



Test Report: RS-75-12

75W Single Output Switching Power Supply

■ 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

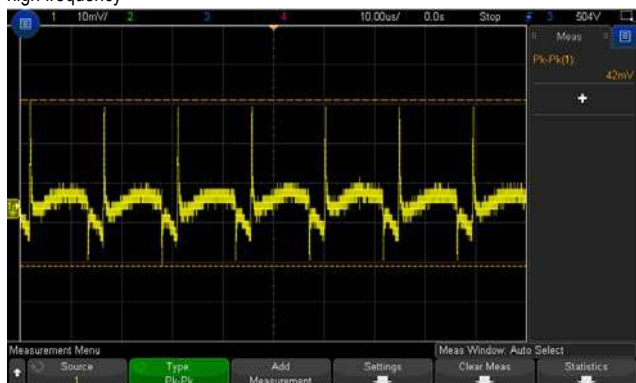
ENVIRONMENT TEST

DESIGN VERIFY TEST

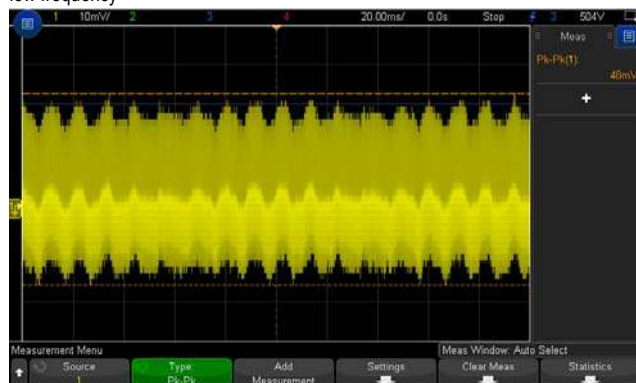
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 10.8 V~13.2 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	10.34V~13.83V/230VAC 10.34V~13.83V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -1%~ 1 %	I/P: 88VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.04 %~0.04%
3	LINE REGULATION (Max)	V1: -0.5 %~ 0.5 %	I/P: 88VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1: -0.01 %~0.01%
4	LOAD REGULATION(Max)	V1: -0.5 %~0.5 %	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.04 %~ 0.04%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	0.4%
6	RIPPLE & NOISE(Max)	V1: 120 mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 48mVp-p

high frequency :



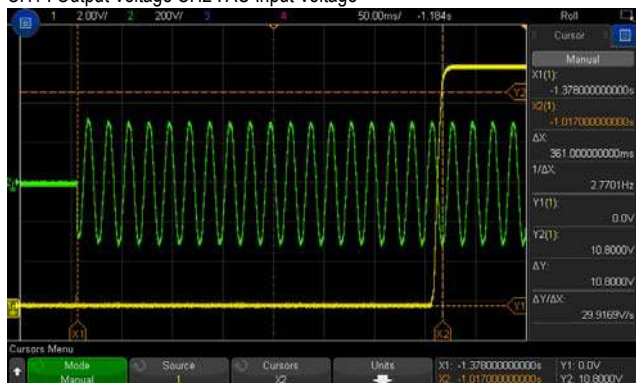
low frequency :



7	SET UP TIME(Max)	500ms /230VAC 1200ms /115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 361 ms 115VAC/ 360ms
---	------------------	---------------------------------	--	---------------------------------

