

Anex

Asus ROG Thor 850 (#1)

Lab ID#: 448

Receipt Date: Jul 31, 2018

Test Date: Aug 6, 2018

Report:

Report Date: Aug 8, 2018

DUT INFORMATION

Brand	Asus ROG
Manufacturer (OEM)	Seasonic
Series	Rog Thor Platinum
Model Number	RTSS02-850P1
Serial Number	AX19030003
DUT Notes	RTSS02-850P1

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	12-6
Rated Frequency (Hz)	50-60
Rated Power (W)	850
Type	ATX12V
Cooling	135mm Double Ball Bearing Fan (PLA13525B12M)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	71	3	0.3
	Watts	100		852	15	3.6
Total Max. Power (W)		852				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (610mm)	1	1	18-20AWG	No
4+4 pin EPS12V (650mm)	2	2	18AWG	No
6+2 pin PCIe (680mm)	2	2	18AWG	No
6+2 pin PCIe (680mm+70mm)	1	2	18-20AWG	Yes
SATA (450mm+115mm)	1	2	18AWG	No
SATA (450mm+115mm+115mm+115mm)	2	8	18AWG	No
4 pin Molex (350mm+120mm)	1	2	18AWG	No
4 pin Molex (450mm+115mm+115mm)	1	3	18AWG	No
FDD Adapter (+105mm)	1	1	22AWG	No
RGB Cable (800mm)	1	1	22AWG	No

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General Data	
Manufacturer (OEM)	Seasonic
Platform Model	Focus Plus Platinum
Primary Side	
Transient Filter	4x Y caps, 1x X caps, 2x CM chokes, 1x MOV, 1x CM02X
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	2x APD ALB2560U (600V, 25A)
APFC MOSFETS	2x Infineon IPP60R125CP (650V, 16A @ 100°C, 0.125 Ohm)
APFC Boost Diode	1x CREE C3D08060A (600V, 8A @ 152°C)
Hold-up Cap	Hitachi (400V, 820uF, 2000h @ 105°C, HU)
Main Switchers	4x Infineon IPP50R199CP (550V, 11A @ 100°C, 0.199 Ohm)
APFC Controller	Champion CM6500UNX
Current Sensor IC	Allegro ACS725T
Switching Controller	Champion CM6901T6X
Topology	Primary side: Full-Bridge & LLC Resonant Converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Nexperia MOSFETs
5V & 3.3V	DC-DC Converters: 6x Infineon BSC0906NS (30V, 40A @ 100°C, 4.5mΩ) PWM Controller: APW7159
Filtering Capacitors	Electrolytics: Chemi-Con (4,000-10,000h @ 105°C, KY), Chemi-Con (1,000-5,000h @ 105°C, KZE), 3x Nichicon (4,000-10,000h @ 105°C, HE), Rubycon (5VSB circuit, 105°C, YXD) Polymers: FPCAP, Nippon Chemi-Con
Micro Controller	Microchip ATmega8A
Supervisor IC	Weltrend WT7527V (OVP, UVP, OCP, SCP, PG)
Fan Model	Power Logic PLA13525B12M (135mm, 12V, 0.40A, 2000 RPM, 111.1 CFM, 41.6 dB[A], Double Ball Bearing)
5VSB Circuit	
PWM Controller	Excelliance EM8569C

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	89.966%
Efficiency With 10W (≤500W) or 2% (>500W)	63.199
Average Efficiency 5VSB	76.946%
Standby Power Consumption (W)	0.0439733
Average PF	0.985
Avg Noise Output	15.58 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A+

230V

Average Efficiency	91.905%
Average Efficiency 5VSB	76.422%
Standby Power Consumption (W)	0.0739211
Average PF	0.951
Avg Noise Output	14.82 dB(A)
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	A++

TEST EQUIPMENT

Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Chroma 61604, Keysight AC6804B	
Power Analyzers	N4L PPA1530 x2, 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	

