



SILVERSTONE[®]
Designing Inspiration

STRIDER ESSENTIAL SERIES

Power for everything you need

SST-ST70F-ESB

SST-ST60F-ESB

High efficiency with 80 PLUS Bronze certification

24/7 continuous power output with 40°C operating temperature

Class-leading single +12V rail

Multiple protection circuitry

Silent running 120mm fan with 18dBA

PCI-E 8pin and PCI-E 6pin connectors support

ATX 12V 2.3 support

Active PFC

SPECIFICATION

SilverStone Strider Essential

ST70F-ESB

ST60F-ESB

ATX12V 2.3 Switching Power Supply
With Active PFC
80Plus Bronze
PS/2

1. General

1.1 Scope

This specification defines the performance characteristics of a single phase 700,600 watts, 5 output power supply. This specification also defines worldwide safety and electromagnetic compatibility requirements for the power supply which is intended for use in computer products.

2. Input Characteristics

2.1 Input Voltage

Nominal Voltage

115-230 Vrms

Voltage Variation Range

103.5 - 253 Vrms

2.2 Input Frequency

Nominal Frequency

50-60 Hz

Frequency Variation Range

47 Hz to 63 Hz

* The power supply must operate at above frequency with 103.5 - 253VACrms input voltage range.

2.3 Max. Input AC Current

Max. Input Current	Measuring Range
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10A	103.5 - 253 Vrms

2.4 Inrush Current

The power supply must meet inrush requirements for any rated AC voltage, during turn on at any phase of AC voltage, during a single cycle AC dropout condition, during repetitive ON/OFF cycling of AC, and over the specified temperature range. The peak inrush current shall be less than the ratings of its critical components (including input fuse, bulk rectifiers, and surge limiting device).

2.5 Efficiency

ST70F-ESB and ST60F-ESB provide an efficiency of 82% when measured at full load under 115V/60Hz and 230V/50Hz condition.

3. Output characteristics

3.1 Normal Operation Output

SST-ST70F-ESB :

Output Voltage	Load MIN	Range MAX	Peak	Regulation	Ripple & Noise P-P Max.
1. +5V	0.2A	22.0A		±5%	50mV
2. +3.3V	0.1A	22.0A		±5%	50mV
3. +12V	0.6A	52.5A		±5%	120mV
4. -12V	0.0A	0.3A		±10%	120mV
5. +5Vs	0.0A	2.5A	3.5A	±5%	50mV

- Maximum continuous total DC output power should not exceed 700W.
- Maximum continuous combined load on +3.3VDC and +5VDC outputs shall not exceed 130W.
- Maximum combined load on 12V outputs shall not exceed 630W.

NOTE:

Noise test should be measured with 20 MHz bandwidth frequency oscilloscope. The output terminal shall add a tantalum capacitor of 10uF in parallel with a ceramic capacitor of 0.1uF.

SST-ST60F-ESB :

Output Voltage	Load MIN	Range MAX	Peak	Regulation	Ripple & Noise P-P Max.
1. +5V	0.2A	22.0A		±5%	50mV
2. +3.3V	0.1A	22.0A		±5%	50mV
3. +12V	0.6A	45.0A		±5%	120mV
4. -12V	0.0A	0.3A		±10%	120mV
5. +5Vs	0.0A	2.5A	3.5A	±5%	50mV

- Maximum continuous total DC output power should not exceed 600W.
- Maximum continuous combined load on +3.3VDC and +5VDC outputs shall not exceed 120W.
- Maximum combined load on 12V outputs shall not exceed 540W.

NOTE:

Noise test should be measured with 20 MHz bandwidth frequency oscilloscope. The output terminal shall add a tantalum capacitor of 10uF in parallel with a ceramic capacitor of 0.1uF.

3.2 Remote On/Off Controlled mode

The PSON# signal is required to remotely turn on/off the power supply, PSON# is an active low signal that turns on the output power rails. When this is not pulled low by the system, or left open, the outputs (except the +5VSB) turn off. This signal is pulled to a standby voltage by a pull-up resistor internal to the power supply.

