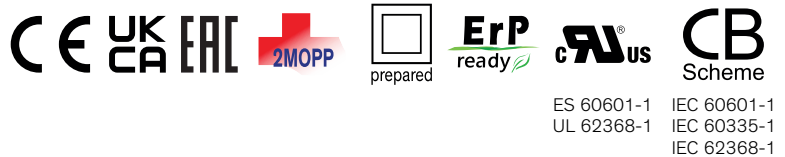


- High power density power supply (open frame)
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP
- Low leakage current <75 μ A rated for BF applications
- EMC compliance to IEC 60601-1-2 4th edition
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3
- Protection class II
- Operating up to 5000 m altitude
- Ready to meet ErP directive, no load power consumption <60 mW
- 5-year product warranty



The TPP 30A-D AC/DC power supplies feature a reinforced double I/O isolation system according to medical safety standards IEC/EN/ES 60601-1 3rd edition for 2 x MOPP approved for an operating altitude of 5000 m. The earth leakage current is below 75 μ A what makes the units suitable for BF (body floating) applications. The excellent efficiency of up to 92% offers a high power density in the packaging format 1.36" x 2.74". The full load operating temperature range covers -40°C to $+60^{\circ}\text{C}$ while it goes up to 85°C with 50% load derating. The units operate in compliance to the medical EMC emission and immunity levels according to latest standard IEC 60601-1-2 4th edition.

Models

| Order Code | Output Power max. | Output Voltage nom. (adjustable) | Output Current max. | Efficiency typ. |
|---------------|-------------------|----------------------------------|---------------------|-----------------|
| TPP 30-103A-D | 20 W | 3.3 VDC (2.97 - 3.63 VDC) | 6'000 mA | 84 % |
| TPP 30-105A-D | 30 W | 5 VDC (4.5 - 5.5 VDC) | 6'000 mA | 87 % |
| TPP 30-109A-D | | 9 VDC (8.1 - 9.9 VDC) | 3'340 mA | 88 % |
| TPP 30-112A-D | | 12 VDC (10.8 - 13.2 VDC) | 2'500 mA | 91 % |
| TPP 30-115A-D | | 15 VDC (13.5 - 16.5 VDC) | 2'000 mA | 91 % |
| TPP 30-124A-D | | 24 VDC (21.6 - 26.4 VDC) | 1'250 mA | 90 % |
| TPP 30-136A-D | | 36 VDC (32.4 - 39.6 VDC) | 840 mA | 90 % |
| TPP 30-148A-D | | 48 VDC (43.2 - 52.8 VDC) | 630 mA | 92 % |

Input Specifications

| | | |
|------------------------|-----------------------------|--|
| Input Voltage | - AC Range | Operational Range: 85 - 264 VAC (Full Range) Rated Range: 100 - 240 VAC (Full Range) |
| | - DC Range | Operational Range: 120 - 370 VDC (Designed for, no certification) Polarity: +DC: L / -DC: N |
| Input Frequency | | Operational Range: 47 - 440 Hz Certified: 50/60 Hz |
| Input Current | - Full Load & Vin = 230 VAC | 400 mA max. |
| | - Full Load & Vin = 115 VAC | 800 mA max. |
| Power Consumption | - No load & Vin = 230 VAC | 60 mW max. (Ready to meet ErP directive) |
| | - No load & Vin = 115 VAC | 60 mW max. |
| Input Inrush Current | - At 230 VAC | 40 A max. |
| | - At 115 VAC | 25 A max. |
| Input Protection | | T 1.6 A / 250 VAC (Internal Fuse in L & N) |
| Recommended Input Fuse | | (The need of an external fuse has to be assessed in the final application.) |