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

Hold-Up Time (ms)	24.3
AC Loss to PWR_OK Hold Up Time (ms)	20.1
PWR_OK Inactive to DC Loss Delay (ms)	4.2

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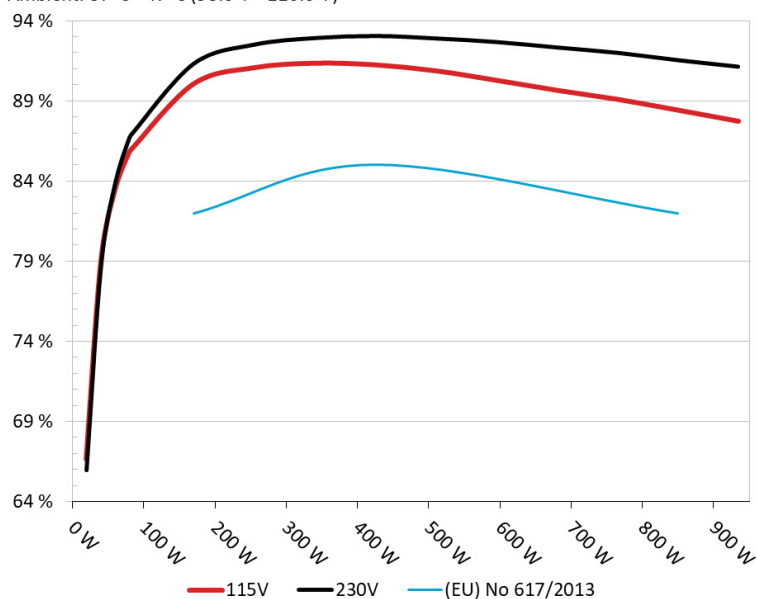
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EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: ASUS RTSS02-850P1

Ambient: 37°C - 47°C (98.6°F - 116.6°F)



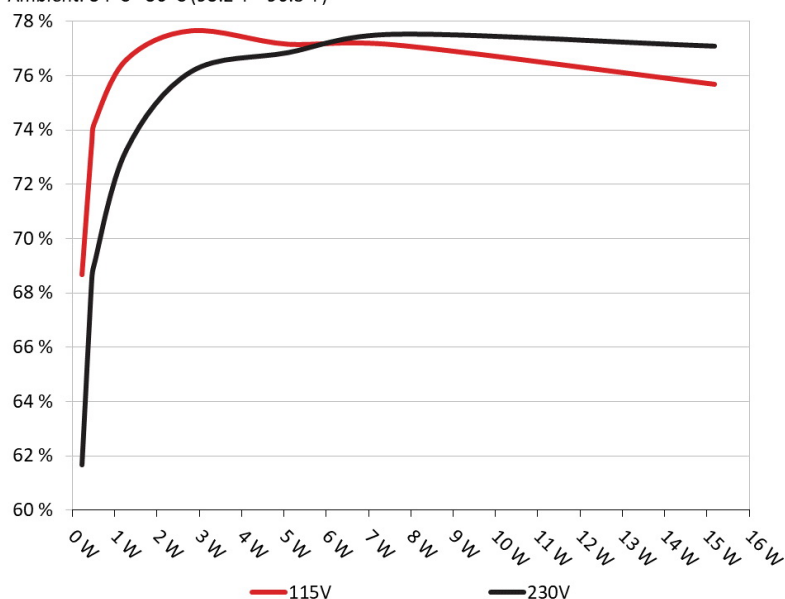
INFO

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

5VSB Efficiency: ASUS RTSS02-850P1

Ambient: 34°C - 36°C (93.2°F - 96.8°F)



