



Test Report: RD-125-2448

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

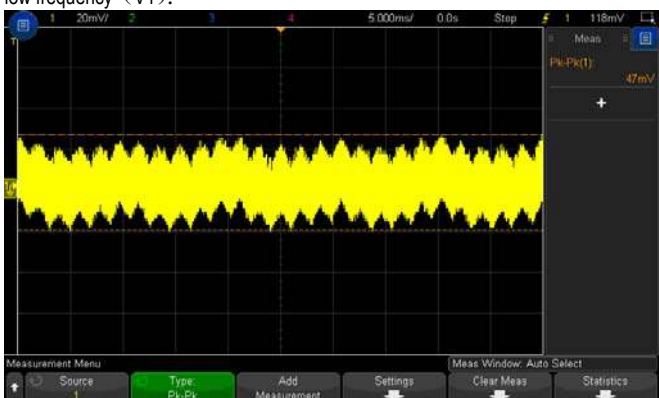
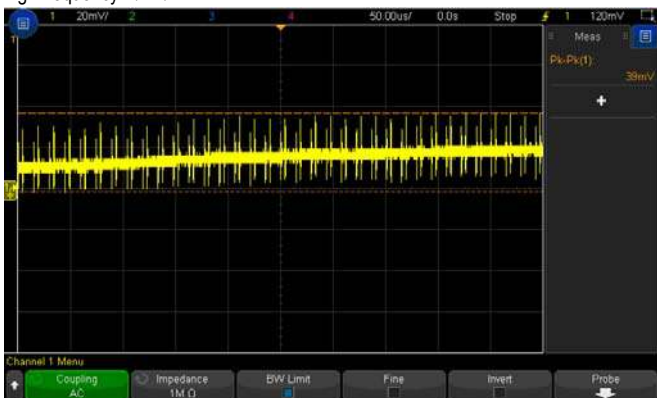
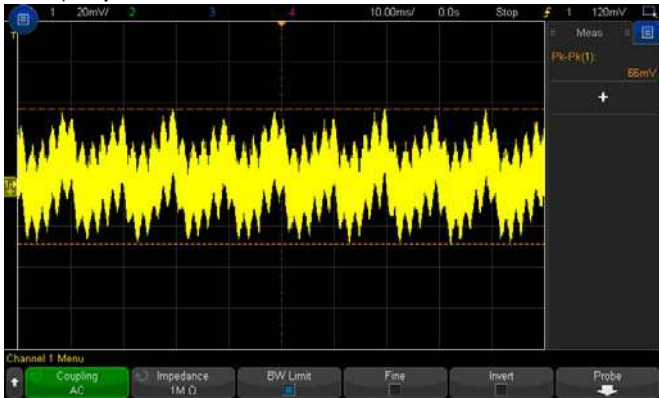
E.M.C. Test

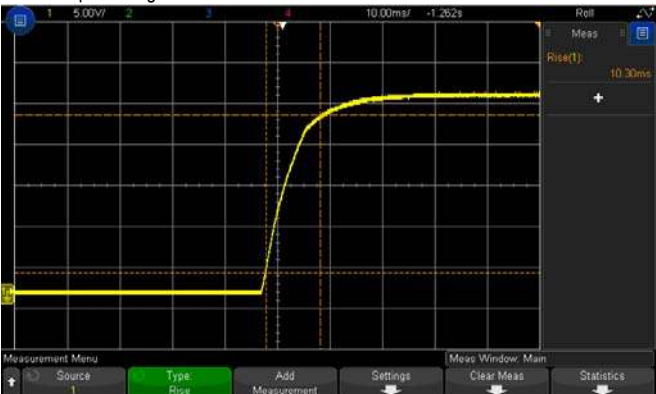
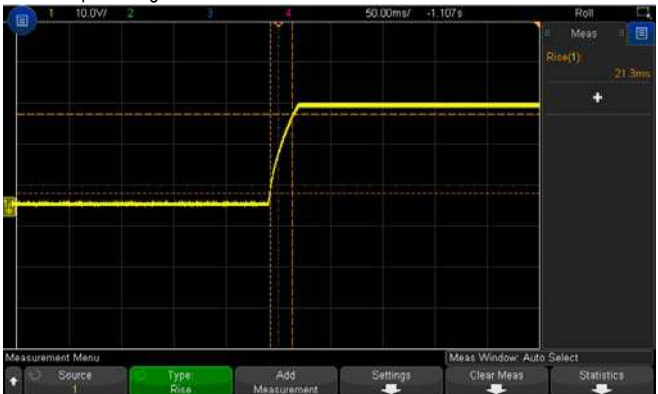
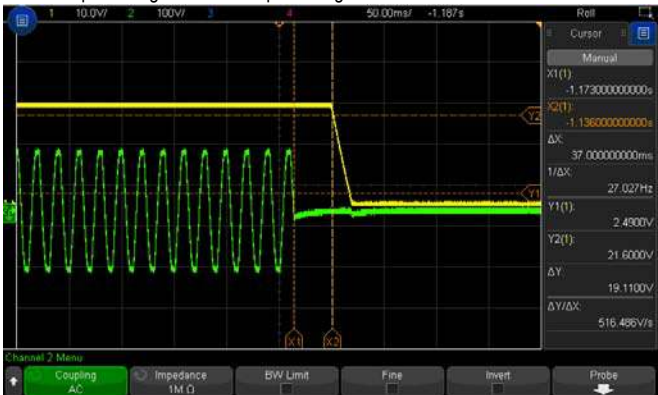
■ RELIABILITY TEST

