# Super Flower Golden King 650W

S1604223285

Lab ID 129

ID 25129

ID:

: Jun 20, 2018

115V 230V

ETA-EMI PSU




115V 230V







LAMBDA PSU



Aristeidis Bitziopoulos,

# General Information

## Test Equipment

| | |
|---|---|
| Electronic Loads | Chroma 63601-5 x2<br>Chroma 63600-2<br>Chroma 63640-80-80 x10<br>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 | Super Flower |
| Model | Golden King 650W |
| OEM/ODM | Super Flower |
| Serial Number | S1604223285 |
| Product Specifications | |
| Manufacturer-Provided Information | |
| □□□□ (Vrms) | 115-240 |
| □□□□ (Arms) | 10 |

| | |
|---|---|
| □□□□ (Hz) | 50-60 |
| □□□□ (W) | 650 |
| □□□□□□□□□□ (°C) | |
| □□ | ATX12V |
| □□□□ | Fixed cables |
| □□ | - |
| Cybenetics Measurements | |
| Dimensions (W x H x D) | |
| □□ | |
| □□ | 122mm Duro Bearing Fan<br>(S1202512L) |
| □□□□□ | ✗ |
| Cybenetics Testing Information | |
| Lab ID | 129 |
| Date of receipt | Jun 6, 2018 |
| Testing Date | Jun 18, 2018 |
| Report Issued Date | Jun 20, 2018 |
| □□□□□□ | Low 5VSB Efficiency |
| Engineer Name | - |
| Authorized By the Laboratory Technical Manager | Aristeidis Bitziopoulos |
| Signature |  |

## □□□□□
## (Non-accredited measurements)

| Captive Cables | | | |
|---|---|---|---|
| Description | Cable Count | Connector Count (Total) | Gauge |
| ATX connector 20+4 pin (540mm) | 1 | 1 | 16-24AWG |
| 4+4 pin EPS12V (650mm) | 1 | 1 | 16AWG |
| 6+2 pin PCIe (500mm+125mm) | 1 | 2 | 16-22AWG |
| 6+2 pin PCIe (500mm) | 1 | 1 | 16-22AWG |

| | | | |
|---|---|---|---|
| SATA (510mm+135mm+135mm) / 4 pin Molex (+135mm) | 1 | 3 / 1 | 18AWG |
| SATA (510mm+135mm) / 4 pin Molex (+135mm+135mm) | 1 | 2 / 2 | 18AWG |

□□□□

| Rail | | 3.3V | 5V | 12V | 5VSB | -12V |
|---|---|---|---|---|---|---|
| Max. Power | Amps | 20 | 20 | 54 | 2.5 | 0.5 |
| | Watts | 10 | | 648 | 12.5 | 6 |
| Total Max. Power (W) | | 650 | | | | |

# Test Results

## Temperature & Compliance Info

| | |
|---|---|
| □□□□ (°C /°F) | 28-32 / 82.4-89.6 |
| □□ ErP Lot 3/6 | ErP Lot 6 2010: ✓<br>ErP Lot 6 2013: Partially<br>ErP Lot 3 2014 & CEC: ✗ |
| □□ (EU) No 617/2013□□ | ✓ |

## Performance Summary

### 115V

| | |
|---|---|
| Accredited | |
| □□□□ (>1450 load combinations) | 89.935% |
| Average Noise Output (>1450 Load Combinations) | 27.53dBA |
| PF□□□ (>1450 Load Combinations) | 0.980 |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | - |
| □□□□ | 0.1224W |
| Non-Accredited | |
| 12V Ripple (Full Load) | 41.90mV |
| 5V Ripple (Full Load) | 18.94mV |
| 3.3V Ripple (Full Load) | 28.21mV |

| | |
|---|---|
| 5VSB Ripple (Full Load) | 15.73mV |
| 12V Load Regulation | 0.90% |
| 5V Load Regulation | 2.24% |
| 3.3V Load Regulation | 2.40% |
| 5VSB Load Regulation | 2.32% |
| Inrush Current | 33.613A |

## 230V

| | | |
|---|---|---|
| Accredited | | |
| □□□□ (>1450 load combinations) | | 92.226% |
| Average Noise Output (>1450 Load Combinations) | | 27.12dBA |
| PF□□□ (>1450 Load Combinations) | | 0.931 |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | | - |
| □□□□ | | 0.2680W |
| Non-Accredited | | |
| 12V Ripple (Full Load) | | 45.08mV |
| 5V Ripple (Full Load) | | 17.98mV |
| 3.3V Ripple (Full Load) | | 29.54mV |
| 5VSB Ripple (Full Load) | | 15.73mV |
| 12V Load Regulation | | 0.57% |
| 5V Load Regulation | | 1.70% |
| 3.3V Load Regulation | | 1.75% |
| 5VSB Load Regulation | | 1.85% |
| Inrush Current | | 58.157A |
| □□□□ & PWR_OK □□ | | 11.20ms |
| AC Loss to PWR_OK Hold Up Time | | 9.90ms |
| PWR_OK Inactive to DC Loss Delay | | 1.30ms |
| OPP (0.00°C / 0.00°C) | - | - |

