Seasonic Prime Titanium 850W

Serial Number R1606TA106460008

Lab ID 49

Certification ID 2549

Test Result Report ID:

Certificate Issue Date: Jan 24, 2018

Scheme: ETA-EMI PSU

115V



230V



115V



230V



Scheme: LAMBDA PSU



Aristeidis Bitziopoulos, Certification Body General Manager

General Information

Test Equipment

Electronic Loads	Chroma 63601-5 x2 Chroma 63600-2 Chroma 63640-80-80 x10 Chroma 63610-80-20
AC Sources	Chroma 6530, APM SP300VAC4000W-P, GW Instek ASR-3500
Power Analyzers	Rohde & Schwarz HMC8015 & NPA701
Oscilloscopes	Picoscope 4444, Siglent SDS2104X PLUS
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Temperature Logger	Picoscope TC-08
Tachometer	UNI-T UT372
Multimeters	Keysight 34465A
EMI Analyzer	TekBox TBMR-110M-EU
Isolation Transformer	4kVA
UPS	FSP Champ Tower 3kVA, CyberPower OLS3000E 3kVA
Testing Methodology	Cybenetics PSU Test Protocol

DUT Information(Non-accredited measurements)

Product Identification Details	
Brand	Seasonic
Model	Prime Titanium 850W
OEM/ODM	Seasonic
Serial Number	R1606TA106460008
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	11-5.5
Rated Frequency (Hz)	50-60

Rated Power (W)	850
Operating Temperature (Continuous Full Load) (°C)	
Type	ATX12V
Cable Design	Fully Modular
Warranty	-
Cybenetics Measurements	
Dimensions (W x H x D)	
Weight	
Cooling	135mm Fluid Dynamic Bearing Fan (HA13525M12F-Z)
Semi-Passive Operation	✓ (selectable)
Cybenetics Testing Information	
Lab ID	49
Date of receipt	Jan 15, 2018
Testing Date	Jan 22, 2018
Report Issued Date	Jan 24, 2018
DUT Notes	Retested on 4/28/17
Engineer Name	-
Authorized By the Laboratory Technical Manager	Aristeidis Bitziopoulos
Signature	

Cables and Connectors(Non-accredited measurements)

Modular Cables				
Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18-22AWG	No
4+4 pin EPS12V (650mm)	2	2	18AWG	No
6+2 pin PCIe (750mm)	6	6	18AWG	No
SATA (450mm+115mm+115mm+115mm)	2	8	18AWG	No
SATA (350mm+115mm)	1	2	18AWG	No
4 pin Molex (450mm+120mm+120mm)	1	3	18AWG	No
4 pin Molex (350mm+120mm)	1	2	18AWG	No

FDD Adapter (+110mm)	1	1	22AWG	No
AC Power Cord (1350mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	70	3	0.3
	Watts	100		840	15	3.6
Total Max. Power (W)		850				

Parts Description

Primary Side	
Transient Filter	6x Y caps, 3x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x Vishay LVB2560 (600V, 25A @ 105°C)
APFC MOSFETS	2x Infineon IPP60R099CP (650V, 19A @ 100°C, 0.099 Ohm)
APFC Boost Diode	1x SCS110AG (600V, 10A @ 117°C)
Hold-up Cap(s)	2x Nippon Chemi-Con (400V, 650uF & 450uF or 1100uF combined, 2000h @ 105°C, CE)
Main Switchers	4x Infineon IPP50R140CP (550V, 15A @ 100°C, 0.140 Ohm)
Drivers For Main Switchers	2x Silicon Labs Si8230BD
APFC Controller	ON Semiconductor NPC1654
Switching Controller	Champion CM6901
Topology	Primary side: Full-Bridge & LLC Resonant Converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Infineon BSC014N04LS (40V, 100A @ 100°C, 1.4 mOhm)
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS PWM Controller: APW7159
Filtering Capacitors	Electrolytics: Nippon Chemi-Con (105°C, KZE, KZH) 1x Rubycon (5VSB circuit, 105°C, YXD) Polymers: FPCAP, Nippon Chemi-Con
Supervisor IC	WeltrendWT7527V (OVP, UVP, OCP, SCP, PG)
Fan Model	Hong Hua HA13525M12F-Z (135mm, 12V, 0.36A, 1800 RPM, Fluid Dynamic Bearing)

5VSB Circuit	
Buck Converter	Leadtrend LD7750R
Rectifiers	STMicroelectronics STU6N65K3 (650V, 3A @ 100°C, 1.3O), Infineon BSC0906NS(30V, 40A @ 100°C, 4.5 mOhm)
-12V Circuit	
Buck Converter	Lite-On LSP5523 (3A max output current)

Test Results

Temperature & Compliance Info

Temperature Range (°C /°F)	28-32 / 82.4-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	91.986%
Average Noise Output (>1450 Load Combinations)	16.40dBA
Average PF (>1450 Load Combinations)	0.990
Efficiency With 10W (≤500W) or 2% (>500W) Load	-
Standby Power Consumption	0.0574W
Non-Accredited	
12V Ripple (Full Load)	-
5V Ripple (Full Load)	-
3.3V Ripple (Full Load)	-
5VSB Ripple (Full Load)	-
12V Load Regulation	-
5V Load Regulation	-
3.3V Load Regulation	-

