



Test Report: UHP-200-24

200W Slim Type with PFC 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

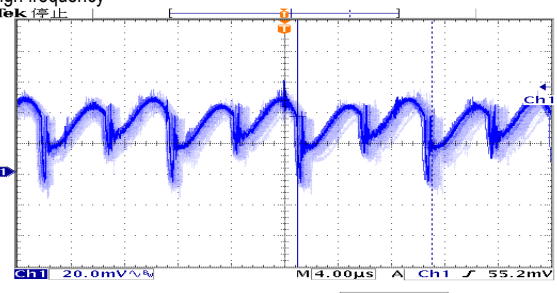
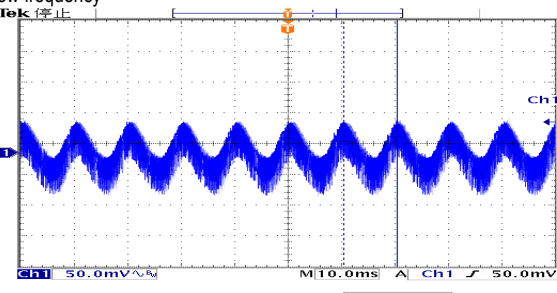
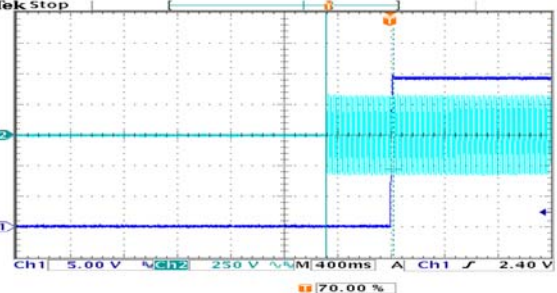
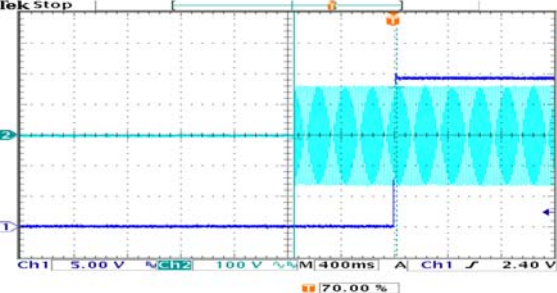
E.M.C. Test

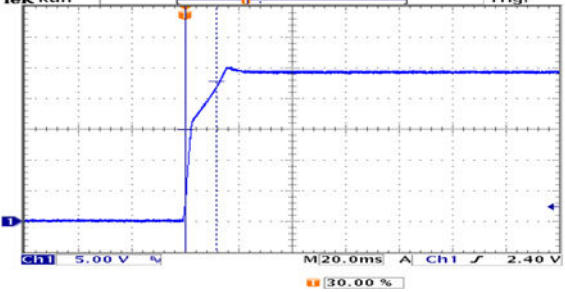
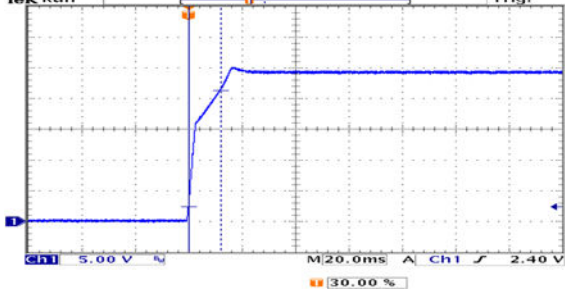
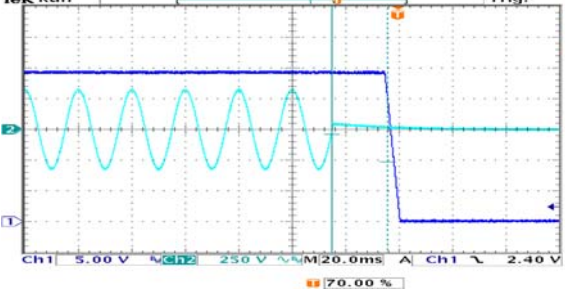
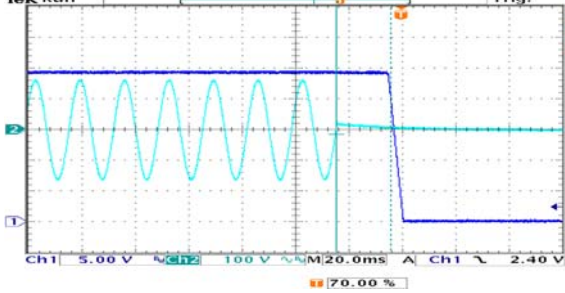
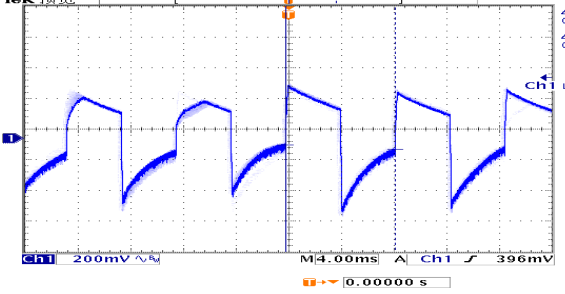
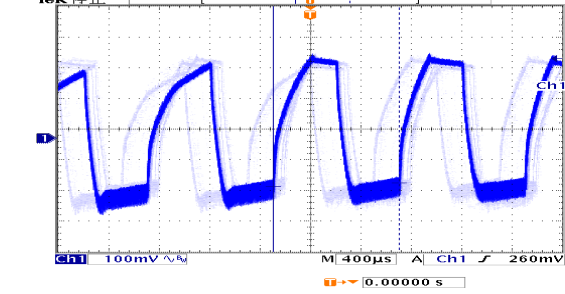
■ RELIABILITY TEST

