



# Test Report : HSP-200-5

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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 TEST

Safety Test

## ■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	RIPPLE & NOISE	V1 : 150 mVp-p (Max)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	V1 : 92 mVp-p (Max)	PASS
2	OUTPUT VOLTAGE ADJUST RANGE	V1 : 4.5 V ~ 5.5 V	I/P : 115 VAC O/P : NO LOAD Ta : 25°C	V1 : 4.369V~ 5.688V	PASS
3	OUTPUT VOLTAGE TOLERANCE	V1 : -2.0 %~ 2.0 % (Max)	I/P : 100 VAC / 264 VAC O/P : FULL/ NO LOAD Ta : 25°C	V1 : -0.75 %~ 1.42 %	PASS
4	LINE REGULATION	V1 : -0.5 %~ 0.5 % (Max)	I/P : 100 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0.01 %~ 0 %	PASS
5	LOAD REGULATION	V1 : -1.0 %~ 1.0 % (Max)	I/P : 230 VAC O/P : FULL-NO LOAD Ta : 25°C	V1 : -0.32 %~ 0.33 %	PASS
6	SET UP TIME	115VAC : 3000 ms (Max) 230VAC : 2000 ms(Max)	I/P : 115 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	115VAC/ 1980 ms 230VAC/ 1245 ms	PASS
7	RISE TIME	115VAC : 200 ms (Max) 230VAC : 200 ms (Max)	I/P : 115 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	115VAC/ 89 ms 230VAC/ 115 ms	PASS
8	HOLD UP TIME	115VAC : 16 ms (TYP) 230VAC : 16 ms (TYP)	I/P : 115 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	115VAC/ 26 ms 230VAC/ 26 ms	PASS
9	OVER/UNDERSHOOT TEST	< ±10%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : < 10 %	PASS
10	DYNAMIC LOAD	V1 : 1000 mVp-p	I/P : 230 VAC (1).O/P : FULL /NO LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /NO LOAD 50%DUTY/ 120HZ Ta : 25°C	(1) 644 mVp-p (2) 892 mVp-p	PASS

**INPUT FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90 VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	87V~264 V	PASS
			I/P : (1)LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P : FULL/NO LOAD ON : 30 Sec OFF : 30 Sec 10MIN (2)230VAC ON : 0.5 Sec OFF : 0.5 Sec 20MIN (3)230VAC ON : 3Sec OFF : 3Sec 12HOURS ( POWER ON/OFF NO DAMAGE )	TEST : (1) OK (2) OK (3) OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90 VAC ~ 264 VAC O/P : FULL ~NO LOAD Ta : 25°C	TEST : OK	PASS
3	POWER FACTOR	115V/ 0.98 (TYP) 230V/ 0.95 (TYP)	I/P : 115 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.996 / 115 VAC PF= 0.975 / 230 VAC	PASS
4	EFFICIENCY	88.5% (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	89.01%	PASS
5	INPUT CURRENT	115V/ 3.0 A (TYP) 230V/ 2.0 A (TYP)	I/P : 115 VAC I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 2.033 A / 115 VAC I = 1.006 A / 230 VAC	PASS
6	INRUSH CURRENT	230V/ 70 A (TYP) COLD START	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	I = 57.6 A	PASS
7	LEAKAGE CURRENT	< 1.0 mA / 240 VAC	I/P : 264 VAC O/P : NO LOAD Ta : 25°C	L-FG : 0.338 mA N-FG : 0.337 mA	PASS

**PROTECTION FUNCTION TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	110 % ~ 140 %	I/P : 100 VAC I/P : 230 VAC I/P : 264 VAC O/P : TESTING Ta : 25°C	128.79 %/ 100 VAC 129.52 %/ 230 VAC 129.52 %/ 264 VAC Hiccup mode, recovers automatically after fault condition is removed	PASS
2	OVER VOLTAGE PROTECTION	CH1 : 5.6 V ~ 7.0 V	I/P : 90 VAC I/P : 230 VAC I/P : 264 VAC O/P : NO LOAD Ta : 25°C	6.07 V/ 90 VAC 6.12 V/ 230 VAC 6.11 V/ 264 VAC Hiccup mode, recovers automatically after fault condition is removed	PASS
3	OVER TEMPERATURE PROTECTION	SPEC : O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active Shut down O/P voltage, recovers automatically after fault condition is removed	PASS
4	SHORT PROTECTION	SHORT EVERY OUTPUT 1 HOUR NO DAMAGE	I/P : 264 VAC O/P : FULL LOAD Ta : 25°C	NO DAMAGE Hiccup mode, recovers automatically after fault condition is removed	PASS

