



# Test Report: EPP-300-12

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300W Single Output With PFC Function

## ■ DESIGN VERIFY TEST

Output Function Test  
Input Function Test  
Protection Function Test  
Control 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	VERDICT
1	RIPPLE & NOISE	V1 : 120 mVp-p (Max)	I/P : 230VAC O/P : FULL LOAD Ta : 25°C	V1 : 28.8 mVp-p (Max)	P
2	OUTPUT VOLTAGE ADJUST RANGE	CH1 : 11.4 V ~ 12.6 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	11.104 V ~ 12.968 V / 230 VAC 11.104 V ~ 12.968 V / 115 VAC	P
3	OUTPUT VOLTAGE TOLERANCE	V1 : 3 %~ -3% (Max)	I/P : 115 VAC / 264 VAC O/P : FULL / MIN LOAD Ta : 25°C	V1 : 0.6 %~ -0.6 %	P
4	LINE REGULATION	V1 : 0.5 %~ -0.5 % (Max)	I/P : 115 VAC ~ 264 VAC O/P : FULL LOAD Ta : 25°C	V1 : 0 %~ 0 %	P
5	LOAD REGULATION	V1 : 1 %~ -1 % (Max)	I/P : 230 VAC O/P : FULL ~MIN LOAD Ta : 25°C	V1 : 0.6 %~ -0.6 %	P
6	SET UP TIME	230VAC : 2500 ms (Max) 115VAC : 3000 ms(Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 1001 ms 115VAC/ 1120 ms	P
7	RISE TIME	230VAC : 30 ms (Max) 115VAC : 30 ms (Max)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 12 ms 115VAC/ 11 ms	P
8	HOLD UP TIME	230VAC : 13 ms (TYP) 115VAC : 13 ms (TYP)	I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	230VAC/ 13.7 ms 115VAC/ 14 ms	P
9	OVER/UNDERSHOOT TEST	< ±5%	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	TEST : <5 %	P
10	DYNAMIC LOAD	V1 : 1200 mVp-p	I/P : 230 VAC (1).O/P : FULL /Min LOAD 90%DUTY/ 1KHZ (2).O/P : FULL /Min LOAD 90%DUTY/ 3KHZ (3).O/P : FULL /Min LOAD 90%DUTY/ 5KHZ (4).O/P : FULL /Min LOAD 50%DUTY/ 120HZ Ta : 25°C	(1)776 mVp-p (2)690 mVp-p (3)700 mVp-p (4) 740 mVp-p	P

## INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	INPUT VOLTAGE RANGE	90VAC~264 VAC	I/P : TESTING O/P : FULL LOAD Ta : 25°C	74.9 V~264V	P
			I/P : LOW-LINE -3V= 87 V HIGH-LINE+15%=300 V O/P : FULL/MIN LOAD ON : 30 Sec . OFF : 30 Sec 10MIN ( AC POWER ON/OFF NO DAMAGE )	TEST : OK	
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE OSC	I/P : 90VAC ~ 264 VAC O/P : FULL -MIN LOAD Ta : 25°C	TEST : OK	P
3	POWER FACTOR	0.93 / 230 VAC(TYP)	I/P : 230 VAC	PF= 0.9888 / 230 VAC	P
		0.98 / 115 VAC(TYP)	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	PF= 0.9970 / 115 VAC	
4	EFFICIENCY	90 % (TYP)	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	91.03 %	P
5	INPUT CURRENT	230V/ 1.8 A (TYP)	I/P : 230 VAC	I = 1.50 A/ 230 VAC	P
		115V/ 3.5 A (TYP)	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 3.09 A/ 115 VAC	
6	INRUSH CURRENT	230V/ 80 A (TYP)	I/P : 230 VAC	I = 61 A/ 230 VAC	P
		115V/ 40 A (TYP) COLD START	I/P : 115 VAC O/P : FULL LOAD Ta : 25°C	I = 31 A/ 115 VAC	
7	LEAKAGE CURRENT	< 2 mA/ 240 VAC	I/P : 240VAC O/P : Min LOAD Ta : 25°C	L-FG : 0.08 mA N-FG : 0.08 mA	P
8	NO LOAD CONSUMPTION	< 0.5 W	I/P : 240VAC O/P : NO LOAD PS-ON="Low"or"<0-0.5V" Ta : 25°C	< 0.38 W	P

