thermaltake

Thermaltake Toughpower GF3 1000W

Serial Number PSTPD1000FNFAGE4SI000035

Lab ID TT10002072

Certification ID 252072

Test Result Report ID: 22PS2072A

Certificate Issue Date: Oct 10, 2022

Scheme: ETA-EMI PSU

115V: CYBENETICS GOLD

230V: CYBENETICS GOLD 230v

Scheme: LAMBDA PSU

115V: CYBENETICS STANDARD+

230V: CYBENETICS STANDARD+ 230v

CYBENETICS ATX 3.0 PASS

Outside Validation Scope

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 GF3 1000W
OEM/ODM	CWT
Serial Number	PSTPD1000FNFAGE4SI000035
Product Specifications	
Manufacturer-Provided Information	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	13-6.5

Rated Frequency (Hz)	50-60
Rated Power (W)	1000
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 (HA13525H12SF-Z)
Semi-Passive Operation	✓ (selectable)
Cybenetics Testing Information	
Lab ID	TT10002072
Date of receipt	Sep 22, 2022
Testing Date	Oct 10, 2022
Report Issued Date	Oct 10, 2022
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	16AWG	No
8 pin EPS12V (700mm)	1	1	16AWG	No
4+4 pin EPS12V (700mm)	1	1	16AWG	No
6+2 pin PCIe (500mm+150mm)	2	4	16-18AWG	No
12+4 pin PCIe (600mm) (450W)	1	1	16-24AWG	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 (1400mm) - C13 coupler	1	1	18AWG	-

Power Specifications

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	22	22	83.5	3	0.3
	Watts	120		999.6	15	3.6
Total Max. Power (W)		1000				

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	✓
ALPM (Alternative Low Power Mode) compatible	✓
ATX v3.0 Compliance	✓

Performance Summary

115V

Accredited	
Average Efficiency (>1450 load combinations)	88.619%
Average Noise Output (>1450 Load Combinations)	37.48dBA
Average PF (>1450 Load Combinations)	0.984
Efficiency With 10W (≤500W) or 2% (>500W) Load	79.663%
Standby Power Consumption	0.0158W
Non-Accredited	
12V Ripple (Full Load)	28.50mV
5V Ripple (Full Load)	10.31mV

3.3V Ripple (Full Load)	12.75mV
5VSB Ripple (Full Load)	15.18mV
12V Load Regulation	0.70%
5V Load Regulation	0.70%
3.3V Load Regulation	0.95%
5VSB Load Regulation	1.37%
Inrush Current	24.440A

230V

Accredited	
Average Efficiency (>1450 load combinations)	90.568%
Average Noise Output (>1450 Load Combinations)	37.47dBA
Average PF (>1450 Load Combinations)	0.961
Efficiency With 10W (≤500W) or 2% (>500W) Load	78.442%
Standby Power Consumption	0.0716W
Non-Accredited	
12V Ripple (Full Load)	26.85mV
5V Ripple (Full Load)	10.53mV
3.3V Ripple (Full Load)	12.85mV
5VSB Ripple (Full Load)	13.53mV
12V Load Regulation	0.71%
5V Load Regulation	0.76%
3.3V Load Regulation	0.92%
5VSB Load Regulation	1.35%
Inrush Current	46.590A
12V Transient Response (200%)	11.35V
5V Transient Response (200%)	4.882V
3.3V Transient Response (200%)	3.169V
5VSB Transient Response (200%)	4.989V
Hold-Up Time & PWR_OK Signal	18.00ms
AC Loss to PWR_OK Hold Up Time	15.50ms
PWR_OK Inactive to DC Loss Delay	2.50ms

PSU Timings: T1 (20% / 100%)	60.0ms	60.0ms
PSU Timings: T3 (20% / 100%)	128.0ms	130.0ms
OPP (25.53°C / 42.08°C)	126.30%	126.29%

Hold-Up Time & PWR_OK Signal

Hold-Up Time (ms)	18
AC Loss to PWR_OK Hold Up Time (ms)	15.5
PWR_OK Inactive to DC Loss Delay (ms)	2.5

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Tables

115V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	115.15 V	115.12 V	113.85 V	115.20 V	116.15 V	PASS
Mains Frequency:	60.00 Hz	59.99 Hz	59.40 Hz	60.01 Hz	60.60 Hz	PASS
Mains Voltage CF:	1.416	1.415	1.340	1.419	1.490	PASS
Mains Voltage THD:	0.13 %	0.10 %	N/A	0.17 %	2.00 %	PASS
Real Power:	0.016 W	0.011 W	N/A	0.020 W	N/A	N/A
Apparent Power:	10.287 W	10.199 W	N/A	10.372 W	N/A	N/A
Power Factor:	0.002	N/A	N/A	N/A	N/A	N/A

