

Anex

Super Flower Leadex III Gold 650W rev.3 (mode 1)

Lab ID#: SF19650062
 Receipt Date: Jun 20, 2019
 Test Date: Feb 7, 2019

Report:
 Report Date: Jul 17, 2019

DUT INFORMATION	
Brand	Super Flower
Manufacturer (OEM)	Super Flower
Series	Leadex III Gold
Model Number	SF-650F14HG rev.3
Serial Number	S1906198802
DUT Notes	

DUT SPECIFICATIONS	
Rated Voltage (Vrms)	100-240
Rated Current (Arms)	10
Rated Frequency (Hz)	50-60
Rated Power (W)	650
Type	ATX12V
Cooling	130mm Fluid Dynamic Bearing (S1282412L)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

TEST EQUIPMENT	
Electronic Loads	Chroma 63601-5 x4 Chroma 63600-2 x2 63640-80-80 x20 63610-80-20 x2
AC Sources	Chroma 6530, Keysight AC6804B
Power Analyzers	N4L PPA1530 x2
Sound Analyzer	Bruel & Kjaer 2270 G4
Microphone	Bruel & Kjaer Type 4955-A
Data Loggers	Picoscope TC-08 x2, Labjack U3-HV x2
Tachometer	UNI-T UT372 x2
Digital Multimeter	Keysight U1273AX, Fluke 289
UPS	CyberPower OLS3000E 3kVA x2
Transformer	3kVA x2

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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	88.801%
Efficiency With 10W (≤500W) or 2% (>500W)	66.336
Average Efficiency 5VSB	80.418%
Standby Power Consumption (W)	0.0479006
Average PF	0.982
Avg Noise Output	11.12 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A++

230V

Average Efficiency	90.833%
Average Efficiency 5VSB	78.972%
Standby Power Consumption (W)	0.0826411
Average PF	0.921
Avg Noise Output	10.91 dB(A)
Efficiency Rating (ETA)	SILVER
Noise Rating (LAMBDA)	A++

POWER SPECIFICATIONS

Rail		3.3V	5V	12V	5VSB	-12V
Max. Power	Amps	20	20	54.1	3	0.5
	Watts	100		649.2	15	6
Total Max. Power (W)		650				

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

Hold-Up Time (ms)	24.9
AC Loss to PWR_OK Hold Up Time (ms)	22.4
PWR_OK Inactive to DC Loss Delay (ms)	2.5

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CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (600mm)	1	1	18-22AWG	Yes
4+4 pin EPS12V (700mm)	2	2	18-22AWG	Yes
6+2 pin PCIe (550mm+150mm)	2	4	18-20AWG	Yes
SATA (550mm+120mm+120mm)	2	6	18AWG	No
4 pin Molex (550mm+100mm+100mm+100mm)	1	4	18AWG	No
AC Power Cord (1370mm) - C13 coupler	1	1	18AWG	-

