



Test Report: EPP-300-48

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 : 250 mVp-p (Max) | I/P : 230VAC O/P : FULL LOAD Ta : 25°C | V1 : 130 mVp-p (Max) | P |
| 2 | OUTPUT VOLTAGE ADJUST RANGE | CH1 : 45.6 V ~ 50.4V | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 43.46 V ~ 51.84 V / 230 VAC 43.46 V ~ 51.84 V / 115 VAC | P |
| 3 | OUTPUT VOLTAGE TOLERANCE | V1 : 2 %~ - 2% (Max) | I/P : 115 VAC / 264 VAC O/P : FULL / MIN LOAD Ta : 25°C | V1 : 0.3 %~ -0.3 % | 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 : 0.3 %~ -0.3 % | 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/ 925 ms 115VAC/ 983 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/ 16 ms 115VAC/ 10 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/ 17 ms 115VAC/ 18 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 : 4800 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)396 mVp-p (2)456 mVp-p (3)484 mVp-p (4) 864 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 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) | 74.7 V~264V TEST : OK | P |
| 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) 0.98 / 115 VAC(TYP) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | PF= 0.988 / 230 VAC PF= 0.994 / 115 VAC | P |
| 4 | EFFICIENCY | 93 % (TYP) | I/P : 230 VAC O/P : FULL LOAD Ta : 25°C | 93.33 % | P |
| 5 | INPUT CURRENT | 230V/ 1.8 A (TYP) 115V/ 3.5 A (TYP) | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | I = 1.44 A/ 230 VAC I = 2.97 A/ 115 VAC | P |
| 6 | INRUSH CURRENT | 230V/ 80 A (TYP) 115V/ 40 A (TYP) COLD START | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | I = 67 A/ 230 VAC I = 34 A/ 115 VAC | P |
| 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 | 116 %/ 230 VAC 116 %/ 115 VAC Hiccup Mode | P |
| 2 | OVER VOLTAGE PROTECTION | CH1 : 52 V ~ 59.5 V | I/P : 230 VAC I/P : 115 VAC O/P : MIN LOAD Ta : 25°C | 55.56 V/ 230 VAC 55.53 V/ 115 VAC Shut down Re- power ON | P |
| 3 | OVER TEMPERATURE PROTECTION | SPEC : TSW1 : 110±5°C O.T.P. TSW2 : 85±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 : 4.9652 V RIPPLE : 30.2 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 : 11.162 V / 0.5A AUX : 12.334 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= 2.2981 V POWEROFF= 0 V | P |
| 4 | POWER GOOD / POWER FAIL SIGNAL | 500ms>PG>10ms PF>1ms | I/P : 230 VAC I/P : 115 VAC O/P : FULL LOAD Ta : 25°C | POWER GOOD : 83.2 ms POWER FAIL : 13.6 ms | 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) 409 V (2) 398 V (3) 408 V | P |
| 2 | Diode Peak Voltage | Q101Rated : YA868C15RSC 30A/150V | 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) 104 V (2) 12.4 V (3) 103 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) 386.81 V (2) 388.26 V (3) 396.46 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) 13.307 V (2) 13.308 V (3) 13.314 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) 406 V (2) 400 V (3) 400 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 : 1.275 mA I/P-FG : 1.232 mA O/P-FG : 0.146 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 : 6KV | 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 MEDICAL L-N : 1KV L,N-PE : 2KV | I/P : 230 VAC/50HZ O/P : FULL LOAD Ta : 25°C | CRITERIA A | P |
| 7 | Test by certified Lab & Test Report Prepare | | | | |

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|----|-----------------------------|---|---|---|
| 6 | STORAGE TEMPERATURE TEST | <ol style="list-style-type: none"> 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 | P |
| 7 | THERMAL SHOCK TEST | <ol style="list-style-type: none"> 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 | P |
| 8 | VIBRATION TEST | <p>1 Carton & 1 Set</p> <ol style="list-style-type: none"> (1) Waveform : Sine Wave (2) Frequency : 10-500Hz (3) Sweep Time : 12min/sweep cycle (4) Acceleration : 2G (5) Test Time : 60min in each axis (X.Y.Z) (6) Ta : 25°C | TEST : OK | P |
| 9 | CAPACITOR LIFE CYCLE | <p>EPP-300-24V SUPPOSE C105 IS THE MOST CRITICAL COMPONENT</p> <ol style="list-style-type: none"> (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 <p>The experiments above are tested with a 20.5CFM Fan.</p> | <ol style="list-style-type: none"> (1) 2423560HRS (2) 388800HRS (3) 437400HRS (4) 472027HRS | 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 |

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