



Test Report: UHP-350-24

350W 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

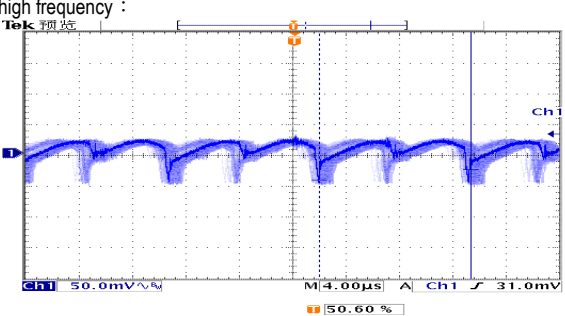
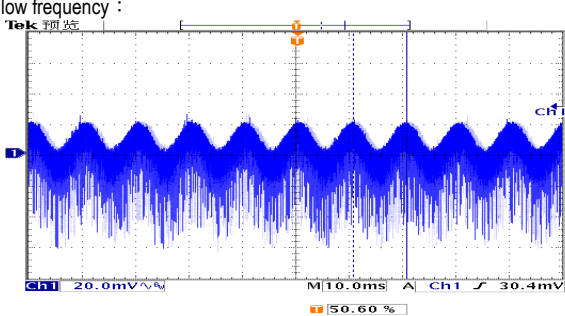
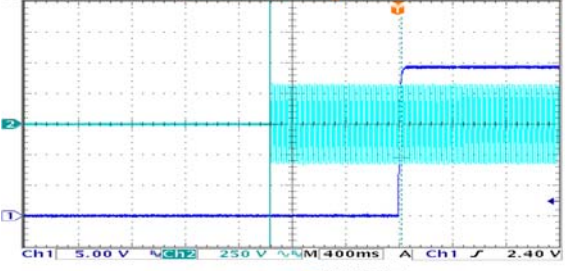
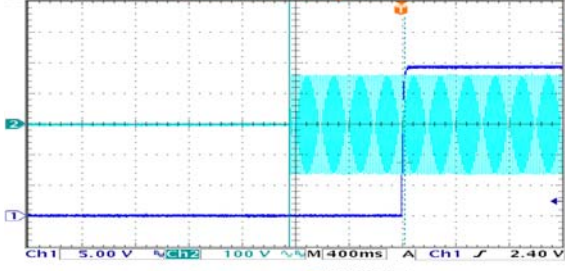
E.M.C. Test

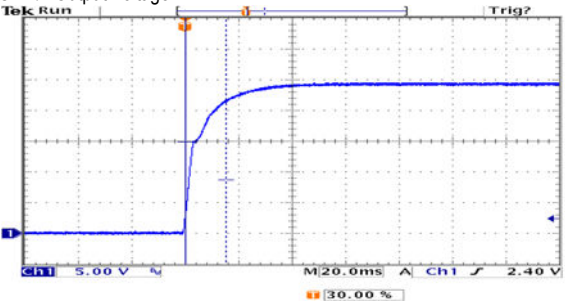
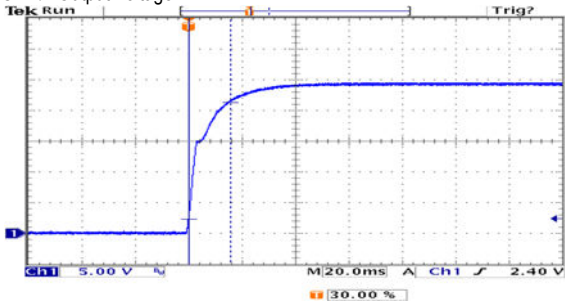
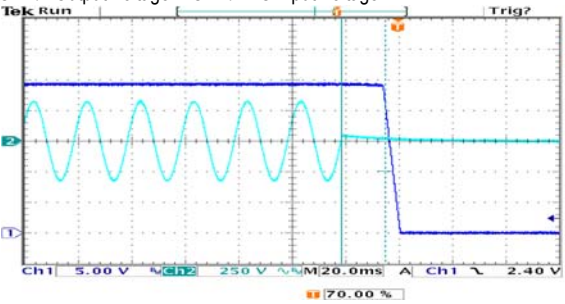
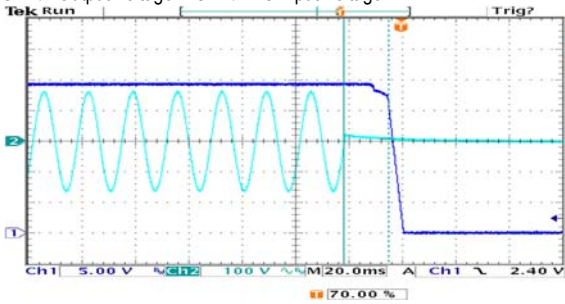
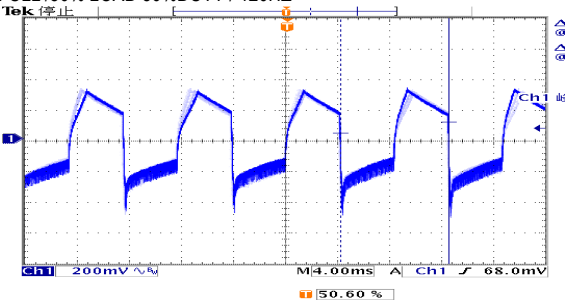
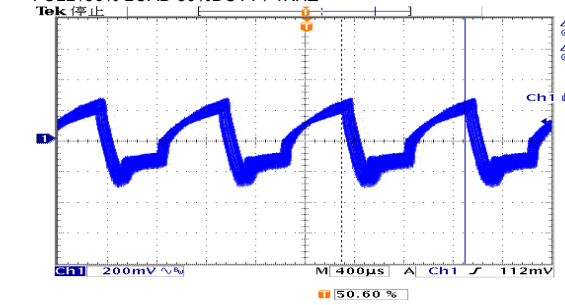
■ RELIABILITY TEST

