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# SPECIFICATION



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# SPECIFICATION

P/N: 9PD2000301

FSP200-61DL(48V)

<b>P.E</b>	<b>R/D</b>	<b>APPROVED</b>	<b>REV.</b>
			01

## 1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model FSP200-61DL(48V). It is a DC/DC switching mode power supply designed and manufactured by FSP GROUP, INC. located in Taiwan, Republic of China. This specification is intended to describe the detailed functions and performance of the 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 following EMI requirements and safety approvals:

### 2.1 EMI REGULATORY

- CISPR 22 Class 'B'

### 2.2 SAFETY

- TUV EN60950
- CSA 22.2 NO. 234 LEVEL 3
- UL60950
- CE

## 3. PHYSICAL REQUIREMENTS

### 3.1 MECHANICAL SPECIFICATIONS

The mechanical drawing states the form factor, location of the mounting holes, the length of the connectors, and other physical specifications of the power supply. Please refer to the attached drawings.

### 3.2 CONNECTOR SPECIFICATIONS

DC Inlet:	Standard SCREW TERMINALS 40A/250V, UL/CSA/VDE approved.
P1:	The equivalent of MOLEX 39-01-2200, 20 pin connector
P2:	The equivalent of MOLEX 39-01-2040, 4 pin connector
P3,P4,P5:	The equivalent of AMP 1-480424-0, 4 pin connector
P6:	The equivalent of AMP 171822-4, 4 pin connector

### 3.3 CONNECTOR PIN DESIGNATIONS

The pin designations and color codes are defined as follows:

	P1 SYSTEM BOARD		P2 DISK DRIVER		P3,P4,P5 DISK DRIVER		P6 DISK DRIVER	
PIN1	+3.3V	ORANGE	COM	BLACK	+12V	YELLOW	+12V	YELLOW
PIN2	+3.3V	ORANGE	COM	BLACK	COM	BLACK	COM	BLACK
PIN3	COM	BLACK	+12V	YELLOW	COM	BLACK	COM	BLACK
PIN4	+5V	RED	+12V	YELLOW	+5V	RED	+5V	RED
PIN5	COM	BLACK						
PIN6	+5V	RED						
PIN7	COM	BLACK						
PIN8	PWR_OK	GRAY						
PIN9	+5VSB	PURPLE						
PIN10	+12V	YELLOW						
PIN11	+3.3V	ORANGE						
	+3.3V sense	BROWN						
PIN12	-12V	BLUE						
PIN13	COM	BLACK						
PIN14	PS-ON#	GREEN						
PIN15	COM	BLACK						
PIN16	COM	BLACK						
PIN17	COM	BLACK						
PIN18	NC	NC						
PIN19	+5V	RED						
PIN20	+5V	RED						

## 4. ELECTRICAL REQUIREMENTS

### 4.1 INPUT ELECTRICAL SPECIFICATIONS

#### 4.1.1 DC VOLTAGE RANGE

MIN	NOM	MAX	Peak <sup>1</sup>
36V	48V	72V	80V

1. The time duration is 1 second maximum.

#### 4.1.2 INPUT LINE CURRENT

Input Current	MAX
DC Current	8A
Inrush Current	100A

## 4.2 OUTPUT ELECTRICAL REQUIREMENTS

### 4.2.1 OUTPUT RATING

Output	Nominal	Regulation	Ripple/Noise	Min	Max
1	+3.3V	±5%	50mV	0.0A	12A
2	+5V	±5%	50mV	1.0A	12A
3	+12V	±5%	120mV	0.5A	15.4 A
4	-12V	±10%	120mV	0.0 A	0.5A
5	+5VSB	±5%	50mV	0.0 A	2.0A

※ +5V, +3.3V and+12V total output not exceed 184W.

The +3.3V and +5V total output shall not exceed 80watts, and the total output for this subject power supply is 200watts. The 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.

### 4.2.2 LOAD CAPACITY SPECIFICATIONS

The loading of cross regulation test is defined as follows. The output voltages shall meet the regulation and noise requirement specified in 4.2.1.

LOAD	+3.3V	+5V	+12V	-12V	5VSB
1	0.0A	0.0A	0.0A	0.0A	0.0A
2	0.0A	1.0A	0.5A	0.0A	0.0A
3	12.0A	1.0A	0.5A	0.0A	0.0A
4	0.0A	12.0A	0.5A	0.0A	0.0A
5	0.0A	1.0A	15.4A	0.0A	0.0A
6	0.0A	1.0A	1.0A	0.5A	0.0A
7	0.0A	1.0A	0.5A	0.0A	2.0A
8	12.0A	8.1A	8.7A	0.5A	2.0A
9	6.1A	12.0A	8.7A	0.5A	2.0A

### 4.2.3 OUTPUT RISE TIME

The rise time is measured form 10% to 90% of its final value with Input voltage = 24V and full load.

