

Anex

Seasonic SSR-650PD

Lab ID#: 197

Receipt Date: -

Test Date: -

Report:

Report Date: Oct 17, 2018

DUT INFORMATION		DUT SPECIFICATIONS	
Brand	Seasonic	Rated Voltage (Vrms)	100-240
Manufacturer (OEM)	Seasonic	Rated Current (Arms)	8.5-4
Series	Prime Platinum	Rated Frequency (Hz)	50-60
Model Number	SSR-650PD	Rated Power (W)	650
Serial Number	R1701TA101410009	Type	ATX12V
DUT Notes		Cooling	135mm Fluid Dynamic Bearing Fan (HA13525H12F-Z)
		Semi-Passive Operation	✓ (selectable)
		Cable Design	Fully Modular

POWER SPECIFICATIONS						
Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	54	2.5	0.3
	Watts	100		648	12.5	3.6
Total Max. Power (W)		650				

CABLES AND CONNECTORS			
Modular Cables			
Description	Cable Count	Connector Count (Total)	Gauge
ATX connector 20+4 pin (610mm)	1	1	18-22AWG
4+4 pin EPS12V (650mm)	1	1	18AWG
6+2 pin PCIe (680mm+80mm)	2	4	18AWG
SATA (460mm+110mm+110mm+110mm)	1	4	18AWG
SATA (360mm+110mm)	1	2	18AWG
4 pin Molex (460mm+130mm+130mm)	1	3	18AWG
FDD Adapter (+110mm)	1	1	22AWG

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
Average Efficiency	90.776
Efficiency With 10W ($\leq 500W$) or 2% ($> 500W$) Load -115V	0.000
Average Efficiency 5VSB	79.811
Standby Power Consumption (W) -115V	0.0568295
Standby Power Consumption (W) -230V	0.0865551
Average PF	0.987
ErP Lot 3/6 Ready	✓
(EU) No 617/2013 Compliance	✓
Avg Noise Output	33.19
Efficiency Rating (ETA)	PLATINUM
Noise Rating (LAMBDA)	Standard++

TEST EQUIPMENT

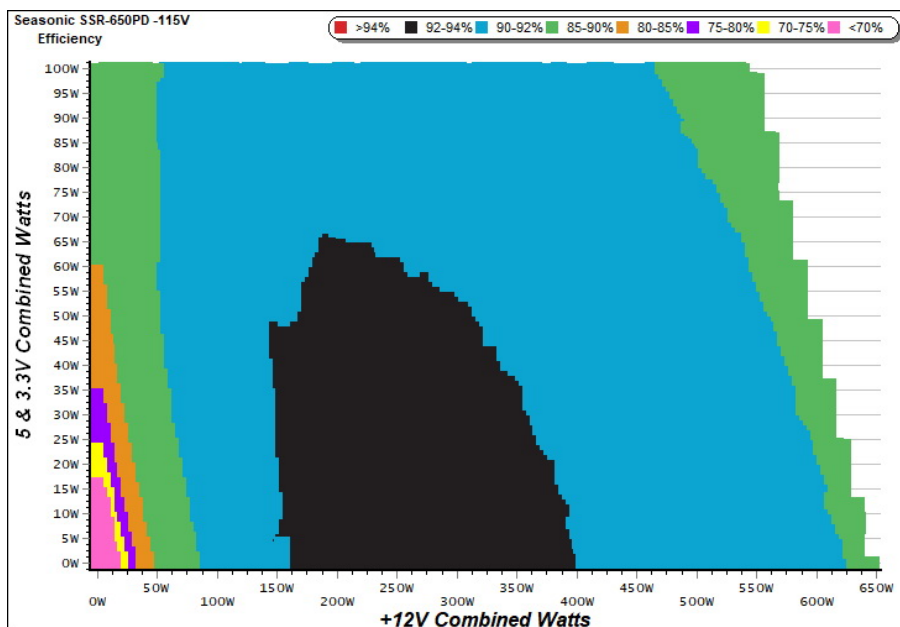
Electronic Loads	Chroma 6314A x2 63123A x6 63102A 63101A	Chroma 63601-5 x2 Chroma 63600-2 63640-80-80 x10 63610-80-20
AC Sources	Chroma 6530, Chroma 61604	
Power Analyzers	N4L PPA1530, N4L PPA5530	
Oscilloscopes	Picoscope 4444 & 3424, Keysight DSOX3024A, Rigol DS2072A	
Voltmeter	Keithley 2015 THD 6.5 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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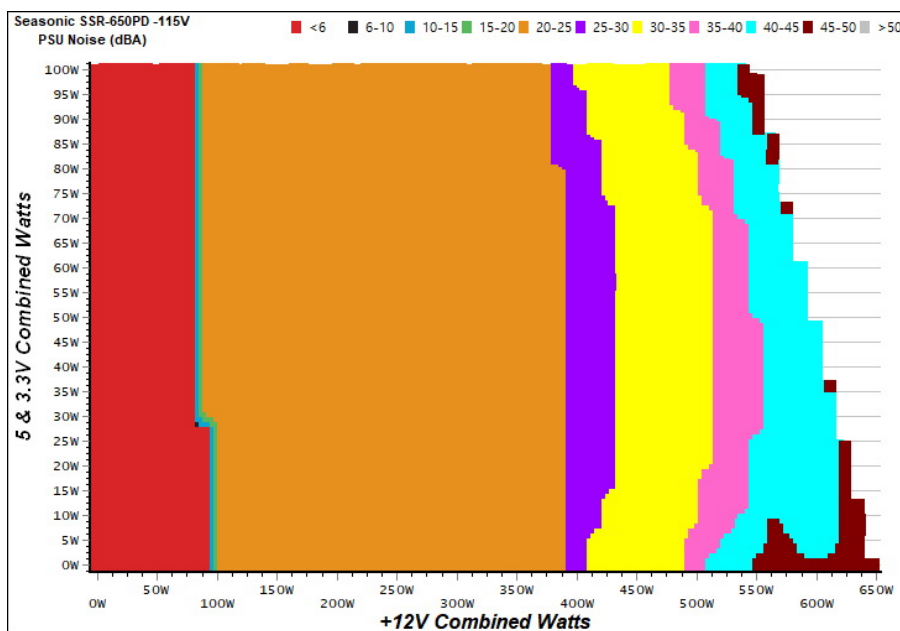
EFFICIENCY GRAPH