## PROTECTION FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	OVER LOAD PROTECTION	105 % ~ 135 %	I/P : 230 VAC I/P : 115 VAC O/P : TESTING Ta : 25°C	115.6 %/ 230 VAC 115.5%/ 115 VAC Hiccup Mode	P
2	OVER VOLTAGE PROTECTION	CH1 : 13.5V ~ 15 V	I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C	13.925V/ 230 VAC 13.924V/ 115 VAC Shut down Re- power ON	P
3	OVER TEMPERATURE PROTECTION	SPEC : TSW1 : 110± 5°C O.T.P. TSW2 : 115± 5°C O.T.P. NO DAMAGE	I/P : 230 VAC O/P : FULL LOAD	O.T.P. Active TSW1 : Shut down o/p voltage · recovers automatically after temperature goes down TSW2 : Shut down o/p voltage · Re-power on to recover	P
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	P

## CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	5V STANDBY	5V@1A : TOLERANCE±2% RIPPLE : 120mVp-p	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	5VSB : 4.9650 V RIPPLE : 45.2 mVp-p	P
2	AUXILIARY POWER	12V@0.5A : TOLERANCE-15%~+10%	I/P : 230 VAC O/P : FULL/NO LOAD Ta : 25°C	AUX : 11.259 V / 0.5A AUX : 12.447 V / 0 A	P
3	PS-ON INPUT SIGNAL	POWER ON="Hi"or">2-5V" POWEROFF="Low"or"<0-0.5V"	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	POWER ON= 2.27 V POWEROFF= 0 V	P
4	POWER GOOD / POWER FAIL SIGNAL	500ms>PG>10ms PF>1ms	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	POWER GOOD : 86.4 ms POWER FAIL : 9.20 ms	P
5	REMOTE SENSE	>0.3V	I/P : 230 VAC O/P : FULL LOAD Ta : 25°C	> 0.3 V	P

## COMPONENT STRESS TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	Power Transistor (D to S) or (C to E) Peak Voltage	Q 5 Rated : STL26NM60N 19A/600V	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) 410 V (2) 400 V (3) 408 V	P
2	Diode Peak Voltage	Q101 Rated : AP9963GP 160A/40V	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) 35.6 V (2) 10.6 V (3) 36.4 V	P
3	Input Capacitor Voltage	C 5 Rated : 150u/400V 105°C CXW	I/P : High-Line +3V = 267 V O/P : (1) Full Load Turn on /Off (2) Min load Turn on /Off (3) Full Load /Min load Change Ta : 25°C	(1) 376.62 V (2) 367.76 V (3) 378.34 V	P
4	Control IC Voltage Test	U 1 Rated : PWM L6599AD 8.85V-16V	I/P : High-Line +3V = 267 V O/P : (1) Full Load Turn on /Off (2) Min load Turn on /Off (3) Full Load /Min load Change Ta : 25°C	(1) 13.365 V (2) 13.390 V (3) 13.365 V	P
5	Power Transistor (D to S) or (C to E) Peak Voltage	Q 1 Rated : STW26NM60N 20A/600V	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) 412 V (2) 400 V (3) 410 V	P

## ■ SAFETY & E.M.C. TEST

### SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	WITHSTAND VOLTAGE	I/P-O/P : 3 KVAC/min I/P-FG : 2 KVAC/min O/P-FG : 0.5 KVAC/min	I/P-O/P : 3.6KVAC/min I/P-FG : 2.4 KVAC/min O/P-FG : 0.6 KVAC/min Ta : 25°C	I/P-O/P : 1.157 mA I/P-FG : 1.249 mA O/P-FG : 0.143 mA NO DAMAGE	P
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 : 30 GΩ I/P-FG : 30 GΩ O/P-FG : 30 GΩ NO DAMAGE	P
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40 A / 2min Ta : 25°C / 70%RH	24 mΩ	P