Environment Test

DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	22.8V~25.2V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	22.34V~ 26.25V
2	PEAK LOAD	150% peak load capability(100ms)	I/P: 230VAC O/P: 150% LOAD Ta: 25°C	TEST: OK
3	OUTPUT VOLTAGE TOLERANCE	-1%~+1%	I/P: 110VAC / 264VAC O/P: FULL / NO LOAD Ta: 25°C	-0.5%~+0.5%
4	LINE REGULATION	-0.3%~+0.3%	I/P: 180VAC ~ 264VAC O/P: FULL LOAD Ta: 25°C	-0%~+0%
5	LOAD REGULATION	-0.5%~+0.5%	I/P: 230VAC O/P: FULL ~NO LOAD Ta: 25°C	0%~+0%
6	OVER/UNDERSHOOT TEST	<± 5 %	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<5%
7	RIPPLE & NOISE (Max)	240mVp-p	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	119mVp-p
high frequency :  峰-峰值測定 66.4mV low frequency :  峰-峰值測定 119mV				
8	SET UP TIME(Max)	230VAC/ 2000ms 115VAC/ 3000ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/504 ms 115VAC/768 ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage  280 V 0.00 V 504ms -488ms INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage  168 V -12.0 V 768ms -752ms				

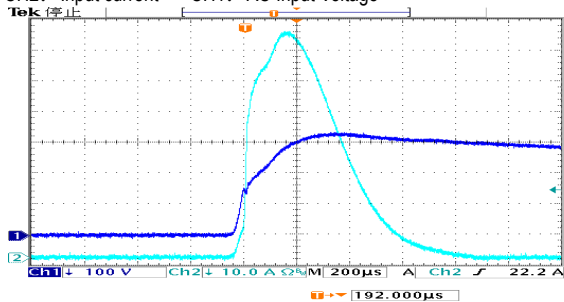
9	RISE TIME (Max)	230VAC/ 80ms 115VAC/ 80ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/11.6 ms 115VAC/12.0 ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage  INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage 				
10	HOLD UP TIME(Typ)	230VAC/ 10ms 115VAC/ 10ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/20.8 ms 115VAC/20.4ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage  INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage 				
11	DYNAMIC LOAD	V1: 2400 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) 824mVp-p (2) 510mVp-p
FULL /50% LOAD 50%DUTY / 120HZ  FULL /50% LOAD 50%DUTY / 1KHZ 				

