



Test Report:ERP-200-24

200W Single Output Switching Power Supply

■ DESIGN VERIFY TEST

- Output Function Test
- Input Function Test
- Protection Function Test
- Component Stress Test

■ SAFETY & E.M.C. TEST

- Safety Test
- E.M.C. Test

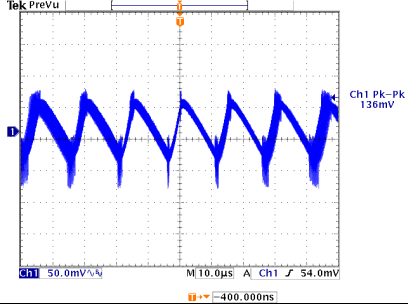
■ RELIABILITY TEST

- Environment Test

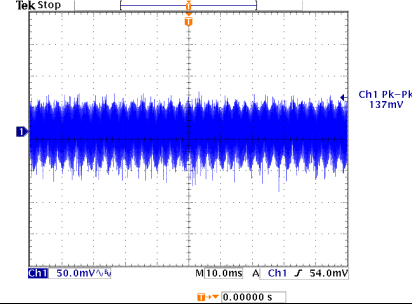
OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OUTPUT VOLTAGE ADJUST RANGE	CH1: 21.6 V~ 26.4 V	I/P: 230 VAC O/P:MIN LOAD Ta:25°C	20.81V~27.56 V/230VAC	PASS
2	OUTPUT VOLTAGE TOLERANCE	V1: -1.0 %~ 1.0 %	I/P: 180 VAC / 264 VAC O/P:FULL/ MIN LOAD Ta:25°C	V1: -0.016%~0.041%	PASS
3	LINE REGULATION	V1: -0.5 %~ 0.5 %	I/P: 180 VAC ~ 264 VAC O/P:FULL LOAD Ta:25°C	V1: -0.016%~0.016%	PASS
4	LOAD REGULATION	V1: -0.5 %~ 0.5 %	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: -0.062 %~ +0.075%	PASS
5	RIPPLE & NOISE	V1: 150 mVp-p	I/P: 230 VAC O/P:(1) FULL LOAD (2) 0%~100% LOAD Ta:25°C	(1) <u>136</u> mVp-p (2) <u>137</u> mVp-p	PASS

High Frequency :



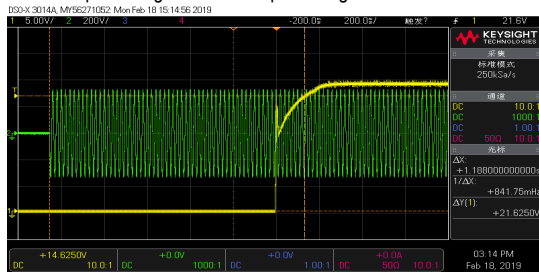
Low Frequency :



6	SET UP TIME	230VAC/1500 ms (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 1188 ms	PASS
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INPUT=230VAC/50HZ @ FULL LOAD

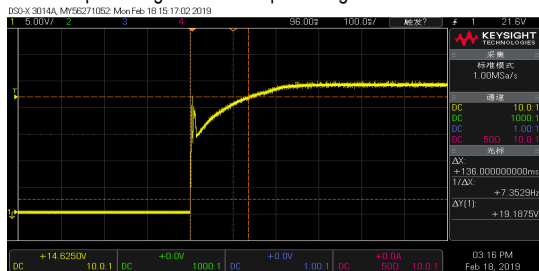
CH1 : Output Voltage CH2 : AC Input Voltage



7	RISE TIME	230VAC/ 200 ms (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	230 VAC/ 136 ms	PASS
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INPUT=230VAC/50HZ @ FULL LOAD

CH1 : Output Voltage CH2 : AC Input Voltage

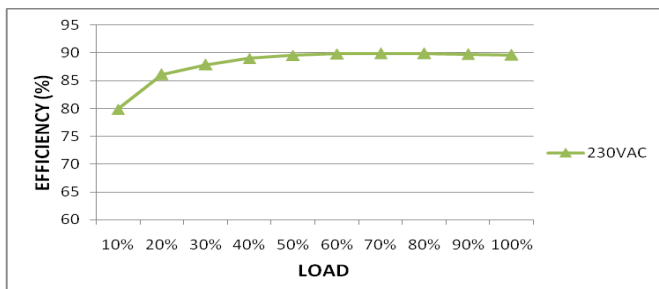


8	HOLD UP TIME	230VAC/ 20 ms (Typ)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	230VAC/40ms	PASS
<p>INPUT=230VAC/50HZ @ FULL LOAD CH1 : Output Voltage CH2 : AC Input Voltage</p>					
9	OVER/UNDERSHOOT TEST	< ± 5 %	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: 2.26 %	PASS
10	DYNAMIC LOAD	V1: 2400mVp-p	I/P : 230 VAC (1)O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2)O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3)O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4)O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 1410mVp-p (2) 520 mVp-p (3) 430mVp-p (4) 1170mVp-p	PASS

