Evaluation Report

SilverStone SX700-PT

DUT INFORMATION

Brand	SilverStone
Manufacturer (OEM)	High Power
Series	PT Series
Model Number	SX700-PT
Serial Number	DESX700PT019280244
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10
Rated Frequency (Hz)	50-60
Rated Power (W)	700
Type	SFX
Cooling	92mm Fluid Dynamic Bearing Fan (S0921512HB)
Semi-Passive Operation	✗
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	58.4	2.5	0.3
	Watts	110		700	12.5	3.6
Total Max. Power (W)		700				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (300-330mm)	1	1	16-22AWG	No
4+4 pin EPS12V (550mm)	1	1	16AWG	No
4+4 pin EPS12V (405mm)	1	1	16AWG	No
6+2 pin PCIe (550mm+150mm)	1	2	16-18AWG	No
6+2 pin PCIe (400mm+150mm)	1	2	16-18AWG	No
SATA (300mm+200mm+100mm)	2	6	18AWG	No
4-pin Molex (300mm+200mm+200mm)	1	3	18AWG	No
FDD Adapter (+105mm)	1	1	22AWG	No
AC Power Cord (1400mm) - C13 coupler	1	1	18AWG	-

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General Data	
Manufacturer (OEM)	High Power
PCB Type	Double Sided
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 3x CM chokes, 1x MOV, 1x Discharge IC
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x HY GBU1506L (600V, 15A @ 100°C)
APFC MOSFETS	2x Infineon IPA60R120C7 (650V, 7A @ 100°C, 0.12Ohm)
APFC Boost Diode	1x Infineon IDH08G65C6 (650V, 8A @ 145°C)
Hold-up Cap(s)	1x Rubycon (420V, 470uF, 3,000h @ 85°C, USH)
Main Switchers	2x Infineon IPA60R120C7 (650V, 7A @ 100°C, 0.12Ohm)
IC Driver	1x Silicon Labs Si8233BD
APFC Controller	Infineon ICE3PCS01G
Resonant Controllers	Champion CM6901
Topology	Primary side: Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6x Toshiba TPHR8504PL (40V, 150A @ 25°C, 0.85mOhm)
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm) PWM Controllers: ANPEC APW7159
Filtering Capacitors	Electrolytics: 3x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 2x Nippon Chemi-Con (1-5,000h @ 105°C, KZE), 2x Rubycon (3-6,000h @ 105°C, YXG) Polymers: 18x FPCAP, 3x United Chemi-Con
Supervisor IC	SITI PS224 (OVP, UVP, OCP, SCP, PG)
Fan Controller	STC 15W408AS
Fan Model	Globe Fan S0921512HB (92mm, 12V, 0.45A, Fluid Dynamic Bearing Fan)
5VSB Circuit	
Rectifier	1x PFC P10V45SP SBR (45V, 10A)
Standby PWM Controller	Sanken STR-A6069H
-12V	
Rectifier	KEC KIA7912PI (-12V, 1A)

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RESULTS

Test Date	10-08-2019
Certification Date	10-15-2019
Lab ID #	SL19700124
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	92.102
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	63.128
Average Efficiency 5VSB	76.692
Standby Power Consumption (W) -115V	0.0883097
Standby Power Consumption (W) -230V	0.1452270
Average PF	0.956
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	35.84
Efficiency Rating (ETA)	ETA-A
Noise Rating (LAMBDA)	LAMBDA-S+