**COMPONENT STRESS TEST**

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor ( D to S) or (C to E) Peak Voltage	Q3 Rated 600 V 11A	I/P : High-Line +3V = 267 V O/P : (1)FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta : 25°C	(1) 444 V (2) 440 V (3) 443 V	PASS
2	Diode Peak Voltage	Q101 Rated 40 V/32 A  Q102 Rated 40V/120A	I/P : High-Line +3V = 267V O/P : (1) FULL LOAD Turn on (2)Output Short (3) FULL LOAD continue Ta : 25°C	Q101 (1) 17.9 V (2) 19.3 V (3) 18.2 V Q102 (1) 17.4 V (2) 17.0 V (3) 17.2 V	PASS
3	Input Capacitor Voltage	C5 Rated 120uF / 450 V	I/P : High-Line +3V = 267 V O/P : (1) FULL LOAD Turn on /Off (2) NO LOAD Turn on /Off (3) FULL LOAD /NO LOAD Change Ta : 25°C	(1) 448 V (2) 446 V (3) 448 V	PASS
4	Control IC Voltage Test	U2 Rated 30V	I/P : High-Line +3V = 267 V O/P : (1) FULL LOAD Turn on /Off (2) NO LOAD Turn on /Off (3) FULL LOAD /NO LOAD Change Ta : 25°C	(1) 20.4 V (2) 20.4 V (3) 20.3 V	PASS
5	PFC Transistor ( D to S) or (C to E) Peak Voltage	Q1 Rated 600 V 16A	I/P : High-Line +3V = 267V O/P : (1)FULL LOAD Turn on (2) Output Short (3) FULL LOAD continue Ta : 25°C	(1) 498 V (2) 490 V (3) 494 V	PASS

■ SAFETY TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
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 : 1.798mA I/P-FG : 2.393mA O/P-FG : 1.421mA NO DAMAGE	PASS
2	ISOLATION RESISTANCE	I/P-O/P : 500V>100MΩ I/P-FG : 500V>100MΩ O/P-FG : 500V>100MΩ	I/P-O/P : 500 VDC Ta : 25°C/70% RH	I/P-O/P : >9999 MΩ I/P-FG : >9999 MΩ O/P-FG : >9999MΩ NO DAMAGE	PASS
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta : 25°C	5 mΩ	PASS

■ RELIABILITY TEST

ENVIRONMENT TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	TEMPERATURE RISE TEST	MODEL : HSP-200-5 1. ROOM AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=28.8 °C 2. HIGH AMBIENT BURN-IN : 2 HRS I/P : 230VAC O/P : FULL LOAD Ta=54.4 °C			PASS
2	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/100VAC O/P : FULL LOAD Ta= -35°C	TEST : OK	PASS

3	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 °C NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50 °C HUMIDITY= 95% R.H	TEST : OK	PASS
4	TEMPERATURE COEFFICIENT	±0.03 %(0~60°C)	I/P : 230 VAC O/P : FULL LOAD	±0.012 %(0~60°C)	PASS
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		OK	PASS
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 turn on 58sec ; turn off 2sec		OK	PASS
7	VIBRATION TEST	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 90min in each axis (X.Y.Z) (6) Ta : 25°C		TEST : OK	PASS
8	CAPACITOR LIFE CYCLE	HSP-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) 165974 HRS (2) 29695 HRS (3) 66527 HRS (4) 114984 HRS	PASS
9	MTBF	Conducted by Parts Stress Analysis Prediction 1684.5K hrs min. Telcordia SR-332 (Bellcore); 202.1K hrs min. MIL-HDBK-217F (25°C)			PASS
10	DMTBF/Accelerated Life Test	Demonstration Mean Time Between Failure(Expected Life) : 30000 hours @ Tcase 65°C			PASS

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	ZHOUB/ ZHUOKB	SKY	LIUWY

2009/08/04 A50-G058