Test Report: XLN-40-12

40W Constant Voltage 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

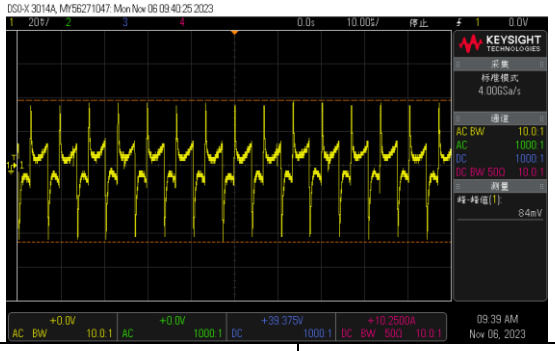
ENVIRONMENT TEST

■ DESIGN VERIFY TEST

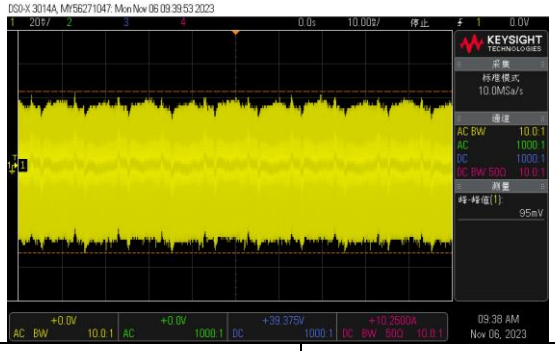
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE	V1: -4% ~ 4%	I/P:100VAC /305AC O/P:FULL/ MIN LOAD Ta:25℃	V1: -0.08%~1.17%
2	LINE REGULATION	V1: -0.5% ~ 0.5%	I/P:100VAC~305AC O/P:FULL LOAD Ta:25℃	V1: -0.0%~0.0%
3	LOAD REGULATION	V1: -5% ~ 5%	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25℃	V1: -0.50%~0.58%
4	OVER/UNDERSHOOT TEST	< ± 5%	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ **CCH MODE TEST**	TEST: 2.25 %
5	RIPPLE & NOISE (Max)	V1: 120mVp-p	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ **CCH MODE TEST**	V1: 95mVp-p

high frequency :

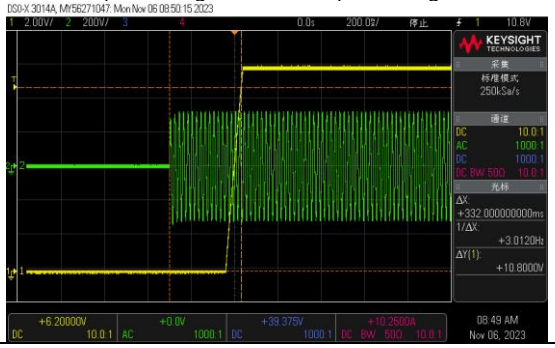


low frequency :