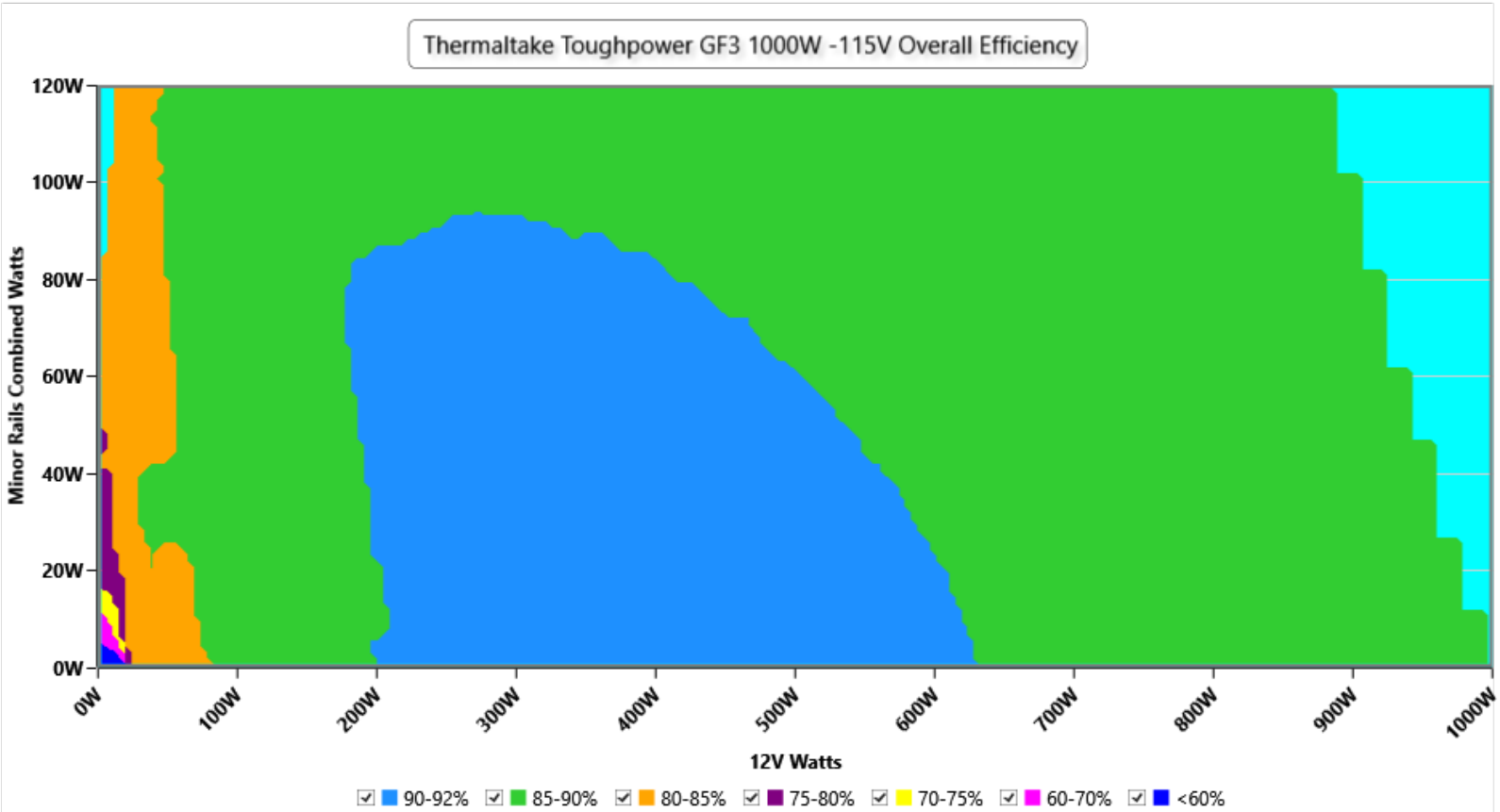
230V

Detailed Results						
	Average	Min	Limit Min	Max	Limit Max	Result
Mains Voltage RMS:	230.34 V	230.20 V	227.70 V	230.37 V	232.30 V	PASS
Mains Frequency:	50.00 Hz	49.99 Hz	49.50 Hz	50.01 Hz	50.50 Hz	PASS

Mains Voltage CF:	1.416	1.415	1.340	1.417	1.490	PASS
Mains Voltage THD:	0.13 %	0.10 %	N/A	0.23 %	2.00 %	PASS
Real Power:	0.072 W	0.064 W	N/A	0.086 W	N/A	N/A
Apparent Power:	34.746 W	34.502 W	N/A	35.018 W	N/A	N/A
Power Factor:	0.002	N/A	N/A	N/A	N/A	N/A