5VSB Load Regulation	-
Inrush Current	-

230V

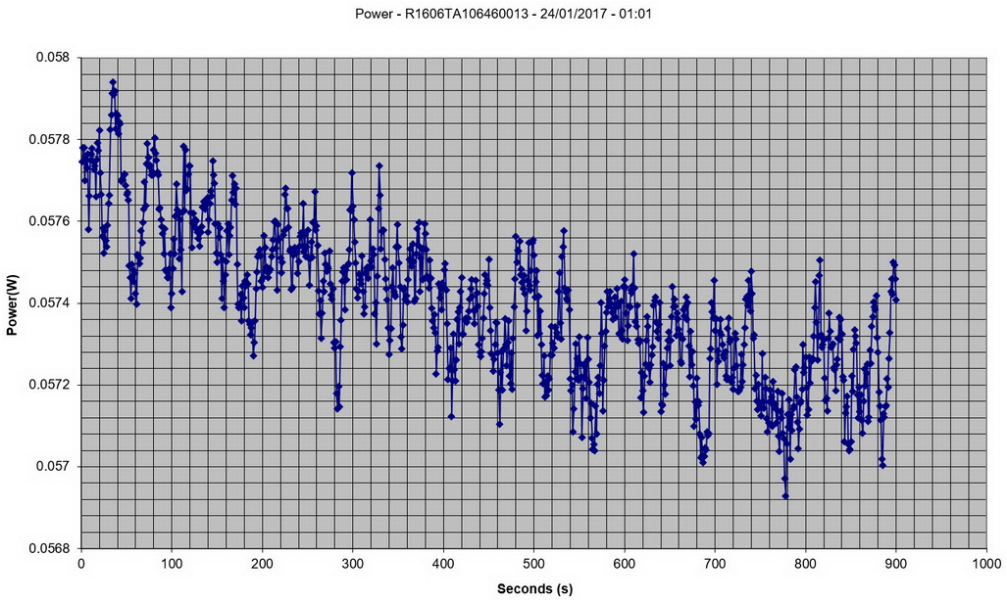
Accredited		
Average Efficiency (>1450 load combinations)		94.164%
Average Noise Output (>1450 Load Combinations)		15.02dBA
Average PF (>1450 Load Combinations)		0.952
Efficiency With 10W (≤500W) or 2% (>500W) Load		-
Standby Power Consumption		0.0988W
Non-Accredited		
12V Ripple (Full Load)		-
5V Ripple (Full Load)		-
3.3V Ripple (Full Load)		-
5VSB Ripple (Full Load)		-
12V Load Regulation		-
5V Load Regulation		-
3.3V Load Regulation		-
5VSB Load Regulation		-
Inrush Current		-
Hold-Up Time & PWR_OK Signal		0.00ms
AC Loss to PWR_OK Hold Up Time		0.00ms
PWR_OK Inactive to DC Loss Delay		0.00ms
OPP (0.00°C / 0.00°C)	-	-

Hold-Up Time & PWR_OK Signal

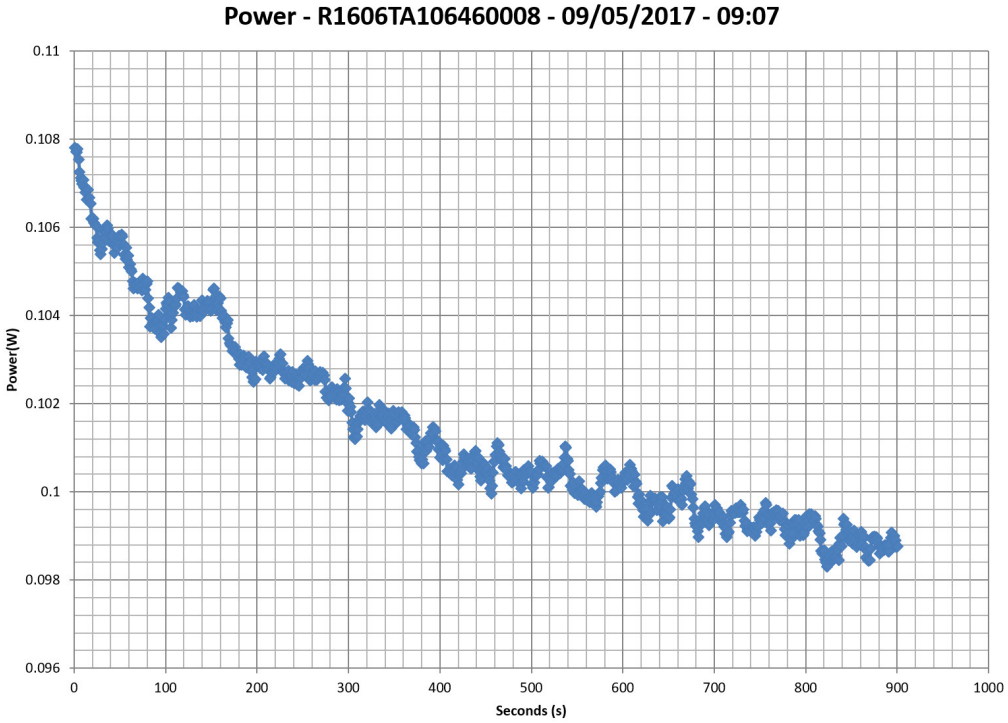
Hold-Up Time (ms)	31.34
AC Loss to PWR_OK Hold Up Time (ms)	30.10
PWR_OK Inactive to DC Loss Delay (ms)	1.24

