Thermaltake Toughpower GF1 850W (#2)

Serial Number PSTPD0850FNFAGU1LF000041

Lab ID 617

Certification ID 25617

Test Result Report ID:

Certificate Issue Date: Jan 31, 2019

Scheme: ETA-EMI PSU

115V: CYBENETICS PLATINUM

230V: CYBENETICS GOLD 230v

Scheme: LAMBDA PSU

115V: CYBENETICS A-

230V: CYBENETICS A- 230v

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	Thermaltake
Model	Toughpower GF1 850W (#2)
OEM/ODM	Channel Well Technology
Serial Number	PSTPD0850FNFAGU1LF000041
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	12
Rated Frequency (Hz)	47-63

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	140mm Hydro Dynamic Bearing Fan [TT-1425 (A1425L12S)]
Semi-Passive Operation	✓ (selectable)
Cybenetics Testing Information	
Lab ID	617
Date of receipt	Jan 22, 2019
Testing Date	Jan 27, 2019
Report Issued Date	Jan 31, 2019
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	18AWG	No
4+4 pin EPS12V (650mm)	1	1	16AWG	No
8 pin EPS12V (650mm)	1	1	16AWG	No
6+2 pin PCIe (700mm+150mm)	3	6	16-18AWG	No
SATA (500mm+150mm+150mm+150mm)	3	12	18AWG	No
4 pin Molex (500mm+150mm+150mm+150mm)	1	4	18AWG	No
FDD Adapter (100mm)	1	1	22AWG	No
AC Power Cord (1420mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	70.9	3	0.3
	Watts	120		850	15	3.6
Total Max. Power (W)		850				

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)	89.216%
Average Noise Output (>1450 Load Combinations)	28.45dBA
Average PF (>1450 Load Combinations)	0.979
Efficiency With 10W (≤500W) or 2% (>500W) Load	69.051%
Standby Power Consumption	0.0470W
Non-Accredited	
12V Ripple (Full Load)	14.01mV
5V Ripple (Full Load)	15.07mV
3.3V Ripple (Full Load)	11.87mV
5VSB Ripple (Full Load)	13.94mV
12V Load Regulation	0.52%
5V Load Regulation	0.20%
3.3V Load Regulation	0.42%

5VSB Load Regulation	1.62%
Inrush Current	32.788A

230V

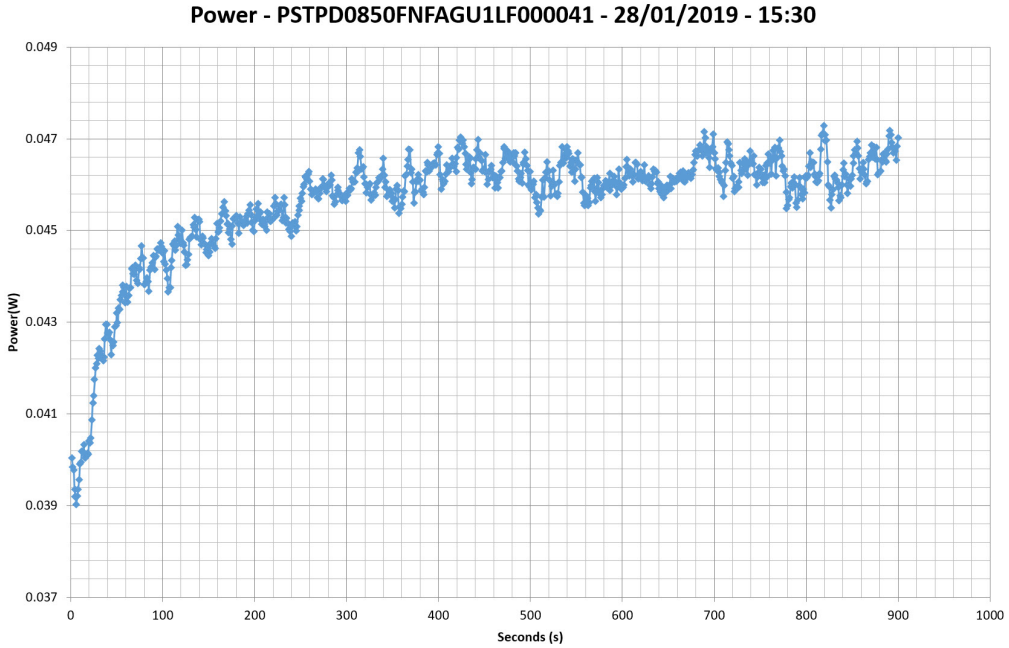
Accredited		
Average Efficiency (>1450 load combinations)	90.852%	
Average Noise Output (>1450 Load Combinations)	27.91dBA	
Average PF (>1450 Load Combinations)	0.937	
Efficiency With 10W (≤500W) or 2% (>500W) Load	-	
Standby Power Consumption	0.0609W	
Non-Accredited		
12V Ripple (Full Load)	-	
5V Ripple (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	66.240A	
Hold-Up Time & PWR_OK Signal	20.00ms	
AC Loss to PWR_OK Hold Up Time	18.60ms	
PWR_OK Inactive to DC Loss Delay	1.40ms	
OPP (0.00°C / 0.00°C)	-	-

