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SPECIFICATION



ESD040305

9PA4001800(FSP400-60GLN,PC,ATX,S,W/NK,W/IO,W/O)

RANGE



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Released Date:2005/5/16-11:53:18



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SPECIFICATION

FSP400-60GLN

9PA4001800

Main Feature:
Low Noise
High Efficiency
Active PFC Circuit
Full Range Input

April 6, 2005
REV:01

全漢企業股份有限公司
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MODEL: FSP400-60GLN

Revision History

| <u>Rev</u> | <u>Description</u> | <u>Date</u> | <u>Author</u> |
|------------|--------------------|-------------|---------------|
| 1.0 | | 2005-04-06 | |
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1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model FSP400-60GLN; AC-line powered switching power supply with active PFC (Power Factor Correction) circuit, meet EN61000-3-2 and with Full Range Input features.

The specification below is intended to describe as detailedly as possible the functions and performance of the subject power supply. Any comment or additional requirements to this specification from our customers will be highly appreciated and treated as a new target for us to approach.

2. REFERENCE DOCUMENTS

The subject power supply will meet the EMI requirements and obtain main safety approvals as following:

2.1 EMI REGULATORY

- FCC Part 15 Subpart J, Class 'B' 115 Vac operation.
- CISPR 22 Class 'B' 230 Vac operation.

2.2 SAFETY

- NEMKO EN 60950
- TUV EN60950 OR VDE EN60950
- CSA-C22.2 NO. 950-95
- IEC 60950
- UL 60950
- CE :
 - EN 55022:1998+A1: 2000, Class B
 - EN 61000-3-2: 2000
 - EN 61000-3-3: 1995+A1: 2001
- CISPR22: 1997+A1: 2000, Class B
- AS/NZS CISPR 22: 2002, Class B

3. INPUT ELECTRICAL SPECIFICATIONS

3.1. AC INPUT

| Parameter | Min. | Nom. ⁽¹⁾ | Max. | Unit |
|---------------------------|------|---------------------|------|--------------------|
| V _{in} (115VAC) | 90 | 115 | 135 | VAC _{rms} |
| V _{in} (230VAC) | 180 | 230 | 265 | VAC _{rms} |
| V _{in} Frequency | 47 | -- | 63 | HZ |

◆ Nominal voltages for test purposes are considered to be within ±1.0V of nominal.

3.2. INRUSH CURRENT

(Cold start – 25 deg. C)

| | |
|------|-----------|
| 115V | No damage |
| 230V | No damage |

Maximum inrush current from power-on (with power on at any point on the AC sine) and including, but not limited to, three line cycles, shall be limited to a level below the surge rating of the input line cord, AC switch if present, bridge rectifier, fuse, and EMI filter components. Repetitive ON/OFF cycling of the AC input voltage should not damage the power supply or cause the input fuse to blow.

3.3. INPUT LINE CURRENT

| | |
|------|-----------------------|
| 115V | 5.0Amps – rms maximum |
| 230V | 2.5Amps – rms maximum |

3.4. EFFICIENCY

3.4.1 General

Under the load conditions defined in Table 1 and Table 2. The loading condition for testing efficiency shown in Table 1 represents a fully loaded system. a ~ 50% (typical) loaded system. and a ~ 20% (light) loaded system.

Table. 1 Loading Table for Efficiency Measurements

| 400W(loading shown in Amps) | | | | | | |
|------------------------------------|--------------|--------------|------------|--------------|-------------|--------------|
| Loading | +12V1 | +12V2 | +5V | +3.3V | -12V | +5Vsb |
| Full | 12.0 | 14.0 | 9.0 | 11.0 | 0.3 | 1.0 |
| Typical | 5.0 | 9.0 | 3.0 | 5.0 | 0.1 | 1.0 |
| Light | 3.0 | 3.0 | 1.0 | 3.0 | 0.0 | 1.0 |

Table 2. Minimum Efficiency Vs Load

| Loading | Voltage | Full load | Typical load | Light load |
|------------------------------------|----------------|------------------|---------------------|-------------------|
| Required Minimum Efficiency | 115V | 75% | 75% | 70% |
| Required Minimum Efficiency | 230V | 80% | 80% | 75% |

3.5 MECHANICAL SPECIFICATIONS

The mechanical drawing of the subject power supply, which indicate the form factor, location of the mounting holes, location, the length of the connectors, and other physical specifications of the subject power supply. Please refer to the attachment drawing.

