



Test Report: XBG-240

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

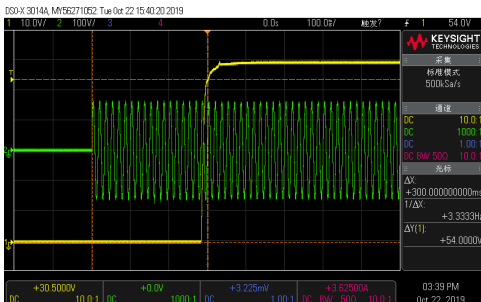
Environment Test

■ DESIGN VERIFY TEST

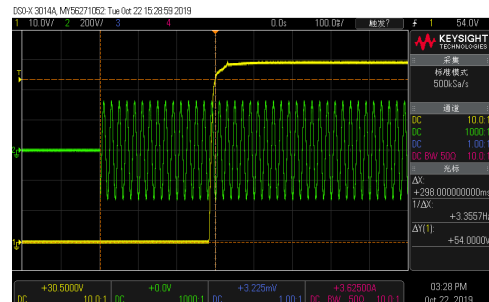
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	CURRENT TOLERANCE	±5%	I/P: 230 VAC O/P: FULL LOAD CP: 4A & 5.7A Ta: 25°C	CP: 4A: 3.979A/230VAC@LED MAX-1V 3.983A/230VAC@LED MIN 0.53% CP: 5.7A: 5.729A/230VAC@LED MAX-1V 5.728A/230VAC@LED MIN 0.5%
2	FULL POWER CURRENT RANGE	4000 mA ~5700mA	I/P: 230 VAC O/P: FULL LOAD CP: 4A & 5.7A Ta: 25°C	60V/4A/230VAC 42V/5.7A/230VAC
3	CONSTANT CURRENT REGION	CP: 4A: CH1: 30V~ 63.6 V CP 5.7A: CH1: 30V~42V	I/P: 230 VAC O/P: FULL LOAD CP: 4A & 5.7A Ta: 25°C	CP 4A: 5.7V~ 63.6V/230VAC CP 5.7A: 6.5V~ 48.7V/230VAC
4	OPEN CIRCUIT VOLTAGE (max.)	65V	I/P: 230 VAC O/P: NO LOAD CP: OPEN	63.8V
5	CURRENT RIPPLE	4.0% max. @ rated current	I/P: 230 VAC O/P: FULL LOAD CP: 4A & 5.7A Ta: 25°C	CP 4A: 1.00% CP 5.7A: 0.71%
6	CURRENT ADJ. RANGE	2000 mA ~5700mA	I/P: 230 VAC O/P: LED MIN& LED MAX-1V Ta: 25°C	1809mA ~ 4410mA/230VAC@ LED max 1806mA ~ 6780mA /230VAC@ LED min
7	CONSTANT POWER	O/P: 240W	I/P: 230 VAC O/P: $V_o \times I_o$ CP: 4A & 5.7A	TEST: OK
8	SET UP TIME(Max)	1200ms/115VAC 500ms/230VAC	I/P: 115 VAC I/P: 230 VAC O/P: FULL LOAD CP: 4A Ta: 25°C	300 ms /115 VAC 298 ms /230 VAC

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



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

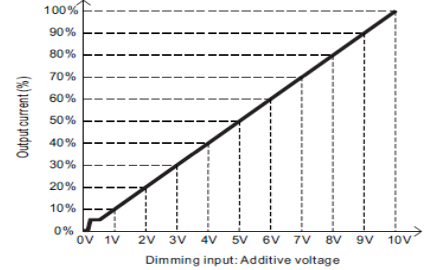
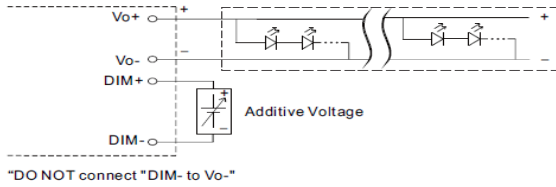