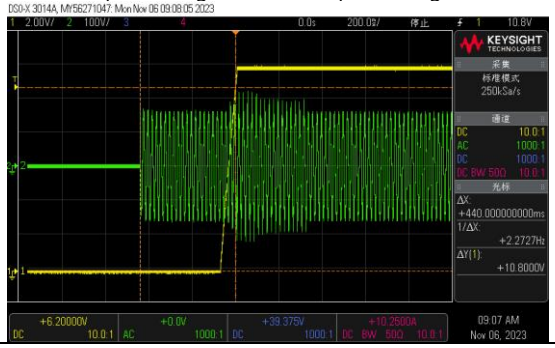


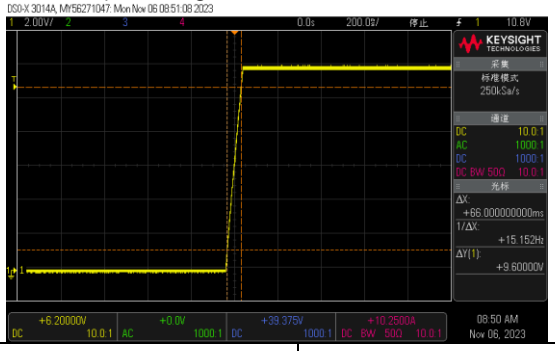
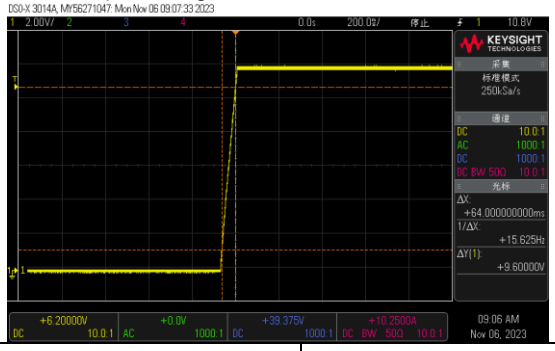
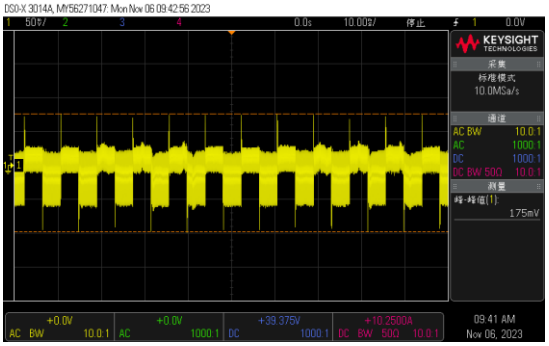
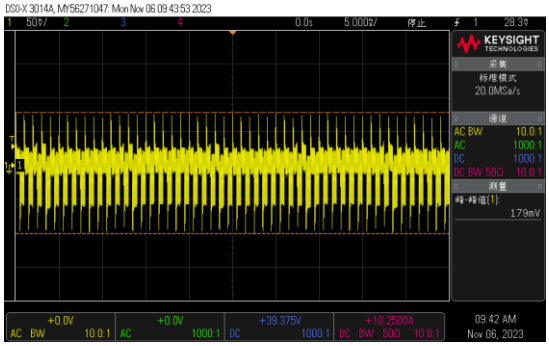
6	SET UP TIME (Max)	230VAC/500ms 115VAC/1000ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25℃ **CCH MODE TEST**	230VAC/332ms 115 VAC/440ms

