Anex

Gamemax GP-400A rev.2 (#2)

Lab ID#: GM19400007
Receipt Date: Apr 3, 2019
Test Date: Dec 3, 2019

Report:
Report Date: Mar 13, 2019

DUT INFORMATION

Brand	Gamemax
Manufacturer (OEM)	Gamemax
Series	GP Series
Model Number	
Serial Number	
DUT Notes	

DUT SPECIFICATIONS

Rated Voltage (Vrms)	100-240
Rated Current (Arms)	6-3
Rated Frequency (Hz)	50-60
Rated Power (W)	400
Type	ATX12V
Cooling	120mm Sleeve Bearing Fan (DF1202512SEL)
Semi-Passive Operation	✗
Cable Design	Fixed cables

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	

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Anex

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RESULTS

Temperature Range (°C /°F)	30-32 / 86-89.6
ErP Lot 3/6 Ready	ErP Lot 6 2010: ✓ ErP Lot 6 2013: Partially ErP Lot 3 2014 & CEC: Partially
(EU) No 617/2013 Compliance	✓

115V

Average Efficiency	83.819%
Efficiency With 10W (≤500W) or 2% (>500W)	57.752
Average Efficiency 5VSB	74.659%
Standby Power Consumption (W)	0.1091800
Average PF	0.992
Avg Noise Output	29.41 dB(A)
Efficiency Rating (ETA)	BRONZE
Noise Rating (LAMBDA)	A-

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	15	15	24	2.5	0.5
	Watts	100		288	12.5	6
Total Max. Power (W)		400				

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

Hold-Up Time (ms)	16.2
AC Loss to PWR_OK Hold Up Time (ms)	11.2
PWR_OK Inactive to DC Loss Delay (ms)	5.0

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CABLES AND CONNECTORS

Captive Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (510mm)	1	1	18-22AWG	No
4+4 pin EPS12V (510mm)	1	1	18AWG	No
6+2 pin PCIe (430mm)	1	1	18AWG	No
SATA (430mm) / 4-pin Molex (+150mm)	1	1 / 1	18AWG	No
4-pin Molex (430mm) / SATA (+150mm+150mm)	1	1 / 2	18AWG	No

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General Data	
Manufacturer (OEM)	Gamemax
PCB Type	Single Layer
Primary Side	
Transient Filter	4x Y caps, 2x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor
Bridge Rectifier(s)	1x GBU1506L (600V, 15A @ 100°C)
APFC MOSFETS	2x Champion GP18S50G (500V, 28A @ 150°C, 0.19Ω)
APFC Boost Diode	1x CREE C3D06060A (600V, 6A @ 154°C)
Hold-up Cap(s)	1x CapXon (400V, 270uF, 2000h @ 105 °C, HP)
Main Switchers	2x Champion GP18S50G (500V, 28A @ 150°C, 0.19Ω)
Combo APFC/PWM Controller	Champion CM6805BSX
Topology	Primary side: Double Forward Secondary side: Group Regulation & Passive Rectification
Secondary Side	
+12V MOSFETS	2x MOSPEC S60M60C SBR (60V, 60A)
5V & 3.3V	2x MOSPEC S40M45C SBR (45V, 40A)
Filtering Capacitors	Electrolytics: CapXon (2-5,000 @ 105°C, KF), ChengX (2-4,000h @ 105°C, GR)
Supervisor IC	Grenergy GR8313 (OVP, UVP, SCP, PG)
Fan Model	Xin Zheng Heng Electronic DF1202512SEL (120mm, 12V, 0.10A, 1.2W, Sleeve Bearing)
5VSB Circuit	
Rectifier	1x MOSPEC S60M60C SBR (60V, 60A) & CEF04N7G (700V, 4A, 3.3Ohm)
Standby PWM Controller	Excelliance EM8569A

