EFFICIENCY AND NOISE LEVEL CERTIFICATIONS

Anex

Super Flower Leadex III Gold ARGB 650W (#2)

Lab ID#: SF19650138
Receipt Date: Nov 18, 2019
Test Date: Nov 28, 2019

Report: 19PS892A
Report Date: Nov 30, 2019

DUT INFORMATION

Brand	Super Flower
Manufacturer (OEM)	Super Flower
Series	Leadex III Gold ARGB
Model Number	SF-650F14RG
Serial Number	S1908199005
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 Fan (RL4C S1302412L)
Semi-Passive Operation	✓ (selectable)
Cable Design	Fully Modular

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				

CABLES AND CONNECTORS

Modular Cables

Description	Cable Count	Connector Count (Total)	Gauge	In Cable Capacitors
ATX connector 20+4 pin (590mm)	1	1	18-22AWG	Yes
4+4 pin EPS12V (690mm)	2	2	18-22AWG	Yes
6+2 pin PCIe (540mm+150mm)	2	4	18-22AWG	Yes
SATA (550mm+120mm+120mm)	2	6	18AWG	No
4-pin Molex (550mm+100mm+100mm+100mm)	1	4	18AWG	No
ARGB Sync cable (550mm+180mm)	1	2	28AWG	No
AC Power Cord (1380mm) - C13 coupler	1	1	18AWG	-

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Super Flower Leadex III Gold ARGB 650W (#2)

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) & 1x SPN5003 FET (for reduced no-load consumption)
APFC Boost Diode	1x STMicroelectronics STTH8R06D (600V, 8A @ 130°C)
Hold-up Cap(s)	1x Nippon Chemi-Con (400V, 470uF, 2,000h @ 105°C, KMQ)
Main Switchers	2x Infineon IPA50R199CP (550V, 11A @ 100°C, 0.199Ohm)
APFC Controller	SF29603 & S9602
Resonant Controllers	SF29605
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:8x Alpha & Omega AON6516 (30V, 25A @ 100°C, 8mOhm @ 125°C) PWM Controllers: 2x ON Semiconductor NCP1587A
Filtering Capacitors	Electrolytics: 4x Nippon Chemi-Con (4-10,000h @ 105°C, KY), 9x Nippon Chemi-Con (1-5,000h @ 105°C, KZE), 2x Nippon Chemi-Con (1-2,000h @ 105°C, KMG), 7x Nichicon (1,000h @ 105°C, RZ) Polymers: 8x FPCAP, 3x United Chemi-Con, 2x Jamicon
Supervisor IC	SF29603 & LM339A
Fan controller	STMicroelectronics STM8S003F3
Fan Model	Globe Fan S1302412L (130mm, 12V, 0.25A, Fluid Dynamic Bearing Fan)
5VSB Circuit	
Rectifier	1x PFC PFR20L60CT SBR (60V, 20A)
Standby PWM Controller	SF29604

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Super Flower Leadex III Gold ARGB 650W (#2)

RESULTS

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

115V

Average Efficiency	88.832%
Efficiency With 10W (≤500W) or 2% (>500W)	65.596
Average Efficiency 5VSB	80.520%
Standby Power Consumption (W)	0.0453548
Average PF	0.982
Avg Noise Output	20.99 dB(A)
Efficiency Rating (ETA)	GOLD
Noise Rating (LAMBDA)	A

230V

Average Efficiency	90.774%
Average Efficiency 5VSB	79.568%
Standby Power Consumption (W)	0.0754545
Average PF	0.917
Avg Noise Output	20.65 dB(A)
Efficiency Rating (ETA)	BRONZE
Noise Rating (LAMBDA)	A

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, Keithley 2015 - THD
UPS	CyberPower OLS3000E 3kVA x2

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

Hold-Up Time (ms)	25.6
AC Loss to PWR_OK Hold Up Time (ms)	23.2
PWR_OK Inactive to DC Loss Delay (ms)	2.4