Graphs

115V

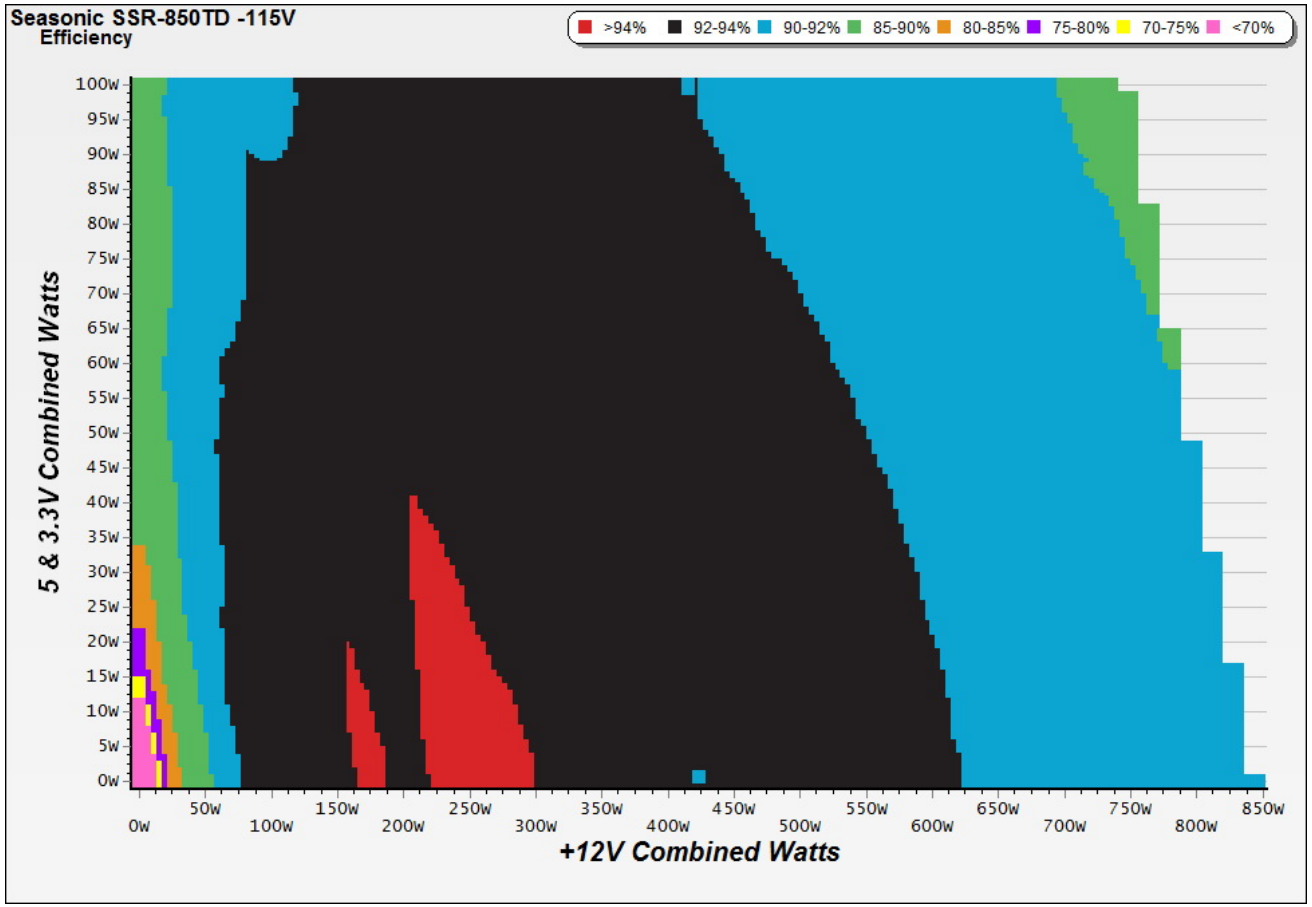


230V



Efficiency Graph

