



# Test Report: OWA-200E-36

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200W Single Output Moistureproof Adaptor

## ■ 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

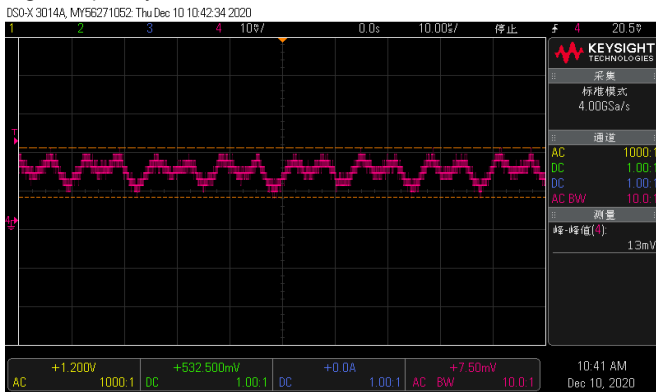
ENVIRONMENT TEST

## DESIGN VERIFY TEST

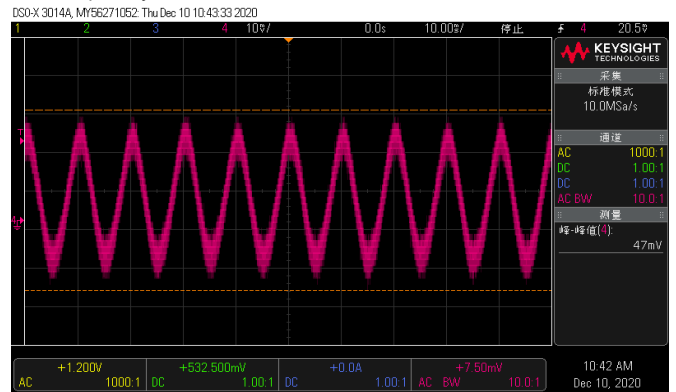
### OUTPUT FUNCTION TEST

N O	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE TOLERANCE	V1: -3% ~ 3% (Max)	I/P:180VAC /264AC O/P:FULL~MIN LOAD Ta:25°C	V1: 0.09%~ 0.37 %
2	LINE REGULATION	V1: -0.5% ~0.5% (Max)	I/P:180VAC~264AC O/P:FULL LOAD Ta:25°C	V1: 0.01 %~ 0.011 %
3	LOAD REGULATION	V1: -3% ~ 3% (Max)	I/P: 230 VAC O/P:FULL ~MIN LOAD Ta:25°C	V1: 0.22 %~ 0.23 %
4	OVER/UNDERSHOOT TEST	< +5%	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	TEST: 1.4 %
5	RIPPLE & NOISE	V1: 200mVp-p (Max)	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	V1: 47 mVp-p / 100% load

high frequency :



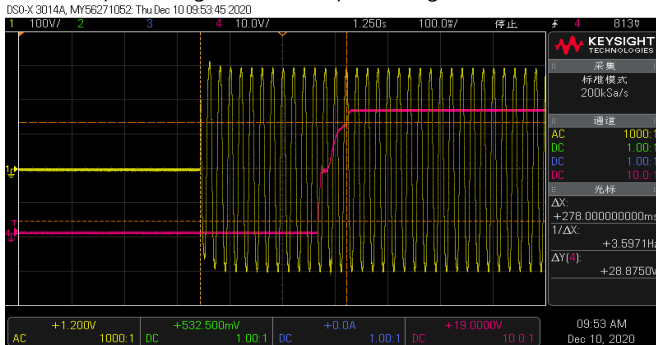
low frequency :



6	SET UP TIME (Max)	230VAC/500ms	I/P: 230 VAC O/P:FULL LOAD Ta:25°C 使用 LEDH MODE TEST	230VAC/ 278 ms
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INPUT=230VAC/50HZ @ FULL LOAD

