



Test Report: RS-75-5

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

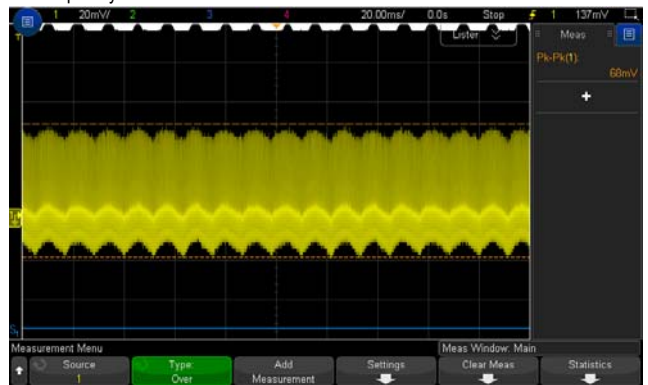
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 4.75 V~5.5 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	4.65V~5.90V/230VAC 4.65V~5.90V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -2%~ 2 %	I/P: 88VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1: -0.26 %-0.26%
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: -1 %~1 %	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.26 %~ 0.26%
5	OVER/UNDERSHOOT TEST	< ±10%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	2.4 %
6	RIPPLE & NOISE(Max)	V1: 80 mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 68mVp-p

high frequency :



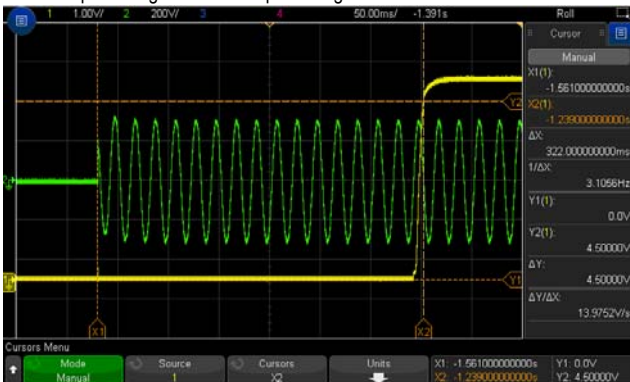
low frequency :



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/ 322ms 115VAC/ 347ms
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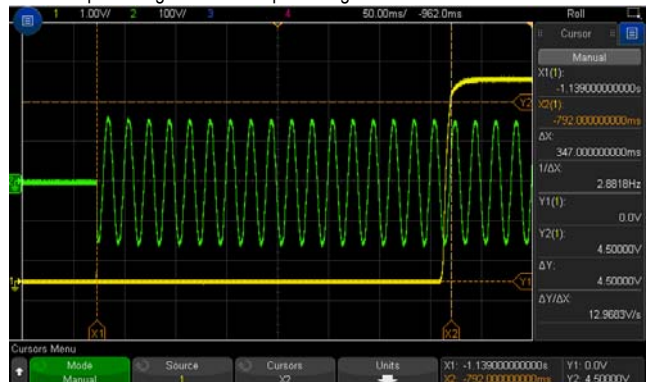
INPUT=230VAC/50HZ @ FULL LOAD