TTL level

"H" 2.0 V – 5.25 V

"L" 0.0 V – 1.0 V

3.3 Regulation

The cross regulation defined as follows, the output regulation should be within the specified range.

SST-ST70F-ESB :

Load	+5V	+3.3V	+12V	-12V	+5Vsb
Light Load	2.83A	2.83A	9.47A	0.05A	0.45A
Typical Load	7.06A	7.06A	23.68A	0.14A	1.13A
Full Load	14.13A	14.13A	47.35A	0.27A	2.25A

SST-ST60F-ESB :

Load	+5V	+3.3V	+12V	-12V	+5Vsb
Light Load	2.57A	2.57A	7.99A	0.05A	0.44A
Typical Load	6.42A	6.42A	19.97A	0.13A	1.11A
Full Load	12.83A	12.83A	39.93A	0.27A	2.22A

3.4 Rise Time

DC output rise time is less than 20 mS at nominal line and full load.

3.5 Hold-up Time

DC +5V output maintains at least 16mS ,after power off , under 230V/50Hz 75%Load condition.

3.6 5VSB

5VSB is required for the implementation of PS-ON described above. 5VSB is a standby voltage that may be used to power circuits that require power input during the powered-down state of all power rails. The 5 VSB pin should deliver $5V \pm 5\%$ at a minimum of 2.5 A for PC board circuits to operate. Conversely, PC board should draw no more than 2.5A maximum from this pin. This power may be used to operate circuits such as soft power control.

3.7 PG-OK

PG-OK is a power good signal and should be asserted high by power supply to indicate that the +5 VDC and +3.3 VDC outputs are above the under-voltage thresholds of the power supply. When this signal is asserted high, there should be sufficient mains energy stored by the converter to guarantee continuous power operation within specification. Conversely, when either the +5VDC or the +3.3VDC output voltage falls below the under-voltage threshold, or when mains power has been removed for a time sufficiently long so that power supply operation is no longer guaranteed, PG-OK should be deasserted to a low state. See Figure 1 for a representation of the timing characteristics of the PG-OK, PS-ON, and germane power rail signals.

3.8 3.3V Sense

A default 3.3V sense line should be implemented pin 13 of the connector.

3.9 Capacitive Load

The power supply should be able to power up and operate normally with the following capacitances simultaneously present on the DC outputs.

Output	Capacitive load (uF)
+5V	6000
+12V	8000
+3.3V	6000
-12V	350
+5VS	350

4. Protection

4.1 Input Protection

In primary circuit of the power supply , a protected fuse is inserted. Only internal fault of the power supply will cause the fuse blown. Any overload or short circuit at DC output will keep from fuse brown or fire hazard.

4.2 Output Protection

4.2.1 Under voltage protection

The +5V/+3.3V DC output are protected against the under voltage condition. Range value can't be exceed 3.3~3.7V at 5V terminal and 2.0~2.4V at 3.3V.

4.2.2 Over Voltage Protection

The +5V/+12V/+3.3V DC output are protected against the over voltage condition . Maximum value can't be over 6.5V at 5V terminal and 15.5V at 12V, 4.3V at 3.3V.

4.2.3 Over Power Protection

The power supply can be used electronic circuit to limit the output current against exceeding 50% of surge output power or protected against excessive power delivery since short circuit of any output or over total power at high line.

4.2.4 Short Circuit Protection

Short circuit placed on +5V,+12V,+3.3V,-12V will latch off. +5VSB will auto-recovery.

5. Start Stability

5.1 No Load Start

When power is applied to ST70F-ESB and ST60F-ESB with no load connected or under minimum load connected, neither damage to power supply nor hazards to users will occur.

5.2 Cold Start

The power supply shall operate properly when first applied at normal input voltage and or so maximum load after 4 hours storage in 0°C environment.

