



# Test Report: RD-125-4812

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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

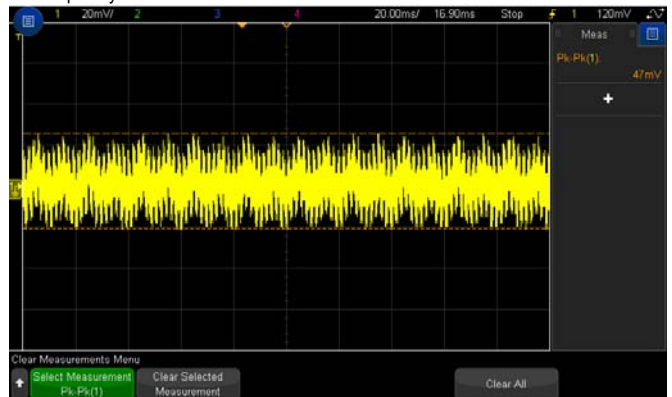
OUTPUT FUNCTION TEST

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°C	42.15V~53.32V /230VAC 42.15V~53.32V /115VAC
2	OUTPUT VOLTAGE(Max) TOLERANCE	V1 : -2%~2 % V2 : -10%~10%	I/P: 88VAC /264VAC O/P:FULL/ MIN. LOAD Ta:25°C	V1 : -0.02%~0.02% V2 : -0.05%~0.42%
3	LINE REGULATION (Max)	V1: -0.5%~ 0.5% V2: -1%~ 1%	I/P: 88VAC~ 264VAC O/P:FULL LOAD Ta:25°C	V1 : -0.00%~0.02% V2 : -0.00%~0.38%
4	LOAD REGULATION(Max)	V1: -1%~1% V2: -5%~5%	I/P: 230VAC O/P:FULL ~MIN LOAD Ta:25°C	V1 : -0.02%~0.01% V2 : -0.05%~0.42%
5	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230VAC O/P:FULL LOAD Ta:25°C	1.2%
6	RIPPLE & NOISE(Max)	V1: 240mVp-p V2: 120mVp-p	I/P:230VAC O/P:FULL LOAD Ta:25°C	V1: 47 mVp-p V2: 55 mVp-p

high frequency (V1) :



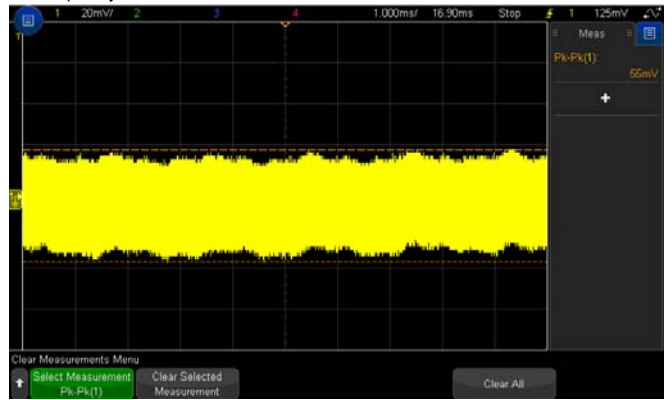
low frequency (V1):



high frequency (V2) :



low frequency (V2) :



