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SPECIFICATION

FSP250-50FEB

Main Feature
Active PFC Circuit
Full Range Input

JUN.11.2019
REV:1.4

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MODEL:FSP250-50FEB

Revision History

Rev	Description	Date	Author
1.0	First Edition	2018/9/5	JIMMY
1.1	Modified 12V/5V/3.3 OCP to 20A~30A	2018/10/9	JIMMY
1.2	4.1.6. OVER-CURRENT PROTECTION	2018/12/05	Winnie (Jimmy)
1.3	4.1.6. OVER-CURRENT PROTECTION(+3.3V→15~30A)	2019/6/03	Winnie (Jimmy)
1.4	4.1.6. OVER-CURRENT PROTECTION(+5V→15~35A)	2019/6/11	Winnie (Jimmy)

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1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model **FSP250-50FEB**; AC-line powered switching power supply with active PFC (Power Factor Correction) circuit, meet EN61000-3-2 , power factor 0.9 at 100% of rated output power. Designed and manufactured by FSP GROUP.

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 32 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.

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4.1.1. OUTPUT RATING

Output	Nominal	Regulation	Ripple/Noise	Min	Max
1	+3.3V	±5%	50mV	0.0A	12.0 A
2	+5V	±5%	50mV	0.0 A	14.0 A
3	+12V	±5%	120mV	0.0 A	18.0 A
4	-12V	±10%	120mV	0.0 A	0.3A
5	+5VSB	±5%	50mV	0.0 A	2.5A

※ −12V,+3.3V, +5V,+12V will have the regulation to ±10% when all load take off.

The +3.3V and +5V total output shall not exceed 80watts. The total output for this subject power supply is 250 watts. 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.

	+3.3V	+5V	+12V	-12V	5VSB
LOAD1	7.02A	8.19A	14.42A	0.24A	2.0A
LOAD2	0.0 A	14 A	8 A	0.01A	0.0A
LOAD3	12.0 A	0.2 A	0.5A	0.0A	0.0A
LOAD4	0.0 A	0.5 A	18.0A	0.01A	0.0A
LOAD5	0.0 A	0.2 A	0.5A	0.0A	0.0A

4.1.3. HOLD-UP TIME @80% LOAD

115V / 60Hz : 16 mSec. Minimum.
230V / 50Hz : 16 mSec. Minimum.

4.1.4.OUTPUT RISE TIME

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

115V-rms or 230V-rms +5Vdc：20ms Maximum
+3.3Vdc：20ms Maximum
+12Vdc：20ms Maximum
-12Vdc：20ms Maximum

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4.1.5.OVER VOLTAGE PROTECTION

Voltage Source	Protection Point
+ 3.3 V_{dc}	3.7V-4.5V
+5V_{dc}	5.7V-6.5V
+12Vdc	13.3V – 15.5V

4.1.6. OVER-CURRENT PROTECTION

OUTPUT VOLTAGE	OCP
+3.3V	15A-30A
+5V	15A-35A

4.1.7. OVER POWER PROTECTION

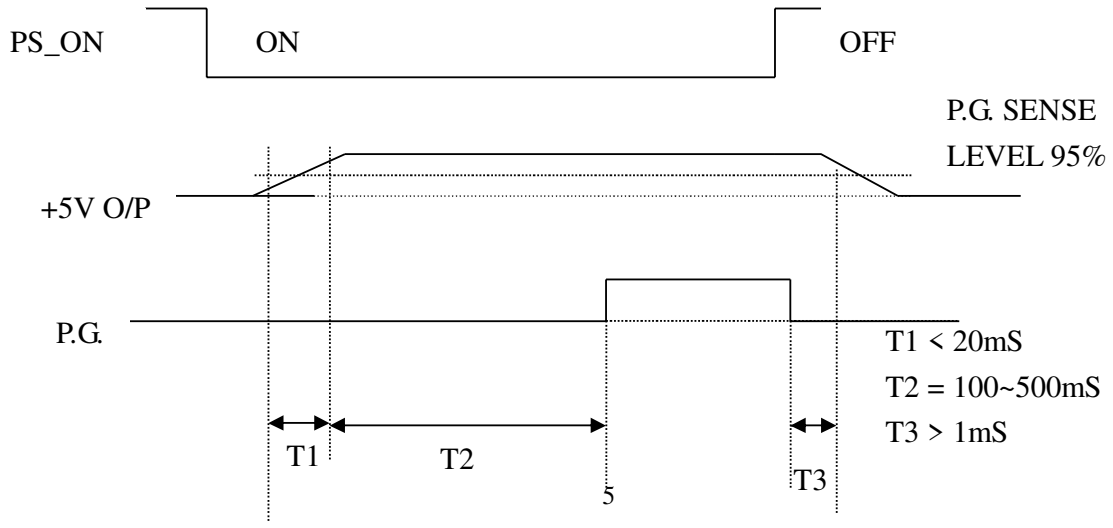
Total output shall not exceed 250 watts , in the event of an output total power condition on output , If the total exceed 150% , the power supply will shutdown and latch off without damage to the power supply.

