EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

SilverStone ST1500-TI

Lab ID#: 207
Receipt Date: -
Test Date: -

Report: 19PS207A
Report Date: Jan 11, 2018

DUT INFORMATION

Brand	SilverStone
Manufacturer (OEM)	Enhance Electronics
Series	Strider Titanium Series
Model Number	ST1500-TI
Serial Number	DB17250301STK50TI0
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	17.6-8.8
Rated Frequency (Hz)	50-60
Rated Power (W)	1500
Type	ATX12V
Cooling	140mm Double Ball-Bearing Fan (D14BH-12)
Semi-Passive Operation	✓
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	25	22	125	3	0.3
	Watts	120		1500	15	3.6
Total Max. Power (W)		1500				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (550mm)	1	1	16-22AWG	No
4+4 pin EPS12V (750mm)	1	1	16AWG	No
4+4 pin EPS12V (550mm)	1	1	16AWG	No
6+2 pin PCIe (550mm)	8	8	16AWG	No
SATA (600mm+140mm+140mm+140mm)	4	16	18AWG	No
4 pin Molex (600mm+150mm+150mm)	2	6	18AWG	No
FDD Adapter (+120mm)	1	1	22AWG	No

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General Data	
Manufacturer (OEM)	CWT
Primary Side	
Transient Filter	6x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor
Bridge Rectifier(s)	2x GBJ1510 (700V, 15A @ 100°C)
APFC MOSFETS	2x Vishay SiHF22N60E (650V, 13A @ 100°C, 0.18 Ohm)
APFC Boost Diode	1x Power Integrations QH08TZ600 (600V, 8A @ 150°C)
Hold-up Cap(s)	2x Nichicon (400V, 470uF each or 940uF combined, 2000h @ 105°C, GG)
Main Switchers	2x Vishay SiHG20N50C (560V, 11A @ 100°C, 0.27Ohm)
APFC Controller	Infineon ICE3PCS01G - CM03X
Switching Controller	Infineon ICE2HS01G
Topology	Primary side: Half-Bridge & LLC Resonant Controller Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	6xInte ational Rectifier IRFH7004TRPBF (40V, 164A @ 100°C, 1.4 mOhm)
5V & 3.3V	DC-DC Converters: 4x QM3004D (30V, 40A @ 100°C, 8.5 mOhm) 2x QM3006D (30V, 57A @ 100°C, 5.5 mOhm) PWM Controller: ANPEC APW7159
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (1-5,000 @ 105°C, KZE), Nippon Chemi-Con (4-10,000 @ 105°C, KY), Nippon Chemi-Con (5-6,000 @ 105°C, KZH) Polymers: FPCAP
Supervisor IC	Weltrend WT7502 (OVP, UVP, SCP, PG), LM358
Fan Model	NR135L (12V, 0.22A, Rifle Bearing)
5VSB Circuit	
Rectifier	SD04N65A, QM3004D, MBRU2045CT SBR (45V, 20A @ 125°C)
Standby PWM Controller	On-Bright OB5269CP

