



SILVERSTONE®
Designing Inspiration

STRIDER PLUS

SST-ST50F-P / ST40F-P / ST35F-P

Unparalleled combination of power, efficiency, and flexibility

100% modular cables
24hour continuous power output with 40°C operating temperature
Efficiency 82%~85% at 20%~100% loading
Class-leading powerful single +12V rail
Silent running 120mm fan with 18dBA minimum
PCI-E connectors support
Support ATX 12V 2.3
Active PFC

SPECIFICATION

SilverStone Strider Plus ST50F-P / ST40F-P / ST35F-P

ATX12V / EPS 12V Switching Power Supply With Active PFC PS/2

1. GENERAL REQUIREMENTS

This specification describes a 500, 400, 350 watts power supply. With +5V stand-by, and remote ON/OFF control for ATX-12V system and a "Power factor collector (PFC)" circuit to meet EPA requirement of input range with in 115V/60HZ & 230V/50Hz.

2. INPUT REQUIREMENTS

The AC mains steady-state input voltage shall be 100 to 240 Vrms

The power supply shall operate from 90 to 264 Vrms.

The power supply shall operate from an AC mains frequency of 47-63Hz.

The AC mains steady-state RMS input current shall be

ST50F-P:

8Amp (maximum) at 115 Vrms/ 60 Hz

4Amp (maximum) at 230 Vrms/ 50 Hz.

ST40F-P:

6 Amp (maximum) at 115 Vrms/ 60 Hz

3 Amp (maximum) at 230 Vrms/ 50 Hz

ST35F-P:

5.0 Amp (maximum) at 115 Vrms/ 60 Hz

2.5 Amp (maximum) at 230 Vrms/ 50 Hz.

3. OUTPUT REQUIREMENTS

3.1 OUTPUT VOLTAGE AND CURRENT

ST50F-P:

	MINIMUM LOAD	MINIMUM LOAD	MINIMUM LOAD	LOAD REG	LINE REG	RIPPLE & NOISE
+3.3V	0.5A	14.77A	24A	±5%	±1%	50mV P-P
+5V	0.3A	12.31A	20A	±5%	±1%	50mV P-P
+12V	0.5A	17A	34A	±5%	±1%	120mV P-P
-12V	0A	0.28A	0.3A	±10%	±2%	200mV P-P
+5Vsb	0A	2.3A	2.5A	±5%	±1%	50mV P-P

(1) +3.3V & +5V total output not exceed 120W.

When +5V is load to 20A, the +3.3V maximum load is 6A.

When +3.3V is load to 24A, the +5V maximum load is 8A.

(2) All outputs shall be safety-isolated from the AC mains and share a common return. This common return must be connected to supply chassis.

(3) 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.

LOAD REGULATION CHARACTERISTICS

NO.	LOAD CONDITION	OUTPUT LOAD				
		+3.3V	+5V	+12V1	-12V	+5Vsb
1	COND.1	X	X	X	X	2.5A
2	COND.2	X	X	X	X	0A
3	COND.3	0.5A	0.3A	1A	0A	0A
4	COND.4	24A	0.5A	8A	0.1A	2A
5	COND.5	6A	15A	9A	0A	2.5A
6	COND.6	0.5A	4A	19A	0A	2.5A
7	COND.7	12A	4A	19A	0A	2.5A
8	COND.8	11A	6.8A	20A	0.2A	1.5A
9	COND.9	24A	6A	12A	0.3A	0A
10	COND.10	0.5A	8A	34A	0.3A	1A
11	COND.11	14.77A	12.31A	31.24A	0.28A	2.3A

ST40F-P:

	MINIMUM LOAD	MINIMUM LOAD	MINIMUM LOAD	LOAD REG	LINE REG	RIPPLE & NOISE
+3.3V	0.5A	15.82A	24A	±5%	±1%	50mV P-P
+5V	0.3A	9.89A	15A	±5%	±1%	50mV P-P
+12V	0.5A	14A	28A	±5%	±1%	120mV P-P
-12V	0A	0.25A	0.3A	±10%	±2%	200mV P-P
+5Vsb	0A	2.12A	2.5A	±5%	±1%	50mV P-P

- (1) +3.3V & +5V total output not exceed 120W.
When +5V is load to 15A, the +3.3V maximum load is 13.6A.
When +3.3V is load to 24A, the +5V maximum load is 8A.
- (2) All outputs shall be safety-isolated from the AC mains and share a common return. This common return must be connected to supply chassis.
- (3) 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.

