Anex

SilverStone SX500-G

Lab ID#: 179
Receipt Date: -
Test Date: -

Report:
Report Date: Sep 21, 2018

DUT INFORMATION

Brand	SilverStone
Manufacturer (OEM)	High Power
Series	SFX
Model Number	SX500-G
Serial Number	DE17280517SX500G00
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10
Rated Frequency (Hz)	50-60
Rated Power (W)	500
Type	SFX
Cooling	92mm Fluid Dynamic Bearing Fan (S0921512MB)
Semi-Passive Operation	✗
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	41.7	2.5	0.3
	Watts	110		500	12.5	3.6
Total Max. Power (W)		500				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge
ATX connector 20+4 pin (300mm)	1	1	16-22AWG
4+4 pin EPS12V (410mm)	1	1	18AWG
6+2 pin PCIe (560mm)	1	1	18AWG
6+2 pin PCIe (410mm)	1	1	18AWG
SATA (310mm+200mm+100mm)	2	6	18AWG
4 pin Molex (300mm+200mm+200mm)	1	3	18AWG
FDD Adapter (+105mm)	1	1	22AWG

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General Data	
Manufacturer (OEM)	High Power
Platform Model	-
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 3x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x GBU1506 (600V, 15A @ 100°C)
APFC MOSFETS	2x Toshiba TK12A60W (600V, 11.5A @ 150°C, 0.3Ohm)
APFC Boost Diode	1x Infineon IDH06G65C5 (650V, 6A @ 145°C)
Hold-up Cap(s)	1x Rubycon (420V, 470uF, 3000h @ 85 °C, USH)
Main Switchers	2x Toshiba TK12A60W (600V, 11.5A @ 150°C, 0.3Ohm) Driver IC: Silicon Labs Si8233BD
APFC Controller	Infineon ICE3PCS01G
LLC Resonant Controller	Champion CM6901
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Infineon BSC027N04LSG (40V, 88A @ 100°C, 2.7 mOhm)
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mOhm) PWM Controller: ANPEC APW7159C
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (1-5,000 @ 105°C, KZE), Nippon Chemi-Con (4-10,000 @ 105°C, KY) Polymers: Nippon Chemi-Con
Supervisor IC	SITI PS224 (OVP, UVP, OCP,SCP, PG)
Fan Controller	STC 15W408AS
Fan Model	Globe Fan S0921512MB (12V, 0.23A, Fluid Dynamic Bearing)
5VSB Circuit	
Rectifier	1x P10V45SP SBR (45V, 10A)
Standby PWM Controller	Sanken STR-A6069H
-12V Circuit	
Rectifier	KEC KIA7912PI (-12V, 1A)

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RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	88.788
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	78.675
Standby Power Consumption (W) -115V	0.0827359
Standby Power Consumption (W) -230V	0.1395730
Average PF	0.987
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	30.78
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

TEST EQUIPMENT		
Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 Digit	
Sound Analyzer	Bruel & Kjaer 2250-L G4	
Microphone	Bruel & Kjaer Type 4955-A, Bruel & Kjaer Type 4189	
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2	

