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Designing Inspiration

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Issue date: April, 2011

NO:G11214010

NIGHTJAR SERIES

ST50NF

Industrial-class fanless power supply

Fan-less thermal solution, 0 dBA acoustics
Efficiency 82%~85% at 20%~100% loading
500W continuous power output
Strict $\pm 3\%$ voltage regulation
PCI-E 8pin and PCI-E 6pin connector support
Powerful class-leading single +12V rail
Aluminum construction
Server-level components
Support ATX 12V 2.3 & EPS 12V
Active PFC



SPECIFICATION

Silverstone Nightjar ST50NF

ATX12V / EPS 12V Switching Power Supply
With Active PFC
Fan-less Thermal Solution
80Plus Bronze
PS/2

1. Input Requirements

1-1. Input Voltage

The power supply shall be operated at universal input voltage defined in the following table.

Input Voltage	MIN	NOM	MAX
Voltage	99	110-240	264

1-2. Frequency

The input frequency range is from 47Hz to 63Hz.

1-3. Inrush Current

The max inrush current is 100A for 115/230VAC.

1-3-1. Cold Start

Conditions	Limits
115/230VAC, full load. 25°C ambient.	No component over stress or damage should occur to the power supply. Input fuse shall not blow.

1-3-2. Warm Start

Conditions	Limits
Turn off at 132/264VAC full load for 1 sec then turn on at the peak of the input voltage cycle at 25°C ambient.	No component over stress or damage should occur to the power supply. Input fuse shall not blow.

1-4. AC Input Current

AC Input	MAX	Units
115V	6.5	AMPS
230V	4	AMPS

1-5. Efficiency

The minimum power supply system efficiency shall be >82%, measured at nominal input voltage 115V or 230V and full loading.

1-6. Leakage current

3.5ma max, At 240Vac/60Hz

2. Output Requirements

2-1. Output Regulations

Output Voltage	Range	MIN	Nominal	MAX	Units
+5V	±5%	+4.75	+5.00	+5.25	Volts
+12V	±5%	+11.40	+12.00	+12.60	Volts
-12V	±10%	-10.80	-12.00	-13.20	Volts
+3.3V	±5%	+3.135	+3.30	+3.465	Volts
+5Vsb	±5%	+4.75	+5.00	+5.25	Volts

Note:

1. The above voltage range should also include ripple and noise.
2. The output voltage should be measured at the terminals of output connector.

2-2-1. Cross Regulation

The DC loads shall remain within the ranges specified in 2-2 DC Load Requirements and the DC output voltages also shall remain within the regulation ranges specified in 2-1 Output Regulation when measured at the load end of the output connectors.

	+5V	+3.3V	+12V	-12V	+5VSB
1	0.5	18	0.5	0.5	0.1
2	18	0.5	10	0.5	0.1
3	1	1	38	0.5	0.1

2-3. +5V standby voltage

The +5Vsb is on whenever the AC power is present.

2-2-1. Cross Regulation

Output Voltage	Ripple & Noise Max	Units
+5V	50	Mv
+12V	120	Mv
-12V	120	Mv
+3.3V	50	Mv
+5Vsb	50	Mv

Note: The measurements should be made by crossing a 47uf/ electrolytic and a 0.1uf ceramic disk capacitors at each output with measuring bandwidth from DC to 20 mhz. If ambient temperature is under 20°C or over 30°C, the AC input should be nominal input.