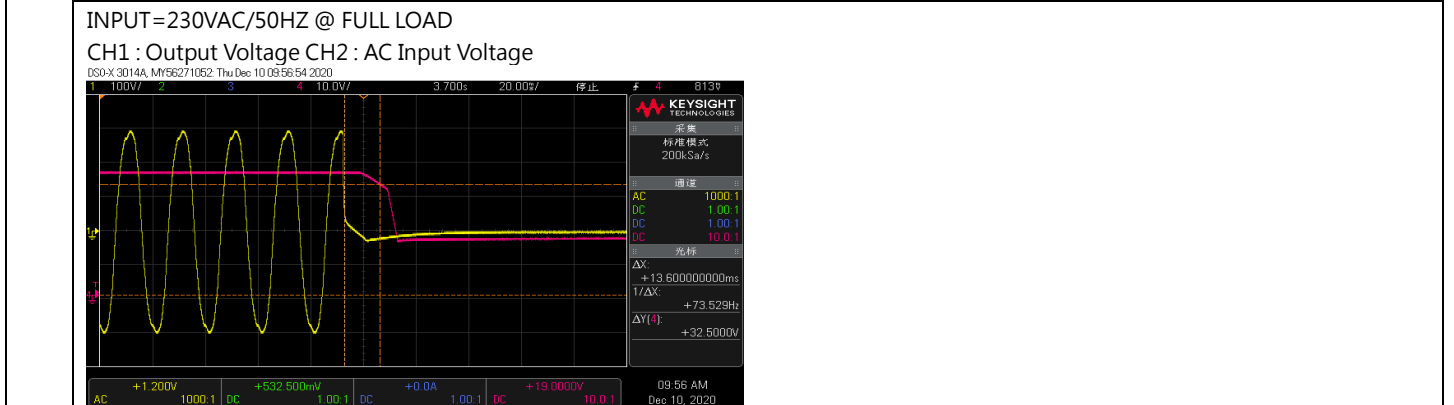
CH1 : Output Voltage CH2 : AC Input Voltage