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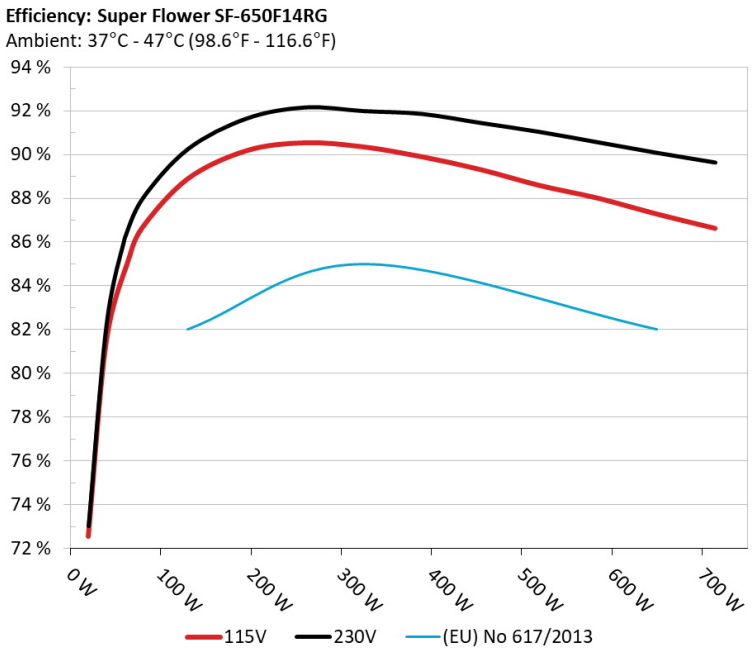
Super Flower Leadex III Gold ARGB 650W (#2)

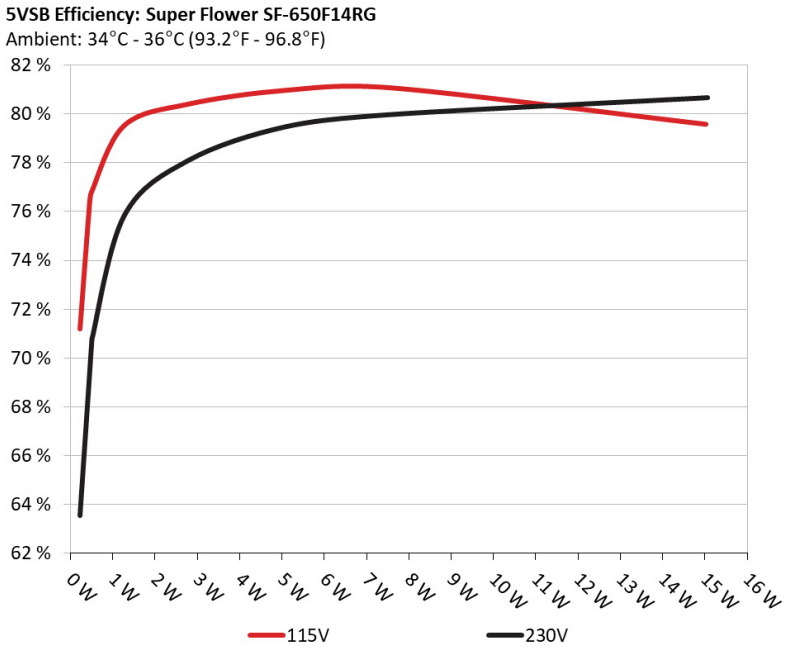
EFFICIENCY UNDER HIGH AMBIENT TEMPERATURE



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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Super Flower Leadex III Gold ARGB 650W (#2)

5VSB EFFICIENCY -115V (ERP LOT 3/6 & CEC)

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.230	71.207%	0.023
	5.115V	0.323		115.12V
2	0.090A	0.460	76.412%	0.042
	5.114V	0.602		115.11V
3	0.550A	2.806	80.401%	0.211
	5.100V	3.490		115.11V
4	1.000A	5.086	80.961%	0.313
	5.086V	6.282		115.11V
5	1.500A	7.605	81.059%	0.380
	5.070V	9.382		115.12V
6	3.000A	15.030	79.574%	0.466
	5.010V	18.888		115.12V