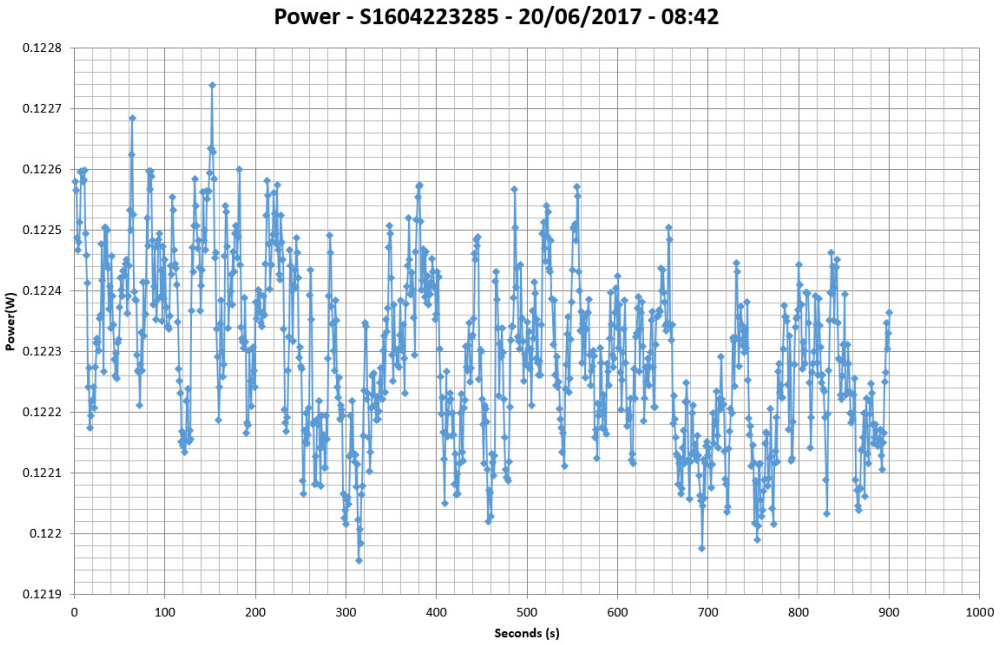
## □□□□ & PWR_OK □□

| | |
|---|---|
| Hold-Up Time (ms) | 11.2 |
| AC Loss to PWR_OK Hold Up Time (ms) | 9.9 |
| PWR_OK Inactive to DC Loss Delay (ms) | 1.3 |