TEST EQUIPMENT

Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

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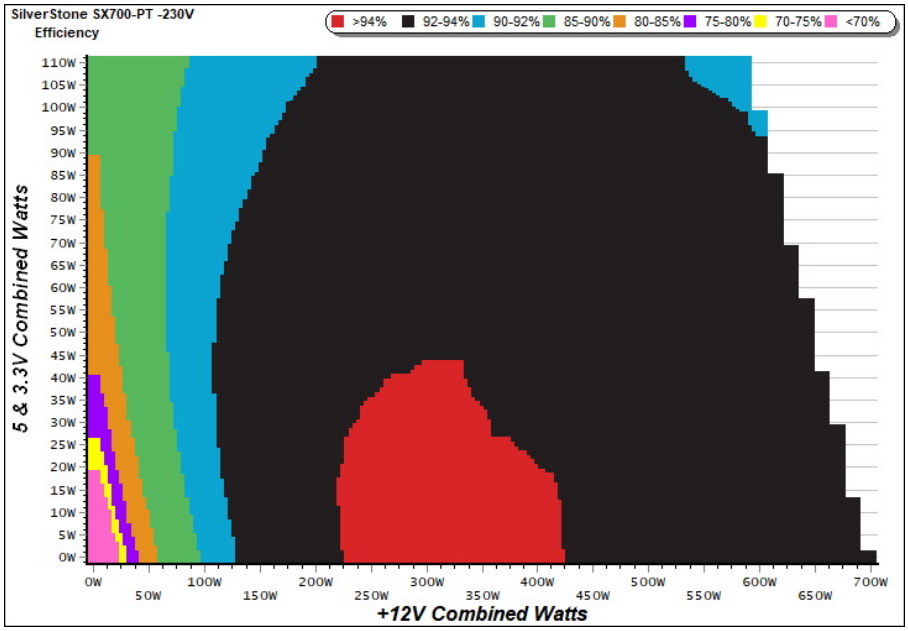
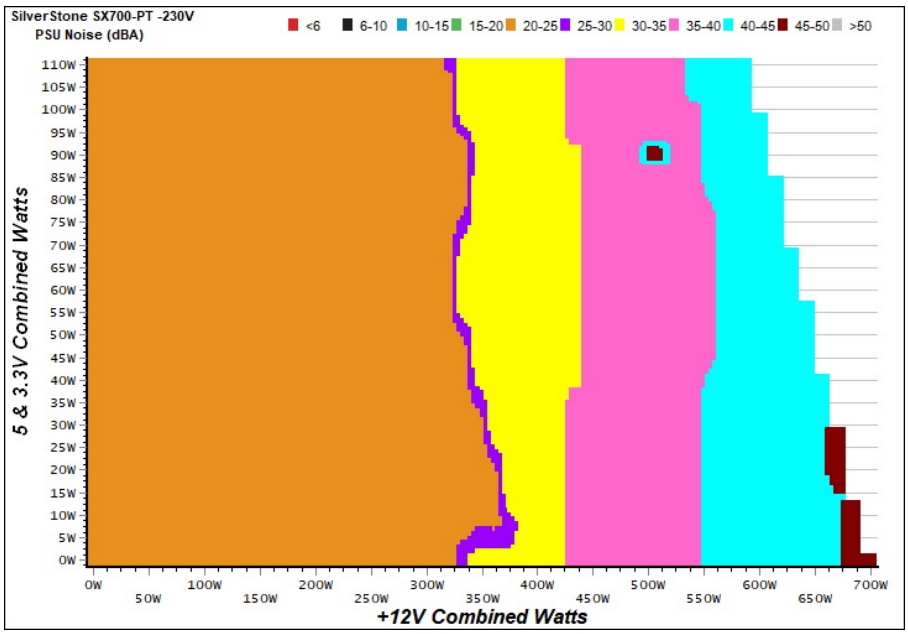
EFFICIENCY GRAPH



INFO

This graph depicts the PSU's efficiency throughout its entire operational range. For the generation of the efficiency and noise graphs we set our loaders to auto mode through our custom-made software before trying thousands of possible load combinations

NOISE GRAPH



INFO

The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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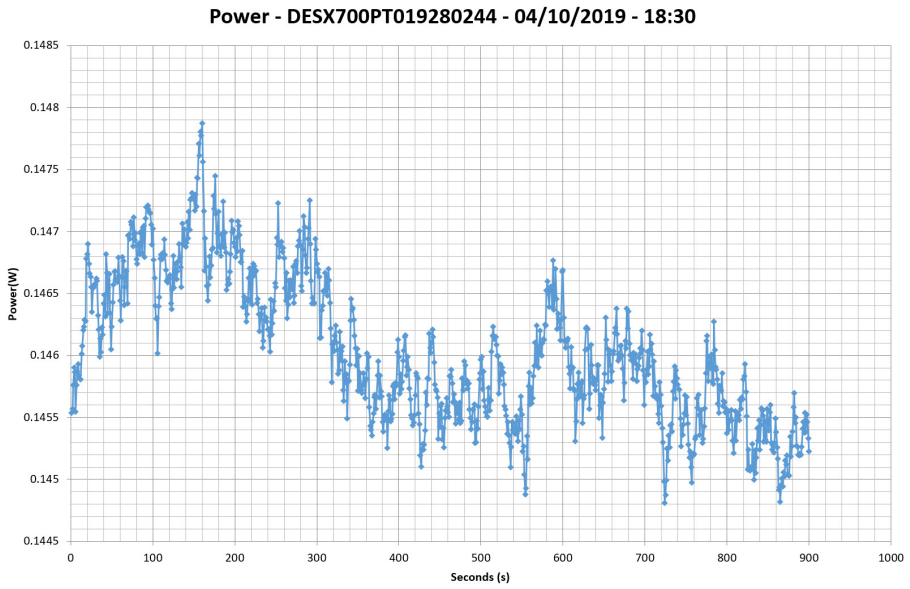
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	63.712%	0.062
	5.101V	0.361		115.12V
2	0.090A	0.460	70.769%	0.107
	5.099V	0.650		115.12V
3	0.550A	2.798	79.062%	0.324
	5.086V	3.539		115.13V
4	1.000A	5.074	79.805%	0.383
	5.073V	6.358		115.13V
5	1.500A	7.591	79.838%	0.414
	5.060V	9.508		115.13V
6	2.500A	12.549	78.294%	0.446
	5.019V	16.028		115.12V