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	21.89V~ 26.67V
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	-0.29%~+0.29%
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	87.2mVp-p
high frequency :  峰-峰值测定 75.0mV low frequency :  峰-峰值测定 87.2mV				
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/984 ms 115VAC/864 ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage  峰-峰值测定 968ms INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage CH2: AC Input Voltage  峰-峰值测定 848ms				

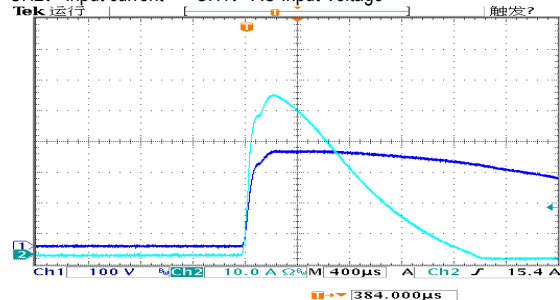
9	RISE TIME (Max)	230VAC/ 80ms 115VAC/ 80ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/15.2 ms 115VAC/15.6 ms
INPUT=230VAC/50HZ @ FULL LOAD CH1: Output Voltage  INPUT=115VAC/60HZ @ FULL LOAD CH1: Output Voltage 				
10	HOLD UP TIME(Typ)	230VAC/ 10ms 115VAC/ 10ms	I/P: 230 VAC I/P: 115 VAC O/P: FULL LOAD Ta: 25°C	230VAC/16.4 ms 115VAC/16.8 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: 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) 804mVp-p (2) 560mVp-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	4.0A/115VAC 2.0A/230VAC	I/P: 115 VAC I/P: 230 VAC O/P: FULL LOAD Ta: 25°C	I = 3.31A/ 115VAC I = 1.62 A/ 230VAC
5	LEAKAGE CURRENT	< 0.75mA / 240VAC	I/P: 240 VAC O/P: NO LOAD Ta: 25°C	L-FG: 0.265 mA N-FG: 0.275mA
6	NO LOAD CONSUMPTION	---	I/P: 115VAC I/P: 230VAC O/P: NO LOAD Ta: 25°C	1.32 W/115VAC 0.92 W/230VAC
7	INRUSH CURRENT(Typ)	230V/ 60A 115V/ 30A COLD START	I/P: 230 VAC/115VAC O/P: FULL LOAD Ta: 25°C	I = 52.2A/ 230VAC I = 23.0A/ 115VAC

