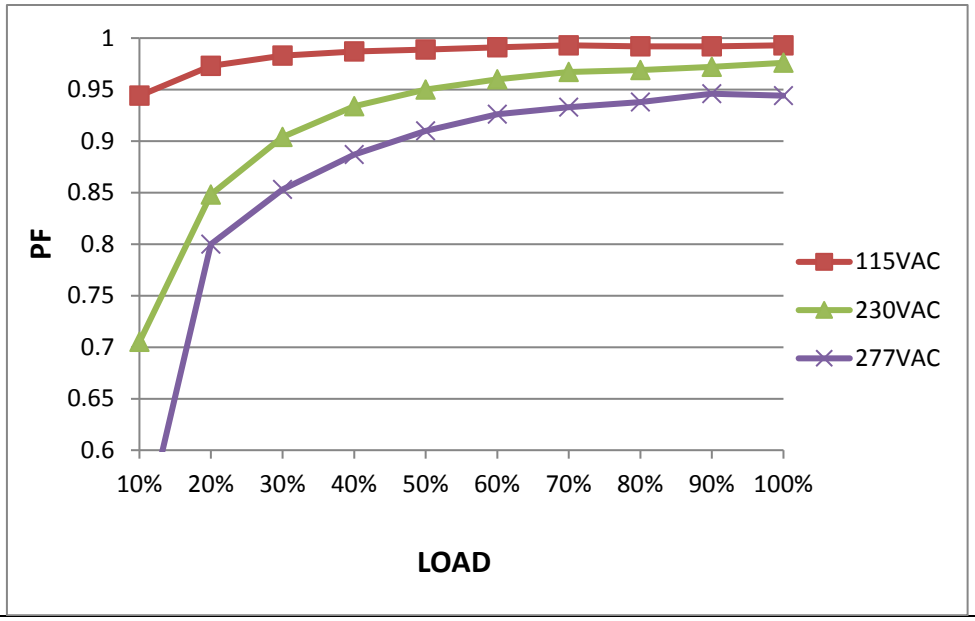
7	SET UP TIME	230VAC/ 500ms (Max) 115VAC/1200 ms (Max)	I/P: 230VAC I/P: 115VAC O/P:LEDmax CP 2.8A Ta:25℃	230VAC/145.6ms 115VAC/ 391.6ms
	INPUT=230VAC/50HZ @ LEDMAX@ CP 2.8A CH1 : Output Voltage CH2 : AC Input Voltage 		INPUT=115VAC/60HZ @ LEDMAX@ CP 2.8A CH1 : Output Voltage CH2 : AC Input Voltage 	