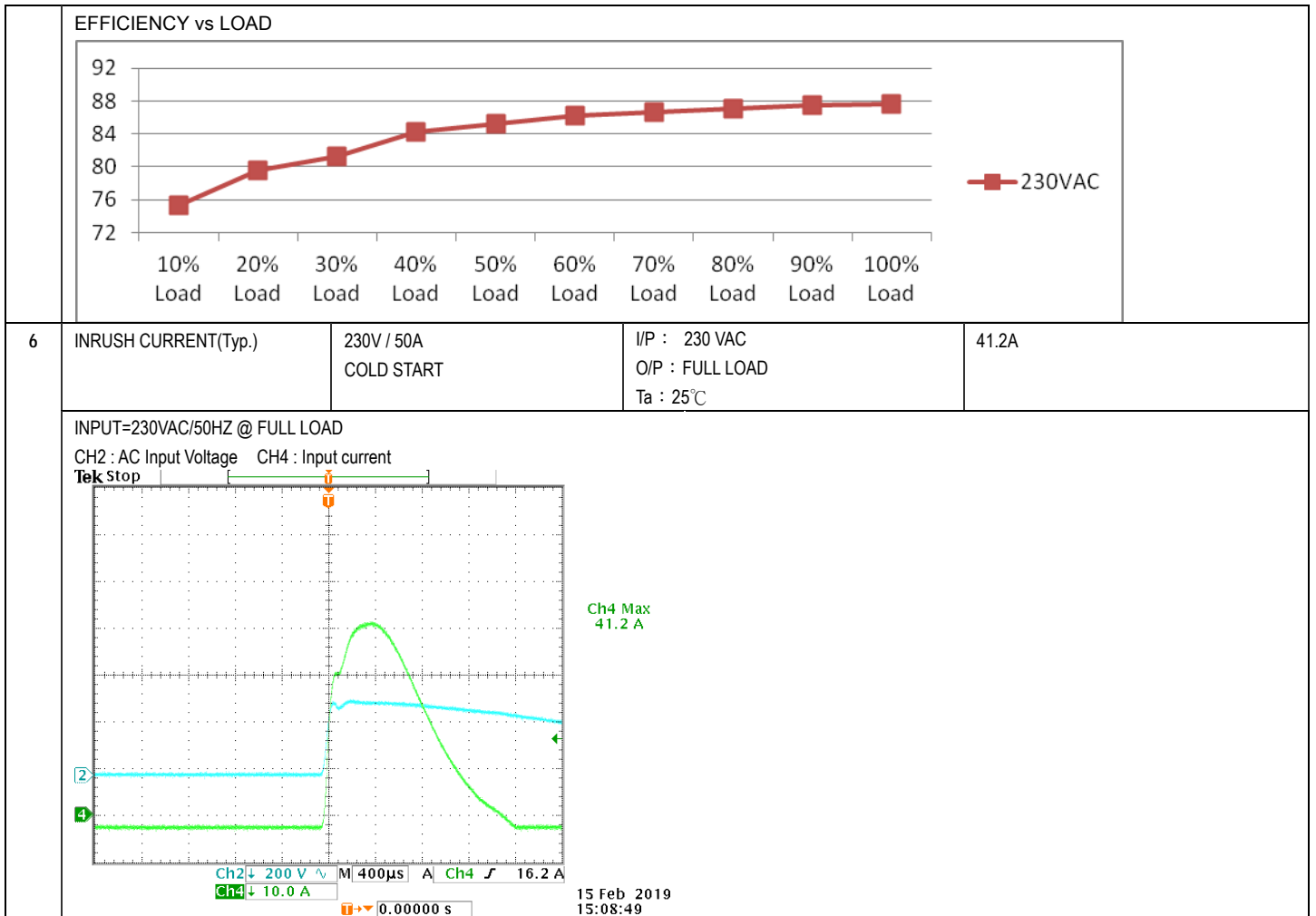
7	SET UP TIME(Max)	230VAC/500ms 115VAC/1200ms	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 317 ms 115VAC/ 338 ms
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	<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>	<p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>	
<p>8 RISE TIME (Max)</p>	<p>230VAC/20ms 115VAC/30ms</p>	<p>I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>230VAC/ 7.7ms 115VAC/ 20.2ms</p>
	<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage</p>		<p>INPUT=115VAC/60HZ @ FULL LOAD CH1 : Output Voltage</p>
<p>9 HOLD UP TIME (Typ.)</p>	<p>230VAC/25ms 115VAC/30ms</p>	<p>I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C</p>	<p>230VAC/ 41ms 115VAC/ 40ms</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 DYNAMIC LOAD</p>	<p>V1: 4800 mVp-p V2: 1200 mVp-p</p>	<p>I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C</p>	<p>(1) (2) V1: 2170mVp-p 3500mVp-p V2: 740mVp-p 430mVp-p</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 = 1.14A / 230VAC I = 2.03A / 115VAC
4	LEAKAGE CURRENT	<2 mA / 240 VAC	I/P : 240 VAC O/P : Min LOAD Ta : 25°C	0.71mA
5	EFFICIENCY(Typ.)	86%	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	87.6%



### 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°C	113.43%/ 264VAC 116.73%/ 230VAC 124.76%/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°C	61.2V/ 264VAC 61.2V/ 230VAC 61.2V/ 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°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 : 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) 660V (2) 837V (3) 604V
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 D60 (1) 373V (1) 105V (2) 369V (2) 107V (3) 469V (3) 105V
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) 189V (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) 15.5V (2) 15.7V (3) 14.9V (4) 15.1V (5) 13.1V
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) 636V (2) 572V

**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:3.76mA I/P-FG:1.74mA O/P-FG:1.33mA 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	7mΩ

**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 <u>INDUSTRY</u> 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 <u>INDUSTRY</u> INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A
6	SURGE	IEC61000-4-5 <u>INDUSTRY</u> 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-125-2412 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 border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 23.4 °C</th> <th>HIGH AMBIENT Ta=45.0 °C</th> </tr> </thead> <tbody> <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> </tbody> </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 232.4K 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