



SILVERSTONE®
Designing Inspiration

STRIDER TITANIUM SERIES

ST80F-TI / ST70F-TI / ST60F-TI

World's smallest 80 PLUS Titanium,
full-modular ATX power supplies

High efficiency with 80 PLUS Titanium certification
Compact design with a depth of 150mm for easy integration
100% modular cables
24/7 continuous power output with 40C operating temperature
Class-leading single +12V rail
Strict $\pm 3\%$ voltage regulation and low ripple & noise
All Japanese capacitors
Ultra silent 120mm fan with 18dBA minimum

Installation and system optimization guide:

The following manual and guides were carefully prepared by the SilverStone engineering team to help you maximize the potential of your SilverStone product. Please keep this manual for future reference when upgrading or performing maintenance on your system. A copy of this manual can also be downloaded from our website at:

<http://www.silverstonetek.com>

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SPECIFICATION

SilverStone Strider Titanium

ST80F-TI ST70F-TI ST60F-TI

ATX12V / EPS 12V Switching Power Supply
With Active PFC
80Plus Titanium
PS/2

This specification describes the requirements of 600,700,800 Watts switching power supply with an stretch ATX form-factor and EPS 12V, +5V standby voltage ,remote on/off control, full range line input capability and forced air cooling characteristics.

1. AC INPUT

1.1 AC input requirements

The input voltage, current, and frequency requirements for continuous operation are stated below.

Table 1 AC Input Line Requirements

Parameter	Min.	Nom.	Max.	Unit
Vin(Full range)	90	100---240	264	VACrms
Vin Frequency	47	60-----50	63	Hz
Iin(600W)	-	9-----4.5	-	Arms
Iin(700W)	-	10-----5	-	Arms
Iin(800W)	-	11--- 5.5	-	Arms

Power factor correction (PF)>0.90 at full load.

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 (Top). The peak inrush current shall be less than the ratings of its critical components (including input fuse, bulk rectifiers, and surge limiting device).

2. DC OUTPUT

2.1 DC voltage regulation

Parameter	Range	Min	Nom.	Max	Unit
+3.3V	+/-3%	+3.20	+3.30	+3.39	Volts
+5V	+/-3%	+4.85	+5.00	+5.15	Volts
+12V	+/-3%	+11.64	+12.00	+12.36	Volts
-12V	+/-10%	-13.20	-12.00	-10.80	Volts
+5VSB	+/-5%	+4.75	+5.00	+5.25	Volts

2.2 Load ranges

2.2.1 ST60F-TI Load Range

Parameter	Min(optional)	Nom.	Max	Peak	Unit
+3.3V	0.1	-	20	-	Amps
+5V	0.2	-	20	-	Amps
+12V	0.15	-	49	-	Amps
-12V	0	-	0.3	-	Amps
+5VSB	0	-	2.5	-	Amps

1. Maximum continuous total DC output power should not exceed 600W.
2. Maximum continuous combined load on +3.3V and +5V outputs shall not exceed 100W.
3. Maximum combined current for the +12V outputs shall be 49A(588W).
4. Peak DC output power should not exceed 650W for 12 second.

2.2.2: ST70F-TI Load Range

Parameter	Min(optional)	Nom.	Max	Peak	Unit
+3.3V	0.1	-	22	-	Amps
+5V	0.2	-	22	-	Amps
+12V	0.15	-	58	-	Amps
-12V	0	-	0.3	-	Amps
+5VSB	0	-	2.5	-	Amps

1. Maximum continuous total DC output power should not exceed 700W.
2. Maximum continuous combined load on +3.3V and +5V outputs shall not exceed 120W.
3. Maximum combined current for the +12V outputs shall be 58A(696W).
4. Peak DC output power should not exceed 750W for 12 second.

2.2.3: ST80F-TI Load Range

Parameter	Min(optional)	Nom.	Max	Peak	Unit
+3.3V	0.1	-	22	-	Amps
+5V	0.2	-	22	-	Amps
+12V	0.15	-	66	-	Amps
-12V	0	-	0.3	-	Amps
+5VSB	0	-	2.5	-	Amps

1. Maximum continuous total DC output power should not exceed 800W.
2. Maximum continuous combined load on +3.3V and +5V outputs shall not exceed 120W.
3. Maximum combined current for the +12V outputs shall be 66A(792W).
4. Peak DC output power should not exceed 850W for 12 second.