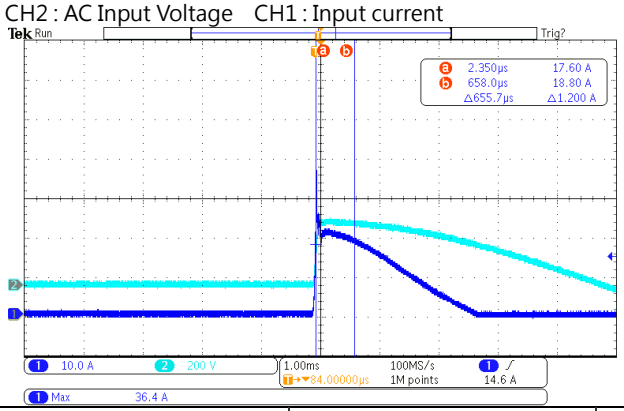
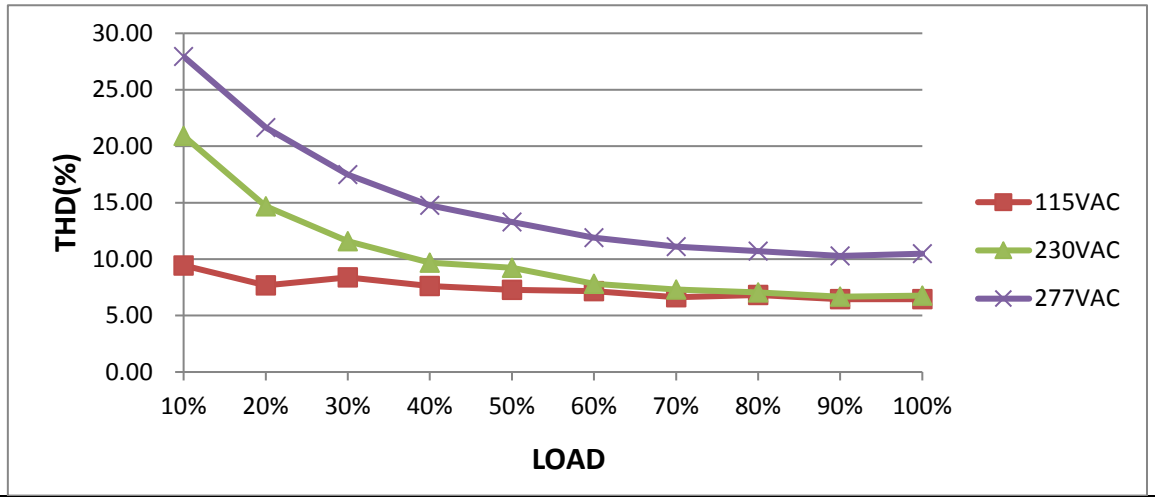
INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305 VAC 142VDC ~ 431VDC	(1) I/P:TESTING O/P:LEDmax (2) I/P:DC TESTING(L:+ N:-) O/P:LEDmax (3) I/P:DC TESTING(L:- N:+) O/P:LEDmax Ta:25℃	(1) 87VAC~308VAC (2) 142VDC ~ 431VDC (3) 142VDC ~ 431VDC
			I/P: LOW-LINE-3V=97 V HIGH-LINE+10V=315 V O/P: LEDmax / LEDmin CP 2.8A (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: 100 VAC ~305VAC O/P: LEDmax ~ LEDmin CP A Ta:25℃	TEST:OK

3	INPUT CURRENT (TYP)	230VAC/ 1.6 A 277VAC/ 1.3A 115VAC/ 3 A	I/P: 230VAC/277VAC/115VAC O/P:LEDmax CP: 2.8A Ta:25℃	I = 1.47 A/ 230VAC I = 1.24A/ 277VAC I = 2.97A/ 115VAC
4	LEAKAGE CURRENT	EN61230-1 < 0.75mA / 277VAC	I/P: 277 VAC O/P:Min LOAD Ta:25℃	L-FG: 0.285mA N-FG:0.287 mA
5	POWER FACTOR(TYP)	0.95/230VAC LEDMAX 0.92/277 VAC LEDMAX 0.98/115 VAC LEDMAX	I/P: 115VAC/230VAC/277VAC O/P:LEDmax CP: 2.8A Ta:25℃	PF= 0.971/230V/100%LOAD PF=0.941/277V/100%LOAD PF=0.993/115V/100%LOAD
	P.F vs LOAD			
6	EFFICIENCY (TYP)	93.5%	I/P: 230VAC O/P:LEDmax CP: 2.8 A Ta:25℃	94%
	EFFICIENCY vs LOAD			





7	INRUSH CURRENT (TYP)	230V/ 45A COLD START (twidth=1200 usmeasured at 50% Ipeak) COLD START	I/P: 230VAC O/P:LEDmax CP A Ta:25℃	I =36.4A /230VAC T50= 655.7 μS
	INPUT=230VAC/ 60HZ @ LEDMAX CH2 : AC Input Voltage CH1 : Input current  			
8	TOTAL HARMONIC DISTORTION	THD< 10% @ 230VAC> 50% loading THD< 10% @ 115VAC> 50% loading THD< 15% @ 277VAC> 75% loading	I/P： 277/230/115VAC O/P：75%/50% LOAD CP :2.8A Ta：25℃	THD：9.25%230V 50% THD：7.24%115V50% THD：10.86%277V 75%
	THD vs LOAD  			

ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER VOLTAGE PROTECTION	V1: 190V~220V	I/P: 305VAC I/P: 230VAC I/P: 100VAC CP: 2.1A O/P:MIN LOAD Ta:25℃	205V / 305VAC 204V/ 230VAC 205V/ 100VAC PROTECTION TYPE： Shut down output voltage, re-power on to recovery