Efficiency Graph

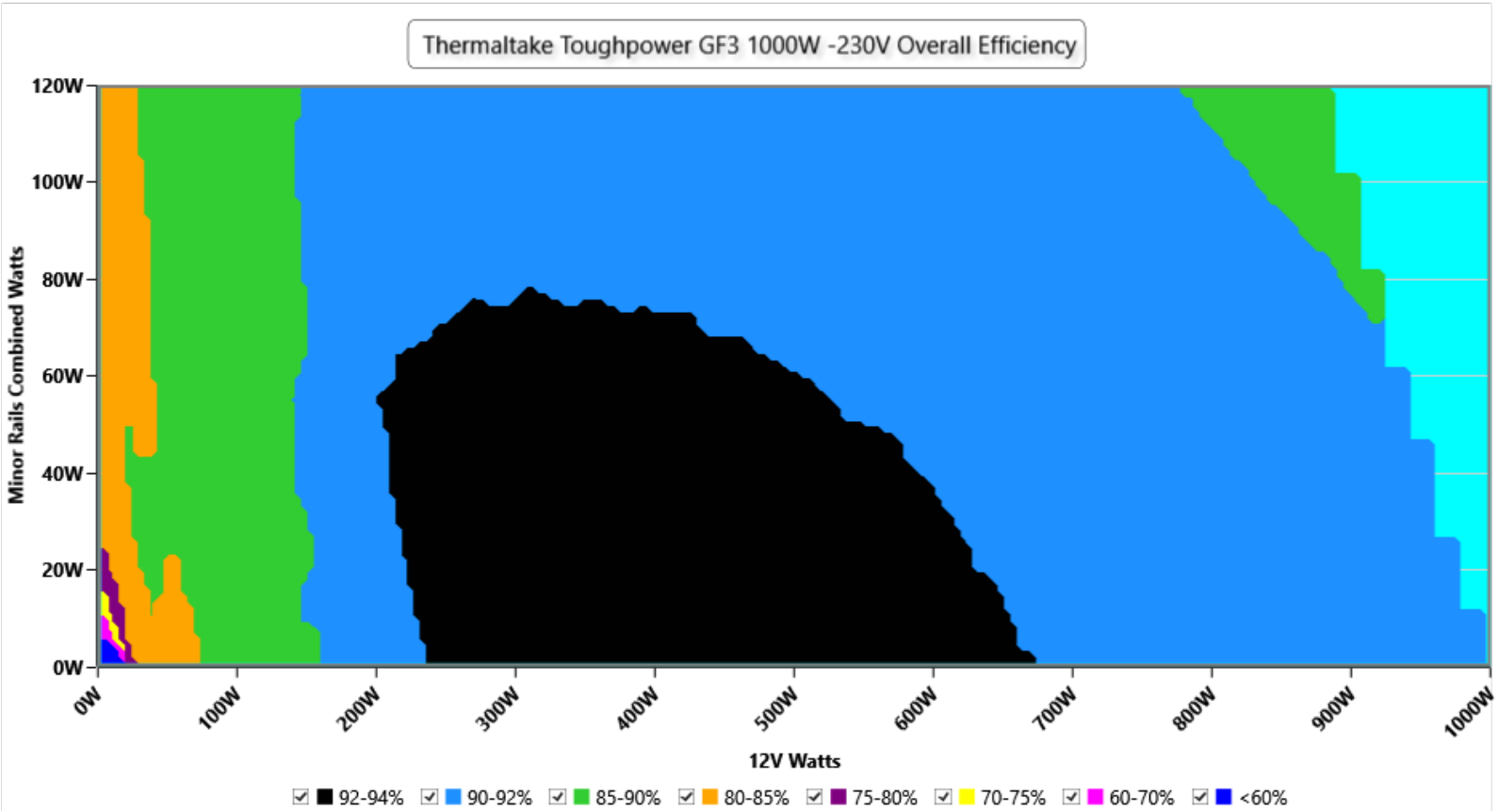
115V



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

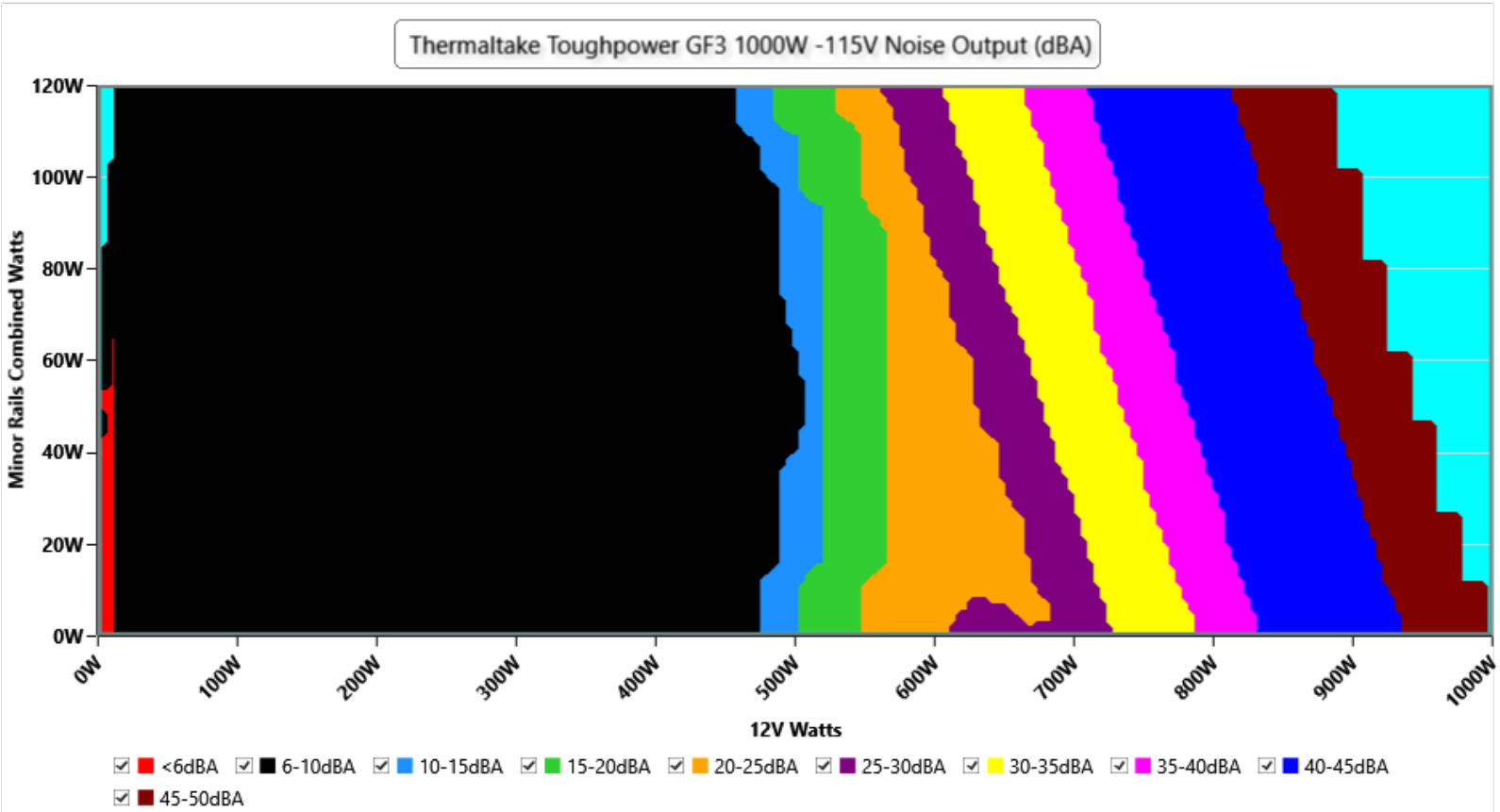


INFO

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

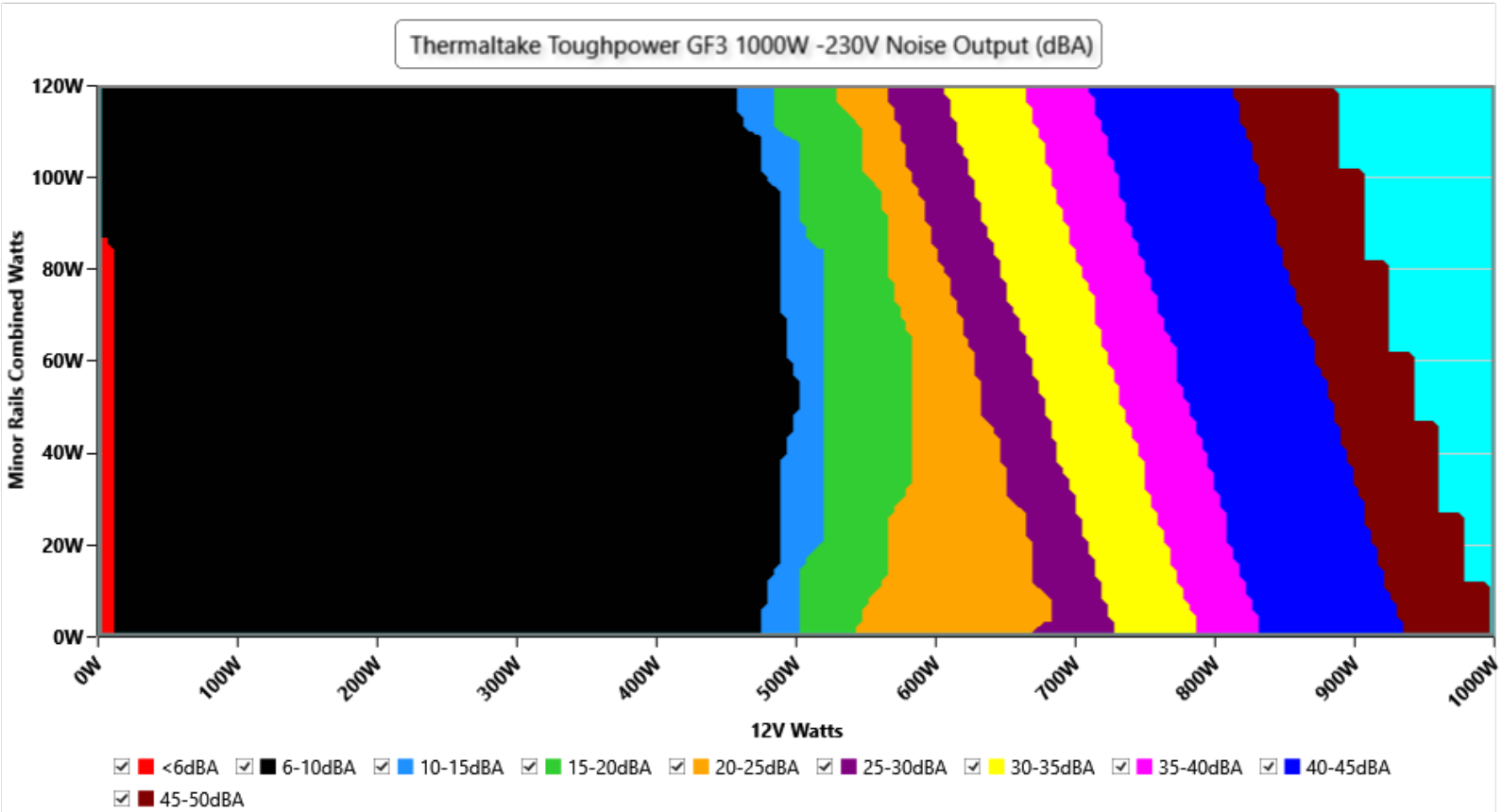
115V



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