Output Voltage	MAX
+3.3V	20mS
+5V	20mS

+12V	20mS
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#### 4.2.4 OVER VOLTAGE PROTECTION

Output	MIN	TYP	MAX
+3.3V	3.7V	3.9V	4.1V
+5V	5.7V	6.1V	6.5V
+12V	13.1V	13.8V	14.5V

In the event of an over-voltage 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 power switch has been turned off for more than 2 seconds.

#### 4.2.5 UNDER VOLTAGE PROTECTION

Output	MIN	TYP	MAX
+3.3V	2.0V	2.2V	2.4V
+5V	3.0V	3.5V	3.7V
+12V	8.5V	9.0V	9.5V

In the event of an under-voltage 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 power switch has been turned off for more than 2 seconds.

#### 4.2.6 OVER CURRENT PROTECTION

Output	MIN	TYP	MAX
+3.3V	13.2A	15.6A	18A
+5V	13.2A	15.6A	18A
+12V	17.6A	20.4A	24.0A

In the event of an over-current 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 power switch has been turned off for more than 2 seconds.

#### 4.2.7 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



### 4.3 OUTPUT TRANSIENT LOAD RESPONSE

Transient response is measured by switching the output load from 70% to 100% to 70% of its full value at a frequency of 100Hz and 50% duty cycle, with a slew rate of 0.5A/us. The transient response is less than +/-5% of +5V, +3.3V and +12V outputs and the recovery time is less than 10mS.

+5V & +3.3V Outputs:

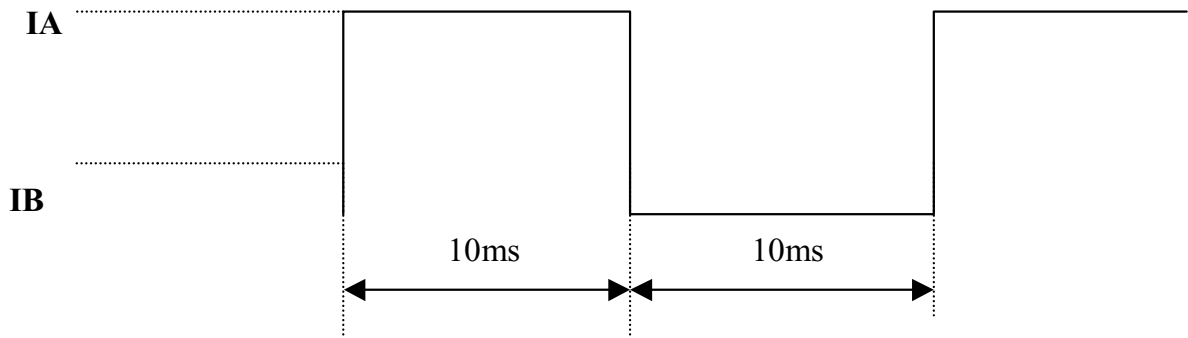
IA: 12.0 amps

IB: 8.4 amps

+12V Output:

IA: 16.0 amps

IB: 11.2 amps



### 4.4 EFFICIENCY

DC INPUT 24V @Full Load	78% Minimum
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### 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 and -12VDC. When PS\_ON# is pulled to TTL high or open-circuit, 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.

The power supply shall provide an internal pull-up to TTL high. The power supply shall also provide de-bounce 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.

	Min.	Max.
VIL, Input Low Voltage	0.0V	0.8V
IIL, Input Low Current (Vin = 0.4V)		-1.6mA
VIH, Input High Voltage (Iin = -200 $\mu$ A)	2.0V	
VIH OPEN circuit, Iin = 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
Storage	-20 to +80 deg. C

### 5.2 HUMIDITY

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

### 5.3 VIBRATION

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

Vibration conditions – Sine wave excited, 0.25 G maximum acceleration, 10-250 Hz swept at one octave/min. Fifteen minutes dwell at all resonant points, where resonance is defined as the exciting frequencies at which the device under test experiences excursions two times larger than the non-resonant excursions. The plane of vibration is along the three mutually perpendicular axes.

### 5.4 SHOCK

The power supply shall 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.

## 5.5 COOLING SPECIFICATIONS

The power supply is equipped with one 4 cm ball-bearing fan for cooling.

## 6. ELECTROMAGNETIC COMPATIBILITY

### 6.1 RADIATED EMI

The power supply shall meet FCC and CISPR 22 requirements under all load conditions.

## 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

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.

## 9. SAFETY REQUIREMENTS

### 9.1 SAFETY

The subject power supply designed to meet the following safety regulations

-TUV

-UL 60950

-CSA 22.2 LEVEL 3

-CE