



# Test Report : OWA-60E-24

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60W Single Output Moistureproof Adaptor

## ■ 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: 150 mVp-p (Max)	I/P: 230VAC O/P: Full LOAD Ta: 25°C	V1: 71 mVp-p (Max)	PASS
2	OUTPUT VOLTAGE TOLERANCE	V1: -3%~ 3% (Max)	I/P: 100 VAC / 264 VAC O/P: Full/ NO LOAD Ta: 25°C	V1: -0.63%~ 0.25%	PASS
3	LINE REGULATION	V1: -1%~ 1% (Max)	I/P: 100 VAC ~ 264 VAC O/P: Full LOAD Ta: 25°C	V1: -0.08%~ 0.25%	PASS
4	LOAD REGULATION	V1: -1%~ 1% (Max)	I/P: 230 VAC O/P: Full-NO LOAD Ta: 25°C	V1: -0.21%~ 0.25%	PASS
5	SET UP TIME	230VAC: 500 ms (Max) 115VAC: 1000 ms(Max)	I/P: 230 VAC I/P: 115 VAC O/P: 95% LOAD Ta: 25°C	230VAC/ 291 ms 115VAC/ 278 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/ 36 ms 115VAC/ 31 ms	PASS
7	HOLD UP TIME	230VAC: 10 ms (TYP) 115VAC: 10 ms (TYP)	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/ 95 ms 115VAC/ 18 ms	PASS
8	OVER/UNDERSHOOT TEST	< ±5%	I/P: 230 VAC O/P: Full LOAD Ta: 25°C	TEST: < 5%	PASS
9	DYNAMIC LOAD	V1: 2400 mVp-p	I/P: 230 VAC (1) O/P: Full /NO LOAD 90%DUTY/ 1KHZ (2) O/P: Full /NO LOAD 50%DUTY/ 120HZ Ta: 25°C	(1) 404 mVp-p (2) 812 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: Full LOAD Ta: 25°C	87 V~264V	PASS
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P: FULL/NO LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230Vac ON: 0.5 Sec OFF: 0.5 Sec 20MIN (3)230Vac ON: 3Sec OFF: 3Sec 12HOURS ( POWER ON/OFF NO DAMAGE )	TEST: (1) OK (2) OK (3) OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P: 90 VAC ~ 264 VAC O/P: Full ~NO LOAD Ta: 25°C	TEST: OK	PASS
3	EFFICIENCY	90% (TYP)	I/P: 230 VAC O/P: Full LOAD Ta: 25°C	90.19%	PASS
4	INPUT CURRENT	230V/ 0.7 A (TYP) 115V/ 1.2 A (TYP)	I/P: 230 VAC I/P: 115 VAC O/P: Full LOAD Ta: 25°C	I = 0.54 A/ 230 VAC I = 0.92 A/ 115 VAC	PASS
5	INRUSH CURRENT	230V/ 65 A (TYP) Twidth =750 us measured at 50% Ipeak COLD START	I/P: 230 VAC O/P: Full LOAD Ta: 25°C	I = 53.0 A/ 230 VAC Twidth = 696 us	PASS
6	LEAKAGE CURRENT	< 0.25 mA / 240 VAC	I/P: 240 VAC O/P: NO LOAD Ta: 25°C	L-CASE: 0.003 mA /240VAC N-CASE: 0.003 mA /240VAC	PASS
7	NO LOAD POWER CONSUMPTION	< 0.15 W	I/P: 230 VAC I/P: 115 VAC O/P: NO LOAD Ta: 25°C	0.068W / 230VAC 0.053W / 115VAC	PASS