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)

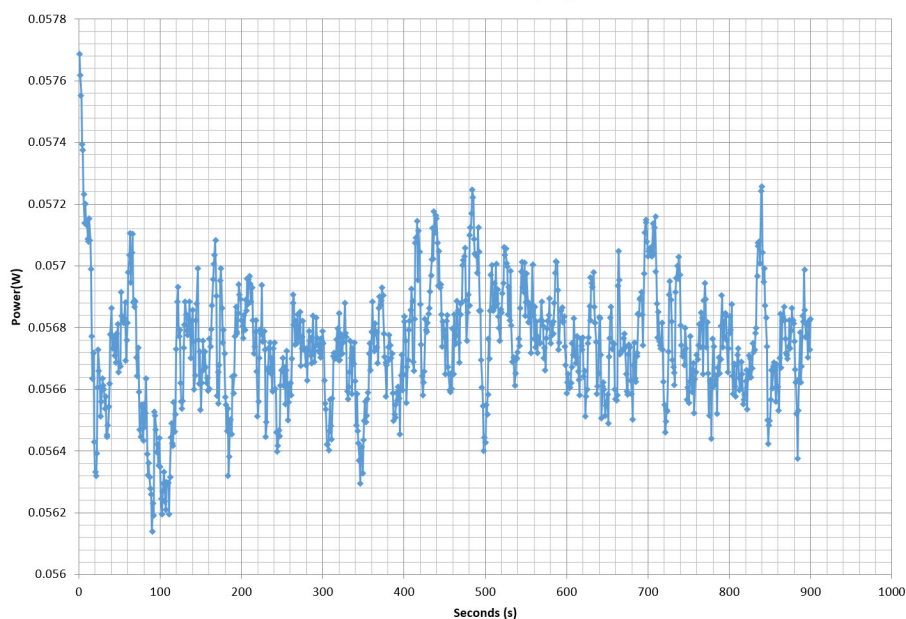
Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.215	66.154%	0.036
	5.125V	0.325		115.10V
2	0.087A	0.448	73.443%	0.066
	5.123V	0.610		115.10V
3	0.542A	2.766	80.430%	0.278
	5.100V	3.439		115.09V
4	1.002A	5.089	80.688%	0.372
	5.077V	6.307		115.09V
5	1.502A	7.590	80.925%	0.422
	5.054V	9.379		115.09V
6	2.502A	12.524	79.715%	0.471
	5.006V	15.711		115.09V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.042A	0.216	60.000%	0.012
	5.125V	0.360		230.25V
2	0.087A	0.448	68.817%	0.022
	5.123V	0.651		230.25V
3	0.542A	2.765	78.351%	0.110
	5.098V	3.529		230.25V
4	1.002A	5.085	79.953%	0.181
	5.073V	6.360		230.25V
5	1.502A	7.578	80.403%	0.240
	5.046V	9.425		230.25V
6	2.501A	12.491	80.307%	0.316
	4.994V	15.554		230.25V

