Test Report: RD-125-4824

125W Dual 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

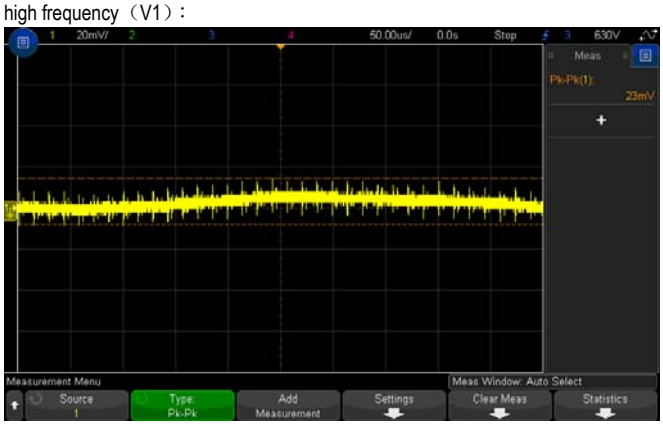
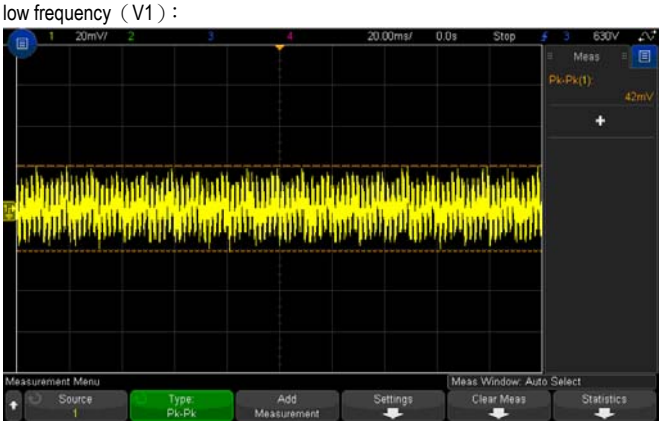
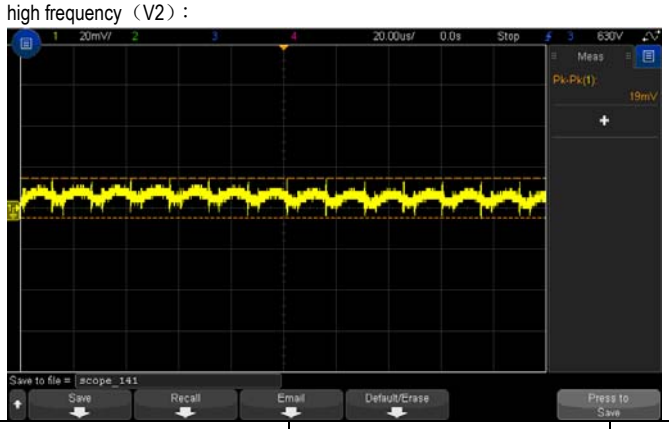
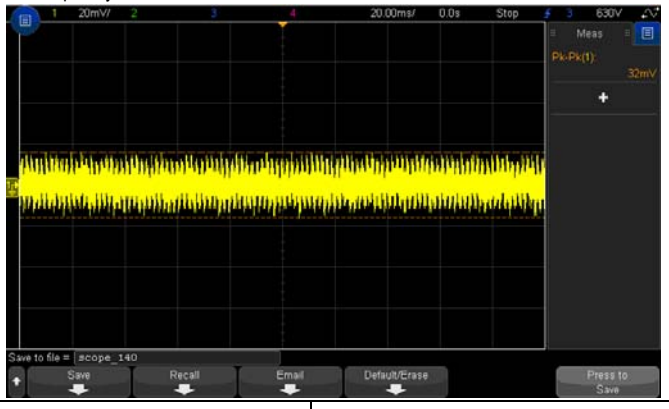
Safety Test
E.M.C. Test