2.3 Output Ripple

2.3.1 Ripple regulation

Parameter	Ripple&Noise	Unit
+3.3V	50	mVp-p
+5V	50	mVp-p
+12V	120	mVp-p
-12V	120	mVp-p
+5VSB	50	mVp-p

2.3.2 Definition

The ripple voltage of the outputs shall be measured at the pins of the output connector when terminated in the load impedance specified in figure 1. Ripple and noise are measured at the connectors with a 0.1 μ F ceramic capacitor and a 10 μ F electrolytic capacitor to simulate system loading. Ripple shall be measured under any condition of line voltage, output load, line frequency, operation temperature.

2.3.3 Ripple voltage test circuit

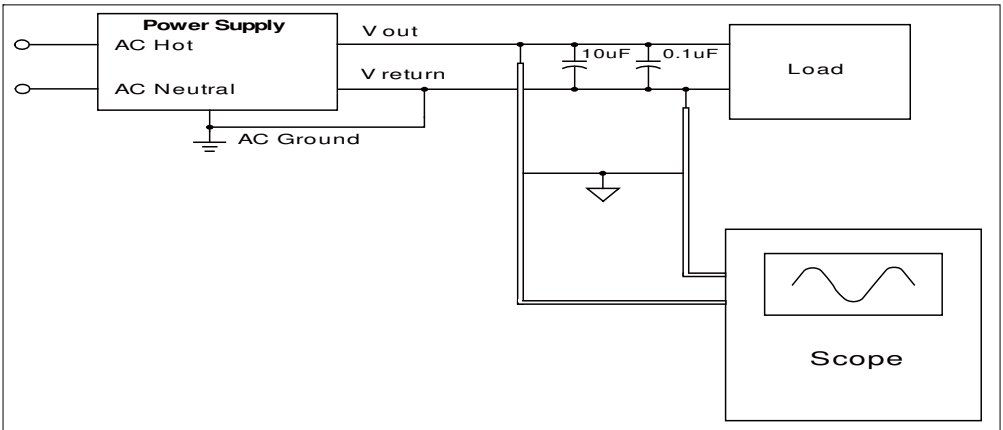


Figure 1. Ripple voltage test circuit

2.4 Overshoot

Any overshoot at turn on or turn off shall be less 10% of the normal voltage value, all outputs shall be within the regulation limit of section 2.0 before issuing the power good signal of section 5.0.

2.5 Efficiency

Power supply efficiency typical 10% load/90%, 20% load/92%, 50% load/94%, 100% load/90% at 115V AC voltage on all outputs.

2.6 Remote ON/OFF control

When the logic level "PS-ON" is low, the DC outputs are to be enabled.

When the logic level is high or open collector, the DC outputs are to be disabled.

3. PROTECTION

3.1 Over current protection

The power supply shall have current limit to prevent the +3.3V,+5V,and +12V outputs from exceeding the values shown in the following Table. If the current limits are exceeded the power supply shall shutdown and latch off.

ST60F-TI

Voltage	Over Current Limit (Iout limit)
+12V	49A minimum; 75A maximum
+5V	22A minimum; 45A maximum
+3.3V	22A minimum; 45A maximum

ST70F-TI

Voltage	Over Current Limit (Iout limit)
+12V	58A minimum; 87A maximum
+5V	24A minimum; 45A maximum
+3.3V	24A minimum; 45A maximum

ST80F-TI

Voltage	Over Current Limit (Iout limit)
+12V	66A minimum; 95A maximum
+5V	24A minimum; 45A maximum
+3.3V	24A minimum; 45A maximum

3.2 Over Temperature Protection

The power supply will be protected against over temperature conditions caused by loss of fan cooling or excessive ambient temperature. In an OTP condition the PSU will shutdown. When the power supply temperature drops to within specifice limits, the power supply shall restore power automatically. The OTP circuit temperature drops to within specifice limits, the power supply shall restore power automatically. The OTP circuit condition.

3.3 Over-power protection

The power supply will be shutdown and latch off when output power within 110~160% of rated DC output.

Note: Assurance machine can work at low voltage,full load won't damage machine.

3.4 Under voltage protection.

In an under voltage fault occurs, the supply will latch all DC outputs into a shutdown state when +12V,+5V & +3.3V outputs under 85% of it's maximum value.

3.5 Over voltage protection

The over voltage sense circuitry and reference shall reside in packages that are separate and distinct from the regulator control circuitry and reference. No single point fault shall be able to cause a sustained from the regulator control circuitry and reference. No single point fault shall be able to cause a sustained as defined in Table.

output	Minimum	Nominal	Maximum	Unit
+12 VDC	13	15	17	Volts
+5 VDC	5.5	6	7	Volts
+3.3 VDC	3.6	4	5	Volts

3.6 Short circuit

An output short circuit is defined as any output impedance of less than 0.1 ohms. The power supply shall shut down and latch off for shorting the +3.3 VDC,+5 VDC,or+12 VDC rails to return or any other rail. Shorts between main output rails and +5VSB shall not cause any damage to the power supply. The power supply shall either shut down and latch off or fold back for shorting the negative rails.+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 of withstanding a continuous short-circuit to the output without damage or overstress to the unit

3.7 No load operation

No damage or hazardous condition should occur with all the DC output connectors disconnected from the load. The power supply may latch into the shutdown state.