LOAD REGULATION CHARACTERISTICS

NO.	LOAD CONDITION	OUTPUT LOAD				
		+3.3V	+5V	+12V1	-12V	+5Vsb
1	COND.1	X	X	X	X	2.5A
2	COND.2	X	X	X	X	0A
3	COND.3	0.5A	0.3A	1A	0A	0A
4	COND.4	24A	0.5A	5A	0A	2A
5	COND.5	6A	15A	9A	0A	2.5A
6	COND.6	0.5A	1A	17A	0A	2.5A
7	COND.7	10A	0.5A	3A	0A	2.5A
8	COND.8	11A	6.8A	20A	0.2A	1.5A
9	COND.9	24A	6A	12A	0.3A	0A
10	COND.10	0.5A	4A	28A	0.3A	1A
11	COND.11	15.82A	9.89A	11.86A	0.25A	2.12A

ST35F-P:

	MINIMUM LOAD	MINIMUM LOAD	MINIMUM LOAD	LOAD REG	LINE REG	RIPPLE & NOISE
+3.3V	0.5A	12.52A	21A	±5%	±1%	50mV P-P
+5V	0.3A	8.94A	15A	±5%	±1%	50mV P-P 120mV P-P 200mV P-P
+12V	0.5A	12.5A	25A	±5%	±1%	50mV P-P
-12V	0A	0.25A	0.3A	±10%	±2%	
+5Vsb	0A	2.09A	2.5A	±5%	±1%	

- (1) +3.3V & +5V total output not exceed 103W.
When +5V is load to 15A, the +3.3V maximum load is 8.48A.
When +3.3V is load to 21A, the +5V maximum load is 6.74A.
- (2) All outputs shall be safety-isolated from the AC mains and share a common return. This common return must be connected to supply chassis.
- (4) 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.

LOAD REGULATION CHARACTERISTICS

NO.	LOAD CONDITION	OUTPUT LOAD				
		+3.3V	+5V	+12V1	-12V	+5Vsb
1	COND.1	X	X	X	X	2.5A
2	COND.2	X	X	X	X	0A
3	COND.3	0.5A	0.3A	1A	0A	0A
4	COND.4	24A	0.5A	8A	0.1A	2A
5	COND.5	6A	15A	9A	0A	2.5A
6	COND.6	0.5A	4A	16A	0.1A	2.5A
7	COND.7	12A	4A	3A	0.1A	2.5A
8	COND.8	11A	6.8A	20A	0.2A	1.5A
9	COND.9	24A	6A	12A	0.3A	0A
10	COND.10	0.5A	8A	25A	0.3A	1A
11	COND.11	12.52A	8.94A	20.88A	0.25A	2.09A

3.2 REMOTE ON/OFF CONTROL

The power supply shall accept a logic open collector level which will disable/ enable all the output voltage (exclude + 5V standby). As logic level is low, outputs voltage were enabled. As logic level is high, outputs voltage were disabled.

- Note: 1. Logic high level: 2.0-5.25V while sourcing 0.2mA maximum.
2. Logic low level: 0-0.5V while sinking 1.6mA maximum.
3. Rise Time: 15ms maximum (10%-90%).

3.3 OUTPUT VOLTAGE HOLD-UP TIME

16.0 mS minimum : at 115V / 60 Hz. (LOAD COND.8)

3.4 OPERATION AT NO LOAD

The power supply shall be capable of being operated with no load on any or all outputs without damage. For no load on +3.3V & +5V, the output shall not exceed +4.3V & +6.5Vdc and the power supply may shutdown and require by remote-control or remove AC power restart.

3.5 PROTECTION

3.5.1 Over-voltage protection

In the event of an over-voltage condition on +3.3 & +5Vdc & +12V the power supply shall shutdown and require remote control or remove the AC mains input to reset the system.