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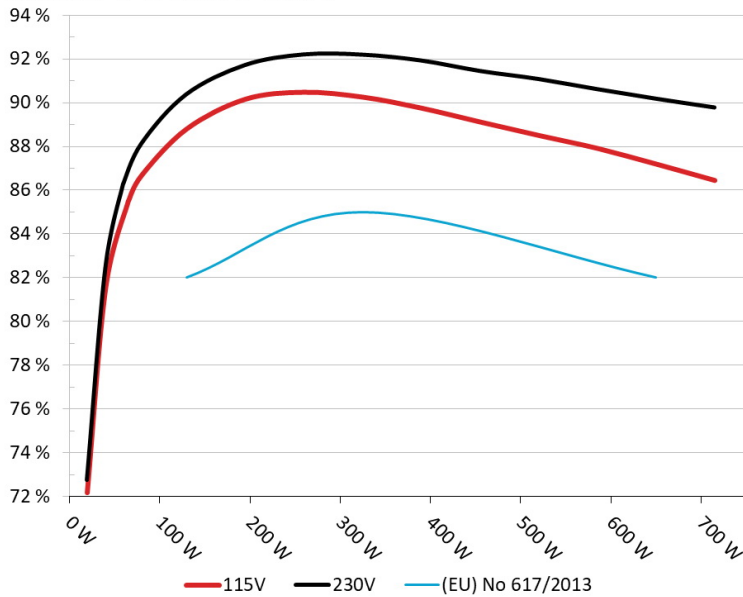
General Data	
Manufacturer (OEM)	Super Flower
Platform Model	Leadex III
PCB Type	Single Sided
Primary Side	
Transient Filter	3x Y caps, 3x X caps, 2x CM chokes, 1x MOV
Inrush Protection	NTC Thermistor & Relay
Bridge Rectifier(s)	1x
APFC MOSFETS	2x Infineon IPA50R199CP (550V, 11A @ 100°C, 0.199Ohm)
APFC Boost Diode	1x STMicroelectronics STTH8R06D (600V, 8A @ 130°C)
Hold-up Cap(s)	1x Nippon Chemi-Con (400V, 470uF, 2000h @ 105°C, KMQ)
Main Switchers	2x Infineon IPA50R199CP (550V, 11A @ 100°C, 0.199Ohm)
APFC Controller	SF29603
Resonant Controllers	SF29605 & S9602
Topology	Primary side: Half-Bridge & LLC converter Secondary side: Synchronous Rectification & DC-DC converters
Secondary Side	
+12V MOSFETS	4x Infineon IPP041N04N (40V, 80A @ 100°C, 4.1mOhm)
5V & 3.3V	DC-DC Converters: 6x Alpha & Omega AON6516 (30V, 25A @ 100°C, 8mOhm) PWM Controllers: 2x ON Semiconductor NCP1587A
Filtering Capacitors	Electrolytics: 7x Nichicon (2-5,000h @ 105°C, HD), 2x Nichicon (4-10,000h @ 105°C, HE), 2x Nichicon (5-6,000h @ 105°C, HV), 2x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 3x Nippon Chemi-Con (1-2,000h @ 105°C, KMG), 8x United Chemi-Con (1,000h @ 105°C, KRG) Polymers: 3x FPCAP, 7x Teapo
Supervisor IC	SF29603
Fan Model	Globe Fan S1282412L (130mm, 12V, 0.18A, Fluid Dynamic Bearing)
5VSB Circuit	
Rectifier	1x PFC Device PFR20L60CT SBR (60V, 20A)
Standby PWM Controller	SF29604

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EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE

Efficiency: Super Flower SF-650F14HG
Ambient: 37°C - 47°C (98.6°F - 116.6°F)

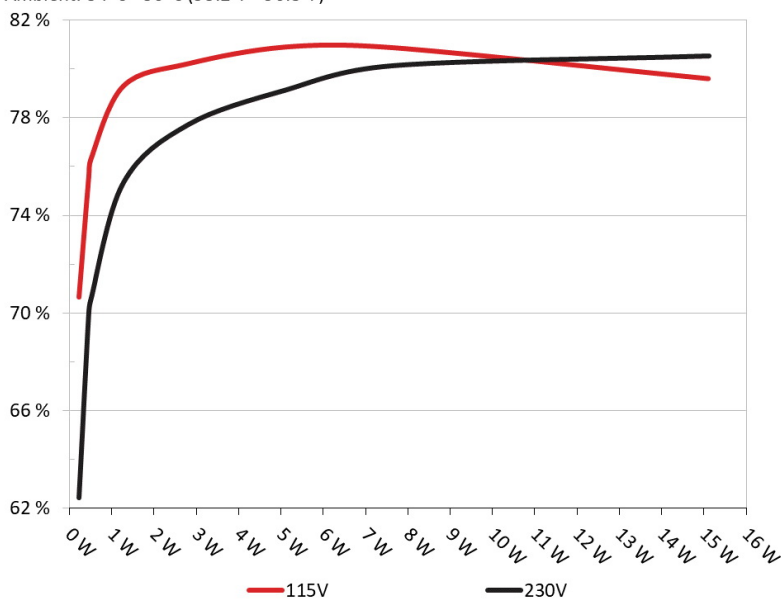


INFO

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: Super Flower SF-650F14HG
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	0.231	70.642%	0.025
	5.123V	0.327		115.17V
2	0.090A	0.461	75.574%	0.046
	5.122V	0.610		115.17V
3	0.550A	2.811	80.223%	0.221
	5.110V	3.504		115.17V
4	1.000A	5.098	80.908%	0.318
	5.098V	6.301		115.17V
5	1.500A	7.625	80.885%	0.380
	5.083V	9.427		115.16V
6	2.999A	15.097	79.609%	0.463
	5.034V	18.964		115.16V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.231	62.432%	0.008
	5.123V	0.370		230.35V
2	0.090A	0.462	70.000%	0.015
	5.122V	0.660		230.36V
3	0.550A	2.811	77.716%	0.080
	5.110V	3.617		230.36V
4	1.000A	5.098	79.125%	0.135
	5.098V	6.443		230.36V
5	1.500A	7.625	80.128%	0.187
	5.083V	9.516		230.36V
6	3.000A	15.111	80.528%	0.292
	5.037V	18.765		230.36V