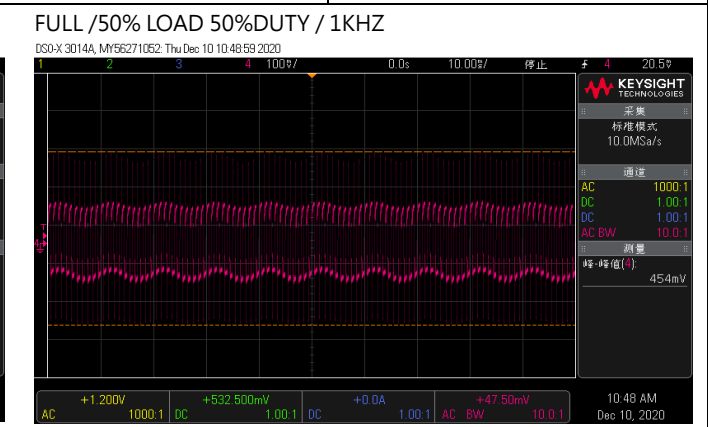
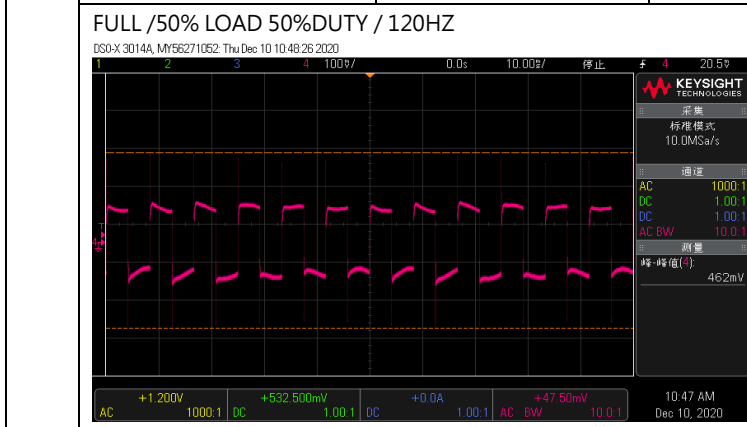
7	RISE TIME (Max)	230VAC/80ms	I/P: 230 VAC O/P:FULL LOAD Ta:25°C 使用 LEDH MODE TEST	230VAC/ 53.6 ms
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9	HOLD UP TIME (Typ)	230VAC/10ms	I/P: 230 VAC O/P:FULL LOAD Ta:25°C 使用 LEDH MODE TEST	230VAC/ 13.6 ms
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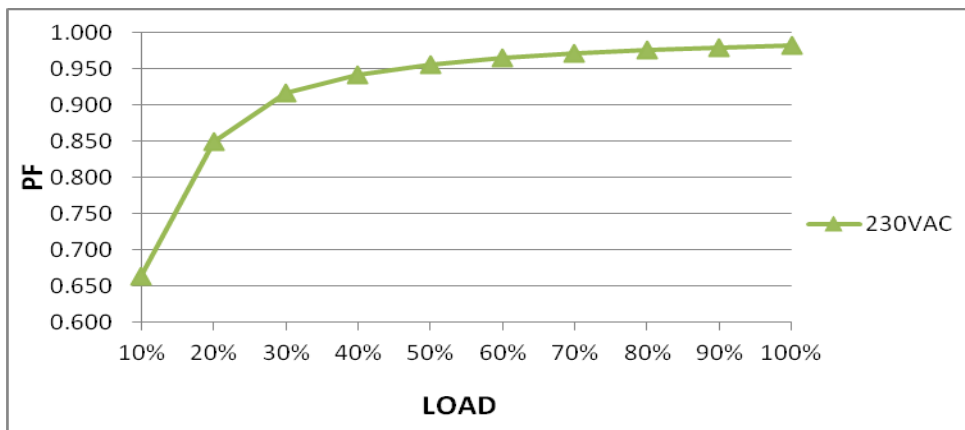
10	DYNAMIC LOAD	V1: 3600mVp-p	I/P: 230VAC O/P: (1)FULL /50% LOAD 50%DUTY / 120HZ (2)FULL /50% LOAD 50%DUTY / 1KHZ Ta:25°C	462mVp-p FULL /50% LOAD 50%DUTY / 120HZ 454mVp-p FULL /50% LOAD 50%DUTY / 1KHZ
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### INPUT FUNCTION TEST

N O	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	180VAC~264VAC 254VDC~ 370VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD Ta:25°C	(1)180 V~264VAC  (2)242Vdc~370Vdc/FULL LOAD  (3) 242Vdc~370Vdc/FULL LOAD
			I/P: LOW-LINE-3V=177 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: 180 VAC ~264VAC O/P:FULL~MIN LOAD Ta:25°C	OK
3	INPUT CURRENT (TYP)	230 VAC/1.1A	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I = 0.9301A/ 230VAC
	NO LOAD POWER CONSUMPTION	<0.15W	I/P: 230 VAC O/P:NO LOAD Ta:25°C	0.124W/ 230VAC
4	POWER FACTOR(TYP)	0.96/230 VAC FULL LOAD	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	PF= 0.982 /230V/100%LOAD