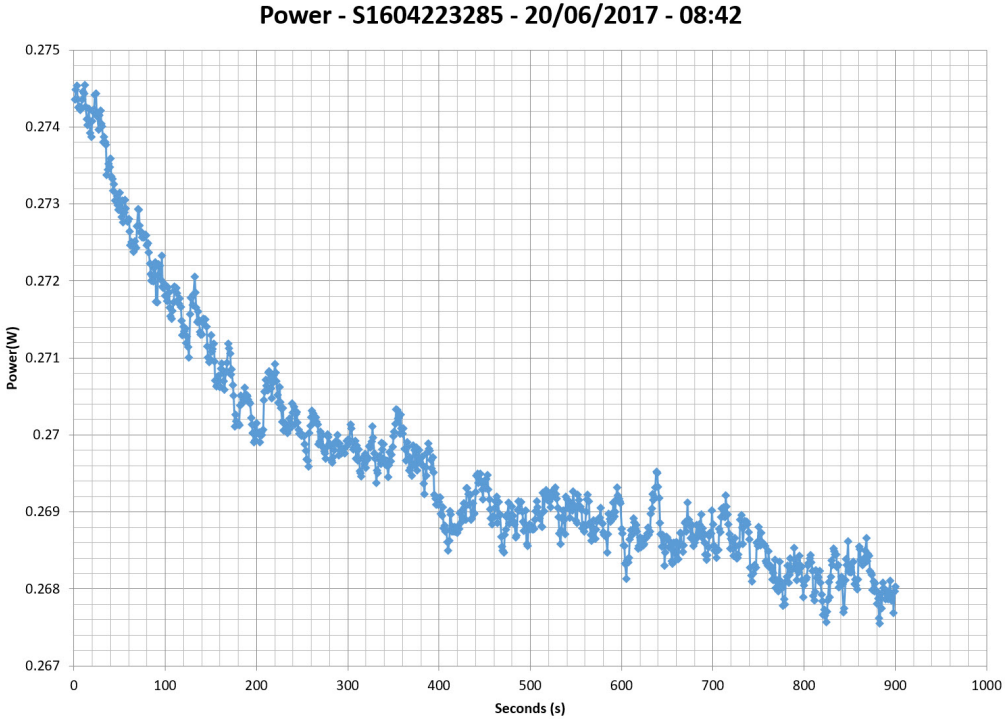
## □□□□

### Graphs

**115V**

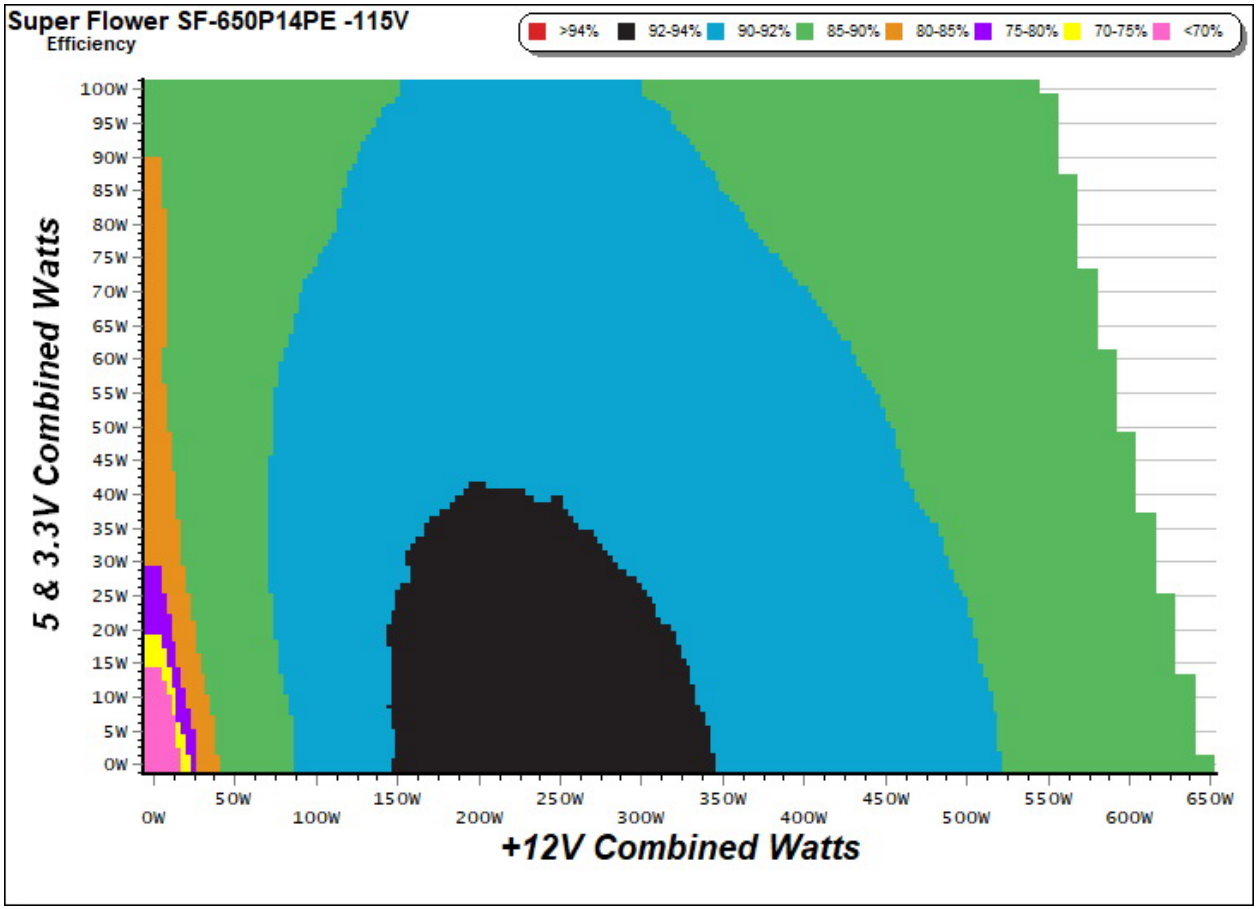



**230V**



## □□□□□□

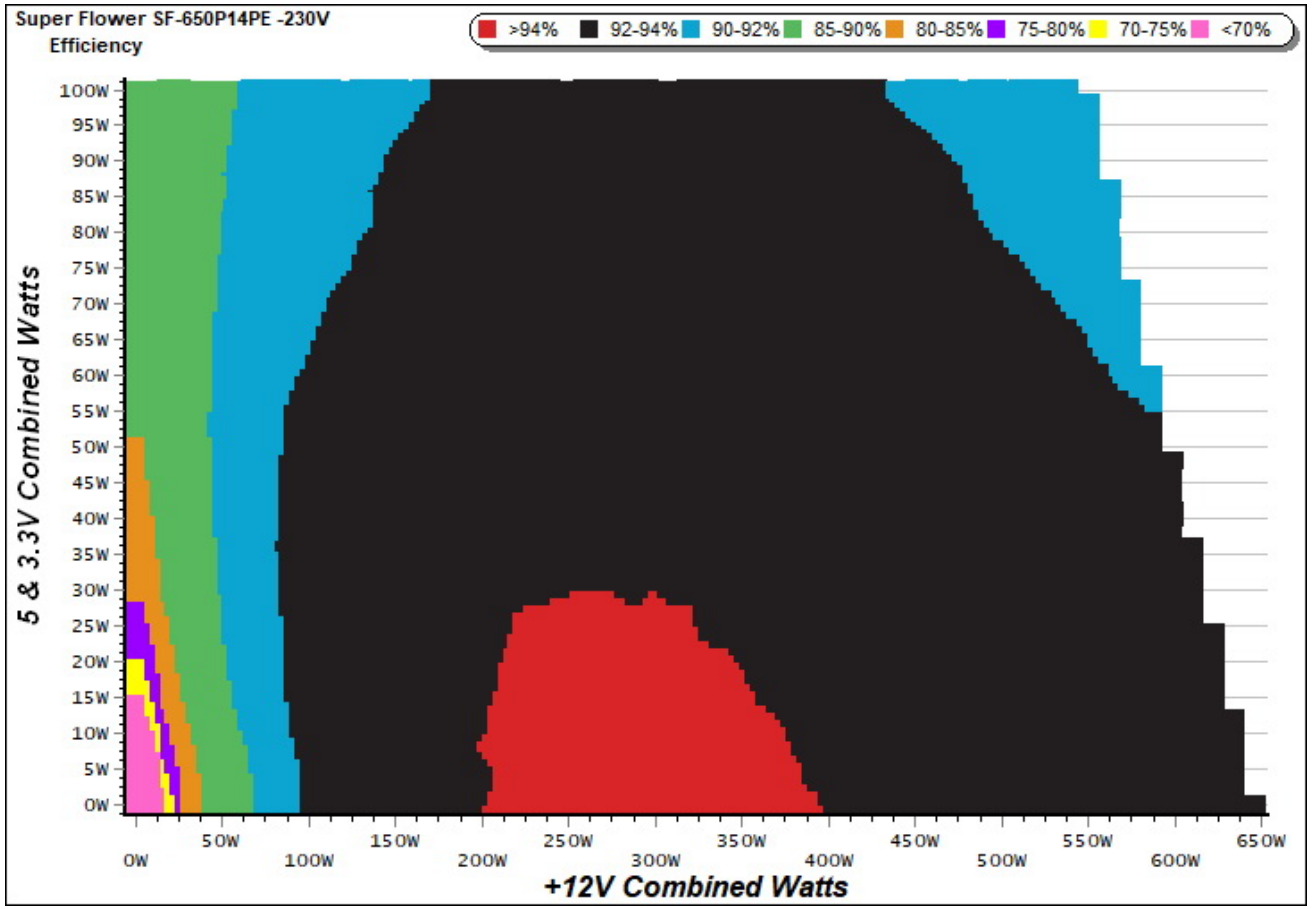
### 115V




□□

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.