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264VAC	I/P: TESTING O/P: 75%~FULL LOAD Ta: 25°C	87 V~300V
			I/P: (1)LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P: 90%/FULL/NO LOAD ON: 30 Sec OFF: 30 Sec 10MIN (2)230VAC ON: 0.5 Sec OFF: 0.5 Sec 20MIN (POWER ON/OFF NO DAMAGE)	TEST: OK
2	Withstand 300VAC Surge	300VAC input for 5 seconds No damage	I/P: 300VAC O/P: FULL LOAD Ta: 25°C	TEST: OK
3	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P: 90 VAC ~264 VAC O/P: FULL~NO LOAD Ta: 25°C	TEST: OK
4	AC CURRENT	2.2A/115VAC 1.1A/230VAC	I/P: 115 VAC I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 1.92A/ 115VAC I = 0.92 A/ 230VAC
5	LEAKAGE CURRENT	< 0.75mA / 240VAC	I/P: 240 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.173 mA N-FG: 0.213 mA
6	NO LOAD CONSUMPTION	---	I/P: 115VAC I/P: 230VAC O/P: NO LOAD Ta: 25°C	0.45W/115VAC 1.03 W/230VAC
7	INRUSH CURRENT(Typ)	230V/ 80A 115V/ 40A COLD START	I/P: 230 VAC/115VAC O/P: FULL LOAD Ta: 25°C	I = 74.0A/ 230VAC I = 33.3A/ 115VAC

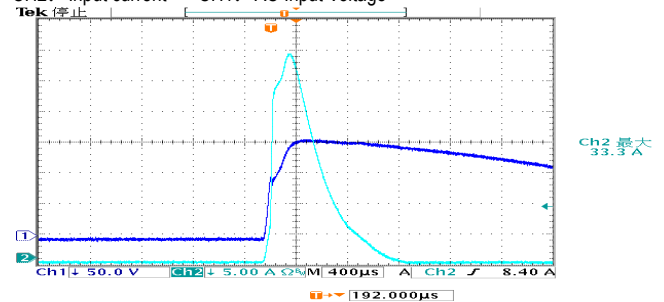
INPUT=230VAC/50HZ @ FULL LOAD

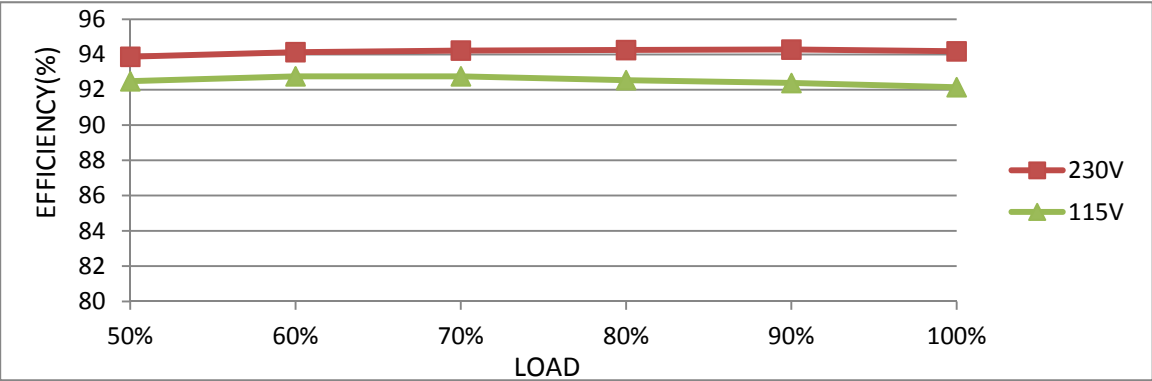
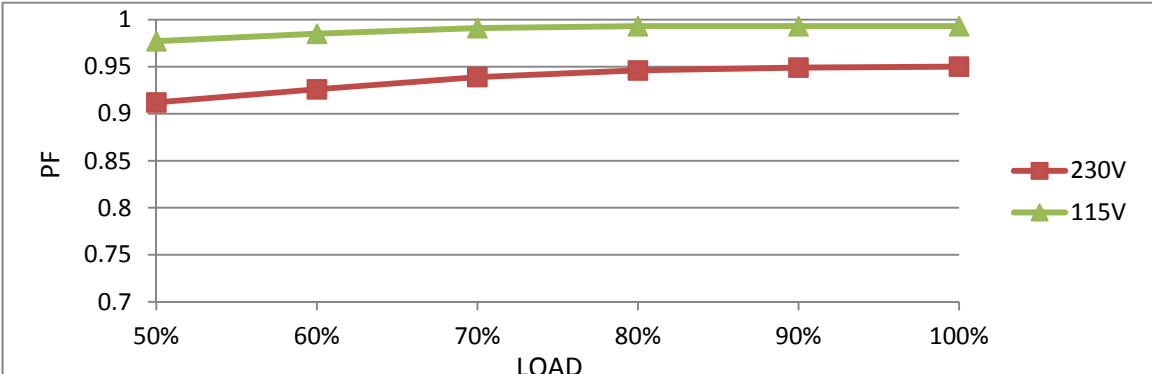
CH2: Input current CH1: AC Input Voltage



