

# 電氣規格書





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# SPECIFICATION

## Flex DC/DC Power Supply

### FSP250-52FGB

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REV: 1.7



## Revision History

Rev.	Description of Changes	Date	Author / Owner
1.0	First edition	2018/03/21	陳俊豪 / RAZ02
1.1	New define Peak Load (5V & 5Vsb)	2018/08/14	陳俊豪 / RAZ02
1.2	Redefine Hold Time	2018/12/17	Joanna / Rayn
1.3	ADD S.C.P	2019/2/13	陳俊豪 / RAZ02
1.4	Modify 3.3V OCP 18A to 20A	2019/2/25	陳俊豪 / RAZ02
1.5	4.1.1. OUTPUT RATING(Minimum load)	2019/05/16	Winnie/RAZ02
1.6	修正 4.1.6. OVER CURRENT PROTECTION +12V 20A-26A	2019/8/29	陳俊豪 / RAZ02
1.7	修正 3.3V,5V COMBINE LOAD	2019/11/4	陳俊豪 / RAZ02



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# 1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model FSP250-52FGB;  
DC input powered switching power supply.  
Designed and manufactured by FSP GROUP.

Altitude: 5000M

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

- EN55022 Class 'B' .

## 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
1	+3.3V	±5%	50mV	0.0 A	10.0 A
2	+5V	±5%	50mV	0.0 A	14.0 A
3	+12V	±5%	120mV	0.05 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 be 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.

LOAD	STM	+3.3V	+5V	+12V	-12V	5VSB
ALL MAX	HHHHH	4.37A	6.12A	15.95A	0.3A	2.0A
+5V MAX other MIN	LHLLL	0.0 A	14 A	0.05 A	0.0A	0.0A
+3.3V MAX other MIN	HLLLL	10.0 A	0.0 A	0.05A	0.0A	0.0A
+12V MAX other MIN	LLHLL	0.0 A	0.0 A	18.0A	0.0A	0.0A
ALL MIN	LLLLL	0.0 A	0.0 A	0.05A	0.0A	0.0A
Half-Load	HHHHH	2.18 A	3.06 A	7.98 A	0.15 A	1.0 A



#### 4.1.3. HOLD-UP TIME (@FULL LOAD)

$$24Vdc \geq 2mS$$

#### 4.1.4. OUTPUT RISE TIME

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

24Vdc	+5Vdc : 20ms Maximum
	+3.3Vdc : 20ms Maximum
	+12Vdc : 20ms Maximum
	-12Vdc : 20ms Maximum

#### 4.1.5. OVER VOLTAGE PROTECTION

Voltage Source	Protection Point
+ 3.3 V <sub>dc</sub>	3.7V-4.5V
+5V <sub>dc</sub>	5.7V-6.5V
+12Vdc	13.3V – 15.5V

#### 4.1.6. OVER CURRENT PROTECTION

OUTPUT VOLTAGE	OCP
+3.3V	15A-20A
+5V	18A-22A
+12V	20A-26A

#### 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. 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.



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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.