Output Specifications

| | | |
|--|---------------------------------|--|
| Output Voltage Adjustment | | ±10% (By external trim resistor) See application note: www.tracopower.com/overview/tpp30a-d Output power must not exceed rated power! |
| Voltage Set Accuracy | | ±1% max. |
| Regulation | - Input Variation (Vmin - Vmax) | 0.2% max. |
| | - Load Variation (0 - 100%) | 0.7% max. (3.3 and 5 VDC model) 0.5% max. (other output models) |
| Ripple and Noise (20 MHz Bandwidth) | 3.3 VDC model: | 50 mVp-p typ. (w/ 10 µF X7R) |
| | 5 VDC model: | 50 mVp-p typ. (w/ 10 µF X7R) |
| | 9 VDC model: | 50 mVp-p typ. (w/ 10 µF X7R) |
| | 12 VDC model: | 50 mVp-p typ. (w/ 1 µF X7R) |
| | 15 VDC model: | 50 mVp-p typ. (w/ 1 µF X7R) |
| | 24 VDC model: | 50 mVp-p typ. (w/ 1 µF X7R) |
| | 36 VDC model: | 50 mVp-p typ. (w/ 1 µF X7R) |
| | 48 VDC model: | 50 mVp-p typ. (w/ 0.1 µF X7R) |
| Capacitive Load | 3.3 VDC model: | 10'000 µF max. |
| | 5 VDC model: | 12'000 µF max. |
| | 9 VDC model: | 3'720 µF max. |
| | 12 VDC model: | 2'085 µF max. |
| | 15 VDC model: | 1'350 µF max. |
| | 24 VDC model: | 520 µF max. |
| | 36 VDC model: | 235 µF max. |
| 48 VDC model: | 130 µF max. | |
| Minimum Load | | Not required |
| Temperature Coefficient | | ±0.02 %/K max. |
| Hold-up Time | - At 115 VAC | 16 ms min. |
| Start-up Time | - At 230 VAC | 1'500 ms max. |
| Short Circuit Protection | | Continuous, Automatic recovery |
| Output Current Limitation | | 110 - 170% of Iout max. |
| | | 140% typ. of Iout max. |
| Overvoltage Protection | | 125 - 140% of Vout nom. |
| Transient Response | - Response Deviation | 3% max. (50% to 75% Load Step) |
| | - Response Time | 500 µs typ. (50% to 75% Load Step) |

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Safety Specifications

| | | |
|-----------------------|-----------------------------|--|
| Safety Standards | - IT / Multimedia Equipment | EN 62368-1 IEC 62368-1 UL 62368-1 |
| | - Household | EN 60335-1 IEC 60335-1 |
| | - Medical Equipment | EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1 2 x MOPP (Means Of Patient Protection) |
| | - Power Transformers | IEC 61558-1 IEC 61558-2-16 |
| | - Certification Documents | www.tracopower.com/overview/tpp30a-d |
| | Protection Class | Class I & II (Prepared): Reinforced Insulation |
| Pollution Degree | PD 2 | |
| Over Voltage Category | OVC II | |

EMC Specifications

| | | |
|---------------|----------------------------------|--|
| EMI Emissions | - Conducted Emissions | EN 60601-1-2 edition 4 (Medical Devices) EN 55011 class B (internal filter) EN 55014-1 (internal filter) EN 55032 class B (internal filter) FCC Part 15 class B (internal filter) FCC Part 18 class B (internal filter) |
| | - Radiated Emissions | EN 55011 class B (internal filter) EN 55014-1 (internal filter) EN 55032 class B (internal filter) FCC Part 15 class B (internal filter) FCC Part 18 class B (internal filter) |
| | - Harmonic Current Emissions | EN 61000-3-2, class A |
| | - Voltage Fluctuations & Flicker | EN 61000-3-3 |
| EMS Immunity | - Electrostatic Discharge | EN 55024 (IT Equipment) EN 55035 (Multimedia) EN 60601-1-2 edition 4 (Medical Devices) EN 55014-2 (Household Appliances Tools) Air: EN 61000-4-2, ±15 kV, perf. criteria A Contact: EN 61000-4-2, ±8 kV, perf. criteria A EN 61000-4-3, 20 V/m, perf. criteria A EN 61000-4-4, ±2 kV, perf. criteria A L to L: EN 61000-4-5, ±1 kV, perf. criteria A EN 61000-4-6, 20 Vrms, perf. criteria A Continuous: EN 61000-4-8, 30 A/m, perf. criteria A 230 VAC / 50 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A 60%, 1 period, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria A |
| | - RF Electromagnetic Field | |
| | - EFT (Burst) / Surge | |
| | - Conducted RF Disturbances | |
| | - PF Magnetic Field | |
| | - Voltage Dips & Interruptions | 115 VAC / 60 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A 60%, 1 period, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria A |

General Specifications

| | | |
|--------------------|---------------------------|----------------|
| Relative Humidity | 95% max. (non condensing) | |
| Temperature Ranges | - Operating Temperature | -40°C to +85°C |
| | - Storage Temperature | -40°C to +85°C |