4.0. OUTPUT ELECTRICAL REQUIREMENTS

4.1 OUTPUT VOLTAGE AND CURRENT RATING

| Output | MINIMUM LOAD | NORMAL LOAD | MAXIMUM LOAD | LOAD REG | LINE REG | RIPPLE&NOISE |
|---------------|---------------------|--------------------|---------------------|-----------------|-----------------|-------------------------|
| +3.3V | 0.5A | 15A | 30A | ±5% | ±1% | 50mV P-P |
| +5V | 0.3A | 15A | 30A | ±5% | ±1% | 50mV P-P |
| +12V1 | 1.0A | 7A | 14 A | ±5% | ±1% | 120mV P-P |
| +12V2 | 1.0A | 7.5A | 15A | ±5% | ±1% | 120mV P-P |
| -12V | 0.0A | 0.25A | 0.5A | ±10% | ±1% | 120mV P-P |
| +5VSB | 0.0A | 1.0A | 2.0 A | ±5% | ±1% | 50mV P-P |

- (1) +3.3V & +5V total output not exceed 152W.
- (2) +3.3V & +5V & +12V1 & +12V2 total output not exceed 380W
- (3) total output for this subject power supply is 400 watts

4.2. LOAD CAPACITY SPECIFICATIONS

The cross regulation defined as follows, the voltage regulation limits DC include DC Output ripple & noise.

| LOAD | STM. | +3.3V | +5V | +12V1 DC | +12V2 DC | -12V | +5VSB |
|---------------------------------|--------|-------|-------|----------|----------|------|-------|
| FULL LOAD | LHHMHH | 0.5A | 30A | 14A | 5.3A | 0.5A | 2A |
| FULL LOAD | HMMHHH | 30A | 10.6A | 4.3A | 15A | 0.5A | 2A |
| +3.3V MAX other MIN | HLLLLL | 30A | 0.3A | 1A | 1A | 0A | 0A |
| +5V MAX Other MIN | LHLLLL | 0.5A | 21A | 1A | 1A | 0A | 0A |
| +12V1&+12V2 MAX Other MIN | LLHHLL | 0.5 A | 2.0A | 14A | 15A | 0A | 0A |
| -12V MAX other MIN | LLLLHL | 0.5A | 0.3A | 1A | 1A | 0.5A | 0A |
| +5VSB MAX other MIN | LLLLLH | 0.5A | 0.3A | 1A | 1A | 0A | 2A |
| ALL MIN | LLLLLL | 0.5A | 0.3 A | 1A | 1A | 0A | 0A |

4.3. HOLD-UP TIME (@FULL LOAD)

115V / 60Hz : 17 mSec. Minimum.

230V / 50Hz : 17 mSec. Minimum.

The output voltage will remain within specification, in the event that the input power is removed or interrupted, for the duration of one cycle of the input frequency. The interruption may occur at any point in the AC voltage cycle. The power good signal shall remain high during this test.

4.4. OUTPUT RISE TIME

(10% TO 95% OF FINAL OUTPUT VALUE, @FULL LOAD)

115V-rms or 230V-rms

- + 3.3Vdc : 20ms Maximum
- + 5Vdc : 20ms Maximum
- + 12Vdc : 20ms Maximum
- + 5Vsb : 25ms Maximum
- 12Vdc : 20ms Maximum

4.5.OVER VOLTAGE PROTECTION

| Voltage Source | Protection Point |
|----------------|------------------|
| +3.3V | 3.76V-4.8V |
| +5V | 5.6V-7.0V |
| +12V | 13.0V-15.6V |

4.6.OVER-CURRENT PROTECTION

| OUTPUT VOLTAGE | Max. overcurrent limit |
|----------------|------------------------|
| +3.3V | 50.0A |
| +5V | 48.0A |
| +12V1 DC | 20.5A |
| +12V2 DC | 20.5A |

4.7.SHORT CIRCUIT PROTECTION

Output short circuit is defined to be a short circuit load of less than 0.1 ohm.

In the event of an output short circuit condition on +3.3V, +5V or +12V output, the power supply will shutdown and latch off without damage to the power supply. The power supply shall return to normal operation after the short circuit has been removed and the power switch has been turned off for no more than 2 seconds.

In the event of an output short circuit condition on -12V output, the power supply will not be damaged. The power supply shall return to normal operation as soon as the short circuit has been removed. and the power switch has been turned off for no more than 2 seconds.

