



**SILVERSTONE**<sup>®</sup>  
Designing Inspiration

**ELEMENT SERIES**

# **SST-ST70EF**

**Incredible performance  
and efficiency**

Efficiency 85%~90% at 20%~100% loading  
700W continuous power output rated

High performance five +12V rail(s) with 56A  
Quad PCI-E 6Pin, Single PCI-E 8Pin

Ultra silent running 135mm Fan with 16.5dBA minimum

# SPECIFICATION

## SilverStone ELEMENT ST70EF ATX12V 2.3 Switching Power Supply With Active PFC PS/2 700W

### 1. GENERAL DESCRIPTION AND SCOPE

This is the specification of Model SST-ST70EF AC-line powered switching power supply with active PFC (Power Factor Correction) circuit, meet EN61000-3-2 and with Full Range Input features.

### 2. REFERENCE DOCUMENTS

#### 2.1 EMI REGULATORY

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

#### 2.2 SAFETY

- NEMKO EN 60950
- VDE EN60950
- CSA-C22.2 NO. 60950
- IEC 60950
- UL 60950
- 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

## 3. INPUT ELECTRICAL SPECIFICATIONS

### 3.1 AC INPUT

Parameter	Min	Nom	Max	Unit
Vin (115VAC)	100	115	150	VAC rms
Vin Frequency	47	60	63	HZ
Vin (230VAC)	150	230	265	VAC rms
Vin Frequency	47	50	63	HZ

\* Nominal voltages for test purposes are considered to be within  $\pm 1.0V$  of nominal.

### 3.2. INRUSH CURRENT

Repetitive ON/OFF cycling of the AC input voltage should not damage the power supply or cause the input fuse to blow.

### 3.3. INPUT LINE CURRENT & POWER FACTOR

AC input	Input line current	Power Factor
115V	< 9.0Amps – rms	> 0.95(at full load)
230V	< 4.5Amps – rms	> 0.9(at full load)

## 3.4 EFFICIENCY

### 3.4.1 General

Under the load conditions defined in Table 1 and Table 2. The loading condition for testing efficiency shown in Table 1 represents a fully loaded system. at 50% (typical) loaded system. and at 20% (light) loaded system.

Table 1 Loading Table for Efficiency Measurements

700W(loading shown in Amps)									
Load	5V	3.3V	12V1	12V2	12V3	12V4	12V5	-12V	+5Vsb
Full	18.00	14.4	9.06	9.06	9.06	9.06	9.06	0.4	2.83
Typical	9.00	7.2	4.53	4.53	4.53	4.53	4.53	0.2	1.42
Light	3.60	2.88	1.81	1.81	1.81	1.81	1.81	0.08	0.57

Table 2. Minimum Efficiency Vs Load

Loading	Full load	Typical load	Light load
115V Required Minimum Efficiency	85%	88%	85%
230V Required Minimum Efficiency	87%	90%	87%

For this test, the detect probe shall be on the output terminal side of PSU, if detect on the test fixture side, there will be 2% tolerance.

### 3.5 MECHANICAL SPECIFICATIONS

The mechanical drawing of the subject power supply, which indicate the form factor, location of the mounting holes, location, the length of the connectors, and other physical specifications of the subject power supply. Please refer to the attachment drawing.

## 4. OUTPUT ELECTRICAL REQUIREMENTS

### 4.1 OUTPUT VOLTAGE AND CURRENT RATING

Output	MINIMUM LOAD	NORMAL LOAD	MAXIMUM LOAD	LOAD REG	LINE REG	RIPPLE& NOISE
+3.3 V	0.5A	9A	24A	±5%	±1%	50mV P-P
+5 V	0.8A	11A	30A	±5%	±1%	50mV P-P
+12V1	0.2A	6.4A	18A	±5%	±1%	120mV P-P
+12V2	0.2A	6.4A	18A	±5%	±1%	120mV P-P
+12V3	0.2A	6.4A	18A	±5%	±1%	120mV P-P
+12V4	0.2A	6.4A	18A	±5%	±1%	120mV P-P
+12V5	0.2A	6.4A	18A	±5%	±1%	120mV P-P
-12V	0A	0.4A	0.5A	±10%	±1%	120mV P-P
+5VSB	0.1A	1.5A	3.5 A	±5%	±1%	50mV P-P

- ( 1 ) +3.3V & 5V total output not exceed 170W.
- ( 2 ) total output for this subject power supply is 700W watts
- ( 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.
- ( 4 ) Maximum combined current for the 12V outputs shall be 56A

## 4.2. LOAD CAPACITY SPECIFICATIONS

The cross regulation defined as follows, the voltage regulation limits DC include DC Output ripple & noise.