INFO

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

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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	68.657%	0.055
	5.121V	0.335		115.10V
2	0.090A	0.461	73.525%	0.099
	5.120V	0.627		115.10V
3	0.550A	2.811	77.652%	0.328
	5.112V	3.620		115.10V
4	1.000A	5.103	77.155%	0.398
	5.102V	6.614		115.10V
5	1.500A	7.639	77.130%	0.435
	5.092V	9.904		115.10V
6	3.000A	15.179	75.679%	0.481
	5.059V	20.057		115.10V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	61.662%	0.019
	5.121V	0.373		230.25V
2	0.090A	0.461	68.499%	0.033
	5.120V	0.673		230.25V
3	0.550A	2.811	76.138%	0.160
	5.111V	3.692		230.25V
4	1.000A	5.102	76.837%	0.241
	5.102V	6.640		230.25V
5	1.500A	7.639	77.514%	0.296
	5.092V	9.855		230.25V
6	3.000A	15.187	77.076%	0.373
	5.062V	19.704		230.25V

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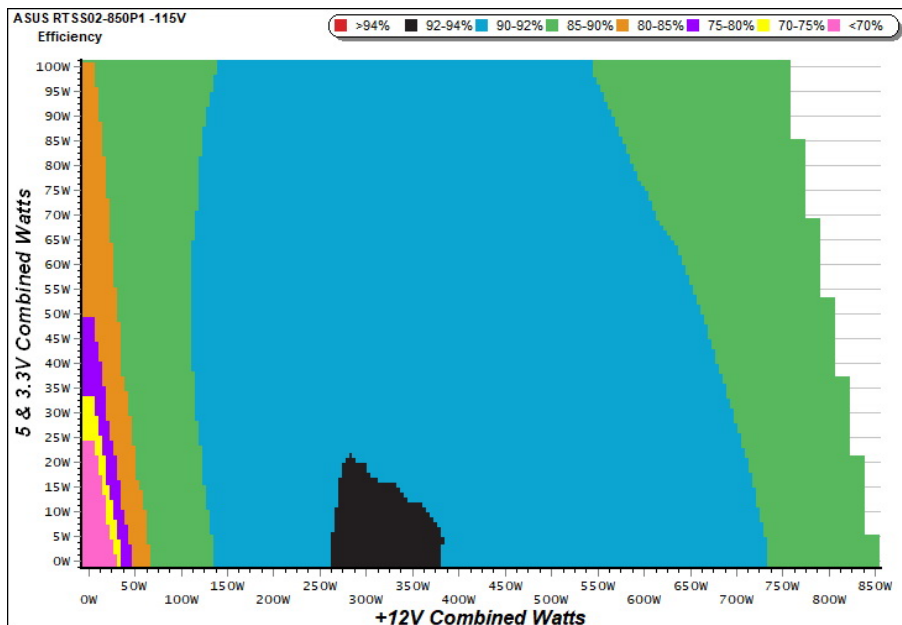
115V

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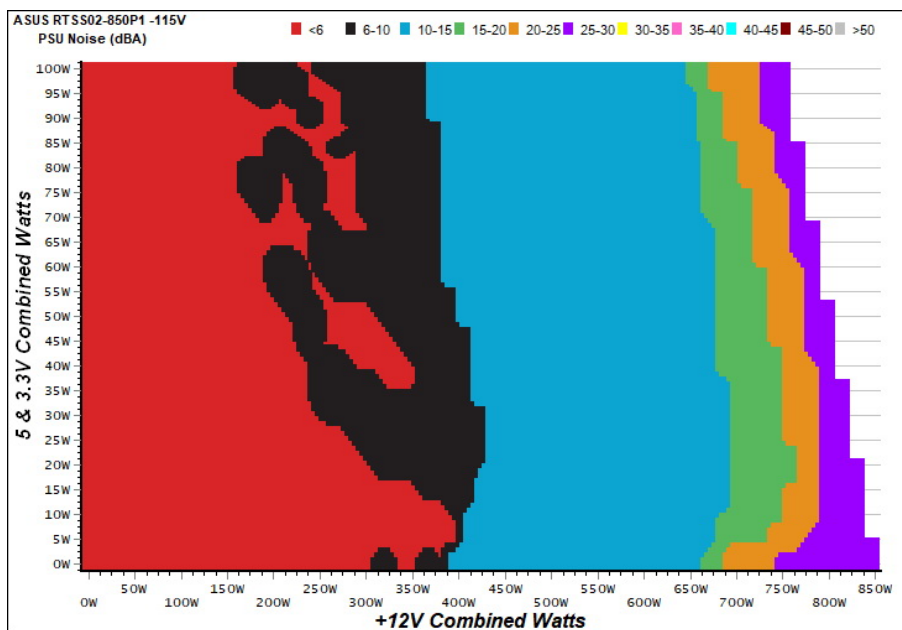
EFFICIENCY GRAPH 115V