9 DIMMING OPERATION (for AB-Type)

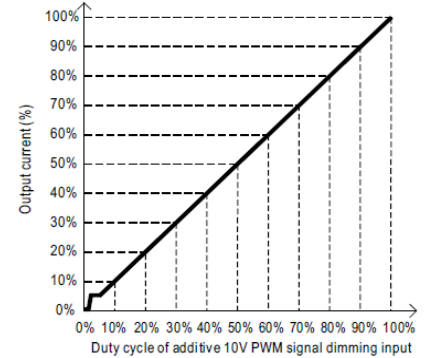
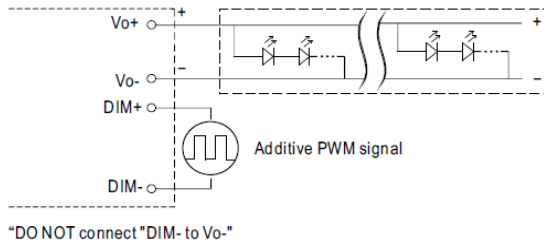
※ 3 in 1 dimming function (for AB-Type)

- 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 μ A (typ.)

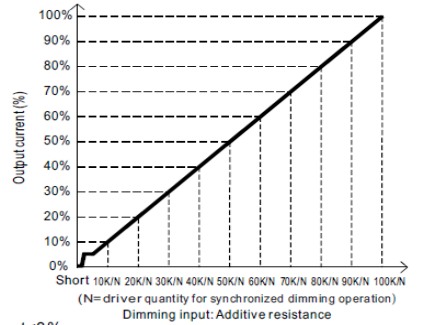
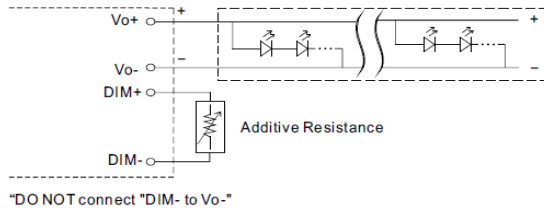
◎ Applying additive 0 ~ 10VDC



◎ 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 $0\% < I_{out} < 8\%$.
 2. The output current could drop down to 0% when dimming input is about $0k\ \Omega$ or 0Vdc, or 10V PWM signal with 0% duty cycle.

I/P: 230 VAC

O/P: DIMMING TEST

Ta: 25°C

1	DIMMING	Short	1V	2V	3V	4V	5V	6V	7V	8V	9V	10V	OPEN
	Output Current	0	0.489A	0.831A	1.210A	1.570A	1.940A	2.320A	2.770A	3.170A	3.580A	3.990A	3.990A
%	0%	12.23%	20.78%	30.25%	39.25%	48.50%	58.00%	69.25%	79.25%	89.50%	99.75%	99.75%	
2	PWM	0V	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	OPEN
	Output Current	0	0.488A	0.830A	1.165A	1.520A	1.940A	2.320A	2.700A	3.110A	3.540A	3.990A	3.990A
	%	0%	12.20%	20.75%	29.13%	38.00%	48.50%	58.00%	67.50%	77.75%	88.50%	99.75%	99.75%
3	R	0%	10K	20K	30K	40K	50K	60K	70K	80K	90K	100K	OPEN
	Output Current	0	0.488A	0.828A	1.165A	1.570A	1.940A	2.320A	2.700A	3.140A	3.540A	3.910A	3.990A
	%	0%	12.20%	20.70%	29.13%	39.25%	48.50%	58.00%	67.50%	78.50%	88.50%	97.75%	99.75%

