



## Thermaltake Toughpower PF3 850W

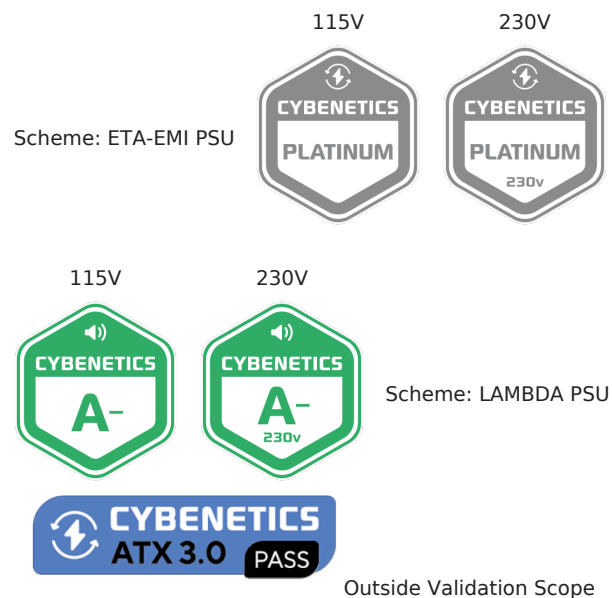
Serial Number PSTPD0850FNFAU3PD000098

Lab ID TT85002267

Certification ID 252267

Test Result Report ID: 23PS2267A

Certificate Issue Date: Oct 24, 2023



## 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                             | Thermaltake              |
| Model                             | Toughpower PF3 850W      |
| OEM/ODM                           | HKC                      |
| Serial Number                     | PSTPD0850FNFAPU3PD000098 |
| Product Specifications            |                          |
| Manufacturer-Provided Information |                          |
| Rated Voltage (Vrms)              | 100-240                  |
| Rated Current (Arms)              | 10                       |

|                                                   |                                                                                     |
|---------------------------------------------------|-------------------------------------------------------------------------------------|
| Rated Frequency (Hz)                              | 50-60                                                                               |
| Rated Power (W)                                   | 850                                                                                 |
| Operating Temperature (Continuous Full Load) (°C) |                                                                                     |
| Type                                              | ATX12V                                                                              |
| Cable Design                                      | Fully Modular                                                                       |
| Warranty                                          | -                                                                                   |
| Cybenetics Measurements                           |                                                                                     |
| Dimensions (W x H x D)                            |                                                                                     |
| Weight                                            |                                                                                     |
| Cooling                                           | 120mm Fluid Dynamic Bearing Fan<br>[TT-1225 (BDK12025MS)]                           |
| Semi-Passive Operation                            | ✓ (selectable)                                                                      |
| Cybenetics Testing Information                    |                                                                                     |
| Lab ID                                            | TT85002267                                                                          |
| Date of receipt                                   | Sep 23, 2023                                                                        |
| Testing Date                                      | Oct 23, 2023                                                                        |
| Report Issued Date                                | Oct 24, 2023                                                                        |
| 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                       | 18AWG    | No                  |
| 4+4 pin EPS12V (650mm+150mm)          | 1           | 2                       | 18AWG    | No                  |
| 6+2 pin PCIe (500mm+150mm)            | 2           | 4                       | 18AWG    | No                  |
| 12+4 pin PCIe (590mm) (450W)          | 1           | 1                       | 18-26AWG | No                  |
| SATA (500mm+145mm+145mm+145mm)        | 2           | 8                       | 18AWG    | No                  |
| 4-pin Molex (500mm+150mm+150mm+150mm) | 1           | 4                       | 18AWG    | No                  |
| FDD Adapter (150mm)                   | 1           | 1                       | 22AWG    | No                  |

|                                      |   |   |       |   |
|--------------------------------------|---|---|-------|---|
| AC Power Cord (1380mm) - C13 coupler | 1 | 1 | 16AWG | - |
|--------------------------------------|---|---|-------|---|

### Power Specifications

| Rail                 |       | 3.3V | 5V | 12V   | 5VSB | -12V |
|----------------------|-------|------|----|-------|------|------|
| Max. Power           | Amps  | 20   | 20 | 70.8  | 3    | 0.3  |
|                      | Watts | 100  |    | 849.6 | 15   | 3.6  |
| Total Max. Power (W) |       | 850  |    |       |      |      |

### Parts Description

|                      |                                                                                                                               |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------|
| General Data         | -                                                                                                                             |
| Manufacturer (OEM)   | HKC                                                                                                                           |
| PCB Type             | Double-Sided                                                                                                                  |
| Primary Side         | -                                                                                                                             |
| Transient Filter     | 4x Y caps, 2x X caps, 2x CM chokes, 1x MOV                                                                                    |
| Inrush Protection    | 1x NTC Thermistor 5D-15 (5 Ohm @ 25°C) & Relay                                                                                |
| Bridge Rectifier(s)  | 2x no info                                                                                                                    |
| APFC MOSFETs         | 2x WayOn WML36N60F2 (650V, 20A @ 100°C, Rds(on): 0.11Ohm)                                                                     |
| APFC Boost Diode     | 1x P3D0601012                                                                                                                 |
| Bulk Cap(s)          | 2x Rubycon (420V, 390uF each or 780uF combined, 3000h @ 105°C, MXK)                                                           |
| Main Switchers       | 4x Ncepower NCE65TF130F (650V, 18A @ 100°C, Rds(on): 0.13Ohm)                                                                 |
| APFC Controller      | Champion CH6502UHHX                                                                                                           |
| Resonant Controller  | Champion CU6901VPA                                                                                                            |
| Topology             | Primary side: APFC, Full-Bridge & LLC converter<br>Secondary side: Synchronous Rectification & DC-DC converters               |
| Secondary Side       | -                                                                                                                             |
| +12V MOSFETs         | 8x                                                                                                                            |
| 5V & 3.3V            | DC-DC Converters: 2x<br>PWM Controller(s): ANPEC APW7159C                                                                     |
| Filtering Capacitors | Electrolytic: 5x Nippon Chemi-Con (2-5,000 @ 105°C, KZE), 2x Nippon Chemi-Con (4-10,000 @ 105°C, KYA)<br>Polymer: 35x no info |
| Supervisor IC        | Weltrend WT7527RA                                                                                                             |
| Fan Model            | TT-1225 BDK12025MS (120mm, 12V, 0.30A, Fluid Dynamic Bearing Fan)                                                             |

|                        |        |
|------------------------|--------|
| 5VSB Circuit           | -      |
| Rectifier              | PJ1256 |
| Standby PWM Controller | PN8141 |