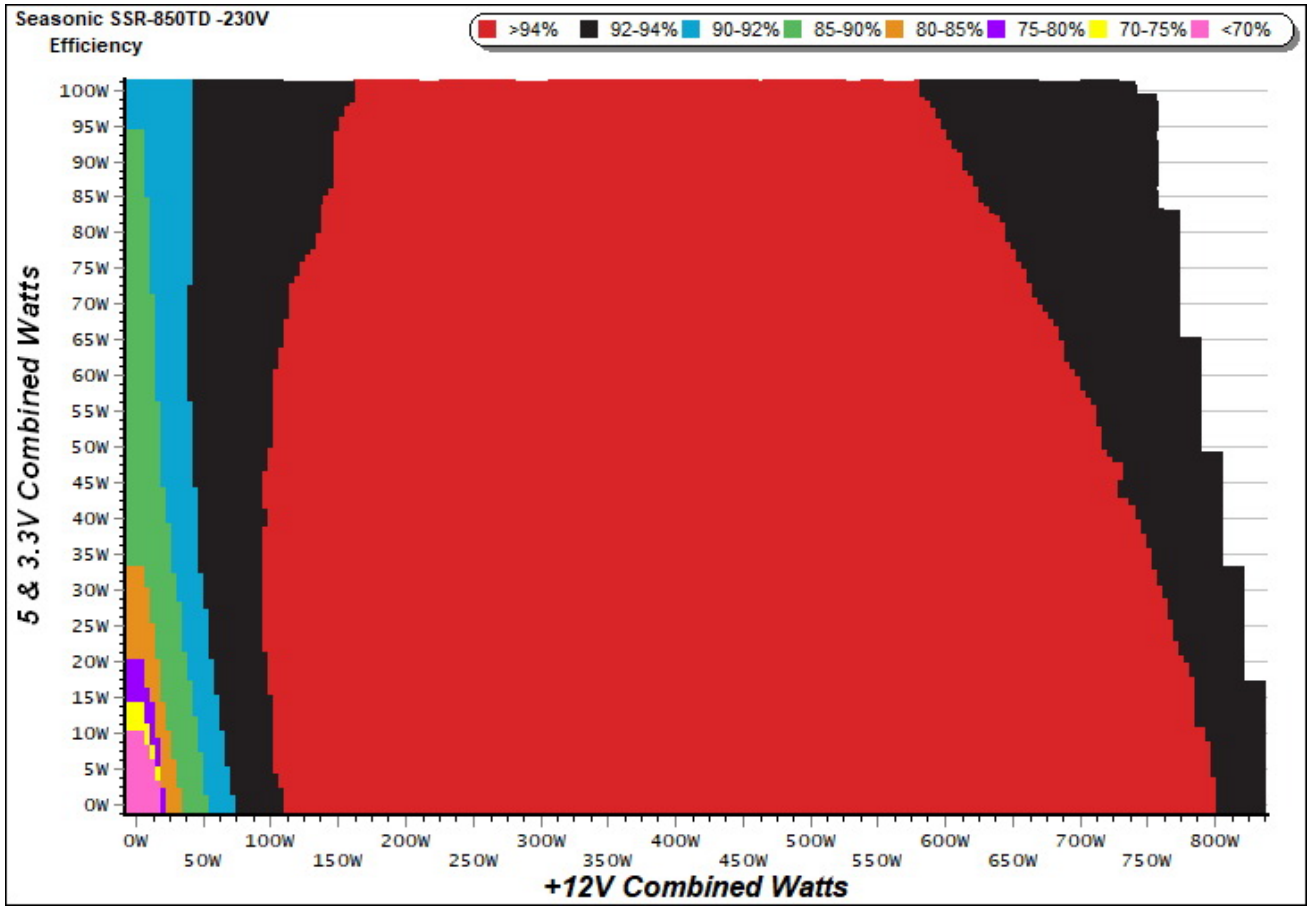
115V



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.