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

| | | |
|---------------------------------|--|--|
| Power Derating | - High Temperature - Low Input Voltage | Depending on model 4 %/V below 90 VAC See application note: www.tracopower.com/overview/tpp30a-d |
| Cooling System | | Natural convection (20 LFM) |
| Altitude During Operation | | 5'000 m max. |
| Switching Frequency | | 30 - 60 kHz (PWM) |
| Insulation System | | Reinforced Insulation |
| Working Voltage (rated) | | 272 VAC |
| Isolation Test Voltage | - Input to Output, 60 s - Input to Case or PE, 60 s - Output to Case or PE, 60 s | 4'000 VAC 1'500 VAC 1'500 VAC |
| Creepage | - Input to Output | 8 mm min. |
| Clearance | - Input to Output | 8 mm min. |
| Isolation Resistance | - Input to Output, 500 VDC | 100 MΩ min. |
| Leakage Current (at 264 VAC) | - Touch Current | 75 μA max. |
| Reliability | - Calculated MTBF | 3'300'000 h (MIL-HDBK-217F, ground benign) |
| Washing Process | | Not allowed |
| Environment | - Vibration - Mechanical Shock | IEC 60068-2-6 IEC 60068-2-27 |
| Pin Material | | Copper |
| Pin Foundation Plating | | Nickel (2 - 3 μm) |
| Pin Surface Plating | | Tin (3 - 5 μm), matte |
| Housing Type | | Open Frame |
| Mounting Type | | PCB Mount |
| Connection Type | | THD (Through-Hole Device) |
| Weight | | 58 g |
| Environmental Compliance | - REACH Declaration - RoHS Declaration | www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.) |

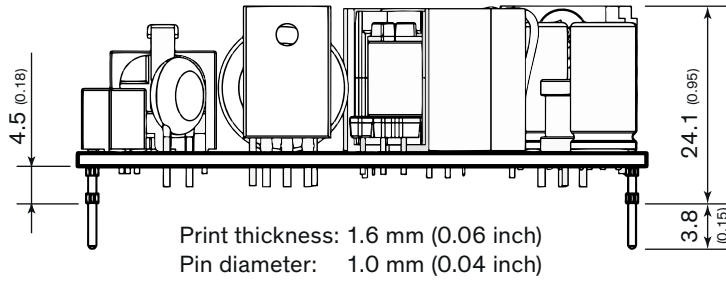
Supporting Documents

Overview Link (for additional Documents)

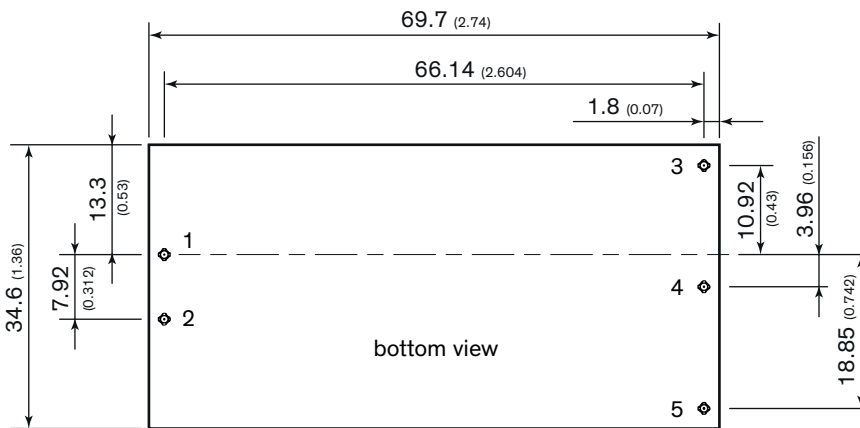
www.tracopower.com/overview/tpp30a-d

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Outline Dimensions



| PCB Pinout | |
|------------|----------|
| Pin | Function |
| 1 | Neutral |
| 2 | Line |
| 3 | +Vout |
| 4 | -Vout |
| 5 | Trim |



Dimension in mm, () = inch
 Tolerances: x.x ±0.50 (±0.02)
 x.xx ±0.25 (±0.01)
 Pin pitch tolerance: ±0.25 (±0.010)
 Pin dimension tolerance: ±0.10 (±0.004)