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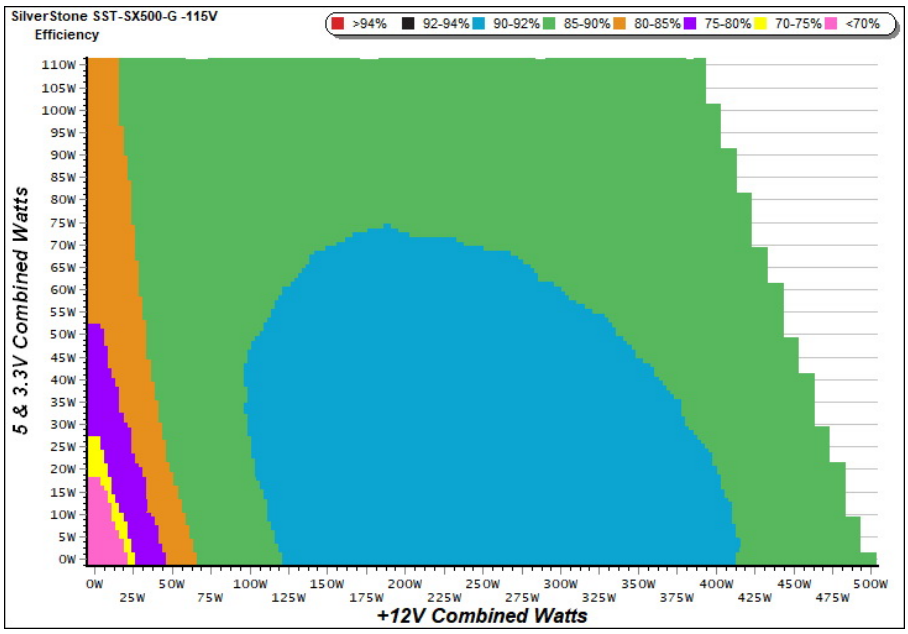
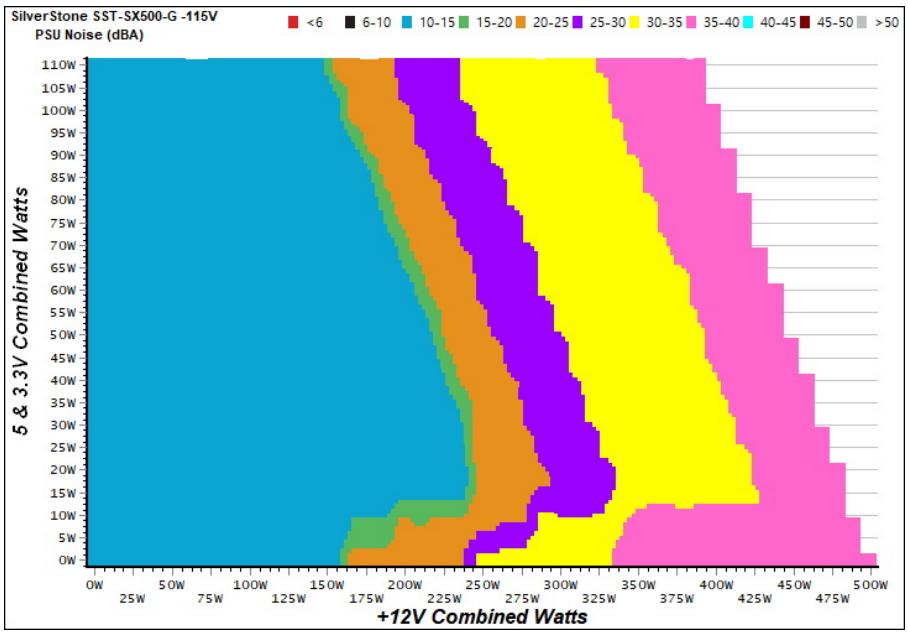
EFFICIENCY GRAPH



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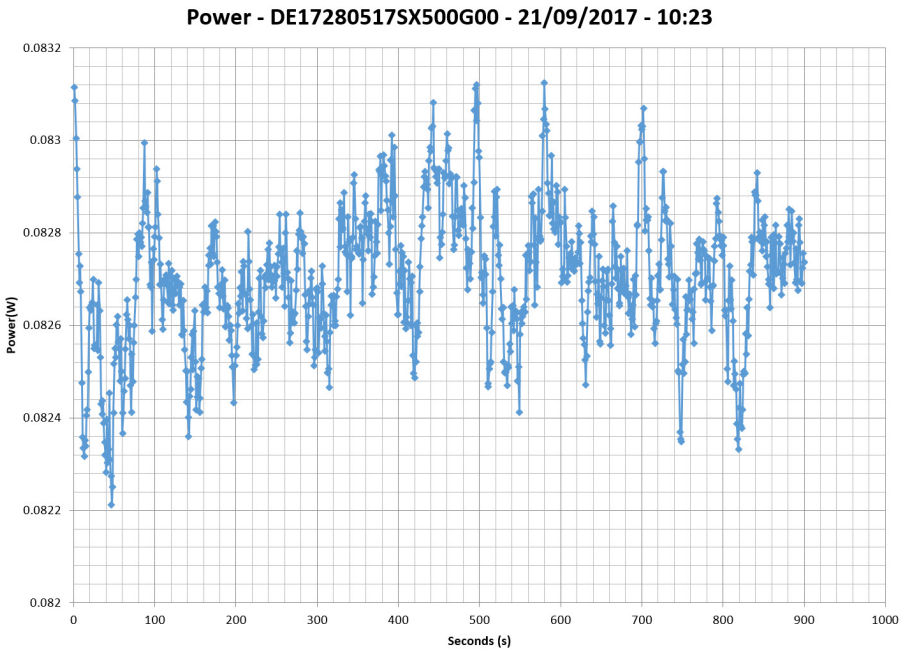
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.214	62.941%	0.056
	5.112V	0.340		115.13V
2	0.087A	0.447	71.178%	0.099
	5.110V	0.628		115.15V
3	0.542A	2.762	78.869%	0.316
	5.094V	3.502		115.13V
4	1.002A	5.093	80.116%	0.379
	5.081V	6.357		115.14V
5	1.502A	7.607	80.141%	0.412
	5.065V	9.492		115.14V
6	2.501A	12.571	78.914%	0.446
	5.026V	15.930		115.14V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.214	54.592%	0.020
	5.111V	0.392		230.37V
2	0.088A	0.447	63.675%	0.035
	5.108V	0.702		230.37V
3	0.542A	2.760	75.492%	0.157
	5.088V	3.656		230.36V
4	1.002A	5.087	78.262%	0.232
	5.075V	6.500		230.36V
5	1.502A	7.596	78.797%	0.283
	5.058V	9.640		230.37V
6	2.501A	12.576	79.610%	0.337
	5.028V	15.797		230.37V

