Test Report: XLG-320-V

315W Constant Power Mode LED Driver

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Protection Function Test
Control Function Test
Component Stress Test

■ SAFETY & E.M.C. TEST

Safety Test
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

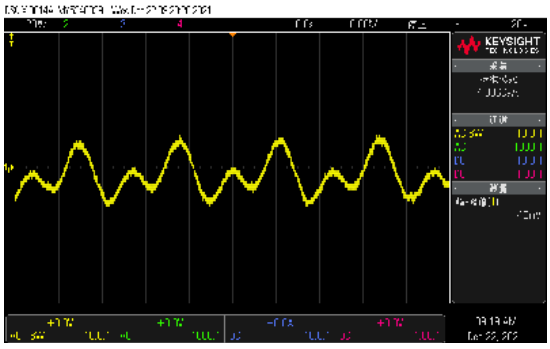
■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

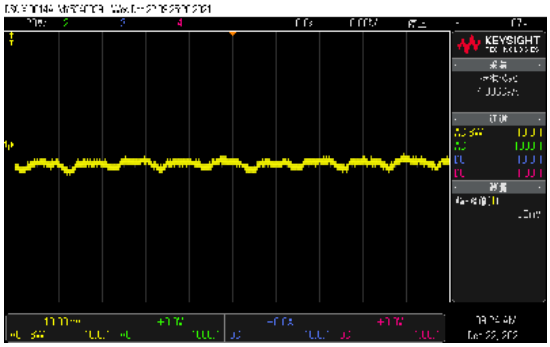
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -3%~ 3%	I/P: 90VAC /305VAC O/P:FULL/ MIN. LOAD Ta:25℃	V1: 0.17%~ 0.35%/12V V2: 0.2%~ 1.175%/24V
2	LINE REGULATION (Max)	V1: -0.5%~ 0.5%	I/P: 90VAC~ 305VAC O/P:FULL LOAD Ta:25℃	V1:0.092%~0.025%/12V V2:0.025%~0.267%/24V
3	LOAD REGULATION(Max)	V1: -2%~ 2%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: 0.271%~0.258%/12V V2:0.63%~0.70%/24V
4	RIPPLE & NOISE(Max)	V1: 240mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25℃	V1(24V): 42mVp-p 100mVp-p V2(12V): 13mVp-p 63mVp-p

high frequency :

24V

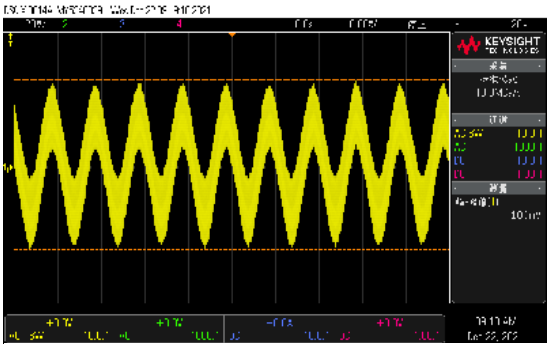


12V

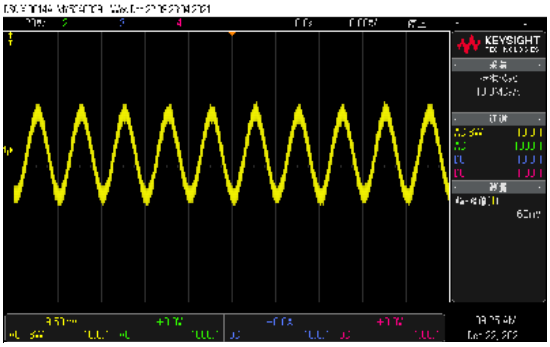


low frequency :