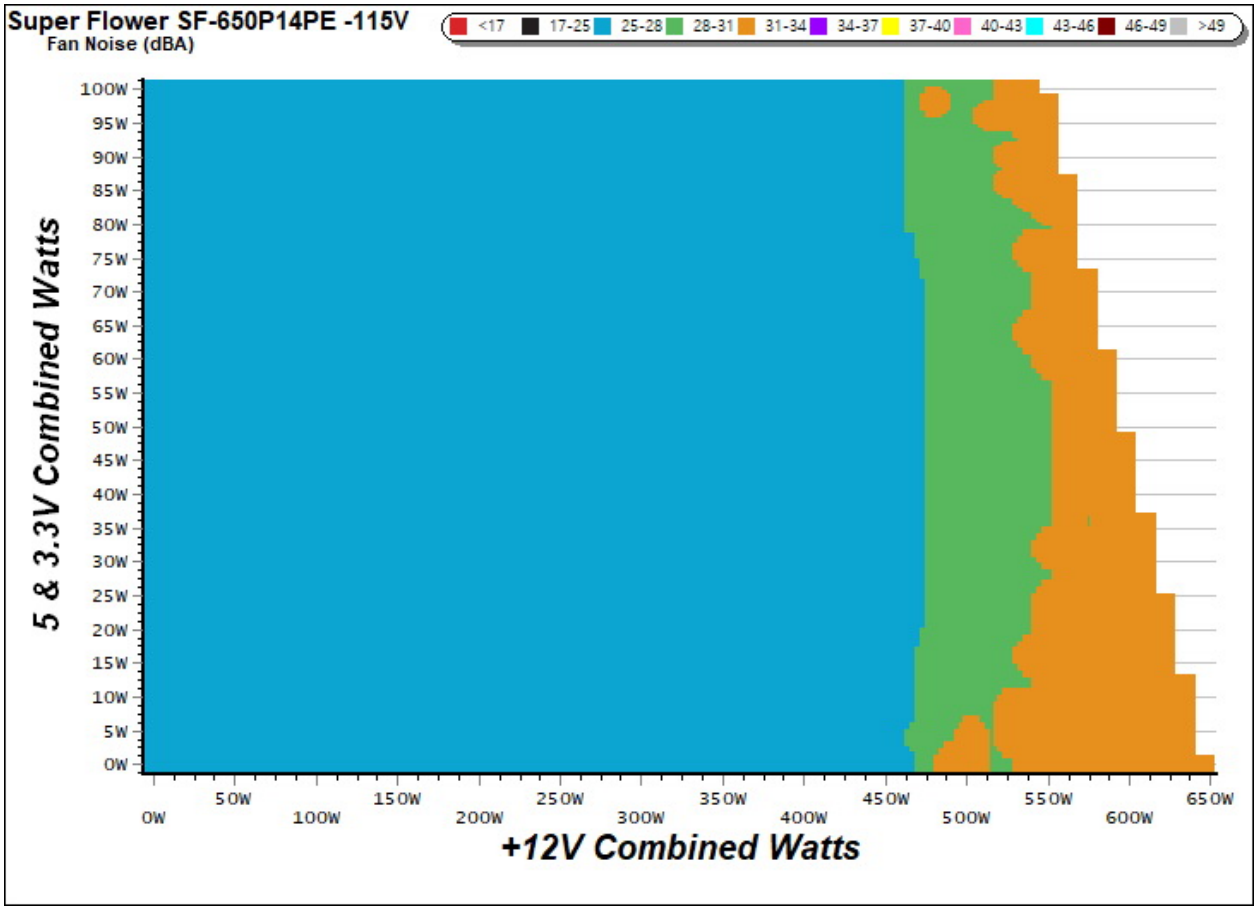
## 230V




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.