P.F vs LOAD



5	EFFICIENCY (TYP)	94%	I/P: 230VAC O/P: 100%Load Ta:25°C	94.61 %																						
<p>EFFICIENCY vs LOAD</p> <table border="1"> <caption>Efficiency vs Load Data (Approximate)</caption> <thead> <tr> <th>LOAD (%)</th> <th>EFFICIENCY (%)</th> </tr> </thead> <tbody> <tr><td>10%</td><td>88</td></tr> <tr><td>20%</td><td>91</td></tr> <tr><td>30%</td><td>92</td></tr> <tr><td>40%</td><td>93</td></tr> <tr><td>50%</td><td>93.5</td></tr> <tr><td>60%</td><td>94</td></tr> <tr><td>70%</td><td>94.2</td></tr> <tr><td>80%</td><td>94.4</td></tr> <tr><td>90%</td><td>94.5</td></tr> <tr><td>100%</td><td>94.6</td></tr> </tbody> </table>					LOAD (%)	EFFICIENCY (%)	10%	88	20%	91	30%	92	40%	93	50%	93.5	60%	94	70%	94.2	80%	94.4	90%	94.5	100%	94.6
LOAD (%)	EFFICIENCY (%)																									
10%	88																									
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50%	93.5																									
60%	94																									
70%	94.2																									
80%	94.4																									
90%	94.5																									
100%	94.6																									
6	INRUSH CURRENT (TYP)	230 V/ 65A (twidth=550us measured at 50% Ipeak) COLD START	I/P: 230 VAC O/P:FULL LOAD Ta:25°C	I =53.2 A/ 230VAC T50=480us																						
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH2 : AC Input Voltage CH3 : Input current</p> <p>Ch3 Max 53.2 A</p> <p>Measurement Data:</p> <ul style="list-style-type: none"> <li>△: 26.6 A</li> <li>@: 26.8 A</li> <li>△: 480µs</li> <li>@: 432µs</li> </ul> <p>Scale: Ch2 100 V, Ch3 20.0 A, 400µs</p>																										

### ROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	105 %~150%	I/P: 267VAC I/P: 230VAC I/P: 180VAC O/P:TESTING Ta:25°C	131.1%/ 267VAC 130.6%/ 230VAC 130.0%/180VAC PROTECTION TYPE : Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	V1: 41 V~ 49V	I/P: 267VAC I/P: 230VAC I/P: 180VAC O/P:TESTING Ta:25°C	46.9V/ 267VAC 46.7V/ 230VAC 46.7V/ 180VAC PROTECTION TYPE : Shut down o/p voltage, re-power on to recover

3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 267 VAC I/P: 180 VAC O/P: FULL LOAD	O.T.P. Active PROTECTION TYPE : Shut down o/p voltage, re-power on to recover
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 267VAC I/P: 180 VAC 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	Q73 Rated 11A/ 600V	AC ON/OFF  I/P:High-Line +3V =267V VDS: O/P: (1)Full Load (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 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load.  I/P:Low-Line -3V = 177V O/P: (1)Full Load (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 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load. Ta:25°C	VDS: (1) 437V (2) 461V (3) 437V (4) 437V (5) 432V (6) 428V (7) 445V  VDS: (1) 436V (2) 457V (3) 432V (4) 432V (5) 432V (6) 428V (7) 440V

2	<p>P.F.C Transistor ( D to S) or (C to E) Peak Voltage</p>	<p>Q1 Rated 26A/ 600 V</p>	<p>I/P:High-Line +3V =267 V AC ON/OFF O/P: (1)Full Load (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 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load.</p> <p>I/P:Low-Line -3V =177V AC ON/OFF O/P: (1)Full Load (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 100% Load/ Min. Load 50%Duty/120Hz (7)0%→400% Load.</p> <p>Ta:25°C</p>	<p>VDS: (1) 501V (2) 445V (3) 501V (4) 501V (5) 501V (6) 485V (7) 485V</p> <p>VDS: (1) 485V (2) 461V (3) 485V (4) 485V (5) 485V (6) 485V (7) 485V</p>
3	<p>P.F.C DIODE</p>	<p>D 5 Rated 9A/ 600V</p>	<p>I/P:High-Line +3V =267 V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz</p> <p>I/P:Low-Line -3V = 177V AC ON/OFF O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/ Min. Load 90%Duty/5KHz (4)Dynamic Load 100% Load/ Min. Load 50%Duty/120Hz</p> <p>Ta:25°C</p>	<p>(1) 485V (2) 445V (3) 485V (4) 485V</p> <p>(1) 424V (2) 412V (3) 424V (4) 424V</p>
4	<p>Diode Peak Voltage</p>	<p>Q101 Rated 46A/ 100V</p> <p>Q100 Rated</p>	<p>AC ON/OFF I/P:High-Line +3V =267 V O/P: (1)Full Load (2)Output Short (3)Dynamic Load Full Load/</p>	<p>Q101: VDS: (1) 84.7V (2) 11.7V (3) 84.7V</p>