24V



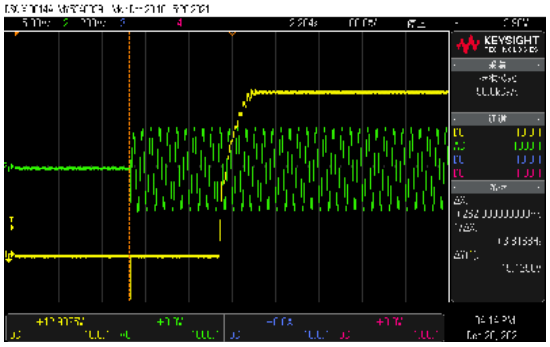
12V



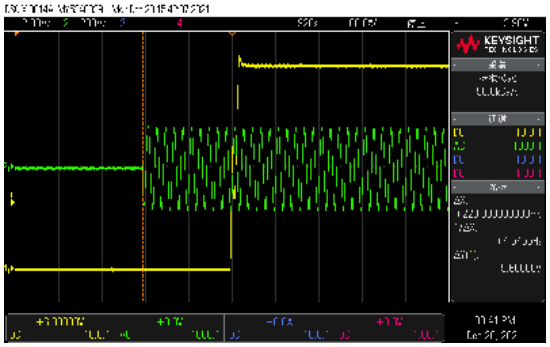
5	SET UP TIME(Max)	230VAC/500ms 115VAC/ 1200ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	V1(24V): 230VAC/ 262ms 115VAC/ 478ms V2(12V): 230VAC/220 ms 115VAC/450 ms

INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage

24V

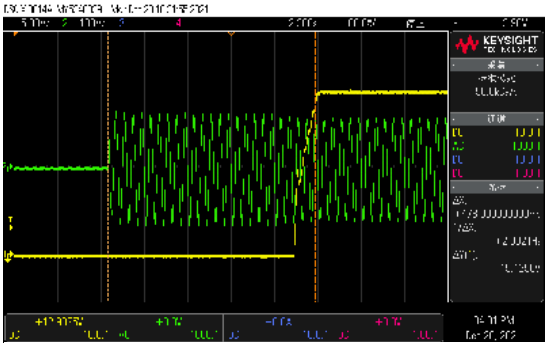


12V

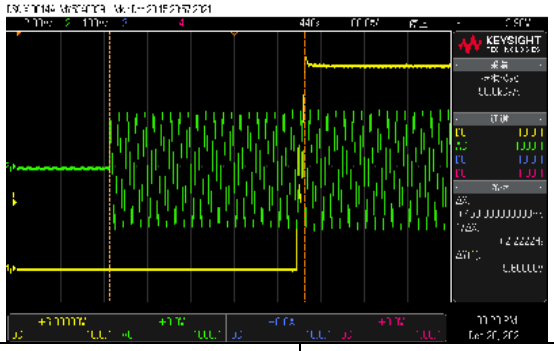


INPUT=115VAC/60HZ @ FULL LOAD
CH1 : Output Voltage CH2 : AC Input Voltage

24V



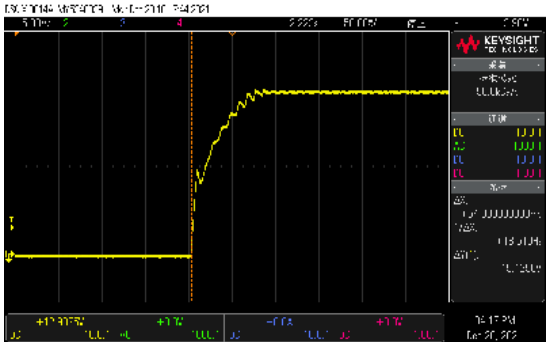
12V



6	RISE TIME (Max)	230VAC/160ms 115VAC/160ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	V1(24V): 230VAC/54ms 115VAC/48.2ms V2 (12V): 230VAC/17.2ms 115VAC/17.8ms