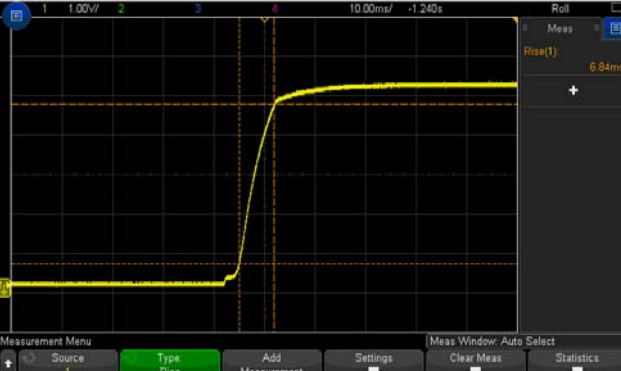
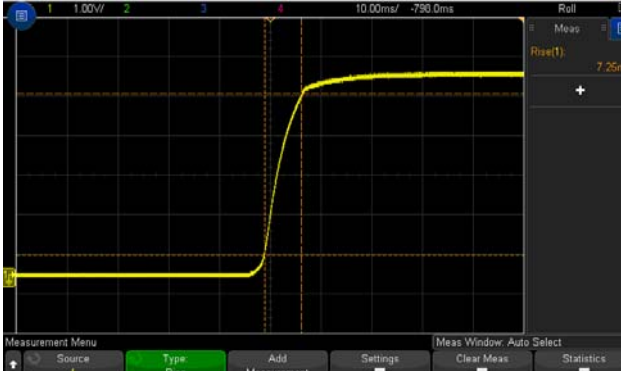
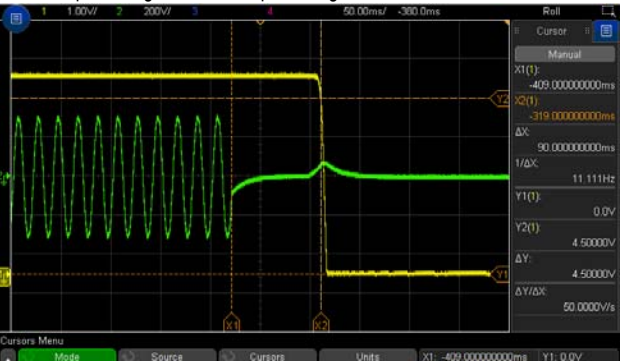
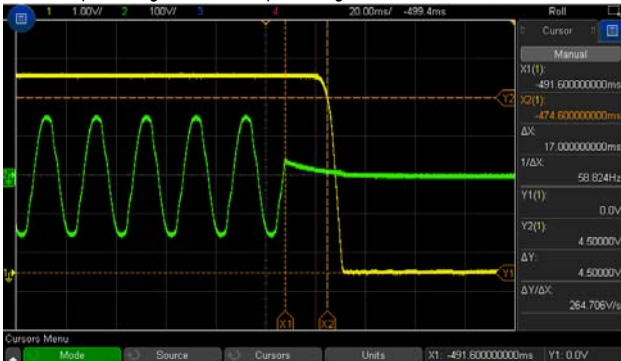
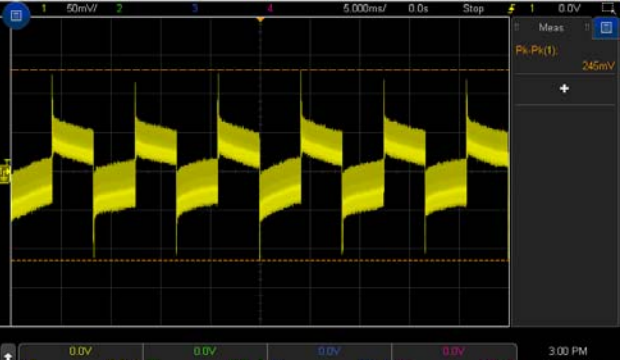
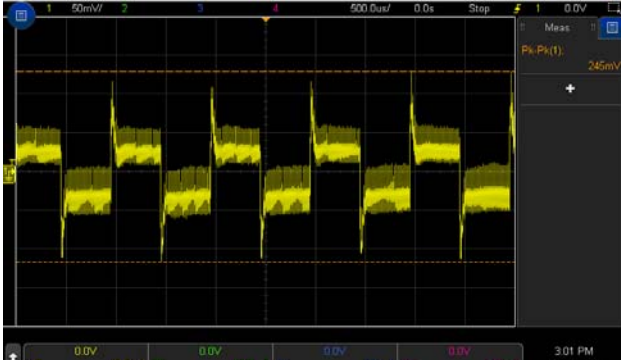
CH1 : Output Voltage CH2 : AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