## □□□

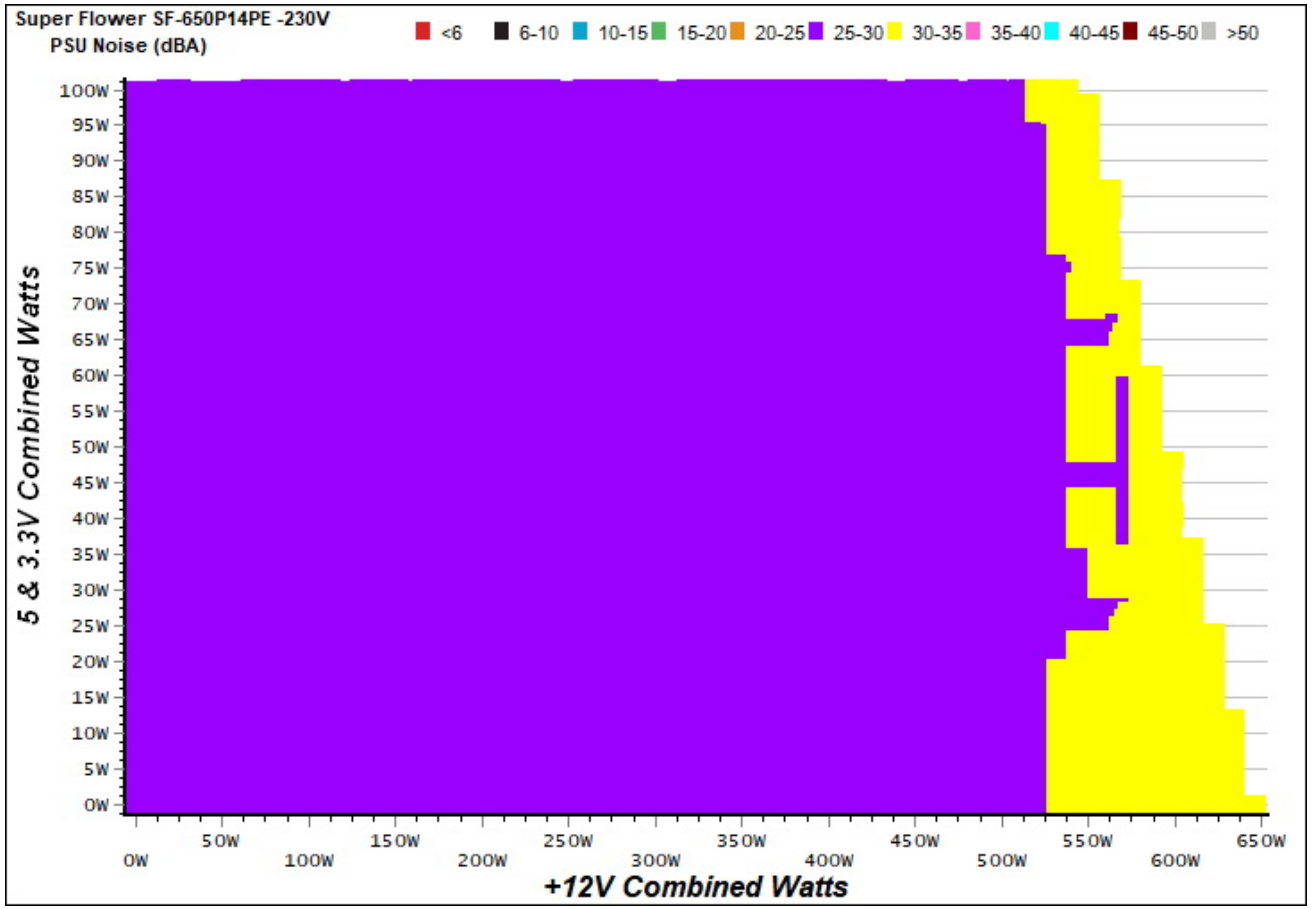
### 115V




□□

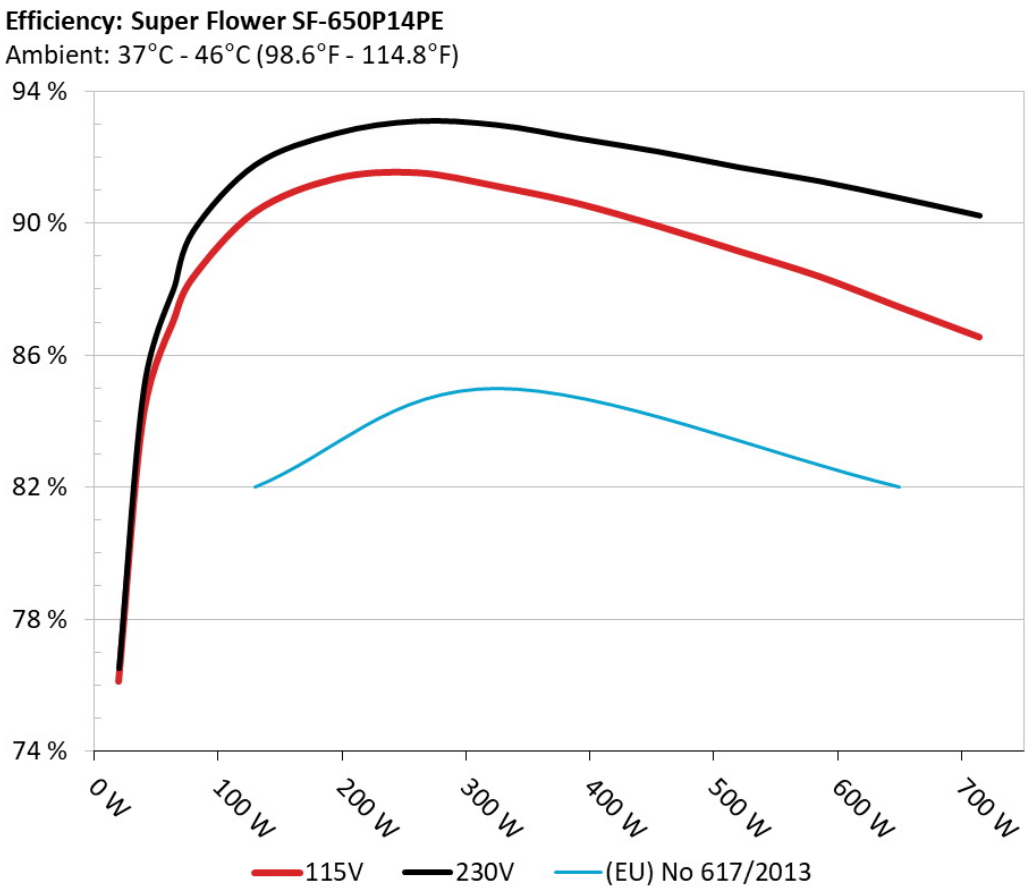
The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

