



# Test Report: UHP-200A-4.5

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200W Single Output with PFC Function

## ■ 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

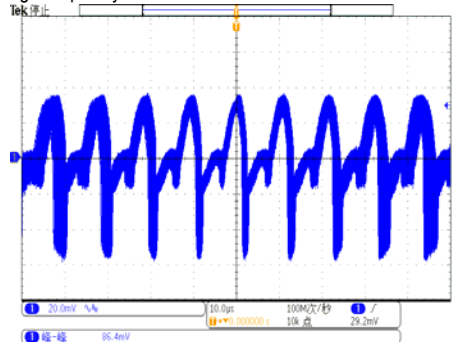
Environment Test

## DESIGN VERIFY TEST

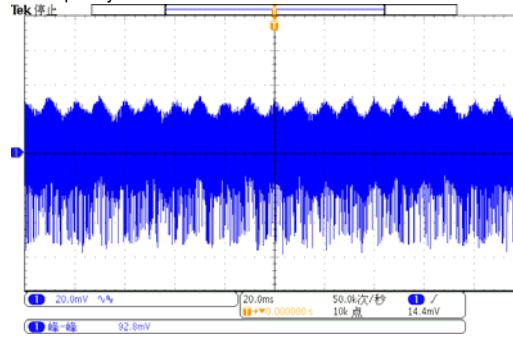
### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	4.3V~4.7V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	4.02 V~ 4.72V
2	OUTPUT VOLTAGE TOLERANCE	-4%~+4%	I/P: 180VAC / 264VAC O/P: FULL / NO LOAD Ta: 25°C	-0.2%~ 0.2%
3	LINE REGULATION	-0.5%~+0.5%	I/P: 180VAC ~ 264VAC O/P: FULL LOAD Ta: 25°C	-0.2%~ 0%
4	LOAD REGULATION	-2.5%~+2.5%	I/P: 230VAC O/P: FULL ~NO LOAD Ta: 25°C	0%~ 0.2%
5	DC OK	PSU Turns on: DC ok PSU turns off: DC fail	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	OK
6	OVER/UNDERSHOOT TEST	<± 10 %	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<±3.167 %
7	RIPPLE & NOISE (Max)	200mVp-p	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	92.8 mVp-p

high frequency :



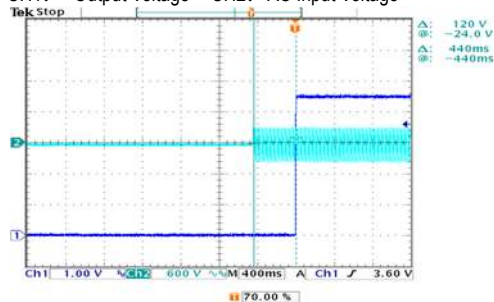
low frequency :



8	SET UP TIME(Max)	230VAC/ 2000ms 115VAC/ 3000ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD/80% LOAD Ta: 25°C	230VAC/ 440 ms 115VAC/ 928 ms
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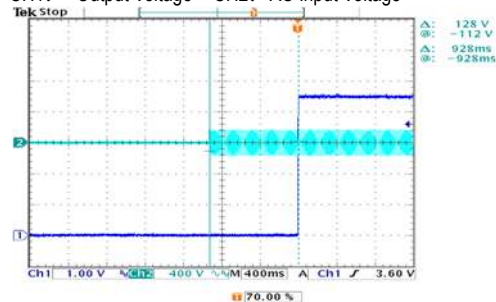
INPUT=230VAC/50HZ @ FULL LOAD