Hold-Up Time & PWR_OK Signal

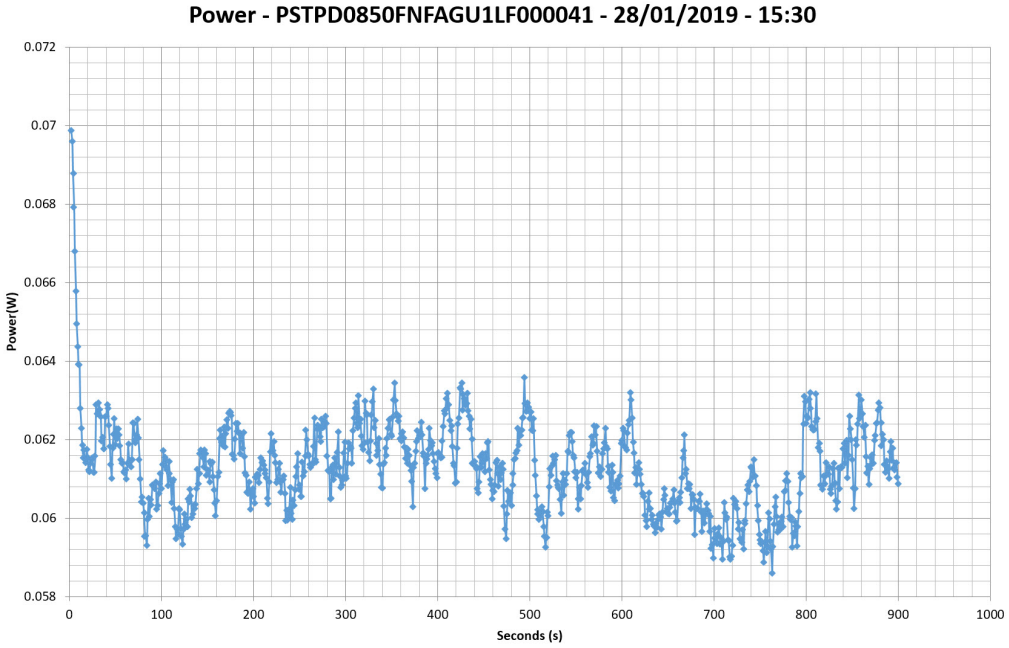
Hold-Up Time (ms)	20
AC Loss to PWR_OK Hold Up Time (ms)	18.6
PWR_OK Inactive to DC Loss Delay (ms)	1.4