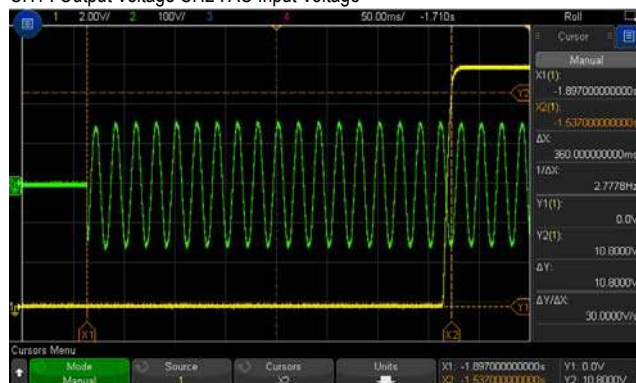
INPUT=230VAC/50HZ @ FULL LOAD

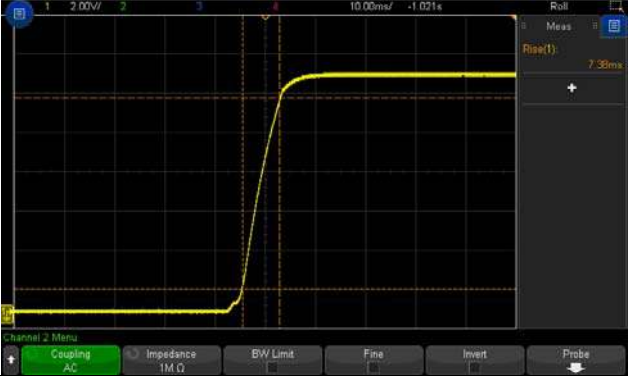
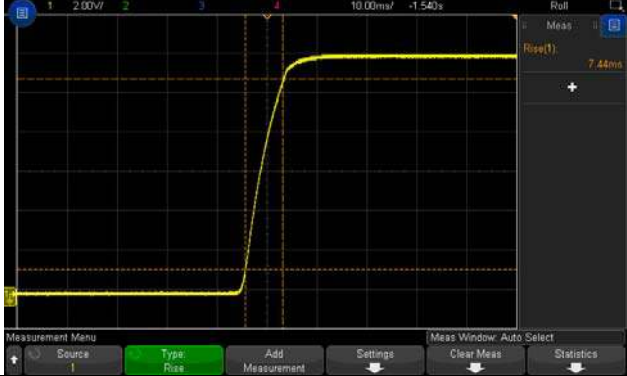
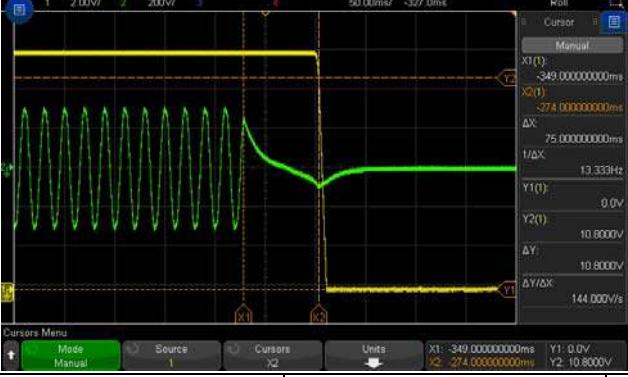
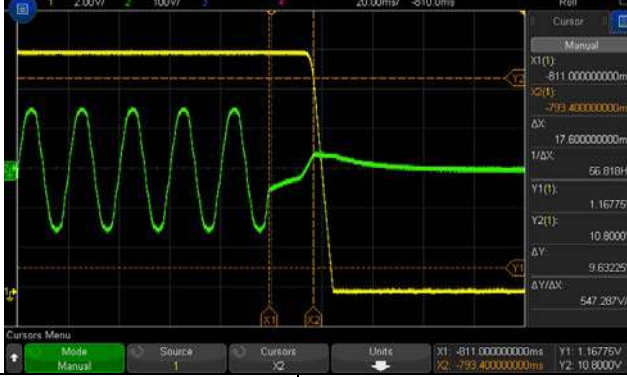
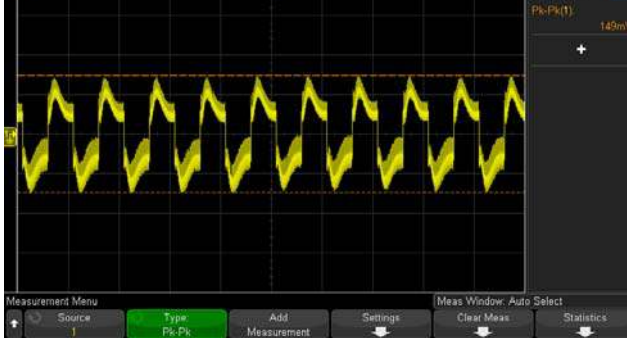
CH1 : Output Voltage CH2 : AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

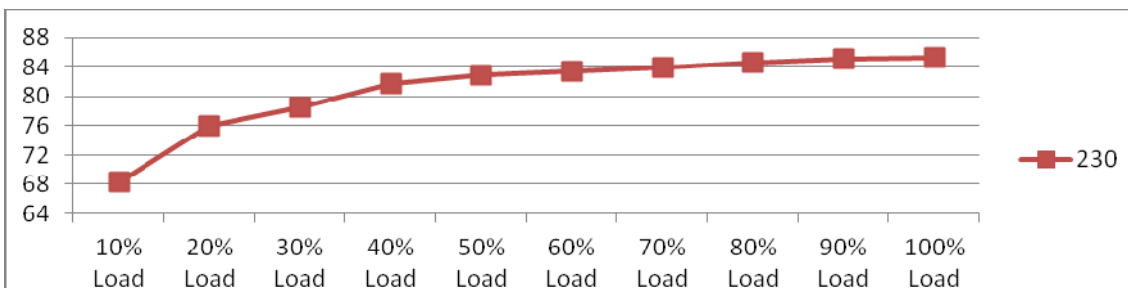


8	RISE TIME (Max)	30ms/ 230VAC 30ms/ 115VAC/	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 7.38 ms 115VAC/ 7.44ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage				
INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage				
9	HOLD UP TIME (Typ.)	60ms/ 230VAC 14ms /115VAC	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 75ms 115VAC/ 17.6ms
INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage				
INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage				
10	DYNAMIC LOAD	V1: 1200 mVp-p	I/P: 230VAC O/P: (1)FULL /MIN LOAD 50%DUTY / 120HZ (2)FULL /MIN LOAD 50%DUTY / 1KHZ Ta:25°C	181mVp-p 149mVp-p
FULL /MIN LOAD 50%DUTY / 120HZ				
FULL /MIN LOAD 50%DUTY / 1KHZ				