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

Test #	5VSB	DC/AC (Watts)	Efficiency	PF/AC Volts
1	0.045A	0.231	64.167%	0.008
	5.121V	0.360		230.26V
2	0.090A	0.461	70.706%	0.014
	5.119V	0.652		230.27V
3	0.550A	2.807	77.456%	0.077
	5.103V	3.624		230.27V
4	1.000A	5.089	78.595%	0.132
	5.088V	6.475		230.26V
5	1.500A	7.606	79.320%	0.183
	5.070V	9.589		230.26V
6	3.000A	15.050	79.575%	0.288
	5.016V	18.913		230.26V

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Super Flower Leadex III Gold ARGB 650W (#2)

115V

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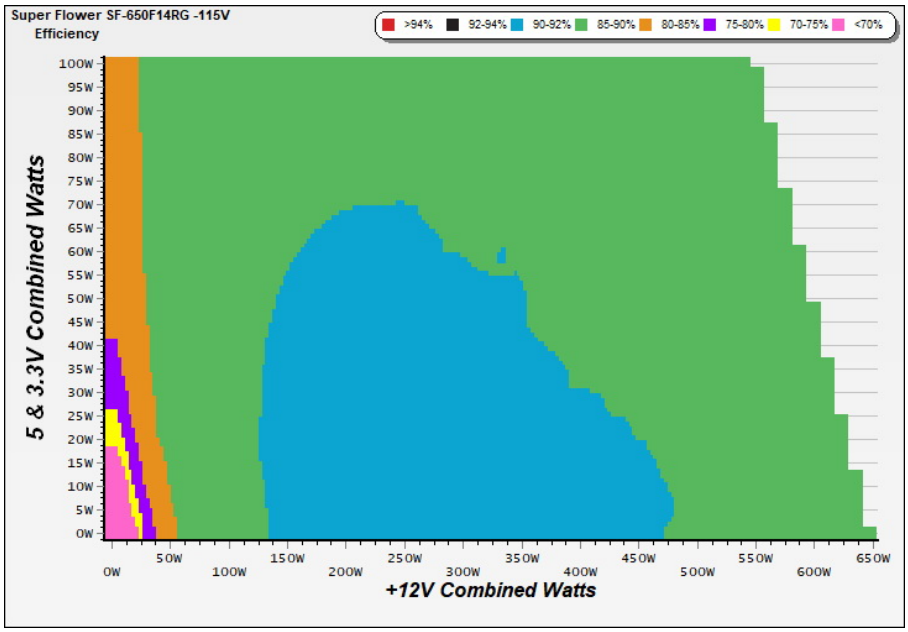
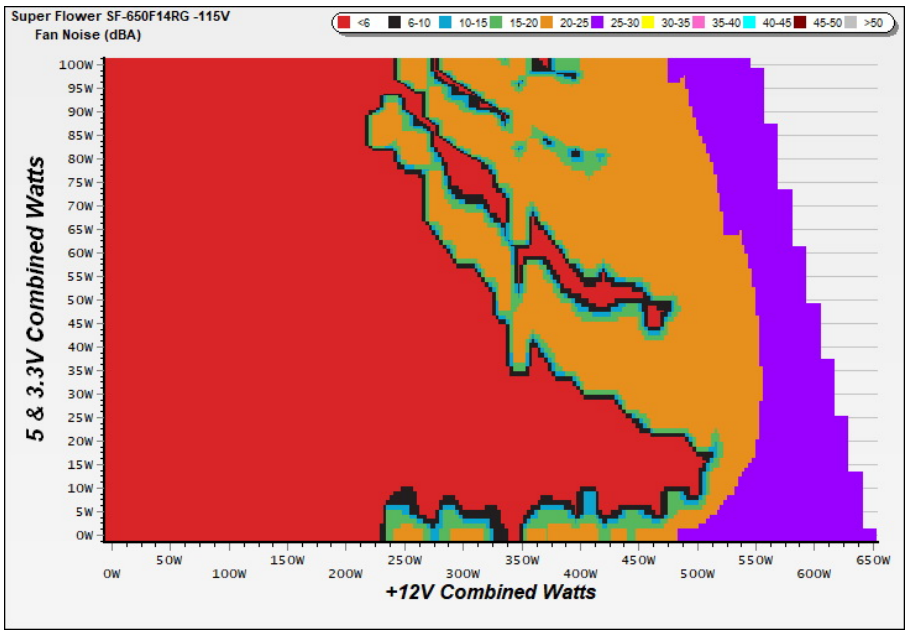
EFFICIENCY GRAPH 115V