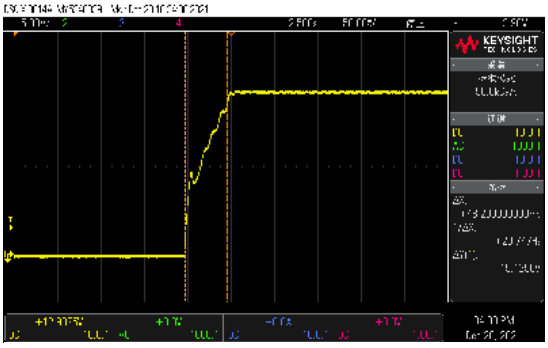
INPUT=230VAC/50HZ @ FULL LOAD
CH1 : Output Voltage

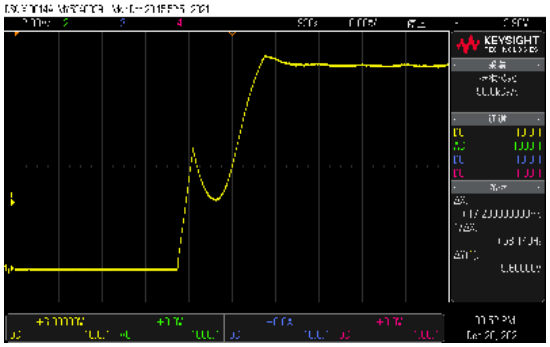
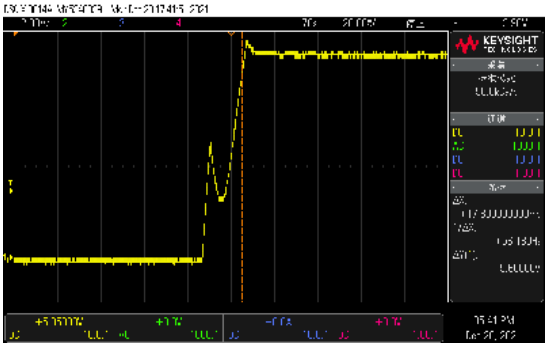
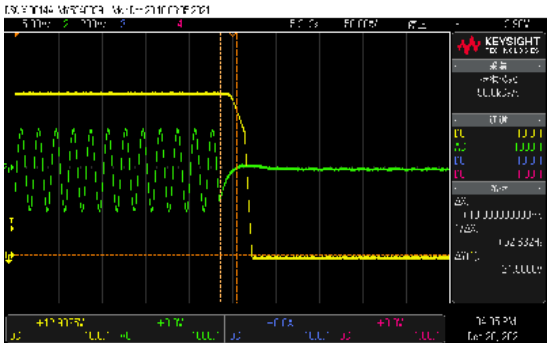
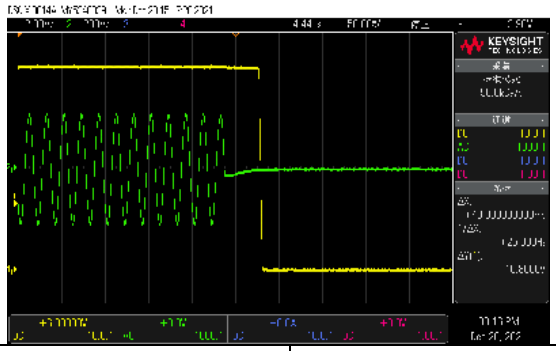
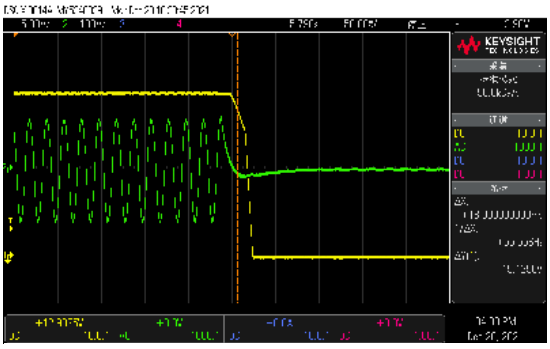
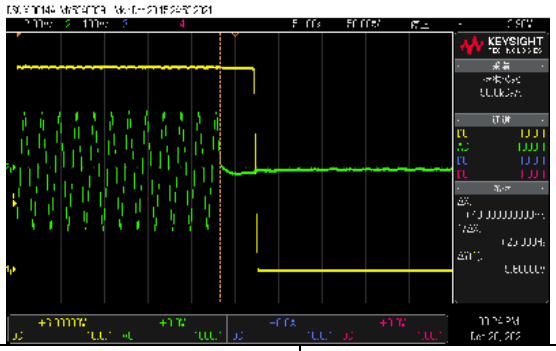
24V