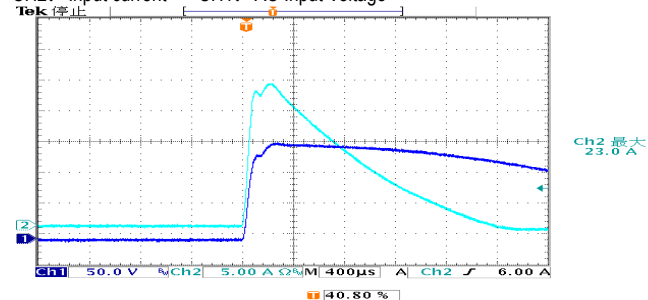
INPUT=230VAC/50HZ @ FULL LOAD

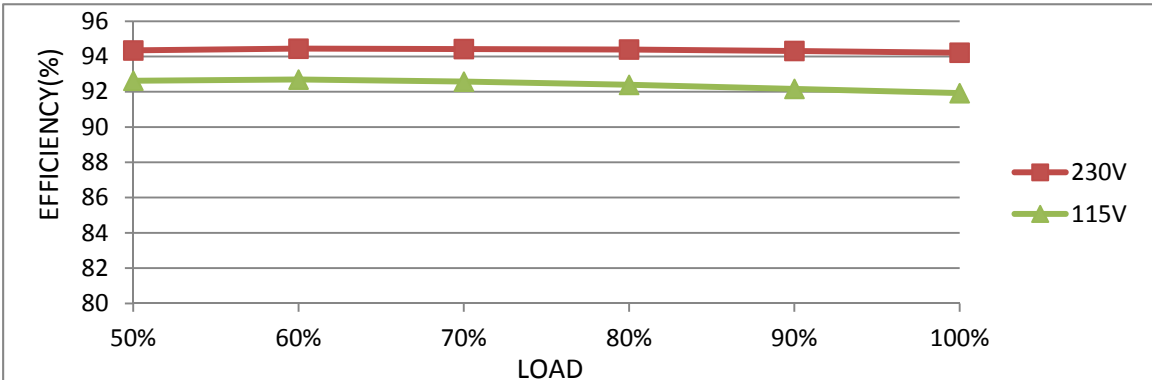
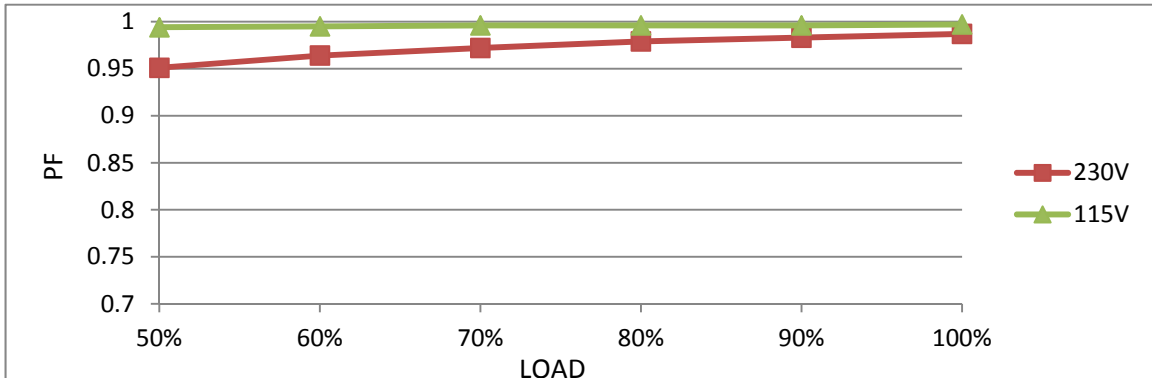
CH2: Input current CH1: AC Input Voltage



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	94.21%																					
EFFICIENCY vs LOAD  <table><thead><tr><th>LOAD</th><th>230V</th><th>115V</th></tr></thead><tbody><tr><td>50%</td><td>94.21%</td><td>92.5%</td></tr><tr><td>60%</td><td>94.21%</td><td>92.5%</td></tr><tr><td>70%</td><td>94.21%</td><td>92.5%</td></tr><tr><td>80%</td><td>94.21%</td><td>92.5%</td></tr><tr><td>90%</td><td>94.21%</td><td>92.5%</td></tr><tr><td>100%</td><td>94.21%</td><td>92.5%</td></tr></tbody></table>					LOAD	230V	115V	50%	94.21%	92.5%	60%	94.21%	92.5%	70%	94.21%	92.5%	80%	94.21%	92.5%	90%	94.21%	92.5%	100%	94.21%	92.5%
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100%	94.21%	92.5%																							
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=0.987/ 230VAC PF=0.997/ 115VAC																					
P.F vs LOAD  <table><thead><tr><th>LOAD</th><th>230V</th><th>115V</th></tr></thead><tbody><tr><td>50%</td><td>0.94</td><td>1.0</td></tr><tr><td>60%</td><td>0.96</td><td>1.0</td></tr><tr><td>70%</td><td>0.97</td><td>1.0</td></tr><tr><td>80%</td><td>0.98</td><td>1.0</td></tr><tr><td>90%</td><td>0.985</td><td>1.0</td></tr><tr><td>100%</td><td>0.987</td><td>1.0</td></tr></tbody></table>					LOAD	230V	115V	50%	0.94	1.0	60%	0.96	1.0	70%	0.97	1.0	80%	0.98	1.0	90%	0.985	1.0	100%	0.987	1.0
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100%	0.987	1.0																							