VAMPIRE POWER -115V

Power - R1701TA101410009 - 16/10/2017 - 11:36



INFO

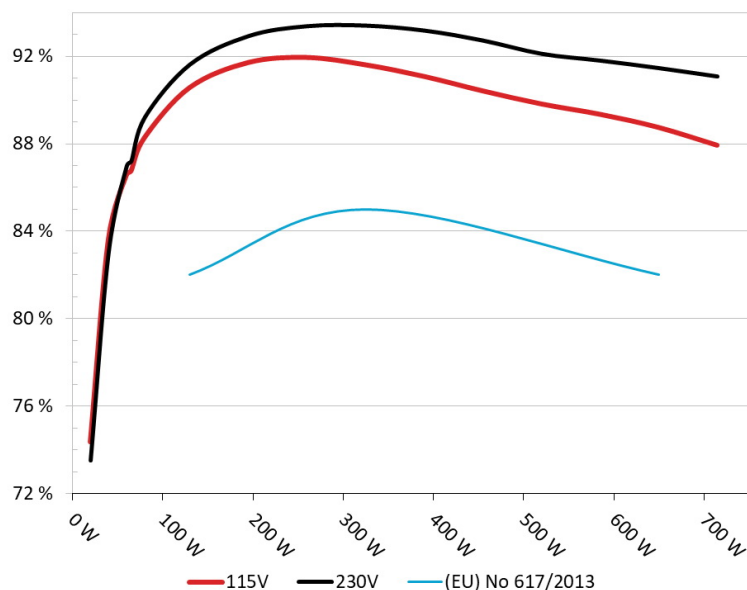
This graph is generated by the PPA Standby Power Analysis software which takes full control of the power analyzer during the whole procedure. This application features all of the EN50564 & IEC62301 test limits for standby power software testing

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EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: Seasonic SSR-650PD
Ambient: 37°C - 46°C (98.6°F - 114.8°F)