INPUT=115VAC/60HZ @ FULL LOAD
CH1 : Output Voltage

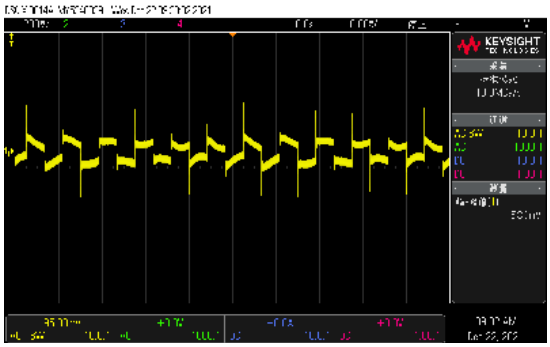
24V



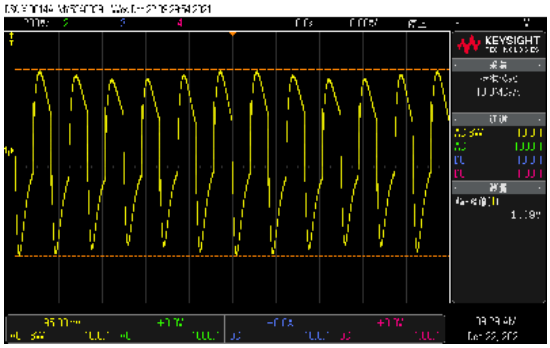
	12V  12V 			
7	HOLD UP TIME (Typ.)	230VAC/10ms 115VAC/10ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	V1 (24V): 230VAC/19ms 115VAC/ 18ms V2(12V): 230VAC/40ms 115VAC/40ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 24V  12V 		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 24V  12V 	
8	DYNAMIC LOAD	V1:2400/1200mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25℃	V1(24V): (1) 580mVp-p (2)550mVp-p V2 (12V): (1)1090mVp-p (2)490mVp-p