- +5V : 6.5V (maximum)
+3.3V : 4.3V (maximum)
+12V : 15.5V (maximum)

3.5.2 OVER- CURRENT PROTECTION

There shall be protection from an output over-current event.
The PSU may shutdown form such an event and require power-on restart.

The overload currents should be ramped at a minimum rate of 10 A/s starting from full load.

Over-current test values:

ST50F-P:

Output Voltage	3.3V	5V	12V
Protecting trigger condition	< 60A	< 45A	< 42A

ST40F-P:

Output Voltage	3.3V	5V	12V
Protecting trigger condition	< 60A	< 45A	< 35A

ST35F-P:

Output Voltage	3.3V	5V	12V
Protecting trigger condition	< 60A	< 45A	< 33A

3.5.3 Short-Current Protection

An O/P short circuit is defined as any O/P impedance of less than 0.1 ohms. The power supply shall shutdown and latch off for shorting +3.3V, +5V or +12V rail to return or any other rail. and +5VSB shall not cause any damage to the power supply. The power supply shall either shutdown and latch off or fold back for shorting negative rail. +5VSB must be capable of being shorted indefinitely, but when the short is removed, the power supply shall recover automatically or by cycling PS_ON#. The power supply shall be capable withstanding a continuous short-circuit to the O/P without damage or overstress to the unit (for example to components, PCB traces, connectors) under the I/P conditions specified.

3.6 OUTPUT RISETIME

The cold-start enable main output voltage rise-time of all outputs shall be measured with maximum load on all outputs.

(with COND.11)

Rise time: +3.3V 20mS (maximum)
 (10-90%) +5V 20mS (maximum)
 +12 V 20mS (maximum)
 -12 V 20mS (maximum)

The test condition: 115Vac/60Hz

3.7 OUTPUT OVERSHOOT/UNDERSHOOT

No output voltage shall overshoot / undershoot or generate spikes at turn-on or turn-off, during momentary power loss, output short, or realistic input voltage or output load changes. Overshoot/undershoot is defined as any output that exceeds the voltage tolerance plus or minus an additional 5%. All outputs shall be measured with minimum load (COND.3)

	Overshoot	Undershoot
+3.3V	3.63V	2.97V
+5V	5.5V	4.5V
+12V	13.2V	10.8V
-12V	-13.8V	-10.2V
+5VSB	5.5V	4.5V

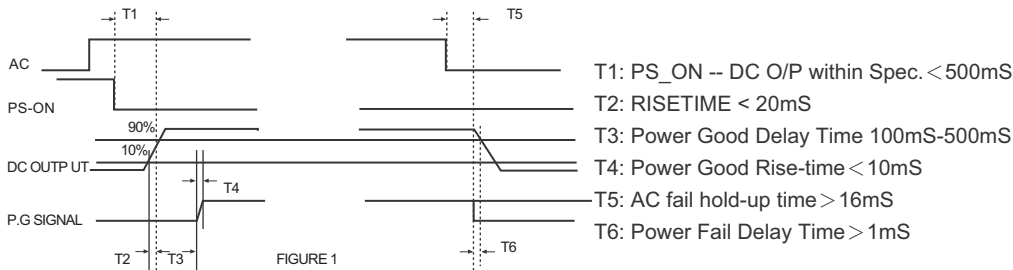
3.8 EFFICIENCY requirement of main output

The PSU should be a minimum of 82% efficiency under 100% of full load and 50% of full load, and 20% of full load in a “light” load or ideal condition. That should be tested at nominal Input voltage is 115V/60Hz and oad conditions defined in below Table.

3.9 EFFICIENCY requirement of standby output

Input power has to be under 1W when output current is set up at 100mA and input voltage is set up at 115Vac/60HZ both condition (Remote off: PS_ON# high state).

3.10 POWER GOOD SIGNAL Time sequence



3.11 Output Transient Response

Expected output transient step sizes for each output. The transient load slew rate is = 1.0 A/μs.