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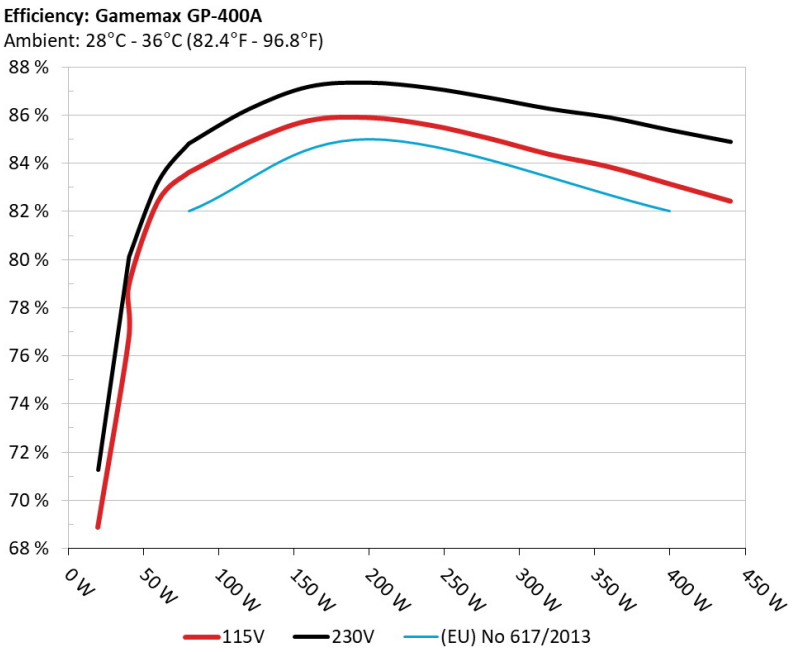
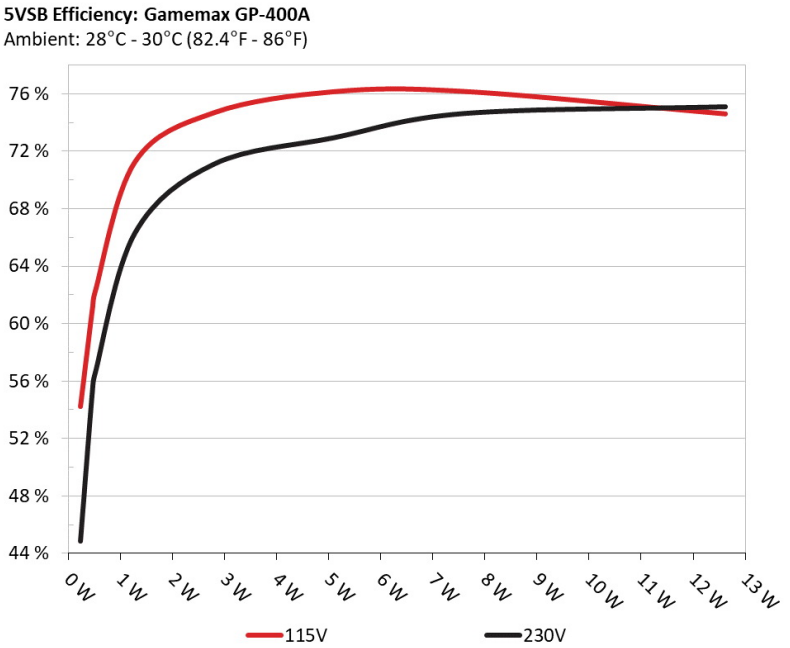
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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

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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	54.245%	0.058
	5.110V	0.424		115.09V
2	0.090A	0.460	61.089%	0.100
	5.107V	0.753		115.09V
3	0.550A	2.803	74.727%	0.281
	5.095V	3.751		115.09V
4	1.000A	5.084	76.176%	0.330
	5.083V	6.674		115.09V
5	1.500A	7.608	76.194%	0.356
	5.071V	9.985		115.09V
6	2.500A	12.614	74.635%	0.387
	5.045V	16.901		115.09V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	44.834%	0.022
	5.109V	0.513		230.23V
2	0.090A	0.460	55.355%	0.035
	5.107V	0.831		230.23V
3	0.550A	2.802	71.135%	0.144
	5.094V	3.939		230.25V
4	1.000A	5.084	72.952%	0.212
	5.083V	6.969		230.25V
5	1.500A	7.607	74.652%	0.258
	5.070V	10.190		230.25V
6	2.500A	12.614	75.119%	0.309
	5.045V	16.792		230.24V