230V

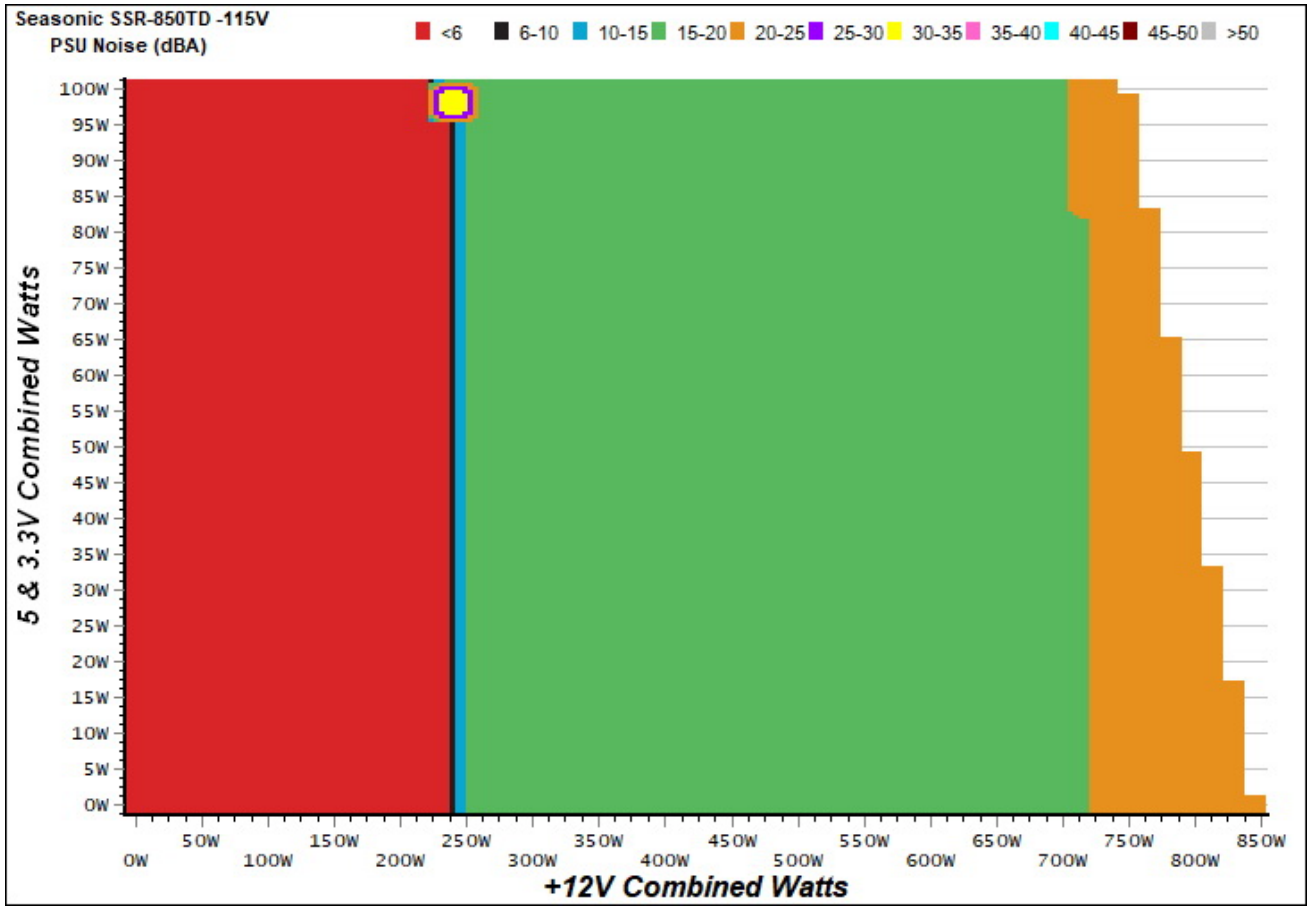


INFO

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

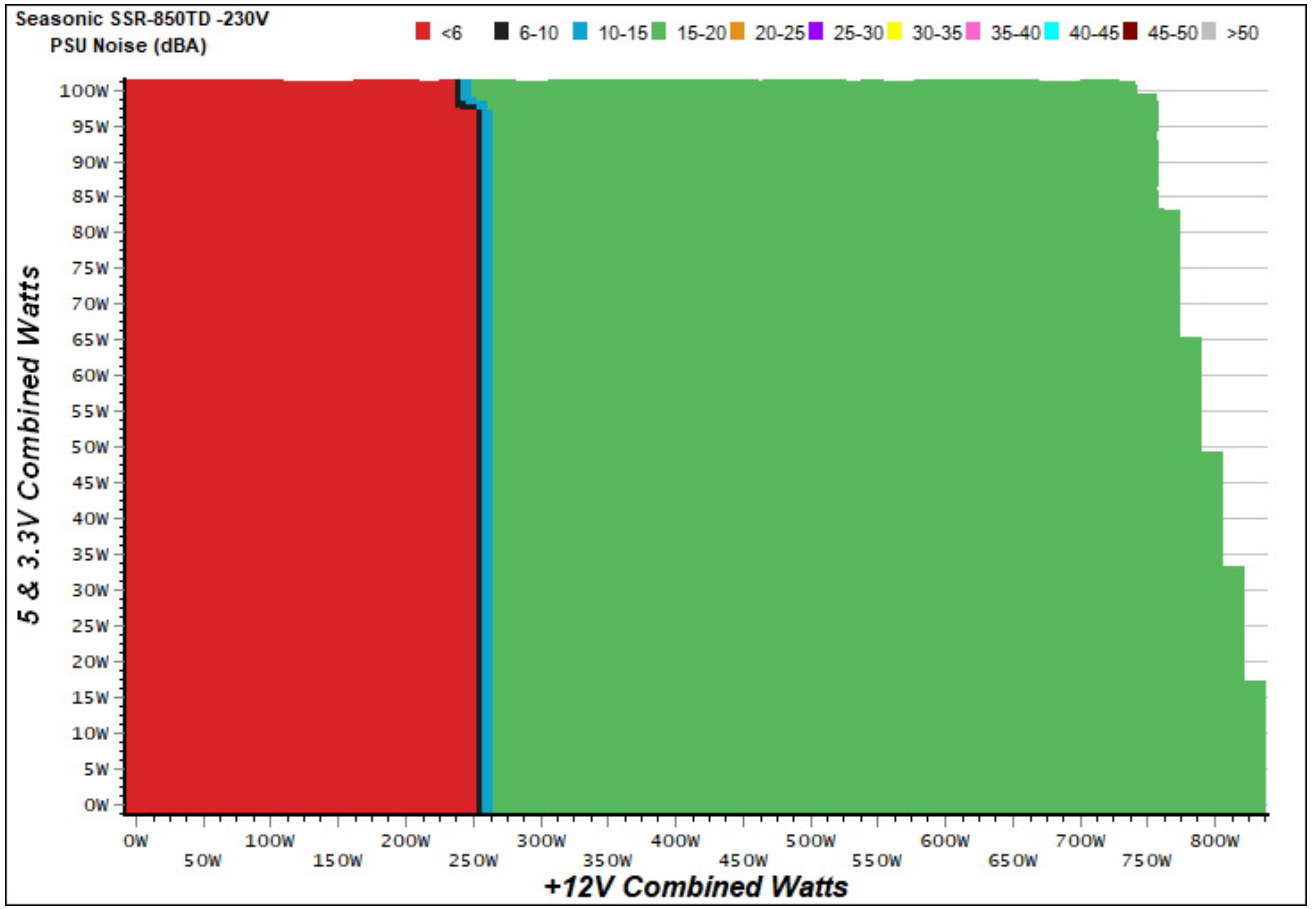
115V



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.