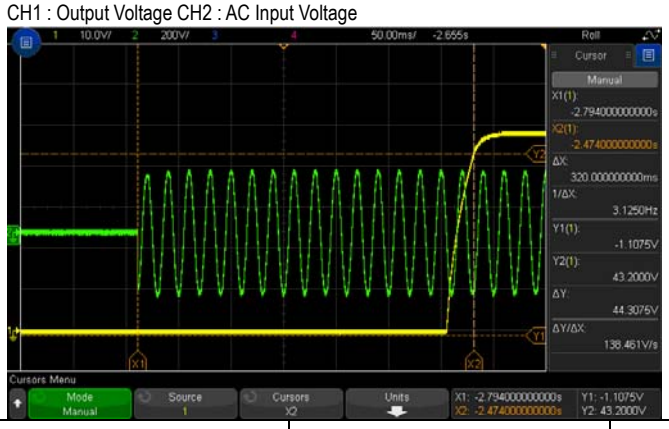
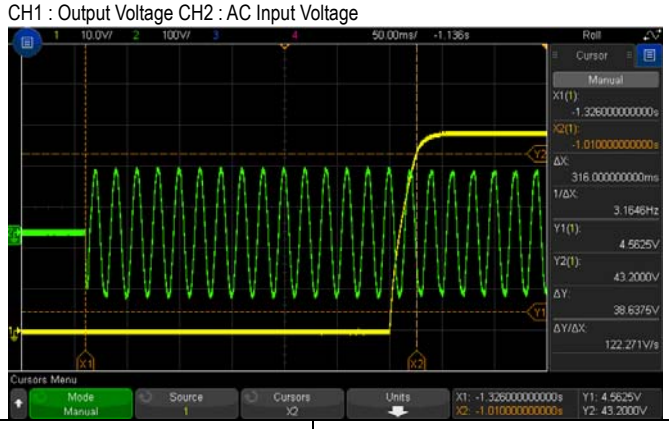
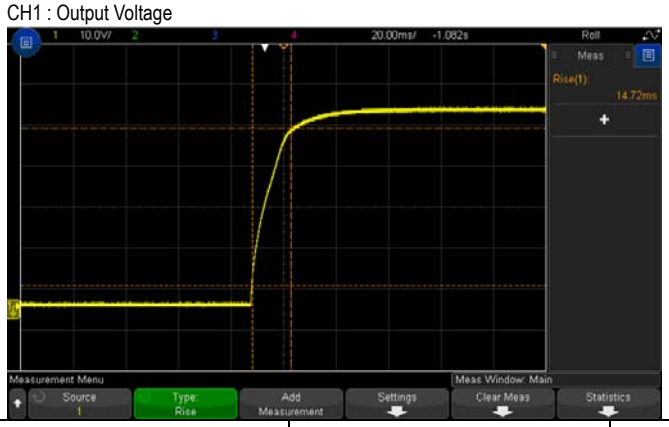
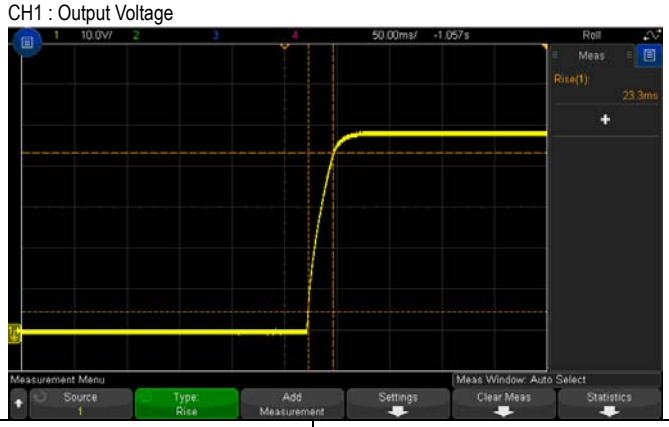
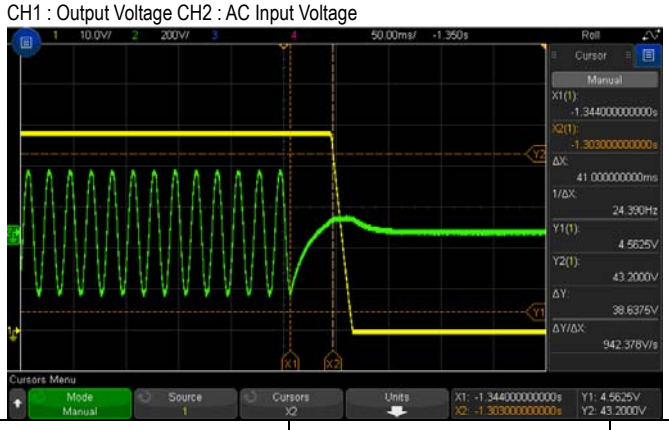
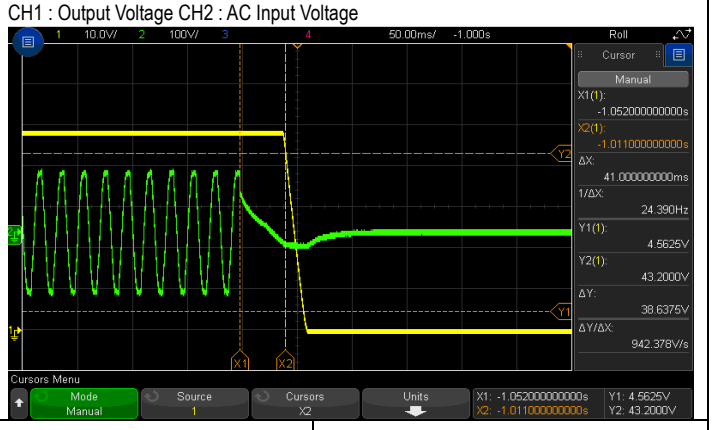
■ RELIABILITY TEST