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115V

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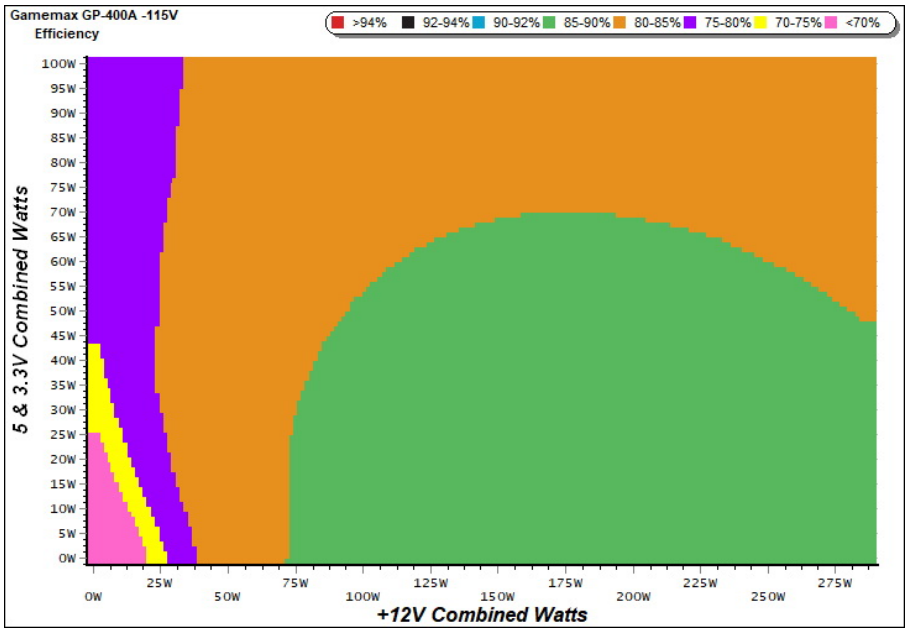
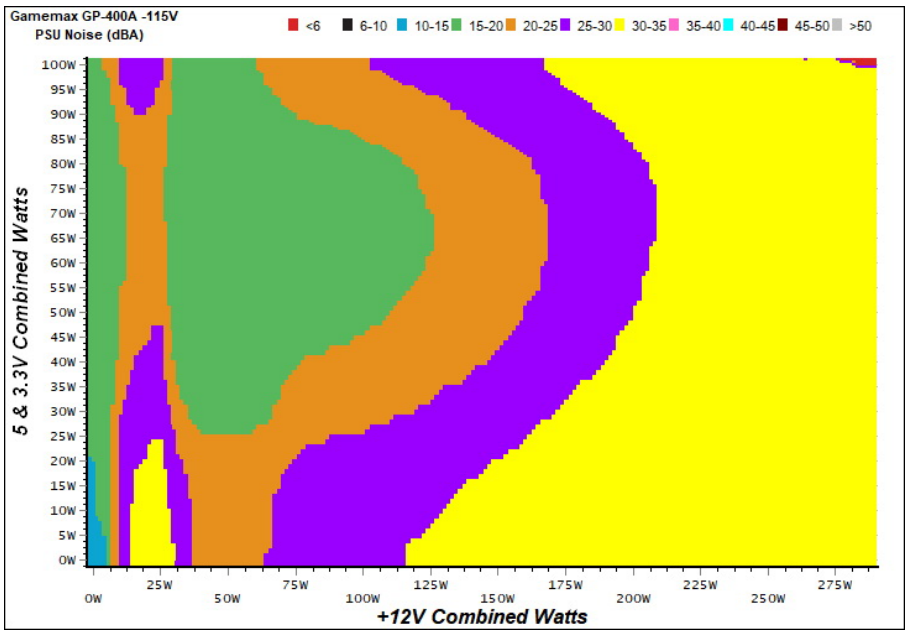
EFFICIENCY GRAPH 115V



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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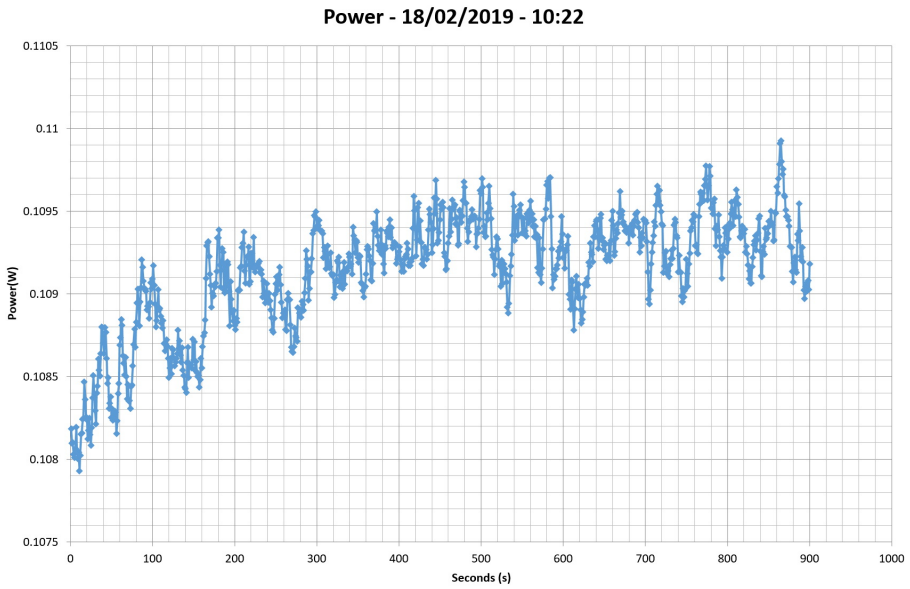
VAMPIRE POWER -115V