## 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)          | 90.769%  |
| Average Noise Output (>1450 Load Combinations)        | 27.36dBA |
| Average PF (>1450 Load Combinations)                  | 0.978    |
| Efficiency With 10W ( $\leq$ 500W) or 2% (>500W) Load | 69.244%  |
| Standby Power Consumption                             | 0.0513W  |
| Non-Accredited                                        |          |
| 12V Ripple (Full Load)                                | 19.24mV  |
| 5V Ripple (Full Load)                                 | 10.46mV  |
| 3.3V Ripple (Full Load)                               | 16.27mV  |
| 5VSB Ripple (Full Load)                               | 20.16mV  |
| 12V Load Regulation                                   | 0.51%    |
| 5V Load Regulation                                    | 0.46%    |
| 3.3V Load Regulation                                  | 0.81%    |
| 5VSB Load Regulation                                  | 2.42%    |

|                                                |          |         |
|------------------------------------------------|----------|---------|
| Inrush Current                                 | 33.260A  |         |
| 230V                                           |          |         |
| Accredited                                     |          |         |
| Average Efficiency (>1450 load combinations)   | 92.105%  |         |
| Average Noise Output (>1450 Load Combinations) | 27.24dBA |         |
| Average PF (>1450 Load Combinations)           | 0.939    |         |
| Efficiency With 10W (≤500W) or 2% (>500W) Load | 68.289%  |         |
| Standby Power Consumption                      | 0.1406W  |         |
| Non-Accredited                                 |          |         |
| 12V Ripple (Full Load)                         | 21.39mV  |         |
| 5V Ripple (Full Load)                          | 10.40mV  |         |
| 3.3V Ripple (Full Load)                        | 18.21mV  |         |
| 5VSB Ripple (Full Load)                        | 18.72mV  |         |
| 12V Load Regulation                            | 0.84%    |         |
| 5V Load Regulation                             | 0.44%    |         |
| 3.3V Load Regulation                           | 0.81%    |         |
| 5VSB Load Regulation                           | 2.44%    |         |
| Inrush Current                                 | 65.300A  |         |
| 12V Transient Response (200%)                  | 11.49V   |         |
| 5V Transient Response (200%)                   | 4.978V   |         |
| 3.3V Transient Response (200%)                 | 3.225V   |         |
| 5VSB Transient Response (200%)                 | 4.913V   |         |
| Hold-Up Time & PWR_OK Signal                   | 22.40ms  |         |
| AC Loss to PWR_OK Hold Up Time                 | 17.80ms  |         |
| PWR_OK Inactive to DC Loss Delay               | 4.60ms   |         |
| PSU Timings: T1 (20% / 100%)                   | 93.0ms   | 93.0ms  |
| PSU Timings: T3 (20% / 100%)                   | 124.0ms  | 125.0ms |
| OPP (25.83°C / 40.25°C)                        | 142.67%  | 136.20% |

## Hold-Up Time & PWR\_OK Signal

|                                       |      |
|---------------------------------------|------|
| Hold-Up Time (ms)                     | 22.4 |
| AC Loss to PWR_OK Hold Up Time (ms)   | 17.8 |
| PWR_OK Inactive to DC Loss Delay (ms) | 4.6  |

## Stromverbrauch im Ruhezustand

### Tables

#### 115V

| Detailed Results   |          |          |           |          |           |        |
|--------------------|----------|----------|-----------|----------|-----------|--------|
|                    | Average  | Min      | Limit Min | Max      | Limit Max | Result |
| Mains Voltage RMS: | 114.87 V | 114.82 V | 113.85 V  | 114.93 V | 116.15 V  | PASS   |
| Mains Frequency:   | 60.00 Hz | 59.98 Hz | 59.40 Hz  | 60.01 Hz | 60.60 Hz  | PASS   |
| Mains Voltage CF:  | 1.419    | 1.417    | 1.340     | 1.422    | 1.490     | PASS   |
| Mains Voltage THD: | 0.15 %   | 0.09 %   | N/A       | 0.25 %   | 2.00 %    | PASS   |
| Real Power:        | 0.051 W  | -0.003 W | N/A       | 0.087 W  | N/A       | N/A    |
| Apparent Power:    | 8.845 W  | 8.817 W  | N/A       | 8.890 W  | N/A       | N/A    |
| Power Factor:      | 0.008    | N/A      | N/A       | N/A      | N/A       | N/A    |