ENVIRONMENT TEST

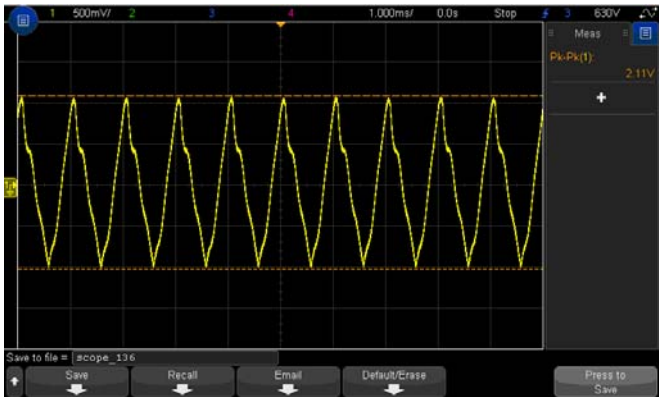
■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

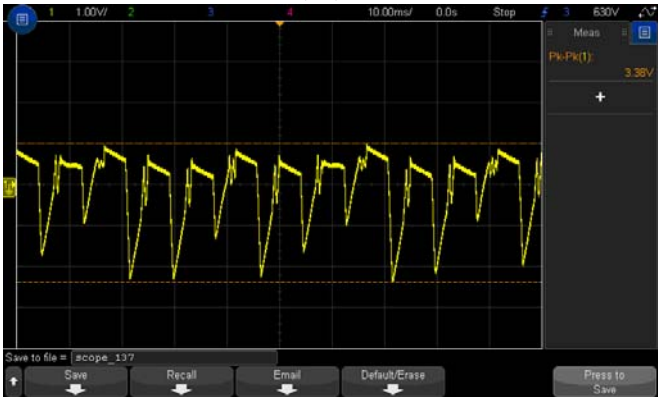
NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 45.6V~ 52.8V	I/P： 230 VAC I/P： 115 VAC O/P：MIN LOAD Ta：25℃	41.54V~53.21V /230VAC 41.54V~53.21V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1： -1%~1 % V2： -8%~8 %	I/P: 88VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25℃	V1： -0.05%~0.07% V2： -0.10%~0.14%
3	LINE REGULATION (Max)	V1: -0.5%~ 0.5% V2: -1%~ 1%	I/P: 88VAC~ 264VAC O/P:FULL LOAD Ta:25℃	V1： -0.05%~0.03% V2： -0.05%~0.04%
4	LOAD REGULATION(Max)	V1: -1%~1% V2: -5%~5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1： -0.02%~0.07% V2： -0.10%~0.14%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25℃	1.2%
6	RIPPLE & NOISE(Max)	V1: 240mVp-p V2: 240mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25℃	V1: 42mVp-p V2: 32mVp-p
	high frequency（V1）：  low frequency（V1）：  high frequency（V2）：  low frequency（V2）： 			
7	SET UP TIME(Max)	230VAC/500ms 115VAC/1200ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	230VAC/ 320 ms 115VAC/ 316ms

	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)	230VAC/20ms 115VAC/30ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	230VAC/14.7ms 115VAC/ 23.3ms
	INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage 		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage 	
9	HOLD UP TIME (Typ.)	230VAC/25ms 115VAC/30ms	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	230VAC/ 41ms 115VAC/ 41ms
	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: 4800 mVp-p V2: 2400 mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25℃	（1） （2） V1：2110mVp-p 3380mVp-p V2：900mVp-p 1150mVp-p