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



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

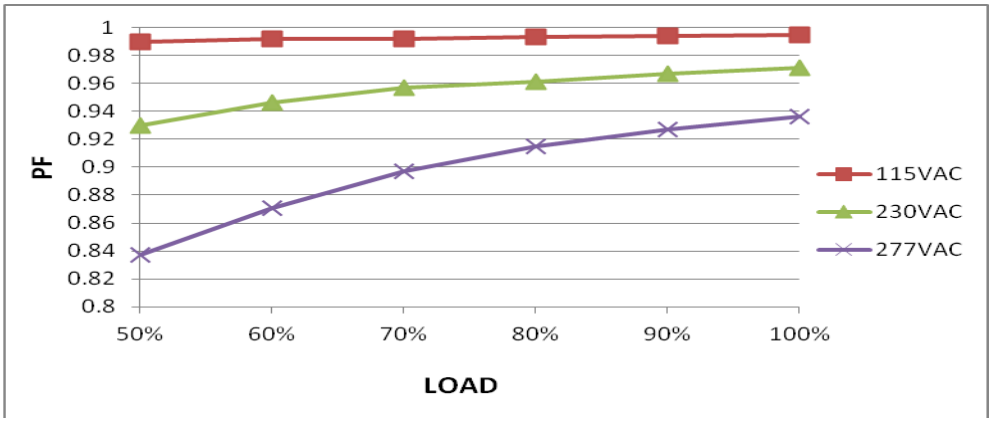


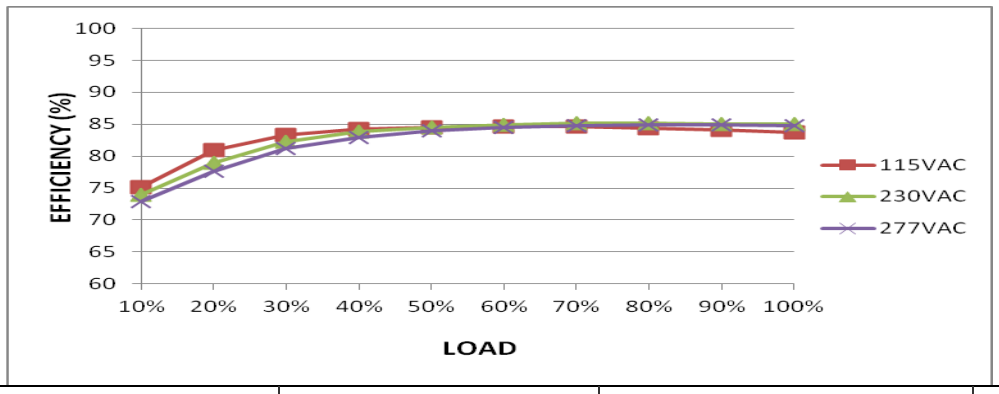
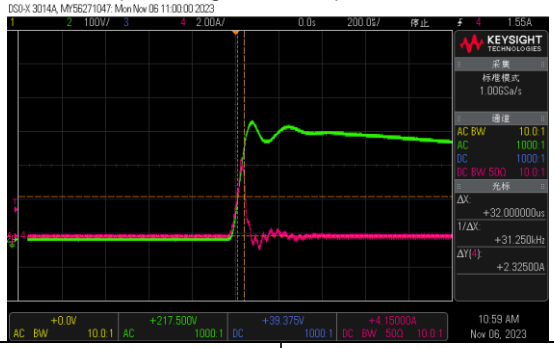
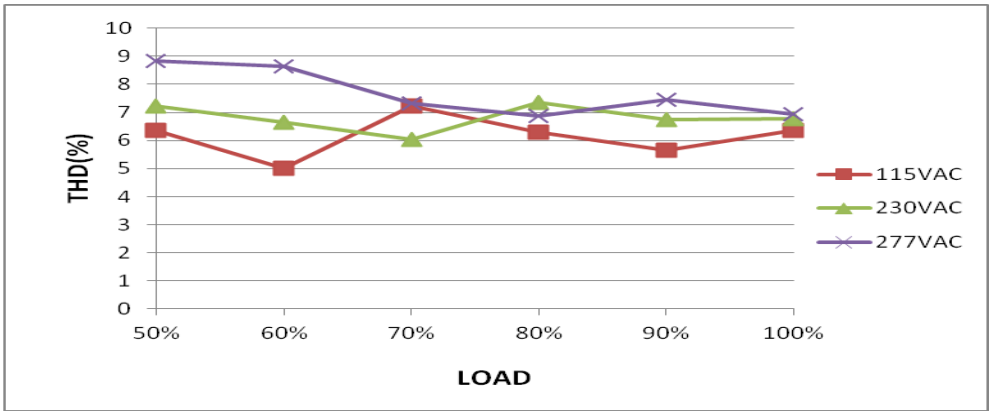
7	RISE TIME (Max)	230VAC/100ms 115VAC/100ms	I/P: 230 VAC I/P: 115 VAC O/P:FULL LOAD Ta:25℃ **CCH MODE TEST**	230VAC/66ms 115 VAC/64ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage 		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage 	
8	DYNAMIC LOAD	V1:1200mVp-p	I/P: 230VAC O/P: (1) FULL /50% LOAD 50%DUTY / 120HZ (2) FULL /50% LOAD 50%DUTY / 1KHZ Ta:25℃	 175mVp-p 179mVp-p
	FULL /50% LOAD 50%DUTY / 120HZ 		FULL /50% LOAD 50%DUTY / 1KHZ 	

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~305 VAC 141VDC~400VDC	(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) 141Vdc~431Vdc/FULL LOAD 141Vdc~431Vdc/50% LOAD (3) 141Vdc~431Vdc/FULL LOAD 141Vdc~431Vdc/50% LOAD
			I/P: LOW-LINE-3V=97 V HIGH-LINE+10V=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: 100 VAC ~305VAC O/P:FULL~MIN LOAD Ta:25℃	TEST:OK
3	INPUT CURRENT (TYP)	277VAC/0.2A 230 VAC/0.25A 115 VAC/ 0.5A	I/P: 277VAC/230 VAC/115 VAC O/P:FULL LOAD Ta:25℃ CCH MODE TEST	I= 0.118A/277VAC I =0.210A/ 230VAC I =0.420A/ 115VAC
4	LEAKAGE CURRENT	<0.75mA / 277 VAC	I/P： 277VAC O/P：Min LOAD Ta：25℃	L-FG:0.013mA N-FG:0.012mA
5	POWER FACTOR(TYP)	0.95/230 VAC FULL LOAD 0.97/115 VAC FULL LOAD 0.92/277 VAC FULL LOAD	I/P: 230 VAC/115VAC/277VAC O/P:FULL LOAD Ta:25℃ CCH MODE TEST	PF=0.971/230V/100%LOAD PF= 0.995/115V/100%LOAD PF= 0.936/277V/100%LOAD

