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SPECIFICATION

ESD12061952

FSP400-72PFL

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SPECIFICATION

FSP400-72PFL

Main Feature:
Active PFC Circuit
Full Range Input

JUL 16,2012
REV: 1.0

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MODEL: FSP400-72PFL

Revision History

Rev	Description	Date	Author

1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model FSP400-72PFL; AC-line powered switching power supply with active PFC (Power Factor Correction) circuit, meet EN61000-3-2 and with Full Range Input features. Designed and manufactured by FSP GROUP.

The 5Vsb power is less than $0.45W_{input}$ at power off mode (PS_ON input at high state) which is comply with EuP Lot 6 year 2013 requirement.

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.

3. PHYSICAL REQUIREMENTS

3.1 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. ELECTRICAL REQUIREMENTS

4.1 OUTPUT ELECTRICAL REQUIREMENTS

The subject power supply will meet all electrical specifications below, over the full operation temperature range and dynamic load regulation.

4.1.1. OUTPUT RATING

Output	Nominal	Regulation	Ripple/Noise	Min	Max	peak
1	+3.3V	±5%	50mV	0.5A	21.0 A	
2	+5V	±5%	50mV	0.5A	16.0 A	
3	+12V1	±5%	120mV	0.5A	17.0 A	
4	+12V2	±5%	120mV	0.5A	17.0 A	
5	-12V	±10%	120mV	0 A	0.5 A	
6	+5VSB	±5%	50mV	0 A	3A	3.5A

7	-5V	±10%	100mV	0 A	0.3A	

*-5V Option, +5vsb peak <=10ms.

(1) The +3.3V and +5V total output shall not exceed 110watts.

(2)total output for this subject power supply is 400 watts.

(3)Ripple and noise measurements shall be made under all specified load conditions through a single pole low pass filter with 20MHz cutoff frequency. Outputs shall bypassed at the connector with a 0.1uF ceramic disk capacitor and a 10uF electrolytic capacitor to simulate system loading.

4.1.2. LOAD CAPACITY SPECIFICATIONS

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

	+12V1	+12V2	+5V	+3.3V	-12V	+5Vsb	-5V
1	12.62A	12.62A	8.75A	11.48A	0.37A	2.23A	0.1A
2	1A	1A	1A	21.0A	0.1A	3A	0.05A
3	17.0A	0.5A	3A	0.5A	0.5A	0.1A	0
4	4A	4A	16.0A	0.5A	0.05A	0.1A	0.3AA
5	6.31A	6.31A	4.37A	5.74A	0.19A	1.11A	0
6	10A	10A	3A	0.5A	0.05A	0.1A	0.3A
7	0.5A	17.0A	3A	0.5A	0.5A	0.1A	0
8	0.5A	0.5A	3A	0.5A	0.05A	3A	0
9	2.52A	2.52A	1.75A	2.3A	0.07A	0.45A	0
10	0.5A	0.5A	0.5A	0.5A	0A	0.1A	0

4.1.3. HOLD-UP TIME (@FULL LOAD)

115V / 60Hz : 15mSec. Minimum.

230V / 50Hz : 15mSec. Minimum.

4.1.4.OUTPUT RISE TIME

(10% TO 90% OF FINAL OUTPUT VALUE, @FULL LOAD)

115V-rms or 230V-rms + 5Vdc : 20ms Maximum

4.1.5.OVER VOLTAGE PROTECTION

Voltage Source	Protection Point
+ 3.3 V_{dc}	3.7V-4.8V
+5V_{dc}	5.7V-7.0V
+12Vdc AND +12Vdc	13.3V – 16V

4.1.6.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 or 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 -12Vand -5V 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.