Table of DC Output Transient Step Sizes

Output	Max. step size (% of rated output amps per Sec 3.1)
+12V1	6A (2000uF)
+5 V	5A (1000uF)
+3.3 V	6A (680uF)
-12 V	0.12A (350uF)
+5 VSB	0.625A (350uF)

(Adding external capacitor)

Output voltages should remain within the regulation limits of Section 4.1, and the power supply should be stable when subjected to load transients per above table from any steady state load, including any or all of the following conditions:

- Load-changing repetition rate of 50 Hz to 10 kHz

3.12 Capacitive Load

The power supply should be able to power up and operate normally with the following capacitances simultaneously present on the DC outputs. This capacitive loading should be used to check all of function test, but without hold-up time.

Output	ATX12V Capacitive load (uF)
+12V1	8000
+5 V	6000
+3.3 V	6000
-12 V	350
+5 VSB	350

3.13 Closed-loop Stability

The power supply shall be unconditionally stable under all line/load/transient load conditions including capacitive loads specified in Section 3.13. A minimum of 45 degrees phase margin and 10 dB gain margin is recommended at both the maximum and minimum loads.

4. Physical Environment

4.1 Temperature

4.1.1 Operating Ambient: +0 to 40°C

4.1.2 Non-Operating Ambient(Storage): -40°C to +70°C

4.2 Humidity

4.2.1 Operating: To 85% relative humidity (non-condensing)

4.2.2 Non-Operating: To 95% relative humidity (non-condensing)

Note: 95%RH is achieved with a dry bulb temperature of 55°C and a wet bulb temperature of 54°C.

4.3 Altitude

4.3.1 Operating: To 10,000ft

4.3.2 Non-Operating: To 50,000ft

5. Other Requirements

5.1 Input Connections

Refer to Mechanical Specifications for placement.
The AC mains input are through a three-circuit IEC type connector mounted on the rear of the power supply chassis.

5.2 Reliability

The power supply reliability, when calculated by “Bellcore” latest revision are exceed 100,000 hours with all output at maximum load and an ambient temperature of 25°C.

The special requirement is for cooling fan that MTTF be guarantee over 30,000 hours at 25°C ambient temperature.

6. MECHANICAL REQUIREMENTS

6.1 Physical Dimension

150 mm (W) × 86 mm (H) × 140mm (D)

6.2 Connectors

M/B 24PIN connector

	Signal	Pin	Pin	Signal	
Orange	+3.3V	13	1	+3.3V	Orange
Orange	+3.3Vsense	13			
Blue	-12VDC	14	2	+3.3V	Orange
Black	COM	15	3	COM	Black
Green	PS-ON	16	4	+5VDC	Red
Black	COM	17	5	COM	Black
Black	COM	18	6	+5VDC	Red
Black	COM	19	7	COM	Black
White	N/C	20	8	PWRGOOD	Grey
Red	+5VDC	21	9	+5Vsb	Purple
Red	+5VDC	22	10	+12V	Yellow
Red	+5Vsense	22			
Red	+5VDC	23	11	+12V	Yellow
Black	COM	24	12	+3.3V	Orange

EPS 12V 8PIN connector

	Signal	Pin	Pin	Signal	
Yellow	+12V	5	1	COM	Black
Yellow	+12V	6	2	COM	Black
Yellow	+12V	7	3	COM	Black
Yellow	+12V	8	4	COM	Black

ATX 12V 4PIN (4+4PIN EPS 12V in split mode)

	Signal	Pin	Pin	Signal	
Black	GND	1	3	+12V	Yellow
Black	GND	2	4	+12V	Yellow

4PIN peripheral connector (HDD) 4PIN floppy connector (FDD)

	Signal	Pin	Pin	Signal	
Yellow	+12V	1	1	+5VDC	Red
Black	COM	2	2	COM	Black
Black	COM	3	3	COM	Black
Red	+5VDC	4	4	+12V	Yellow

SATA connector

	Signal	Pin
Orange	+3.3V	5
Black	COM	4
Red	+5V	3
Black	COM	2
Yellow	+12V	1

8PIN PCI Express connector

	Signal	Pin	Pin	Signal	
Yellow	+12V	1	5	COM	Black
Yellow	+12V	2	6	COM	Black
Yellow	+12V	3	7	COM	Black
Black sense1	COM	4	8	COM	Black

6PIN PCI Express connector

	Signal	Pin	Pin	Signal	
Yellow	+12V	1	4	COM	Black
Yellow	+12V	2	5	COM	Black
Yellow	+12V	3	6	COM	Black

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