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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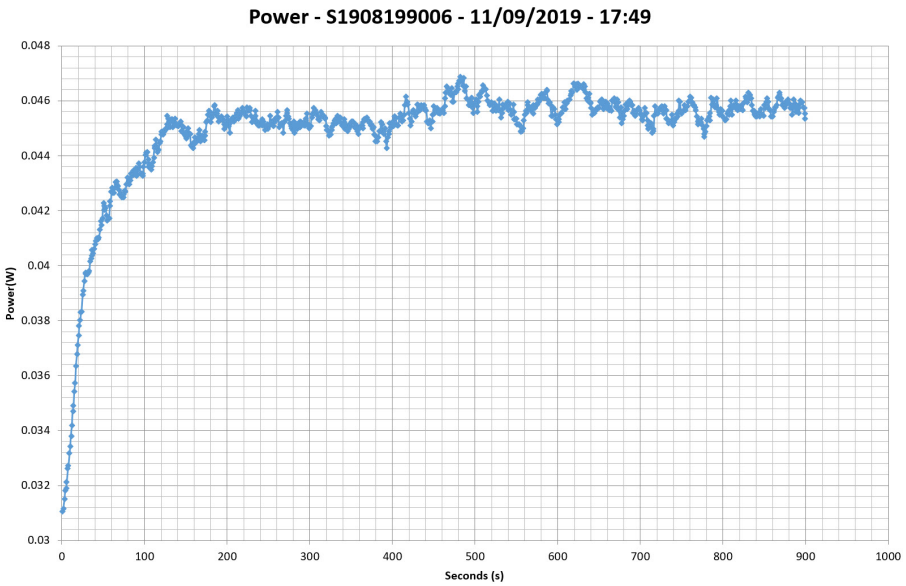
Super Flower Leadex III Gold ARGB 650W (#2)

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

Anex

Super Flower Leadex III Gold ARGB 650W (#2)

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	3.572A	1.984A	1.991A	0.985A	64.961	85.102%	0	<6.0	43.73°C	0.921
	12.141V	5.037V	3.314V	5.078V	76.333				40.07°C	115.12V
2	8.169A	2.981A	2.990A	1.185A	130.028	88.872%	0	<6.0	45.25°C	0.965
	12.134V	5.033V	3.311V	5.066V	146.309				40.83°C	115.12V
3	13.109A	3.481A	3.493A	1.385A	195.037	90.160%	0	<6.0	46.50°C	0.983
	12.127V	5.030V	3.308V	5.054V	216.323				41.05°C	115.12V
4	18.057A	3.977A	3.995A	1.587A	260.048	90.526%	0	<6.0	47.66°C	0.989
	12.120V	5.027V	3.305V	5.042V	287.263				41.58°C	115.12V
5	22.672A	4.978A	5.000A	1.790A	325.092	90.336%	0	<6.0	48.87°C	0.992
	12.111V	5.023V	3.301V	5.029V	359.870				42.30°C	115.12V
6	27.238A	5.978A	6.004A	1.994A	389.529	89.888%	962	25.0	43.01°C	0.994
	12.105V	5.020V	3.298V	5.016V	433.350				50.13°C	115.12V
7	31.856A	6.978A	7.013A	2.199A	454.848	89.300%	946	24.8	43.11°C	0.995
	12.108V	5.018V	3.296V	5.005V	509.350				50.81°C	115.11V
8	36.478A	7.981A	8.017A	2.404A	520.158	88.575%	1157	30.7	43.46°C	0.995
	12.110V	5.014V	3.292V	4.992V	587.252				51.55°C	115.11V
9	41.494A	8.483A	8.512A	2.407A	585.050	87.993%	1380	34.7	44.46°C	0.996
	12.111V	5.011V	3.290V	4.987V	664.885				53.16°C	115.11V
10	46.253A	8.987A	9.035A	3.024A	649.889	87.272%	1562	37.4	45.40°C	0.996
	12.111V	5.009V	3.287V	4.962V	744.668				54.62°C	115.11V
11	51.600A	8.990A	9.043A	3.027A	714.693	86.615%	1724	39.9	46.54°C	0.996
	12.112V	5.007V	3.284V	4.957V	825.136				56.31°C	115.12V
CL1	0.098A	12.003A	11.997A	0.000A	100.949	83.356%	0	<6.0	48.74°C	0.959
	12.121V	5.014V	3.299V	5.093V	121.106				42.49°C	115.14V
CL2	54.106A	1.001A	1.001A	1.000A	668.419	87.756%	1605	38.1	45.40°C	0.996
	12.107V	5.021V	3.294V	5.035V	761.677				54.81°C	115.11V