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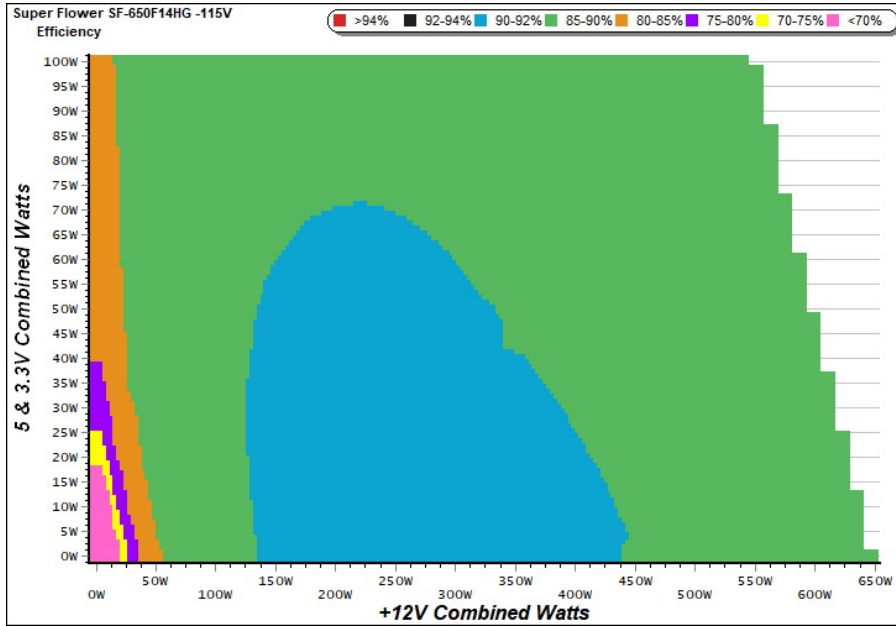
115V

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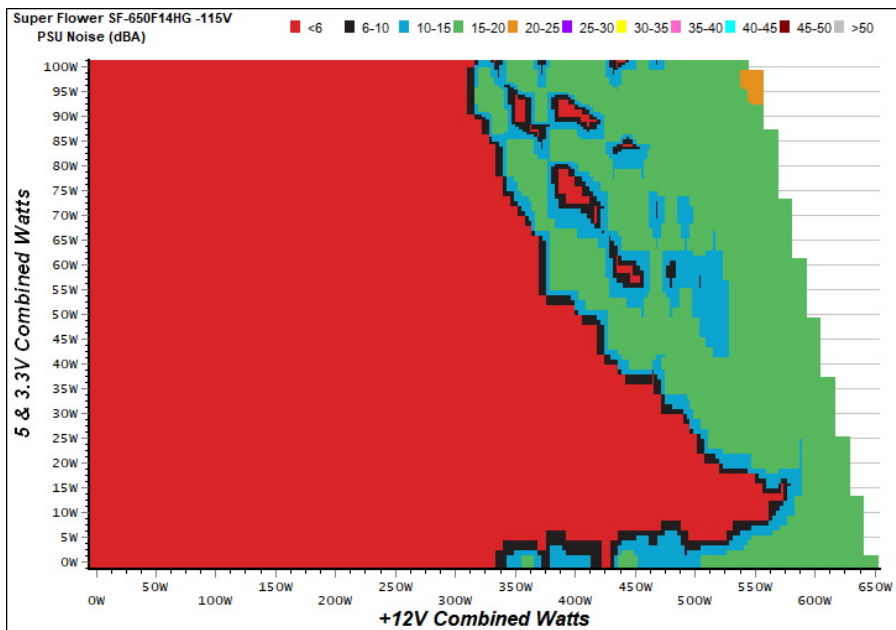
EFFICIENCY GRAPH 115V