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

NOISE GRAPH 115V



INFO

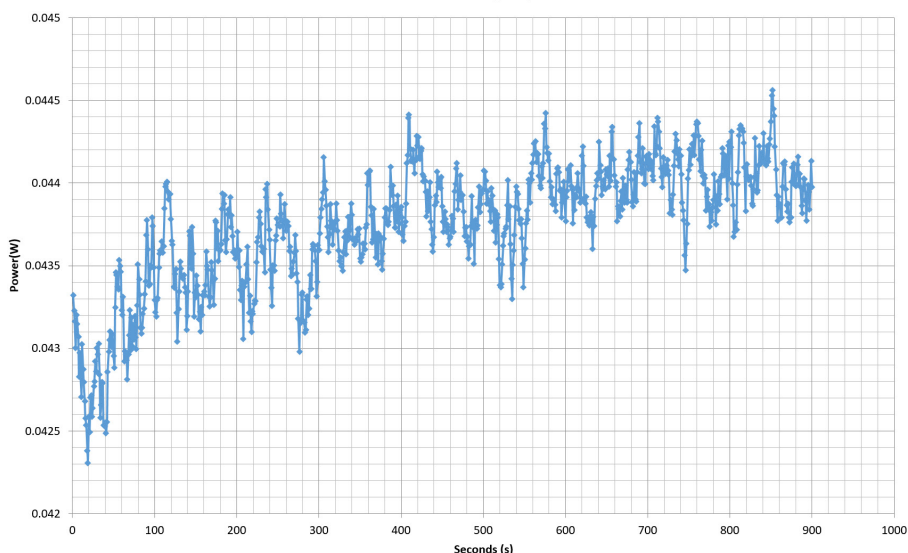
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

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VAMPIRE POWER -115V

Power - AX19030003 - 06/08/2018 - 14:16



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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Asus ROG Thor 850 (#1)