230V

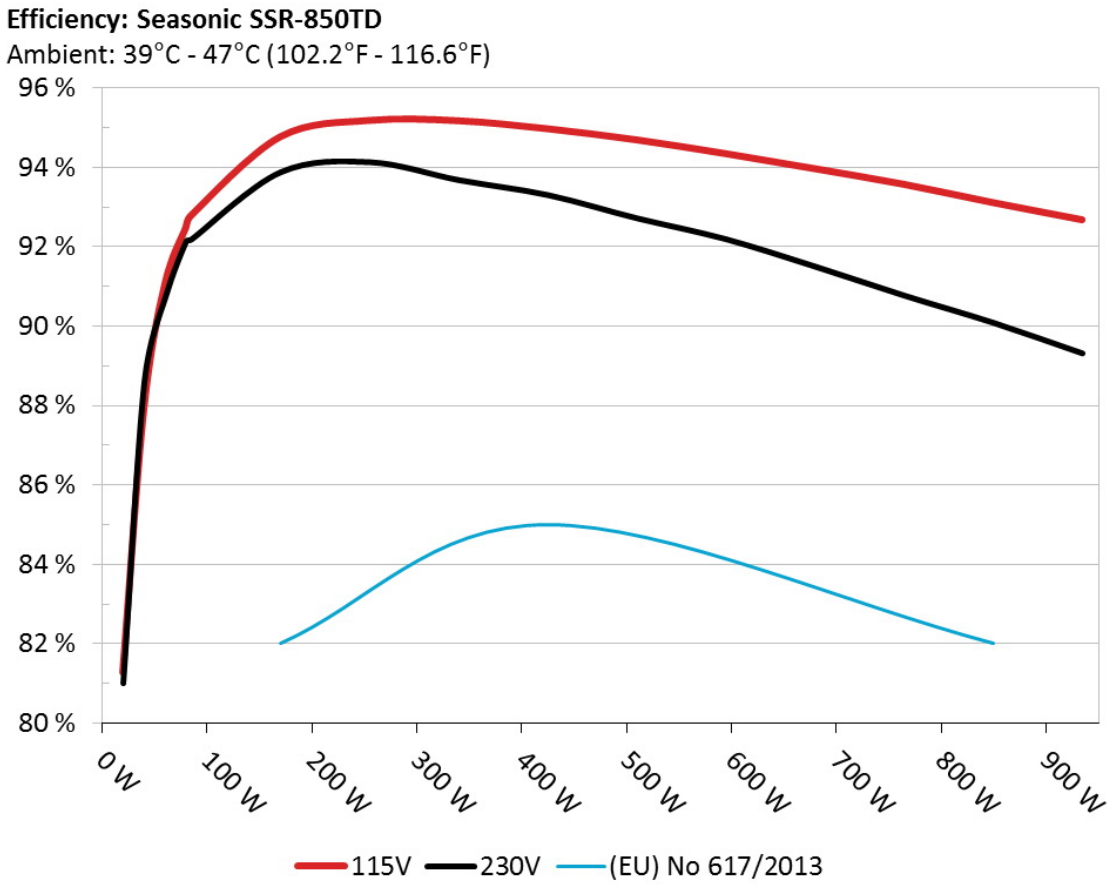


INFO

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.

Indicative Performance

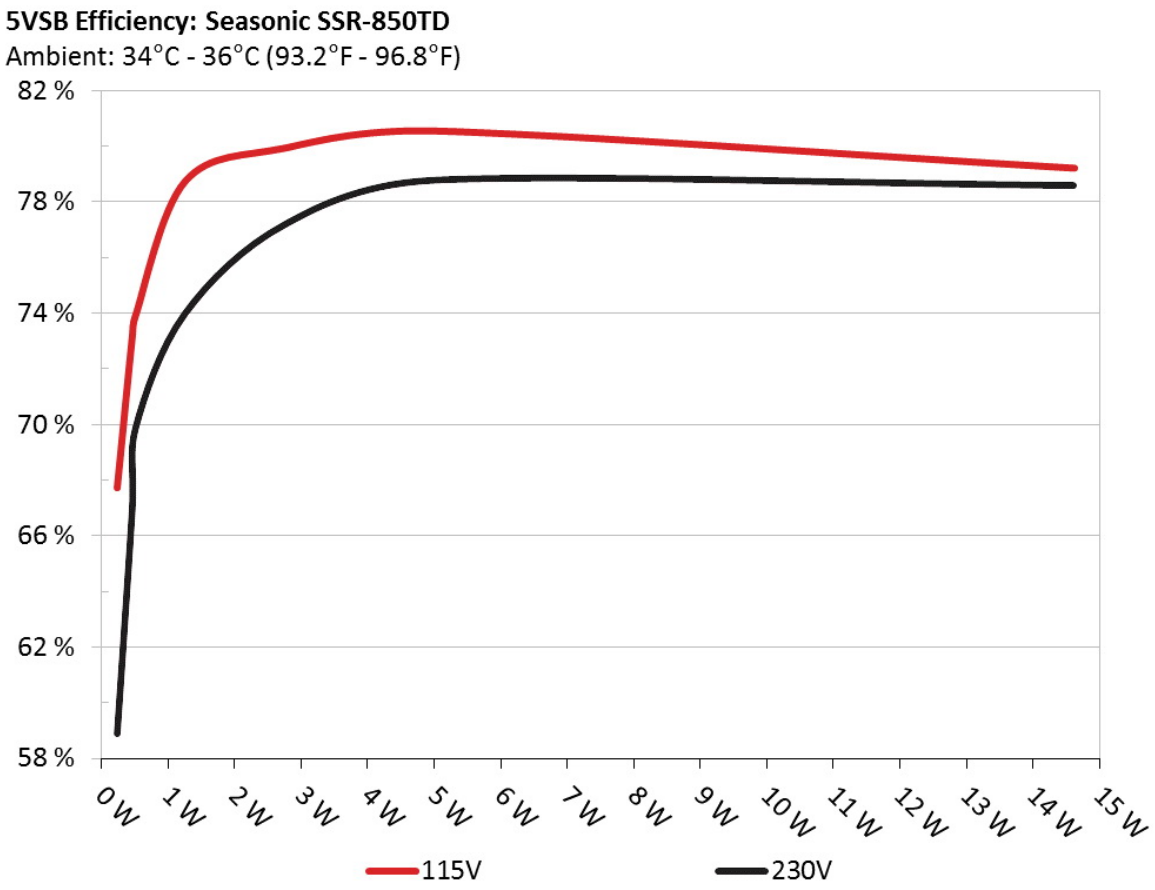
Efficiency under high ambient temperature



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.