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Super Flower Leadex III Gold ARGB 650W (#2)

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	1.221A	0.496A	0.498A	0.196A	19.989	72.537%	0	<6.0	0.709
	12.150V	5.042V	3.318V	5.108V	27.557				115.12V
2	2.444A	0.991A	0.994A	0.392A	39.979	81.467%	0	<6.0	0.859
	12.147V	5.040V	3.317V	5.100V	49.074				115.12V
3	3.670A	1.488A	1.491A	0.589A	60.010	85.243%	0	<6.0	0.917
	12.144V	5.039V	3.316V	5.092V	70.399				115.12V
4	4.890A	1.983A	1.992A	0.787A	79.961	86.653%	0	<6.0	0.933
	12.141V	5.037V	3.314V	5.084V	92.277				115.12V

RIPPLE MEASUREMENTS 115V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	5.5 mV	6.1 mV	8.0 mV	4.6 mV	Pass
20% Load	5.6 mV	6.4 mV	8.3 mV	5.2 mV	Pass
30% Load	5.9 mV	7.0 mV	8.3 mV	5.8 mV	Pass
40% Load	6.4 mV	7.4 mV	9.0 mV	5.9 mV	Pass
50% Load	7.1 mV	8.3 mV	9.4 mV	6.4 mV	Pass
60% Load	7.9 mV	8.4 mV	10.7 mV	8.6 mV	Pass
70% Load	8.2 mV	9.2 mV	11.2 mV	8.3 mV	Pass
80% Load	8.3 mV	10.5 mV	12.1 mV	9.1 mV	Pass
90% Load	9.1 mV	11.2 mV	13.1 mV	10.5 mV	Pass
100% Load	12.1 mV	11.8 mV	14.3 mV	11.7 mV	Pass
110% Load	12.5 mV	12.9 mV	14.7 mV	12.2 mV	Pass
Crossload 1	7.5 mV	7.7 mV	9.9 mV	9.5 mV	Pass
Crossload 2	12.1 mV	11.3 mV	13.2 mV	9.1 mV	Pass

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Super Flower Leadex III Gold ARGB 650W (#2)

230V

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Super Flower Leadex III Gold ARGB 650W (#2)