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RESULTS	
Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	91.403
Efficiency With 10W (≤500W) or 2% (>500W) Load -115V	0.000
Average Efficiency 5VSB	78.874
Standby Power Consumption (W) -115V	0.1126340
Standby Power Consumption (W) -230V	0.1579400
Average PF	0.981
ErP Lot 3/6 Ready	ErP Lot 3/6 2010: ✓ ErP Lot 3/6 2013: ✓ ErP Lot 3/6 2014, CEC: Partially
(EU) No 617/2013 Compliance	✓
Avg Noise Output	44.24
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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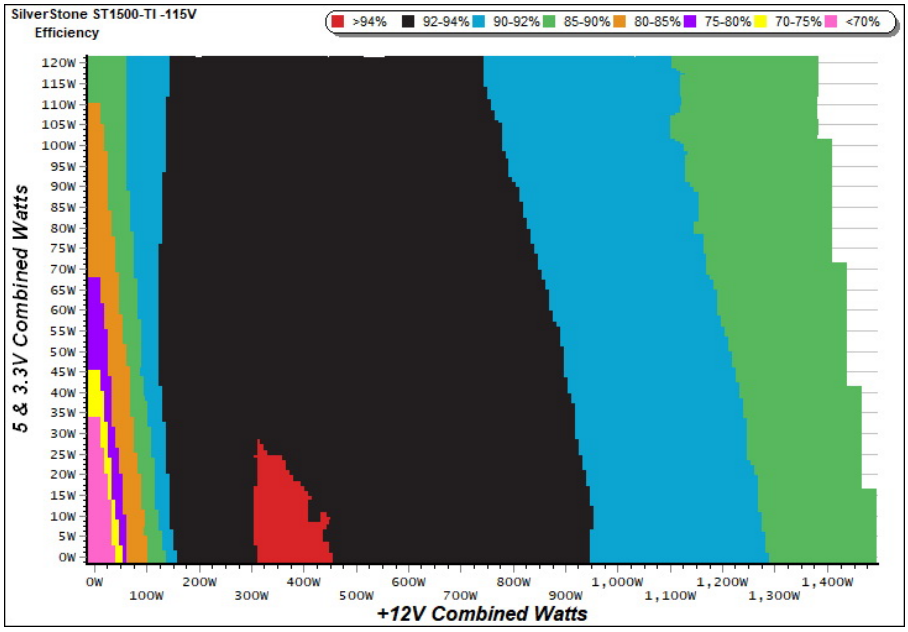
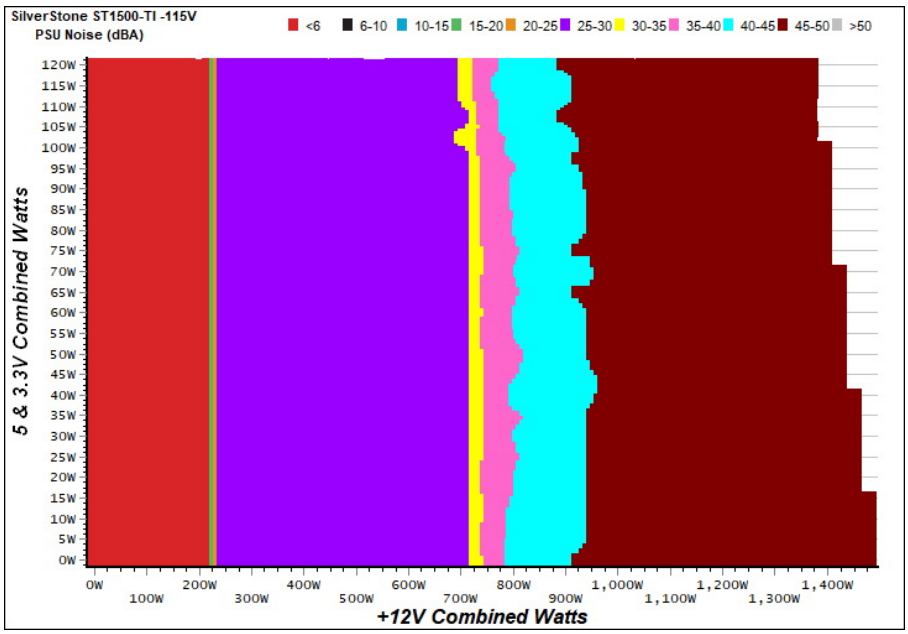
EFFICIENCY GRAPH



