



# Test Report: UHP-200-3.3

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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

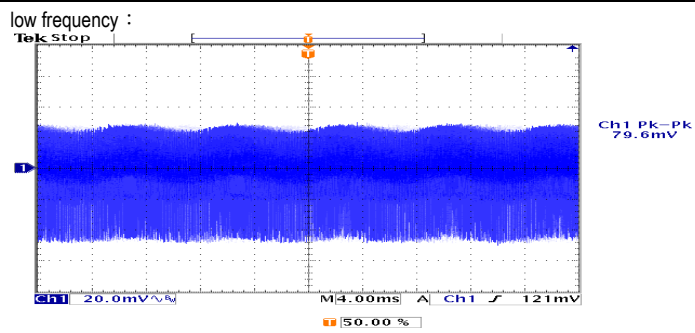
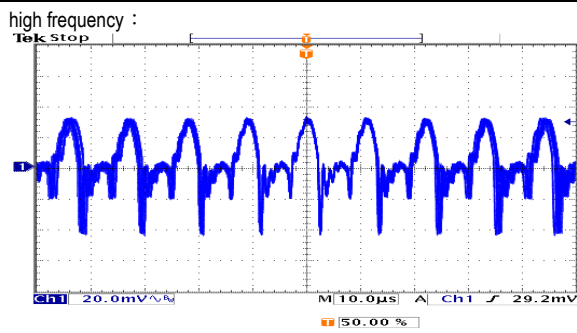
## ■ RELIABILITY TEST

Environment Test

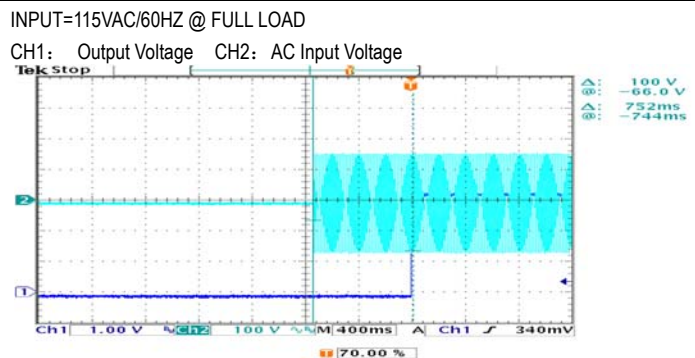
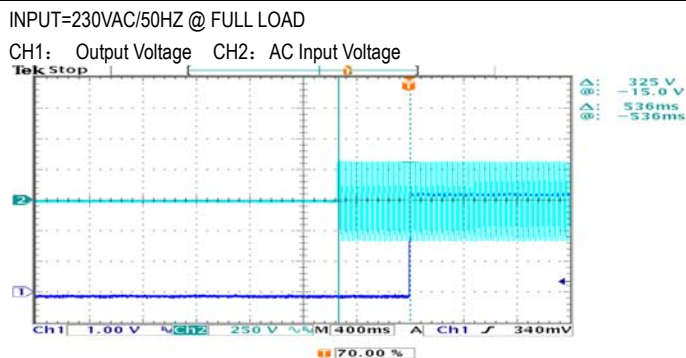
## DESIGN VERIFY TEST

### OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	OUTPUT VOLTAGE ADJUST RANGE	3.2V~3.5V	I/P: 230VAC O/P: NO LOAD Ta: 25°C	3.12V~ 3.71V
2	PEAK LOAD	150% peak load capability(100ms)	I/P: 230VAC O/P: 150% LOAD Ta: 25°C	TEST: OK
3	OUTPUT VOLTAGE TOLERANCE	-2%~+2%	I/P: 90VAC / 264VAC O/P: FULL / NO LOAD Ta: 25°C	- 1.51%~ +1.51%
4	LINE REGULATION	-0.5%~+0.5%	I/P: 100VAC ~ 264VAC O/P: FULL LOAD Ta: 25°C	- 0.3%~+0.3%
5	LOAD REGULATION	-1%~+1%	I/P: 230VAC O/P: FULL~NO LOAD Ta: 25°C	- 0.29%~+0.29%
6	OVER/UNDERSHOOT TEST	<± 15 %	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	<15%
7	RIPPLE & NOISE (Max)	150mVp-p	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	79.6mVp-p



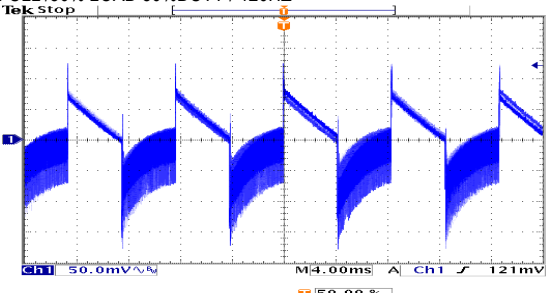
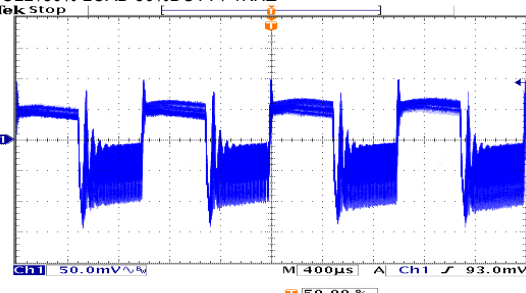
8	SET UP TIME(Max)	230VAC/ 2000ms 115VAC/ 3000ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/536 ms 115VAC/752 ms
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200W Slim Type with PFC Switching Power Supply