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	88VAC~264VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	72V~264V
			I/P: LOW-LINE-3V=85 V HIGH-LINE+15%=300 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: 88 VAC ~264 VAC O/P: FULL~MIN LOAD Ta: 25°C	TEST: OK
3	INPUT CURRENT (Typ.)	230V/1.2A 115V/2.0A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I=0.61A/ 230VAC I=1.13A/ 115VAC
4	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.4 mA
5	EFFICIENCY(Typ.)	84.5%	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	85.3%

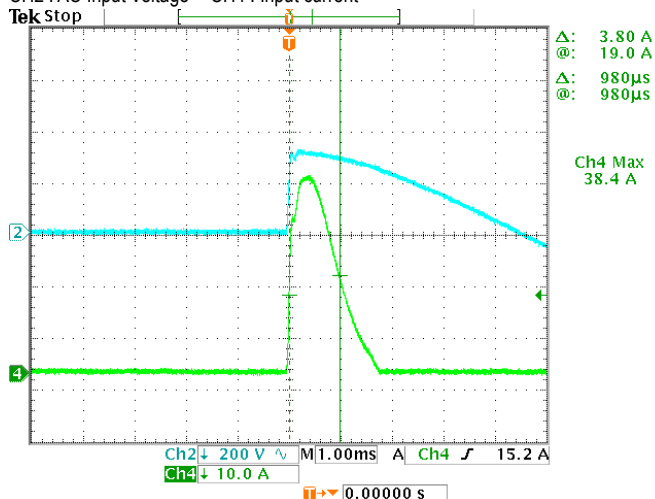
EFFICIENCY vs LOAD



6	INRUSH CURRENT(Typ.)	230V/40A COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	38.4A
---	----------------------	------------------------	---	-------