Graphs

115V

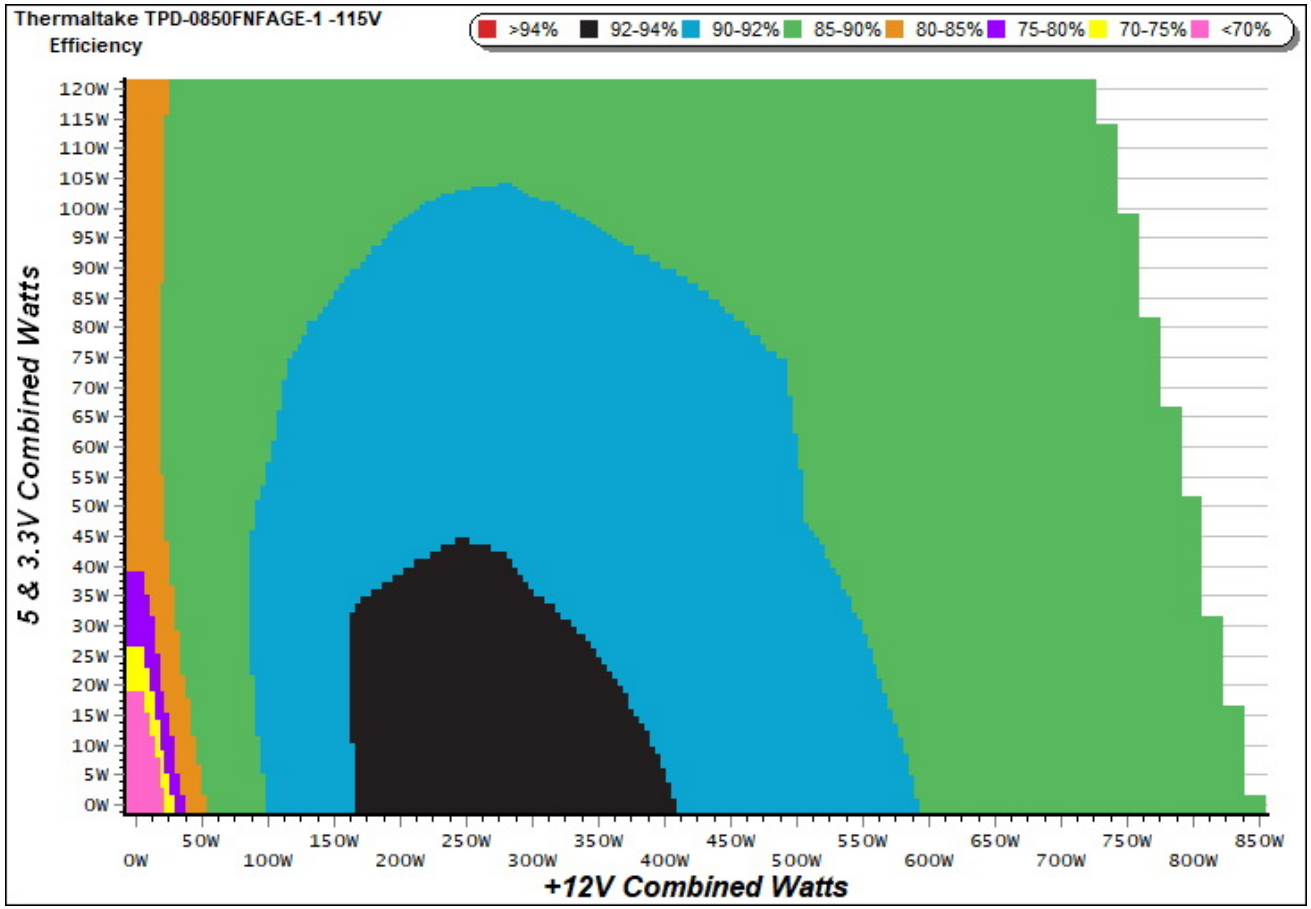


230V



Efficiency Graph

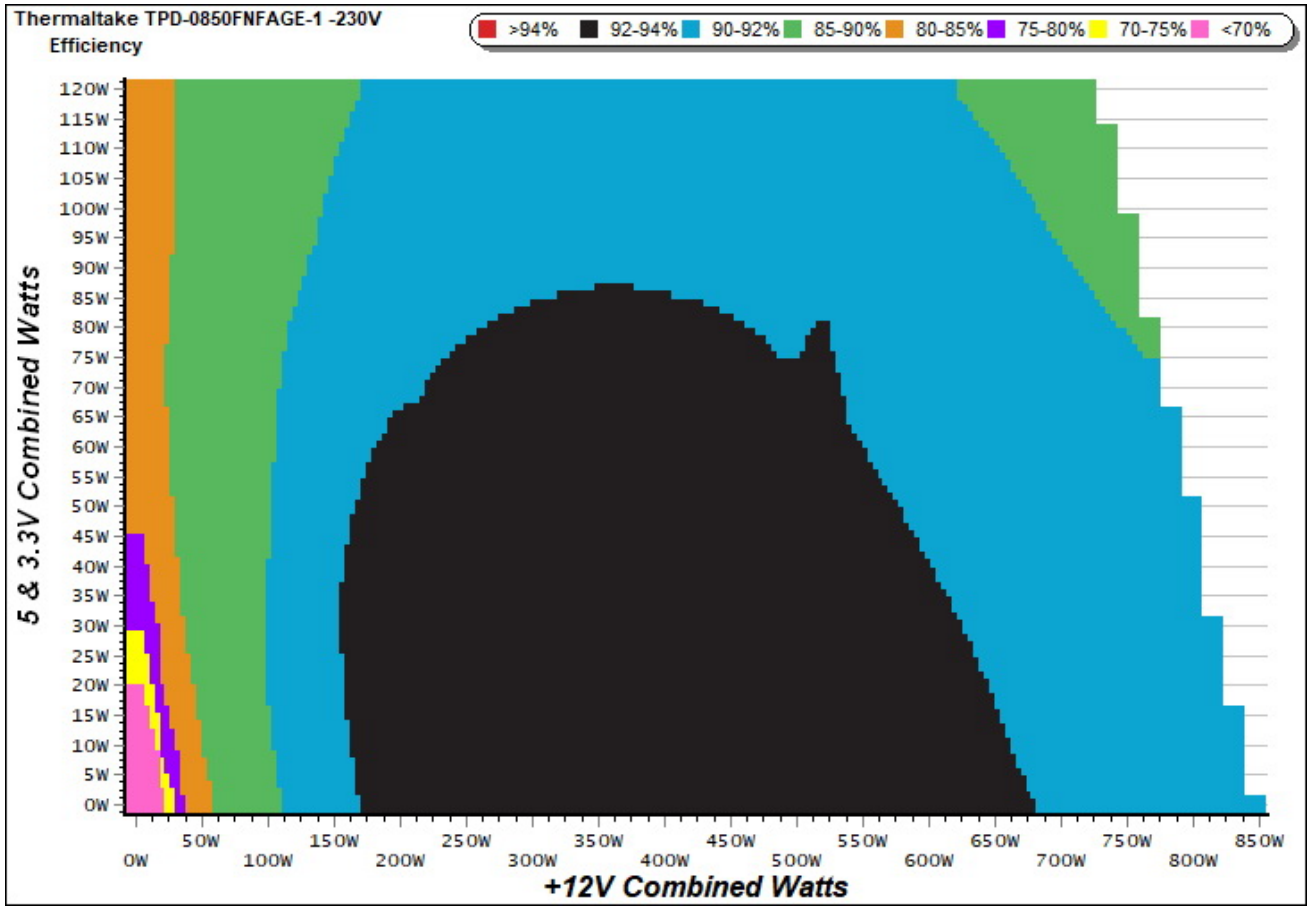
115V



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

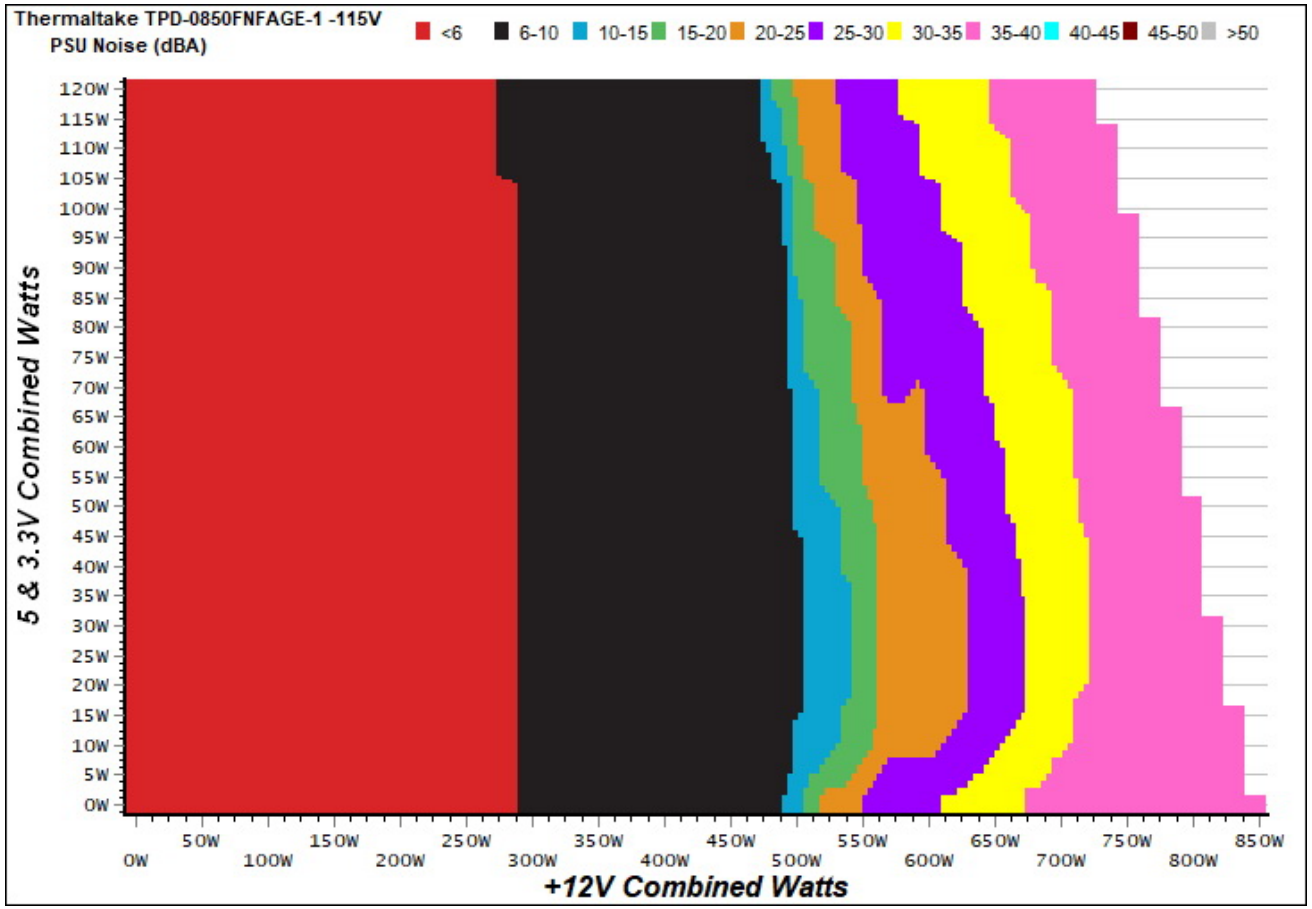


INFO

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

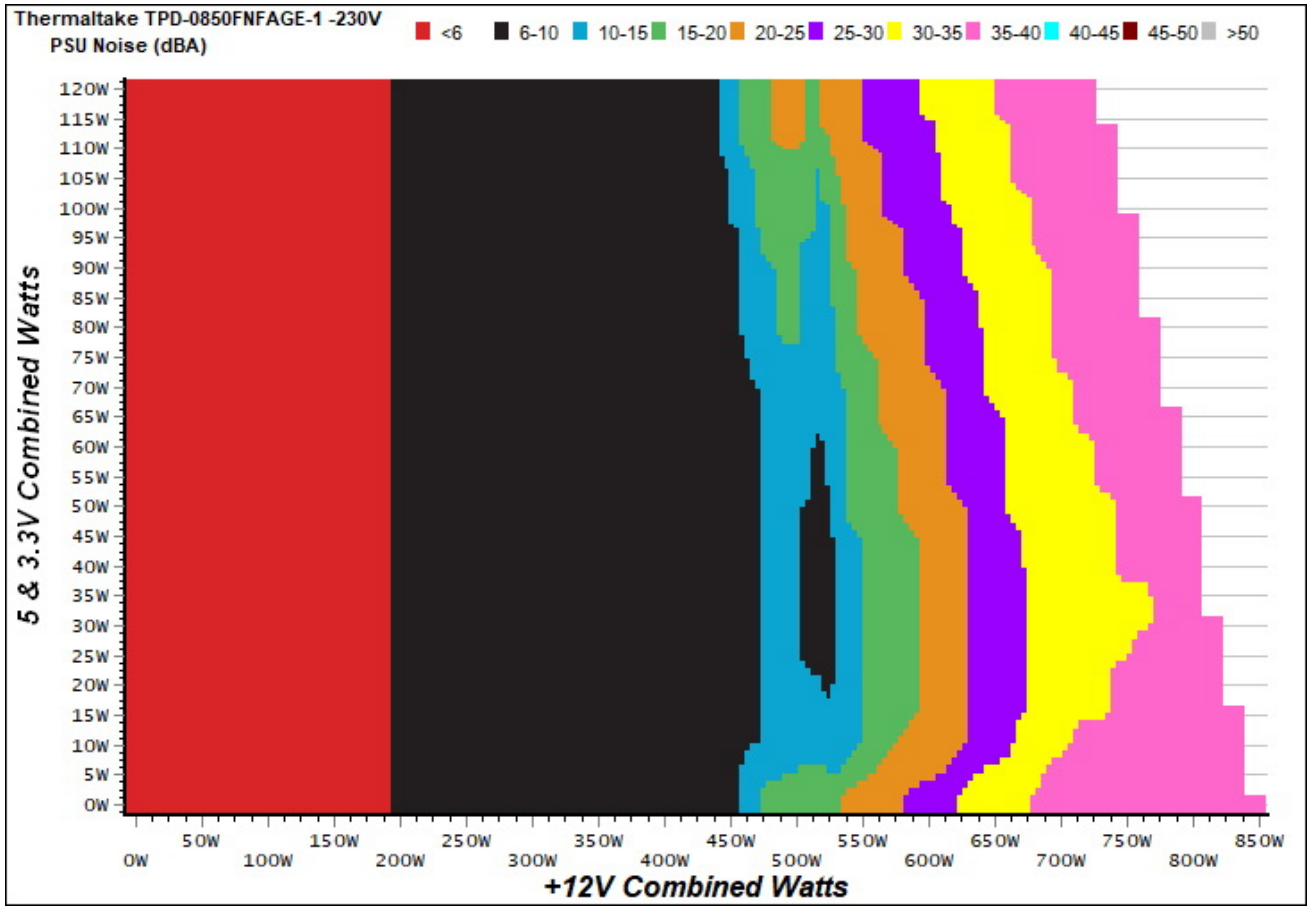