**UHP-200 series**

9	RISE TIME (Max)	230VAC/ 80ms 115VAC/ 80ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/4 ms 115VAC/4 ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage		INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage		
10		230VAC/ 10ms 115VAC/ 10ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/29.2 ms 115VAC/29.6 ms
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: 990 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) 296mVp-p (2) 238mVp-p
FULL /50% LOAD 50%DUTY / 120HZ 		FULL /50% LOAD 50%DUTY / 1KHZ 		

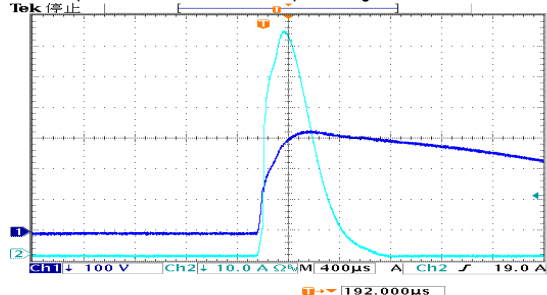


**INPUT FUNCTION TEST**

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 = 1.33A/ 115VAC I = 0.69A/ 230VAC
5	LEAKAGE CURRENT	< 0.75mA / 240VAC	I/P: 240 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.282mA N-FG: 0.271mA
6	NO LOAD CONSUMPTION	---	I/P: 115VAC I/P: 230VAC O/P: NO LOAD Ta: 25°C	0.66 W/115VAC 0.74 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 = 72.8A/ 230VAC I = 32.8A/ 115VAC

INPUT=230VAC/50HZ @ FULL LOAD

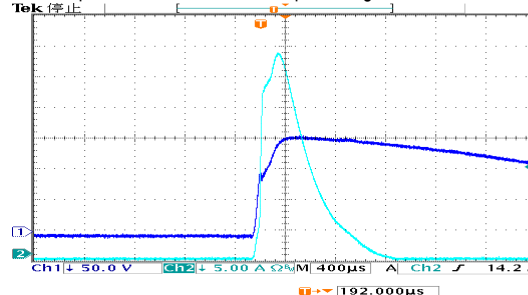
CH2: Input current CH1: AC Input Voltage