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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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	1.488A	1.972A	1.957A	0.986A	39.991	76.738%	815	14.4	30.05°C	0.947
	12.368V	5.067V	3.370V	5.071V	52.114				34.57°C	115.11V
2	3.944A	2.972A	2.944A	1.187A	79.687	82.629%	819	14.5	30.79°C	0.990
	12.370V	5.048V	3.361V	5.056V	96.439				35.77°C	115.10V
3	6.735A	3.475A	3.430A	1.389A	119.208	84.858%	827	14.8	31.18°C	0.993
	12.353V	5.038V	3.353V	5.042V	140.480				37.18°C	115.10V
4	9.597A	3.978A	3.944A	1.591A	159.577	85.768%	1063	20.9	31.67°C	0.996
	12.336V	5.027V	3.345V	5.028V	186.057				38.46°C	115.10V
5	12.091A	4.994A	4.942A	1.796A	199.708	85.898%	1293	26.3	32.30°C	0.997
	12.341V	5.006V	3.337V	5.012V	232.494				39.56°C	115.10V
6	14.585A	6.016A	5.945A	2.001A	239.808	85.589%	1511	31.1	32.55°C	0.998
	12.343V	4.986V	3.329V	4.997V	280.187				40.38°C	115.10V
7	17.048A	7.046A	6.952A	2.208A	279.523	85.032%	1604	33.4	32.90°C	0.998
	12.344V	4.966V	3.322V	4.981V	328.726				41.17°C	115.11V
8	19.585A	8.088A	7.964A	2.417A	320.057	84.364%	1611	33.6	33.45°C	0.998
	12.339V	4.946V	3.314V	4.965V	379.378				42.78°C	115.12V
9	22.463A	8.612A	8.459A	2.421A	359.323	83.854%	1613	33.6	34.52°C	0.998
	12.324V	4.935V	3.309V	4.956V	428.511				44.47°C	115.11V
10	25.425A	9.138A	8.990A	2.529A	400.021	83.135%	1615	33.7	35.46°C	0.998
	12.304V	4.924V	3.303V	4.944V	481.172				46.55°C	115.11V
11	28.779A	9.139A	9.000A	2.532A	440.052	82.426%	1617	33.7	36.03°C	0.998
	12.261V	4.924V	3.299V	4.937V	533.878				48.82°C	115.10V
CL1	0.134A	12.000A	11.999A	0.000A	99.145	76.151%	1518	31.2	32.52°C	0.993
	12.938V	4.780V	3.338V	5.058V	130.195				39.72°C	115.11V
CL2	24.002A	1.001A	0.996A	1.000A	301.167	86.021%	1571	32.6	35.78°C	0.998
	11.986V	5.124V	3.336V	5.027V	350.109				46.51°C	115.10V

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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	1.168A	0.489A	0.471A	0.196A	19.419	68.886%	810	14.2	0.828
	12.265V	5.120V	3.377V	5.099V	28.190				115.10V
2	2.406A	0.981A	0.977A	0.393A	39.898	78.890%	809	14.2	0.947
	12.303V	5.098V	3.373V	5.088V	50.574				115.10V
3	3.568A	1.475A	1.453A	0.591A	59.334	82.405%	810	14.2	0.986
	12.315V	5.084V	3.368V	5.079V	72.003				115.10V
4	4.805A	1.971A	1.959A	0.789A	79.794	83.613%	814	14.3	0.990
	12.322V	5.072V	3.364V	5.069V	95.432				115.10V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	18.3 mV	12.6 mV	15.9 mV	16.4 mV	Pass
20% Load	22.7 mV	13.2 mV	17.0 mV	49.2 mV	Pass
30% Load	27.6 mV	15.4 mV	20.7 mV	53.2 mV	Fail
40% Load	31.1 mV	15.8 mV	23.7 mV	54.4 mV	Fail
50% Load	33.8 mV	16.0 mV	23.2 mV	52.3 mV	Fail
60% Load	30.1 mV	15.8 mV	18.6 mV	46.8 mV	Pass
70% Load	41.9 mV	20.0 mV	22.3 mV	70.0 mV	Fail
80% Load	44.1 mV	22.3 mV	24.5 mV	80.2 mV	Fail
90% Load	48.3 mV	25.0 mV	25.3 mV	84.0 mV	Fail
100% Load	52.5 mV	29.7 mV	26.5 mV	90.7 mV	Fail
110% Load	59.3 mV	32.9 mV	25.5 mV	97.2 mV	Fail
Crossload 1	36.4 mV	66.1 mV	27.7 mV	23.2 mV	Fail
Crossload 2	35.2 mV	19.5 mV	18.5 mV	48.9 mV	Pass

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Top side

Power specifications label

CERTIFICATIONS 115V

Aristeidis Bitziopoulos
Lab Director

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