10-110% 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	5.212A	1.977A	1.983A	0.982A	84.782	86.091%	0	<6.0	48.02°C	0.969
	12.123V	5.057V	3.327V	5.094V	98.480				39.01°C	115.11V
2	11.485A	2.967A	2.975A	1.180A	170.101	90.079%	587	11.9	40.20°C	0.984
	12.121V	5.055V	3.326V	5.083V	188.835				49.89°C	115.11V
3	18.089A	3.463A	3.459A	1.380A	255.216	91.091%	408	7.2	40.66°C	0.986
	12.119V	5.052V	3.325V	5.072V	280.177				50.72°C	115.14V
4	24.694A	3.962A	3.971A	1.581A	340.420	91.369%	585	11.8	41.20°C	0.987
	12.117V	5.049V	3.323V	5.062V	372.576				51.56°C	115.15V
5	30.975A	4.954A	4.966A	1.782A	425.763	91.265%	587	11.9	41.83°C	0.987
	12.115V	5.047V	3.322V	5.051V	466.511				52.73°C	115.13V
6	37.259A	5.948A	5.964A	1.985A	511.098	90.889%	592	12.1	42.22°C	0.988
	12.112V	5.045V	3.321V	5.039V	562.333				54.23°C	115.09V
7	43.543A	6.943A	6.960A	2.188A	596.418	90.292%	606	12.7	43.26°C	0.989
	12.110V	5.043V	3.319V	5.027V	660.546				56.15°C	115.09V
8	49.832A	7.934A	7.955A	2.393A	681.757	89.667%	885	24.1	44.37°C	0.990
	12.108V	5.041V	3.318V	5.015V	760.319				58.30°C	115.09V
9	56.518A	8.436A	8.438A	2.396A	766.704	89.103%	1250	35.2	45.50°C	0.991
	12.106V	5.039V	3.317V	5.008V	860.467				58.22°C	115.08V
10	62.976A	8.938A	8.956A	3.007A	851.910	88.423%	1570	40.1	45.97°C	0.992
	12.103V	5.036V	3.316V	4.989V	963.452				59.20°C	115.08V
11	69.829A	8.939A	8.959A	3.011A	934.702	87.747%	1785	44.5	46.89°C	0.993
	12.101V	5.034V	3.315V	4.983V	1065.219				60.56°C	115.08V
CL1	0.147A	12.000A	12.000A	0.000A	102.270	85.158%	590	12.0	42.55°C	0.973
	12.121V	5.053V	3.321V	5.098V	120.094				52.52°C	115.12V
CL2	71.013A	1.003A	0.999A	1.000A	872.884	88.769%	1610	40.5	45.96°C	0.992
	12.103V	5.040V	3.322V	5.040V	983.317				59.32°C	115.08V

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Asus ROG Thor 850 (#1)

20-80W LOAD TESTS 115V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.184A	0.493A	0.479A	0.195A	19.443	66.668%	0	<6.0	0.872
	12.124V	5.062V	3.331V	5.117V	29.164				115.11V
2	2.440A	0.986A	0.990A	0.391A	39.862	78.908%	0	<6.0	0.937
	12.124V	5.057V	3.328V	5.111V	50.517				115.11V
3	3.627A	1.482A	1.470A	0.588A	59.360	83.397%	0	<6.0	0.952
	12.123V	5.058V	3.328V	5.105V	71.178				115.11V
4	4.882A	1.977A	1.980A	0.784A	79.767	85.811%	0	<6.0	0.969
	12.123V	5.057V	3.327V	5.099V	92.957				115.11V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	11.0 mV	6.1 mV	11.2 mV	8.3 mV	Pass
20% Load	13.5 mV	7.9 mV	11.8 mV	7.9 mV	Pass
30% Load	16.0 mV	7.0 mV	12.8 mV	8.7 mV	Pass
40% Load	16.6 mV	8.0 mV	13.2 mV	9.3 mV	Pass
50% Load	14.3 mV	8.2 mV	14.7 mV	8.2 mV	Pass
60% Load	13.4 mV	10.4 mV	15.4 mV	8.8 mV	Pass
70% Load	13.6 mV	10.0 mV	16.4 mV	9.1 mV	Pass
80% Load	14.3 mV	9.8 mV	17.2 mV	10.4 mV	Pass
90% Load	15.9 mV	10.0 mV	17.2 mV	10.3 mV	Pass
100% Load	17.1 mV	10.2 mV	18.8 mV	13.4 mV	Pass
110% Load	18.8 mV	10.6 mV	19.2 mV	15.2 mV	Pass
Crossload 1	11.6 mV	6.9 mV	18.0 mV	6.9 mV	Pass
Crossload 2	16.9 mV	9.1 mV	16.0 mV	12.7 mV	Pass

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Asus ROG Thor 850 (#1)