INPUT=115VAC/60HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage



8	EFFICIENCY(Typ)	94%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	94.18%																				
	EFFICIENCY vs LOAD																							
	 <table border="1"><caption>Efficiency vs Load Data</caption><thead><tr><th>LOAD</th><th>230V</th><th>115V</th></tr></thead><tbody><tr><td>50%</td><td>94.0</td><td>92.5</td></tr><tr><td>60%</td><td>94.2</td><td>93.0</td></tr><tr><td>70%</td><td>94.3</td><td>93.0</td></tr><tr><td>80%</td><td>94.3</td><td>92.8</td></tr><tr><td>90%</td><td>94.4</td><td>92.5</td></tr><tr><td>100%</td><td>94.3</td><td>92.2</td></tr></tbody></table>				LOAD	230V	115V	50%	94.0	92.5	60%	94.2	93.0	70%	94.3	93.0	80%	94.3	92.8	90%	94.4	92.5	100%	94.3
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100%	94.3	92.2																						
9	POWER FACTOR	0.94/ 230VAC 0.98/115VAC	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	PF=0.950/ 230VAC PF=0.993/ 115VAC																				
	P.F vs LOAD																							
	 <table border="1"><caption>P.F vs Load Data</caption><thead><tr><th>LOAD</th><th>230V</th><th>115V</th></tr></thead><tbody><tr><td>50%</td><td>0.91</td><td>0.97</td></tr><tr><td>60%</td><td>0.92</td><td>0.98</td></tr><tr><td>70%</td><td>0.93</td><td>0.99</td></tr><tr><td>80%</td><td>0.94</td><td>0.99</td></tr><tr><td>90%</td><td>0.94</td><td>0.99</td></tr><tr><td>100%</td><td>0.95</td><td>0.99</td></tr></tbody></table>				LOAD	230V	115V	50%	0.91	0.97	60%	0.92	0.98	70%	0.93	0.99	80%	0.94	0.99	90%	0.94	0.99	100%	0.95
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PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OVER CURRENT PROTECTION	110~140%	I/P: 110VAC I/P: 230VAC I/P: 264VAC O/P: TESTING Ta: 25°C	121.4%/ 110VAC 121.4%/ 230VAC 121.4 %/ 264VAC Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	26.4V~31.2V	I/P: 90VAC I/P: 230VAC I/P: 264VAC O/P: NO LOAD Ta: 25°C	29.6V/ 90VAC 29.5V/ 230VAC 29.5V/ 264VAC Shut down o/p voltage, re-power on to recovery
3	OVER TEMPERATURE PROTECTION	NO DAMAGE	I/P: 100VAC I/P: 230VAC I/P: 264VAC O/P: 90%/FULL LOAD	O.T.P. Active Shut down o/p voltage, recovers automatically after temperature goes down

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	REDUNDANT CONTROL	For parallel connection protection:For parallel applications,when one PSU can not work,the another one will be automatically enabled.This can preven the system crash,and provide the reliability of system	I/P: 230 VAC O/P:FULL LOAD	TEST : OK
2	DCOK CONTACT RATINGS	15VDC/10mA RESISTIVE LOAD	I/P:230VAC O/P:FULL LOAD Ta:25℃	TEST : OK

COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	PWM Power Transistor	Q5 Rated 18A/500V	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25℃	(1) 446 V (2) 416 V (3) 445 V
2	O/P Diode (MOSFET)	Q100 Rated 80V/100A	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25℃	(1) 61.2 V (2) 11.5 V (3) 60.4 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℃	(1) 442 V (2) 442 V (3) 420 V
4	Control IC	U1 Rated 38V (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℃	(1) 34.8 V (2) 23.4 V (3) 23.6 V (4) 30.0 V (5) 21.5 V
5	PFC Power Transistor	Q 1 Rated 26A/600V	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25℃	(1) 512 V (2) 444 V (3) 511 V