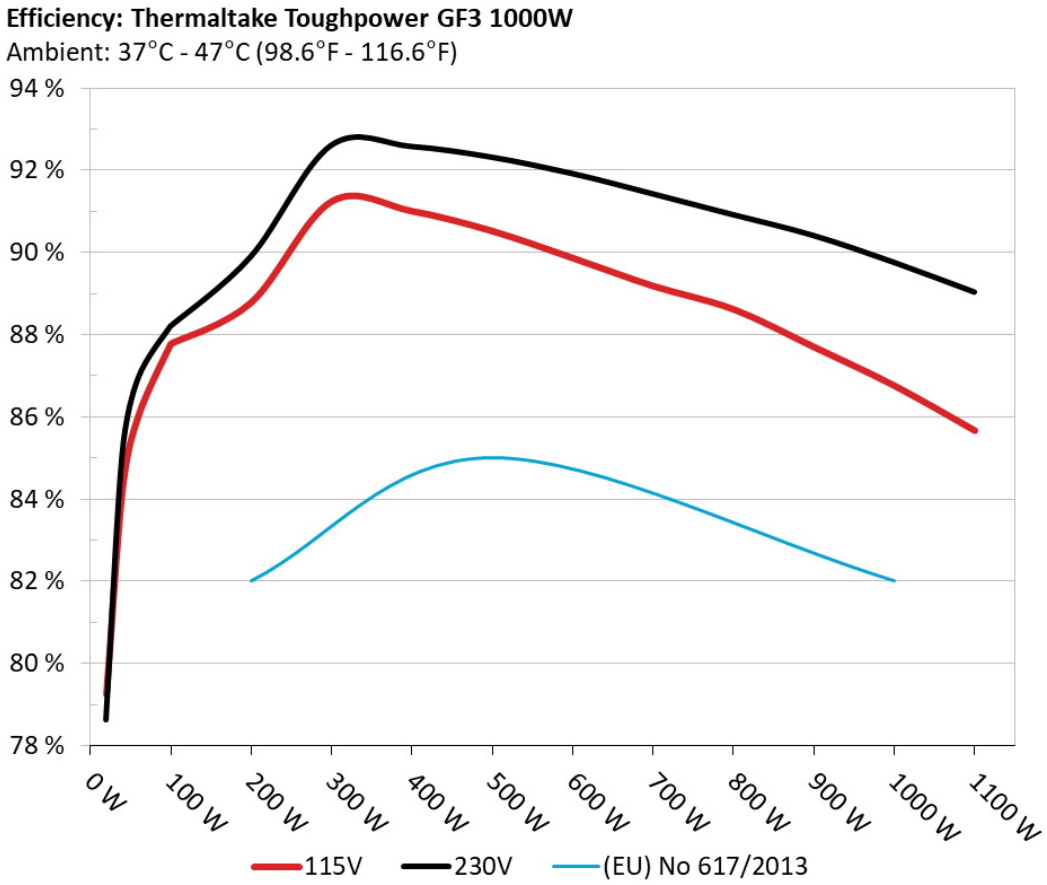


INFO

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

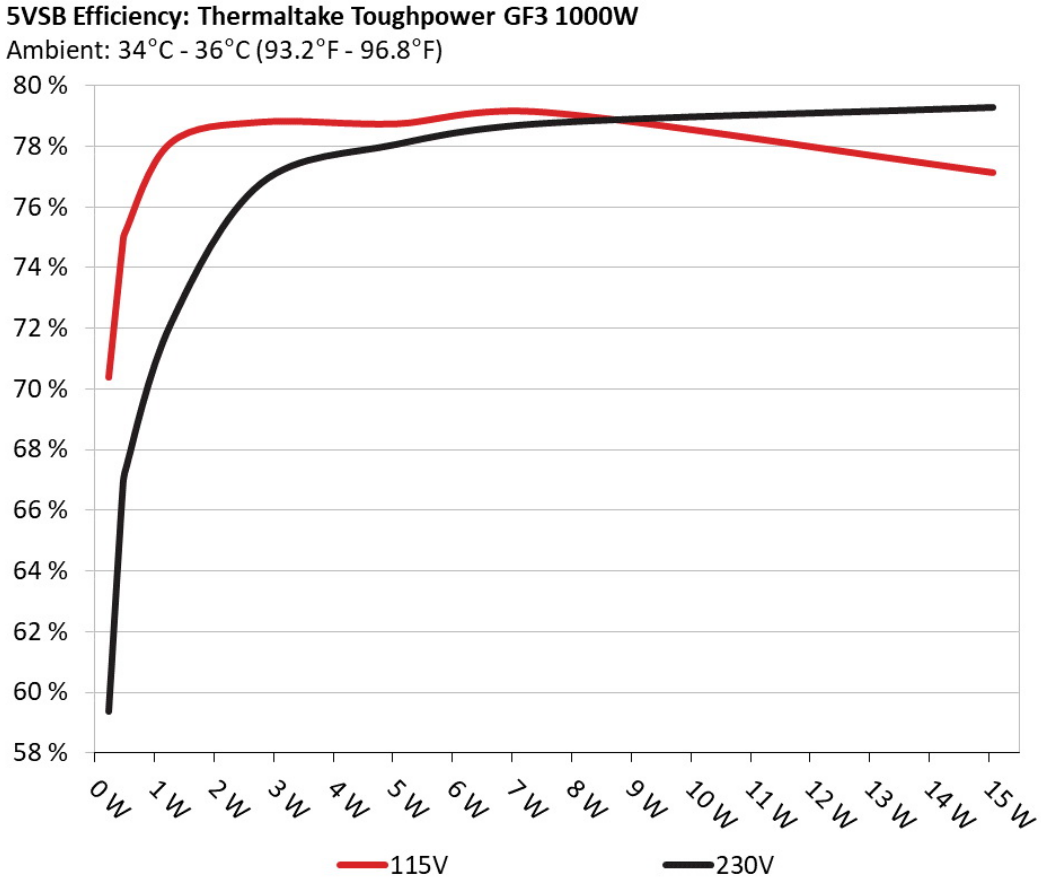
Efficiency under high ambient temperature



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	0.228W	70.369%	0.032
	5.073V	0.324W		115.15V
2	0.09A	0.456W	74.64%	0.06
	5.072V	0.611W		115.16V
3	0.55A	2.785W	78.78%	0.272
	5.065V	3.535W		115.16V
4	1A	5.056W	78.722%	0.375
	5.057V	6.423W		115.15V
5	1.5A	7.572W	79.098%	0.428
	5.049V	9.573W		115.15V
6	2.999A	15.066W	77.115%	0.504
	5.024V	19.538W		115.15V

230V

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.228W	59.361%	0.012
	5.073V	0.384W		230.34V
2	0.09A	0.456W	66.524%	0.021
	5.072V	0.686W		230.34V
3	0.55A	2.785W	76.775%	0.104
	5.065V	3.627W		230.34V
4	1A	5.056W	78.058%	0.173
	5.057V	6.477W		230.34V
5	1.5A	7.572W	78.757%	0.233
	5.049V	9.615W		230.34V
6	2.999A	15.065W	79.276%	0.341
	5.024V	19.003W		230.34V