2	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305 VAC I/P: 100 VAC O/P:LEDmax CP: 2.1A Ta:25℃	O.T.P. Active PROTECTION TYPE : Tcase>85 ℃ ± 5 ℃ ,derate power automatically
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 100 VAC O/P: LEDMAX CP: A &A Ta:25℃	CP:2.1 A NO DAMAGE PROTECTION TYPE : Hiccup mode or Constant current limiting, recovers automatically after fault condition is removed CP: 2.8A NO DAMAGE PROTECTION TYPE : Hiccup mode or Constant current limiting, recovers automatically after fault condition is removed

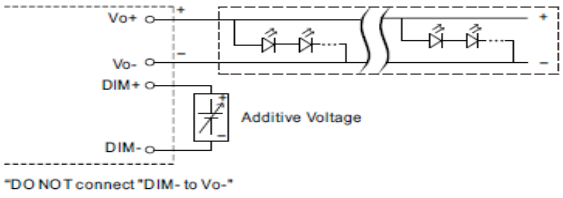
DIMMING OPERATION TEST

1 DIMMING OPERATION (forAB-Type)

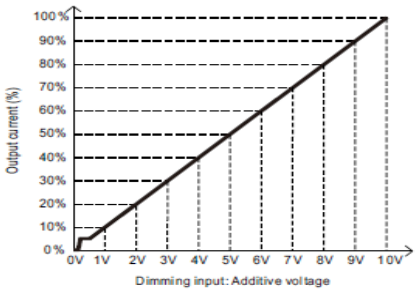
※ **3 in 1 dimming function (for AB-Type)**

- 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: 100 μA (typ.)

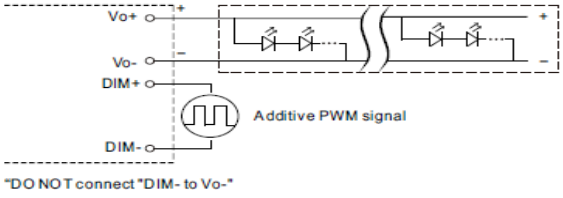
◎ Applying additive 0 ~ 10VDC



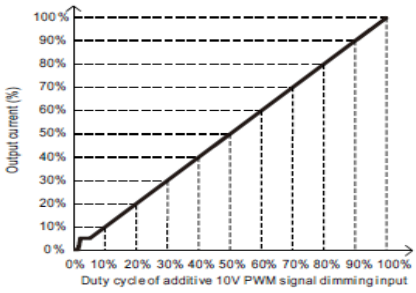
"DO NOT connect "DIM- to Vo-"



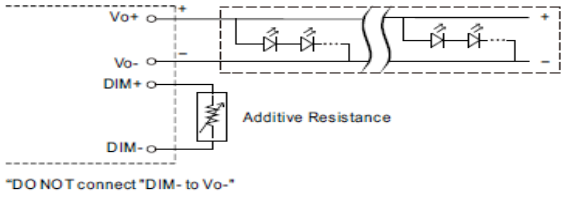
◎ Applying additive 10V PWM signal (frequency range 100Hz ~ 3KHz):



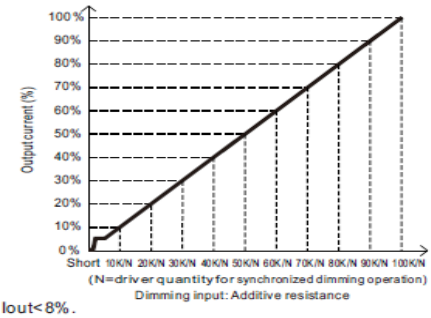
"DO NOT connect "DIM- to Vo-"



◎ Applying additive resistance:



"DO NOT connect "DIM- to Vo-"



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 0Ωor 0Vdc, or 10V PWM signal with 0% duty cycle.
3. When PWM frequency >2K HZ ,the lighting will be triggered at 10~15% PWM duty .