INPUT FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	180 VAC~ 264 VAC	I/P:TESTING O/P:FULL LOAD Ta:25°C (1)I/P: LOW-LINE-3V= 177 V HIGH-LINE+15%= 300 V O/P:FULL /MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (2) I/P:230VAC ON: 2.5 Sec . OFF: 2.5 Sec 20MIN (AC POWER ON/OFF NO DAMAGE)	177 V~ 300 V TEST: (1) OK (2) OK	PASS
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ	I/P: 180 VAC ~ 264 VAC O/P:FULL~MIN LOAD Ta:25°C	TEST: OK	PASS
3	EFFICIENCY	89% (Typ)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	89.658 %	PASS

EFFICIENCY vs LOAD



4	INPUT CURRENT	230 V/ 4.0 A (Typ)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 1.64 A/ 230VAC	PASS
5	INRUSH CURRENT	230 V/90 A (Typ) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 48.1A/ 230VAC	PASS
INPUT=230VAC/50HZ @ FULL LOAD CH2 : AC Input Voltage CH4 : Input current 					
6	LEAKAGE CURRENT	< 1 mA / 240VAC	I/P: 264 VAC O/P:NO LOAD Ta:25°C	L-FG: 0.6811 mA N-FG: 0.6823 mA	PASS

PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110 %~ 140% RATED OUTPUT POWER	I/P: 180 VAC I/P: 230 VAC I/P: 264 VAC O/P:TESTING Ta:25°C	115.25%/ 180 VAC 115.25 %/ 230VAC 115.24%/ 264 VAC ■ Protection type :Constant current limiting, recovers automatically after fault condition is removed	PASS
2	OVER VOLTAGE PROTECTION	CH1: 27.6 V~ 32.4V	I/P: 180 VAC I/P: 230 VAC I/P: 264 VAC O/P:MIN LOAD Ta:25°C	28.748V/180 VAC 28.744V/ 230VAC 28.741V/264 VAC ■ Protection type : Hiccup mode, recovers automatically after fault condition is removed	PASS
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 230 VAC O/P:FULL LOAD	O.T.P. Active: OK ■ Protection type :Shut down o/p voltage · recovers automatically after temperature goes down	PASS
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 264 VAC O/P: FULL LOAD Ta:25°C	NO DAMAGE: OK ■ Hiccup mode, recovers automatically after fault condition is removed	PASS

COMPONENT STRESS TEST

NO	TEST ITEM	SPECICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q2 Rated : 650V /15A	I/P: High-Line +3V =267 V O/P: (1)Full Load input on/off (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz	VDS (1) 564V/5.48A (2)630V/11.1A (3) 546V/5.44A (4)548V/5.28 A (5) 550V/5.36 A	PASS

			<p>(6)Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8) NO LOAD (9) 200% Load 开机</p> <p>I/P: Low-Line -3V = 177 V O/P: (1)Full Load input on/off (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8) NO LOAD (9) 200% Load 开机</p>	<p>(6) 554V/5.4A (7) 624V/6.76A (8) 486V/6.04A (9) 534V/6.44A</p> <p>VDS (1) 374V/4.80A (2) 452V/8.48A (3) 376V/5.56A (4) 378V/4.88A (5) 376V/4.98A (6)376V/4.92A (7)446V /8.28A (8) 340V/4.24A (9) 406V/5.30A</p>																							
2	Diode Peak Voltage	D102/D103 Rated D102: 150V/ 20A D103 :200V/ 20A	<p>I/P: High-Line +3V = 267 V O/P: (1)Full Load input on/off (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8) NO LOAD (9)200% Load 开机</p>	<table border="0"> <tr> <td>D102</td> <td>D103</td> </tr> <tr> <td>VDS</td> <td>VDS</td> </tr> <tr> <td>(1) 117V</td> <td>154V</td> </tr> <tr> <td>(2) 104V</td> <td>149V</td> </tr> <tr> <td>(3) 117V</td> <td>153V</td> </tr> <tr> <td>(4)115 V</td> <td>153V</td> </tr> <tr> <td>(5)116V</td> <td>151V</td> </tr> <tr> <td>(6) 118 V</td> <td>152V</td> </tr> <tr> <td>(7)106 V</td> <td>150V</td> </tr> <tr> <td>(8) 113V</td> <td>151V</td> </tr> <tr> <td>(9)105V</td> <td>153V</td> </tr> </table>	D102	D103	VDS	VDS	(1) 117V	154V	(2) 104V	149V	(3) 117V	153V	(4)115 V	153V	(5)116V	151V	(6) 118 V	152V	(7)106 V	150V	(8) 113V	151V	(9)105V	153V	PASS
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(6) 118 V	152V																										
(7)106 V	150V																										
(8) 113V	151V																										
(9)105V	153V																										
3	Clamp Diode Peak Voltage	D11 Rated 600 V 1 A	<p>I/P: High-Line +3V = 267 V O/P: (1)Full Load input on/off (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/1KHz (4)Dynamic Load Full Load/ Min. Load 90%Duty/3KHz (5)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (6)Dynamic Load Full Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. (8) NO LOAD (9) 200% Load 开机</p> <p>Ta:25°C</p>	<p>(1)374V (2) 368V (3) 382V (4) 386V (5) 386V (6) 388V (7) 388V (8) 366V (9) 372V</p>	PASS																						
4	Input Capacitor Voltage	C5 Rated 120u F/ 400V	<p>I/P: High-Line +3V = 267 V O/P: (1)Full Load input on/off (2) Min load input on /Off (3)Full Load /Min load Change (4)Full load continue</p> <p>Ta:25°C</p>	<p>(1) 380 V (2) 378 V (3) 380 V (4) 378V</p>	PASS																						