Ch2 最大 72.8A

INPUT=115VAC/60HZ @ FULL LOAD

CH2: Input current CH1: AC Input Voltage

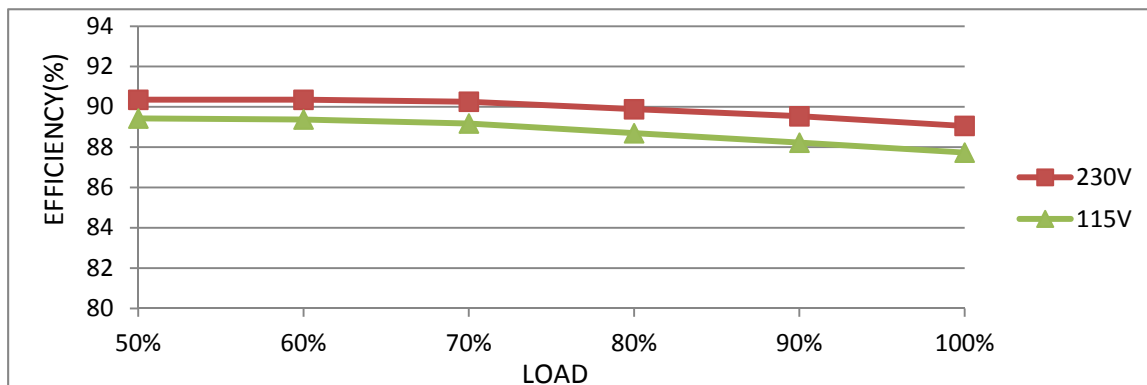


Ch2 最大 32.8A



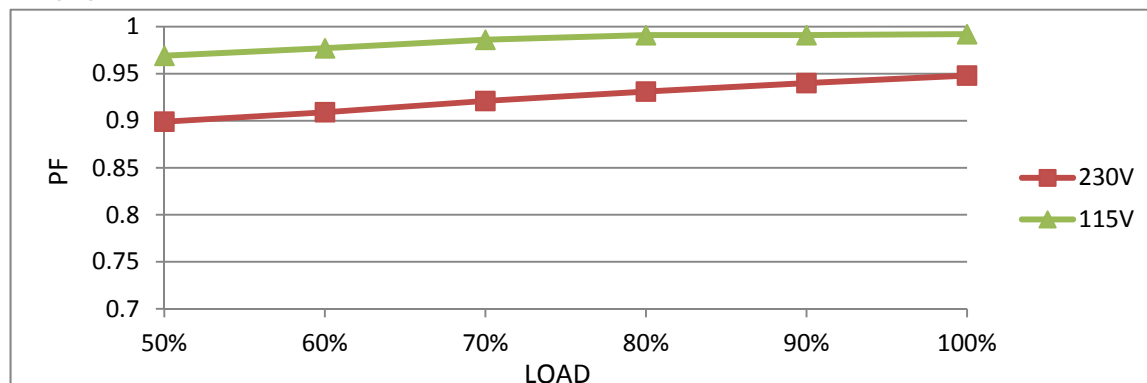
8	EFFICIENCY(Typ)	89%	I/P: 230VAC O/P: FULL LOAD Ta: 25°C	89.05 %
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**EFFICIENCY vs LOAD**



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=0.948/ 230VAC PF=0.992/ 115VAC
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**P.F vs LOAD**



**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	128.8 %/ 110VAC 128.5 %/ 230VAC 128.8%/ 264VAC Hiccup mode, recovers automatically after fault condition is removed
2	OVER VOLTAGE PROTECTION	3.8V~4.6V	I/P: 90VAC I/P: 230VAC I/P: 264VAC O/P: NO LOAD Ta: 25°C	4.142 V/ 90VAC 4.144 V/ 230VAC 4.179V/ 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°C	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°C	(1) 440 V (2) 444 V (3) 438 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) 11.0 V (2) 4.36 V (3) 10.6 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) 432 V (2) 432 V (3) 430 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°C	(1) 37.8 V (2) 26.2 V (3) 26.4 V (4) 27.2 V (5) 20.2 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°C	(1) 538 V (2) 530 V (3) 536 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: 2.345 mA I/P-FG: 2.435 mA O/P-FG: 2.254 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	9 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=29.4°C 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=49.6°C																																																																		
				<table border="1"> <thead> <tr> <th>NO</th> <th>Position</th> <th>ROOM AMBIENT Ta=29.4 °C</th> <th>HIGH AMBIENT Ta=49.6 °C</th> </tr> </thead> <tbody> <tr><td>1</td><td>RT1</td><td>77.6°C</td><td>90.4°C</td></tr> <tr><td>2</td><td>ZR1</td><td>48.9°C</td><td>68.9°C</td></tr> <tr><td>3</td><td>BD1</td><td>56.7°C</td><td>77.0°C</td></tr> <tr><td>4</td><td>Q1</td><td>61.7°C</td><td>82.4°C</td></tr> <tr><td>5</td><td>C5</td><td>54.3°C</td><td>74.5°C</td></tr> <tr><td>6</td><td>U1</td><td>54.1°C</td><td>74.6°C</td></tr> <tr><td>7</td><td>Q5</td><td>55.5°C</td><td>76.4°C</td></tr> <tr><td>8</td><td>Q6</td><td>57.7°C</td><td>78.6°C</td></tr> <tr><td>9</td><td>U3</td><td>52.4°C</td><td>73.2°C</td></tr> <tr><td>10</td><td>T1</td><td>74.4°C</td><td>95.7°C</td></tr> <tr><td>11</td><td>Q101</td><td>68.8°C</td><td>90.2°C</td></tr> <tr><td>12</td><td>Q103</td><td>72.7°C</td><td>95.1°C</td></tr> <tr><td>13</td><td>C105</td><td>68.8°C</td><td>89.5°C</td></tr> <tr><td>14</td><td>TSW1</td><td>49.2°C</td><td>69.5°C</td></tr> <tr><td>15</td><td>TC</td><td>49.1°C</td><td>69.3°C</td></tr> </tbody> </table>	NO	Position	ROOM AMBIENT Ta=29.4 °C	HIGH AMBIENT Ta=49.6 °C	1	RT1	77.6°C	90.4°C	2	ZR1	48.9°C	68.9°C	3	BD1	56.7°C	77.0°C	4	Q1	61.7°C	82.4°C	5	C5	54.3°C	74.5°C	6	U1	54.1°C	74.6°C	7	Q5	55.5°C	76.4°C	8	Q6	57.7°C	78.6°C	9	U3	52.4°C	73.2°C	10	T1	74.4°C	95.7°C	11	Q101	68.8°C	90.2°C	12	Q103	72.7°C	95.1°C	13	C105	68.8°C	89.5°C	14	TSW1	49.2°C	69.5°C	15	TC	49.1°C	69.3°C
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12	Q103	72.7°C	95.1°C																																																																	
13	C105	68.8°C	89.5°C																																																																	
14	TSW1	49.2°C	69.5°C																																																																	
15	TC	49.1°C	69.3°C																																																																	
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P: 264VAC/90VAC O/P: FULL /75% 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	±0.004%/°C (0~50°C)																																																																
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																																																																





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) 2143039 HRS (2) 113771 HRS (3) 550846 HRS (4) 1803142 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