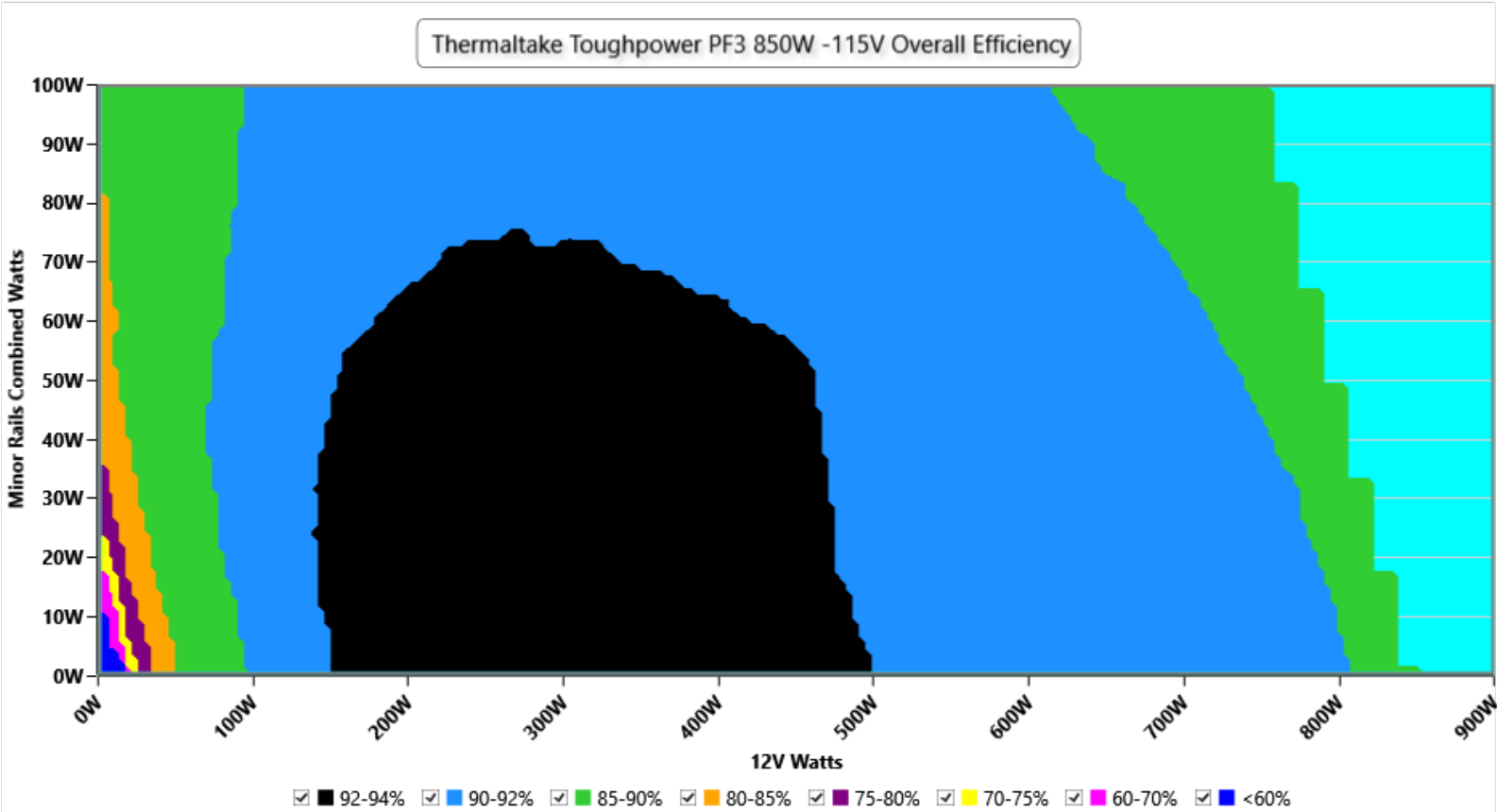
#### 230V

| Detailed Results   |          |          |           |          |           |        |
|--------------------|----------|----------|-----------|----------|-----------|--------|
|                    | Average  | Min      | Limit Min | Max      | Limit Max | Result |
| Mains Voltage RMS: | 229.96 V | 229.89 V | 227.70 V  | 230.01 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:  | 1.417    | 1.416    | 1.340     | 1.419    | 1.490     | PASS   |
| Mains Voltage THD: | 0.13 %   | 0.09 %   | N/A       | 0.18 %   | 2.00 %    | PASS   |
| Real Power:        | 0.141 W  | 0.092 W  | N/A       | 0.241 W  | N/A       | N/A    |
| Apparent Power:    | 31.052 W | 30.994 W | N/A       | 31.091 W | N/A       | N/A    |

|               |       |     |     |     |     |     |
|---------------|-------|-----|-----|-----|-----|-----|
| Power Factor: | 0.003 | N/A | N/A | N/A | N/A | N/A |
|---------------|-------|-----|-----|-----|-----|-----|