EFFICIENCY GRAPH 230V

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INFO

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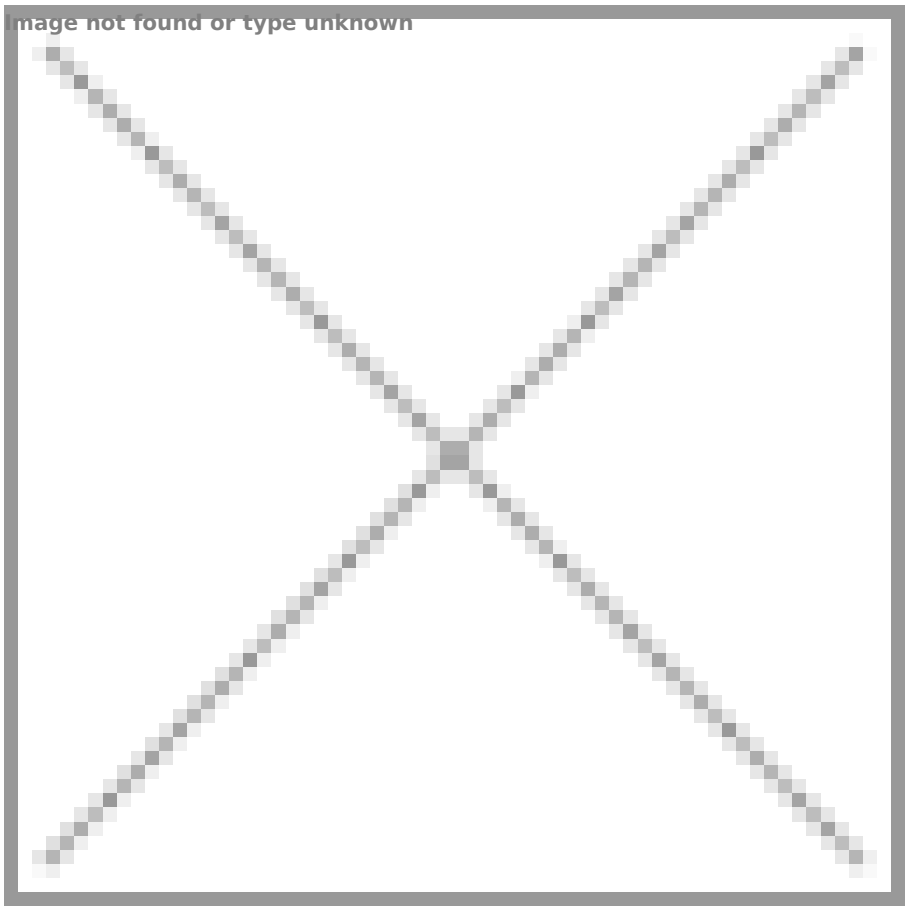
Super Flower Leadex III Gold ARGB 650W (#2)

VAMPIRE POWER -230V



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Super Flower Leadex III Gold ARGB 650W (#2)

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	3.572A	1.986A	1.991A	0.985A	64.956	86.208%	0	<6.0	43.57°C	0.645
	12.137V	5.036V	3.314V	5.078V	75.348				40.16°C	230.24V
2	8.171A	2.981A	2.988A	1.184A	130.014	90.267%	0	<6.0	44.86°C	0.831
	12.131V	5.032V	3.311V	5.066V	144.033				40.48°C	230.24V
3	13.117A	3.477A	3.493A	1.385A	195.025	91.662%	0	<6.0	46.44°C	0.906
	12.121V	5.028V	3.307V	5.054V	212.766				41.31°C	230.24V
4	18.065A	3.979A	3.994A	1.587A	260.035	92.173%	0	<6.0	47.58°C	0.935
	12.114V	5.026V	3.304V	5.042V	282.117				41.76°C	230.24V
5	22.686A	4.980A	5.000A	1.790A	325.090	92.005%	925	24.5	42.16°C	0.951
	12.103V	5.023V	3.301V	5.029V	353.341				48.51°C	230.25V
6	27.237A	5.978A	6.004A	1.994A	389.463	91.874%	924	24.5	42.43°C	0.961
	12.103V	5.020V	3.298V	5.017V	423.908				49.45°C	230.25V
7	31.858A	6.978A	7.011A	2.198A	454.792	91.461%	976	25.7	43.27°C	0.970
	12.106V	5.017V	3.296V	5.006V	497.250				50.53°C	230.25V
8	36.481A	7.982A	8.020A	2.404A	520.130	91.051%	1142	30.4	43.72°C	0.976
	12.108V	5.013V	3.292V	4.993V	571.253				51.58°C	230.25V
9	41.498A	8.484A	8.512A	2.406A	585.010	90.574%	1377	34.7	44.44°C	0.980
	12.109V	5.011V	3.289V	4.988V	645.895				52.52°C	230.26V
10	46.258A	8.988A	9.037A	3.023A	649.858	90.097%	1554	37.3	45.05°C	0.983
	12.109V	5.008V	3.287V	4.963V	721.291				53.74°C	230.26V
11	51.616A	8.993A	9.043A	3.026A	714.686	89.651%	1719	39.8	46.52°C	0.985
	12.108V	5.006V	3.284V	4.958V	797.191				56.35°C	230.26V
CL1	0.100A	12.002A	12.000A	0.000A	100.966	84.858%	0	<6.0	48.26°C	0.790
	12.120V	5.013V	3.299V	5.093V	118.983				42.44°C	230.26V
CL2	54.107A	1.001A	1.001A	1.000A	668.378	90.640%	1625	38.4	45.35°C	0.984
	12.106V	5.021V	3.294V	5.036V	737.398				53.68°C	230.26V