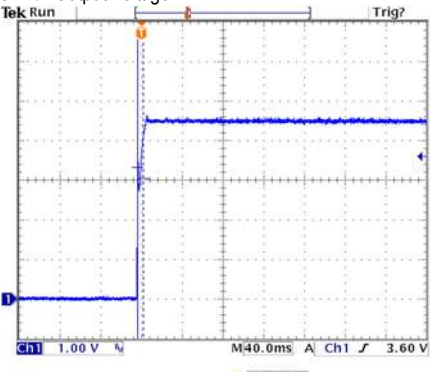
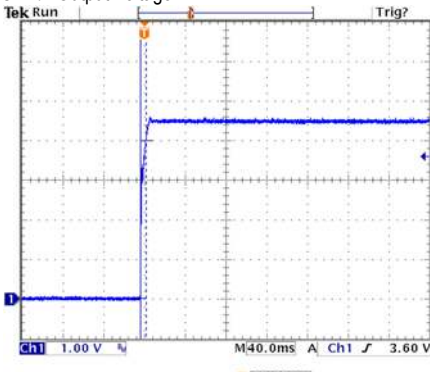
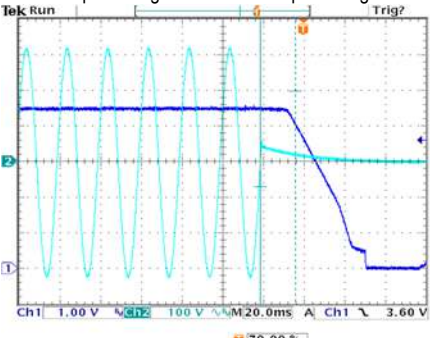
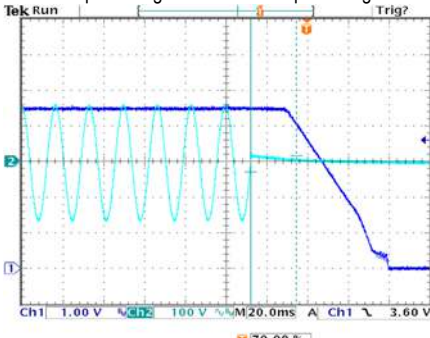
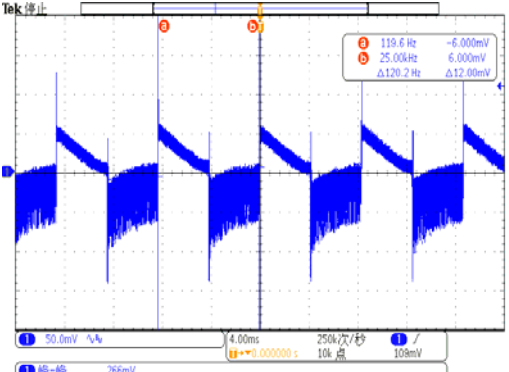
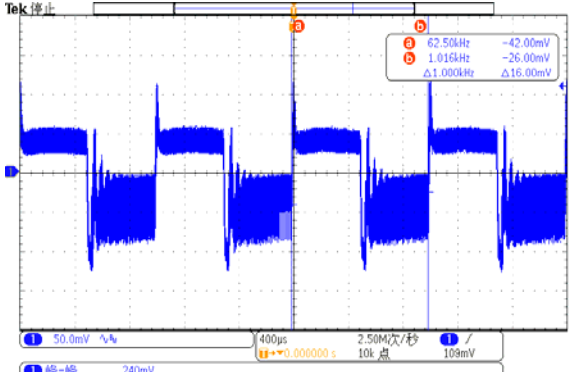
CH1: Output Voltage CH2: AC Input Voltage



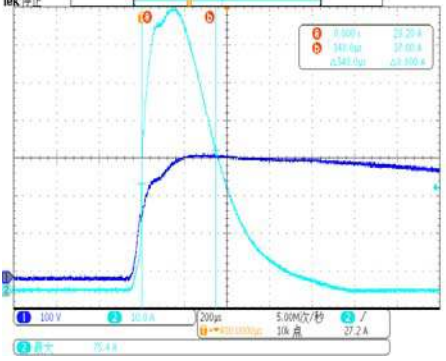
INPUT=115VAC/60HZ @ 80% LOAD

CH1: Output Voltage CH2: AC Input Voltage



9	RISE TIME (Max)	230VAC/ 200ms 115VAC/ 200ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD/80% LOAD Ta: 25°C	230VAC/ 5.6 ms 115VAC/ 5.6 ms
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1: Output Voltage</p> 		<p>INPUT=115VAC/60HZ @ 80% LOAD</p> <p>CH1: Output Voltage</p> 		
10	HOLD UP TIME(Typ)	230VAC/ 10ms 115VAC/ 10ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD/80% LOAD Ta: 25°C	230VAC/ 17.2ms 115VAC/ 22.4ms
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</p> 		<p>INPUT=115VAC/60HZ @ 80% LOAD</p> <p>CH1: Output Voltage CH2: AC Input Voltage</p> 		
1	DYNAMIC LOAD	V1: 900 mVp-p	I/P: 230VAC O/P: (1)FULL/50% LOAD 50%DUTY / 120HZ (2)FULL/50% LOAD 50%DUTY / 1KHZ Ta: 25°C	(1) 266 mVp-p (2) 240 mVp-p
<p>FULL /50% LOAD 50%DUTY / 120HZ</p> 		<p>FULL /50% LOAD 50%DUTY / 1KHZ</p> 		