4.1.7.OVER CURRENT PROTECTION

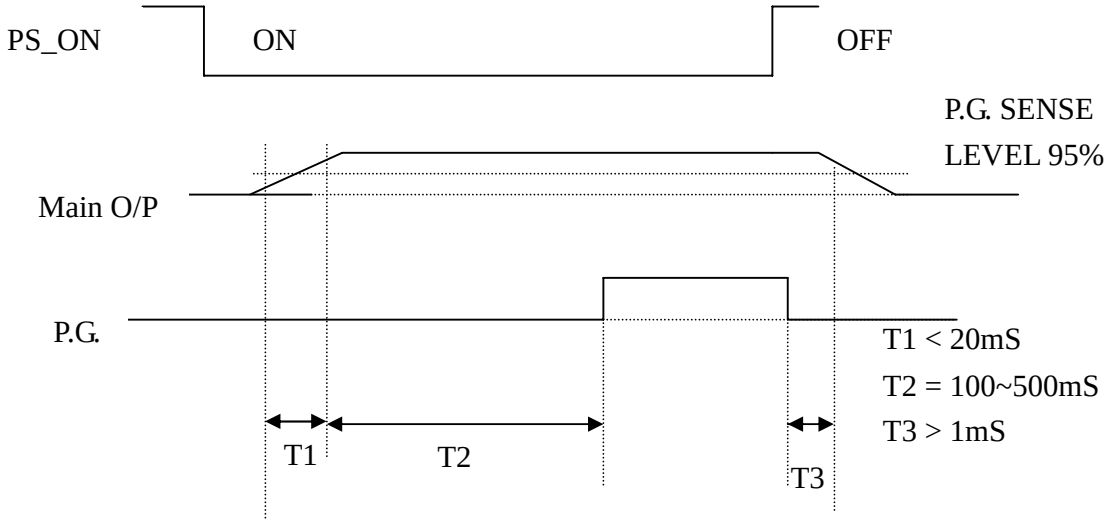
	O.C.P
+5V	25A~45A
+3.3V	25A~50A
+12V1,+12V2	20A~28A

4.1.8.POWER GOOD SIGNAL

The power good signal is a TTL compatible signal for the purpose of initiating an orderly star-up procedure under normal input operating conditions. This signal is asserted (low) until +5Vdc has reached 4.75 volts during power up. Characteristics:

TTL signal asserted (low state) : less than 0.5V while sinking 10mA.
TTL signal asserted (high state): greater than 4.75V while sourcing 500uA.
High state output impedance: less or equal to 1Kohm from output to common.

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



4.2. OUTPUT TRANSIENT LOAD RESPONSE

+5V and +12V must be within specification for a step change in current as specified below. The outputs will be tested one section at a time with all other sections at maximum load. The test transition will be from IA to IB and IB to IA. The step current will have a nominal transition time of 0.5 amp per microsecond for +5V and 0.1 amp per microsecond for +12V.

+5Vdc:

IA: 16.0 amps
IB: 11.0 amps
Volts variation: 400 mV max (p-p)
Setting time: 10 ms max

+12V1/4A,12V2/4A,+3.3V/0.5A,-12V/0.1,+5VSB/0.1A

+12V1dc, +12V2dc,

IA: 17.0 amps
IB: 11.9 amps
Volts variation: 550 mV max (p-p)
Setting time: 10 ms max

+5V/5A,+3.3V/0.5A,-12V/0.1A,+5VSB/0.1A,

+3.3Vdc:

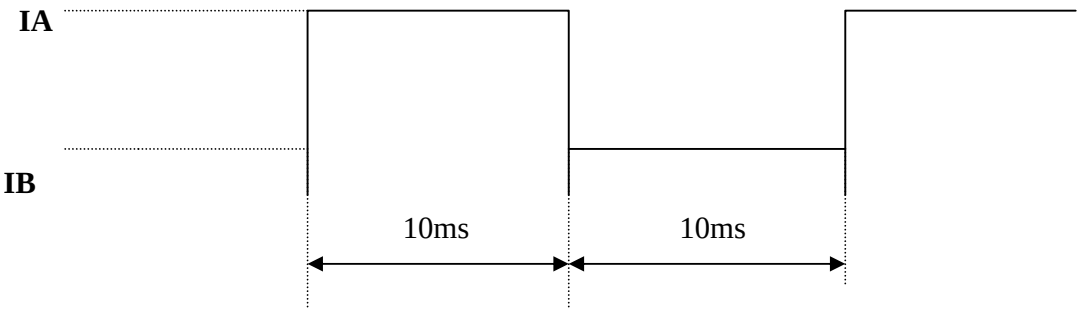
IA: 21.0 amps

IB: 14.7 amps

Volts variation: 400 mV max (p-p)