I/P： 230 VAC O/P：DIMMING TEST

	V	Short	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
1	Output Current	0.00000A	0.289A	0.474A	0.662A	0.853A	1.049A	1.248A	1.452A	1.659A	1.877A	2.094A	2.094A
	%	0.00%	13.78%	22.58%	31.50%	40.61%	49.94%	59.42%	69.12%	79.02%	89.39%	99.73%	99.73%
2	PWM	0V	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current（100Hz）	0.00000A	0.320A	0.507A	0.699A	0.895A	1.096A	1.302A	1.511A	1.724A	1.965A	2.095A	2.096A
	%	0.00%	15.22%	24.14%	33.28%	42.63%	52.18%	61.99%	71.96%	82.09%	93.56%	99.76%	99.79%
	Output Current（3KHz）	0.00000A	0.288A	0.476A	0.667A	0.863A	1.062A	1.266A	1.474A	1.687A	1.911A	2.094A	2.096A
	%	0.00%	13.69%	22.66%	31.78%	41.09%	50.57%	60.28%	70.21%	80.32%	91.00%	99.73%	99.79%
3	R	0%	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
	Output Current	0.00000A	0.318A	0.505A	0.700A	0.898A	1.100A	1.305A	1.515A	1.729A	1.969A	2.095A	2.095A
	%	0.00%	15.13%	24.06%	33.32%	42.78%	52.40%	62.14%	72.14%	82.35%	93.74%	99.76%	99.74%

TEST RESULT：OK

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Transistor (D to S) or (C to E) **Peak Voltage**	Q8 Rated 13 A/ 600V	I/P:High-Line +3V =308v AC ON/OFF **CP: 2.1A&2.8A** VDS: O/P: (1)LEDmax (2) LEDmax continue (3) LEDmin (4) LEDmin continue (5) Output Short I/P:Low-Line -3V = 97V VDS: O/P: (1)LEDmax (2) LEDmax continue (3) LEDmin (4) LEDmin continue (5) Output Short Ta:25℃	308V **CP: 2.1A** Q8 VDS: (1) 461V (2) 452V (3) 467V (4) 442V (5) 491V **CP: 2.8A** **VDS:** (1) 489V (2) 461V (3) 501V (4) 471V (5) 492V 97V **CP:2.1 A** Q8 VDS: (1) 461V (2) 453V (3) 449V (4) 435V (5) 447V **CP: 2.8A** VDS: (1) 472V (2) 452V (3) 474V (4) 449V (5) 501V
2	P.F.C Transistor (D to S) or (C to E) **Peak Voltage**	Q1 Rated 20 A/ 600V	I/P:High-Line +3V =308v AC ON/OFF **CP: 2.1A** VDS: O/P: (1)LEDmax (2) LEDmax continue (3) LEDmin (4) LEDmin continue (5) Output Short I/P:Low-Line -3V = 97V	 **CP: 2.1** Q1 VDS: (1) 499V (2) 478V (3) 462V (4) 456V (5) 488V **CP: 2.1A**

			VDS: O/P: (1)LEDmax (2) LEDmax continue (3) LEDmin (4) LEDmin continue (5) Output Short Ta:25℃	Q1 VDS: (1) 472V (2) 474V (3) 466V (4) 472V (5) 468V
3	P.F.C DIODE	D5 Rated 9 A/ 600 V	I/P:High-Line +3V =308v AC ON/OFF **CP:2.1 A** VDS: O/P: (1)LEDmax (2) LEDmax continue (3) LEDmin (4) LEDmin continue (5) Output Short I/P:Low-Line -3V = 97V O/P: (1)LEDmax (2) LEDmax continue (3) LEDmin (4) LEDmin continue (5) Output Short Ta:25℃	 (1) 494V (2) 446V (3) 478V (4)457V (5)469V (1)472 V (2) 461V (3) 466V (4)448V (5)472V
4	Diode Peak **Voltage**	D100 Rated: 10A/400V	I/P:High-Line +3V =308v AC ON/OFF **CP: 2.1A&2.8A** VDS: O/P: (1)LEDmax (2) LEDmax continue (3) Output Short	 **CP: 2.1A** Q100 VDS: (1) 162V (2) 154V (3) 14V **CP: 2.8A** Q100 VDS: (1) 150V (2) 118V (3) 6V
5	**Input Capacitor Voltage**	C5 Rated: 180μ/450 V	I/P:High-Line +3V =308v AC ON/OFF **CP: A** VDS: O/P: (1)LEDmax (2) LEDmax continue (3) LEDmin (4) LEDmin continue Ta:25℃	 (1) 453V (2) 439V (3) 443V (4) 437V