## 230V



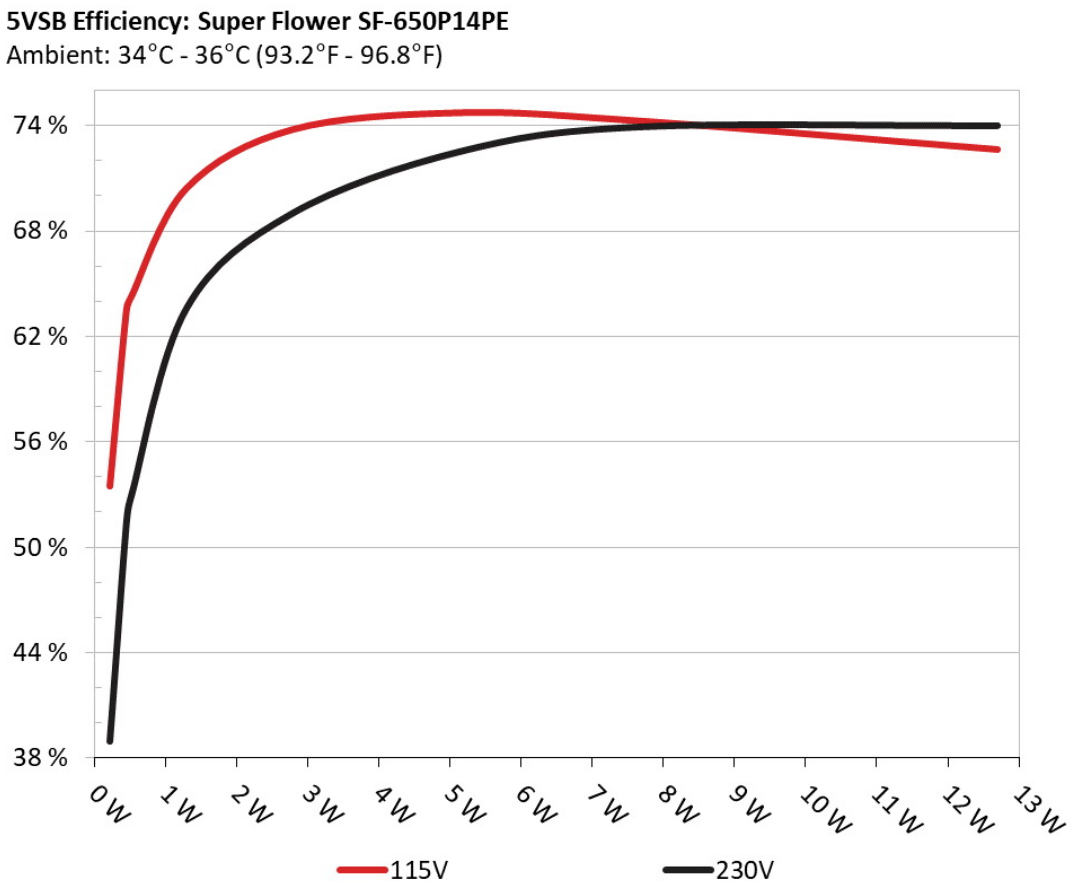

The PSU`s noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails.

## Indicative Performance




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□□




□□

This graph depicts the efficiency levels of the 5VSB rail with 115V and 230V input.

## 5VSB□□□ ERP LOT 3/6□ CEC□

### 115V

| Test # | 5VSB | DC/AC (Watts) | Efficiency | PF/AC Volts |
|---|---|---|---|---|
| 1 | 0.042A | 0.214 | 53.500% | 0.066 |
| | 5.133V | 0.400 | | 115.13V |
| 2 | 0.087A | 0.447 | 63.494% | 0.112 |
| | 5.133V | 0.704 | | 115.13V |
| 3 | 0.542A | 2.779 | 73.772% | 0.343 |
| | 5.125V | 3.767 | | 115.10V |
| 4 | 1.002A | 5.125 | 74.730% | 0.411 |
| | 5.114V | 6.858 | | 115.11V |
| 5 | 1.502A | 7.661 | 74.263% | 0.444 |
| | 5.101V | 10.316 | | 115.12V |
| 6 | 2.501A | 12.700 | 72.642% | 0.480 |
| | 5.077V | 17.483 | | 115.12V |

### 230V

| Test # | 5VSB | DC/AC (Watts) | Efficiency | PF/AC Volts |
|---|---|---|---|---|
| 1 | 0.042A | 0.215 | 38.949% | 0.028 |
| | 5.134V | 0.552 | | 230.27V |
| 2 | 0.087A | 0.448 | 51.376% | 0.043 |
| | 5.134V | 0.872 | | 230.30V |
| 3 | 0.542A | 2.780 | 68.983% | 0.173 |
| | 5.125V | 4.030 | | 230.28V |
| 4 | 1.002A | 5.126 | 72.493% | 0.253 |
| | 5.115V | 7.071 | | 230.29V |
| 5 | 1.502A | 7.663 | 73.910% | 0.304 |
| | 5.102V | 10.368 | | 230.29V |
| 6 | 2.501A | 12.702 | 73.982% | 0.362 |
| | 5.078V | 17.169 | | 230.29V |