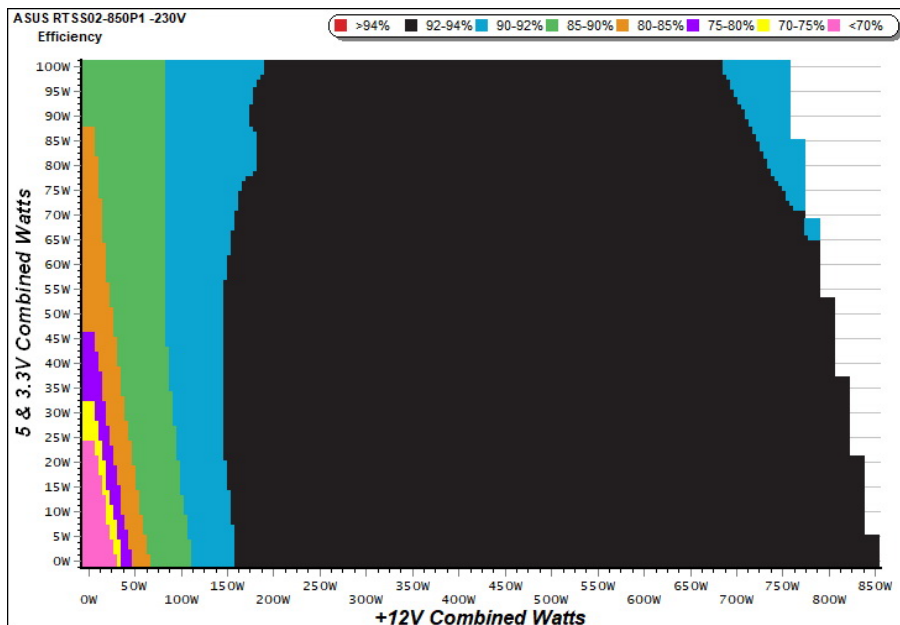
230V

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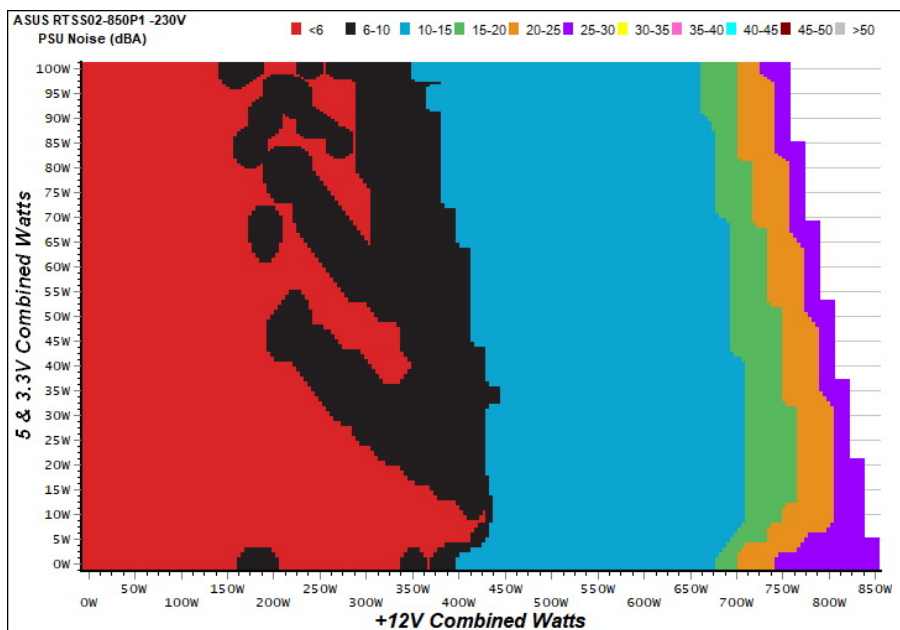
EFFICIENCY GRAPH 230V