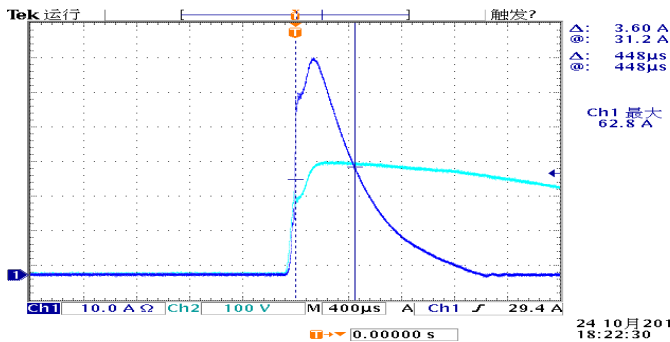
TEST RESULT: OK

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305VAC	I/P: TESTING O/P: FULL LOAD CP 4A (PLEASE CHECK DERATING CURVE) Ta: 25°C	97V~315V
			I/P: LOW-LINE-3V=97 V HIGH-LINE+10V=315 V O/P: FULL/MIN LOAD CP 4A (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: 97 VAC ~308 VAC O/P: FULL~NO LOAD CP 4A Ta: 25°C	TEST: OK
3	INPUT CURRENT	3.2A/115VAC 1.3A/230VAC 1.2A/277VAC	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: FULL LOAD CP 4A Ta: 25°C	I=2.282A/ 115VAC I = 1.122A/ 230VAC I = 0.951A/277VAC
4	LEAKAGE CURRENT	< 0.75mA / 277VAC	I/P: 277 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.273mA N-FG: 0.274mA
5	STANDBY POWER CONSUMPTION	<0.5W for AB -Type	I/P: 230VAC O/P: STANDBY Ta: 25°C	0.448W
6	INRUSH CURRENT(Typ)	230 V/ 65A COLD START (twidth=600us measured at 50% Ipeak) COLD START at 230V	I/P: 230 VAC O/P: FULL LOAD CP 4A Ta: 25°C	I=62.8A/ 230VAC Twidth = 448us

INPUT=230VAC/50HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



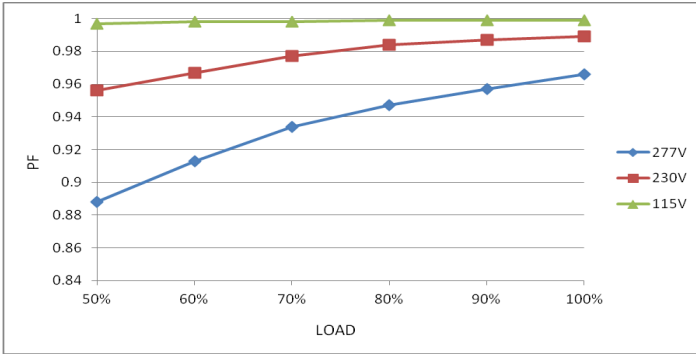


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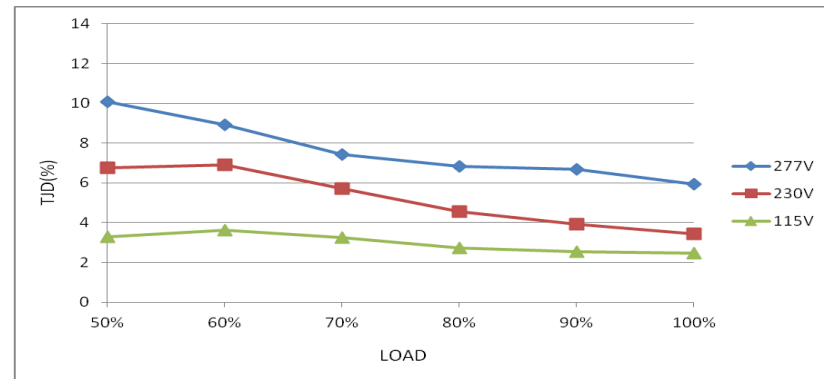
7	POWER FACTOR	0.97/ 115VAC@ FULL LOAD 0.95/ 230VAC@ FULL LOAD 0.92/ 277VAC@ FULL LOAD	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC CP 4A O/P: FULL LOAD Ta: 25°C	PF=0.999 @ FULL LOAD /115VAC PF=0.989 @ FULL LOAD /230VAC PF=0.966@ FULL LOAD /277VAC
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PF vs LOAD



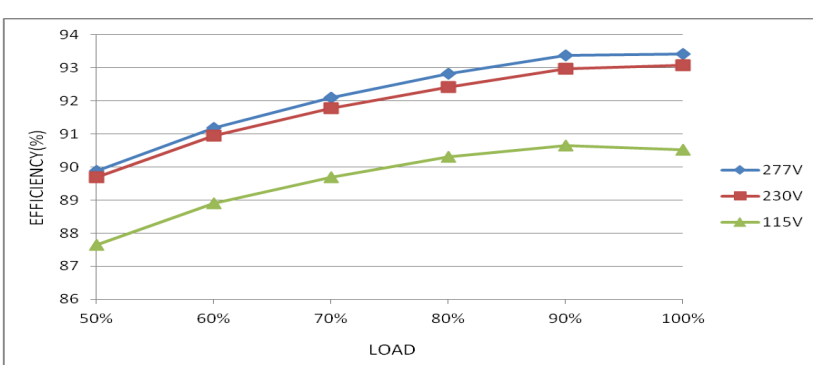
8	TOTAL HARMONIC DISTORTION	THD < 10% (@load ≥ 50%/115VAC; @load ≥ 50%/230VAC; @load ≥ 75%/277VAC)	I/P: 115 VAC I/P: 230 VAC I/P: 277 VAC O/P: 50% /75% LOAD CP 4A Ta: 25°C	THD=3.31% @50% load /115VAC THD=6.76% @50% load /230VAC THD=7.09% @75% load /277VAC
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THD vs LOAD



