



SILVERSTONE[®]
Designing Inspiration

NIGHTJAR SERIES
SST-ST40NF

**Optimum fan-less power supply
with stability and silence**

SPECIFICATION

SilverStone Nightjar ST40NF ATX12V 2.3 Switching Power Supply With Active PFC PS/2 400W

1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model SST-ST40NF; AC-line powered switching power supply with active PFC (Power Factor Correction) circuit, meet EN61000-3-2 and with AC Input features 99Vac~264Vac.

2. REFERENCE DOCUMENTS

The subject power supply will meet the EMI requirements and obtain main safety approvals as following:

2.1 REFERENCE DOCUMENTS

- FCC Part 15 Subpart J, Class 'B' 115 Vac operation.
- CISPR 22 Class 'B' 230 Vac operation.

2.2 SAFETY

NEMKO EN 60950-1

- VDE EN 60950-1
- UL 60950-1
- CB EN 60950-1
- IEC 60950-1

- CE :

EN 55022:1998+A1: 2000, Class B
EN 61000-3-2: 2000

EN 61000-3-3: 1995+A1: 2001

CISPR22: 1997+A1: 2000, Class B
AS/NZS CISPR 22: 2002, Class B

EN 55024: 1998+A1: 2001

IEC 61000-4-2: 2001

IEC 61000-4-3: 2002

IEC 61000-4-4:1995

+A1:2000+A2: 2001

IEC 61000-4-5: 2001

IEC 61000-4-6: 2001

IEC 61000-4-8: 2001

IEC 61000-4-11: 2001

3. INPUT ELECTRICAL SPECIFICATIONS

3.1 AC INPUT

Parameter	Min.	Max.	Unit
Vin Voltage	99	264	VAC _{rms}
Vin Frequency	47 Hz	63	Hz

3.2 INRUSH CURRENT

(Cold start – 25 deg. C)

115V	No damage
230V	No damage

3.3 INPUT LINE CURRENT

115V	5.0 Amps – rms maximum
230V	2.5 Amps – rms maximum

4. ELECTRICAL REQUIREMENTS

4.1 OUTPUT ELECTRICAL REQUIREMENTS

The subject power supply will meet all electrical specifications below, over the full operation temperature range and dynamic load regulation.

4.1.1. OUTPUT RATING

Output	Nominal	Regulation	Ripple/Noise	Min	Max	Peak
1	+3.3V	±3%	50mV	0A	20.0 A	-
2	+5V	±3%	50mV	0A	14.0 A	-
3	+12V	±3%	120mV	0.2A	27.0 A	31.5A
4	-12V	±10%	120mV	0 A	0.5 A	-
5	+5VSB	±5%	50mV	0 A	2.5A	3.5A

The +3.3V and +5V total output shall not exceed 130watts, total output power max shall not exceed 400W ,

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 bypassed at the connector with a 0.1uF ceramic disk capacitor and a 10uF electrolytic capacitor to simulate system loading.

4.2 EFFICIENCY

In Standby mode, +5Vsb efficiency should be greater than 50% with a minimum loading of 100mA under I/P 230Vac.

Efficiency

Loading	Voltage	Full load	Typical load	Light load
Required Minimum Efficiency	115V	>82%	>85%	>82%

4.2.1 HOLD-UP TIME (@FULL LOAD)

99V ~264V: 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.

4.2.2 OUTPUT RISE TIM

For all output range voltages shall rise from $\leq 10\%$ of nominal to within the regulation ranges specified in Section 4.1.1 within 0.1 ms to 20 ms ($0.1 \text{ ms} \leq T1 \leq 20 \text{ ms}$).

(10% TO 90% OF FINAL OUTPUT VALUE, @FULL LOAD)

4.2.3 OVER VOLTAGE PROTECTION

Voltage Source	Protection Point
+3.3V	3.7V-4.5V
+5V	5.7V-7.0V
+12V	13.1-15.6V

4.2.4 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, the power supply will shutdown 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.