4.8. POWER SIGNAL

| | |
|---------------------------------|-----------------|
| POWER GOOD @ 115/230V,FULL LOAD | 100 –500mSec. |
| POWER FAIL @115/230V, FULL LOAD | 1 mSec. minimum |

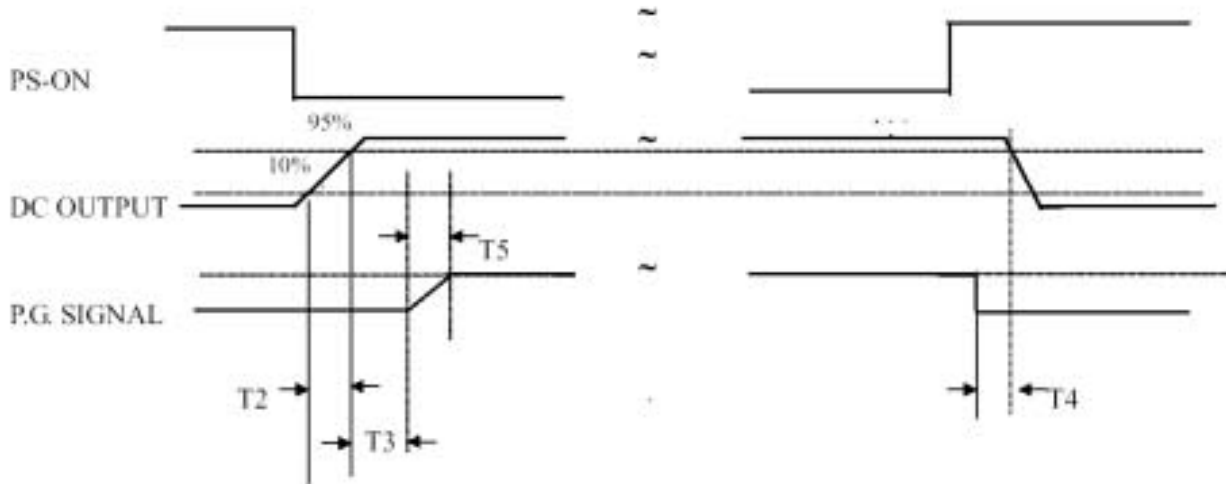


Figure 1

- T2 : RISE TIME < 20mS
- T3 : POWER GOOD DELAY TIME 100mS-500mS
- T4 : POWER FAIL DELAY TIME > 1mS
- T5 : POWER GOOD RISE TIME \leq 10mS

5.0 FAN NOISE REQUIREMENTS

5.1. The subject power supply is cooled by a self-contained, 120mm, 12VDC fan.

5.2. FAN NOISE

| AC INPUT | FULL (Table.1) | TYPICAL (Table.1) | LIGHT (Table.1) |
|----------|-------------------|-------------------|-------------------|
| 115V | NOISE \leq 35dB | NOISE \leq 25dB | NOISE \leq 22dB |
| 230V | NOISE \leq 35dB | NOISE \leq 25dB | NOISE \leq 22dB |

6.0 ENVIRONMENTAL REQUIREMENTS

The power supply will be compliant with each item in this specification for the following Environmental conditions.

6.1. TEMPERATURE RANGE

| | |
|-----------|-------------------|
| Operating | 0 to +50 deg. C |
| Storage | -20 to +80 deg. C |

6.2. HUMIDITY

| | |
|-----------|---------------------------|
| Operating | 5 -95% RH, Non-condensing |
| Storage | 5 -95% RH, Non-condensing |

6.3. VIBRATION

The subject power supply will withstand the following imposed conditions without experiencing non-recoverable failure or deviation from specified output characteristics.

Vibration Operating – Sine wave excited, 0.25 G maximum acceleration, 10-250 Hz swept at one octave / min. Fifteen minute dwell at all resonant points, where resonance is defined as those exciting frequencies at which the device under test experiences excursions two times large than non-resonant excursions.

Plane of vibration to be along three mutually perpendicular axes.

6.4 GROUND LEAKAGE CURRENT

The power supply ground leakage current shall be less than 3.5 mA.

6.5 RELIABILITY

The power supply reliability, when calculated by MIL-HDBK-217; latest revision, are exceed 100,000 hours with all output at maximum load and an ambient temperature of 25°C.

6.6 DIELECTRIC STRENGTH

Primary to Frame Ground : 1800 Vac for 1 sec.

Primary to Secondary : 1800Vac for 1 sec

6.7 INSULATION RESISTANCE

Primary to Frame Ground : 20 Meg.ohms Minimum

Primary to Secondary : 20 Meg.ohms Minimum