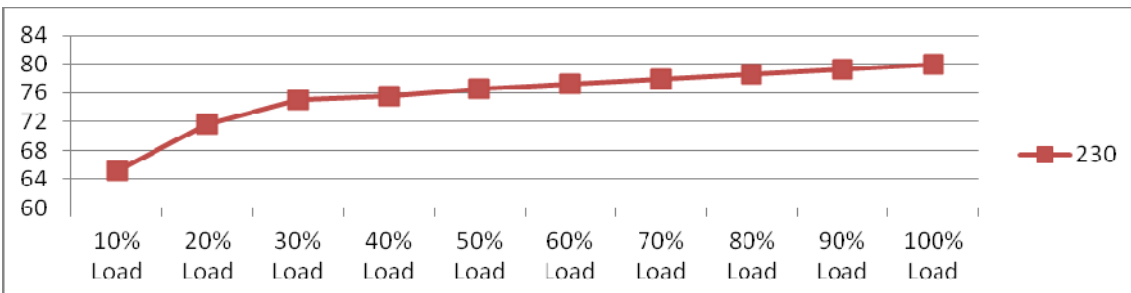


<p>8</p> <p>RISE TIME (Max)</p>	<p>30ms/ 230VAC 30ms/ 115VAC/</p>	<p>I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>230VAC/ 6.84ms 115VAC/ 7.25 ms</p>
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage</p> 		<p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage</p> 	
<p>9</p> <p>HOLD UP TIME (Typ.)</p>	<p>60ms/ 230VAC 14ms /115VAC</p>	<p>I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>230VAC/ 90ms 115VAC/ 17ms</p>
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p> 		<p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p> 	
<p>10</p> <p>DYNAMIC LOAD</p>	<p>V1: 1000 mVp-p</p>	<p>I/P: 230VAC O/P: (1)FULL /MIN LOAD 50%DUTY / 120HZ (2)FULL /MIN LOAD 50%DUTY / 1KHZ Ta:25°C</p>	<p>245mVp-p 245mVp-p</p>
<p>FULL /MIN LOAD 50%DUTY / 120HZ</p> 		<p>FULL /MIN LOAD 50%DUTY / 1KHZ</p> 	

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	77V~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=0.56A/ 230VAC I=0.98A/ 115VAC
4	LEAKAGE CURRENT	< 2 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.3 mA
5	EFFICIENCY(Typ.)	79%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	79.9%

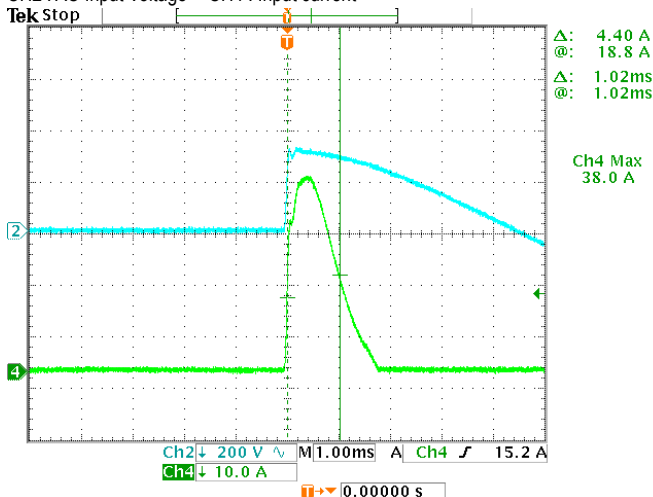
EFFICIENCY vs LOAD



6	INRUSH CURRENT(Typ.)	230V/40A COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	38A
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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	118.7%/ 264VAC 121.5%/ 230VAC 120.2%/115VAC PROTECTION TYPE : Hiccup mode ,recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	5.75V~6.75V	I/P: 264VAC I/P: 230VAC I/P: 88VAC O/P: MIN LOAD Ta:25°C	6.59V/ 264VAC 6.59V/ 230VAC 6.59V/ 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 : 6A/ 600 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) 544V (2) 520V (3) 540V
2	O/P DIODE	D55 Rated : 30A/ 45 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) 40.5V (2) 34.0V (3) 38.1V
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) 387V (2) 375V (3) 375V (4) 371V
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) 16.6V (2) 13..2V (3) 14.2V (4) 12.7V (5) 12.7V
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) 508V (2) 512V