		46A/ 100V	<p>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 100% Load/            Min. Load 50%Duty/120Hz            (7)0%→400% Load.            (8).NO LOAD</p> <p>Ta:25°C</p>	<p>(4) 84.7V            (5) 84.7V            (6) 85.5V            (7) 82.3V            (8) 81.5 V</p> <p>Q100:            VDS:            (1) 82.3V            (2) 11.5V            (3) 82.3V            (4) 82.3V            (5) 82.3V            (6) 82.3V            (7) 83.1V            (8) 83.1 V</p>												
5	Input Capacitor Voltage	C5 Rated: 100μ / 450V	<p>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</p> <p>Ta:25°C</p>	<p>(1) 422V            (2) 422V            (3) 422V            (4) 422V</p>												
6	Control IC Voltage Test	<p>U2 Rated            -0.3V~20V</p> <p>U1 Rated            -0.3V~35V</p>	<p>AC ON/OFF</p> <p>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)</p> <p>Ta:25°C</p>	<table border="0"> <tr> <td>U2</td> <td>U1</td> </tr> <tr> <td>(1) 16.36V</td> <td>(1) 16.8V</td> </tr> <tr> <td>(2) 17.0V</td> <td>(2) 16.8V</td> </tr> <tr> <td>(3) 17.0V</td> <td>(3) 17.0V</td> </tr> <tr> <td>(4) 16.8V</td> <td>(4) 16.8V</td> </tr> <tr> <td>(5) 16.6V</td> <td>(5) 16.8V</td> </tr> </table>	U2	U1	(1) 16.36V	(1) 16.8V	(2) 17.0V	(2) 16.8V	(3) 17.0V	(3) 17.0V	(4) 16.8V	(4) 16.8V	(5) 16.6V	(5) 16.8V
U2	U1															
(1) 16.36V	(1) 16.8V															
(2) 17.0V	(2) 16.8V															
(3) 17.0V	(3) 17.0V															
(4) 16.8V	(4) 16.8V															
(5) 16.6V	(5) 16.8V															



## SAFETY & EMC TEST

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	IEC60950-1 I/P-O/P: 4.2KVAC/min	I/P-O/P: 4.5KVAC/min Ta:25°C	I/P-O/P: 1.397 mA NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ	I/P-O/P: 500 VDC Ta:25°C	I/P-O/P: 9999 MΩ NO DAMAGE
3	LEAKAGE CURRENT	0.25mA / 240VAC	I/P: 240 VAC O/P:Min LOAD Ta:25°C	L-FG: 0.062mA N-FG:0.057 mA