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	100VAC~264VAC	I/P: TESTING O/P: FULL LOAD Ta: 25°C	97 V~ 264V
			(1)I/P: LOW-LINE-3V= 97 V HIGH-LINE+15%= 300 V O/P:FULL /MIN LOAD ON: 30 Sec . OFF: 30 Sec 10MIN (2) I/P:230VAC ON: 2.0 Sec . OFF: 2.0 Sec 20MIN ( AC POWER ON/OFF NO DAMAGE )	TEST: OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 100 VAC ~264 VAC O/P: FULL~NO LOAD Ta: 25°C	TEST: OK
3	AC CURRENT	3.0A/115VAC 2.0A/230VAC	I/P: 115 VAC I/P: 230 VAC O/P: 80% LOAD/FULL LOAD Ta: 25°C	I = 1.79 A/ 115VAC I = 0.88 A/ 230VAC
4	LEAKAGE CURRENT	< 1.0mA / 240VAC	I/P: 264 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.166 mA N-FG: 0.167 mA
5	INRUSH CURRENT(Typ)	230V/85A COLD START	I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 75.4 A/ 230VAC
<p>INPUT=230VAC/50HZ @ FULL LOAD</p> <p>CH2: Input current CH1: AC Input Voltage</p>  <p>Tek 停止</p> <p>1 0.500V 25.20ns 2 540.0ns 27.60ns 3 2540.0ns 2.000ns</p> <p>100V 20.0ns 200ns 5.00ns/格 27.2A 75.4A 10% 27.2A</p>				
6	EFFICIENCY(Typ)	88%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	89.58 %
7	POWER FACTOR	0.97/ 115VAC FULL LOAD 0.95/ 230VAC FULL LOAD	I/P: 115 VAC I/P: 230 VAC O/P: 80% LOAD/FULL LOAD Ta: 25°C	PF= 0.996 / 115VAC PF= 0.984 / 230VAC



**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER LOAD PROTECTION	110~140% RATED OUTPUT POWER	I/P: 180VAC I/P: 230VAC I/P: 264VAC O/P: TESTING Ta: 25°C	127.5 %/ 180VAC 129.0 %/ 230VAC 128.7 %/ 264VAC Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	5.0V~6.4V	I/P: 180VAC I/P: 230VAC I/P: 264VAC O/P: NO LOAD Ta: 25°C	5.846 V/ 100VAC 5.840V/ 230VAC 5.850 V/ 264VAC Hiccup mode, recovers automatically after fault condition is removed
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 180VAC I/P: 230VAC I/P: 264VAC O/P: FULL LOAD	O.T.P. Active Shut down o/p voltage, recovers automatically after fault condition is removed
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P: 100VAC I/P: 264VAC O/P: FULL LOAD Ta: 25°C	NO DAMAGE Hiccup mode, recovers automatically after fault condition is removed

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q2 Rated 500V/7A	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25°C	(1) 440 V (2) 440 V (3) 452 V
2	O/P Diode (MOSFET)	Q100 Rated 30V/100A	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25°C	(1) 22.2 V (2) 8.04 V (3) 17.1 V
3	Input Capacitor	C5 Rated 100u/ 450V	I/P: High-Line +3V =267 V O/P: (1) FULL LOAD input on/off (2) NO LOAD input on /Off (3) FULL LOAD /NO LOAD Change Ta: 25°C	(1) 410 V (2) 408 V (3) 394 V
4	Control IC	U2 Rated 25V (MAX.)	I/P: High-Line +3V =267 V O/P: ((1) FULL LOAD (2) Output Short (3) O.L.P (4) O.V.P (5) Low Line No Load Vo(min) Ta: 25°C	(1) 15.6 V (2) 15.9 V (3) 17.4 V (4) 16.3 V (5) 14.8 V
5	PFC Power Transistor	Q 1 Rated 710V/15A	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25°C	(1) 468 V (2) 428 V (3) 448 V

## SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.0 KVAC/min I/P-FG: 2.0 KVAC/min O/P-FG: 0.5 KVAC/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: 1.798 mA I/P-FG: 1.677 mA O/P-FG: 2.440 mA 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: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta: 25°C	I/P-O/P: >9999 MΩ I/P-FG: >9999 MΩ O/P-FG: >9999 MΩ
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta: 25°C	10 mΩ

## E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P: 220V/230V/240V AC 50HZ O/P:100%/75%/60% LOAD Ta:25°C	PASS
2	CONDUCTION	EN55022 CLASS B	I/P: 230 VAC (50HZ) O/P: FULL LOAD Ta: 25°C	PASS Test by certified Lab
3	RADIATION	EN55022 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: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
6	SURGE	EN61000-4-5 INDUSTRY L-N: 2KV L,N-PE: 4KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	CRITERIA A
7	Test by certified Lab & Test Report Prepare			