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Super Flower Leadex III Gold ARGB 650W (#2)

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	1.222A	0.496A	0.495A	0.196A	19.985	73.031%	0	<6.0	0.362
	12.144V	5.041V	3.318V	5.108V	27.365				230.23V
2	2.444A	0.992A	0.995A	0.392A	39.974	82.290%	0	<6.0	0.503
	12.142V	5.039V	3.317V	5.100V	48.577				230.23V
3	3.670A	1.489A	1.494A	0.589A	60.005	86.081%	0	<6.0	0.618
	12.140V	5.037V	3.315V	5.092V	69.708				230.23V
4	4.890A	1.987A	1.991A	0.787A	79.956	88.014%	0	<6.0	0.707
	12.137V	5.036V	3.314V	5.084V	90.845				230.24V

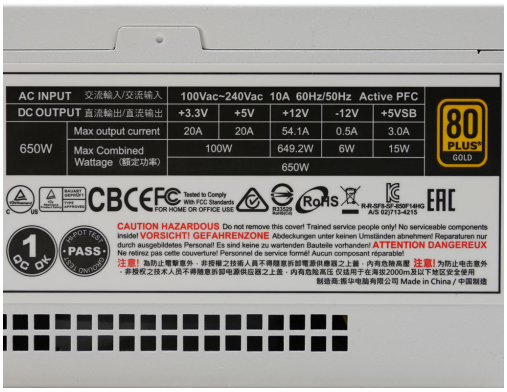
RIPPLE MEASUREMENTS 230V

Test	12V	5V	3.3V	5VSB	Pass/Fail
10% Load	5.1 mV	5.7 mV	7.8 mV	4.8 mV	Pass
20% Load	5.7 mV	6.7 mV	8.1 mV	5.2 mV	Pass
30% Load	5.8 mV	7.8 mV	8.9 mV	5.7 mV	Pass
40% Load	6.5 mV	7.8 mV	9.5 mV	6.2 mV	Pass
50% Load	7.0 mV	8.1 mV	9.6 mV	6.3 mV	Pass
60% Load	7.7 mV	8.5 mV	10.4 mV	7.0 mV	Pass
70% Load	7.6 mV	9.6 mV	11.2 mV	7.6 mV	Pass
80% Load	8.4 mV	10.0 mV	12.6 mV	8.5 mV	Pass
90% Load	8.2 mV	10.9 mV	13.4 mV	8.8 mV	Pass
100% Load	12.2 mV	12.0 mV	14.5 mV	11.8 mV	Pass
110% Load	12.7 mV	12.7 mV	14.9 mV	11.5 mV	Pass
Crossload 1	7.2 mV	7.6 mV	10.3 mV	9.6 mV	Pass
Crossload 2	12.1 mV	11.9 mV	12.8 mV	8.5 mV	Pass

Anex

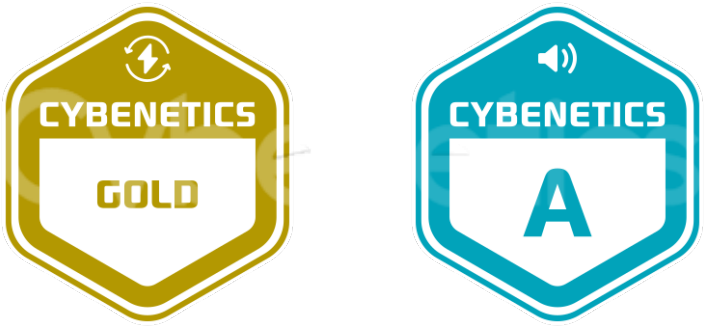
Super Flower Leadex III Gold ARGB 650W (#2)

Top side



Power specifications label

CERTIFICATIONS 115V



CERTIFICATIONS 230V