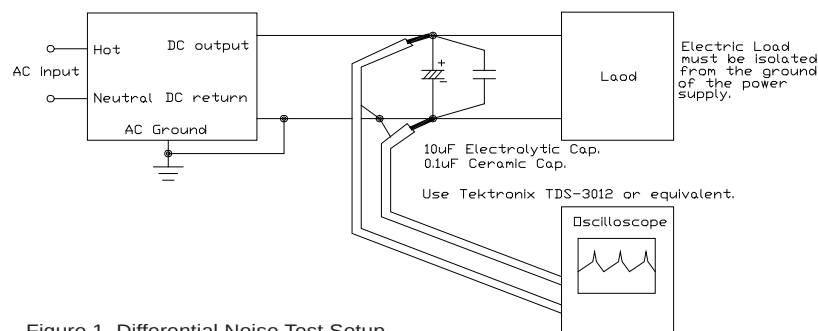


Figure 1. Differential Noise Test Setup

2-5. Total Output Power

Ac Input Voltage	MAX	Units
99V~264Vac	500	Watts

2-6. Remote ON/OFF Control

The power supply outputs shall be enabled with an active-low TTL signal.

When TTL signal is low, the DC outputs are to be enabled.

When TTL signal is high or open circuited, the DC outputs are to be disabled.

Electronic means or a mechanical switch may activate the TTL signal.

After the TTL signal is active high, must wait for 3 seconds before active low again.

2-7. Power Sequence

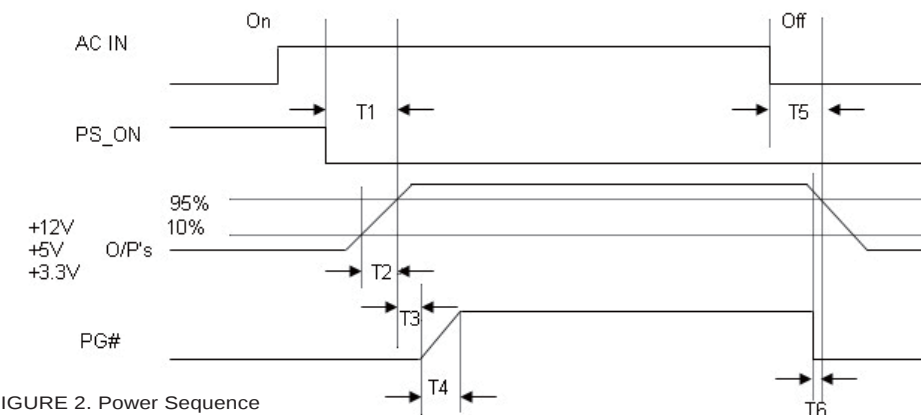


FIGURE 2. Power Sequence

2-8. Power On Time (T1)

MAX	Units
500	Ms

2-9. Rise Time (T2)

MAX.	Units
70	Ms

2-10. Power Good Delay Time (T3)

MIN.	MAX.	Units
100	500	Ms

2-11. Power Good Rise Time (T4)

MAX	Units
10	Ms

The test environment is 25°C condition @ nominal input. See1-1

2-12. Hold Up Time (T5)

MIN.	Units
16	Ms

The test environment is 25°C & full load condition @ nominal input.

2-13. Power Fail Signal (T6)

Power good signal shall go to a down level 1ms before +5V output voltage falls below the regulation limits during PS-ON signal pull high.

MIN.	Units
1	Ms

3. Protections

3-1. Over Voltage Protection

When the DC outputs (+5V, +12V, +3.3V) have over voltage condition, the power supply shall provide latch mode over voltage protection.

DC output	Max	Unit
+12V	16.0	V
+5V	7.0	V
+3.3V	4.5	V

3-2. Short Circuit Protection

A short circuit placed to ground shall cause no damage or power supply shall be shutdown. (The contact resistance is 0.05 ohm when the outputs short circuit.)

3-3. Protection Reset

When the power supply latches into shutdown condition due to a fault on an +5V, +3.3V, +12V, output (OVP, UVP, OCP) and OTP, the protection shall reset after the fault has been removed, use remote on/off control or recycle the AC power again for a typical of 5 seconds.

3-4. Over Shoot

Any output overshoot at turn on shall be less than 15% of the nominal output value (with resistive load) as described in sec. 2.1.

3-5. Over Power Protection

At 115/230Vac input the power supply will shut down all DC output within max. 150% of full load.