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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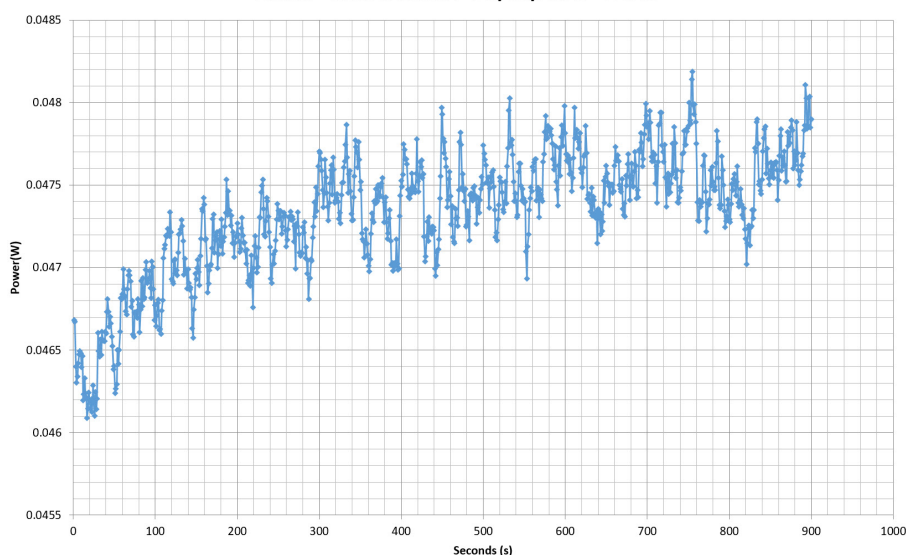
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VAMPIRE POWER -115V

Power - S1906198802 - 27/06/2019 - 14:45



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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Super Flower Leadex III Gold 650W rev.3 (mode 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	3.565A	1.988A	1.993A	0.983A	64.925	85.146%	0	<6.0	47.32°C	0.934
	12.154V	5.029V	3.310V	5.088V	76.251				40.52°C	115.16V
2	8.111A	2.986A	2.994A	1.182A	129.436	88.776%	0	<6.0	48.04°C	0.965
	12.147V	5.026V	3.308V	5.076V	145.801				40.84°C	115.16V
3	13.065A	3.485A	3.480A	1.383A	194.537	90.141%	0	<6.0	49.70°C	0.982
	12.134V	5.022V	3.305V	5.064V	215.813				41.40°C	115.16V
4	18.028A	3.984A	3.997A	1.584A	259.768	90.462%	0	<6.0	50.80°C	0.989
	12.124V	5.019V	3.302V	5.052V	287.156				41.92°C	115.16V
5	22.665A	4.986A	5.001A	1.786A	325.073	90.238%	0	<6.0	52.94°C	0.992
	12.114V	5.016V	3.299V	5.040V	360.241				42.55°C	115.16V
6	27.243A	5.988A	6.008A	1.990A	389.594	89.738%	0	<6.0	54.76°C	0.993
	12.105V	5.012V	3.296V	5.027V	434.144				42.97°C	115.16V
7	31.900A	6.989A	7.012A	2.194A	454.944	89.104%	0	<6.0	55.46°C	0.995
	12.095V	5.010V	3.294V	5.014V	510.578				43.41°C	115.16V
8	36.511A	7.988A	8.017A	2.399A	520.267	88.484%	713	13.8	43.77°C	0.996
	12.102V	5.008V	3.293V	5.005V	587.980				57.10°C	115.16V
9	41.518A	8.493A	8.511A	2.400A	585.177	87.894%	1011	22.9	44.23°C	0.996
	12.107V	5.005V	3.291V	5.001V	665.775				58.17°C	115.16V
10	46.274A	9.000A	9.032A	3.014A	650.023	87.180%	1259	30.5	45.23°C	0.996
	12.108V	5.003V	3.289V	4.978V	745.613				59.68°C	115.16V
11	51.617A	9.003A	9.037A	3.016A	714.855	86.434%	1629	36.5	46.87°C	0.996
	12.111V	5.000V	3.287V	4.974V	827.051				61.73°C	115.16V
CL1	0.149A	12.001A	12.000A	0.000A	101.543	83.345%	0	<6.0	52.90°C	0.960
	12.120V	5.016V	3.295V	5.093V	121.834				42.06°C	115.18V
CL2	54.133A	1.004A	1.000A	1.000A	668.490	87.511%	1400	31.9	45.51°C	0.996
	12.102V	5.008V	3.296V	5.049V	763.891				59.30°C	115.17V