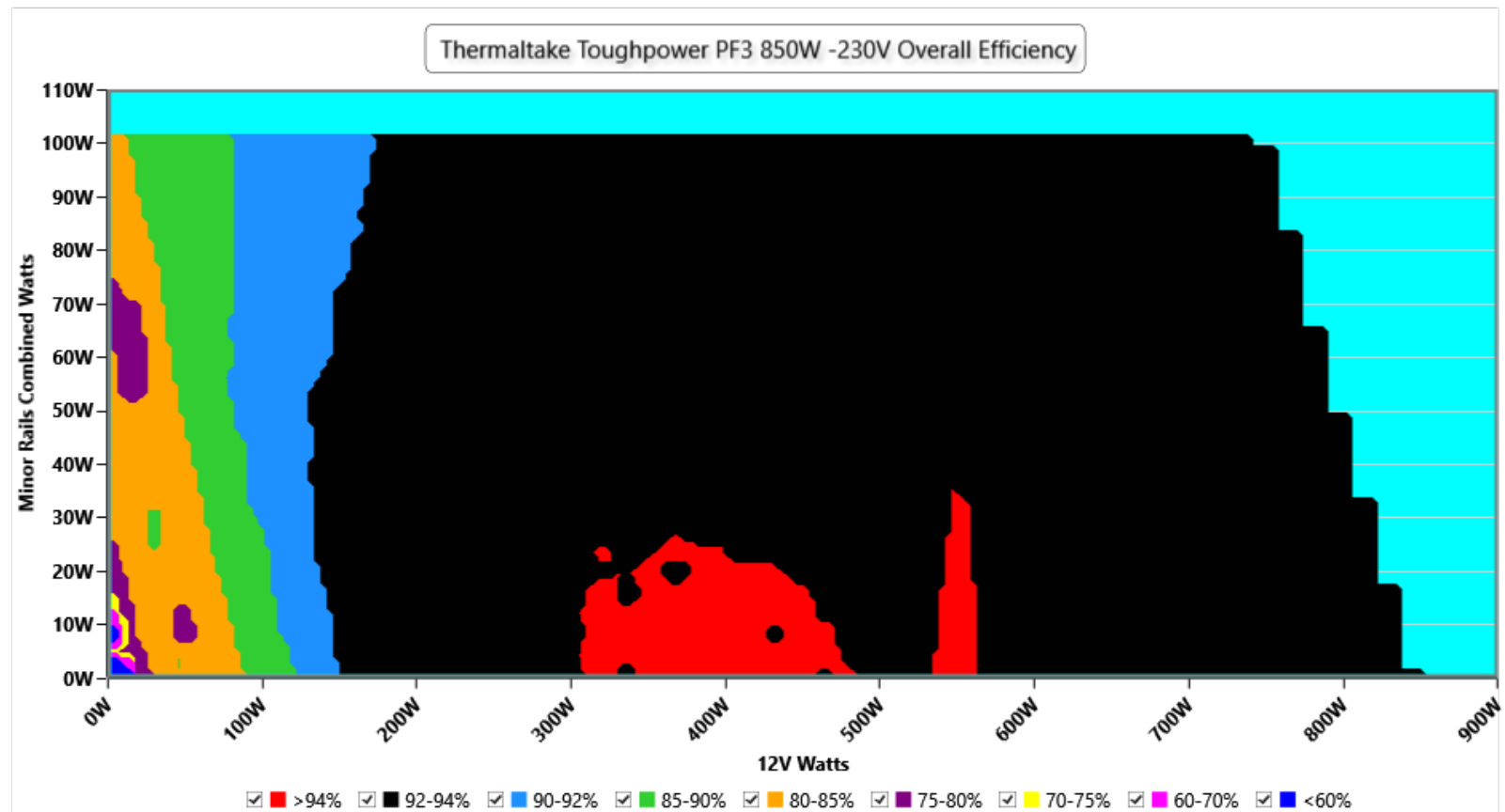
Efficiency Graph

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

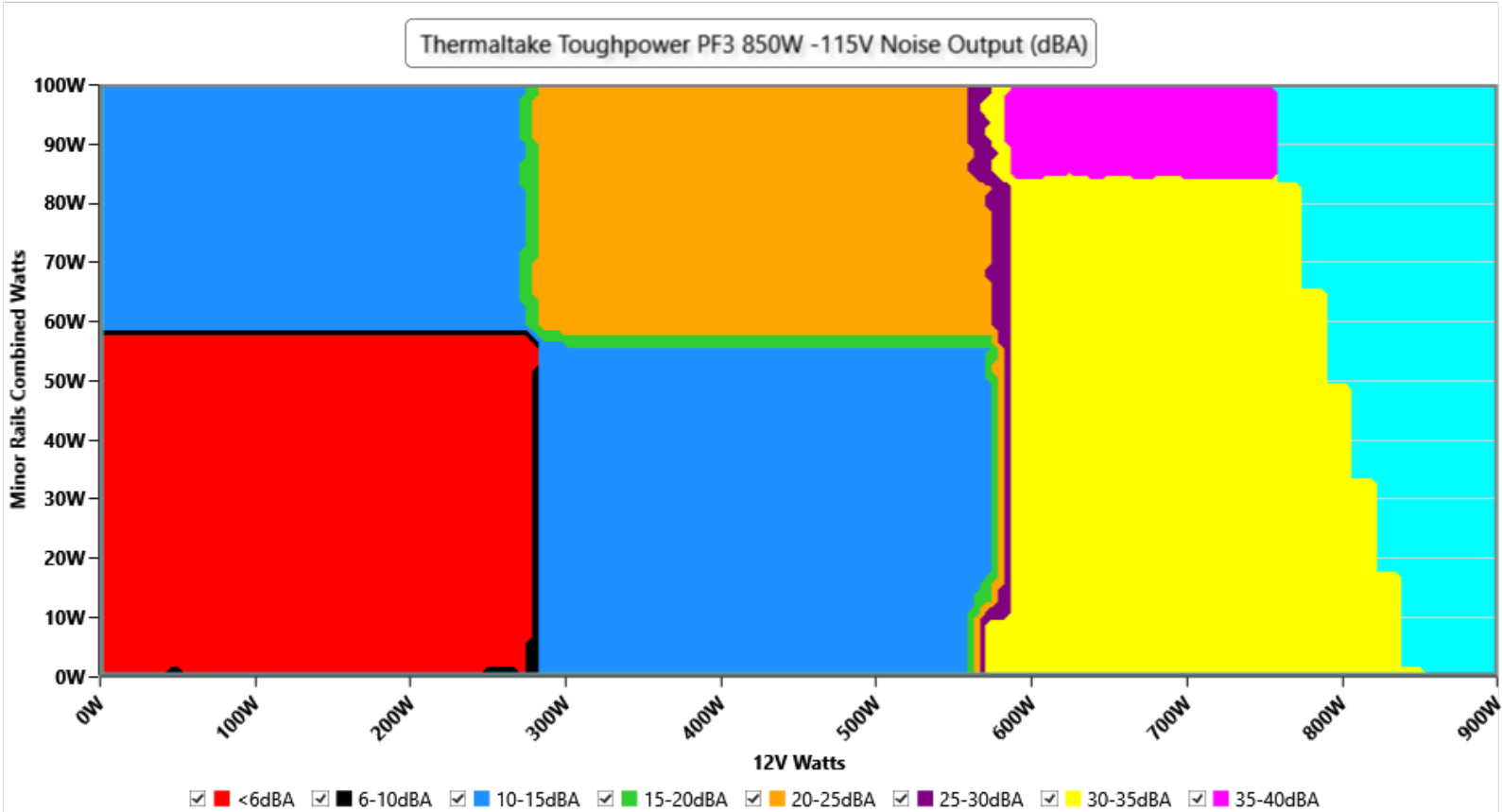


### INFO

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

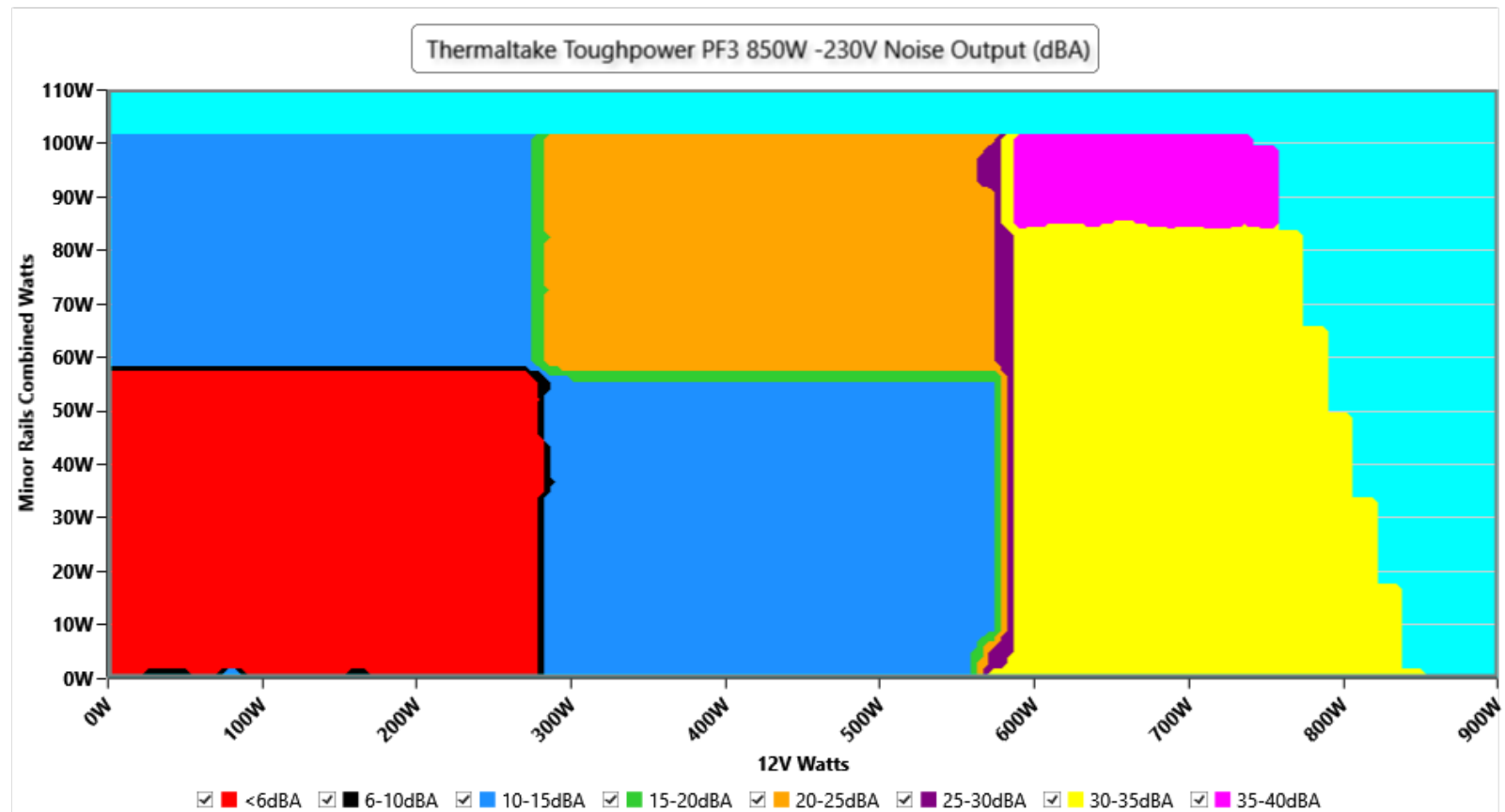
# Noise Graph

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



### INFO

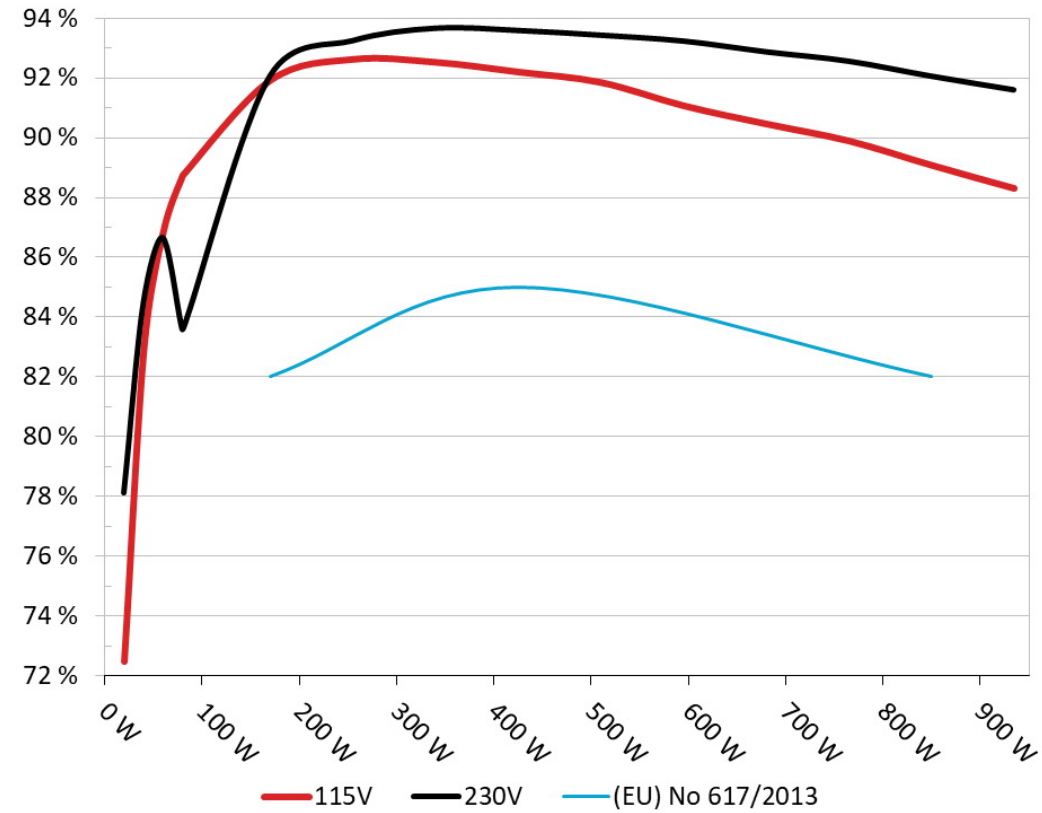