LOAD	+3.3V	+5V	12V1	12V2	12V3	12V4	12V5	-12V	+5VSB
Condition_1	1A	1A	1A	1A	1A	1A	1A	0.1A	3A
Condition_2	0.8A	0.5A	0A	0A	0.9A	0.1A	0.1A	0A	0.1A
Condition_3	0.8A	0.5A	0.5A	0.5A	0.5A	0.5A	0.5A	0A	3A
Condition_4	1A	1A	1A	1A	1A	1A	1A	0.5A	0.1A
Condition_5	1A	2A	10A	10A	10A	5.5A	5.5A	0.1A	0.1A
Condition_6	1A	2A	5.5A	5.5A	15A	15A	15A	0.1A	0.1A
Condition_7	1A	15A	3A	3A	3A	3A	3A	0.1A	0.1A
Condition_8	1.5A	20A	8A	8A	8A	8A	8A	0.1A	0.1A
Condition_9	24A	10A	8A	8A	10A	10A	8A	0.5A	3A
Condition_10	24A	0.5A	1A	1A	1A	1A	1A	0A	0.1A

## 4.3. HOLD-UP TIME (@ Full Load of Table 1)

115V / 60Hz : 17 mSec. Minimum.

230V / 50Hz : 17 mSec. Minimum.

The output voltage will remain within specification, in the event that the input power is removed or interrupted. The interruption may occur at any point in the AC voltage cycle. The power good signal shall remain high during this test.

## 4.4. OUTPUT RISE TIME

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

115V-rms or 230V-rms + 5Vdc/3.3Vdc : 20ms Maximum

115V-rms or 230V-rms + 12Vdc : 20ms Maximum

115V-rms or 230V-rms + 5Vsb : 25ms Maximum

115V-rms or 230V-rms - 12Vdc : 20ms Maximum

## 4.5. OVER VOLTAGE PROTECTION

Voltage Source	Protection Point
+3.3V	3.76V-4.8V
+5V	5.6V-7.0V
12VDC	13.5V-16.5V

#### 4.6.OVER-CURRENT PROTECTION

Output Voltage	Max. overcurrent limit
+3.3V	35A
+5V	40A
12V1	30A
12V2	30A
12V3	30A
12V4	30A
12V5	30A

#### 4.7.SHORT CIRCUIT PROTECTION

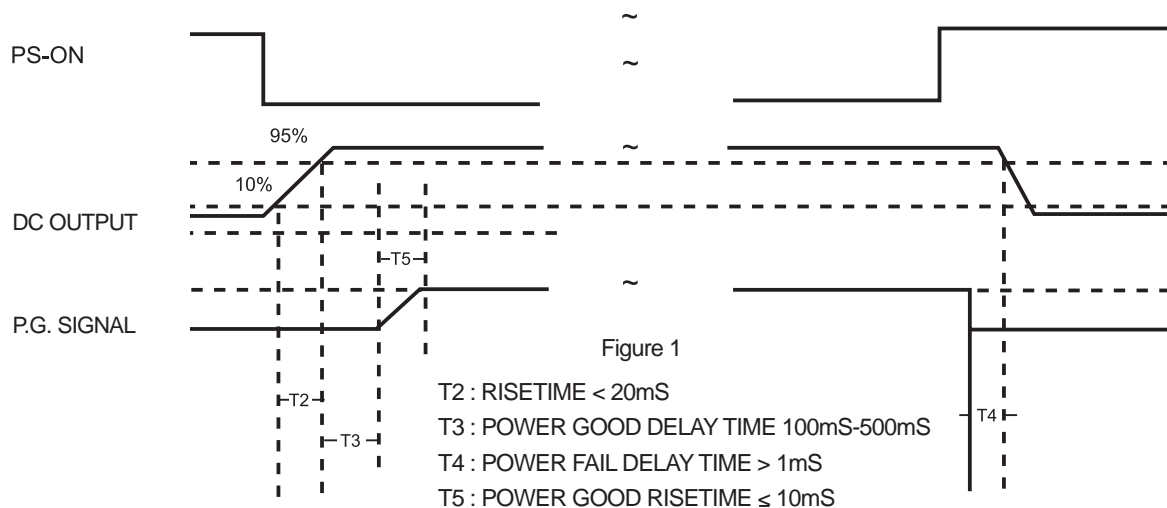
Output short circuit is defined to be a short circuit load of less than 0.1 ohm.

In the event of an output short circuit condition on +3.3V, +5V, +12V1,+12V2,+12V3 or 12V4 12V5 output, 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 more than 2 seconds then turn-on again.

In the event of an output short circuit condition on -12V output, the power supply will not be damaged. The power supply shall return to normal operation as soon as the short circuit has been removed. And the power switch has been turned off for more than 2 seconds then turn-on again.