### E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT	VERDICT
1	HARMONIC	EN61000-3-2 CLASS A CLASS D	I/P : 230 VAC/50HZ O/P:100/75/50%ELECTRONIC LOAD Ta : 25°C	PASS	P
2	CONDUCTION	EN55022 CLASS B	I/P : 230 VAC (50HZ) O/P : FULL/50% LOAD Ta : 25°C	PASS Test by certified Lab	P
3	RADIATION	EN55022 CLASS A	I/P : 230 VAC (50HZ) O/P : FULL LOAD Ta : 25°C	PASS Test by certified Lab	P
4	E.S.D	EN61000-4-2 MEDICAL AIR : 8KV / Contact : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
5	E.F.T	EN61000-4-4 MEDICAL INPUT : 2KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
6	SURGE	IEC61000-4-5 INDUSTRY L-N : 2KV L,N-PE : 4KV	I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C	CRITERIA A	P
7	Test by certified Lab & Test Report Prepare				



6	STORAGE TEMPERATURE TEST	<ol style="list-style-type: none"> <li>1. Thermal shock Temperature : -45°C~ +90°C</li> <li>2. Temperature change rate : 25°C / MIN</li> <li>3. Dwell time low and high temperature : 30 MIN/EACH</li> <li>4. Total test cycle : 5 CYCLE</li> <li>5. Input/Output condition : STATIC</li> </ol>	OK	P
7	THERMAL SHOCK TEST	<ol style="list-style-type: none"> <li>1. Thermal shock Temperature : -35°C~ +55°C</li> <li>2. Temperature change rate : 25°C / MIN</li> <li>3. Dwell time low and high temperature : 30 MIN/EACH</li> <li>4. Total test cycle : 10 CYCLE</li> <li>5. Input/Output condition : 230VAC/Full Load AC ON/OFF TEST turn on 58sec ; turn off 2sec</li> </ol>	OK	P
8	VIBRATION TEST	<p>1 Carton &amp; 1 Set</p> <ol style="list-style-type: none"> <li>(1) Waveform : Sine Wave</li> <li>(2) Frequency : 10-500Hz</li> <li>(3) Sweep Time : 12min/sweep cycle</li> <li>(4) Acceleration : 2G</li> <li>(5) Test Time : 60min in each axis (X.Y.Z)</li> <li>(6) Ta : 25°C</li> </ol>	TEST : OK	P
9	CAPACITOR LIFE CYCLE	<p>EPP-300-12 : SUPPOSE C105 IS THE MOST CRITICAL COMPONENT</p> <ol style="list-style-type: none"> <li>(1) I/P : 230VAC O/P : FULL LOAD Ta= 25 °C LIFE TIME</li> <li>(2) I/P : 230VAC O/P : FULL LOAD Ta= 50 °C LIFE TIME</li> <li>(3) I/P : 230VAC O/P : 75% LOAD Ta= 50 °C LIFE TIME</li> <li>(4) I/P : 230VAC O/P : 50% LOAD Ta= 50 °C LIFE TIME</li> </ol> <p>The experiments above are tested with a 20.5CFM Fan.</p>	<ol style="list-style-type: none"> <li>(1) 864438 HRS</li> <li>(2) 156051HRS</li> <li>(3) 241417HRS</li> <li>(4) 336729HRS</li> </ol>	P
10	MTBF	<p>MIL-HDBK-217F NOTICES2 PARTS COUNT TOTAL FAILURE RATE : 160 KHRS</p>		P
11	DMTBF/Accelerated Life Test	<p>Demonstration Mean Time Between Failure (Expected Life): Above 30,000 hours @ TA 50°C</p>		P

DATE	SAMPLE	TEST RESULT	TESTER	APPROVAL
2012/4/13	RD SAMPLE	PASS	SANFORD SU	VINCENT TSENG

2009/08/04 A50-F023