Setting time: 10 ms max

+12V1/0.5A,+12V2/0.5A,+5V/2A,-12V/0.1A,+5VSB/0.1A



4.2.1 Transient Load Requirement

Output	△Step Load Size	Load Slew Rate	Capacitive Load
+3.3V	30% of max load	0.5 A/μs	6000 μF
+5V	30% of max load	0.5 A/μs	6000 μF
+12V1,+12V2	30% of max load	1.0 A/μs	4700 μF

4.3. INPUT ELECTRICAL SPECIFICATIONS

4.3.1. VOLTAGE RANGE

PARAMETER		UNITS
V-in Range	90 - 264	V-rms

4.3.2. INPUT FREQUENCY

INPUT FREQUENCY	47–63Hz

4.3.3. INRUSH CURRENT

(Cold start – 25 deg. C)

115V	80A
230V	160A

(No damage)

4.3.4. INPUT LINE CURRENT

115V	8.0 Amps – rms maximum
230V	4.0 Amps – rms maximum

4.4. EFFICIENCY

	Full load (100%)	Typical load (50%)	Light load (20%)
115VAC	82%	85%	82%

(loading shown in Amps)

Loading	+12V1	+12V2		+5V	+3.3V	-12V	+5Vsb
Full (100%)	12.62	12.62		8.75	11.48	0.37	2.23
Typical (50%)	6.21	6.21		4.37	5.74	0.19	1.11
Light (20%)	2.52	2.52		1.75	2.3	0.07	0.45

4.5. Standby Power Consumption (5Vsb):

Input Power < 0.45W @ 5Vsb/45mA & 230Vac/50Hz input

PS_ON input signal @ High State

4.6. PS_ ON#

PS_ON# is an active-low, TTL-compatible signal that allows a motherboard to remotely control the power supply in conjunction with features such as soft on/off, Wake on LAN+, or wake-on-modem.

When PS_ON# is pulled to TTL low, the power supply should turn on the five main DC output rails: +12VDC,+5VDC,+3.3VDC,-5VDC,and –12VDC. When PS_ON# is pulled to TTL high or open-circuited, the DC output rails should not deliver current and should be held at zero potential with respect to ground. PS_ON# has no effect on the +5VSB output, which is always enabled whenever the AC power is present. Table 15 lists PS_ON# signal characteristics.

The power supply shall provide an internal pull-up to TTL high. The power supply shall also provide debounce circuitry on PS_ON# to prevent it from oscillating on/off at startup when activated by a mechanical switch. The DC output enable circuitry must be SELV-compliant.

Table 15. PS_ON# Signal Characteristics

	Min.	Max.
VIL, Input Low Voltage	0.0V	0.8V
IIL, Input Low Current (Vin = 0.4V)		-1.6mA
VIH, Input High Voltage (lin = -200 μ A)	2.0V	
VIH OPEN circuit, lin = 0		5.25V

5. ENVIRONMENTAL REQUIREMENTS

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

5.1. TEMPERATURE RANGE

Operating	400W	0 to +50 deg. C
Storage		-20 to +80 deg. C

5.2. HUMIDITY

Operating	5 –85% RH, Non-condensing
Storage	5 –95% RH, Non-condensing

5.3. 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.

5.4. SHOCK

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

Storage 40G, 11 mSec. half-sine wave pulse in both directions on three mutually perpendicular axes.

Operating 10G, 11mSec. half-sine wave pulse in both directions on three mutually Perpendicular axes.

6. SAFETY

6.1. LEAKAGE CURRENT

In addition to the UL,CSA safety requirements,the leakage current from AC to safety ground will not exceed 3.5mA-rms at 264Vac,63Hz

7. ELECTORMAGNETIC COMPATIBILITY

7.1. RADIATED EMI

The subject power suppy will meet FCC and CISPR 22 requirements under normal load conditions.

8. LABELLING

Label marking will be permanent, legible and complied with all agency requirements.
8.1. MODEL NUMBER LABEL

Labels will be affixed to the sides of the power supply showing the following:

- Manufacturer’s name and logo.
- Model no., serial no., revision level, location of manufacturer.
- The total power output and the maximum load for each output.
- AC input rating.

8.2. DC OUTPUT IDENTIFICATION

Each output connector will be labeled.

9. RELIABILITY

9.1. MTBF

The power supply have a minimum predicted MTBF(MIL-HDBK-217) of 100,000 hours of continuous operation at 25℃, maximum-output load, and nominal AC input voltage.