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
10%	6.464A	1.988A	2.005A	0.991A	100.008	85.673%	0	<6.0	44.29°C	0.975
	12.128V	5.032V	3.292V	5.047V	116.729				40.07°C	115.14V
20%	13.939A	2.982A	3.009A	1.191A	199.933	88.789%	0	<6.0	44.79°C	0.984
	12.127V	5.031V	3.29V	5.038V	225.177				40.24°C	115.11V
30%	21.797A	3.48A	3.512A	1.371A	299.953	91.246%	0	<6.0	46.28°C	0.984
	12.107V	5.028V	3.288V	5.107V	328.734				41.21°C	115.08V
40%	29.606A	3.979A	4.02A	1.566A	399.409	91.012%	415	7.5	41.82°C	0.983
	12.099V	5.026V	3.283V	5.107V	438.852				47.36°C	115.05V
50%	37.088A	4.976A	5.028A	1.765A	499.121	90.53%	417	7.8	42.59°C	0.985
	12.096V	5.024V	3.281V	5.099V	551.328				48.59°C	115.02V
60%	44.641A	5.974A	6.037A	1.964A	599.652	89.871%	701	20.9	42.78°C	0.987
	12.093V	5.022V	3.279V	5.091V	667.234				49.32°C	114.99V
70%	52.133A	6.972A	7.048A	2.163A	699.402	89.192%	947	30.4	43.76°C	0.989
	12.090V	5.021V	3.277V	5.083V	784.162				50.87°C	114.95V
80%	59.705A	7.973A	8.057A	2.264A	799.304	88.626%	1126	35.6	44.32°C	0.99
	12.083V	5.018V	3.275V	5.077V	901.888				52.38°C	114.92V
90%	67.601A	8.47A	8.55A	2.366A	899.132	87.712%	1529	44.1	45.5°C	0.991
	12.081V	5.016V	3.273V	5.07V	1025.088				54.59°C	114.88V
100%	75.299A	8.973A	9.076A	2.967A	999.178	86.773%	1927	50.1	45.94°C	0.992
	12.079V	5.014V	3.271V	5.055V	1151.491				55.99°C	114.83V
110%	82.930A	9.975A	10.184A	2.97A	1099.795	85.675%	2209	53.7	47.24°C	0.993
	12.076V	5.012V	3.269V	5.049V	1283.682				58.09°C	114.79V
CL1	0.113A	14.345A	14.514A	0A	121.261	82.886%	418	7.8	42.15°C	0.981
	12.125V	5.033V	3.286V	5.055V	146.299				48.59°C	115.13V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
CL2	0.113A	21.802A	0A	0A	111.375	80.951%	418	7.8	43.54°C	0.977
	12.130V	5.046V	3.29V	5.061V	137.587				50.57°C	115.13V
CL3	0.113A	0A	22.072A	0A	73.962	76.397%	418	7.8	44.23°C	0.976
	12.130V	5.033V	3.289V	5.056V	96.815				52.24°C	115.14V
CL4	82.813A	0A	0A	0A	999.772	87.509%	1748	47.8	45.98°C	0.992
	12.072V	5.029V	3.282V	5.111V	1142.473				55.96°C	114.84V

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
10%	6.462A	1.987A	2.004A	0.991A	99.979	86.76%	0	<6.0	44.84°C	0.888
	12.129V	5.032V	3.293V	5.047V	115.238				40.46°C	230.32V
20%	13.938A	2.982A	3.009A	1.191A	199.909	89.903%	0	<6.0	45.63°C	0.946
	12.126V	5.03V	3.29V	5.038V	222.367				40.98°C	230.31V
30%	21.798A	3.481A	3.512A	1.371A	299.942	92.616%	0	<6.0	46.49°C	0.964
	12.106V	5.027V	3.288V	5.106V	323.854				41.32°C	230.29V
40%	29.605A	3.981A	4.017A	1.567A	399.384	92.589%	417	7.8	41.51°C	0.97
	12.099V	5.024V	3.286V	5.106V	431.351				47.22°C	230.28V
50%	37.097A	4.979A	5.026A	1.765A	499.145	92.329%	418	7.8	42.55°C	0.975
	12.094V	5.022V	3.283V	5.098V	540.612				48.69°C	230.27V
60%	44.655A	5.977A	6.035A	1.965A	599.68	91.93%	705	21.1	42.75°C	0.977
	12.090V	5.02V	3.281V	5.09V	652.329				49.47°C	230.25V
70%	52.158A	6.976A	7.046A	2.164A	699.455	91.437%	949	30.5	43.02°C	0.979
	12.085V	5.018V	3.279V	5.081V	764.956				50.24°C	230.24V
80%	59.728A	7.977A	8.054A	2.266A	799.466	90.928%	1264	39.3	43.3°C	0.981
	12.081V	5.016V	3.277V	5.074V	879.231				51.39°C	230.22V
90%	67.635A	8.476A	8.548A	2.367A	899.235	90.423%	1536	44.2	44.71°C	0.981
	12.076V	5.013V	3.274V	5.068V	994.479				53.75°C	230.2V

Test	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
100%	75.336A	8.979A	9.072A	2.968A	999.219	89.769%	1928	50.1	45.3°C	0.983
	12.074V	5.011V	3.272V	5.053V	1113.113				55.37°C	230.19V
110%	82.977A	9.981A	10.179A	2.971A	1099.817	89.042%	2211	53.8	46.85°C	0.984
	12.070V	5.009V	3.27V	5.048V	1235.159				57.73°C	230.17V
CL1	0.114A	14.352A	14.507A	0A	121.271	83.56%	422	7.9	42.62°C	0.916
	12.128V	5.03V	3.287V	5.054V	145.126				48.97°C	230.31V
CL2	0.114A	21.813A	0A	0A	111.381	81.824%	421	7.9	43.2°C	0.909
	12.131V	5.043V	3.291V	5.06V	136.118				50.53°C	230.32V
CL3	0.113A	0A	22.062A	0A	73.965	76.67%	420	7.9	44.26°C	0.866
	12.130V	5.029V	3.29V	5.055V	96.47				52.38°C	230.32V
CL4	82.805A	0A	0A	0A	999.768	90.478%	1754	47.9	45.24°C	0.982
	12.073V	5.026V	3.284V	5.111V	1104.997				55.22°C	230.19V