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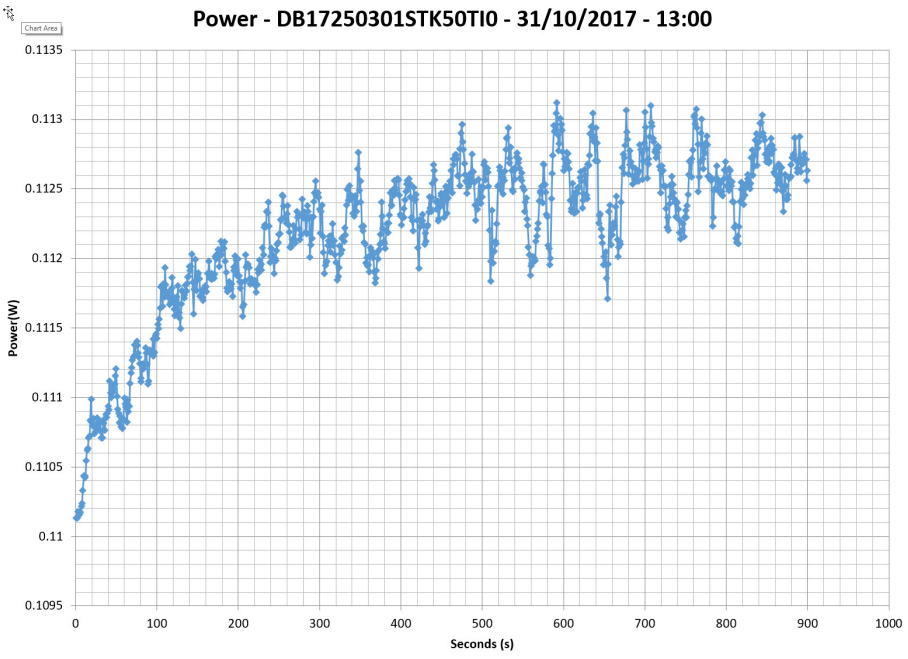
5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.209	56.334%	0.019
	4.985V	0.371		115.09V
2	0.087A	0.435	67.233%	0.033
	4.983V	0.647		115.09V
3	0.542A	2.690	77.566%	0.164
	4.963V	3.468		115.09V
4	1.002A	4.954	80.776%	0.262
	4.944V	6.133		115.09V
5	1.502A	7.394	81.639%	0.341
	4.924V	9.057		115.09V
6	3.001A	14.582	79.061%	0.473
	4.859V	18.444		115.09V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.209	46.966%	0.007
	4.985V	0.445		230.24V
2	0.087A	0.435	57.769%	0.012
	4.983V	0.753		230.24V
3	0.542A	2.692	71.368%	0.057
	4.963V	3.772		230.24V
4	1.002A	4.955	75.974%	0.096
	4.944V	6.522		230.24V
5	1.502A	7.395	80.232%	0.133
	4.924V	9.217		230.24V
6	3.001A	14.589	79.202%	0.238
	4.861V	18.420		230.23V