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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	1.191A	0.498A	0.482A	0.196A	19.599	72.164%	0	<6.0	0.725
	12.168V	5.033V	3.314V	5.116V	27.159				115.16V
2	2.440A	0.995A	0.995A	0.392A	39.982	81.518%	0	<6.0	0.876
	12.163V	5.032V	3.313V	5.108V	49.047				115.16V
3	3.626A	1.493A	1.478A	0.588A	59.496	85.470%	0	<6.0	0.934
	12.160V	5.030V	3.312V	5.101V	69.610				115.16V
4	4.881A	1.989A	1.991A	0.786A	79.929	86.668%	0	<6.0	0.938
	12.156V	5.029V	3.310V	5.093V	92.224				115.16V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	5.4 mV	3.5 mV	13.5 mV	8.5 mV	Pass
20% Load	5.5 mV	4.2 mV	13.3 mV	8.5 mV	Pass
30% Load	6.3 mV	4.9 mV	17.1 mV	9.2 mV	Pass
40% Load	6.2 mV	5.2 mV	14.4 mV	7.5 mV	Pass
50% Load	6.5 mV	6.0 mV	14.9 mV	7.7 mV	Pass
60% Load	6.9 mV	6.5 mV	18.9 mV	8.9 mV	Pass
70% Load	7.6 mV	7.0 mV	18.3 mV	8.8 mV	Pass
80% Load	7.9 mV	7.8 mV	18.7 mV	9.5 mV	Pass
90% Load	7.8 mV	8.1 mV	17.9 mV	10.1 mV	Pass
100% Load	10.5 mV	7.7 mV	18.9 mV	11.1 mV	Pass
110% Load	11.8 mV	7.9 mV	19.5 mV	11.4 mV	Pass
Crossload 1	6.9 mV	4.6 mV	32.7 mV	12.4 mV	Pass
Crossload 2	10.7 mV	7.0 mV	19.3 mV	10.7 mV	Pass

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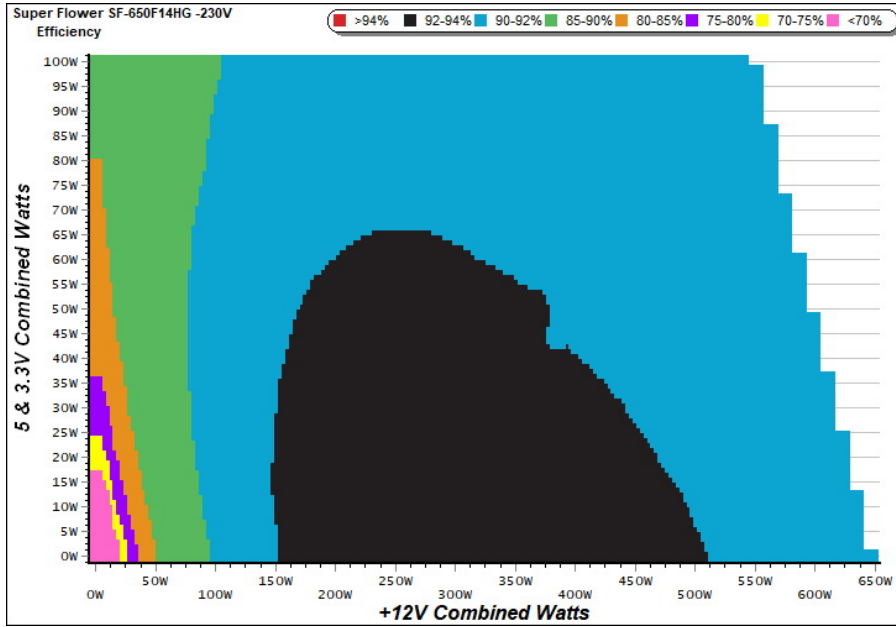
230V