5VSB Efficiency (ERP LOT 3/6 & CEC)

115V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.041A	0.208	64.596%	0.036
	5.013V	0.322		115.16V
2	0.087A	0.435	71.664%	0.067
	5.011V	0.607		115.12V
3	0.542A	2.707	79.900%	0.277
	4.991V	3.388		115.16V
4	1.003A	4.983	80.087%	0.373
	4.970V	6.222		115.16V
5	1.502A	7.429	79.676%	0.425
	4.947V	9.324		115.16V
6	3.002A	14.655	78.617%	0.490
	4.882V	18.641		115.16V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.041A	0.208	57.778%	0.012
	5.013V	0.360		230.29V
2	0.087A	0.435	66.923%	0.022
	5.011V	0.650		230.29V
3	0.542A	2.702	77.002%	0.110
	4.989V	3.509		230.30V
4	1.002A	4.974	78.430%	0.182
	4.966V	6.342		230.30V
5	1.502A	7.422	79.312%	0.241
	4.943V	9.358		230.30V
6	3.001A	14.604	78.130%	0.344
	4.866V	18.692		230.30V

Supplementary Tests (For Reference)

Typical Load Tests

115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	5.206A	1.985A	1.974A	0.995A	84.73	92.178%	395	16.4	38.67°C	0.968
	12.130V	5.041V	3.341V	5.005V	91.92				41.04°C	115.1V
2	11.444A	2.970A	2.961A	1.200A	169.61	93.868%	400	16.5	38.86°C	0.991
	12.125V	5.039V	3.340V	4.998V	180.69				41.35°C	115.1V
3	18.043A	3.478A	3.472A	1.400A	254.81	94.120%	405	16.5	39.48°C	0.996
	12.122V	5.036V	3.338V	4.990V	270.73				42.51°C	115.1V
4	24.629A	3.974A	3.954A	1.605A	339.70	93.669%	408	16.5	40.60°C	0.993
	12.120V	5.035V	3.335V	4.982V	362.66				43.86°C	115.1V
5	30.874A	4.969A	4.946A	1.805A	424.62	93.292%	435	15.0	41.37°C	0.992
	12.118V	5.034V	3.334V	4.975V	455.15				44.18°C	115.1V
6	37.126A	5.961A	5.939A	2.009A	509.58	92.708%	508	17.8	42.15°C	0.994
	12.116V	5.032V	3.332V	4.968V	549.66				45.22°C	115.1V
7	43.380A	6.959A	6.931A	2.214A	594.51	92.181%	395	15.2	43.00°C	0.995
	12.112V	5.032V	3.332V	4.960V	644.94				47.34°C	115.1V
8	49.638A	7.949A	7.922A	2.420A	679.48	91.492%	500	17.2	44.40°C	0.996
	12.110V	5.031V	3.331V	4.953V	742.67				48.87°C	115.1V
9	56.324A	8.455A	8.440A	2.420A	764.57	90.759%	590	21.6	45.44°C	0.997
	12.108V	5.029V	3.329V	4.950V	842.42				50.37°C	115.1V
10	62.760A	8.957A	8.927A	3.042A	849.30	90.078%	925	29.3	46.64°C	0.997
	12.103V	5.027V	3.327V	4.927V	942.85				51.93°C	115.1V
11	69.828A	8.965A	8.934A	3.049A	934.33	89.306%	1300	36.2	46.64°C	0.997
	12.096V	5.021V	3.323V	4.917V	1046.21				52.38°C	115.1V
CL1	0.098A	12.011A	12.005A	0.004A	102.84	89.582%	425	16.0	45.28°C	0.980
	12.139V	5.082V	3.381V	5.089V	114.80				50.51°C	115.2V

CL2	69.946A	1.003A	1.003A	1.001A	859.43	90.329%	915	29.3	46.44°C	0.997
	12.097V	4.997V	3.300V	4.964V	951.44				52.04°C	115.1V

The results above are not used in the certification process

230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	5.208A	1.985A	1.974A	0.996A	84.751	92.898%	0	<6.0	47.75°C	0.806
	12.132V	5.034V	3.336V	5.010V	91.230				40.15°C	365.15V
2	11.441A	2.974A	2.965A	1.196A	169.629	94.865%	0	<6.0	48.77°C	0.910
	12.130V	5.034V	3.335V	5.009V	178.810				40.86°C	230.31V
3	18.039A	3.479A	3.478A	1.397A	254.835	95.265%	402	16.5	40.99°C	0.951
	12.127V	5.030V	3.332V	5.002V	267.500				49.18°C	230.32V
4	24.626A	3.975A	3.960A	1.600A	339.738	95.306%	405	16.5	41.73°C	0.969
	12.124V	5.029V	3.331V	4.995V	356.472				50.03°C	230.33V
5	30.865A	4.975A	4.954A	1.801A	424.670	95.159%	425	15.5	42.13°C	0.975
	12.123V	5.028V	3.328V	4.993V	446.272				50.95°C	230.32V
6	37.114A	5.972A	5.952A	2.002A	509.600	94.859%	490	16.3	42.65°C	0.982
	12.120V	5.025V	3.324V	4.988V	537.220				51.77°C	230.32V
7	43.358A	6.971A	6.948A	2.205A	594.557	94.530%	390	15.0	43.22°C	0.984
	12.119V	5.024V	3.323V	4.985V	628.962				52.60°C	230.33V
8	49.609A	7.964A	7.946A	2.405A	679.495	94.145%	490	18.4	43.91°C	0.988
	12.117V	5.024V	3.321V	4.982V	721.755				53.77°C	230.33V
9	56.289A	8.472A	8.466A	2.405A	764.557	93.764%	575	18.7	44.24°C	0.989
	12.115V	5.021V	3.319V	4.981V	815.410				54.54°C	230.34V
10	62.710A	8.971A	8.953A	3.019A	849.319	93.286%	870	27.9	45.33°C	0.990
	12.113V	5.020V	3.316V	4.965V	910.443				55.80°C	230.34V
11	69.747A	8.973A	8.953A	3.020A	934.261	92.855%	1280	35.2	46.34°C	0.991
	12.109V	5.018V	3.315V	4.963V	1006.148				57.61°C	230.34V
CL1	0.099A	12.013A	12.004A	0.004A	101.704	89.961%	360	14.6	43.43°C	0.841
	12.137V	5.035V	3.332V	5.072V	113.054				51.42°C	230.34V