The PSU's noise in its entire operational range and under 30-32 °C ambient is depicted in this graph. The X axis represents the load on the +12V rail(s) while the Y axis is the load on the minor rails

## Indicative Performance

### Efficiency under high ambient temperature

Efficiency: Thermaltake Toughpower PF3 850W

Ambient: 37°C - 47°C (98.6°F - 116.6°F)



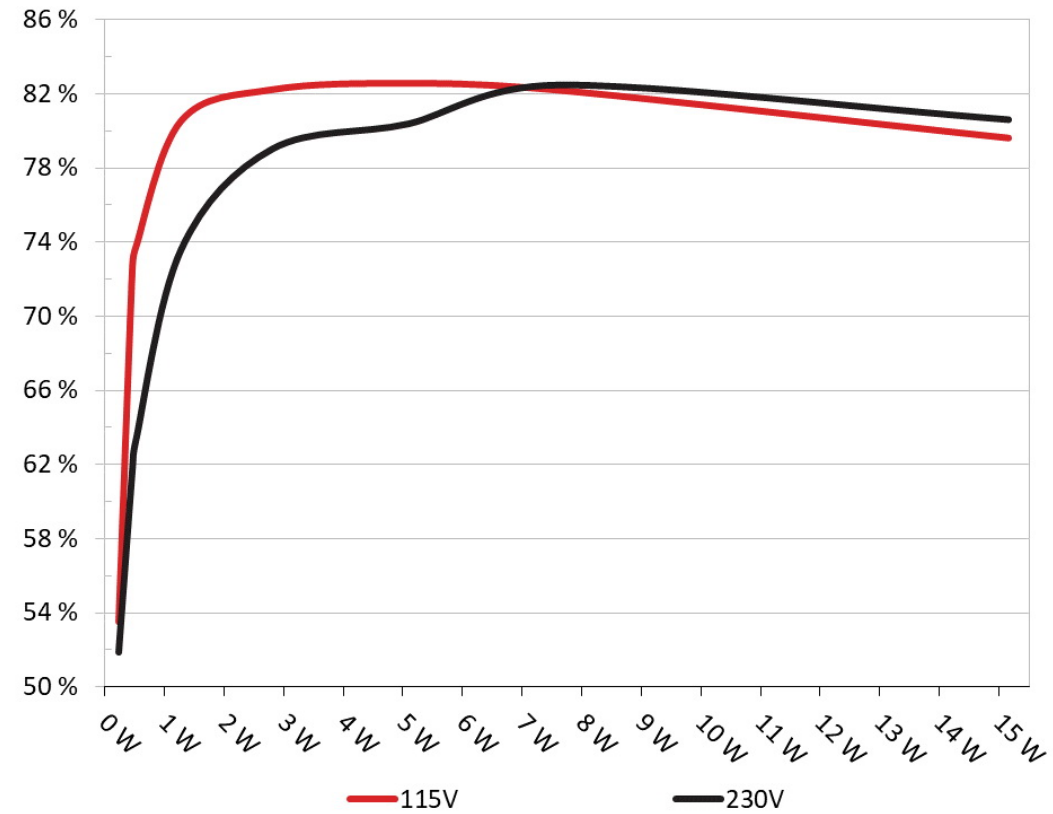
### INFO

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: Thermaltake Toughpower PF3 850W