INFO

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NOISE GRAPH 230V



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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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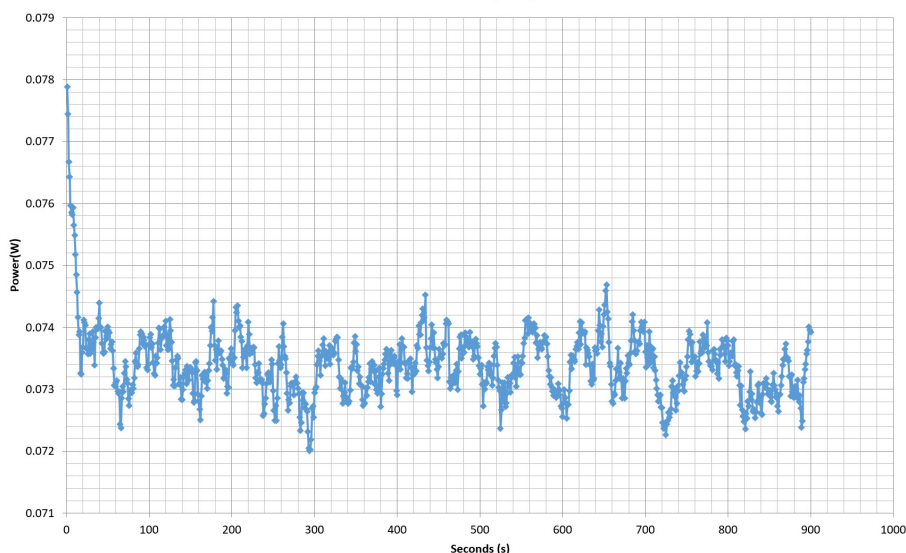
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VAMPIRE POWER -230V

Power - AX19030003 - 06/08/2018 - 13:36



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10-110% LOAD TESTS 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	5.211A	1.977A	1.982A	0.982A	84.763	87.018%	0	<6.0	48.03°C	0.844
	12.122V	5.057V	3.327V	5.094V	97.409				38.70°C	230.26V
2	11.483A	2.967A	2.974A	1.181A	170.077	91.313%	0	<6.0	48.65°C	0.922
	12.121V	5.055V	3.326V	5.082V	186.257				39.12°C	230.28V
3	18.089A	3.463A	3.459A	1.380A	255.209	92.503%	384	6.7	40.11°C	0.948
	12.119V	5.051V	3.324V	5.072V	275.894				49.82°C	230.27V
4	24.693A	3.961A	3.971A	1.581A	340.402	92.912%	583	11.8	40.85°C	0.960
	12.117V	5.049V	3.323V	5.061V	366.369				50.80°C	230.27V
5	30.973A	4.954A	4.964A	1.782A	425.725	93.043%	587	11.9	41.28°C	0.969
	12.115V	5.047V	3.321V	5.050V	457.557				51.78°C	230.27V
6	37.257A	5.949A	5.964A	1.985A	511.071	92.889%	593	12.1	41.97°C	0.973
	12.112V	5.045V	3.320V	5.038V	550.194				52.82°C	230.30V
7	43.540A	6.943A	6.960A	2.189A	596.386	92.661%	603	12.6	42.26°C	0.977
	12.110V	5.043V	3.319V	5.026V	643.623				53.60°C	230.27V
8	49.830A	7.937A	7.954A	2.393A	681.742	92.322%	866	23.4	43.51°C	0.979
	12.108V	5.041V	3.318V	5.014V	738.439				55.45°C	230.27V
9	56.515A	8.438A	8.441A	2.397A	766.684	91.985%	1190	33.4	44.75°C	0.981
	12.106V	5.038V	3.317V	5.008V	833.488				57.25°C	230.26V
10	62.970A	8.938A	8.957A	3.007A	851.901	91.527%	1560	40.0	45.86°C	0.983
	12.104V	5.036V	3.316V	4.988V	930.761				58.88°C	230.27V
11	69.828A	8.940A	8.961A	3.011A	934.698	91.131%	1790	44.5	46.75°C	0.984
	12.101V	5.034V	3.315V	4.982V	1025.669				60.42°C	230.27V
CL1	0.145A	12.000A	11.999A	0.000A	102.243	85.749%	592	12.1	41.43°C	0.870
	12.122V	5.053V	3.321V	5.097V	119.235				52.15°C	230.28V
CL2	71.005A	1.002A	0.999A	1.000A	872.851	91.962%	1625	40.9	45.84°C	0.983
	12.104V	5.039V	3.321V	5.040V	949.142				58.97°C	230.27V