6. Environments

6.1 Temperature and Humidity

6.1.1 Operating

Temperature	0 to 40°C
Relative Humidity	20 to 90 %

6.1.2 Storage

Temperature	-40 to 70°C
Relative Humidity	20 to 95 % noncondensing

6.2 Altitude

The power supply can operate normally at any altitude between 0 to 10000 feet.

6.3 Vibration and Shock

Sweep and resonance search for each of X,Y,Z, axis at the sweep.
RATE of 1/OCTAVE/Min.

Frequency	Duration	Amplitude
5-55-10 Hz	30 minutes	0.35 mm

7. Conducted EMI

CE , FCC

8. Product Safety

8.1 Safety Requirement

TUV, CUS , CB

8.2 Leakage Current

The AC leakage current is less than 3.5mA when the power supply connect to 253Vac/50Hz.

8.3 Insulation Resistance

The insulation resistance should be not less than 30M ohm after applying of 500VDC for 1 minute.

8.4 Dielectric Voltage Withstand

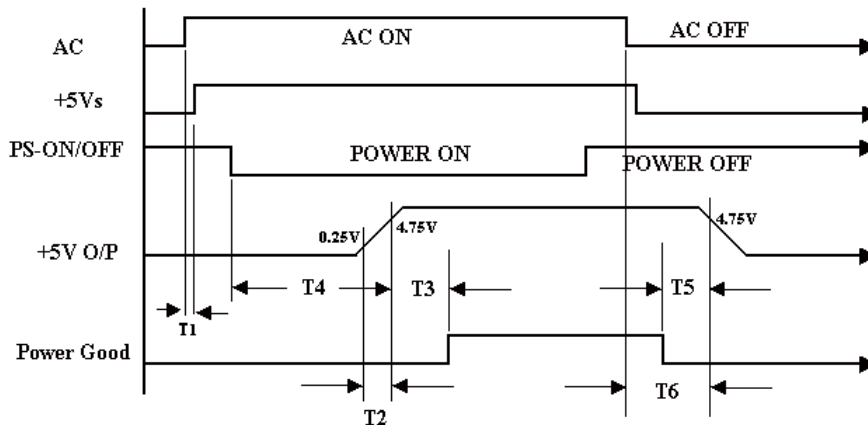
The power supply shall withstand for 1 minute without breakdown the application of a 60Hz 1500V AC voltage applied between both input line and chassis (20mA DC cut-off current). Main transformer shall similarly withstand 3000Vac applied between both primary and secondary windings for a minimum of one minute.

9. Power Good Signal

A TTL compatible signal for the purpose of initiating an orderly start-up procedure under normal input operating conditions. During power up, this signal is asserted (low) until +5V is under regulation and AC reaches min. line specification range. After all voltage are going appropriate level, the system may have a turn on delay of 100mS, but no greater than 500mS. During power off the signal should go to low level before +5V is out of regulation. The low level is 0 to 0.8V and high level is 4.75 to 5.25V. The " Power Good "signal can drive up to 6 standard TTL loads.

Time Diagram

Figure 1



- * T1 : Turn on time (2 sec. Max.)
- * T2 : Rise time ($\leq 20\text{mS}$ Max.)
- * T3 : Power good turn on delay time ($100 < T3 < 500 \text{ mS}$)
- * T4 : Switch on time (0.5 sec. Max.)
- * T5 : Power good turn off delay time (1.0 mS Min.) PS-ON/OFF
- * T6 : Power hold-up time (16 mS Min.)

* Power on-off cycle :

When the power supply is turned off for a minimum of 2.0 sec. and turn on again, the power good signal will be asserted.

10.MTBF

The MTBF of the power should be 100,000 hours min.

11.Harmonics

The product shall meet requirement for EN61000-3-2 & EN61000-3-3 :2003 standard of class D, test at 230Vac 50Hz.

12. Power Factor

The power supply with active power factor correction, and meet the EN61000-3-2 standards, The power factor is greater than 0.9 at 230V/50Hz, Max. load.