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 115 %	I/P: 230 VAC I/P: 115 VAC O/P: TESTING Ta: 25°C	110.66 %/ 230 VAC 110.55 %/ 115 VAC Hiccup mode, recovers automatically after fault condition is removed	PASS
2	OVER VOLTAGE PROTECTION	CH1: 28 V ~ 34 V	I/P: 230 VAC I/P: 115 VAC O/P: NO LOAD Ta: 25°C	30.94 V/ 230 VAC 30.89 V/ 115 VAC Shut down o/p voltage, re-power on to recover	PASS
3	OVER TEMPERATURE PROTECTION	O.T.P NO DAMAGE	I/P: 230 VAC O/P: Full 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: Full 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	Q1 Rated 650 V 15.5 A	I/P: High-Line +3V = 267 V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 512 V (2) 452 V (3) 460 V	PASS
2	Diode Peak Voltage	Q101 Rated 120 V 30 A	I/P: High-Line +3V = 267 V O/P: (1) Full Load Turn on (2) Output Short (3) Full load continue Ta: 25°C	(1) 104 V (2) 88.4 V (3) 90.8 V	PASS
3	Input Capacitor Voltage	C5 Rated 150uF / 400 V	I/P: High-Line +3V = 267 V O/P: (1) Full Load Turn on /Off (2) NO load Turn on /Off (3) Full Load /NO load Change Ta: 25°C	(1) 382 V (2) 384 V (3) 380 V	PASS
4	Control IC Voltage Test	U1 Rated 28 V	I/P: High-Line +3V = 267 V O/P: (1) Full Load Turn on /Off (2) NO load Turn on /Off (3) Full Load /NO load Change Ta: 25°C	(1) 22.9 V (2) 22.7 V (3) 22.5 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: 2.296 mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-O/P: 500 VDC>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 A	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	OK	PASS
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	OK Test by certified Lab	PASS
3	RADIATION	EN55022 CLASS B	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	OK Test by certified Lab	PASS
4	E.S.D	EN61000-4-2 LIGHT INDUSTRY AIR: 8KV / Contact: 4KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A	PASS
5	E.F.T	EN61000-4-4 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A	PASS
6	SURGE	IEC61000-4-5 INDUSTRY L-N: 2KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A	PASS
7	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-60E-20 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: Full LOAD Ta=27.9 °C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: Full LOAD Ta=56.5 °C			PASS																																																																								
		<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta= 27.9 °C</th> <th>HIGH AMBIENT Ta= 56.5 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>RTH1</td><td>51.2°C</td><td>70.8°C</td></tr> <tr><td>2</td><td>ZNR1</td><td>46.1°C</td><td>69.0°C</td></tr> <tr><td>3</td><td>LF2</td><td>49.2°C</td><td>73.7°C</td></tr> <tr><td>4</td><td>BD1</td><td>53.0°C</td><td>77.9°C</td></tr> <tr><td>5</td><td>C5</td><td>51.5°C</td><td>76.3°C</td></tr> <tr><td>6</td><td>D5</td><td>59.0°C</td><td>84.7°C</td></tr> <tr><td>7</td><td>Q1</td><td>57.9°C</td><td>83.7°C</td></tr> <tr><td>8</td><td>U1</td><td>50.8°C</td><td>75.8°C</td></tr> <tr><td>9</td><td>C25</td><td>54.3°C</td><td>79.3°C</td></tr> <tr><td>10</td><td>T1</td><td>60.7°C</td><td>85.4°C</td></tr> <tr><td>11</td><td>Q101</td><td>64.5°C</td><td>89.5°C</td></tr> <tr><td>12</td><td>U100</td><td>51.2°C</td><td>75.2°C</td></tr> <tr><td>13</td><td>C205</td><td>54.2°C</td><td>78.4°C</td></tr> <tr><td>14</td><td>C105</td><td>56.1°C</td><td>80.5°C</td></tr> <tr><td>15</td><td>C106</td><td>58.6°C</td><td>83.2°C</td></tr> <tr><td>16</td><td>TSW1</td><td>52.0°C</td><td>76.0°C</td></tr> <tr><td>17</td><td>TC</td><td>54.0°C</td><td>79.0°C</td></tr> </tbody> </table>	NO	Position		ROOM AMBIENT Ta= 27.9 °C	HIGH AMBIENT Ta= 56.5 °C	1	RTH1	51.2°C	70.8°C	2	ZNR1	46.1°C	69.0°C	3	LF2	49.2°C	73.7°C	4	BD1	53.0°C	77.9°C	5	C5	51.5°C	76.3°C	6	D5	59.0°C	84.7°C	7	Q1	57.9°C	83.7°C	8	U1	50.8°C	75.8°C	9	C25	54.3°C	79.3°C	10	T1	60.7°C	85.4°C	11	Q101	64.5°C	89.5°C	12	U100	51.2°C	75.2°C	13	C205	54.2°C	78.4°C	14	C105	56.1°C	80.5°C	15	C106	58.6°C	83.2°C	16	TSW1	52.0°C	76.0°C	17	TC	54.0°C	79.0°C		
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2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 264VAC/100VAC O/P: Full LOAD Ta= -40/-30°C	TEST: OK	PASS																																																																								
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P: 272 VAC O/P: Full LOAD Ta= 50 °C HUMIDITY= 95 %R.H	TEST: OK	PASS																																																																								
4	TEMPERATURE COEFFICIENT	±0.03 %(0~50°C)	I/P: 230 VAC O/P: Full LOAD	±0.01 %(0~50°C)	PASS																																																																								
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature: -45°C ~ +85°C 2. Temperature change rate: 25°C /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: -40°C ~ +55°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: 230VAC/Full 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: 90min in each axis (X.Y.Z) (6) Ta: 25°C	TEST: OK	PASS
8	CAPACITOR LIFE CYCLE	OWA-60E-20: 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=50 °C LIFE TIME (3) I/P: 230VAC O/P: 75% LOAD Ta=50 °C LIFE TIME (4) I/P: 230VAC O/P: 50% LOAD Ta=50 °C LIFE TIME	(1) 286999 HRS (2) 66947 HRS (3) 124102 HRS (4) 175514 HRS	PASS
9	MTBF	Conducted by Parts Stress Analysis Prediction 4386.2K hrs min. Telcordia SR-332 (Bellcore) ; 522.9K hrs min. MIL-HDBK-217F (25°C)		PASS
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 50000 hours @ Tcase 70°C		PASS

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	ZHANGZJ/ZHUOKB	SKY	LIUWY

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