FULL /50% LOAD 50%DUTY / 120HZ

24V

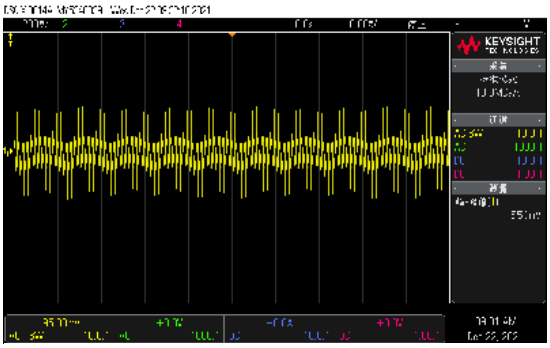


12V

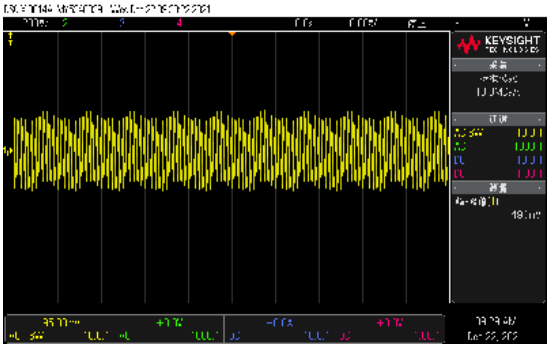


FULL /50% LOAD 50%DUTY / 1KHZ

24V

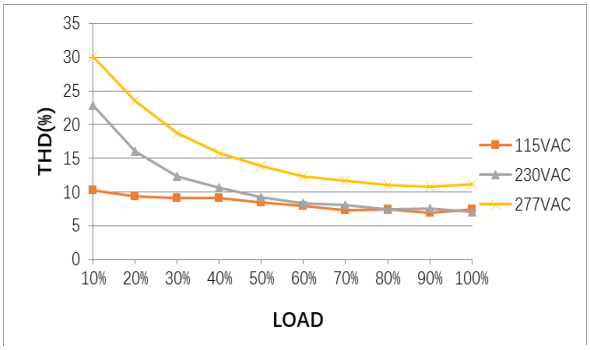
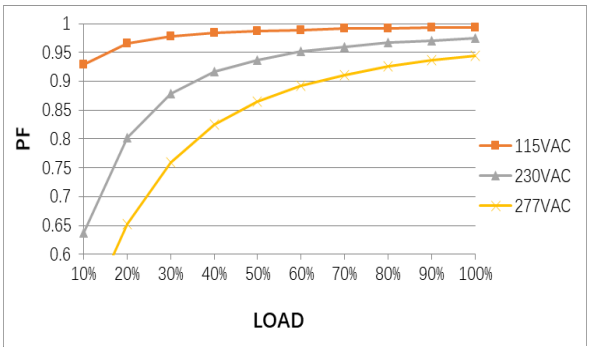
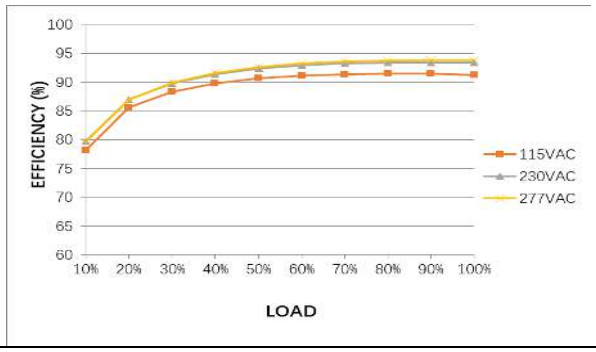


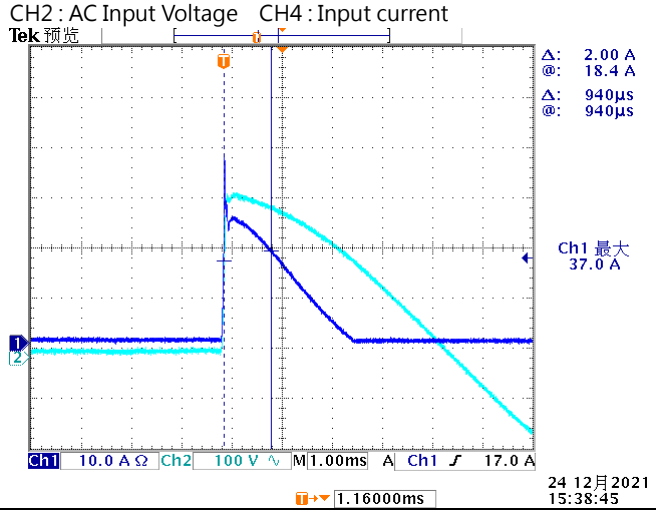
12V



INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305VAC 141VDC~ 431VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD Ta:25℃	(1) 97V~308V (2)142Vdc~431Vdc/FULL LOAD (3) 142Vdc~431Vdc/FULL LOAD
			I/P: LOW-LINE-3V=97 V HIGH-LINE+15%=315 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:90 VAC ~305 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 1.6A 115V/ 3A 277V/ 1.3A	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I =1.47A/ 230VAC I =2.84A/ 115VAC I =1.26A/ 277VAC