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	126.1%/ 110VAC 126.0%/ 230VAC 126.7 %/ 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	28.5V/ 90VAC 28.5V/ 230VAC 28.5V/ 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	Q10 Rated 17.9A/600V	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25℃	(1) 452 V (2) 456 V (3) 450 V
2	O/P Diode (MOSFET)	Q101 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) 53.6 V (2) 11.6 V (3) 52.4 V
3	Input Capacitor	C5 Rated 180 μ / 400 V	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) 400 V (2) 398 V (3) 399 V
4	Control IC	U1 Rated 16V (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) 13.1 V (2) 13.2 V (3) 13.3 V (4) 13.1 V (5) 12.9 V
5	PFC Power Transistor	Q 1 Rated 17.9A/600V	I/P: High-Line +3V =267V O/P: (1) FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta: 25℃	(1) 482 V (2) 412 V (3) 480 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: 2.553 mA I/P-FG: 2.294 mA O/P-FG: 11.24 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-350-24 1. ROOM AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=29.2℃ 2. HIGH AMBIENT BURN-IN: 2 HRS I/P: 230VAC O/P: FULL LOAD Ta=49.9℃ <table><tr><th>NO</th><th>Position</th><th>ROOM AMBIENT Ta=29.2 ℃</th><th>HIGH AMBIENT Ta=49.9 ℃</th></tr><tr><td>1</td><td>LF2</td><td>50.1℃</td><td>69.8℃</td></tr><tr><td>2</td><td>C10</td><td>52.6℃</td><td>72.7℃</td></tr><tr><td>3</td><td>RTH1</td><td>50.7℃</td><td>70.3℃</td></tr><tr><td>4</td><td>BD1</td><td>55.3℃</td><td>74.6℃</td></tr><tr><td>5</td><td>L1</td><td>61.4℃</td><td>82.3℃</td></tr><tr><td>6</td><td>C5</td><td>50.4℃</td><td>70.1℃</td></tr><tr><td>7</td><td>Q1</td><td>51.5℃</td><td>71.5℃</td></tr><tr><td>8</td><td>D1</td><td>52.1℃</td><td>71.6℃</td></tr><tr><td>9</td><td>C92</td><td>53.4℃</td><td>73.8℃</td></tr><tr><td>10</td><td>Q10</td><td>58.5℃</td><td>79.7℃</td></tr><tr><td>11</td><td>U2</td><td>47.3℃</td><td>67.2℃</td></tr><tr><td>12</td><td>U1</td><td>48.0℃</td><td>68.0℃</td></tr><tr><td>13</td><td>T1</td><td>73.2℃</td><td>93.4℃</td></tr><tr><td>14</td><td>Q103</td><td>46.8℃</td><td>67.3℃</td></tr><tr><td>15</td><td>U100</td><td>43.6℃</td><td>63.6℃</td></tr><tr><td>16</td><td>C108</td><td>45.2℃</td><td>65.5℃</td></tr><tr><td>17</td><td>TSW1</td><td>53.9℃</td><td>74.6℃</td></tr><tr><td>18</td><td>TC</td><td>45.4℃</td><td>65.0℃</td></tr></table>			NO	Position	ROOM AMBIENT Ta=29.2 ℃	HIGH AMBIENT Ta=49.9 ℃	1	LF2	50.1℃	69.8℃	2	C10	52.6℃	72.7℃	3	RTH1	50.7℃	70.3℃	4	BD1	55.3℃	74.6℃	5	L1	61.4℃	82.3℃	6	C5	50.4℃	70.1℃	7	Q1	51.5℃	71.5℃	8	D1	52.1℃	71.6℃	9	C92	53.4℃	73.8℃	10	Q10	58.5℃	79.7℃	11	U2	47.3℃	67.2℃	12	U1	48.0℃	68.0℃	13	T1	73.2℃	93.4℃	14	Q103	46.8℃	67.3℃	15	U100	43.6℃	63.6℃	16	C108	45.2℃	65.5℃	17	TSW1	53.9℃	74.6℃	18	TC	45.4℃	65.0℃
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16	C108	45.2℃	65.5℃																																																																													
17	TSW1	53.9℃	74.6℃																																																																													
18	TC	45.4℃	65.0℃																																																																													
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	±0.004%/℃(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																																																																												



350W Slim Type with PFC Switching Power Supply

UHP-350 series

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-350-24: 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) 815041 HRS (2) 148102 HRS (3) 210141 HRS (4) 265537 HRS
9	MTBF	Conducted by Parts Stress Analysis Prediction 285K 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