VAMPIRE POWER -115V



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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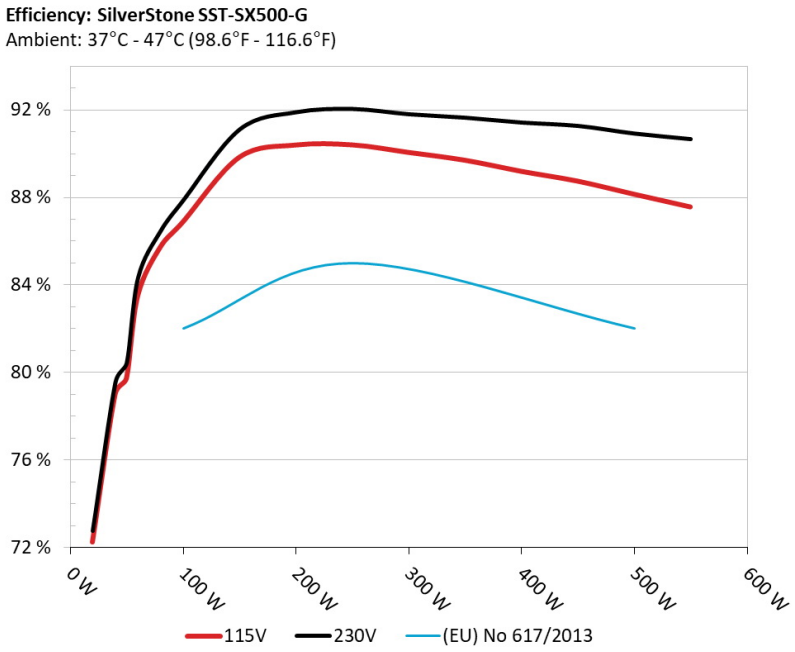
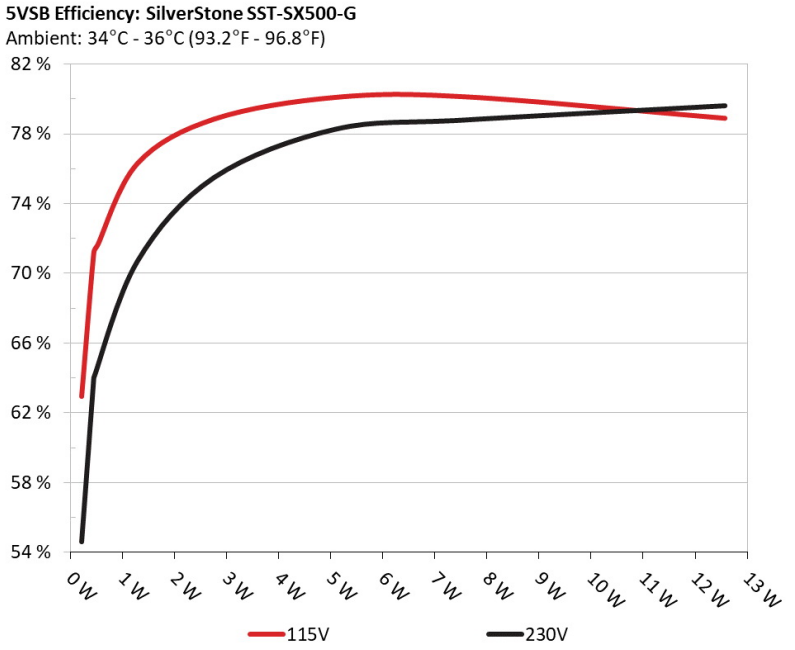
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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	2.305A	1.965A	1.970A	0.986A	49.780	79.716%	898	13.2	38.04°C	0.961
	12.228V	5.098V	3.344V	5.060V	62.447				48.55°C	115.18V
2	5.642A	2.941A	2.962A	1.186A	99.754	86.861%	898	13.2	38.42°C	0.983
	12.213V	5.092V	3.338V	5.047V	114.843				51.11°C	115.18V
3	9.321A	3.443A	3.478A	1.387A	149.888	89.825%	898	13.2	38.85°C	0.987
	12.209V	5.087V	3.332V	5.036V	166.867				53.92°C	115.18V
4	13.002A	3.934A	3.967A	1.591A	199.769	90.385%	898	13.2	39.15°C	0.989
	12.197V	5.081V	3.326V	5.028V	221.020				57.92°C	115.17V
5	16.353A	4.929A	4.968A	1.794A	249.791	90.392%	898	13.2	40.14°C	0.993
	12.187V	5.075V	3.319V	5.013V	276.343				62.69°C	115.17V
6	19.707A	5.914A	5.977A	2.001A	299.727	90.047%	1405	22.9	40.51°C	0.995
	12.176V	5.069V	3.312V	4.998V	332.857				64.10°C	115.17V
7	23.074A	6.918A	6.988A	2.204A	349.766	89.690%	1575	25.3	41.24°C	0.996
	12.163V	5.064V	3.305V	4.986V	389.971				66.10°C	115.17V
8	26.446A	7.906A	8.006A	2.410A	399.717	89.183%	2048	33.6	42.34°C	0.996
	12.151V	5.058V	3.296V	4.977V	448.198				66.99°C	115.17V
9	30.242A	8.413A	8.533A	2.411A	449.745	88.733%	2048	33.6	43.17°C	0.997
	12.140V	5.054V	3.293V	4.972V	506.851				70.74°C	115.16V
10	34.006A	8.916A	9.035A	2.515A	499.669	88.137%	2325	37.6	44.23°C	0.997
	12.129V	5.050V	3.287V	4.965V	566.922				73.58°C	115.16V
11	38.158A	8.919A	9.045A	2.518A	549.652	87.556%	2375	37.7	46.54°C	0.997
	12.119V	5.048V	3.284V	4.960V	627.771				78.87°C	115.16V
CL1	0.098A	13.021A	13.004A	0.005A	110.387	83.444%	898	13.2	44.27°C	0.994
	12.226V	5.080V	3.308V	5.073V	132.289				65.89°C	115.19V
CL2	41.619A	1.004A	1.001A	1.002A	518.247	88.692%	2390	37.9	44.19°C	0.997
	12.129V	5.074V	3.316V	5.026V	584.321				75.76°C	115.17V