P.F vs LOAD



6	EFFICIENCY (TYP)	86%	I/P: 230 VAC O/P:FULL LOAD Ta:25℃ CCH MODE TEST	86.03%
	EFFICIENCY vs LOAD 			
7	INRUSH CURRENT (TYP)	230 V/10A COLD START (twidth=100 us measured at 50% Ipeak) COLD START	I/P: 230 VAC 115VAC O/P:FULL LOAD Ta:25℃ CCH MODE TEST	I = 4.63A/ 230VAC T50= 32 us
	INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current (1V=1A) 			
8	TOTAL HARMONIC DISTORTION	THD< 10%(@load ≥ 50%/230VAC; @load ≥ 75%/277VAC); THD<15%@load 50%/115VAC	I/P : 115VAC/230VAC/277VAC O/P : 50% /75% LOAD Ta : 25℃	THD : 7.22% 230VAC 50% THD : 7.04% 277VAC 75% THD : 6.35% 115VAC 50%
	THD&LOAD 			

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	105%~ 220%	I/P: 305VAC I/P: 230VAC I/P: 100VAC O/P:TESTING Ta:25℃	147.65%/ 305VAC 147.35%/ 230VAC 121.76%/ 100VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	V1: 13V~16V	I/P: 308VAC I/P: 230VAC I/P: 100VAC O/P:MIN LOAD Ta:25℃	14.7V/ 308VAC 14.7V/ 230VAC 14.7V/100VAC PROTECTION TYPE : Shut down and latch off o/p voltage, re-power on to recover
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 305 VAC I/P: 100VAC O/P:FULL LOAD	O.T.P Active OK PROTECTION TYPE : Shut down output voltage, recovers automatically after fault condition is remove
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 308VAC I/P: 100VAC O/P: FULL LOAD Ta:25℃	NO DAMAGE PROTECTION TYPE : Hiccup mode, 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**	Q1 Rated 800V/10A	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) 676V (2) 701V (3) 672V (4) 672V (5) 668V (6) 692V (7) 735V VDS: (1) 407V (2) 415V (3) 407V (4) 407V (5) 411V (6) 424V (7) 387V
2	Diode Peak **Voltage**	D101 Rated 20A/200V	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℃	D101: VDS: (1) 143V (2) 149V (3) 141V (4) 143V (5) 141V (6) 145V (7) 167V (8) 159V

3	**Control IC Voltage Test**	U1 Rated 7V~18V U100 Rated 6V~75V	AC ON/OFF I/P: High-Line +3V =308 V FOR C.V MODE TYPE O/P (1) FULL LOAD (2) Output Short (3) O.L.P (4) O.V.P. (5) NO LOAD VRmin.LOW LINE Ta:25℃	U1 (1) 15.9V (2) 14.7V (3) 14.9V (4) 14.7V (5) 13.1V U100 (1)29.1V (1) 26.8V (2) 25.8V (3) 25.6V (4) 25.8V
4	Clamp Diode Peak Voltage	D10 Rated： 1000V/1A	AC ON/OFF I/P：High-Line +3V = 308 V O/P： (1) Dynamic Load 90%Duty/1KHz (2) Full load continue Ta：25℃	(1)633V (2)637V
5	Buck Diode Peak Voltage MOS	Q110 Rated： 60V /47A	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. Ta：25℃	(1)41.8V (2)42.6V (3)41.4V (4)41.4V (5)41.4V (6)39.4V (7)40.2V
6	Buck Diode Peak Voltage	Q111 Rated： 60V/47A	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. Ta：25℃	(1)33.0V (2)38.2V (3)33.0V (4)35.8V (5)35.8V (6)37.8V (7)38.2V

■ SAFETY & EMC TEST REPORT

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75KVAC/min	I/P-O/P: 4.125 KVAC/min Ta:25℃	I/P-O/P: 1.58mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25℃	I/P-O/P: >9999MΩ NO DAMAGE

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	PASS
2	CONDUCTION	EN55015	I/P: 230 VAC (50HZ) O/P:FULL/50% LOAD Ta:25℃	PASS Test by certified Lab
3	RADIATION	EN55015	I/P: 230 VAC (50HZ) O/P:FULL LOAD Ta:25℃	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 AIR : 8KV / Contact : 4KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
5	E.F.T	EN61000-4-4 INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	CRITERIA A
6	SURGE	IEC61000-4-5 L-N :1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25℃	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