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20-80W LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	PF/AC Volts
1	1.184A	0.494A	0.479A	0.195A	19.447	65.965%	0	<6.0	0.575
	12.124V	5.061V	3.330V	5.116V	29.481				230.26V
2	2.439A	0.987A	0.990A	0.391A	39.853	78.706%	0	<6.0	0.705
	12.124V	5.057V	3.327V	5.110V	50.635				230.27V
3	3.625A	1.483A	1.471A	0.588A	59.341	83.775%	0	<6.0	0.781
	12.123V	5.057V	3.328V	5.104V	70.834				230.26V
4	4.880A	1.976A	1.980A	0.785A	79.743	86.703%	0	<6.0	0.835
	12.123V	5.057V	3.327V	5.098V	91.973				230.27V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	10.9 mV	5.3 mV	10.7 mV	7.3 mV	Pass
20% Load	13.6 mV	6.7 mV	10.6 mV	8.7 mV	Pass
30% Load	16.1 mV	7.4 mV	11.6 mV	9.2 mV	Pass
40% Load	16.7 mV	7.4 mV	11.7 mV	8.7 mV	Pass
50% Load	15.2 mV	8.6 mV	13.3 mV	8.4 mV	Pass
60% Load	13.8 mV	9.6 mV	14.6 mV	8.6 mV	Pass
70% Load	13.9 mV	9.7 mV	15.3 mV	8.3 mV	Pass
80% Load	14.8 mV	9.7 mV	17.1 mV	9.2 mV	Pass
90% Load	15.9 mV	9.1 mV	16.6 mV	9.0 mV	Pass
100% Load	16.7 mV	10.3 mV	18.3 mV	11.0 mV	Pass
110% Load	18.0 mV	10.5 mV	18.8 mV	10.5 mV	Pass
Crossload 1	11.2 mV	7.1 mV	16.3 mV	7.5 mV	Pass
Crossload 2	16.6 mV	9.5 mV	12.8 mV	10.0 mV	Pass

All data and graphs included in this test report can be used by any individual on the following conditions:

- > It should be mentioned that the test results are provided by Cybenetics
- > The link to the original test results document should be provided in any case

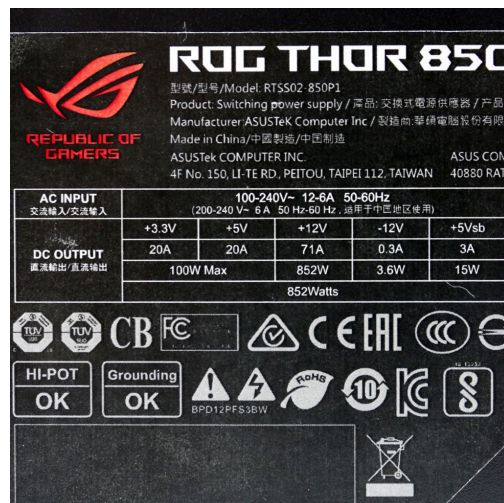
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Anex

Asus ROG Thor 850 (#1)



Top side

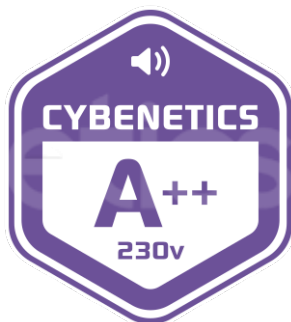


Power specifications label

CERTIFICATIONS 115V



CERTIFICATIONS 230V



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