115V



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

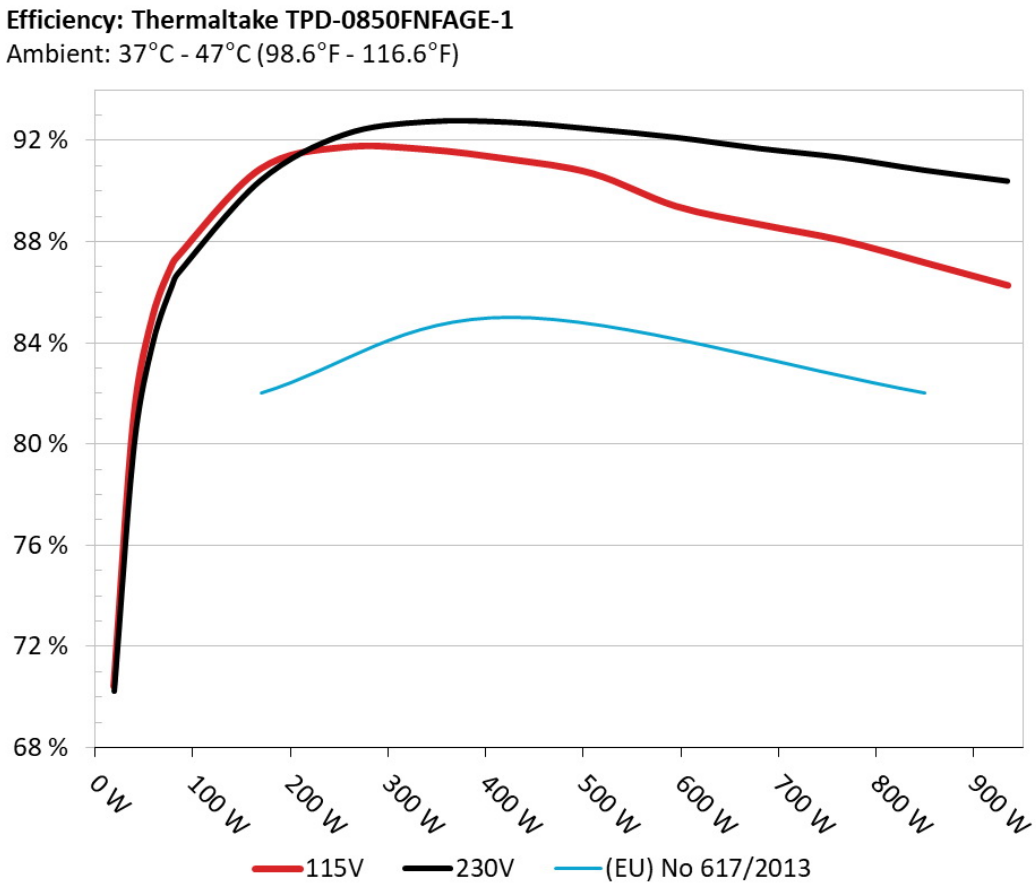


INFO

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

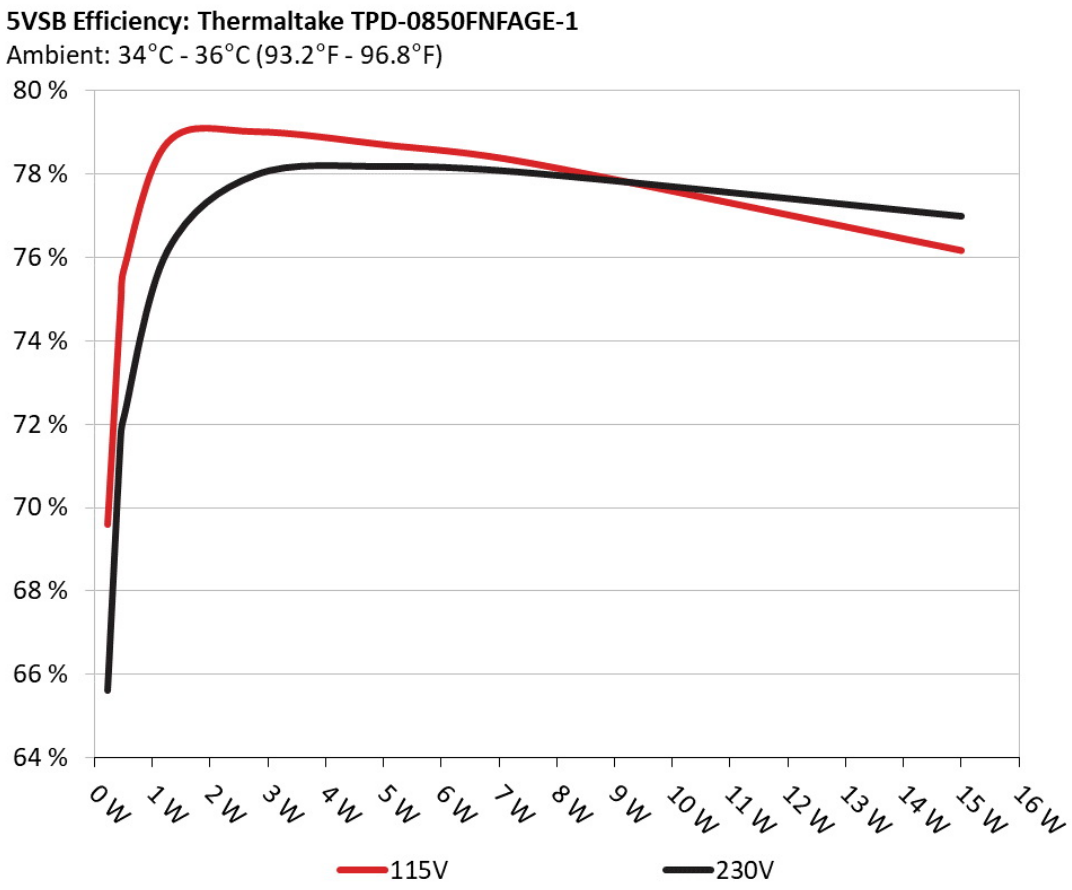
Efficiency under high ambient temperature



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	0.045A	0.229	69.605%	0.033
	5.078V	0.329		115.14V
2	0.090A	0.458	74.959%	0.061
	5.078V	0.611		115.14V
3	0.550A	2.788	79.025%	0.264
	5.067V	3.528		115.12V
4	1.000A	5.056	78.705%	0.356
	5.055V	6.424		115.13V
5	1.500A	7.566	78.266%	0.409
	5.044V	9.667		115.13V
6	3.000A	15.012	76.176%	0.472
	5.004V	19.707		115.14V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.229	65.616%	0.011
	5.078V	0.349		230.24V
2	0.090A	0.457	71.743%	0.019
	5.078V	0.637		230.24V
3	0.550A	2.787	77.980%	0.101
	5.067V	3.574		230.24V
4	1.000A	5.056	78.182%	0.169
	5.055V	6.467		230.24V
5	1.500A	7.563	78.025%	0.227
	5.042V	9.693		230.24V
6	3.000A	15.007	76.991%	0.330
	5.002V	19.492		230.22V