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS C	I/P: 230VAC/50HZ O/P:FULL LOAD Ta:25°C	PASS
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 LIGHT 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 LIGHT INDUSTRY INPUT: 1KV	I/P: 230 VAC/50HZ O/P:FULL LOAD Ta:25°C	CRITERIA A
6	SURGE	IEC61000-4-5 INDUSTRY L-N :2KV	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 : OWA-200U-36 1. ROOM AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta=23.5 °C 2. HIGH AMBIENT BURN-IN : 2HRS I/P : 230VAC O/P : FULL LOAD Ta=48.3 °C																																																																														
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=23.5 °C</th> <th>HIGH AMBIENT Ta=48.3°C</th> </tr> </thead> <tbody> <tr><td>1</td><td>U3</td><td>55.1°C</td><td>76.0°C</td></tr> <tr><td>2</td><td>BD1</td><td>60.3°C</td><td>82.0°C</td></tr> <tr><td>3</td><td>C1</td><td>58.7°C</td><td>77.6°C</td></tr> <tr><td>4</td><td>Q1</td><td>60.4°C</td><td>82.6°C</td></tr> <tr><td>5</td><td>U1</td><td>59.2°C</td><td>81.1°C</td></tr> <tr><td>6</td><td>U2</td><td>62.0°C</td><td>84.2°C</td></tr> <tr><td>7</td><td>C35</td><td>57.8°C</td><td>80.1°C</td></tr> <tr><td>8</td><td>Q50</td><td>60.5°C</td><td>82.7°C</td></tr> <tr><td>9</td><td>T1</td><td>69.4°C</td><td>92.4°C</td></tr> <tr><td>10</td><td>C5</td><td>58.3°C</td><td>80.3°C</td></tr> <tr><td>11</td><td>U101</td><td>60.5°C</td><td>83.6°C</td></tr> <tr><td>12</td><td>Q100</td><td>52.7°C</td><td>77.0°C</td></tr> <tr><td>13</td><td>Q101</td><td>57.2°C</td><td>81.5°C</td></tr> <tr><td>14</td><td>C115</td><td>49.4°C</td><td>72.3°C</td></tr> <tr><td>15</td><td>C105</td><td>48.8°C</td><td>72.8°C</td></tr> <tr><td>16</td><td>C106</td><td>50.0°C</td><td>73.7°C</td></tr> <tr><td>17</td><td>RTH5</td><td>59.3°C</td><td>81.4°C</td></tr> <tr><td>18</td><td>TC</td><td>52.3°C</td><td>74.9°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=23.5 °C	HIGH AMBIENT Ta=48.3°C	1	U3	55.1°C	76.0°C	2	BD1	60.3°C	82.0°C	3	C1	58.7°C	77.6°C	4	Q1	60.4°C	82.6°C	5	U1	59.2°C	81.1°C	6	U2	62.0°C	84.2°C	7	C35	57.8°C	80.1°C	8	Q50	60.5°C	82.7°C	9	T1	69.4°C	92.4°C	10	C5	58.3°C	80.3°C	11	U101	60.5°C	83.6°C	12	Q100	52.7°C	77.0°C	13	Q101	57.2°C	81.5°C	14	C115	49.4°C	72.3°C	15	C105	48.8°C	72.8°C	16	C106	50.0°C	73.7°C	17	RTH5	59.3°C	81.4°C	18	TC	52.3°C	74.9°C
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18	TC	52.3°C	74.9°C																																																																													
2	OVER LOAD BURN-IN TEST	NO DAMAGE 1 HOUR ( MIN )	I/P : 230 VAC O/P : 127 * LOAD Ta : 25°C	TEST : OK																																																																												
3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 230VAC/180VAC O/P : 100 * LOAD Ta=-45 °C	TEST : OK																																																																												
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 45 °C NO DAMAGE	I/P : 264VAC O/P : FULL LOAD Ta= 45 °C HUMIDITY= 95 %R.H	TEST : OK																																																																												
5	TEMPERATURE COEFFICIENT	± 0.03 %/(0°C~50°C)	I/P : 230 VAC O/P : FULL LOAD	± 0.012 %/°C(0~50°C)																																																																												

6	STORAGE TEMPERATURE TEST	-40~85°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 : 10CYCLE 5. Input/Output condition : STATIC
7	THERMAL SHOCK TEST	-40~45°C	1. Thermal shock Temperature : -45°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
8	VIBRATION TEST	10 ~ 500Hz, 5G 10min./1cycle, 60min. 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 : 6G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25°C
9	CAPACITOR LIFE CYCLE	SUPPOSE C106 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) 581123HRS (2) 157085HRS (3) 276430HRS (4) 374468 HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 2677.8K hrs min. Telcordia SR-332 (Bellcore); 267.6K 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 : 50,000 hours	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	WUWQ/HUANGMK	WENF	LINKX

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