4	LEAKAGE CURRENT	<0.75 mA /277 VAC	I/P： 240 VAC O/P：Min LOAD Ta：25℃	L-FG：0.288mA N-FG：0.294 mA
5	TOTAL HARMONIC DISTORTION	THD< 10% @ 230VAC> 50% loading THD< 10% @ 115VAC> 50% loading THD< 15% @ 227VAC>75% loading	I/P： 277/230/115VAC O/P：75%/50% LOAD Ta：25℃	THD： 9.26 230V50% THD： 8.43 115V50% THD： 11.75 277V75%
	T.H.D vs LOAD 			
6	POWER FACTOR (Typ.)	0.95/ 230VAC 0.98/115VAC 0.92/277VAC	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	PF=0.975/230VAC PF=0.993/115VAC PF=0.944/277VAC
	P.F vs LOAD 			
7	EFFICIENCY(Typ.)	93%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	93.37 %
	EFFICIENCY vs LOAD 			

8	INRUSH CURRENT(Typ.)	230V/45A COLD START 45A(twidth=1200 s measured at 50% Ipeak) at 230VAC	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I =37A/ 230VAC T50= 940us/230V
	INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current 			

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	108%~ 135%	I/P: 305VAC I/P: 230VAC I/P: 100VAC O/P:TESTING Ta:25℃	24V: 118.5%/ 305VAC 118.4%/ 230VAC 118.4%/100VAC 12V: 125.1%/ 305VAC 125.3 %/ 230VAC 125.5%/100VAC PROTECTION TYPE： Hiccup mode or Constant current limiting, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	27V~34V	I/P: 305VAC I/P: 230VAC I/P: 100VAC O/P:MIN LOAD Ta:25℃	30.5V/ 305VAC 30.5V/ 230VAC 30.5V/ 100VAC PROTECTION TYPE : Shut down output voltage, re-power on to recovery

3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305VAC I/P: 100VAC O/P:FULL LOAD	O.T.P. Active OK Protection type : Shut down output voltage, re-power on to recover
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 305VAC I/P: 100VAC O/P: FULL LOAD Ta:25℃	NO DAMAGE OK PROTECTION TYPE : Hiccup mode or Constant current limiting, recovers automatically after fault condition is removed

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	AC ON/OFF I/P:High-Line +3V =308V VDS: O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. I/P:Low-Line -3V = 97V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25℃	 VDS: (1) 492V (2) 492V (3) 480V (4) 488V (5) 480V (6) 480V (7) 464V VDS: (1) 448V (2) 460V (3) 444V (4) 440V (5) 440V (6) 440V (7) 460V

2	P.F.C Transistor (D to S) or (C to E) Peak Voltage	Q1 Rated 20A/ 600V	I/P:High-Line +3V =308 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Min. Load 90%Duty/5KHz I/P:Low-Line -3V = 97V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25℃	VDS: (1) 509V (2) 513V (3) 517V (4) 501V (5) 497V (6) 501V (7) 457V VDS: (1) 456V (2) 460V (3) 460V (4) 456V (5) 456V (6) 460V (7) 464V
3	P.F.C DIODE	D5 Rated 9 A/600V	I/P:High-Line +3V =308 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz I/P:Low-Line -3V = 97V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz Ta:25℃	(1) 445V (2) 445V (3) 445V (4) 441V (1) 453V (2) 457V (3) 453V (4) 457V