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])	Temps (In/Out)	PF/AC Volts
20W	1.232A	0.495A	0.5A	0.197A	19.995	79.265%	0	<6.0	39.71°C	0.869
	12.044V	5.049V	3.302V	5.066V	25.23				36.58°C	115.16V
40W	2.713A	0.693A	0.7A	0.296A	39.993	84.262%	0	<6.0	40.49°C	0.941
	12.047V	5.049V	3.302V	5.063V	47.462				37.19°C	115.16V
60W	4.194A	0.893A	0.901A	0.395A	59.993	86.049%	0	<6.0	41.32°C	0.964
	12.045V	5.039V	3.296V	5.06V	69.721				37.63°C	115.15V
80W	5.672A	1.093A	1.102A	0.494A	79.955	87.785%	0	<6.0	43.09°C	0.97
	12.045V	5.034V	3.293V	5.057V	91.082				39.11°C	115.14V

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
20W	1.232A	0.495A	0.5A	0.197A	19.991	78.625%	0	<6.0	39.76°C	0.512
	12.044V	5.049V	3.302V	5.066V	25.422				36.66°C	230.32V
40W	2.713A	0.693A	0.7A	0.296A	39.991	85.068%	0	<6.0	41.18°C	0.702
	12.047V	5.048V	3.302V	5.063V	47.008				37.84°C	230.32V
60W	4.194A	0.893A	0.901A	0.395A	59.991	86.948%	0	<6.0	42.02°C	0.802
	12.045V	5.039V	3.296V	5.06V	69.01				38.61°C	230.32V
80W	5.671A	1.092A	1.102A	0.494A	79.937	88.209%	0	<6.0	43.26°C	0.856
	12.046V	5.035V	3.294V	5.057V	90.622				39.46°C	230.32V

The results above are not used in the certification process

Ripple Measurements

115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	24.56mV	6.60mV	10.16mV	35.07mV	Pass
20% Load	27.49mV	7.52mV	11.27mV	38.30mV	Pass
30% Load	15.42mV	6.25mV	7.48mV	8.30mV	Pass
40% Load	14.86mV	6.71mV	7.84mV	9.71mV	Pass
50% Load	25.42mV	7.42mV	12.89mV	35.22mV	Pass
60% Load	15.56mV	8.13mV	12.64mV	9.77mV	Pass
70% Load	15.72mV	7.77mV	8.59mV	9.87mV	Pass
80% Load	28.15mV	8.64mV	13.95mV	36.63mV	Pass
90% Load	33.70mV	9.76mV	14.00mV	37.80mV	Pass
100% Load	28.50mV	10.31mV	12.75mV	15.18mV	Pass
110% Load	28.32mV	11.35mV	13.54mV	16.03mV	Pass
Crossload1	8.49mV	9.75mV	11.73mV	13.53mV	Pass
Crossload2	9.87mV	12.30mV	8.09mV	12.45mV	Pass

Test	12V	5V	3.3V	5VSB	Pass/Fail
Crossload3	26.43mV	6.15mV	14.15mV	35.47mV	Pass
Crossload4	18.22mV	8.52mV	11.21mV	14.06mV	Pass

The results above are not used in the certification process

230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	15.70mV	18.45mV	7.13mV	33.29mV	Pass
20% Load	25.47mV	7.17mV	9.45mV	42.00mV	Pass
30% Load	16.48mV	6.50mV	7.89mV	8.65mV	Pass
40% Load	24.15mV	7.88mV	9.70mV	32.69mV	Pass
50% Load	27.49mV	8.44mV	9.60mV	42.91mV	Pass
60% Load	13.74mV	8.08mV	12.64mV	9.67mV	Pass
70% Load	30.38mV	7.72mV	9.66mV	30.46mV	Pass
80% Load	15.22mV	8.23mV	10.57mV	10.02mV	Pass
90% Load	35.47mV	9.15mV	11.37mV	33.24mV	Pass
100% Load	26.85mV	10.53mV	12.85mV	13.53mV	Pass
110% Load	28.22mV	11.37mV	13.00mV	14.07mV	Pass
Crossload1	8.13mV	10.86mV	11.67mV	12.98mV	Pass
Crossload2	32.55mV	12.45mV	7.84mV	36.69mV	Pass
Crossload3	7.09mV	6.50mV	13.75mV	12.55mV	Pass
Crossload4	18.79mV	8.39mV	10.55mV	13.97mV	Pass

The results above are not used in the certification process

Thermaltake Toughpower GF3 1000W

Top side

Power specifications label

Cybenetics [redacted] ETA[redacted] LAMBDA[redacted] SAFE[redacted] DELTA[redacted] PHI[redacted]

CYBENETICS LTD Syrou 6, Latsia, 2231, Nicosia Cyprus

www.cybenetics.com - info@cybenetics.com