



# Test Report: OWA-90E-30

---

90W 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

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 200 mVp-p (Max)	I/P : 230VAC O/P : 95% LOAD Ta : 25°C	V1 : 20 mVp-p (Max)	PASS
2	OUTPUT VOLTAGE TOLERANCE	V1 : -3%~ 3% (Max)	I/P : 100 VAC / 264 VAC O/P : 95% / NO LOAD Ta : 25°C	V1 : -0.397 %~ 0.187 %	PASS
3	LINE REGULATION	V1 : -0.5%~ 0.5 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : 95% LOAD Ta : 25°C	V1 : -0.02 %~ 0.02 %	PASS
4	LOAD REGULATION	V1 : -0.5%~ 0.5 % (Max)	I/P : 230 VAC O/P : 95%~NO LOAD Ta : 25°C	V1 : -0.187 %~ 0.187 %	PASS
5	SET UP TIME	230VAC : 500 ms (Max) 115VAC : 500 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : 95% LOAD Ta : 25°C	230VAC/ 341.659 ms 115VAC/ 347.732 ms	PASS
6	RISE TIME	230VAC : 80 ms (Max) 115VAC : 80 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : 95% LOAD Ta : 25°C	230VAC/ 49.339 ms 115VAC/ 57.905 ms	PASS
7	HOLD UP TIME	230VAC : 16 ms (TYP) 115VAC : 16 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 21.075 ms 115VAC/ 20.166 ms	PASS
8	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : 95% LOAD Ta : 25°C	TEST : < 5 %	PASS
9	DYNAMIC LOAD	V1 : 3000 mVp-p	I/P : 230 VAC (1).O/P : 95% /NO LOAD 90%DUTY/ 1KHZ (2).O/P : 95% /NO LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 546 mVp-p (2) 1060 mVp-p	PASS

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P : TESTING O/P : 95% LOAD Ta : 25°C	87 V~264V	PASS
			I/P : LOW-LINE-3V=87 V HIGH-LINE=264 V O/P : 95%/NO LOAD ON : 30 Sec . OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90 VAC ~ 264 VAC O/P : 95% ~NO LOAD Ta : 25°C	TEST : OK	PASS
3	POWER FACTOR	0.96 / 230 VAC(TYP) 0.98 / 115 VAC(TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.978 / 100% PF= 0.997 / 100%	PASS
4	EFFICIENCY	90%	I/P : 230 VAC O/P : 95% LOAD Ta : 25°C	90.56%	PASS
5	INPUT CURRENT	230V/ 0.5 A (TYP) 115V/ 0.95 A (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : 95% LOAD Ta : 25°C	I = 0.439 A/ 230 VAC I = 0.875 A/ 115 VAC	PASS
6	INRUSH CURRENT	230V/ 60 A (TYP) Twidth =550 us measured at 50% Ipeak COLD START	I/P : 230 VAC O/P : 95% LOAD Ta : 25°C	I = 57.812 A/ 230 VAC  Twidth = 424 us	PASS
7	LEAKAGE CURRENT	< 0.25 mA / 240 VAC	I/P : 240 VAC O/P : NO LOAD Ta : 25°C	L-CASE : 0.002 mA /240VAC N-CASE : 0.002 mA /240VAC	PASS
8	NO LOAD POWER CONSUMPTION	< 0.15 W	I/P : 230 VAC I/P : 115 VAC O/P : NO LOAD Ta : 25°C	0.093W / 230VAC 0.103W / 115VAC	PASS

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	95 % ~ 108 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	102.12 %/ 230 VAC 102.19 %/ 115 VAC Constant current limiting, recovers automatically after fault condition is removed	PASS
2	OVER VOLTAGE PROTECTION	CH1 : 34 V ~ 40 V	I/P : 230 VAC I/P : 115 VAC O/P : NO LOAD Ta : 25°C	37.28 V/ 230 VAC 37.26 V/ 115 VAC Shut down o/p voltage, re-power on to recover	PASS
3	OVER TEMPERATURE PROTECTION	SPEC : O.T.P. NO DAMAGE	I/P : 230 VAC O/P : 95% LOAD	O.T.P. Active Shut down o/p voltage, re-power on to recover	PASS
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : 95% LOAD Ta : 25°C	NO DAMAGE Hiccup mode, recovers automatically after fault condition is removed.	PASS