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	5.264A	1.994A	1.996A	0.991A	84.845	87.408%	0	<6.0	43.65°C	0.962
	12.015V	5.014V	3.305V	5.048V	97.068				39.46°C	115.11V
2	11.527A	2.992A	2.994A	1.191A	169.337	90.870%	0	<6.0	44.87°C	0.980
	12.010V	5.014V	3.304V	5.040V	186.350				40.25°C	115.11V
3	18.196A	3.491A	3.483A	1.391A	254.429	91.733%	0	<6.0	46.04°C	0.983
	12.004V	5.013V	3.302V	5.034V	277.359				40.92°C	115.11V
4	24.879A	3.992A	3.997A	1.591A	339.629	91.648%	536	8.8	41.46°C	0.979
	11.995V	5.012V	3.301V	5.030V	370.581				47.97°C	115.11V
5	31.239A	4.990A	4.998A	1.792A	424.995	91.257%	578	9.6	42.17°C	0.978
	11.988V	5.011V	3.300V	5.024V	465.713				48.49°C	115.11V
6	37.528A	5.990A	6.003A	1.993A	509.470	90.694%	795	18.8	42.80°C	0.980
	11.982V	5.010V	3.298V	5.019V	561.749				49.79°C	115.11V
7	43.901A	6.991A	7.010A	2.195A	594.793	89.402%	1304	33.6	43.34°C	0.982
	11.974V	5.008V	3.296V	5.014V	665.299				51.30°C	115.11V
8	50.281A	7.993A	8.014A	2.396A	680.123	88.683%	1526	37.6	43.82°C	0.983
	11.967V	5.006V	3.294V	5.008V	766.918				52.37°C	115.11V
9	57.064A	8.493A	8.504A	2.397A	765.046	88.046%	1526	37.6	44.20°C	0.985
	11.961V	5.005V	3.292V	5.007V	868.914				53.31°C	115.11V
10	63.585A	8.995A	9.023A	3.007A	849.866	87.163%	1525	37.6	45.50°C	0.986
	11.955V	5.004V	3.291V	4.989V	975.033				55.32°C	115.10V
11	70.699A	8.995A	9.025A	3.009A	934.632	86.267%	1524	37.6	46.86°C	0.988
	11.951V	5.004V	3.290V	4.987V	1083.419				57.04°C	115.11V
CL1	0.144A	14.003A	13.999A	0.000A	118.082	83.744%	540	8.9	42.35°C	0.972
	12.007V	5.009V	3.301V	5.069V	141.004				48.35°C	115.13V

CL2	70.836A	1.002A	1.001A	1.000A	860.699	87.776%	1525	37.6	45.19°C	0.987
	11.962V	5.011V	3.295V	5.039V	980.567				55.22°C	115.11V

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	5.265A	1.994A	1.995A	0.991A	84.811	86.742%	0	<6.0	43.83°C	0.805
	12.007V	5.015V	3.305V	5.046V	97.774				39.34°C	230.24V
2	11.534A	2.990A	2.996A	1.191A	169.286	90.411%	536	8.8	40.68°C	0.909
	11.999V	5.013V	3.304V	5.040V	187.241				45.42°C	230.24V
3	18.198A	3.492A	3.482A	1.390A	254.394	92.224%	537	8.8	41.08°C	0.937
	12.001V	5.012V	3.302V	5.036V	275.843				46.78°C	230.24V
4	24.879A	3.991A	3.998A	1.591A	339.595	92.739%	537	8.8	41.61°C	0.951
	11.994V	5.011V	3.300V	5.031V	366.185				47.88°C	230.24V
5	31.233A	4.989A	5.001A	1.791A	424.919	92.718%	587	10.1	42.16°C	0.957
	11.988V	5.011V	3.299V	5.025V	458.292				49.02°C	230.24V
6	37.528A	5.990A	6.001A	1.993A	509.422	92.452%	963	25.0	42.79°C	0.961
	11.981V	5.009V	3.298V	5.019V	551.012				50.36°C	230.25V
7	43.900A	6.991A	7.005A	2.194A	594.759	92.122%	1272	33.3	43.19°C	0.963
	11.974V	5.008V	3.296V	5.014V	645.619				51.24°C	230.24V
8	50.279A	7.992A	8.014A	2.397A	680.099	91.684%	1527	37.6	43.79°C	0.964
	11.967V	5.006V	3.294V	5.008V	741.782				52.82°C	230.25V
9	57.056A	8.493A	8.503A	2.397A	765.003	91.325%	1527	37.6	44.58°C	0.967
	11.962V	5.005V	3.292V	5.006V	837.673				54.46°C	230.24V
10	63.581A	8.994A	9.025A	3.007A	849.828	90.821%	1526	37.6	45.61°C	0.969
	11.955V	5.005V	3.291V	4.989V	935.715				55.86°C	230.24V
11	70.696A	8.994A	9.026A	3.008A	934.589	90.396%	1526	37.6	46.58°C	0.970
	11.951V	5.004V	3.290V	4.987V	1033.884				57.57°C	230.24V
CL1	0.141A	14.001A	13.998A	0.000A	118.030	83.099%	572	<6.0	42.60°C	0.875
	11.998V	5.009V	3.301V	5.069V	142.035				49.32°C	230.24V