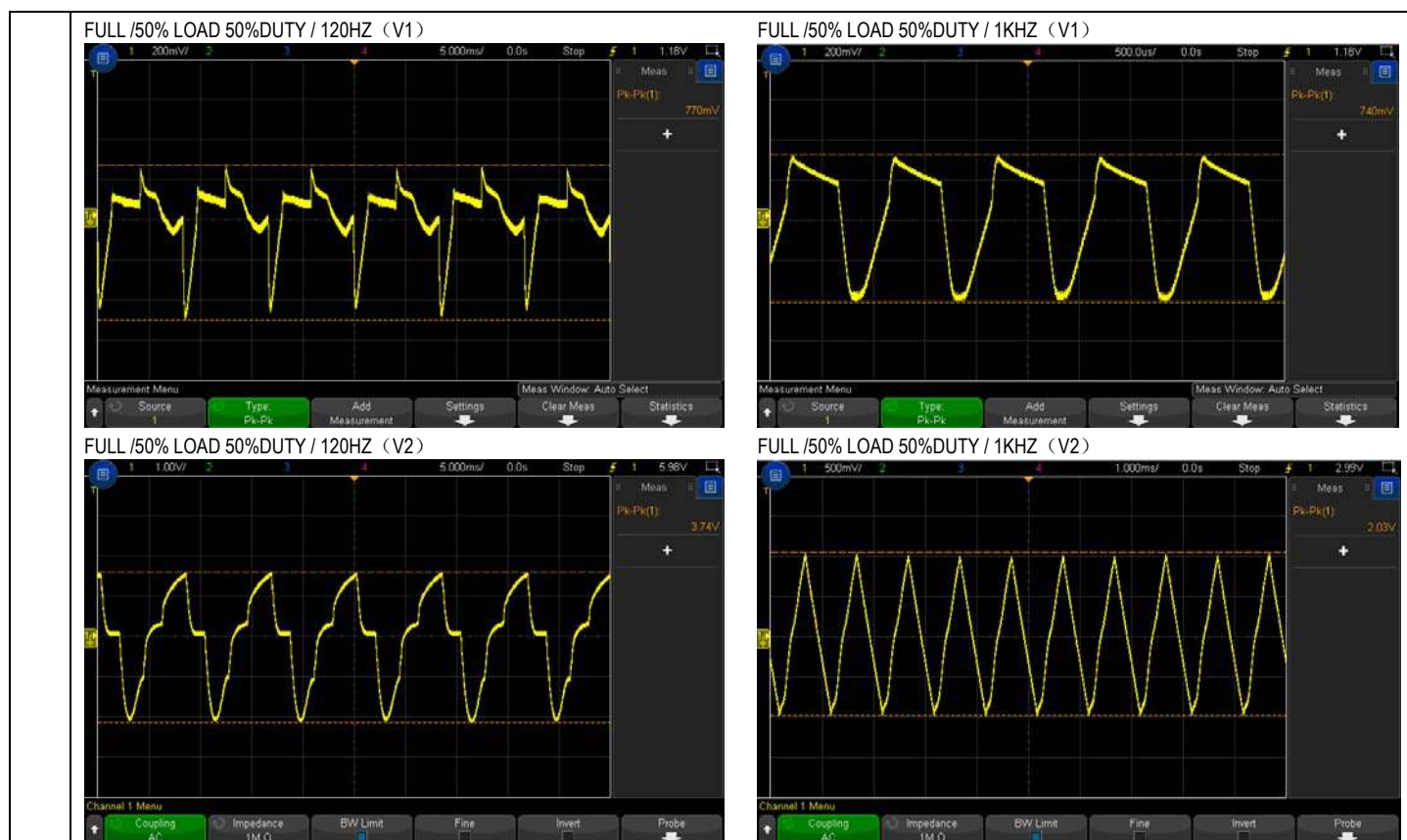
ENVIRONMENT TEST

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 22.8V~ 26.4 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25℃	21.79V~27.56V/230VAC 21.79V~27.56V/115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1: -1%~1 % V2: -6%~6 %	I/P: 88VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25℃	V1 : -0.04%~0.03% V2 : -0.06%~0.33%
3	LINE REGULATION (Max)	V1: -0.5%~0.5% V2: -1%~1%	I/P: 88VAC~ 264VAC O/P:FULL LOAD Ta:25℃	V1 : -0.00%~0.00% V2 : -0.02%~0.04%
4	LOAD REGULATION(Max)	V1: -1%~1% V2: -5%~5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25℃	V1 : -0.04%~0.03% V2 : -0.06%~0.33%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25℃	2.1%
6	RIPPLE & NOISE(Max)	V1: 200mVp-p V2: 240mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25℃	V1: 47 mVp-p V2: 66 mVp-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/ 342 ms 115VAC/ 347ms

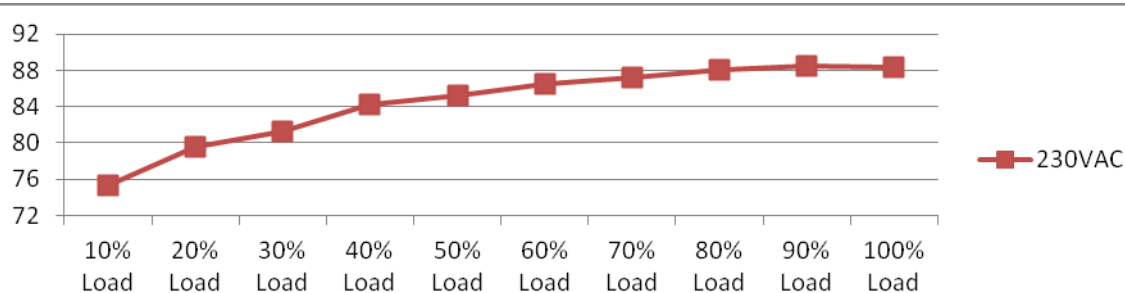
		INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 		INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage 	
8	RISE TIME (Max)	230VAC/20ms 115VAC/30ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C		230VAC/10.3 ms 115VAC/ 21.3 ms
		INPUT=230VAC/50HZ @ 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°C		230VAC/ 43 ms 115VAC/ 37 ms
		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: 2400 mVp-p V2: 4800 mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C		(1) (2) V1: 770 mVp-p 740 mVp-p V2: 3740 mVp-p 2030 mVp-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	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°C	TEST: OK
3	INPUT CURRENT (Typ.)	230V/ 2A 115V/ 3A	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I =1.11A/ 230VAC I =1.99A/ 115VAC
4	LEAKAGE CURRENT	<2 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	0.66 mA
5	EFFICIENCY(Typ.)	86%	I/P:230 VAC O/P:FULL LOAD Ta:25°C	88.3%