4. TIMING

4.1 Signal timing drawing

Figure 2. is a reference for signal timing for main power connector signals and rails.

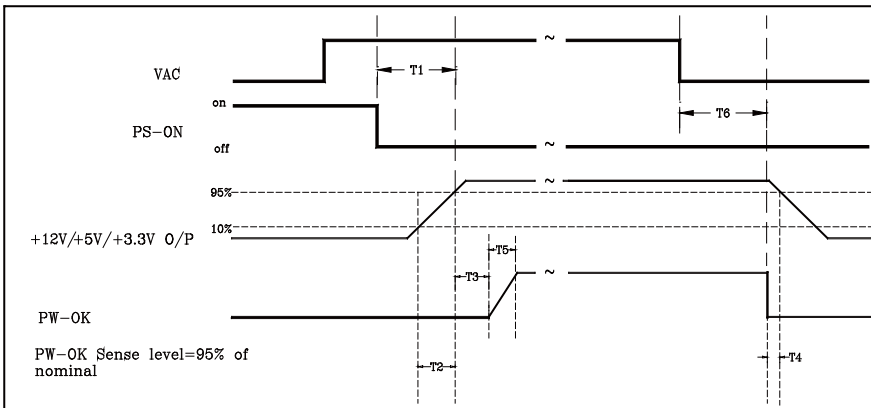


Figure 2. PS-OK Timing Sequence

- (1)T3: Power good signal turn on delay time (100ms~500ms)
- (2)T2: Rise time(0.1~20ms)
- (3)T6: Hold up time (75%Load 16ms)

4.2 Hold up time

When the power loss its input power, it shall maintain 16ms in regulation limit at normal input voltage and 75% full load (AC:115V/60Hz or 230V/50Hz)

5. ENVIRONMENT

5.1 Operation

Temperature	0 to 40°C
Relative Humidity	10 to 90%, non-condensing

5.2 Shipping and Storage

Temperature	-20 to 90°C
Relative Humidity	5 to 95%, non-condensing

5.3 Altitude

Operating	10,000FT max
Storage	50,000FT max

6. SAFETY

6.1 Underwriters Laboratory (UL) recognition.

The power supply designed to meet UL 60950.

7. ELECTROMAGNETIC COMPATIBILITY (EMC)

7.1 ELECTROSTATIC DISCHARGE (ESD) - IEC 61000 – 4 - 2 : 2008

7.2 ELECTRICAL FAST TRANSIENT / BURST (EFT/B) – IEC 61000 – 4 - 4 : 2012

7.3 SURGE – IEC 61000 – 4 - 5 : 2005

7.4 POWER FREQUENCY MAGNETIC FIELD – IEC 61000 – 4 - 8 : 2009

7.5 VOLTAGE DIPS – IEC 61000 – 4 - 11 : 2004

7.6 RADIATED SUSCEPTIBILITY – IEC 61000 – 4 – 3 : 2006+A1 : 2007+A2 : 2010

7.7 CONDUCTED SUSCEPTIBILITY – IEC 61000 – 4 - 6 : 2008

7.8 VOLTAGE FLUCTUATION - EN 61000 – 3 – 3 : 2008

7.9 EN61000-3-2 : 2006+A2 : 2009 harmonic current emissions.

If applicable to sales in Europe, the power supply shall meet the requirements of EN 61000-3-2 Class D and the Guidelines for the Suppression of Harmonics in Appliances and General Use Equipment Class D for harmonic line current content at full-rated power.

7.10 EN55022 : 2010/AC : 2011 Class B Radio interference (CISPR 22).

7.11 ANSI C63.4-2009 / FCC Part 15 Subpart B / ICE-003 Issue 5 class B 115VAC operation.

8. MTBF

8.1 MTBF (mean time between failures) calculation

The demonstrated MTBF shall be 100,000 hours of continuous operation at 25°C, at 80% load, and nominal line. The MTBF of the power supply be calculated in accordance with MIL-HDBK-217F. The DC FAN is not included.

9. Mechanical Specification

150 mm (W) × 86 mm (H) × 150mm (D)

SilverStone Technology Co., Ltd.

www.silverstonetek.com

support@silverstonetek.com

NO: G11226000