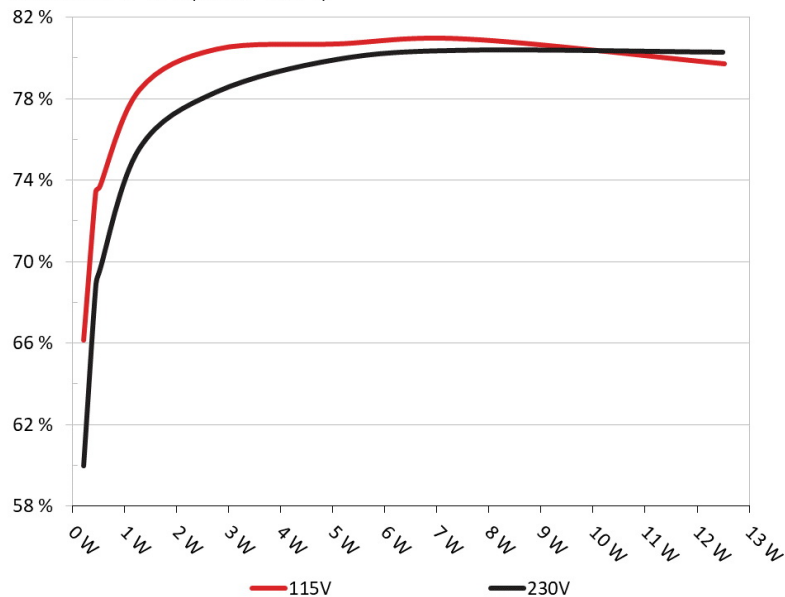


INFO

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: Seasonic SSR-650PD
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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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	3.563A	2.005A	1.979A	0.986A	64.809	86.765%	660	23.8	38.05°C	0.956
	12.128V	4.991V	3.332V	5.066V	74.695				40.86°C	115.10V
2	8.157A	3.001A	2.968A	1.186A	129.777	90.585%	660	23.8	38.30°C	0.985
	12.128V	4.990V	3.331V	5.049V	143.266				41.29°C	115.10V
3	13.096A	3.508A	3.477A	1.390A	194.901	91.733%	660	23.8	38.69°C	0.993
	12.128V	4.989V	3.329V	5.033V	212.466				41.86°C	115.10V
4	18.023A	4.009A	3.962A	1.593A	259.756	91.962%	812	26.7	39.17°C	0.996
	12.128V	4.988V	3.328V	5.016V	282.461				42.53°C	115.10V
5	22.611A	5.009A	4.958A	1.800A	324.691	91.627%	1172	34.8	39.60°C	0.993
	12.128V	4.986V	3.327V	4.997V	354.360				43.29°C	115.09V
6	27.202A	6.016A	5.951A	2.006A	389.673	91.096%	1650	46.1	40.54°C	0.990
	12.128V	4.985V	3.325V	4.980V	427.762				44.59°C	115.08V
7	31.790A	7.020A	6.946A	2.215A	454.609	90.434%	1975	48.5	41.37°C	0.991
	12.128V	4.983V	3.324V	4.962V	502.695				45.84°C	115.07V
8	36.378A	8.034A	7.939A	2.425A	519.620	89.836%	2123	51.2	42.15°C	0.992
	12.129V	4.981V	3.323V	4.945V	578.409				47.38°C	115.07V
9	41.390A	8.532A	8.455A	2.428A	584.635	89.363%	2123	51.2	43.04°C	0.992
	12.130V	4.980V	3.323V	4.938V	654.224				48.53°C	115.07V
10	46.352A	9.048A	8.939A	2.534A	649.510	88.763%	2123	51.2	44.14°C	0.993
	12.131V	4.978V	3.321V	4.928V	731.732				50.48°C	115.07V
11	51.682A	9.050A	8.942A	2.537A	714.374	87.947%	2123	51.2	46.09°C	0.994
	12.135V	4.977V	3.320V	4.921V	812.277				52.73°C	115.07V
CL1	0.101A	12.012A	12.004A	0.005A	101.225	85.043%	2115	50.7	44.19°C	0.976
	12.135V	4.990V	3.335V	5.107V	119.028				47.40°C	115.10V
CL2	53.966A	1.003A	1.003A	1.002A	668.239	88.897%	2123	51.2	44.24°C	0.993
	12.135V	4.985V	3.322V	5.019V	751.697				50.04°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	1.206A	0.501A	0.476A	0.196A	19.720	74.373%	0	<6.0	0.810
	12.127V	4.999V	3.335V	5.113V	26.515				115.10V
2	2.433A	1.000A	0.989A	0.391A	39.796	83.652%	0	<6.0	0.911
	12.129V	4.996V	3.333V	5.099V	47.573				115.10V
3	3.667A	1.497A	1.499A	0.586A	59.926	86.605%	660	23.8	0.951
	12.129V	4.991V	3.332V	5.088V	69.195				115.10V
4	4.884A	2.005A	1.978A	0.785A	79.813	88.298%	660	23.8	0.965
	12.128V	4.991V	3.331V	5.076V	90.390				115.10V

RIPPLE MEASUREMENTS

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	8.0 mV	5.2 mV	5.9 mV	7.0 mV	Pass
20% Load	12.0 mV	5.0 mV	6.3 mV	7.4 mV	Pass
30% Load	14.6 mV	4.7 mV	6.4 mV	8.6 mV	Pass
40% Load	17.7 mV	4.3 mV	5.2 mV	8.8 mV	Pass
50% Load	20.5 mV	4.6 mV	5.3 mV	10.1 mV	Pass
60% Load	20.7 mV	4.9 mV	5.9 mV	12.0 mV	Pass
70% Load	19.7 mV	5.2 mV	6.3 mV	13.9 mV	Pass
80% Load	21.0 mV	5.8 mV	7.7 mV	15.6 mV	Pass
90% Load	24.0 mV	6.6 mV	8.2 mV	16.8 mV	Pass
100% Load	28.3 mV	7.1 mV	9.2 mV	19.4 mV	Pass
110% Load	30.8 mV	7.1 mV	9.7 mV	21.6 mV	Pass
Crossload 1	11.5 mV	7.6 mV	9.5 mV	6.2 mV	Pass
Crossload 2	28.1 mV	5.4 mV	6.6 mV	15.7 mV	Pass

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Anex

Seasonic SSR-650PD

HOLD-UP TIME & POWER OK SIGNAL (230V)	
Hold-Up Time (ms)	21.16
AC Loss to PWR_OK Hold Up Time (ms)	16.46
PWR_OK Inactive to DC Loss Delay (ms)	4.70



CERTIFICATIONS



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