5	Control IC Voltage Test	U1 Rated 30 V U101 Rated 30V	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 VR 下限.LOW LINE (6)No/FULL LOAD 切换 Ta:25°C	U1 U101 (1) 19.0 V 12.9V (2) 19.1V 1.45V (3) 19.1V 10.4V (4) 19.0 V 14.1V (5) 19.1 V 9.30V (6) 19.2 V 13.0V	PASS
6	VCC Diode Peak Voltage	D30 Rated: :1A/400V D200 Rated: :1A/200V	I/P: High-Line +3V = 267VAC O/P: (1) 100%Load input on/off (2) Output Short (3) NO Load (4) Dynamic Load Full Load/ Min. Load 90%Duty/1KHz	D30 D200 (1) 164V 137V (2) 181V 13.0V (3) 160V 58.0V (4)154V 151V	PASS

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	AERDICT
1	WITHSTAND AOLTAGE	I/P-FG: 2.0 KAC/min I/P-O/P: 3.0 KAC/min O/P-FG: 0.5 KAC/min EN 60950-1	I/P-FG: 2.4 KAC/min I/P-O/P: 3.6 KAC/min O/P-FG: 0.6 KAC/min Ta:25°C	I/P-FG: 3.670 mA I/P-O/P: 3.247mA O/P-FG:3.158mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-FG: 500ADC>100MΩ I/P-O/P:500ADC>100MΩ O/P-FG:500ADC>100MΩ	I/P-FG: 500 ADC I/P-O/P: 500 ADC O/P-FG: 500 ADC Ta:25°C	I/P-FG: >9999 MΩ I/P-O/P: >9999 MΩ O/P-FG: >9999 MΩ NO DAMAGE	PASS
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ EN 60950-1	40 A / 2 min Ta:25°C	6 mΩ	PASS

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	AERDICT
1	CONDUCTION	EN55022 CLASS A	I/P:230 AAC (50HZ) O/P:FULL/50% LOAD Ta:25°C	PASS Test by certified Lab	PASS
2	RADIATION	EN55022 CLASS A	I/P: 230 AAC (50HZ) O/P:FULL LOAD Ta:25°C	PASS Test by certified Lab	PASS
3	E.S.D	EN61000-4-2 LIGHT INDUSTRY Contact:4KV	I/P: 230 AAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
4	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 AAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
5	SURGE	EN61000-4-5 INDUSTRY L-N :1KV L,N-PE:2KV	I/P: 230 AAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A	PASS
6	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 : ERP-200-24 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=29.3°C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=40.0°C																																																																																						
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/180VAC O/P : 100%/80% LOAD Ta= -35°C	TEST : OK																																																																																				
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50°C NO DAMAGE	I/P : 272VAC O/P : FULL LOAD Ta=40°C HUMIDITY= 95 %R.H	TEST : OK																																																																																				
4	TEMPERATURE COEFFICIENT	±0.05 %/°C (0~50°C)	I/P : 230 VAC O/P : FULL LOAD	±0.012 %/°C (0~50°C)																																																																																				
5	STORAGE TEMPERATURE TEST	-35°C~ +90°C	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																																																																																					
6	THERMAL SHOCK TEST	-30~+40°C	1. Thermal shock Temperature : -35°C~ +45°C 2. Temperature change rate : 25°C / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16CYCLE 5. Input/Output condition : 15cycle:230VAC/ FULL LOAD AC on 3 sec/AC off 1 sec TEST																																																																																					



			1cycle:230VAC/ FULL LOAD Burn In Test TEST : OK
7	VIBRATION TEST	10~ 500Hz, 3G 12min./1cycle, period for 72min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 4G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25°C TEST : OK
8	CAPACITOR LIFE CYCLE	ERP-200-24 : SUPPOSE C105 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= 40 °C LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 40 °C LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 40 °C LIFE TIME	(1) 157448 HRS (2) 65741 HRS (3) 105225 HRS (4) 166972 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 2233.7K hrs min. Telcordia SR-332 (Bellcore) ; 262.9K hrs min. MIL-HDBK-217F (25°C)	
10	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=40°C Demonstration Mean Time Between Failure :30,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/ZHOUB	WENF	LIUWY