3-6. Over Current Protection

Max.160% for +5V, +12V, +3.3V dc output rail.

3-7. Over Temperature Protection(Optional)

When power supply temperature over 90°C (typ.) The power supply will be shutdown.

4. Environment

4-1. Operation/Storage Temperature Range

Operation:

115V: 0°C to 35°C (Need to increase external forced air cooling) -P1(Note.)

230V: 0°C to 45°C (Need to increase external forced air cooling) -P2(Note.)

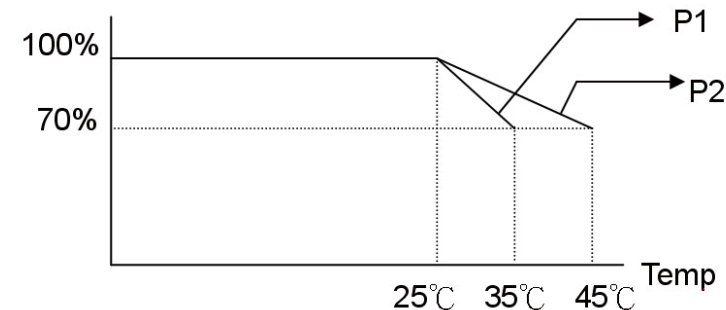


FIGURE 3. Operation/Storage Temperature Range

Caution: Fanless power supply recommends the systems require additional external forced circulation cooling fan to extend product life.

4-2. Humidity (none condensing)

Operation: 20% to 90% RH(nominal input)

Storage: 5% to 95% RH

5. Safety

- 5-1. UL 60950-1, 2005 (2nd Edition.)
- 5-2. BSMI (CNS14336: 94)
- 5-3. TUV EN 60950-1: 2006+A11
- 5-4. CB

6. EMI Requirements

- 6-1. CE
- 6-2. BSMI (CNS13438: 95)
- 6-3. FCC Part 15 Subpart B, Class B at system load
- 6-4. CISPR 22 AS/NZS CISPR 22: 2006, CLASS B

7. Dielectric Voltage Withstand (HI-POT)

The power supply shall withstand for 3 seconds without breakdown the application of an 1800Vac-supply voltage applied between both input line and chassis (10ma AC Cutoff current). Isolating transformers shall similarly withstand 4242Vdc applied between both primary and secondary windings for a minimum of one minute.

8. PFC

Active Power Factor Correction, complies with EN 61000-3-2: 1995 + A1 + A2: 1998, Class D.

9. Electrostatic Discharge (ESD)

Comply with IEC 61000-4-2.

10. EFT/ Burst

Comply with IEC 61000-4-4.

11. Surge

Comply with IEC 61000-4-5.

12. Burn-In

Applying 115 Vac $\pm 10\%$ or 230 Vac $\pm 10\%$ input voltage and maximum load (60%) for this product in $45 \pm 5^\circ\text{C}$ chamber.

13. M.T.B.F.

The power supply shall have a minimum mean time between failure greater than 80,000 hours Minimum (Without Cooling Fan) at continuous operation of 100% load and an ambient temperature of 25°C .

14. LED Indicators

There are two leds for the monitoring the status of the power supply, which allows users to perceive a full awareness of the working condition of the power supply.

- The temperature LED indicates surface temperature of the power supply's housing cage.

Caution: DO NOT TOUCH THE SURFACE OF POWER SUPPLY WHEN THE TEMP-LED INDICATES RED, IT MIGHT BE DANGEROUS.

Temp. Status	LED Color
High $\geq 55^\circ\text{C}$	Red
Low $> 55^\circ\text{C}$	Green

Power Status	LED Color
Standby	Amber
Power ON	Green
Power Fault	Red

- The Status-LED indicates power supply's working.

15. MECHANICAL REQUIREMENTS

15.1. Physical Dimension

Dimension (W x H x D): 150mm (5.90") x 86mm (3.38") x 160mm (6.29")

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

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

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

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

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