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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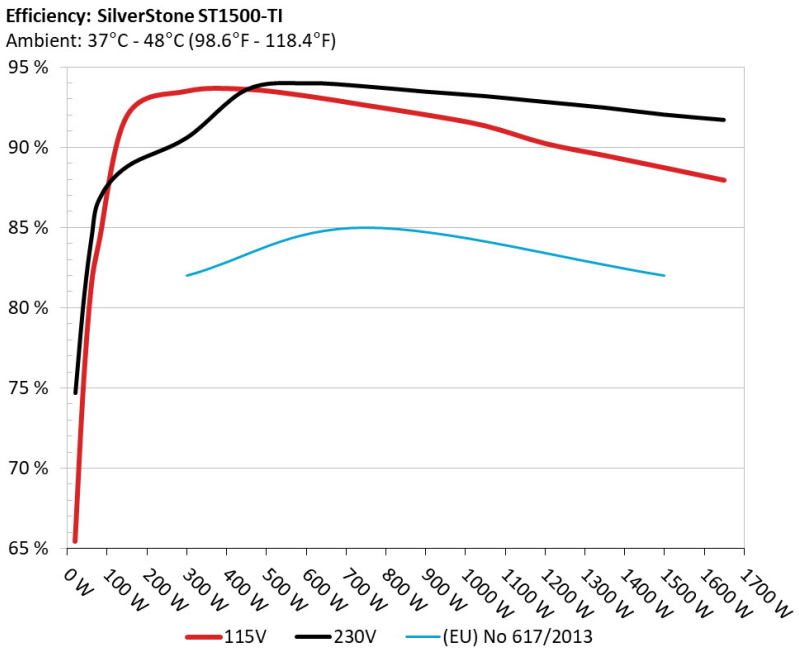
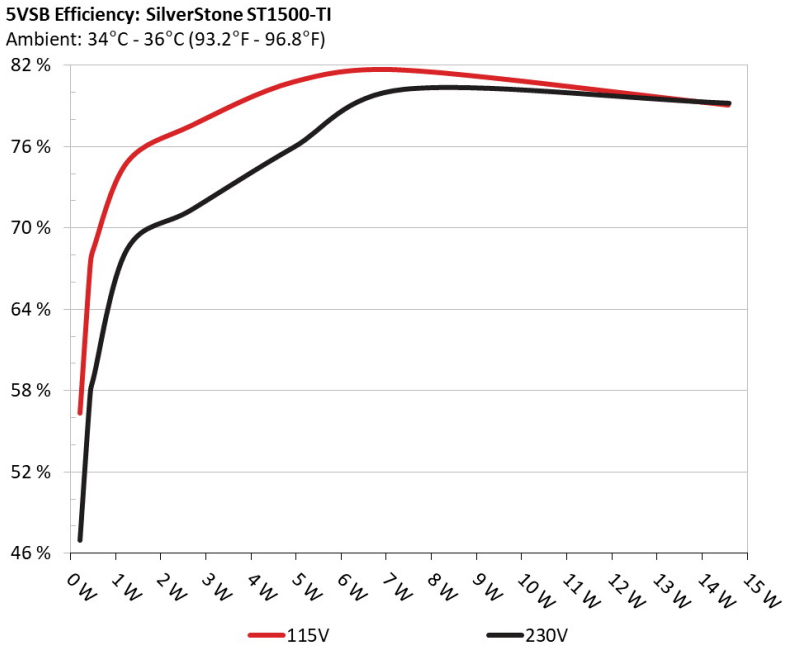
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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	10.602A	1.964A	1.965A	0.986A	149.782	91.933%	0	<6.0	43.53°C	0.956
	12.092V	5.097V	3.352V	5.057V	162.926				38.63°C	115.08V
2	22.278A	2.944A	2.961A	1.191A	299.748	93.476%	1095	30.7	38.44°C	0.974
	12.070V	5.083V	3.339V	5.039V	320.667				43.53°C	115.07V
3	34.334A	3.453A	3.481A	1.390A	449.731	93.595%	1204	34.1	38.93°C	0.982
	12.048V	5.071V	3.329V	5.020V	480.508				44.19°C	115.06V
4	46.428A	3.951A	3.976A	1.598A	599.564	93.181%	1630	40.9	39.39°C	0.984
	12.027V	5.062V	3.316V	5.000V	643.437				45.52°C	115.06V
5	58.226A	4.956A	4.991A	1.806A	749.462	92.600%	2025	45.7	39.98°C	0.987
	12.004V	5.050V	3.304V	4.983V	809.352				46.27°C	115.04V
6	70.049A	5.954A	6.014A	2.011A	899.234	92.011%	2258	48.9	41.04°C	0.988
	11.984V	5.037V	3.291V	4.965V	977.307				47.53°C	115.05V
7	81.873A	6.971A	7.046A	2.221A	1048.958	91.320%	2275	49.0	42.27°C	0.990
	11.968V	5.024V	3.278V	4.945V	1148.656				49.42°C	115.07V
8	93.623A	7.983A	8.083A	2.435A	1199.168	90.223%	2275	49.0	43.95°C	0.992
	11.971V	5.013V	3.265V	4.927V	1329.119				51.67°C	115.07V
9	105.679A	8.495A	8.639A	2.440A	1349.244	89.473%	2283	49.1	46.06°C	0.993
	11.986V	5.002V	3.252V	4.914V	1507.994				54.15°C	115.07V
10	117.369A	9.028A	9.162A	3.075A	1499.105	88.708%	2283	49.1	46.91°C	0.993
	12.008V	4.990V	3.241V	4.876V	1689.933				55.82°C	115.08V
11	129.589A	9.042A	9.187A	3.080A	1649.072	87.932%	2283	49.1	48.29°C	0.994
	12.033V	4.981V	3.233V	4.866V	1875.388				57.32°C	115.13V
CL1	0.099A	14.025A	14.005A	0.004A	118.374	83.095%	2275	49.0	45.92°C	0.936
	12.098V	5.054V	3.304V	5.099V	142.457				50.21°C	115.13V
CL2	124.921A	1.003A	1.002A	0.004A	1511.517	88.907%	2283	49.1	47.59°C	0.993
	12.033V	5.022V	3.280V	5.025V	1700.107				56.53°C	115.08V