CL2	70.832A	1.001A	0.999A	1.000A	860.566	91.492%	1525	37.6	45.95°C	0.969
	11.961V	5.009V	3.295V	5.039V	940.591				55.61°C	230.24V

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	1.205A	0.499A	0.481A	0.197A	19.563	70.416%	0	<6.0	0.786
	12.009V	5.015V	3.306V	5.071V	27.782				115.10V
2	2.466A	0.997A	0.997A	0.395A	39.931	81.032%	0	<6.0	0.904
	12.018V	5.014V	3.305V	5.065V	49.278				115.11V
3	3.666A	1.496A	1.483A	0.593A	59.453	85.049%	0	<6.0	0.943
	12.016V	5.014V	3.305V	5.060V	69.904				115.10V
4	4.929A	1.994A	1.997A	0.792A	79.827	87.145%	0	<6.0	0.959
	12.016V	5.014V	3.305V	5.054V	91.603				115.11V

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	0.494A	0.483A	0.197A	19.550	70.230%	0	<6.0	0.431
	12.013V	5.016V	3.307V	5.069V	27.837				230.26V
2	2.465A	0.996A	0.998A	0.395A	39.900	79.933%	0	<6.0	0.600
	12.010V	5.016V	3.306V	5.063V	49.917				230.25V
3	3.665A	1.495A	1.480A	0.593A	59.398	84.032%	0	<6.0	0.720
	12.008V	5.015V	3.305V	5.058V	70.685				230.24V
4	4.933A	1.993A	1.995A	0.792A	79.818	86.373%	0	<6.0	0.792
	12.007V	5.014V	3.305V	5.053V	92.411				230.24V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	26.1 mV	12.5 mV	6.2 mV	7.6 mV	Pass
20% Load	9.0 mV	11.8 mV	6.8 mV	5.6 mV	Pass
30% Load	8.8 mV	12.1 mV	7.2 mV	5.5 mV	Pass
40% Load	8.7 mV	13.2 mV	7.8 mV	7.5 mV	Pass
50% Load	8.3 mV	13.1 mV	8.2 mV	9.3 mV	Pass
60% Load	8.1 mV	13.7 mV	8.8 mV	9.8 mV	Pass
70% Load	8.4 mV	14.0 mV	9.6 mV	10.8 mV	Pass
80% Load	9.7 mV	25.7 mV	20.2 mV	12.4 mV	Pass
90% Load	9.4 mV	15.4 mV	12.7 mV	11.7 mV	Pass
100% Load	14.0 mV	15.1 mV	11.9 mV	13.9 mV	Pass
110% Load	13.8 mV	16.0 mV	12.4 mV	13.4 mV	Pass
Crossload 1	10.9 mV	14.4 mV	9.8 mV	5.4 mV	Pass
Crossload 2	13.7 mV	13.4 mV	9.1 mV	12.0 mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	2.7 mV	11.5 mV	6.4 mV	8.0 mV	Pass
20% Load	8.1 mV	12.1 mV	7.0 mV	5.1 mV	Pass
30% Load	11.8 mV	12.2 mV	7.7 mV	5.3 mV	Pass
40% Load	9.4 mV	12.6 mV	8.1 mV	7.7 mV	Pass
50% Load	8.6 mV	13.9 mV	9.0 mV	10.1 mV	Pass
60% Load	8.3 mV	14.4 mV	9.9 mV	10.6 mV	Pass
70% Load	9.1 mV	14.0 mV	9.5 mV	11.4 mV	Pass
80% Load	9.6 mV	26.6 mV	20.7 mV	11.9 mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
90% Load	9.3 mV	15.7 mV	12.3 mV	12.6 mV	Pass
100% Load	13.1 mV	15.3 mV	12.1 mV	12.2 mV	Pass
110% Load	14.0 mV	16.2 mV	12.8 mV	13.3 mV	Pass
Crossload 1	5.4 mV	14.0 mV	10.1 mV	5.2 mV	Pass
Crossload 2	13.5 mV	13.7 mV	9.5 mV	11.1 mV	Pass

The results above are not used in the certification process

Thermaltake Toughpower GF1 850W (#2)



Top side



Power specifications label

Cybenetics □□□□□□□□□□□□□□□□□□ ETA□□□□□ LAMBDA□□□□□ SAFE□□□□□□□□□□□□□□□□□ DELTA□□□□□□□ PHI□□□□□□□□□

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