6	**Control IC Voltage Test**	PWM IC U2 Rated 8.9 V~ 15.5V PFC IC U1 Rated 11.85V~ 20V O/P IC U104 Rated 8V~ 24V	I/P:High-Line +3V =308v AC ON/OFF **CP: 2.1A** VDS: O/P: (1)LEDmax (2) LEDmin (3) Output Short (4) NO LOAD VRmin.LOW LINE Ta:25℃	**U1&U2** (1) 14V (2) 13.8V (3) 14.2V (4) 14.2V U104 (1) 11.1V (2) 10.8V (3) 10.9V (4) 10.8V
7	VCC Diode Peak Voltage	D304 Rated 400 V2 A D401 Rated 400 V 2A	AC ON/OFF I/P：High-Line +3V = 308 V O/P：(1) Full load (2) Full load continue Ta：25℃	D304 (1) 148V (2) 141V D401 (1) 132V (2) 115V
8	TOP SWITCHING STAND BY POWER	U300 Rated 1.5A/ 700V	AC ON/OFF **CP: 2.1A** I/P:High-Line +3V =308 V O/P: (1)LEDmax (2) LEDmin I/P:Low-Line -3V =97 V O/P: (1)LEDmax (2) LEDmin Ta:25℃	**CP: 2.1A** (1) 526V (2) 521V (1) 518V (2) 509V

■ SAFETY & EMC TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	EN61230-1 I/P-O/P: 3.75KVAC/min I/P-FG: 2 KVAC/min O/P-FG:1.5KVAC/min	I/P-O/P: 4.125 KVAC/min I/P-FG: 2.4KVAC/min O/P-FG: 1.8 KVAC/min Ta:25℃	I/P-O/P: 3.628mA I/P-FG: 2.859mA O/P-FG:2.251 mA 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℃	I/P-O/P: 9999MΩ I/P-FG: 9999M Ω O/P-FG: 9999M Ω NO DAMAGE

3	GROUNDING CONTINUITY	EN61230-1 FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25℃	13mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230VAC/50HZ O/P: LEDmax Ta:25℃	PASS
2	CONDUCTION	EN 55015	I/P:230VAC (50HZ) O/P: LEDmax Ta:25℃	PASS Test by certified Lab
3	RADIATION	EN 55015	I/P: 230VAC (50HZ) O/P:LEDmax Ta:25℃	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 AIR：8KV / Contact：4KV	I/P: 230VAC (50HZ) O/P:LEDmax Ta:25℃	CRITERIA A
5	E.F.T	EN61000-4-4 INPUT: 2KV	I/P: 230VAC (50HZ) O/P:LEDmax Ta:25℃	CRITERIA A
6	SURGE	IEC61000-4-5 L-N :4KV L,N-PE:6KV	I/P: 230VAC (50HZ) O/P:LEDmax Ta:25℃	CRITERIA B
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