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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	1.207A	0.481A	0.475A	0.196A	19.658	65.444%	0	<6.0	0.819
	12.098V	5.109V	3.367V	5.099V	30.038				115.09V
2	2.442A	0.967A	0.980A	0.391A	39.762	74.821%	0	<6.0	0.900
	12.096V	5.106V	3.363V	5.091V	53.143				115.09V
3	3.673A	1.462A	1.486A	0.591A	59.876	81.218%	0	<6.0	0.899
	12.094V	5.103V	3.360V	5.079V	73.723				115.08V
4	4.896A	1.963A	1.966A	0.785A	79.791	84.082%	0	<6.0	0.941
	12.092V	5.100V	3.356V	5.070V	94.897				115.09V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	23.0 mV	6.5 mV	8.3 mV	3.6 mV	Pass
20% Load	15.6 mV	7.6 mV	9.6 mV	3.8 mV	Pass
30% Load	16.0 mV	7.2 mV	10.5 mV	4.3 mV	Pass
40% Load	16.6 mV	7.7 mV	11.3 mV	5.2 mV	Pass
50% Load	18.3 mV	8.3 mV	12.4 mV	5.0 mV	Pass
60% Load	25.7 mV	9.2 mV	13.5 mV	5.7 mV	Pass
70% Load	34.4 mV	11.1 mV	15.0 mV	6.4 mV	Pass
80% Load	19.5 mV	11.0 mV	19.9 mV	6.9 mV	Pass
90% Load	19.6 mV	11.6 mV	15.5 mV	7.2 mV	Pass
100% Load	20.5 mV	12.6 mV	17.0 mV	7.9 mV	Pass
110% Load	21.6 mV	13.3 mV	18.4 mV	8.1 mV	Pass
Crossload 1	41.7 mV	9.8 mV	11.4 mV	4.3 mV	Pass
Crossload 2	19.4 mV	11.7 mV	13.4 mV	7.0 mV	Pass

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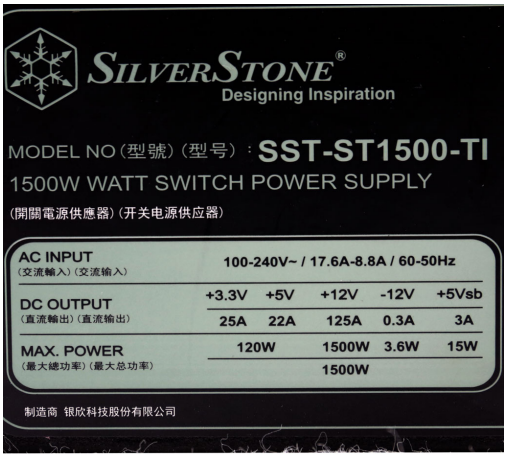
SilverStone ST1500-TI

HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	14.58
AC Loss to PWR_OK Hold Up Time (ms)	19.24
PWR_OK Inactive to DC Loss Delay (ms)	-4.66

Top side



Power specifications label

CERTIFICATIONS

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