## Supplementary Tests (For Reference)

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**115V**

| Test # | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | Fan Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.541A | 1.934A | 1.953A | 0.979A | 64.776 | 86.840% | 930 | 25.1 | 38.11°C | 0.939 |
| | 12.204V | 5.159V | 3.374V | 5.102V | 74.592 | | | | 40.55°C | 115.15V |
| 2 | 8.113A | 2.918A | 2.938A | 1.175A | 129.805 | 90.335% | 930 | 25.1 | 38.45°C | 0.962 |
| | 12.193V | 5.145V | 3.365V | 5.093V | 143.693 | | | | 41.12°C | 115.16V |
| 3 | 13.036A | 3.405A | 3.450A | 1.376A | 194.867 | 91.343% | 930 | 25.1 | 39.02°C | 0.976 |
| | 12.182V | 5.135V | 3.358V | 5.081V | 213.335 | | | | 42.26°C | 115.15V |
| 4 | 17.963A | 3.902A | 3.937A | 1.575A | 259.788 | 91.521% | 930 | 25.1 | 39.45°C | 0.984 |
| | 12.170V | 5.125V | 3.351V | 5.071V | 283.857 | | | | 43.46°C | 115.15V |
| 5 | 22.559A | 4.890A | 4.935A | 1.775A | 324.765 | 91.113% | 1020 | 27.7 | 39.99°C | 0.988 |
| | 12.159V | 5.113V | 3.341V | 5.059V | 356.441 | | | | 44.68°C | 115.15V |
| 6 | 27.167A | 5.882A | 5.937A | 1.980A | 389.769 | 90.595% | 1230 | 33.6 | 40.22°C | 0.990 |
| | 12.147V | 5.098V | 3.333V | 5.049V | 430.232 | | | | 45.60°C | 115.15V |
| 7 | 31.775A | 6.886A | 6.947A | 2.180A | 454.662 | 89.911% | 1395 | 38.3 | 41.55°C | 0.992 |
| | 12.135V | 5.084V | 3.323V | 5.036V | 505.681 | | | | 47.37°C | 115.15V |
| 8 | 36.397A | 7.893A | 7.965A | 2.386A | 519.643 | 89.151% | 1550 | 39.8 | 42.58°C | 0.993 |
| | 12.123V | 5.070V | 3.314V | 5.025V | 582.877 | | | | 48.93°C | 115.15V |
| 9 | 41.457A | 8.401A | 8.497A | 2.390A | 584.707 | 88.386% | 1710 | 43.8 | 43.61°C | 0.994 |
| | 12.111V | 5.062V | 3.307V | 5.019V | 661.535 | | | | 50.92°C | 115.22V |
| 10 | 46.476A | 8.912A | 9.003A | 2.495A | 649.523 | 87.458% | 1850 | 45.0 | 45.10°C | 0.994 |
| | 12.099V | 5.052V | 3.298V | 5.008V | 742.667 | | | | 53.38°C | 115.14V |
| 11 | 51.902A | 8.924A | 9.020A | 2.496A | 714.445 | 86.545% | 1865 | 43.9 | 46.25°C | 0.995 |
| | 12.085V | 5.045V | 3.293V | 5.002V | 825.514 | | | | 55.18°C | 115.15V |
| CL1 | 0.100A | 12.012A | 12.004A | 0.004A | 102.427 | 84.444% | 1215 | 33.2 | 42.99°C | 0.955 |
| | 12.195V | 5.083V | 3.343V | 5.106V | 121.296 | | | | 49.48°C | 115.16V |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CL2 | 54.123A | 1.004A | 1.002A | 1.002A | 668.198 | 87.953% | 1750 | 41.6 | 44.77°C | 0.994 |
| | 12.096V | 5.109V | 3.324V | 5.055V | 759.720 | | | | 52.35°C | 115.15V |

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**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 | 3.539A | 1.933A | 1.952A | 0.976A | 64.760 | 88.096% | 930 | 25.1 | 40.09°C | 0.740 |
| | 12.210V | 5.161V | 3.376V | 5.105V | 73.511 | | | | 42.68°C | 230.24V |
| 2 | 8.108A | 2.918A | 2.934A | 1.176A | 129.851 | 91.890% | 930 | 25.1 | 40.44°C | 0.874 |
| | 12.203V | 5.151V | 3.370V | 5.095V | 141.311 | | | | 43.55°C | 230.24V |
| 3 | 13.022A | 3.404A | 3.443A | 1.376A | 194.911 | 92.863% | 930 | 25.1 | 41.14°C | 0.925 |
| | 12.196V | 5.144V | 3.365V | 5.087V | 209.890 | | | | 44.50°C | 230.25V |
| 4 | 17.935A | 3.890A | 3.926A | 1.575A | 259.780 | 93.251% | 930 | 25.1 | 41.75°C | 0.943 |
| | 12.189V | 5.137V | 3.360V | 5.077V | 278.580 | | | | 45.44°C | 230.25V |
| 5 | 22.520A | 4.876A | 4.918A | 1.776A | 324.784 | 93.137% | 960 | 26.5 | 42.10°C | 0.954 |
| | 12.180V | 5.127V | 3.353V | 5.068V | 348.715 | | | | 46.58°C | 230.25V |
| 6 | 27.107A | 5.859A | 5.916A | 1.976A | 389.745 | 92.824% | 1155 | 31.7 | 42.71°C | 0.962 |
| | 12.173V | 5.118V | 3.345V | 5.059V | 419.873 | | | | 47.94°C | 230.25V |
| 7 | 31.692A | 6.855A | 6.915A | 2.176A | 454.635 | 92.427% | 1380 | 37.7 | 43.11°C | 0.968 |
| | 12.166V | 5.105V | 3.339V | 5.049V | 491.883 | | | | 48.66°C | 230.26V |
| 8 | 36.298A | 7.855A | 7.918A | 2.380A | 519.682 | 91.995% | 1495 | 38.9 | 43.58°C | 0.970 |
| | 12.157V | 5.095V | 3.333V | 5.040V | 564.904 | | | | 49.40°C | 230.26V |
| 9 | 41.326A | 8.357A | 8.446A | 2.380A | 584.700 | 91.608% | 1630 | 40.9 | 44.10°C | 0.975 |
| | 12.150V | 5.087V | 3.326V | 5.036V | 638.262 | | | | 50.37°C | 230.26V |
| 10 | 46.317A | 8.860A | 8.942A | 2.484A | 649.571 | 91.134% | 1775 | 44.7 | 45.27°C | 0.977 |
| | 12.142V | 5.080V | 3.320V | 5.030V | 712.767 | | | | 51.98°C | 230.26V |
| 11 | 51.692A | 8.868A | 8.954A | 2.485A | 714.451 | 90.633% | 1865 | 43.9 | 46.47°C | 0.981 |
| | 12.135V | 5.074V | 3.315V | 5.026V | 788.289 | | | | 53.64°C | 230.26V |
| CL1 | 0.100A | 12.012A | 12.006A | 0.005A | 102.884 | 86.554% | 990 | 27.4 | 42.93°C | 0.846 |
| | 12.204V | 5.105V | 3.358V | 5.117V | 118.867 | | | | 48.27°C | 230.25V |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| CL2 | 53.974A | 1.002A | 1.001A | 1.002A | 668.911 | 91.829% | 1675 | 42.8 | 45.30°C | 0.978 |
| | 12.142V | 5.126V | 3.337V | 5.071V | 728.428 | | | | 51.61°C | 230.26V |