4.2.5 OVERLOAD PROTECTION

OUTPUT VOLTAGE	Max. overcurrent limit
+3.3V	50A
+5V	48A
+12V	40A

4.2.6 POWER GOOD SIGNAL

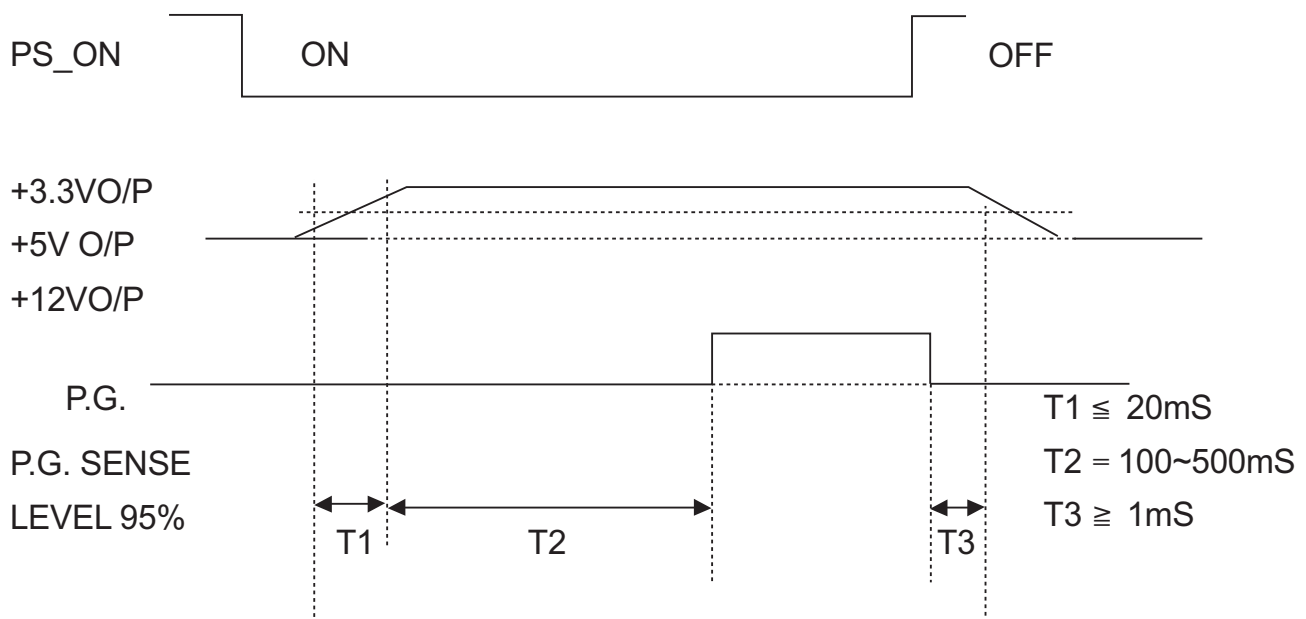
The power good signal is a TTL compatible signal for the purpose of initiating an orderly star-up procedure under normal input operating conditions. This signal is asserted (low) until +5Vdc has reached 4.75 volts during power up. Characteristics:

TTTL signal asserted (low state) : less than 0.4V while sinking 4mA.

TTL signal asserted (high state): Between 2.4 V and 5 V output while sourcing 200 μ A

High state output impedance: less or equal to 1Kohm from output to common.

POWER GOOD @ 99Vac~264Vac,FULL LOAD	100 –500mSec.
POWER FAIL @99Vac~264Vac, FULL LOAD	1 mSec. minimum



4.3 OUTPUT TRANSIENT LOAD RESPONSE

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

DC Output Transient Step Sizes

Output	Max. setp size (% of rated output amps per Sec 4.1.1)	Max . step size (amps)
+12VDC	50%	-
+5VDC	30%	-
+3.3VDC	30%	-
-12VDC	-	0.1A
+5VSB	-	0.5A

- Load-changing repetition rate of 50 Hz to 10 kHz
- Ac input range per section 3.1
- Capacitive loading per section 4.5

4.4. 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-circuited, 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. Table lists PS_ON# signal characteristics. The power supply shall provide an internal pull-up to TTL high. The power supply shall also provide debounce 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.

PS_ON# Signal Characteristics

	Min.	Max.
VIL, Input Low Voltage	0.0V	0.8V
IIL, Input Low Current (Vin = 0.4V)	-	-1.6mA
VIH, Input High Voltage (lin = -200μA)	2.0V	-
VIH OPEN circuit, lin = 0	-	5.25V

4.5 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 stability and should not be included for noise testing.

Output Capacitive Loads

Output	ATX12V Capacitive load (μF)
+12VDC	5000
+5VDC	6000
+3.3VDC	6000
-12VDC	350
+5VSB	350

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 40°C
Storage	-20 to 80°C

5.2 HUMIDITY

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

5.3 VIBRATION

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

Vibration Operating – Sine wave excited, 0.25 G maximum acceleration, 10-250 Hz swept at one octave / min. Fifteen minute dwell at all resonant points, where resonance is defined as those exciting frequencies at which the device under test experiences excursions two times large than non-resonant excursions.

Plane of vibration to be along three mutually perpendicular axes.

5.4 MECHANICAL SHOCK

Non-operating 50 g, trapezoidal input; velocity change ≥ 170 in/s

Three drops on each of six faces are applied to each sample.

6. SAFETY

6.1 LEAKAGE CURRENT

The leakage current from AC to safety ground will not exceed 3.5 mA-rms at 264Vac, 50 Hz.

7. ELECTROMAGNETIC COMPATIBILITY

7.1 LINE CONDUCTED EMI

The subject power supply will meet FCC and VFG class B requirements under full load conditions.

7.2 RADIATED EMI

The subject power supply will meet FCC and CISPR 22 requirements under normal load conditions.

8. LABELLING

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

8.1 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.

9. PHYSICAL REQUIREMENTS

9.1 Physical Dimension

150 mm (W) × 86 mm (H) × 160mm (D)

9.2 Connectors Define

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

SilverStone Technology Co., Ltd.

www.silverstonetek.com

support@silverstonetek.com

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