5VSB EFFICIENCY -230V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	56.790%	0.021
	5.100V	0.405		230.27V
2	0.090A	0.460	65.064%	0.037
	5.098V	0.707		230.27V
3	0.550A	2.794	75.800%	0.164
	5.080V	3.686		230.27V
4	1.000A	5.069	78.262%	0.236
	5.068V	6.477		230.26V
5	1.500A	7.582	78.831%	0.285
	5.054V	9.618		230.27V
6	2.500A	12.567	78.830%	0.337
	5.026V	15.942		230.27V

VAMPIRE POWER -230V



INFO

This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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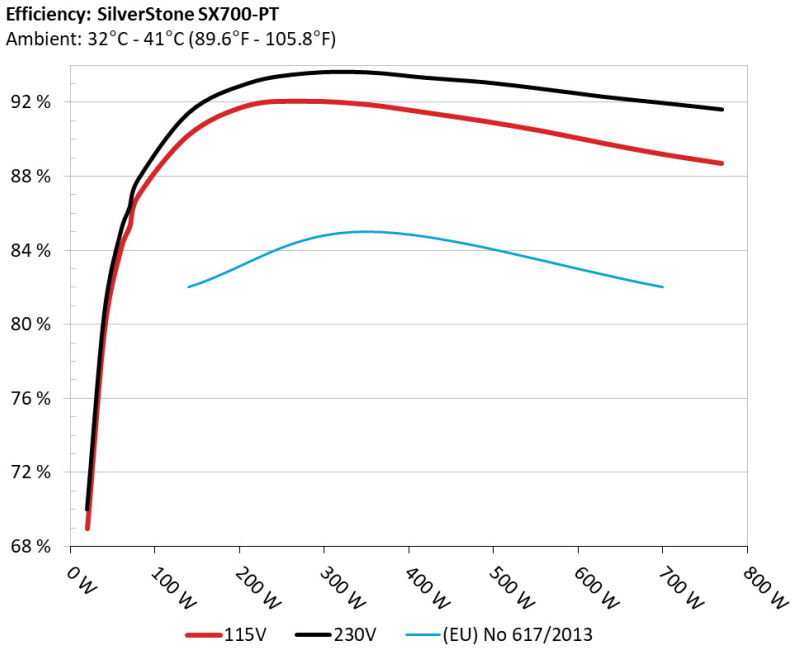
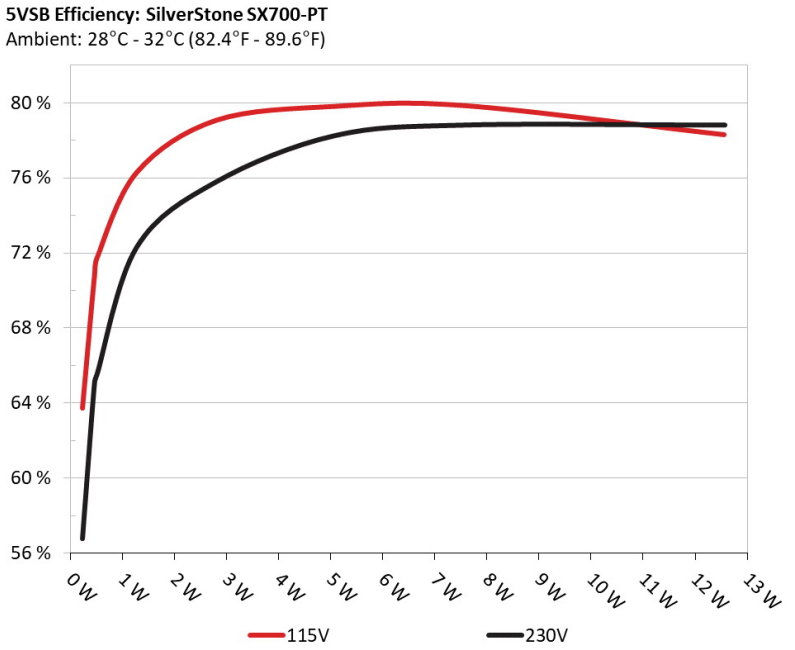
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



INFO

The PSU`s efficiency under high ambient temperatures with 115V and 230V input. For this graph the results of the 10-110% load regulation table are used