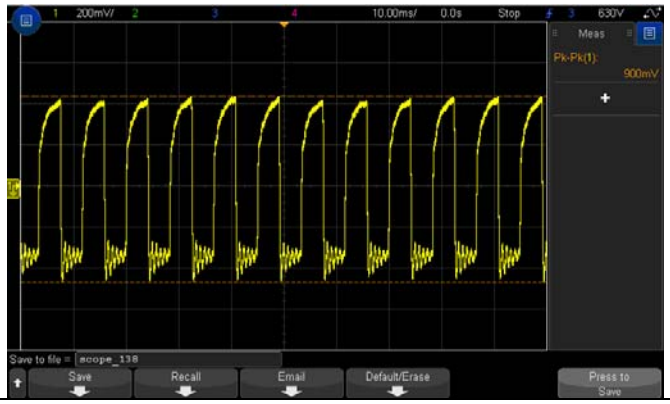
FULL /50% LOAD 50%DUTY / 120HZ（V1）



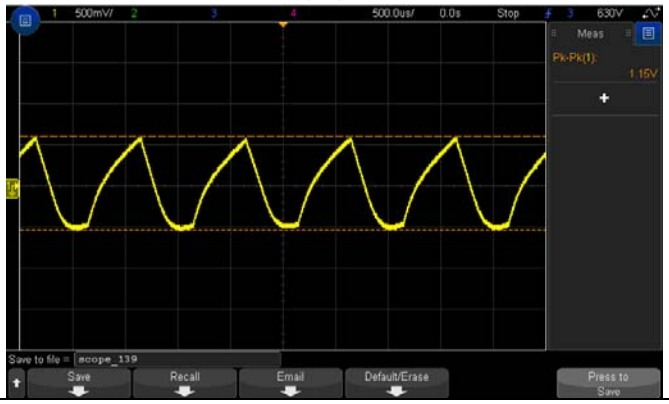
FULL /50% LOAD 50%DUTY / 1KHZ（V1）



FULL /50% LOAD 50%DUTY / 120HZ（V2）



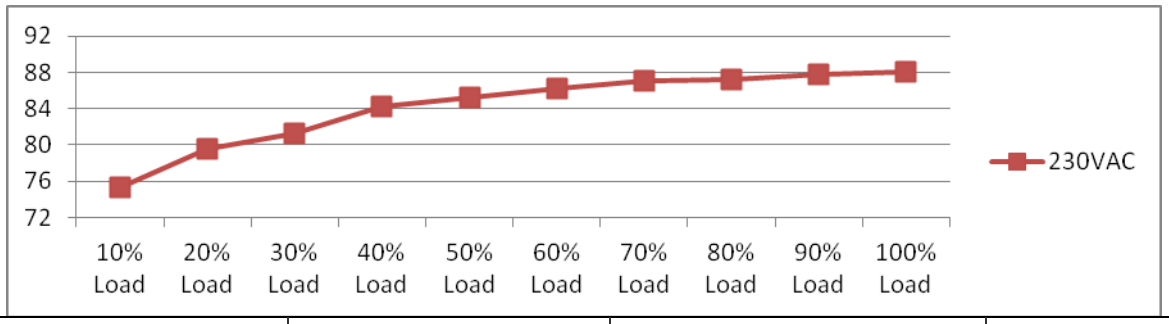
FULL /50% LOAD 50%DUTY / 1KHZ（V2）



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℃	80V~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℃	TEST：OK
3	INPUT CURRENT (Typ.)	230V/ 2A 115V/ 3A	I/P： 230 VAC I/P： 115 VAC O/P：FULL LOAD Ta：25℃	I =1.14A/ 230VAC I =2.03A/ 115VAC
4	LEAKAGE CURRENT	<2 mA / 240 VAC	I/P： 240 VAC O/P：Min LOAD Ta：25℃	0.72mA
5	EFFICIENCY(Typ.)	86%	I/P:230 VAC O/P:FULL LOAD Ta:25℃	88.0%