4	Diode Peak Voltage	Q100 Rated 130 A/ 100 V Q101 Rated 130 A/ 100 V	AC ON/OFF I/P:High-Line +3V =308 V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8).NO LOAD Ta:25℃	Q101: VDS: (1) 54.7V (2) 16.2V (3) 55.1V (4) 54.3V (5) 55.1V (6) 54.3V (7) 54.3V (8) 52.7V	Q100: VDS: (1) 54V (2) 12.7V (3) 54.8V (4) 54.8V (5) 54.8V (6) 53.9V (7) 53.9V (8) 50.7V
5	Input Capacitor Voltage	C5 Rated: 180 μ / 450V	I/P:High-Line +3V =308V 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℃	(1)460V (2)436V (3)444V (4) 436V	
6	Control IC Voltage Test	PWM IC U2 Rated 8.9 V~ 15.5V PFC IC U1 Rated 10.5V~ 25V O/P IC U101 Rated 8V~ 32V AUX IC U300 Rated 4.2V~18V	AC ON/OFF I/P:High-Line +3V =308 V O/P(1)FULL LOAD (2) Output Short (3)O.L.P (4)O.V.P. (5)NO LOAD VRmin(LOW LINE) Ta:25℃	U2/U1: (1) 13.4V (2) 13.6V (3) 13.4V (4) 13.2V (5) 13.2V U101: (1) 10.6V (2) 10.4V (3) 10.4V (4) 10.4V (5) 10.4V	U300: (1) 16.5V (2) 16.5V (3) 16.5V (4) 16.5V (5) 16.1V
7	VCC Diode Peak Voltage	D304 Rated 2A/400V	AC ON/OFF I/P：High-Line +3V = 308 V O/P：(1) Full load (2) Full load continue (3) Dynamic Load 90%Duty/1KHz Ta：25℃	(1) 147V (2) 141V (3) 145V	

8	TOP SWITCHING STAND BY POWER	U300 Rated 1.5 A/ 700V	AC ON/OFF I/P:High-Line +3V =308 V O/P: (1)Full Load I/P:Low-Line -3V =97 V O/P: (1)Full Load Ta:25℃	 (1) 547 V (1)523V

■ SAFETY& E.M.C. 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: 2.957mA I/P-FG: 3.23mA O/P-FG: 2.491mA 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: 9999MΩ O/P-FG: 9999MΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25℃	9 mΩ

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-V
1. ROOM AMBIENT BURN-IN : 2 HRS
I/P : 230VAC O/P : FULL LOAD Ta=30.3 ℃
2. HIGH AMBIENT BURN-IN : 2 HRS
I/P : 230VAC O/P : FULL LOAD Ta=47 ℃</td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P : 230 VAC
O/P : 120 % LOAD
Ta : 25℃</td><td>TEST : OK</td></tr>
<tr><td>3</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>
</table>

NO	Position	ROOM AMBIENT Ta=30.3 ℃	HIGH AMBIENT Ta=47 ℃
1	LF1	64.2℃	79.8℃
2	BD1	71.3℃	86.5℃
3	ZNR4	67.6℃	83.0℃
4	Q1	70.9℃	86.3℃
5	L2	77.1℃	93.0℃
6	Q2	72.3℃	87.7℃
7	D5	80.5℃	97.0℃
8	C5	67.0℃	82.2℃
9	R15	68.8℃	84.1℃
10	RY1	71.0℃	86.8℃
11	RTH1	75.3℃	91.4℃
12	C16	76.1℃	92.3℃
13	U1	66.8℃	82.6℃
14	U2	68.9℃	84.9℃
15	Q7	79.2℃	95.7℃
16	Q8	78.0℃	94.4℃
17	C88	74.0℃	89.8℃
18	T1	82.8℃	98.2℃
19	C142	70.2℃	86.3℃
20	Q100	75.1℃	91.5℃
21	Q101	72.8℃	89.2℃
22	C104	74.2℃	90.5℃
23	C105	71.6℃	87.9℃
24	U101	80.8℃	97.0℃
25	J102	73.1℃	89.4℃
26	RTH2	66.5℃	81.9℃
27	TC	64.0℃	79.3℃

4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 45 ℃/95 %R.H NO DAMAGE	I/P： 315 VAC O/P：FULL LOAD Ta= 45 ℃ HUMIDITY= 95 %R.H	TEST：OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/℃(0~50℃)	I/P： 230 VAC O/P：FULL LOAD	± 0.01 %/℃(0~50℃)
6	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：10 CYCLE 5. Input/Output condition： STATIC	
7	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	
8	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℃	
9	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) 68412HRS (2) 89599HRS (3) 104703HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 1476.4K hrs min. Telcordia SR-332 (Bellcore)； 168.1K hrs min. MIL-HDBK-217F (25℃)		
11	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