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, Typical (50%) LOAD	100 –500mSec.
POWER FAIL @115/230V, Typical (50%) LOAD	1 mSec. minimum



4.2. OUTPUT TRANSIENT LOAD RESPONSE

The output voltages shall remain within the limits specified in 4.1.1 output rating table in page 4 for the step loading and within the limits specified in Table 1 for the capacitive loading. The load transient repetition rate shall be tested between 50Hz and 5 kHz at duty cycles ranging from 10%-90%. The load transient repetition rate is only a test specification. The step load may occur anywhere within the MIN load to the MAX load shown in Table 1.

Table 1: Transient Load Reguirements

Output	△Step Load Size	Load Slew Rate	Capacitive Load
+3.3V	30% of max load	1.0 A/μs	3300μF
+5V	30% of max load	1.0 A/μs	3300μF
+12V	40% of max load	1.0 A/μs	3300μF

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	No damage
230V	No damage

4.3.4. INPUT LINE CURRENT

115V	4.0 Amps – rms maximum
230V	2.0 Amps – rms maximum

4.4. EFFICIENCY

	Full load (100%)	Typical load (50%)	Light load (20%)
115VAC	82%	85%	82%
230VAC	82%	85%	82%

(loading shown in Amps)

Loading	+12V	+5V	+3.3V	-12V	+5Vsb

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Full (100%)	14.42	8.19	7.02	0.24	2.00
Typical (50%)	7.21	4.09	3.51	0.12	1.00
Light (20%)	2.88	1.64	1.40	0.05	0.40

4.5. Standby Power Consumption (5Vsb):

Efficiency > 45% @ 5Vsb/45mA &230Vac input (2013 Lot 6)

Efficiency > 55% @ 5Vsb/550mA &230Vac input

Efficiency > 70% @ 5Vsb/1A &230Vac input

Efficiency > 70% @ 5Vsb/2.5A &230Vac input

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 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. (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.

PS_ON# Signal Characteristics

	Min.	Max.
V_{IL}, Input Low Voltage	0.0V	0.8V
I_{IL}, Input Low Current (Vin = 0.4V)		-1.6mA
V_{IH}, Input High Voltage (lin = -200 μ A)	2.0V	
V_{IH} 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	0 to +50 deg. C FOR 250W
Storage	-20 to +80 deg. C

5.2. HUMIDITY

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Operating	85% RH, Non-condensing
Storage	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 Operation, 0.01g²/Hz at 5 Hz sloping to 0.02g²/Hz at 20 Hz, and maintaining 0.02g²/Hz from 20 Hz to 500 Hz. The area under the PSD curve is 3.13gRMS. The duration shall be 20 minutes per axis for all three axes on all samples.

Plane of vibration to be along three mutually perpendicular axes.

5.4. SHOCK

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

Storage	40G, 9 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.

5.5 COOLING SPECIFICATIONS

5.5.1. The PSU is cooled by a self-contained FAN, 40mm, 12VDC.

5.6 ALTITUDE

The power supply is applied for tropical climates and use at altitudes not exceeding 5000m above Sea level

6. SAFETY

6.1. LEAKAGE CURRENT

The leakage current from AC to safety ground will not exceed 3.5 mA-rms at 264Vac, 50 Hz.

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7. ELECTORMAGNETIC COMPATIBILITY

7.1 LINE CONDUCTED EMI

The subject power supplies will meet FCC class B requirements .

7.2. RADIATED EMI

The subject power supplies will meet FCC and CISPR 32 requirements .

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.

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