5VSB EFFICIENCY



INFO

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input

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10-110% LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	3.941A	1.975A	1.964A	0.989A	69.686	86.295%	1311	20.3	35.34°C	0.828
	12.202V	5.064V	3.358V	5.058V	80.753				39.69°C	230.24V
2	8.934A	2.968A	2.954A	1.190A	139.778	91.432%	1311	20.3	35.59°C	0.930
	12.187V	5.055V	3.350V	5.043V	152.876				40.46°C	230.24V
3	14.269A	3.467A	3.441A	1.390A	209.717	93.024%	1311	20.3	36.52°C	0.960
	12.174V	5.049V	3.343V	5.035V	225.444				41.72°C	230.24V
4	19.611A	3.966A	3.957A	1.592A	279.732	93.570%	1313	20.3	37.18°C	0.972
	12.163V	5.043V	3.336V	5.026V	298.954				42.89°C	230.25V
5	24.631A	4.967A	4.958A	1.796A	349.848	93.618%	1317	20.4	37.52°C	0.979
	12.153V	5.035V	3.328V	5.010V	373.698				43.51°C	230.25V
6	29.663A	5.972A	5.965A	2.002A	419.956	93.323%	1905	32.5	37.73°C	0.984
	12.141V	5.026V	3.319V	4.997V	450.001				44.52°C	230.25V
7	34.700A	6.976A	6.978A	2.206A	490.100	93.080%	2188	36.5	38.28°C	0.988
	12.132V	5.019V	3.311V	4.988V	526.538				46.12°C	230.24V
8	39.752A	7.986A	7.994A	2.411A	560.210	92.706%	2654	41.6	38.35°C	0.991
	12.120V	5.011V	3.302V	4.978V	604.288				46.54°C	230.26V
9	45.212A	8.497A	8.498A	2.414A	629.951	92.298%	3038	45.2	39.18°C	0.993
	12.108V	5.004V	3.295V	4.973V	682.517				47.79°C	230.26V
10	50.668A	9.008A	9.033A	2.519A	700.256	91.961%	3062	45.6	39.87°C	0.994
	12.099V	4.998V	3.288V	4.963V	761.469				49.11°C	230.26V
11	56.459A	9.012A	9.048A	2.522A	769.858	91.612%	3060	45.6	40.62°C	0.995
	12.091V	4.994V	3.283V	4.957V	840.350				50.40°C	230.26V
CL1	0.149A	13.003A	12.999A	0.000A	110.356	85.403%	1349	20.7	36.96°C	0.876
	12.219V	5.027V	3.321V	5.076V	129.218				43.43°C	230.26V
CL2	58.350A	1.003A	1.000A	1.000A	719.353	92.491%	3062	45.6	39.53°C	0.995
	12.099V	5.030V	3.317V	5.013V	777.752				47.63°C	230.26V

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20-80W LOAD TESTS

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.186A	0.493A	0.475A	0.197A	19.563	70.008%	1297	20.0	0.529
	12.193V	5.072V	3.366V	5.087V	27.944				230.25V
2	2.434A	0.987A	0.981A	0.394A	39.982	80.588%	1303	20.1	0.696
	12.193V	5.069V	3.363V	5.078V	49.613				230.24V
3	3.614A	1.480A	1.458A	0.592A	59.484	85.020%	1308	20.2	0.793
	12.199V	5.066V	3.360V	5.067V	69.965				230.24V
4	4.860A	1.974A	1.965A	0.790A	79.873	87.811%	1311	20.3	0.854
	12.198V	5.063V	3.357V	5.062V	90.960				230.24V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.4 mV	7.9 mV	10.0 mV	6.5 mV	Pass
20% Load	11.2 mV	9.4 mV	14.8 mV	5.9 mV	Pass
30% Load	10.7 mV	9.6 mV	16.8 mV	9.3 mV	Pass
40% Load	13.3 mV	9.8 mV	20.1 mV	8.0 mV	Pass
50% Load	17.3 mV	14.6 mV	21.2 mV	7.9 mV	Pass
60% Load	21.9 mV	15.1 mV	21.3 mV	9.5 mV	Pass
70% Load	25.4 mV	18.0 mV	25.7 mV	12.1 mV	Pass
80% Load	36.8 mV	19.3 mV	33.3 mV	11.2 mV	Pass
90% Load	43.5 mV	20.9 mV	33.3 mV	11.6 mV	Pass
100% Load	50.4 mV	20.8 mV	35.9 mV	11.5 mV	Pass
110% Load	60.0 mV	20.6 mV	35.5 mV	11.5 mV	Pass
Crossload 1	18.7 mV	15.2 mV	41.3 mV	15.4 mV	Pass
Crossload 2	44.4 mV	17.3 mV	20.6 mV	7.9 mV	Pass

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HOLD-UP TIME & POWER OK SIGNAL (230V)

Hold-Up Time (ms)	6.80
AC Loss to PWR_OK Hold Up Time (ms)	8.10
PWR_OK Inactive to DC Loss Delay (ms)	-1.30

Top side

Power specifications label

CERTIFICATIONS

ETA A 230V

LAMBDA S+ 230V

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