<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： XLG-320-M-AB
1. ROOM AMBIENT BURN-IN：2 HRS
I/P： 230VAC O/P： FULL LOAD Ta=26 ℃
2. HIGH AMBIENT BURN-IN：2 HRS
I/P： 230VAC O/P： FULL LOAD Ta=48.9 ℃</td></tr>
<tr><td colspan="5">
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=26℃</th><th>HIGH AMBIENT Ta=48.9℃</th></tr>
<tr><td>1</td><td>C1</td><td>56.5℃</td><td>77.5℃</td></tr>
<tr><td>2</td><td>ZNR3</td><td>56.1℃</td><td>76.8℃</td></tr>
<tr><td>3</td><td>BD1</td><td>63.1℃</td><td>83.9℃</td></tr>
<tr><td>4</td><td>RTH1</td><td>65.4℃</td><td>86.3℃</td></tr>
<tr><td>5</td><td>Q1</td><td>65.0℃</td><td>85.6℃</td></tr>
<tr><td>6</td><td>Q2</td><td>66.5℃</td><td>87.0℃</td></tr>
<tr><td>7</td><td>L2</td><td>70.0℃</td><td>90.8℃</td></tr>
<tr><td>8</td><td>D6</td><td>70.1℃</td><td>93.9℃</td></tr>
<tr><td>9</td><td>C5</td><td>60.5℃</td><td>81.9℃</td></tr>
<tr><td>10</td><td>RY1</td><td>66.3℃</td><td>87.8℃</td></tr>
<tr><td>11</td><td>C16</td><td>70.5℃</td><td>90.7℃</td></tr>
<tr><td>12</td><td>U1</td><td>59.4℃</td><td>80.7℃</td></tr>
<tr><td>13</td><td>U2</td><td>61.2℃</td><td>83.0℃</td></tr>
<tr><td>14</td><td>Q7</td><td>71.8℃</td><td>92.0℃</td></tr>
<tr><td>15</td><td>Q8</td><td>71.1℃</td><td>91.3℃</td></tr>
<tr><td>16</td><td>C88</td><td>67.3℃</td><td>87.6℃</td></tr>
<tr><td>17</td><td>T1</td><td>79.7℃</td><td>97.5℃</td></tr>
<tr><td>18</td><td>C142</td><td>65.2℃</td><td>85.9℃</td></tr>
<tr><td>19</td><td>D100</td><td>73.1℃</td><td>101.1℃</td></tr>
<tr><td>20</td><td>D102</td><td>71.8℃</td><td>97.4℃</td></tr>
<tr><td>21</td><td>C104</td><td>68.6℃</td><td>90.2℃</td></tr>
<tr><td>22</td><td>C110</td><td>58.4℃</td><td>80.6℃</td></tr>
<tr><td>23</td><td>U104</td><td>66.3℃</td><td>89.5℃</td></tr>
<tr><td>24</td><td>T2</td><td>67.7℃</td><td>86.8℃</td></tr>
<tr><td>25</td><td>RTH2</td><td>58.9℃</td><td>80.3℃</td></tr>
<tr><td>26</td><td>RTH7</td><td>62.6℃</td><td>84.5℃</td></tr>
<tr><td>27</td><td>TC</td><td>58.9℃</td><td>79.5℃</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： 305VAC/100VAC
O/P： 100%LOAD
Ta= -45/-35 ℃</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 45 ℃
NO DAMAGE</td><td>I/P： 315 VAC
O/P：FULL LOAD
Ta=45 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td></tr>
</table>

4	TEMPERATURE COEFFICIENT	± 0.03 %/(0℃~60℃)	I/P： 230 VAC O/P：FULL LOAD	± 0.001 %/℃(0~60℃)
5	STORAGE TEMPERATURE TEST	-40~85℃	1. Thermal shock Temperature： -45℃~ +90℃ 2. Temperature change rate ：25℃ / MIN 3. Dwell time low and high temperature ： 30 MIN/EACH 4. Total test cycle：10CYCLE 5. Input/Output condition： STATIC TEST：OK	
6	THERMAL SHOCK TEST	-40~45℃	1. Thermal shock Temperature： -45℃~ +50℃ 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： 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test TEST：OK	
7	VIBRATION TEST	10 ~ 500Hz, 5G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform： Sine Wave (2) Frequency：10~500Hz (3) Sweep Time：12min/sweep cycle (4) Acceleration：6G (5) Test Time：180min in each axis (X.Y.Z) (6) Ta：25℃	
8	CAPACITOR LIFE CYCLE	SUPPOSE C104 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Tc=70 ℃ LIFE TIME (2) I/P： 230VAC O/P：75% LOAD Tc=70 ℃ LIFE TIME (3) I/P： 230VAC O/P：50% LOAD Tc= 70 ℃ LIFE TIME		(1) 74954HRS (2) 70037HRS (3) 96978HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 1476.4K hrs min. Telcordia SR-332 (Bellcore)； 168.1K hrs min. MIL-HDBK-217F (25℃)		
10	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD Ta=50℃ Demonstration Mean Time Between Failure : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/HUANGMK	WENF	LINKX