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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	1.195A	0.486A	0.473A	0.196A	19.674	72.238%	898	13.2	0.863
	12.226V	5.103V	3.350V	5.093V	27.235				115.18V
2	2.412A	0.980A	0.984A	0.391A	39.765	78.998%	898	13.2	0.946
	12.225V	5.100V	3.348V	5.082V	50.337				115.18V
3	3.635A	1.467A	1.494A	0.591A	59.883	83.500%	898	13.2	0.962
	12.218V	5.098V	3.344V	5.071V	71.716				115.18V
4	4.848A	1.965A	1.974A	0.786A	79.810	85.718%	898	13.2	0.979
	12.216V	5.095V	3.341V	5.065V	93.108				115.18V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	24.9 mV	17.1 mV	21.9 mV	16.6 mV	Pass
20% Load	36.8 mV	14.3 mV	14.4 mV	15.3 mV	Pass
30% Load	24.2 mV	17.9 mV	15.4 mV	21.2 mV	Pass
40% Load	23.9 mV	21.1 mV	21.4 mV	23.9 mV	Pass
50% Load	23.1 mV	21.7 mV	23.9 mV	20.4 mV	Pass
60% Load	25.8 mV	29.0 mV	28.9 mV	23.8 mV	Pass
70% Load	29.0 mV	27.0 mV	33.1 mV	27.4 mV	Pass
80% Load	30.9 mV	30.2 mV	36.0 mV	30.4 mV	Pass
90% Load	31.7 mV	32.4 mV	30.8 mV	34.3 mV	Pass
100% Load	35.4 mV	36.0 mV	36.5 mV	32.0 mV	Pass
110% Load	37.1 mV	35.0 mV	36.6 mV	34.2 mV	Pass
Crossload 1	32.9 mV	28.1 mV	38.2 mV	30.0 mV	Pass
Crossload 2	34.6 mV	47.7 mV	46.8 mV	28.9 mV	Pass

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HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	23.68
AC Loss to PWR_OK Hold Up Time (ms)	19.80
PWR_OK Inactive to DC Loss Delay (ms)	3.88

Top side

Power specifications label

CERTIFICATIONS

CYBENETICS PLATINUM

CYBENETICS STANDARD++