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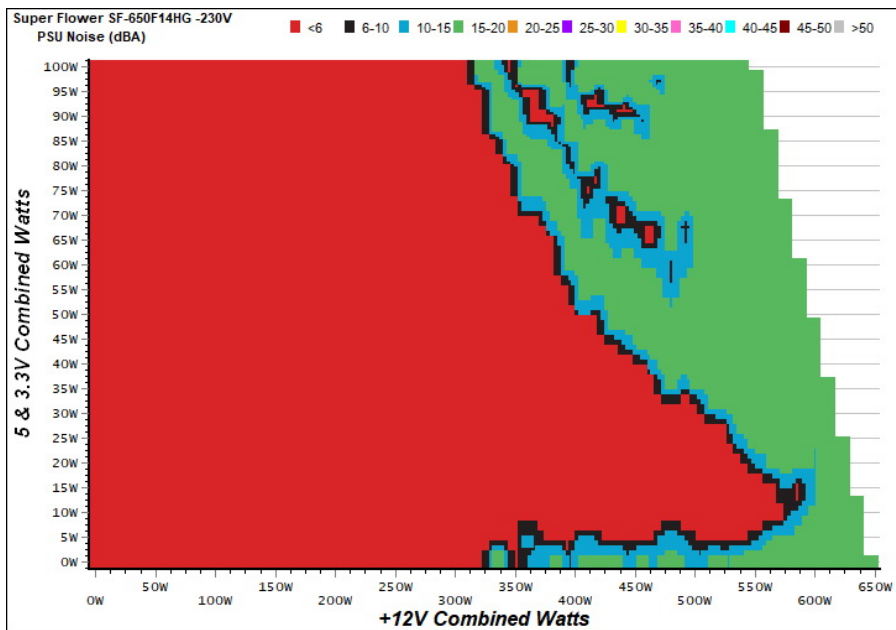
EFFICIENCY GRAPH 230V



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NOISE GRAPH 230V



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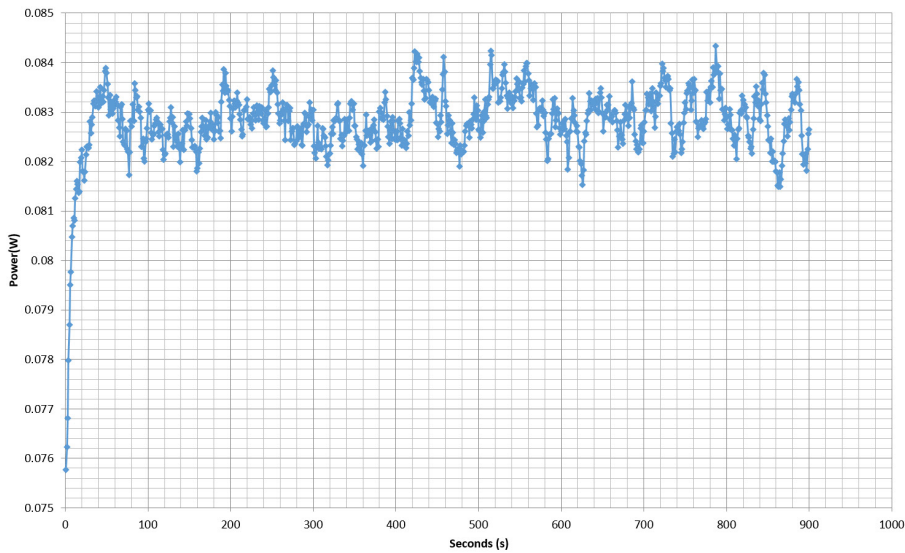
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10-110% LOAD TESTS 230V