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### 115V

| Test # | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | Fan Noise (dB[A]) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.196A | 0.480A | 0.472A | 0.195A | 19.685 | 76.118% | 930 | 25.1 | 0.779 |
| | 12.212V | 5.173V | 3.383V | 5.127V | 25.861 | | | | 115.16V |
| 2 | 2.416A | 0.959A | 0.974A | 0.391A | 39.748 | 84.192% | 930 | 25.1 | 0.892 |
| | 12.209V | 5.168V | 3.379V | 5.121V | 47.211 | | | | 115.16V |
| 3 | 3.642A | 1.454A | 1.480A | 0.586A | 59.949 | 87.126% | 930 | 25.1 | 0.941 |
| | 12.205V | 5.163V | 3.375V | 5.113V | 68.807 | | | | 115.16V |
| 4 | 4.853A | 1.933A | 1.957A | 0.780A | 79.769 | 88.352% | 930 | 25.1 | 0.937 |
| | 12.202V | 5.158V | 3.373V | 5.106V | 90.285 | | | | 115.16V |

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### 230V

| Test # | 12V | 5V | 3.3V | 5VSB | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | PF/AC Volts |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 1.196A | 0.480A | 0.473A | 0.196A | 19.696 | 76.397% | 930 | 25.1 | 0.507 |
| | 12.215V | 5.173V | 3.383V | 5.127V | 25.781 | | | | 230.25V |
| 2 | 2.416A | 0.959A | 0.977A | 0.391A | 39.768 | 84.958% | 930 | 25.1 | 0.637 |
| | 12.213V | 5.169V | 3.380V | 5.122V | 46.809 | | | | 230.25V |
| 3 | 3.638A | 1.455A | 1.480A | 0.586A | 59.937 | 88.156% | 930 | 25.1 | 0.720 |
| | 12.211V | 5.165V | 3.379V | 5.115V | 67.990 | | | | 230.26V |
| 4 | 4.854A | 1.932A | 1.955A | 0.780A | 79.780 | 89.677% | 930 | 25.1 | 0.783 |
| | 12.203V | 5.158V | 3.373V | 5.112V | 88.964 | | | | 230.25V |

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**115V**

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 8.1 mV | 9.6 mV | 8.6 mV | 7.3 mV | Pass |
| 20% Load | 12.4 mV | 10.1 mV | 10.4 mV | 7.9 mV | Pass |
| 30% Load | 15.9 mV | 9.9 mV | 10.8 mV | 8.4 mV | Pass |
| 40% Load | 18.0 mV | 12.1 mV | 12.1 mV | 9.4 mV | Pass |
| 50% Load | 21.0 mV | 12.1 mV | 14.6 mV | 9.8 mV | Pass |
| 60% Load | 24.5 mV | 12.2 mV | 16.1 mV | 10.9 mV | Pass |
| 70% Load | 29.8 mV | 13.0 mV | 19.9 mV | 11.4 mV | Pass |
| 80% Load | 33.7 mV | 14.9 mV | 20.8 mV | 12.2 mV | Pass |
| 90% Load | 36.1 mV | 15.5 mV | 22.6 mV | 13.6 mV | Pass |
| 100% Load | 41.9 mV | 18.9 mV | 28.2 mV | 15.7 mV | Pass |
| 110% Load | 49.6 mV | 19.1 mV | 31.6 mV | 15.7 mV | Pass |
| Crossload 1 | 22.8 mV | 17.3 mV | 24.2 mV | 20.2 mV | Pass |
| Crossload 2 | 35.9 mV | 15.8 mV | 18.1 mV | 13.4 mV | Pass |

□□□□□□□□□□

**230V**

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 10% Load | 9.7 mV | 9.5 mV | 10.3 mV | 7.8 mV | Pass |
| 20% Load | 13.9 mV | 10.0 mV | 11.3 mV | 8.5 mV | Pass |
| 30% Load | 17.8 mV | 10.7 mV | 12.2 mV | 8.8 mV | Pass |
| 40% Load | 20.4 mV | 12.5 mV | 13.9 mV | 10.0 mV | Pass |
| 50% Load | 24.2 mV | 12.6 mV | 16.4 mV | 11.1 mV | Pass |
| 60% Load | 28.4 mV | 12.5 mV | 19.8 mV | 11.5 mV | Pass |
| 70% Load | 32.8 mV | 12.8 mV | 21.1 mV | 12.6 mV | Pass |
| 80% Load | 35.8 mV | 13.2 mV | 23.3 mV | 12.9 mV | Pass |

| Test | 12V | 5V | 3.3V | 5VSB | Pass/Fail |
|---|---|---|---|---|---|
| 90% Load | 40.0 mV | 14.0 mV | 25.9 mV | 13.9 mV | Pass |
| 100% Load | 45.1 mV | 18.0 mV | 29.5 mV | 15.7 mV | Pass |
| 110% Load | 52.4 mV | 18.4 mV | 32.2 mV | 16.1 mV | Pass |
| Crossload 1 | 26.4 mV | 14.0 mV | 26.6 mV | 19.8 mV | Pass |
| Crossload 2 | 36.0 mV | 13.9 mV | 18.8 mV | 12.4 mV | Pass |

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## Super Flower Golden King 650W



Top side




Power specifications label

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