#### 4.8. POWER SIGNAL

POWER GOOD @ 115/230V, FULL LOAD	100 –500mSec.
POWER FAIL @115/230V, FULL LOAD	1 mSec. minimum



## 5. FAN SIZE

5.1. The subject power supply is cooled by a self-contained, 135mm, 12VDC fan.

## 6. ENVIRONMENTAL REQUIREMENTS

The power supply will be compliant with each item in this specification for the following Environmental conditions.

### 6.1. TEMPERATURE RANGE

Operating	10 to + 40 deg. C
Storage	-10 to +60 deg. C

### 6.2. HUMIDITY

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

### 6.3. 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.

## **6.4 GROUND LEAKAGE CURRENT**

The power supply ground leakage current shall be less than 3.5 mA.

## **6.5 RELIABILITY**

The power supply reliability, when calculated by MIL-HDBK-217; latest revision, are exceed 100,000 hours with all output at maximum load and an ambient temperature of 25°C.

## **6.6 DIELECTRIC STRENGTH**

Primary to Frame Ground : 1800 Vac for 1 sec

Primary to Secondary : 1800Vac for 1 sec

## **6.7 INSULATION RESISTANCE**

Primary to Frame Ground : 20 Meg.ohms Minimum

Primary to Secondary : 20 Meg.ohms Minimum

# **7. MECHANICAL REQUIREMENTS**

## **7.1 Physical Dimension**

150 mm (W) × 86 mm (H) × 175 mm (D)

## **7.2 Connectors Define**



## M/B 24PIN connector

18AWG wire	Signal	Pin	Pin	Signal	18AWG wire
Orange (16AWG)	+3.3V	13	1	+3.3V	Orange (16AWG)
Orange (24AWG)	+3.3Vsense	13			
Blue (24AWG)	-12VDC	14	2	+3.3V	Orange (16AWG)
Black (16AWG)	COM	15	3	COM	Black (16AWG)
Green (24AWG)	PS-ON	16	4	+5VDC	Red (18AWG)
Black (16AWG)	COM	17	5	COM	Black (16AWG)
Black (16AWG)	COM	18	6	+5VDC	Red (18AWG)
Black (16AWG)	COM	19	7	COM	Black (16AWG)
N/C	N/C	20	8	POWER-ON	Grey (24AWG)
Red	+5VDC	21	9	+5Vsb	Purple (20AWG)
Red/Blk.(24AWG)	+5Vs	21	10	+12V3	Yel./Blue(16AWG)
Red(18AWG)	+5VDC	22		+12VS	Yel./Purple(24AWG)
Red (18AWG)	+5VDC	23	11	+12V3	Yel./Blue (16AWG)
Black (18AWG)	COM	24	12	+3.3V	Orange (16AWG)

## EPS 12V 8PIN connector

16AWG wire	Signal	Pin	Pin	Signal	16AWG wire
Yellow	+12V1	5	1	COM	Black
Yellow	+12V1	6	2	COM	Black
Yellow	+12V2	7	3	COM	Black
Yellow	+12V2	8	4	COM	Black

## ATX 12V 4PIN

18AWG wire	Signal	Pin	Pin	Signal	18AWG wire
Black	GND	1	3	+12V1	Yellow
Black	GND	2	4	+12V1	Yellow

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

18AWG wire	Signal	Pin	Pin	Signal	20AWG wire
Yellow/Blue	+12V3	1	1	+5VDC	Red
Black	COM	2	2	COM	Black
Black	COM	3	3	COM	Black
Red	+5VDC	4	4	+12V3	Yellow/Blue

SATA connector

18AWG wire	Signal	Pin
Orange	+3.3V	5
Black	COM	4
Red	+5V	3
Black	COM	2
Yellow	+12V3	1

6PIN PCI Express connector #1 & #2

18AWG wire	Signal	Pin	Pin	Signal	18AWG wire
Yellow	+12V4	1	4	COM	Black
Yellow	+12V4	2	5	COM	Black
Yellow	+12V4	3	6	COM	Black

6PIN PCI Express connector #3 & #4

18AWG wire	Signal	Pin	Pin	Signal	18AWG wire
Yellow	+12V5	1	4	COM	Black
Yellow	+12V5	2	5	COM	Black
Yellow	+12V5	3	6	COM	Black

8PIN PCI Express connector #1

18AWG wire	Signal	Pin	Pin	Signal	18AWG wire
Yellow	+12V5	1	4	COM	Black
Yellow	+12V5	2	5	COM	Black
Yellow	+12V5	3	6	COM	Black
Black sense1	COM	4	8	COM	Black



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