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

### 5VSB Efficiency (ERP LOT 3/6 & CEC)

#### 115V

| Test # | 5VSB   | DC/AC (Watts) | Efficiency | PF/AC Volts |
|--------|--------|---------------|------------|-------------|
| 1      | 0.045A | 0.23W         | 53.036%    | 0.031       |
|        | 5.115V | 0.247W        |            | 114.87V     |
| 2      | 0.09A  | 0.46W         | 72.244%    | 0.079       |
|        | 5.114V | 0.637W        |            | 114.87V     |
| 3      | 0.55A  | 2.806W        | 81.716%    | 0.3         |
|        | 5.104V | 3.434W        |            | 114.87V     |
| 4      | 1A     | 5.094W        | 82.054%    | 0.374       |
|        | 5.095V | 6.208W        |            | 114.87V     |
| 5      | 1.5A   | 7.626W        | 81.678%    | 0.426       |
|        | 5.085V | 9.337W        |            | 114.87V     |
| 6      | 3A     | 15.162W       | 79.108%    | 0.491       |
|        | 5.055V | 19.167W       |            | 114.87V     |

#### 230V

| Test # | 5VSB   | DC/AC (Watts) | Efficiency | PF/AC Volts |
|--------|--------|---------------|------------|-------------|
| 1      | 0.045A | 0.23W         | 51.398%    | 0.017       |
|        | 5.113V | 0.448W        |            | 229.94V     |
| 2      | 0.09A  | 0.46W         | 61.315%    | 0.028       |
|        | 5.112V | 0.751W        |            | 229.94V     |
| 3      | 0.55A  | 2.807W        | 78.543%    | 0.124       |
|        | 5.103V | 3.573W        |            | 229.94V     |
| 4      | 1A     | 5.094W        | 79.905%    | 0.199       |
|        | 5.094V | 6.375W        |            | 229.94V     |
| 5      | 1.5A   | 7.627W        | 81.996%    | 0.258       |
|        | 5.084V | 9.301W        |            | 229.94V     |
| 6      | 3A     | 15.163W       | 80.129%    | 0.346       |
|        | 5.054V | 18.924W       |            | 229.94V     |

## 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%  | 5.313A  | 1.983A  | 1.977A  | 0.982A | 84.999        | 88.745%    | 0               | <6.0              | 44.55°C        | 0.951       |
|      | 11.932V | 5.043V  | 3.338V  | 5.092V | 95.781        |            |                 |                   | 40.27°C        | 114.84V     |
| 20%  | 11.649A | 2.975A  | 2.968A  | 1.181A | 169.923       | 91.927%    | 0               | <6.0              | 45.38°C        | 0.97        |
|      | 11.935V | 5.041V  | 3.335V  | 5.082V | 184.843       |            |                 |                   | 40.8°C         | 114.81V     |
| 30%  | 18.334A | 3.472A  | 3.466A  | 1.38A  | 254.922       | 92.629%    | 0               | <6.0              | 46.28°C        | 0.98        |
|      | 11.938V | 5.04V   | 3.333V  | 5.072V | 275.207       |            |                 |                   | 41.21°C        | 114.78V     |
| 40%  | 25.016A | 3.969A  | 3.964A  | 1.58A  | 340.003       | 92.533%    | 1064            | 24.1              | 41.95°C        | 0.982       |
|      | 11.944V | 5.039V  | 3.33V   | 5.061V | 367.437       |            |                 |                   | 47.46°C        | 114.75V     |
| 50%  | 31.326A | 4.964A  | 4.959A  | 1.782A | 424.775       | 92.208%    | 1061            | 24.1              | 42.38°C        | 0.984       |
|      | 11.948V | 5.037V  | 3.328V  | 5.05V  | 460.67        |            |                 |                   | 48.38°C        | 114.72V     |
| 60%  | 37.606A | 5.96A   | 5.955A  | 1.984A | 509.296       | 91.86%     | 1058            | 24.0              | 42.75°C        | 0.984       |
|      | 11.953V | 5.034V  | 3.325V  | 5.04V  | 554.427       |            |                 |                   | 49.25°C        | 114.69V     |
| 70%  | 43.900A | 6.958A  | 6.953A  | 2.187A | 594.61        | 91.079%    | 1052            | 23.8              | 43.26°C        | 0.985       |
|      | 11.970V | 5.031V  | 3.322V  | 5.029V | 652.853       |            |                 |                   | 50.27°C        | 114.66V     |
| 80%  | 50.223A | 7.956A  | 7.952A  | 2.291A | 679.45        | 90.468%    | 1652            | 37.2              | 43.85°C        | 0.986       |
|      | 11.977V | 5.028V  | 3.32V   | 5.02V  | 751.038       |            |                 |                   | 51.91°C        | 114.63V     |
| 90%  | 56.938A | 8.454A  | 8.44A   | 2.394A | 764.871       | 89.898%    | 1650            | 37.2              | 44.29°C        | 0.987       |
|      | 11.985V | 5.027V  | 3.317V  | 5.011V | 850.824       |            |                 |                   | 53.38°C        | 114.59V     |
| 100% | 63.375A | 8.955A  | 8.959A  | 3.004A | 849.724       | 89.082%    | 1645            | 37.2              | 45.11°C        | 0.988       |
|      | 11.993V | 5.025V  | 3.315V  | 4.992V | 953.872       |            |                 |                   | 55.19°C        | 114.56V     |
| 110% | 69.676A | 9.953A  | 10.053A | 3.009A | 934.293       | 88.312%    | 1978            | 42.9              | 46.67°C        | 0.989       |
|      | 11.999V | 5.023V  | 3.312V  | 4.985V | 1057.953      |            |                 |                   | 57.59°C        | 114.52V     |
| CL1  | 0.117A  | 11.963A | 11.922A | 0A     | 101.286       | 86.052%    | 1059            | 24.0              | 40.51°C        | 0.958       |
|      | 11.943V | 5.032V  | 3.33V   | 5.105V | 117.703       |            |                 |                   | 45.99°C        | 114.83V     |

| Test | 12V     | 5V      | 3.3V    | 5VSB   | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|------|---------|---------|---------|--------|---------------|------------|-----------------|-------------------|----------------|-------------|
| CL2  | 0.115A  | 19.882A | 0A      | 0A     | 101.359       | 84.348%    | 1657            | 37.3              | 40.11°C        | 0.959       |
|      | 11.939V | 5.029V  | 3.339V  | 5.108V | 120.17        |            |                 |                   | 47.14°C        | 114.83V     |
| CL3  | 0.115A  | 0A      | 19.843A | 0A     | 67.372        | 80.043%    | 1064            | 24.1              | 40.13°C        | 0.945       |
|      | 11.931V | 5.044V  | 3.326V  | 5.105V | 84.171        |            |                 |                   | 49.18°C        | 114.84V     |
| CL4  | 70.861A | 0A      | 0A      | 0A     | 849.442       | 89.909%    | 1649            | 37.2              | 45.59°C        | 0.988       |
|      | 11.988V | 5.038V  | 3.324V  | 5.061V | 944.782       |            |                 |                   | 56.56°C        | 114.57V     |