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:2.57mA I/P-FG:1.80mA O/P-FG:1.31mA 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	<input checked="" type="checkbox"/> PASS <input type="checkbox"/> 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 <input checked="" type="checkbox"/> LIGHT INDUSTRY AIR: 8KV / Contact: 4KV <input type="checkbox"/> INDUSTRY AIR: 8KV / Contact: 4KV <input type="checkbox"/> 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 <input checked="" type="checkbox"/> LIGHT INDUSTRY INPUT : 1KV <input type="checkbox"/> MEDICAL <input type="checkbox"/> 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-75-5 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 26.9 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 49.9 °C																																																														
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 26.9 °C</th> <th>HIGH AMBIENT Ta= 49.9 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>LF1</td><td>52.4°C</td><td>75.2°C</td></tr> <tr><td>2</td><td>C5</td><td>60.0°C</td><td>82.7°C</td></tr> <tr><td>3</td><td>BD1</td><td>58.6°C</td><td>81.2°C</td></tr> <tr><td>4</td><td>R2</td><td>102.8°C</td><td>117.8°C</td></tr> <tr><td>5</td><td>D1</td><td>82.8°C</td><td>103.7°C</td></tr> <tr><td>6</td><td>D55</td><td>84.9°C</td><td>106.8°C</td></tr> <tr><td>7</td><td>Q1</td><td>73.1°C</td><td>98.1°C</td></tr> <tr><td>8</td><td>U1</td><td>74.1°C</td><td>96.6°C</td></tr> <tr><td>9</td><td>T1core</td><td>85.5°C</td><td>108.9°C</td></tr> <tr><td>10</td><td>C10</td><td>73.0°C</td><td>96.9°C</td></tr> <tr><td>11</td><td>T1coil</td><td>92.5°C</td><td>108.3°C</td></tr> <tr><td>12</td><td>C58</td><td>68.4°C</td><td>91.6°C</td></tr> <tr><td>13</td><td>R55</td><td>86.3°C</td><td>107.8°C</td></tr> <tr><td>14</td><td>R59</td><td>87.9°C</td><td>110.2°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta= 26.9 °C	HIGH AMBIENT Ta= 49.9 °C	1	LF1	52.4°C	75.2°C	2	C5	60.0°C	82.7°C	3	BD1	58.6°C	81.2°C	4	R2	102.8°C	117.8°C	5	D1	82.8°C	103.7°C	6	D55	84.9°C	106.8°C	7	Q1	73.1°C	98.1°C	8	U1	74.1°C	96.6°C	9	T1core	85.5°C	108.9°C	10	C10	73.0°C	96.9°C	11	T1coil	92.5°C	108.3°C	12	C58	68.4°C	91.6°C	13	R55	86.3°C	107.8°C	14	R59	87.9°C	110.2°C
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 135% LOAD Ta : 25°C	TEST : OK																																																												
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/88VAC O/P : 100 % LOAD Ta= -25°C	TEST : OK																																																												
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL50°C /95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta=50 °C HUMIDITY= 95 %R.H	TEST : OK																																																												
5	TEMPERATURE COEFFICIENT	± 0.03%/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.0056%/°C (0~50°C)																																																												
6	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45°C~ +90°C 2. Temperature change rate : 25°C / 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°C~ +55°C 2. Temperature change rate : 25°C / 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) 173328.4 HRS (2) 30170.2 HRS (3) 63419.6 HRS (4) 153310.5 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