CL2	69.941A	1.003A	1.004A	1.002A	860.437	93.645%	635	22.5	45.24°C	0.990
	12.111V	5.023V	3.322V	4.999V	918.824				55.66°C	230.35V

The results above are not used in the certification process

Light Load Tests

115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.200A	0.492A	0.477A	0.195A	19.610	81.000%	0	<6.0	0.799
	12.131V	5.039V	3.341V	5.031V	24.210				115.1V
2	2.429A	0.990A	0.986A	0.396A	39.740	88.587%	0	<6.0	0.912
	12.131V	5.038V	3.340V	5.024V	44.860				115.1V
3	3.662A	1.476A	1.493A	0.594A	59.830	90.720%	0	<6.0	0.952
	12.131V	5.039V	3.341V	5.019V	65.950				115.1V
4	4.880A	1.985A	1.974A	0.797A	79.790	92.136%	0	<6.0	0.966
	12.130V	5.040V	3.341V	5.012V	86.600				115.1V

The results above are not used in the certification process

230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.205A	0.491A	0.475A	0.196A	19.663	81.902%	0	<6.0	0.472
	12.131V	5.036V	3.340V	5.031V	24.008				230.29V
2	2.431A	0.990A	0.986A	0.396A	39.757	88.118%	0	<6.0	0.648
	12.131V	5.035V	3.338V	5.026V	45.118				230.29V
3	3.663A	1.477A	1.496A	0.595A	59.853	91.223%	0	<6.0	0.737
	12.131V	5.034V	3.338V	5.021V	65.612				165.16V
4	4.880A	1.985A	1.975A	0.796A	79.778	92.618%	0	<6.0	0.795
	12.131V	5.034V	3.337V	5.018V	86.137				230.30V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	7.4 mV	5.5 mV	7.3 mV	2.6 mV	Pass
20% Load	9.6 mV	5.5 mV	7.5 mV	3.7 mV	Pass
30% Load	11.5 mV	6.3 mV	7.8 mV	3.6 mV	Pass
40% Load	8.9 mV	6.8 mV	8.3 mV	4.6 mV	Pass
50% Load	8.8 mV	6.2 mV	9.6 mV	5.0 mV	Pass
60% Load	9.8 mV	6.3 mV	10.0 mV	5.2 mV	Pass
70% Load	10.9 mV	6.5 mV	10.8 mV	5.8 mV	Pass
80% Load	11.1 mV	6.6 mV	11.2 mV	6.3 mV	Pass
90% Load	12.6 mV	7.4 mV	12.6 mV	6.7 mV	Pass
100% Load	13.4 mV	7.5 mV	13.1 mV	7.6 mV	Pass
110% Load	13.8 mV	8.3 mV	14.5 mV	8.5 mV	Pass
Crossload 1	8.3 mV	6.6 mV	8.3 mV	3.6 mV	Pass
Crossload 2	13.4 mV	6.5 mV	12.1 mV	6.6 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	8.1 mV	3.4 mV	8.6 mV	4.5 mV	Pass
20% Load	10.0 mV	3.8 mV	8.3 mV	4.8 mV	Pass
30% Load	11.3 mV	4.1 mV	9.2 mV	5.6 mV	Pass
40% Load	7.6 mV	4.1 mV	9.7 mV	6.7 mV	Pass
50% Load	8.3 mV	4.0 mV	9.5 mV	6.5 mV	Pass
60% Load	9.0 mV	4.6 mV	9.4 mV	7.8 mV	Pass
70% Load	10.0 mV	4.5 mV	10.5 mV	8.5 mV	Pass
80% Load	10.4 mV	4.7 mV	9.3 mV	9.5 mV	Pass

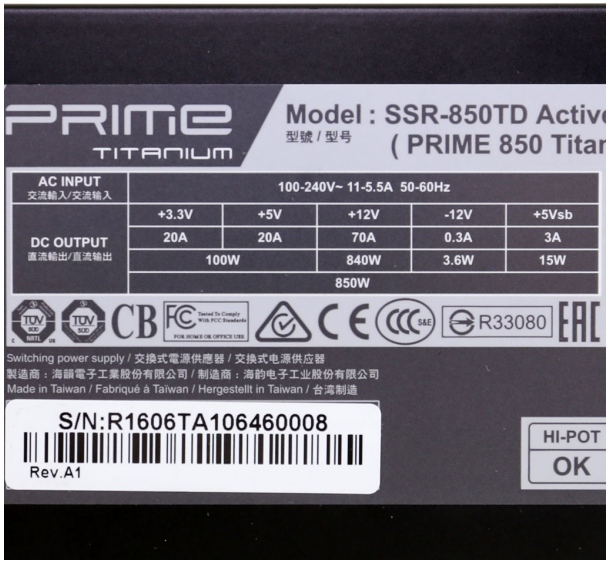
Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	11.0 mV	4.9 mV	10.5 mV	11.0 mV	Pass
100% Load	13.2 mV	5.5 mV	14.5 mV	12.7 mV	Pass
110% Load	12.5 mV	5.6 mV	15.6 mV	13.6 mV	Pass
Crossload 1	9.6 mV	4.8 mV	13.0 mV	5.9 mV	Pass
Crossload 2	13.1 mV	4.7 mV	13.0 mV	11.9 mV	Pass

The results above are not used in the certification process

Seasonic Prime Titanium 850W



Top side



Power specifications label

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