## RELIABILITY TEST

### ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT																																																																																
1	TEMPERATURE RISE TEST	MODEL: UHP-200A-4.5 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=42.9 °C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=51.8 °C																																																																																		
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=42.9 °C</th> <th>HIGH AMBIENT Ta=51.8 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>RTH1</td><td>82.8°C</td><td>90.1°C</td></tr> <tr><td>2</td><td>BD1</td><td>80.7°C</td><td>89.5°C</td></tr> <tr><td>3</td><td>C6</td><td>74.8°C</td><td>84.6°C</td></tr> <tr><td>4</td><td>L1</td><td>74.3°C</td><td>84.4°C</td></tr> <tr><td>5</td><td>C5</td><td>80.9°C</td><td>91.4°C</td></tr> <tr><td>6</td><td>C7</td><td>82.4°C</td><td>92.6°C</td></tr> <tr><td>7</td><td>U2</td><td>86.7°C</td><td>97.5°C</td></tr> <tr><td>8</td><td>U1</td><td>71.0°C</td><td>80.9°C</td></tr> <tr><td>9</td><td>Q2</td><td>76.8°C</td><td>86.8°C</td></tr> <tr><td>10</td><td>T1</td><td>81.5°C</td><td>91.6°C</td></tr> <tr><td>11</td><td>C40</td><td>73.6°C</td><td>83.3°C</td></tr> <tr><td>12</td><td>U100</td><td>76.5°C</td><td>86.1°C</td></tr> <tr><td>13</td><td>Q103</td><td>74.7°C</td><td>84.7°C</td></tr> <tr><td>14</td><td>Q102</td><td>75.8°C</td><td>85.9°C</td></tr> <tr><td>15</td><td>Q100</td><td>80.9°C</td><td>90.9°C</td></tr> <tr><td>16</td><td>Q101</td><td>82.8°C</td><td>92.7°C</td></tr> <tr><td>17</td><td>C104</td><td>82.5°C</td><td>92.4°C</td></tr> <tr><td>18</td><td>C105</td><td>84.9°C</td><td>95.1°C</td></tr> <tr><td>19</td><td>TSW1</td><td>82.2°C</td><td>92.7°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=42.9 °C	HIGH AMBIENT Ta=51.8 °C	1	RTH1	82.8°C	90.1°C	2	BD1	80.7°C	89.5°C	3	C6	74.8°C	84.6°C	4	L1	74.3°C	84.4°C	5	C5	80.9°C	91.4°C	6	C7	82.4°C	92.6°C	7	U2	86.7°C	97.5°C	8	U1	71.0°C	80.9°C	9	Q2	76.8°C	86.8°C	10	T1	81.5°C	91.6°C	11	C40	73.6°C	83.3°C	12	U100	76.5°C	86.1°C	13	Q103	74.7°C	84.7°C	14	Q102	75.8°C	85.9°C	15	Q100	80.9°C	90.9°C	16	Q101	82.8°C	92.7°C	17	C104	82.5°C	92.4°C	18	C105	84.9°C	95.1°C	19	TSW1	82.2°C	92.7°C
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12	U100	76.5°C	86.1°C																																																																																	
13	Q103	74.7°C	84.7°C																																																																																	
14	Q102	75.8°C	85.9°C																																																																																	
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19	TSW1	82.2°C	92.7°C																																																																																	
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 264VAC/110VAC O/P: FULL LOAD/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: 264VAC O/P: FULL LOAD Ta=50°C HUMIDITY= 95%R.H	TEST: OK																																																																																
4	TEMPERATURE COEFFICIENT	±0.03 %/°C (0-50°C)	I/P: 230 VAC O/P: FULL LOAD	0.025 %/°C (0-50°C)																																																																																



200W Single Output with PFC Function

# UHP-200A series

5	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: 5 CYCLE 5. Input/Output condition: STATIC	TEST: OK
6	THERMAL SHOCK TEST	1. Thermal shock Temperature: -35°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 AC on 3 sec/AC off 1 sec TEST	TEST: OK
7	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: 60min in each axes (X.Y.Z) (6) Ta: 25°C	TEST: OK
8	CAPACITOR LIFE CYCLE	UHP-200A-4.5: 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) 276077 HRS (2) 28578 HRS (3) 229631 HRS (4) 1137706 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 204K hrs min. MIL-HDBK-217F (25°C)	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	EDISION/ZHUOKB	SKY	LIUWY