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	110 %~150%	I/P: 264VAC I/P: 230VAC I/P: 115VAC O/P: TESTING Ta:25°C	120.2%/ 264VAC 125.6%/ 230VAC 120.0%/115VAC PROTECTION TYPE : Hiccup mode ,recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	13.8V~16.2V	I/P: 264VAC I/P: 230VAC I/P: 88VAC O/P: MIN LOAD Ta:25°C	15.0V/ 264VAC 15.0V/ 230VAC 15.0V/ 88VAC PROTECTION TYPE : Hiccup mode ,recovers automatically after fault condition is removed
3	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264VAC O/P: FULL LOAD Ta:25°C	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 : 7A/ 650 V	AC ON/OFF I/P: High-Line +3V =267V VDS: O/P: (1) Full Load (2) Output Short (3) Full load continue Ta:25°C	VDS: (1) 556V (2) 572V (3) 516V
2	O/P DIODE	D55 Rated : 10A/ 200 V	I/P: High-Line +3V =267 V AC ON/OFF O/P: (1) Full Load (2) Output Short (3) Full load continue Ta:25°C	(1) 94.4V (2) 101.6V (3) 94.4V
3	Input Capacitor Voltage	C5 Rated : 150 μ / 400 V	I/P: High-Line +3V =267V 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) 379V (2) 371V (3) 371V (4) 367V
4	Control IC Voltage Test	U1 Rated : 7.7 V~ 18 V	AC ON/OFF I/P: High-Line +3V =267 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°C	U1 (1) 15.0V (2) 13.6V (3) 16.4V (4) 12.9V (5) 13.3V
5	Clamp Diode	D1 Rated : 3A/ 600 V	AC ON/OFF I/P : High-Line +3V = 267 V O/P : (1) Dynamic Load 90%Duty/1KHz (2) Full load continue Ta : 25°C	(1) 524V (2) 520V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG:2 KVAC/min O/P-FG: 0.5KVAC/min	I/P-O/P: 3.6 KVAC/min I/P- FG: 2.4 KVAC/min O/P - FG: 0.6 KVAC/min Ta:25°C	I/P-O/P:2.94mA I/P-FG:1.79mA O/P-FG:1.26mA 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: 600 VDC I/P- FG: 600 VDC Ta:25°C	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	40 A / 2min Ta: 25°C/70%RH	7 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:FULL LOAD Ta:25°C	☒ PASS ☐ FAIL
2	CONDUCTION	EN55032 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS B	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 ☐ INDUSTRY AIR: 8KV / Contact: 4KV ☐ Din rail Model : AIR: 15KV / Contact: 8KV	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 ☐ MEDICAL ☐ INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 LIGHT INDUSTRY L-N : 1KV L/N-PE : 2KV	I/P : 230 VAC/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 : RS-75-24 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 26.9 ℃ 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 49.9 ℃ <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 26.9 ℃</th><th>HIGH AMBIENT Ta= 49.9 ℃</th></tr><tr><td>1</td><td>LF1</td><td>53.5℃</td><td>75.1℃</td></tr><tr><td>2</td><td>C5</td><td>50.6℃</td><td>73.8℃</td></tr><tr><td>3</td><td>BD1</td><td>55.4℃</td><td>77.6℃</td></tr><tr><td>4</td><td>R2</td><td>76.3℃</td><td>94.9℃</td></tr><tr><td>5</td><td>D1</td><td>66.0℃</td><td>91.0℃</td></tr><tr><td>6</td><td>D55</td><td>63.6℃</td><td>86.2℃</td></tr><tr><td>7</td><td>Q1</td><td>55.1℃</td><td>90.9℃</td></tr><tr><td>8</td><td>U1</td><td>58.9℃</td><td>83.5℃</td></tr><tr><td>9</td><td>T1core</td><td>72.9℃</td><td>95.2℃</td></tr><tr><td>10</td><td>C10</td><td>56.4℃</td><td>80.3℃</td></tr><tr><td>11</td><td>T1coil</td><td>75.8℃</td><td>98.0℃</td></tr><tr><td>12</td><td>C58</td><td>47.8℃</td><td>70.9℃</td></tr><tr><td>13</td><td>ZD1</td><td>63.8℃</td><td>86.0℃</td></tr><tr><td>14</td><td>R55</td><td>81.1℃</td><td>103.4℃</td></tr><tr><td>15</td><td>R59</td><td>75.3℃</td><td>98.3℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 26.9 ℃	HIGH AMBIENT Ta= 49.9 ℃	1	LF1	53.5℃	75.1℃	2	C5	50.6℃	73.8℃	3	BD1	55.4℃	77.6℃	4	R2	76.3℃	94.9℃	5	D1	66.0℃	91.0℃	6	D55	63.6℃	86.2℃	7	Q1	55.1℃	90.9℃	8	U1	58.9℃	83.5℃	9	T1core	72.9℃	95.2℃	10	C10	56.4℃	80.3℃	11	T1coil	75.8℃	98.0℃	12	C58	47.8℃	70.9℃	13	ZD1	63.8℃	86.0℃	14	R55	81.1℃	103.4℃	15	R59	75.3℃	98.3℃
NO	Position	ROOM AMBIENT Ta= 26.9 ℃	HIGH AMBIENT Ta= 49.9 ℃																																																																	
1	LF1	53.5℃	75.1℃																																																																	
2	C5	50.6℃	73.8℃																																																																	
3	BD1	55.4℃	77.6℃																																																																	
4	R2	76.3℃	94.9℃																																																																	
5	D1	66.0℃	91.0℃																																																																	
6	D55	63.6℃	86.2℃																																																																	
7	Q1	55.1℃	90.9℃																																																																	
8	U1	58.9℃	83.5℃																																																																	
9	T1core	72.9℃	95.2℃																																																																	
10	C10	56.4℃	80.3℃																																																																	
11	T1coil	75.8℃	98.0℃																																																																	
12	C58	47.8℃	70.9℃																																																																	
13	ZD1	63.8℃	86.0℃																																																																	
14	R55	81.1℃	103.4℃																																																																	
15	R59	75.3℃	98.3℃																																																																	
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 128% LOAD Ta : 25℃	TEST : OK																																																																
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/88VAC O/P : 100 % LOAD Ta= -25℃	TEST : OK																																																																
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL50℃ /95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta=50 ℃ HUMIDITY= 95 %R.H	TEST : OK																																																																
5	TEMPERATURE COEFFICIENT	± 0.03%/℃ (0~50℃)	I/P : 230 VAC O/P : FULL LOAD	± 0.0037%/℃ (0~50℃)																																																																
6	STORAGE TEMPERATURE TEST	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		TEST : OK																																																																
7	THERMAL SHOCK TEST	1. Thermal shock Temperature : -25℃~ +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		TEST : OK																																																																



8	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 5G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C	TEST : OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C58 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta=50 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME	(1) 595587.7 HRS (2) 104596.8 HRS (3) 132497 HRS (4) 190208.8 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 265K hrs min. MIL-HDBK-217F (25°C)	
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50°C Demonstration Mean Time Between Failure : 30,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

2018.4.30 GP-A50-F010