<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： XLN-40-12
1. ROOM AMBIENT BURN-IN：2 HRS
I/P： 230VAC O/P： FULL LOAD Ta=25.4 ℃
2. HIGH AMBIENT BURN-IN： 2 HRS
I/P： 230VAC O/P： FULL LOAD Ta=51.3 ℃
<table>
<tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=25.4 ℃</th><th>HIGH AMBIENT Ta=51.3 ℃</th></tr>
<tr><td>1</td><td>ZNR2</td><td>67.0℃</td><td>90.7℃</td></tr>
<tr><td>2</td><td>BD1</td><td>66.8℃</td><td>89.9℃</td></tr>
<tr><td>3</td><td>C4</td><td>68.0℃</td><td>91.8℃</td></tr>
<tr><td>4</td><td>C20</td><td>65.5℃</td><td>89.0℃</td></tr>
<tr><td>5</td><td>Q1</td><td>84.3℃</td><td>109.4℃</td></tr>
<tr><td>6</td><td>U1</td><td>73.7℃</td><td>96.9℃</td></tr>
<tr><td>7</td><td>D10</td><td>83.9℃</td><td>109.0℃</td></tr>
<tr><td>8</td><td>R38</td><td>78.8℃</td><td>102.8℃</td></tr>
<tr><td>9</td><td>T1</td><td>77.1℃</td><td>101.2℃</td></tr>
<tr><td>10</td><td>D101</td><td>91.8℃</td><td>114.9℃</td></tr>
<tr><td>11</td><td>Q110</td><td>82.5℃</td><td>106.9℃</td></tr>
<tr><td>12</td><td>Q111</td><td>81.5℃</td><td>105.6℃</td></tr>
<tr><td>13</td><td>Q120</td><td>77.4℃</td><td>100.8℃</td></tr>
<tr><td>14</td><td>L100</td><td>82.0℃</td><td>106.9℃</td></tr>
<tr><td>15</td><td>C101</td><td>77.8℃</td><td>101.7℃</td></tr>
<tr><td>16</td><td>C201</td><td>70.8℃</td><td>94.8℃</td></tr>
<tr><td>17</td><td>RTH3</td><td>67.0℃</td><td>90.9℃</td></tr>
<tr><td>18</td><td>U100</td><td>77.3℃</td><td>101.4℃</td></tr>
<tr><td>19</td><td>TC</td><td>61.3℃</td><td>85.9℃</td></tr>
</table></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：142.44 % 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/110VAC
O/P： 100 % LOAD
Ta=-30 ℃</td><td>TEST：OK</td></tr>
<tr><td>4</td><td>HIGH HUMIDITY
HIGH TEMPERATURE
HIGH VOLTAGE
TURN ON TEST</td><td>AFTER 12 HOURS
IN CHAMBER ON
CONTROL 50 ℃
NO DAMAGE</td><td>I/P： 315 VAC
O/P：FULL LOAD
Ta=50 ℃
HUMIDITY= 95 %R.H</td><td>TEST：OK</td></tr>
<tr><td>5</td><td>TEMPERATURE
COEFFICIENT</td><td>± 0.03 %(0℃~50℃)</td><td>I/P： 230 VAC
O/P：FULL LOAD</td><td>± 0.01 %(0~50℃)</td></tr>
</table>

6	STORAGE TEMPERATURE TEST	-40~80℃	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
7	THERMAL SHOCK TEST	-25~50℃	1. Thermal shock Temperature： -30℃~ +55℃ 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, 2G 10min./1cycle, period for 60min. 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：3G (5) Test Time：180min in each axis (X.Y.Z) (6) Ta：25℃
9	CAPACITOR LIFE CYCLE	SUPPOSE C101 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Tc=75 ℃ LIFE TIME (2) I/P： 230VAC O/P：75% LOAD Tc=75 ℃ LIFE TIME (3) I/P： 230VAC O/P：50% LOAD Tc=75 ℃ LIFE TIME	(1) 24063HRS (2) 44049HRS (3) 67077HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 3935.2K hrs min. Telcordia SR-332 (Bellcore) ; 342.9K 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

2020.10.1 TAG-QA-009