9	EFFICIENCY(Typ)	93.0%	I/P: 230VAC O/P: FULL LOAD CP 4A Ta: 25°C	93.00%
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EFFICIENCY vs LOAD



PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 100VAC I/P: 230VAC I/P: 305VAC O/P: FULL LOAD CP 4A	O.T.P. Active Shut down output voltage, re-power on to recovery
2	OVER VOLTAGE PROTECTION	V1: 66V~ 78V	I/P: 305VAC I/P: 230VAC I/P: 100VAC O/P: MIN LOAD CP 4A Ta: 25°C	69.5V/ 305VAC 69.5V/ 230VAC 69.5V/ 100VAC Shut down output voltage, re-power on to recovery
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 100VAC I/P: 230VAC I/P: 305VAC O/P: FULL LOAD CP: 4A & 5.7A Ta: 25°C	NO DAMAGE 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	Q69 Rated 12A/600V	I/P: High-Line +3V =308V O/P: (1) Full Load (2) Output Short (3) Full load continue I/P: Low-Line -3VAC =97VAC O/P: (1) Full Load (2) Output Short (3) Full load continue Ta: 25°C	CP:4A CP:5.7A (1) 488V (1)484V (2) 484V (2)484V (3) 440V (3)460V CP:4A CP:5.7A (1) 452V (1)468V (2) 517V (2)525V (3) 440V (3)464V
2	PFC Transistor (D to S) or (C to E) Peak Voltage	Q3 Rated 20A/600V	I/P: High-Line +3V =308V O/P: (1) Full Load (2) Output Short (3) Full Load continue I/P: Low-Line -3VAC =97VAC O/P: (1) Full Load (2) Output Short (3) Full Load continue Ta: 25°C	CP:4A CP:5.7A (1) 554V (1)554V (2) 550V (2)550V (3) 506V (3)506V CP:4A CP:5.7A (1) 566V (1)566V (2) 570V (2)562V (3) 558V (3)562V
3	P.F.C DIODE	D5 Rated 600V/8A	I/P: High-Line +3V =308V O/P: (1) Full Load (2) Output Short (3) Full load continue I/P: Low-Line -3VAC =97VAC O/P: (1) Full Load (2) Output Short (3) Full Load continue Ta: 25°C	CP:4A (1) 498V (2) 486V (3) 482V CP:4A (1) 470V (2) 470V (3) 430V



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4	Diode Peak Voltage	D200 Rated 30A/150V	I/P: High-Line +3V =308V O/P: (1)Full Load (2)Output Short (3) Full Load continue (4) No Load Ta: 25°C	CP:4A (1)134V (2)20.4V (3)132V (4)143V	CP:5.7A 97.6V 20.1V 96.8V 129.3V
5	Input Capacitor Voltage	C5 Rated: 120 μ F/ 450V	I/P: High-Line +3V =308 V CP: 4A O/P: (1)Full Load input on/off (2) Min load input on /Off (3) Full load continue Ta: 25°C	(1) 447V (2) 447V (3) 435V	
6	Control IC Voltage Test	PWM IC U2 Rated 35 V PFC IC U67 25.7V	I/P: High-Line +3V =308V CP: 4A O/P:(1)FULL LOAD (2) Output Short (3) O.V.P (4)NO LOAD VR.LOW LINE Ta: 25°C	U67 (1) 17.7V (2) 17.8V (3) 18.0V (4) 17.4V	U2 17.7V 18.7V 17.6V 18.0V

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: 2.4 KVAC/min O/P-FG: 1.8 KVAC/min Ta: 25°C	I/P-O/P: 3.195mA I/P-FG: 3.070mA O/P-FG: 3.75mA 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: >9999M Ω NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25°C	10mΩ