Test #	12V	5V	3.3V	5VSB	DC/AC (Watts)	Efficiency	Fan Speed (RPM)	PSU Noise (dB[A])	Temps (In/Out)	PF/AC Volts
1	3.566A	1.990A	1.994A	0.983A	64.920	86.254%	0	<6.0	46.81°C	0.660
	12.147V	5.027V	3.309V	5.087V	75.266				40.20°C	230.35V
2	8.115A	2.987A	2.992A	1.183A	129.413	90.370%	0	<6.0	47.47°C	0.842
	12.139V	5.024V	3.307V	5.075V	143.204				40.53°C	230.37V
3	13.067A	3.487A	3.479A	1.383A	194.522	91.712%	0	<6.0	48.49°C	0.913
	12.131V	5.021V	3.304V	5.064V	212.102				41.01°C	230.36V
4	18.034A	3.987A	3.999A	1.584A	259.779	92.201%	0	<6.0	49.76°C	0.939
	12.120V	5.017V	3.301V	5.052V	281.752				41.22°C	230.52V
5	22.672A	4.988A	5.002A	1.786A	325.061	92.189%	0	<6.0	51.23°C	0.954
	12.110V	5.013V	3.298V	5.040V	352.601				42.05°C	230.37V
6	27.250A	5.990A	6.008A	1.990A	389.590	91.926%	0	<6.0	53.28°C	0.964
	12.102V	5.010V	3.295V	5.027V	423.806				42.56°C	230.40V
7	31.888A	6.993A	7.015A	2.194A	454.922	91.446%	0	<6.0	54.40°C	0.971
	12.099V	5.007V	3.292V	5.015V	497.477				43.30°C	230.39V
8	36.515A	7.993A	8.020A	2.399A	520.243	91.076%	623	12.3	43.75°C	0.976
	12.100V	5.005V	3.292V	5.004V	571.220				55.67°C	230.41V
9	41.523A	8.496A	8.512A	2.400A	585.148	90.612%	1020	22.9	44.73°C	0.979
	12.105V	5.003V	3.290V	5.001V	645.775				56.83°C	230.39V
10	46.275A	9.001A	9.034A	3.014A	650.010	90.179%	1245	30.2	45.53°C	0.982
	12.108V	5.000V	3.288V	4.978V	720.797				58.35°C	230.82V
11	51.612A	9.004A	9.038A	3.016A	714.837	89.777%	1570	35.4	46.70°C	0.985
	12.112V	4.999V	3.286V	4.974V	796.237				60.09°C	230.39V
CL1	0.147A	12.001A	12.002A	0.000A	101.549	84.953%	0	<6.0	51.50°C	0.802
	12.123V	5.017V	3.296V	5.092V	119.536				41.83°C	230.39V
CL2	54.118A	1.003A	1.001A	1.000A	668.466	90.683%	1385	31.6	45.68°C	0.983
	12.105V	5.006V	3.294V	5.050V	737.147				58.65°C	230.39V

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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	1.191A	0.498A	0.479A	0.196A	19.572	72.753%	0	<6.0	0.380
	12.156V	5.031V	3.313V	5.115V	26.902				230.34V
2	2.443A	0.994A	0.995A	0.392A	39.990	82.435%	0	<6.0	0.523
	12.154V	5.030V	3.312V	5.108V	48.511				230.35V
3	3.632A	1.490A	1.479A	0.588A	59.518	86.072%	0	<6.0	0.634
	12.151V	5.028V	3.310V	5.100V	69.149				230.35V
4	4.880A	1.990A	1.996A	0.786A	79.894	88.125%	0	<6.0	0.724
	12.148V	5.027V	3.309V	5.093V	90.660				230.35V

RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	5.0 mV	3.4 mV	13.2 mV	7.9 mV	Pass
20% Load	5.5 mV	4.1 mV	13.3 mV	7.9 mV	Pass
30% Load	6.1 mV	4.9 mV	14.6 mV	7.9 mV	Pass
40% Load	6.0 mV	5.4 mV	18.4 mV	8.0 mV	Pass
50% Load	6.7 mV	6.0 mV	26.1 mV	8.2 mV	Pass
60% Load	6.9 mV	5.7 mV	14.3 mV	8.6 mV	Pass
70% Load	7.2 mV	7.1 mV	16.9 mV	8.7 mV	Pass
80% Load	7.4 mV	7.9 mV	15.8 mV	9.2 mV	Pass
90% Load	7.6 mV	8.3 mV	17.2 mV	8.8 mV	Pass
100% Load	11.0 mV	8.2 mV	19.2 mV	10.8 mV	Pass
110% Load	11.0 mV	8.1 mV	18.9 mV	10.7 mV	Pass
Crossload 1	7.0 mV	4.6 mV	16.0 mV	12.4 mV	Pass
Crossload 2	10.8 mV	7.4 mV	18.2 mV	9.8 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

Anex

Super Flower Leadex III Gold 650W rev.3 (mode 1)

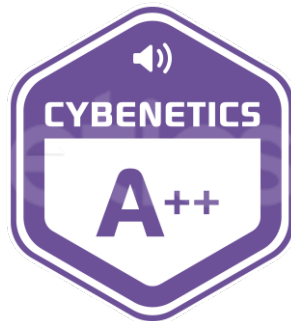


Top side

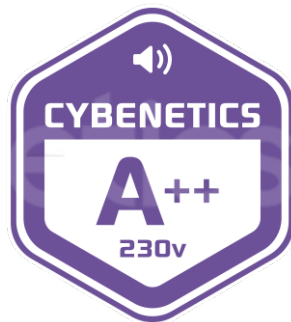


Power specifications label

CERTIFICATIONS 115V



CERTIFICATIONS 230V



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