

電氣規格書





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SPECIFICATION

FSP350-51ACC

9PA350DA00

Main Feature:

**Meet 2013 ErP
ATX 2.3 Version
Active PFC Circuit**

July. 23, 2019

Rev: 1.02



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MODEL: FSP350-51ACC

Revision History

| <u>Rev</u> | <u>Description</u> | <u>Date</u> | <u>Author</u> |
|------------|---|-------------|---------------|
| 1.00 | Original | 2019/02/26 | Sam |
| 1.01 | 4.2. LOAD CAPACITY SPECIFICATIONS SPEC_CON.3 +12V LOAD 由0.2A改1A 4.8. HOLD-UP TIME (70% Full load→Typical load) 230V / 50Hz : 17 mSec. Minimum. | 2019/6/26 | Sam |
| 1.02 | Con9. 5V 由 1A 改 2.6A 3.3V 由 5.1 改 2.8A | 2019/7/23 | Sam |

1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model FSP350-51ACC AC-line powered switching power supply with active PFC (Power Factor Correction) circuit, meet EN61000-3-2 features.

The specification below is intended to describe as detailed 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:

CB : IEC 60950-1:2005+A1+A2

CE : EMC DIRECTIVE(EN55022/EN55024)

3. INPUT ELECTRICAL SPECIFICATIONS

3.1. AC INPUT

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

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

3.2. INRUSH CURRENT

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 & POWER FACTOR (P.F.)

(At Full load)

| AC input | Input line current | P.F.@ Full Load |
|----------|--------------------|-----------------|
| 230V | < 2.5Amps – rms | > 0.95 |

3.4. AC-DC power supplies shall not perform at less than:

(AC input=230V)

1. Power factor 0.8 at 20% of rated output.
2. Power factor 0.9 at 50% of rated output.
3. Power factor 0.95 at 100% of rated output.

3.5. EFFICIENCY

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.

Table1. Loading Table for Efficiency Measurements

| 350W(loading shown in Amps) | | | | | |
|------------------------------------|--------------|--------------|--------------|-------------|--------------|
| Load | +3.3V | +5V | +12V | -12V | +5Vsb |
| Light | 1.88 | 2.03 | 4.25 | 0.05 | 0.41 |
| Typical | 4.71 | 5.07 | 10.63 | 0.12 | 1.02 |
| Full | 9.41 | 10.14 | 21.26 | 0.25 | 2.04 |

Table2. Minimum Efficiency & Load

| Load | Voltage | Light | Typical | Full |
|------------------------------------|----------------|--------------|----------------|-------------|
| Required Minimum Efficiency | 230V | 82% | 85% | 82% |

3.6 Standby Power Consumption (+5Vsb):

Efficiency > 45% @ 5Vsb/45mA & 230Vac input (Lot6 2013)

Efficiency > 45% @ 5Vsb/90mA & 230Vac input (Lot6 2010)

Efficiency > 75% @ 5Vsb/550mA & 230Vac input (Lot3 2014)

Efficiency > 75% @ 5Vsb/1A & 230Vac input

Efficiency > 75% @ 5Vsb/1.5A & 230Vac input (Lot3 2014)

Efficiency > 75% @ 5Vsb/2.5A & 230Vac input

4. OUTPUT ELECTRICAL REQUIREMENTS**4.1. OUTPUT VOLTAGE AND CURRENT RATING**

| Output | MINIMUM LOAD | NORMAL LOAD | MAXIMUM LOAD | PEAK LOAD | LOAD REG. | LINE REG. | Ripple & Noise |
|---------------|---------------------|--------------------|---------------------|------------------|------------------|------------------|---------------------------|
| +3.3V | 0.1A | 6.5A | 13A | | ±5% | ±1% | 50mV P-P |
| +5V | 0.1A | 7A | 14A | | ±5% | ±1% | 50mV P-P |
| +12V | 0.2A | 13A | 26A | | ±5% | ±1% | 120mV P-P |
| -12V | 0A | 0.15A | 0.3A | | ±10% | ±1% | 120mV P-P |
| +5Vsb | 0A | 1.25A | 2.5A | | ±5% | ±1% | 50mV P-P |

(1) +3.3V & +5V total output not exceed 100W.

(2) Maximum combined current for the +12V outputs shall be 26A.

Voltages and ripple are measured at the load side of mating connectors with a 0.1uF monolithic ceramic capacitor paralleled by a 10uF electrolytic capacitor across the measuring terminals.

4.2. LOAD CAPACITY SPECIFICATIONS

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

| LOAD | +3.3V | +5V | +12V | -12V | +5Vsb |
|-------------|-------|-------|-------|------|-------|
| Condition_1 | X | X | X | X | 2.5A |
| Condition_2 | 0.1A | 0.1A | 0.2A | 0A | 0A |
| Condition_3 | 0.1A | 0.1A | 1A | 0A | 2.5A |
| Condition_4 | 3A | 3A | 20A | 0.1A | 1A |
| Condition_5 | 3A | 11A | 3A | 0.1A | 1A |
| Condition_6 | 11A | 3A | 3A | 0.1A | 1A |
| Condition_7 | 13A | 11.4A | 19.5A | 0.3A | 2.5A |
| Condition_8 | 9.1A | 14A | 19.5A | 0.3A | 2.5A |
| Condition_9 | 2.8A | 2.6A | 26A | 0.3A | 2.5A |

4.3. OVER VOLTAGE PROTECTION

| Voltage Source | Over Voltage Protection Point |
|----------------|-------------------------------|
| +3.3V | 3.5V-5.2V |
| +5V | 5.75V-7.5V |
| +12V | 13.5V-16.5V |

4.4. 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, +12V or -12V output, the power supply will shut down 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.