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



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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 : 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: XBG-240-AB 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta= 26.7°C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=68.0°C																																																																																																						
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 26.7 °C</th> <th>HIGH AMBIENT Ta=68.0 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>C2</td><td>56.5°C</td><td>93.9°C</td></tr> <tr><td>2</td><td>BD1</td><td>62.6°C</td><td>98.5°C</td></tr> <tr><td>3</td><td>L1</td><td>58.1°C</td><td>94.7°C</td></tr> <tr><td>4</td><td>L2</td><td>58.5°C</td><td>96.6°C</td></tr> <tr><td>5</td><td>D5</td><td>61.9°C</td><td>101.1°C</td></tr> <tr><td>6</td><td>Q3</td><td>58.4°C</td><td>96.8°C</td></tr> <tr><td>7</td><td>R18</td><td>58.7°C</td><td>97.6°C</td></tr> <tr><td>8</td><td>C5</td><td>58.8°C</td><td>96.8°C</td></tr> <tr><td>9</td><td>Q69</td><td>59.4°C</td><td>100.3°C</td></tr> <tr><td>10</td><td>Q70</td><td>60.0°C</td><td>101.7°C</td></tr> <tr><td>11</td><td>U1</td><td>56.9°C</td><td>95.2°C</td></tr> <tr><td>12</td><td>U2</td><td>55.5°C</td><td>93.7°C</td></tr> <tr><td>13</td><td>U67</td><td>55.7°C</td><td>94.1°C</td></tr> <tr><td>14</td><td>RTH4</td><td>53.4°C</td><td>91.9°C</td></tr> <tr><td>15</td><td>T1</td><td>63.1°C</td><td>102.4°C</td></tr> <tr><td>16</td><td>D200</td><td>63.6°C</td><td>96.9°C</td></tr> <tr><td>17</td><td>D201</td><td>64.5°C</td><td>102.7°C</td></tr> <tr><td>18</td><td>C205</td><td>58.1°C</td><td>96.4°C</td></tr> <tr><td>19</td><td>C207</td><td>61.1°C</td><td>99.5°C</td></tr> <tr><td>20</td><td>C206</td><td>61.1°C</td><td>99.4°C</td></tr> <tr><td>21</td><td>C208</td><td>54.7°C</td><td>93.0°C</td></tr> <tr><td>22</td><td>U140</td><td>56.8°C</td><td>95.7°C</td></tr> <tr><td>23</td><td>U231</td><td>51.6°C</td><td>89.8°C</td></tr> <tr><td>24</td><td>TC</td><td>48.7°C</td><td>86.3°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 26.7 °C	HIGH AMBIENT Ta=68.0 °C	1	C2	56.5°C	93.9°C	2	BD1	62.6°C	98.5°C	3	L1	58.1°C	94.7°C	4	L2	58.5°C	96.6°C	5	D5	61.9°C	101.1°C	6	Q3	58.4°C	96.8°C	7	R18	58.7°C	97.6°C	8	C5	58.8°C	96.8°C	9	Q69	59.4°C	100.3°C	10	Q70	60.0°C	101.7°C	11	U1	56.9°C	95.2°C	12	U2	55.5°C	93.7°C	13	U67	55.7°C	94.1°C	14	RTH4	53.4°C	91.9°C	15	T1	63.1°C	102.4°C	16	D200	63.6°C	96.9°C	17	D201	64.5°C	102.7°C	18	C205	58.1°C	96.4°C	19	C207	61.1°C	99.5°C	20	C206	61.1°C	99.4°C	21	C208	54.7°C	93.0°C	22	U140	56.8°C	95.7°C	23	U231	51.6°C	89.8°C	24	TC	48.7°C	86.3°C
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12	U2	55.5°C	93.7°C																																																																																																					
13	U67	55.7°C	94.1°C																																																																																																					
14	RTH4	53.4°C	91.9°C																																																																																																					
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19	C207	61.1°C	99.5°C																																																																																																					
20	C206	61.1°C	99.4°C																																																																																																					
21	C208	54.7°C	93.0°C																																																																																																					
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOURS	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 60 °C NO DAMAGE	I/P: 305VAC O/P: FULL LOAD Ta=60 °C HUMIDITY= 95% R.H	TEST: OK
4	TEMPERATURE COEFFICIENT	±0.03%/°C (0~60°C)	I/P: 230 VAC O/P: FULL LOAD	±0.001%/°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~+60°C	1. Thermal shock Temperature: -45°C~ +65°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	XBG-240-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) 46259 HRS (2) 50908 HRS (3) 48258 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 3491.7K hrs min. Telcordia SR-332 (Bellcore) ; 154.6K 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/ZHOUBIAO	WENF	LIUWY