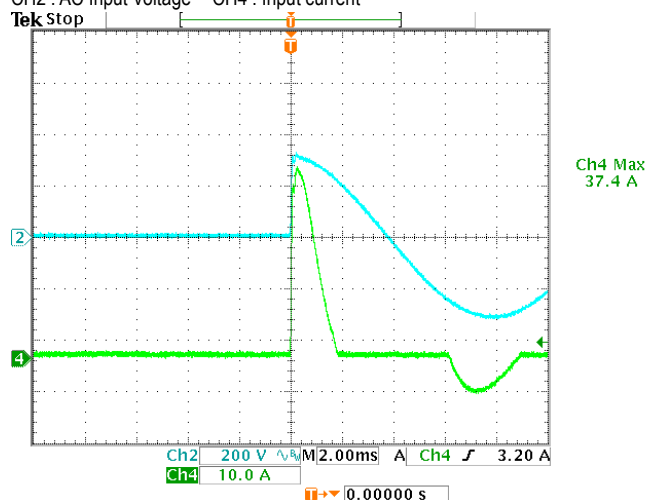
EFFICIENCY vs LOAD



6	INRUSH CURRENT(Typ.)	230V / 50A COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25℃	37.4 A
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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: 88VAC O/P: TESTING Ta: 25℃	114.4%/ 264VAC 115.2%/ 230VAC 123.1%/88VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	27.6V~32.4V	I/P: 264VAC I/P: 230VAC I/P: 88VAC O/P: MIN LOAD Ta: 25℃	31.0V/ 264VAC 31.0V/ 230VAC 31.0V/ 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 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°C	VDS: (1) 700V (2) 845V (3) 603V
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°C	D55 (1) 374V (2) 370V (3) 378V D60 (1) 202V (2) 200V (3) 202V
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°C	(1) 187V (2) 185V (3) 185V (4) 183 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°C	(1) 15.9V (2) 15.6V (3) 14.4V (4) 15.2V (5) 13.6V
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°C	(1) 628V (2) 612V

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: 4.12mA I/P-FG: 2.28mA O/P-FG: 1.76mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P: 500VDC > 100M Ω I/P- FG: 500VDC > 100M Ω O/P- FG: 500VDC > 100M Ω	I/P-O/P: 600 VDC I/P- FG: 600 VDC Ta: 25°C	I/P-O/P: 9999M Ω I/P-FG: 9999M Ω O/P-FG: 9999M Ω NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 m Ω	40 A / 2min Ta: 25°C / 70%RH	7m Ω

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 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 INDUSTRY INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	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°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 : RD-125-1224 1. ROOM AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta= 23.4 °C 2. HIGH AMBIENT BURN-IN : 1.5 HRS I/P : 230VAC O/P : FULL LOAD Ta=45.0°C <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta= 23.4 °C</th><th>HIGH AMBIENT Ta=45.0 °C</th></tr><tr><td>1</td><td>LF1</td><td>50.5°C</td><td>70.8°C</td></tr><tr><td>2</td><td>BD1</td><td>65.4°C</td><td>84.4°C</td></tr><tr><td>3</td><td>C5</td><td>59.6°C</td><td>77.9°C</td></tr><tr><td>4</td><td>C6</td><td>56.6°C</td><td>75.5°C</td></tr><tr><td>5</td><td>Q1</td><td>67.9°C</td><td>89.1°C</td></tr><tr><td>6</td><td>D1</td><td>70.1°C</td><td>89.9°C</td></tr><tr><td>7</td><td>U1</td><td>62.0°C</td><td>81.3°C</td></tr><tr><td>8</td><td>C10</td><td>57.3°C</td><td>76.8°C</td></tr><tr><td>9</td><td>ZD1</td><td>69.0°C</td><td>87.5°C</td></tr><tr><td>10</td><td>ZD2</td><td>61.5°C</td><td>81.0°C</td></tr><tr><td>11</td><td>T1</td><td>75.0°C</td><td>93.8°C</td></tr><tr><td>12</td><td>D60</td><td>78.5°C</td><td>98.1°C</td></tr><tr><td>13</td><td>D55</td><td>91.5°C</td><td>110.5°C</td></tr><tr><td>14</td><td>L60</td><td>84.9°C</td><td>105.5°C</td></tr><tr><td>15</td><td>C56</td><td>62.4°C</td><td>84.2°C</td></tr><tr><td>16</td><td>C62</td><td>75.4°C</td><td>95.6°C</td></tr><tr><td>17</td><td>R55</td><td>100.7°C</td><td>112.7°C</td></tr></table>			NO	Position	ROOM AMBIENT Ta= 23.4 °C	HIGH AMBIENT Ta=45.0 °C	1	LF1	50.5°C	70.8°C	2	BD1	65.4°C	84.4°C	3	C5	59.6°C	77.9°C	4	C6	56.6°C	75.5°C	5	Q1	67.9°C	89.1°C	6	D1	70.1°C	89.9°C	7	U1	62.0°C	81.3°C	8	C10	57.3°C	76.8°C	9	ZD1	69.0°C	87.5°C	10	ZD2	61.5°C	81.0°C	11	T1	75.0°C	93.8°C	12	D60	78.5°C	98.1°C	13	D55	91.5°C	110.5°C	14	L60	84.9°C	105.5°C	15	C56	62.4°C	84.2°C	16	C62	75.4°C	95.6°C	17	R55	100.7°C	112.7°C
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2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR (MIN)	I/P : 230 VAC O/P : 115% 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 CONTROL45°C /95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta=45 °C HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03%/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.01%/°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 : -30°C~ +50°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 C62 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=45 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=45 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 45 °C LIFE TIME		(1) 71715.8HRS (2) 19783.7HRS (3) 30934.5 HRS (4) 44504.5HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 218.2K 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