4.5. OVER CURRENT PROTECTION

Test: Typical load

| Output voltage | Over current limit |
|----------------|--------------------|
| +3.3V | 16A~35A |
| +5V | 16A~35A |

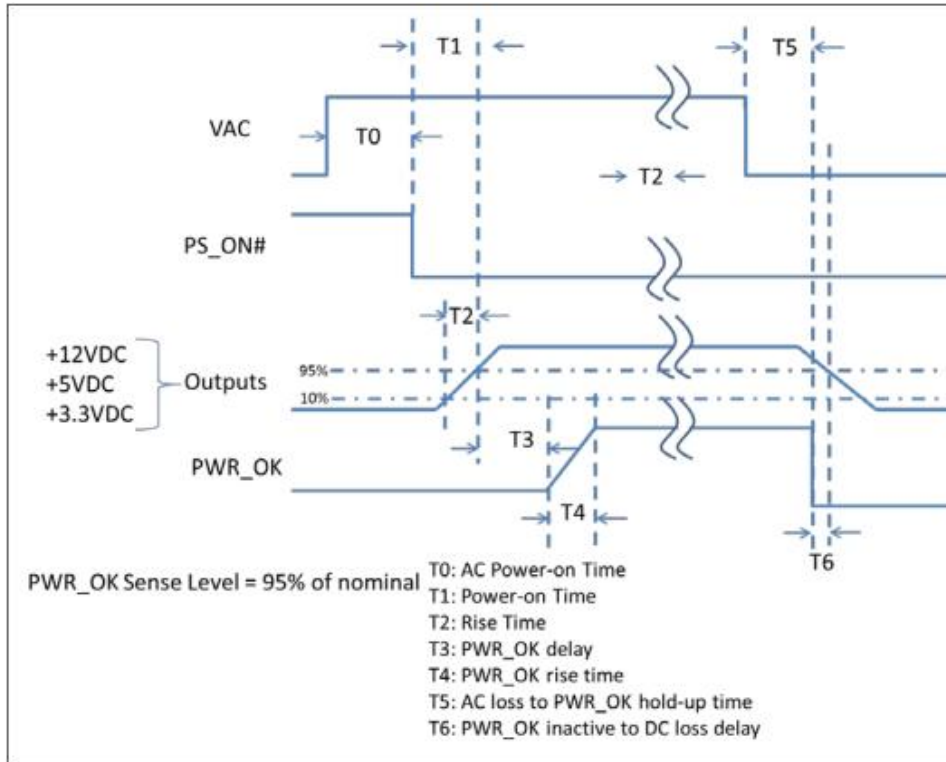
4.6. OVER POWER PROTECTION

The power supply shall be shut down and latch off.

when the output wattage of the power supply is higher from 420W to 525W.

| | | | | | |
|-----------|-------|--------|-----------|-------|-------|
| Test load | +3.3V | +5V | +12V | -12V | +5Vsb |
| | 9.41A | 10.14A | 27A~35.8A | 0.25A | 2.04A |

4.7. POWER SIGNAL



| Parameter | Description | Value | | |
|-----------|----------------------------------|---------------|--|--|
| | | Required | Recommended for non-alternative sleep mode | Recommended for alternative sleep mode |
| T0 | AC power on time | <2s | - | - |
| T1 | Power-on time | < 500ms | < 200ms | <150ms |
| T2 | Rise time | 0.2 - 20 ms | - | - |
| T3 | PWR_OK delay | 100* - 500 ms | 100ms* - 250 ms | 100ms* - 150ms |
| T4 | PWR_OK rise time | < 10 ms | - | - |
| T5 | AC loss to PWR_OK hold-up time | > 16 ms | - | - |
| T6 | PWR_OK inactive to DC loss delay | > 1 ms | - | - |

4.8. HOLD-UP TIME (Typical load)

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.

4.9. Dynamic

| LOAD | +3.3V | +5V | +12V | -12V | +5Vsb |
|-----------------|----------|----------|-----------|-------|---------|
| +3.3V | 9.1A~13A | 11.4A | 19.5A | 0.3A | 2.5A |
| +5V | 9.1A | 9.8A~14A | 19.5A | 0.3A | 2.5A |
| +12V | 5.1A | 1A | 15.6A~26A | 0.3A | 2.5A |
| Capacitive Load | 10000uF | 10000uF | 10000uF | 350uF | 10000uF |

5. FAN NOISE REQUIREMENTS

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

| AC INPUT | Full load | Typical load | Light load |
|----------|--------------|--------------|--------------|
| 230V | Noise < 40dB | Noise < 30dB | Noise < 25dB |

6. 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 +40 deg. C |
| Storage | -20 to +70 deg. C |

6.2. HUMIDITY

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

6.3. VIBRATION

Random Vibration

0.01g²/ Hz at 5 Hz, sloping to 0.02g²/ Hz at 20 Hz, and maintaining 0.02g²/ Hz from 20Hz to 500Hz. The area under the PSD curve is 3.13g RMS.

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

7. SAFETY TESTING

7.1. GROUND LEAKAGE CURRENT

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

7.2. DIELECTRIC STRENGTH

Primary to Frame Ground : 1800Vac for 3 sec.

Primary to Secondary : 1800Vac for 3 sec.

7.3. INSULATION RESISTANCE

Primary to Frame Ground : 20M ohm , Minimum

Primary to Secondary : 20M ohm , Minimum

8. RELIABILITY

8.1. 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.

9. LABELLING

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

9.1. 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.

10. 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.