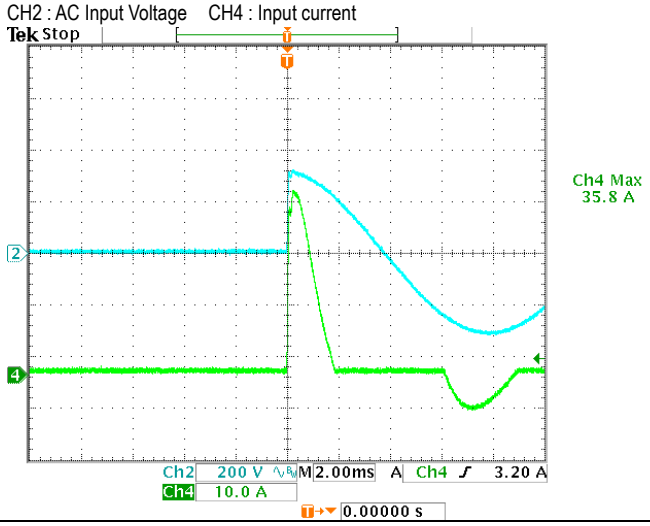
EFFICIENCY vs LOAD



6	INRUSH CURRENT(Typ.)	230V / 50A COLD START	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	35.8A

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: 88VAC O/P:TESTING Ta:25℃	112.3%/ 264VAC 114.4%/ 230VAC 121.6%/88VAC PROTECTION TYPE： Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	55.2V~64.8V	I/P: 264VAC I/P: 230VAC I/P: 88VAC O/P:MIN LOAD Ta:25℃	61.6V/ 264VAC 61.6V/ 230VAC 61.6V/ 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 I/P: 88VAC 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 : 900 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℃	VDS: (1) 716V (2) 853V (3) 628V
2	O/P Diode	D55 Rated : 400 V D60 Rated : 200 V	AC ON/OFF I/P:High-Line +3V =267 V O/P: (1)Full Load (2)Output Short (3) Full Load Continue Ta:25℃	D55 D60 (1) 386V (1) 191V (2) 378V (2) 197V (3) 390V (3) 191V
3	Input Capacitor Voltage	C5 Rated :330 μ / 200 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℃	(1) 189V (2) 187V (3) 187V (4) 185 V
4	Control IC Voltage Test	U1 Rated :8.4V~ 21 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℃	(1) 15.5V (2) 15.5V (3) 15.3V (4) 14.7V (5) 14.9V
5	Clamp Diode Peak Voltage	D1 Rated :1000 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℃	(1) 620V (2) 588V

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℃	I/P-O/P:3.55mA I/P-FG:1.69mA O/P-FG:1.30mA 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℃	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℃/70%RH	6mΩ

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℃	☑PASS ☐FAIL
2	CONDUCTION	EN55032 CLASS B	I/P： 230 VAC (50HZ) O/P：FULL/50% LOAD Ta：25℃	PASS Test by certified Lab
3	RADIATION	EN55032 CLASS B	I/P： 230 VAC (50HZ) O/P：FULL LOAD Ta：25℃	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR：8KV / Contact：4KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT： 2KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N ：2KV L/N-PE ：4KV	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

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	TEMPERATURE RISE TEST	MODEL：RD-125-2412 1. ROOM AMBIENT BURN-IN：1.5 HRS I/P： 230VAC O/P： FULL LOAD Ta= 23.4 ℃ 2. HIGH AMBIENT BURN-IN：1.5 HRS I/P： 230VAC O/P： FULL LOAD Ta=45.0℃		

NO	Position	ROOM AMBIENT Ta= 23.4 ℃	HIGH AMBIENT Ta=45.0 ℃
1	LF1	50.5℃	70.8℃
2	BD1	65.4℃	84.4℃
3	C5	59.6℃	77.9℃
4	C6	56.6℃	75.5℃
5	Q1	67.9℃	89.1℃
6	D1	70.1℃	89.9℃
7	U1	62.0℃	81.3℃
8	C10	57.3℃	76.8℃
9	ZD1	69.0℃	87.5℃
10	ZD2	61.5℃	81.0℃
11	T1	75.0℃	93.8℃
12	D60	78.5℃	98.1℃
13	D55	91.5℃	110.5℃
14	L60	84.9℃	105.5℃
15	C56	62.4℃	84.2℃
16	C62	75.4℃	95.6℃
17	R55	100.7℃	112.7℃

2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P： 230 VAC O/P：115% 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 CONTROL45℃ / 95 %R.H NO DAMAGE	I/P： 272 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	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： -30℃~ +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		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℃		TEST：OK
9	CAPACITOR LIFE CYCLE	SUPPOSE C62 IS THE MOST CRITICAL COMPONENT (1) I/P： 230VAC O/P：FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P： 230VAC O/P：FULL LOAD Ta=45 ℃ LIFE TIME (3) I/P： 230VAC O/P：75% LOAD Ta=45 ℃ LIFE TIME (4) I/P： 230VAC O/P：50% LOAD Ta= 45 ℃ LIFE TIME		(1) 71715.8HRS (2) 19783.7HRS (3) 30934.5 HRS (4) 44504.5HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 232.4K hrs min. MIL-HDBK-217F (25℃)		
11	Ongoing Reliability Test	I/P：230VAC O/P：FULL LOAD TA=50℃ Demonstration Mean Time Between Failure : 30,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	LIUTT		WANGDZ

2018.4.30 GP-A50-F010