#### 4.1.9. POWER GOOD SIGNAL

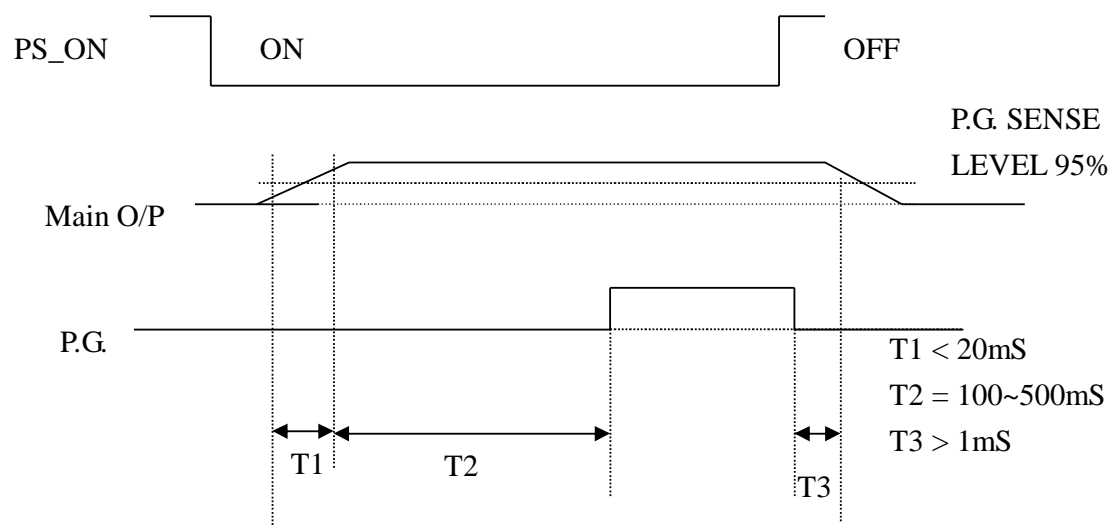
The power good signal is a TTL compatible signal for the purpose of initiating an orderly start-up procedure under normal input operating conditions. This signal is asserted (low) until +5Vdc has reached 4.75 volts during power up. Characteristics:

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 @ 110/220,FULL LOAD	100 –500mSec.
POWER FAIL @110/220V, FULL 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 Requirements**





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Output	$\Delta$ Step Load Size	Load Slew Rate	Capacitive Load
+3.3V	30% of max load	1.0 A/ $\mu$ s	3300 $\mu$ F
+5V	30% of max load	1.0 A/ $\mu$ s	3300 $\mu$ F
+12V	40% of max load	1.0 A/ $\mu$ s	3300 $\mu$ F

### 4.3. INPUT ELECTRICAL SPECIFICATIONS

#### 4.3.1. VOLTAGE RANGE

PARAMETER	STD	Max	Min
Voltage (Vdc)	-24V	-36	-18

#### 4.3.2. INRUSH CURRENT

(Cold start : 25 deg. C)

-24Vdc	No damage
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#### 4.3.3. INPUT LINE CURRENT

-24Vdc	18.0 Amps – rms maximum
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### 4.4. EFFICIENCY

	Full load (100%)
-24VDC	80%

(loading shown in Amps)

Loading	+12V	+5V	+3.3V	-12V	+5Vsb
Full (100%)	15.95	6.12	4.37	0.3	2.00

### 4.5. 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


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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 DC power is present. Table 2 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 2. PS\_ON# Signal Characteristics**

	Min.	Max.
V <sub>IL</sub> , Input Low Voltage	0.0V	0.8V
I <sub>IL</sub> , Input Low Current (V <sub>in</sub> = 0.4V)		-1.6mA
V <sub>IH</sub> , Input High Voltage (I <sub>in</sub> = -200 $\mu$ A)	2.0V	
V <sub>IH</sub> OPEN circuit, I <sub>in</sub> = 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

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

### 5.3. VIBRATION

Random Vibration

0.01g<sup>2</sup>/ Hz at 5 Hz, sloping to 0.02g<sup>2</sup>/ Hz at 20 Hz, and maintaining 0.02g<sup>2</sup>/ Hz from 20Hz to 500Hz. The area under the PSD curve is 3.13gRMS.

The duration shall be 20 minutes per axis for all three axes on all samples.



## **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, 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.

## **6. ELECTROMAGNETIC COMPATIBILITY**

### **6.1. RADIATED EMI**

The subject power supply will meet EN55022 requirements under normal load conditions.

### **6.2. DIELECTRIC STRENGTH**

Primary to Frame Ground : 1800Vac for 1 sec.

Primary to Secondary : 1800Vac for 1 sec

## **7. LABELLING**

Label marking will be permanent, legible and complied with all agency requirements.

### **7.1. 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.
- DC input rating.

### **7.2. DC OUTPUT IDENTIFICATION**



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Each output connector will be labeled.

## **8. RELIABILITY**

### **8.1. MTBF**

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