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) Peak Voltage	Q2 Rated 800 V 9.0A	I/P : High-Line +3V = 267 V O/P : (1)95% Load Turn on (2) Output Short (3) 95% load continue Ta : 25°C	(1) 724 V (2) 508 V (3) 704 V	PASS
2	Diode Peak Voltage	Q101 Rated 120 V 20 A	I/P : High-Line +3V = 267 V O/P : (1) 95% Load Turn on (2)Output Short (3) 95% load continue Ta : 25°C	(1) 94.4 V (2) 56.6 V (3) 92.4 V	PASS
3	Input Capacitor Voltage	C5 Rated 82uF / 450 V	I/P : High-Line +3V = 267 V O/P : (1) 95% Load Turn on /Off (2) NO load Turn on /Off (3) 95% Load /Min load Change Ta : 25°C	(1) 440 V (2) 442 V (3) 448 V	PASS
4	Control IC Voltage Test	U1 Rated 28V	I/P : High-Line +3V = 267 V O/P : (1) 95% Load Turn on /Off (2) NO load Turn on /Off (3) 95% Load /Min load Change Ta : 25°C	(1) 17.0 V (2) 17.1 V (3) 17.1 V	PASS
5	Power Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated 600 V/ 10 A	I/P : High-Line +3V = 267 V O/P : (1) 95% Load Turn on (2) Output Short (3) 95% load continue Ta : 25°C	(1) 482 V (2) 426 V (3) 462 V	PASS

■ SAFETY & E.M.C. TEST

**SAFETY TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3.75 KVAC/min	I/P-O/P : 4.2 KVAC/min Ta : 25°C	I/P-O/P : 1.719 mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-O/P : 500VDC>100MΩ	I/P-O/P : 500 VDC Ta : 25°C/70% RH	I/P-O/P : >9999 MΩ NO DAMAGE	PASS

**E.M.C TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS C	I/P:115VAC/230VAC O/P:95%, 60%LOAD Ta:25°C	PASS	PASS
2	CONDUCTION	FCC Part15 Class B	I/P: 230 VAC (50HZ)/115V[60HZ] O/P: 95% LOAD Ta:25°C	PASS Test by certified Lab	PASS
3	RADIATION	FCC Part15 Class B	I/P: 230 VAC (50HZ)/115V[60HZ] O/P: 95% LOAD Ta:25°C	PASS Test by certified Lab	PASS
4	Test by certified Lab & Test Report Prepare				

■ RELIABILITY TEST

**ENVIRONMENT TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : OWA-90E-48 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : 95% LOAD Ta=25.6 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : 95% LOAD Ta=51.0 °C			PASS

2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : 95% LOAD Ta= -40/-25℃	TEST : OK	PASS
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃ NO DAMAGE	I/P : 272 VAC O/P : 95% LOAD Ta= 50 ℃ HUMIDITY= 95 %R.H	TEST : OK	PASS
4	TEMPERATURE COEFFICIENT	±0.03 %(0-50℃)	I/P : 230 VAC O/P : 95% LOAD	±0.005 %(0-50℃)	PASS
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature : -45℃~ +85℃ 2. Temperature change rate : 25℃ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 5 CYCLE 5. Input/Output condition : STATIC		OK	PASS
6	THERMAL SHOCK TEST	1. Thermal shock Temperature : -45℃~ +55℃ 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 : 230VAC/95% Load AC ON/OFF TEST turn on 58sec ; turn off 2sec		OK	PASS
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 5G (5) Test Time : 72min in each axis (X.Y.Z) (6) Ta : 25℃		TEST : OK	PASS
8	CAPACITOR LIFE CYCLE	OWA-90E-48: SUPPOSE C105 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : 95% LOAD Ta=25 ℃ LIFE TIME (2) I/P : 230VAC O/P : 95% LOAD Ta=50 ℃ LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta=50 ℃ LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta=50 ℃ LIFE TIME		(1) 289080.4 HRS (2) 59080.3 HRS (3) 85375.6 HRS (4) 99366.1 HRS	PASS
9	MTBF	Conducted by Parts Stress Analysis Prediction 3044.3K hrs min. Telcordia SR-332 (Bellcore) ; 292.9K hrs min. MIL-HDBK-217F (25℃)			PASS
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 50000 hours @ Tcase 75℃			PASS

TEST RESULT	TESTER	APPROVAL
PASS	ZHOUB/ ZHUOKB	LIUWY

2009/08/04 A50-G058