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3.75 KVAC/min I/P-FG: 2.0 KVAC/min O/P-FG: 1.25 KVAC/min	I/P-O/P: 4.2 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG: 1.5 KVAC/min Ta: 25°C	I/P-O/P: 2.710 mA I/P-FG: 2.614 mA O/P-FG: 1.624 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/70%RH	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	11 mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2	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 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 HEAVY INDUSTRY AIR: 8KV Contact: 4KV	I/P: 230 VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS CRITERIA A
5	E.F.T	EN61000-4-4 HEAVY INDUSTRY INPUT: 2KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS CRITERIA A
6	SURGE	EN61000-4-5 HEAVY INDUSTRY L-N: 2KV L,N-PE: 4KV	I/P: 230VAC/50HZ O/P: FULL LOAD Ta: 25°C	PASS 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-200-5 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=27.3℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=53.3℃ <table><thead><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=27.3 ℃</th><th>HIGH AMBIENT Ta=53.3 ℃</th></tr></thead><tbody><tr><td>1</td><td>RT1</td><td>66.8℃</td><td>83.3℃</td></tr><tr><td>2</td><td>ZR1</td><td>41.4℃</td><td>64.9℃</td></tr><tr><td>3</td><td>BD1</td><td>52.7℃</td><td>75.9℃</td></tr><tr><td>4</td><td>Q1</td><td>52.5℃</td><td>76.0℃</td></tr><tr><td>5</td><td>C5</td><td>46.3℃</td><td>69.9℃</td></tr><tr><td>6</td><td>U1</td><td>46.6℃</td><td>70.4℃</td></tr><tr><td>7</td><td>Q5</td><td>52.8℃</td><td>67.8℃</td></tr><tr><td>8</td><td>Q6</td><td>51.6℃</td><td>77.0℃</td></tr><tr><td>9</td><td>D1</td><td>52.7℃</td><td>76.3℃</td></tr><tr><td>10</td><td>T1</td><td>57.4℃</td><td>76.8℃</td></tr><tr><td>11</td><td>Q100</td><td>53.1℃</td><td>78.2℃</td></tr><tr><td>12</td><td>Q102</td><td>54.0℃</td><td>79.1℃</td></tr><tr><td>13</td><td>C105</td><td>50.1℃</td><td>74.7℃</td></tr><tr><td>14</td><td>TSW1</td><td>42.7℃</td><td>66.7℃</td></tr><tr><td>15</td><td>TC</td><td>41.5℃</td><td>65.3℃</td></tr></tbody></table>			NO	Position	ROOM AMBIENT Ta=27.3 ℃	HIGH AMBIENT Ta=53.3 ℃	1	RT1	66.8℃	83.3℃	2	ZR1	41.4℃	64.9℃	3	BD1	52.7℃	75.9℃	4	Q1	52.5℃	76.0℃	5	C5	46.3℃	69.9℃	6	U1	46.6℃	70.4℃	7	Q5	52.8℃	67.8℃	8	Q6	51.6℃	77.0℃	9	D1	52.7℃	76.3℃	10	T1	57.4℃	76.8℃	11	Q100	53.1℃	78.2℃	12	Q102	54.0℃	79.1℃	13	C105	50.1℃	74.7℃	14	TSW1	42.7℃	66.7℃	15	TC	41.5℃	65.3℃
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15	TC	41.5℃	65.3℃																																																																	
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 264VAC/90VAC O/P: FULL/75% LOAD Ta= -35℃	TEST: OK																																																																
3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50℃ NO DAMAGE	I/P: 264VAC O/P: FULL LOAD Ta=50℃ HUMIDITY= 95%R.H	TEST: OK																																																																
4	TEMPERATURE COEFFICIENT	±0.03 %/℃ (0~50℃)	I/P: 230 VAC O/P: FULL LOAD	±0.002%/℃ (0~50℃)																																																																
5	STORAGE TEMPERATURE TEST	1. Thermal shock Temperature: -45℃~ +90℃ 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		TEST: OK																																																																
6	THERMAL SHOCK TEST	1. Thermal shock Temperature: -35℃~ +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/FULL LOAD AC ON/OFF TEST AC on 3 sec/AC off 1 sec TEST		TEST: OK																																																																



200W Slim Type with PFC Switching Power Supply

UHP-200 series

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-200-5: 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) 78863 HRS (2) 13463 HRS (3) 55660 HRS (4) 148521 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 257K hrs min. MIL-HDBK-217F (25°C)	
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30,000 hours @ Ta 50°C	

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	SHENJW/ZHUOKB	SKY	LIUWY