13. Mechanical Requirements

13.1 Physical Dimension

150 mm (W) × 86 mm (H) × 140mm (D)

13.2 Connectors

M/B 24PIN connector

	Signal	Pin	Pin	Signal	
Orange	+3.3V	13	1	+3.3V	Orange
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	+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

Warranty Information

Warranty terms & conditions

1. Product component defects or damages resulted from defective production is covered under warranty. Defects or damages with the following conditions will be fixed or replaced under SilverStone Technology's jurisdiction.

- a) Usage in accordance with instructions provided in this manual, with no misuse, overuse, or other inappropriate actions.
- b) Damage not caused by natural disaster (thunder, fire, earthquake, flood, salt, wind, insect, animals, etc...)
- c) Product is not disassembled, modified, or fixed. Components not disassembled or replaced.
- d) Warranty mark/stickers are not removed or broken.

Loss or damages resulted from conditions other than ones listed above are not covered under warranty.

2. Under warranty, SilverStone Technology's maximum liability is limited to the current market value for the product (depreciated value, excluding shipping, handling, and other fees). SilverStone Technology is not responsible for other damages or loss associated with the use of product.

3. Under warranty, SilverStone Technology is obligated to repair or replace its defective products. Under no circumstances will SilverStone Technology be liable for damages in connection with the sale, purchase, or use including but not limited to loss of data, loss of business, loss of profits, loss of use of the product or incidental or consequential damage whether or not foreseeable and whether or not based on breach of warranty, contract or negligence, even if SilverStone Technology has been advised of the possibility of such damages.

4. Warranty covers only the original purchaser through authorized SilverStone distributors and resellers and is not transferable to a second hand purchaser

5. You must provide sales receipt or invoice with clear indication of purchase date to determine warranty eligibility.

6. If a problem develops during the warranty period, please contact your retailer/reseller/SilverStone authorized distributors or SilverStone <http://www.silverstonetek.com>

Please note that: (i) You must provide proof of original purchase of the product by a dated itemized receipt; (ii) You shall bear the cost of shipping (or otherwise transporting) the product to SilverStone authorized distributors. SilverStone authorized distributors will bear the cost of shipping (or otherwise transporting) the product back to you after completing the warranty service; (iii) Before you send the product, you must be issued a Return Merchandise Authorization ("RMA") number from SilverStone. Updated warranty information will be posted on SilverStone's official website. Please visit <http://www.silverstonetek.com> for the latest updates.

Additional info & contacts

For North America (usasupport@silverstonetek.com)

SilverStone Technology in North America may repair or replace defective product with refurbished product that is not new but has been functionally tested. Replacement product will be warranted for remainder of the warranty period or thirty days, whichever is longer. All power supplies should be sent back to the place of purchase if it is within 30 days of purchase, after 30 days, customers need to initiate RMA procedure with SilverStone Technology in USA by first downloading the "USA RMA form for end-users" form from the below link and follow its instructions.

For Australia only (support@silverstonetek.com)

Our goods come with guarantees that cannot be excluded under the Australian Consumer Law. You are entitled to a replacement or refund for a major failure and for compensation for any other reasonably foreseeable loss or damage. You are also entitled to have the goods repaired or replaced if the goods fail to be of acceptable quality and the failure does not amount to a major failure. Please refer to above "Warranty terms & conditions" for further warranty details.

For Europe (support.eu@silverstonetek.de)

For all other regions (support@silverstonetek.com)

Warranty length

For North America and Australia

All SilverStone retail PSU have from the date of purchase, 3 years limited warranty (some PSU carry a 1 or 5 year warranty)

For further information please visit: <http://www.silverstonetek.com>

For Europe

All SilverStone retail PSU have from the date of purchase, 3 years limited warranty (some PSU carry a 2 or 5 year warranty)

For further information please visit: <http://www.silverstonetek.com>

For all other regions

Please contact your local SilverStone authorized dealer or distributors for more information.

Note

SilverStone reserve the right to alter the above warranty information. Please visit <http://www.silverstonetek.com> for the latest update of the warranty information

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