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%  | 5.290A  | 1.983A | 1.977A | 0.982A | 85.002        | 83.999%    | 0               | <6.0              | 44.43°C        | 0.814       |
|      | 11.987V | 5.042V | 3.338V | 5.093V | 101.194       |            |                 |                   | 40.21°C        | 229.93V     |
| 20%  | 11.618A | 2.976A | 2.968A | 1.181A | 169.932       | 92.057%    | 0               | <6.0              | 45.27°C        | 0.904       |
|      | 11.967V | 5.041V | 3.335V | 5.082V | 184.593       |            |                 |                   | 40.72°C        | 229.92V     |
| 30%  | 18.306A | 3.473A | 3.466A | 1.38A  | 254.927       | 93.244%    | 0               | <6.0              | 46.19°C        | 0.937       |
|      | 11.956V | 5.039V | 3.333V | 5.072V | 273.398       |            |                 |                   | 41.15°C        | 229.9V      |
| 40%  | 24.981A | 3.97A  | 3.964A | 1.58A  | 340.008       | 93.662%    | 1060            | 24.0              | 41.79°C        | 0.952       |
|      | 11.961V | 5.039V | 3.33V  | 5.062V | 363.016       |            |                 |                   | 47.31°C        | 229.89V     |
| 50%  | 31.286A | 4.964A | 4.959A | 1.782A | 424.793       | 93.587%    | 1058            | 24.0              | 42.03°C        | 0.961       |
|      | 11.963V | 5.036V | 3.328V | 5.051V | 453.901       |            |                 |                   | 48.09°C        | 229.87V     |
| 60%  | 37.567A | 5.96A  | 5.956A | 1.984A | 509.338       | 93.431%    | 1055            | 23.9              | 42.8°C         | 0.966       |
|      | 11.966V | 5.034V | 3.325V | 5.039V | 545.148       |            |                 |                   | 49.31°C        | 229.86V     |
| 70%  | 43.898A | 6.958A | 6.954A | 2.187A | 594.635       | 93.232%    | 1051            | 23.8              | 43.42°C        | 0.97        |
|      | 11.971V | 5.031V | 3.322V | 5.029V | 637.803       |            |                 |                   | 50.51°C        | 229.85V     |
| 80%  | 50.224A | 7.956A | 7.952A | 2.291A | 679.461       | 92.874%    | 1651            | 37.2              | 43.77°C        | 0.972       |
|      | 11.977V | 5.028V | 3.32V  | 5.02V  | 731.588       |            |                 |                   | 51.8°C         | 229.83V     |
| 90%  | 56.940A | 8.454A | 8.44A  | 2.394A | 764.869       | 92.558%    | 1647            | 37.2              | 44.15°C        | 0.974       |
|      | 11.984V | 5.027V | 3.317V | 5.011V | 826.365       |            |                 |                   | 53.16°C        | 229.82V     |

| Test | 12V     | 5V      | 3.3V    | 5VSB   | DC/AC (Watts) | Efficiency | Fan Speed (RPM) | PSU Noise (dB[A]) | Temps (In/Out) | PF/AC Volts |
|------|---------|---------|---------|--------|---------------|------------|-----------------|-------------------|----------------|-------------|
| 100% | 63.383A | 8.954A  | 8.959A  | 3.004A | 849.709       | 92.058%    | 1647            | 37.2              | 45.01°C        | 0.976       |
|      | 11.991V | 5.025V  | 3.315V  | 4.992V | 923.015       |            |                 |                   | 55.02°C        | 229.81V     |
| 110% | 69.685A | 9.953A  | 10.052A | 3.009A | 934.29        | 91.603%    | 1980            | 42.9              | 46.73°C        | 0.978       |
|      | 11.997V | 5.024V  | 3.312V  | 4.985V | 1019.933      |            |                 |                   | 57.66°C        | 229.79V     |
| CL1  | 0.116A  | 11.963A | 11.922A | 0A     | 101.287       | 83.153%    | 1054            | 23.9              | 40.32°C        | 0.848       |
|      | 11.975V | 5.032V  | 3.33V   | 5.105V | 121.807       |            |                 |                   | 45.84°C        | 229.93V     |
| CL2  | 0.115A  | 19.882A | 0A      | 0A     | 101.363       | 81.87%     | 1655            | 37.3              | 40.77°C        | 0.85        |
|      | 11.975V | 5.029V  | 3.339V  | 5.108V | 123.811       |            |                 |                   | 47.86°C        | 229.93V     |
| CL3  | 0.115A  | 0A      | 19.844A | 0A     | 67.375        | 73.383%    | 1052            | 23.8              | 40.12°C        | 0.796       |
|      | 11.984V | 5.044V  | 3.326V  | 5.105V | 91.89         |            |                 |                   | 49.21°C        | 229.94V     |
| CL4  | 70.848A | 0A      | 0A      | 0A     | 849.46        | 92.779%    | 1646            | 37.2              | 45.1°C         | 0.976       |
|      | 11.990V | 5.038V  | 3.324V  | 5.061V | 915.567       |            |                 |                   | 56.03°C        | 229.8V      |

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  | 1.244A  | 0.495A | 0.494A | 0.196A | 19.996        | 72.479%    | 0               | <6.0              | 39.69°C        | 0.801       |
|      | 11.934V | 5.048V | 3.342V | 5.113V | 27.589        |            |                 |                   | 36.61°C        | 114.86V     |
| 40W  | 2.740A  | 0.693A | 0.691A | 0.294A | 39.998        | 82.895%    | 0               | <6.0              | 40.44°C        | 0.898       |
|      | 11.932V | 5.047V | 3.341V | 5.109V | 48.251        |            |                 |                   | 37.18°C        | 114.86V     |
| 60W  | 4.235A  | 0.892A | 0.889A | 0.392A | 60            | 86.846%    | 0               | <6.0              | 42.33°C        | 0.931       |
|      | 11.932V | 5.046V | 3.34V  | 5.106V | 69.087        |            |                 |                   | 38.64°C        | 114.85V     |
| 80W  | 5.725A  | 1.09A  | 1.087A | 0.49A  | 79.941        | 88.991%    | 0               | <6.0              | 43.15°C        | 0.949       |
|      | 11.932V | 5.045V | 3.339V | 5.103V | 89.831        |            |                 |                   | 39.2°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 |
|------|---------|--------|--------|--------|---------------|------------|-----------------|-------------------|----------------|-------------|
| 20W  | 1.248A  | 0.495A | 0.494A | 0.196A | 19.991        | 78.14%     | 0               | <6.0              | 39.69°C        | 0.455       |
|      | 11.893V | 5.047V | 3.342V | 5.114V | 25.583        |            |                 |                   | 36.6°C         | 229.94V     |
| 40W  | 2.748A  | 0.693A | 0.691A | 0.293A | 39.993        | 84.48%     | 0               | <6.0              | 40.44°C        | 0.619       |
|      | 11.891V | 5.047V | 3.341V | 5.11V  | 47.339        |            |                 |                   | 37.09°C        | 229.94V     |
| 60W  | 4.246A  | 0.892A | 0.889A | 0.392A | 59.996        | 86.659%    | 0               | <6.0              | 41.55°C        | 0.727       |
|      | 11.900V | 5.046V | 3.34V  | 5.107V | 69.231        |            |                 |                   | 38.03°C        | 229.94V     |
| 80W  | 5.698A  | 1.09A  | 1.087A | 0.49A  | 79.941        | 83.607%    | 0               | <6.0              | 42.85°C        | 0.804       |
|      | 11.988V | 5.044V | 3.339V | 5.103V | 95.618        |            |                 |                   | 39.02°C        | 229.93V     |

The results above are not used in the certification process

## Ripple Measurements

## 115V

| Test       | 12V     | 5V      | 3.3V    | 5VSB    | Pass/Fail |
|------------|---------|---------|---------|---------|-----------|
| 10% Load   | 6.65mV  | 6.49mV  | 8.27mV  | 6.14mV  | Pass      |
| 20% Load   | 7.22mV  | 6.70mV  | 8.38mV  | 5.99mV  | Pass      |
| 30% Load   | 8.30mV  | 6.85mV  | 9.05mV  | 6.30mV  | Pass      |
| 40% Load   | 10.31mV | 7.11mV  | 9.57mV  | 6.50mV  | Pass      |
| 50% Load   | 11.03mV | 8.29mV  | 10.91mV | 7.02mV  | Pass      |
| 60% Load   | 11.34mV | 8.71mV  | 11.07mV | 6.97mV  | Pass      |
| 70% Load   | 11.34mV | 8.04mV  | 12.00mV | 7.79mV  | Pass      |
| 80% Load   | 12.48mV | 8.40mV  | 12.78mV | 7.95mV  | Pass      |
| 90% Load   | 13.30mV | 9.48mV  | 13.86mV | 8.41mV  | Pass      |
| 100% Load  | 19.24mV | 10.46mV | 16.27mV | 20.16mV | Pass      |
| 110% Load  | 18.38mV | 11.00mV | 18.57mV | 14.12mV | Pass      |
| Crossload1 | 13.40mV | 9.24mV  | 10.70mV | 6.01mV  | Pass      |
| Crossload2 | 11.55mV | 13.19mV | 9.46mV  | 5.42mV  | Pass      |

| Test       | 12V     | 5V     | 3.3V    | 5VSB   | Pass/Fail |
|------------|---------|--------|---------|--------|-----------|
| Crossload3 | 9.44mV  | 7.57mV | 10.86mV | 4.80mV | Pass      |
| Crossload4 | 19.88mV | 9.21mV | 16.57mV | 7.02mV | Pass      |

The results above are not used in the certification process

## 230V

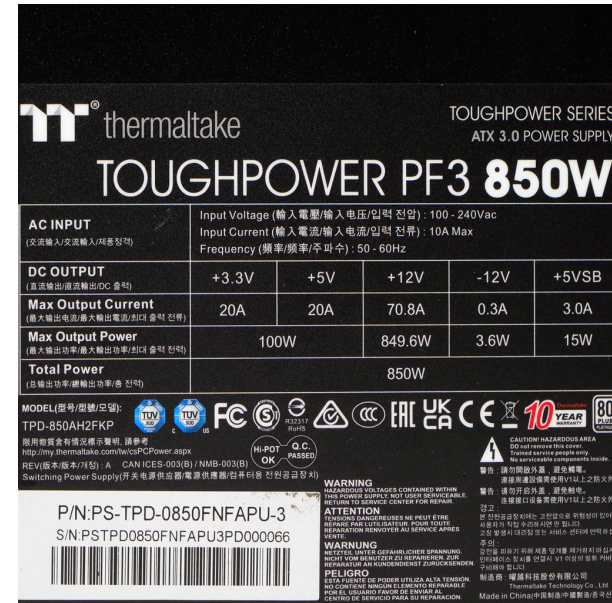
| Test       | 12V     | 5V      | 3.3V    | 5VSB    | Pass/Fail |
|------------|---------|---------|---------|---------|-----------|
| 10% Load   | 6.24mV  | 6.80mV  | 8.43mV  | 6.14mV  | Pass      |
| 20% Load   | 15.48mV | 7.11mV  | 8.22mV  | 6.19mV  | Pass      |
| 30% Load   | 11.64mV | 8.50mV  | 12.88mV | 6.50mV  | Pass      |
| 40% Load   | 11.44mV | 10.15mV | 15.77mV | 6.45mV  | Pass      |
| 50% Load   | 10.52mV | 7.62mV  | 10.55mV | 6.97mV  | Pass      |
| 60% Load   | 10.72mV | 8.40mV  | 12.05mV | 7.28mV  | Pass      |
| 70% Load   | 10.93mV | 9.02mV  | 11.64mV | 7.59mV  | Pass      |
| 80% Load   | 12.53mV | 8.60mV  | 13.34mV | 7.74mV  | Pass      |
| 90% Load   | 13.10mV | 9.94mV  | 14.43mV | 8.67mV  | Pass      |
| 100% Load  | 21.39mV | 10.40mV | 18.21mV | 18.72mV | Pass      |
| 110% Load  | 20.48mV | 12.30mV | 18.31mV | 13.90mV | Pass      |
| Crossload1 | 9.37mV  | 8.66mV  | 10.20mV | 5.47mV  | Pass      |
| Crossload2 | 9.07mV  | 12.67mV | 8.89mV  | 5.58mV  | Pass      |
| Crossload3 | 26.71mV | 6.75mV  | 10.60mV | 5.16mV  | Pass      |
| Crossload4 | 22.02mV | 8.49mV  | 18.44mV | 7.00mV  | Pass      |

The results above are not used in the certification process

## Thermaltake Toughpower PF3 850W



Top side



### Power specifications label

Cybernetics bietet freiwillige Zertifizierungsprogramme für Netzteile – ETA für Effizienz, LAMBDA für Lautstärke und SAFE für Sicherheit und korrekten Betrieb – sowie für Kühlprodukte mit DELTA für die Schalldämmung von Gehäusen und PHI für Luftstrom und statischen Druck von Lüftern

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