

AC/DC Medical Power Supply

TPP 65A Series, 65 Watt

- Open frame power supply with pin connection
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP
- Low leakage current <75 µA rated for BF applications
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3
- EMC compliance to IEC 60601-1-2 ed. 4
- Protection class I and II
- Operating up to 5000 m altitude
- Ready to meet ErP directive, <0.15 W no load power consumption
- 5-year product warranty



ES 60601-1 IEC 60601-1
UL 62368-1 IEC 62368-1

The TPP 65A Series of 65 Watt AC/DC power supplies feature a reinforced double I/O isolation system according to latest medical safety standards (60601-1 3rd edition, 2 x MOPP). The leakage current is below 75 µA what makes the units suitable for BF (body floating) applications. The excellent efficiency of up to 92% allows a high power density for the standard 2.0" x 3.0" packaging format. The full load operating temperature range is -40°C to +60°C while it goes up to 85°C with 50% load derating. The EMC characteristic is dedicated for applications in industrial and domestic fields. High reliability is provided by the use of industrial quality grade components and an excellent thermal management. It makes the products an ideal solution for medical devices and for demanding safety and space critical applications.

Models

| Order Code | Output Power max. | Output Voltage nom. (adjustable) | Output Current max. | Efficiency typ. |
|---------------|-------------------|----------------------------------|---------------------|-----------------|
| TPP 65-105A-J | 50 W | 5 VDC (4.5 - 5.5 VDC) | 10'000 mA | 90 % |
| TPP 65-112A-J | | 12 VDC (10.8 - 13.2 VDC) | 5'420 mA | 93 % |
| TPP 65-124A-J | 65 W | 24 VDC (21.6 - 26.4 VDC) | 2'710 mA | 94 % |
| TPP 65-148A-J | | 48 VDC (43.2 - 52.8 VDC) | 1'360 mA | 93 % |

Note - Other output models are available on request.

Input Specifications

| | | |
|------------------------|-----------------------------|---|
| Input Voltage | - AC Range | Operational Range: 85 - 264 VAC (Full Range) |
| | - DC Range | Rated Range: 100 - 240 VAC (Full Range) |
| | | Operational Range: 120 - 370 VDC (Designed for, no certification) |
| | | Polarity: +DC: L / -DC: N |
| Input Frequency | | 47 - 63 Hz |
| Input Current | - Full Load & Vin = 230 VAC | 950 mA max. |
| | - Full Load & Vin = 115 VAC | 1'650 mA max. |
| Power Consumption | - At no load | 150 mW max. (Ready to meet ErP directive) |
| Input Inrush Current | - At 230 VAC | 60 A max. |
| Input Protection | | T 3.15 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 trim potentiometer) | |
| | Output power must not exceed rated power! | |
| Voltage Set Accuracy | ±1% max. | |
| Regulation | - Input Variation (Vmin - Vmax) - Load Variation (0 - 100%) | |
| | 0.2% max. 0.7% max. (5 VDC model) 0.5% max. (other output models) | |
| Ripple and Noise (20 MHz Bandwidth) | 5 VDC model: 75 mVp-p typ. (w/ 10 µF X7R) 12 VDC model: 75 mVp-p typ. (w/ 10 µF X7R) 24 VDC model: 75 mVp-p typ. (w/ 1 µF X7R) 48 VDC model: 150 mVp-p typ. (w/ 0.1 µF X7R) | |
| Capacitive Load | 5 VDC model: 20'000 µF max. 12 VDC model: 4'520 µF max. 24 VDC model: 1'130 µF max. 48 VDC model: 285 µF max. | |
| Minimum Load | Not required | |
| Temperature Coefficient | ±0.02 %/K max. | |
| Hold-up Time | 16 ms min. | |
| Start-up Time | 1'000 ms max. | |
| Short Circuit Protection | Continuous, Automatic recovery | |
| Output Current Limitation | 120 - 160% of Iout max. 145% typ. of Iout max. | |
| Overvoltage Protection | 125 - 140% of Vout nom. | |
| Transient Response | - Response Deviation - Response Time | |
| | 3% max. (50% to 75% Load Step) 600 µs typ. (50% to 75% Load Step) | |

Safety Specifications

| | | |
|-----------------------|-----------------------------|--|
| Safety Standards | - IT / Multimedia Equipment | EN 62368-1 |
| | - Medical Equipment | IEC 62368-1 |
| | | UL 62368-1 |
| | | EN 60601-1 |
| | | IEC 60601-1 |
| | | ANSI/AAMI ES 60601-1 |
| | | 2 x MOPP (Means Of Patient Protection) |
| | | www.tracopower.com/overview/tpp65a |
| Protection Class | | Class I & II (Prepared): Reinforced Insulation |
| Pollution Degree | | PD 2 |
| Over Voltage Category | | OVC II |

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

EMC Specifications

| | | |
|---------------|----------------------------------|---|
| EMI Emissions | - Conducted Emissions | EN 60601-1-2 edition 4 (Medical Devices) EN 55011 class B (internal filter) EN 55032 class B (internal filter) FCC Part 18 class B (internal filter) EN 55011 class B (internal filter) EN 55032 class B (internal filter) FCC Part 18 class B (internal filter) EN 61000-3-2, class A EN 61000-3-3 |
| | - Radiated Emissions | |
| | - Harmonic Current Emissions | |
| | - Voltage Fluctuations & Flicker | |
| EMS Immunity | - Electrostatic Discharge | Air: EN 61000-4-2, ±15 kV, perf. criteria A |
| | - RF Electromagnetic Field | Contact: EN 61000-4-2, ±8 kV, perf. criteria A |
| | - EFT (Burst) / Surge | EN 61000-4-3, 20 V/m, perf. criteria A |
| | - Conducted RF Disturbances | EN 61000-4-4, ±2 kV, perf. criteria A |
| | - PF Magnetic Field | L to L: EN 61000-4-5, ±1 kV, perf. criteria A |
| | - Voltage Dips & Interruptions | 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 |
| | | >95%, 0.5 periods, perf. criteria A |
| | | >95%, 1 period, perf. criteria A |
| | | >95%, 250 periods, perf. criteria B |
| | | 115 VAC / 60 Hz: EN 61000-4-11 |
| | | 30%, 25 periods, perf. criteria A |
| | | >95%, 0.5 periods, perf. criteria A |
| | | >95%, 1 period, perf. criteria A |
| | | >95%, 250 periods, perf. criteria B |

General Specifications

| | |
|---------------------------------|--|
| Relative Humidity | 95% max. (non condensing) |
| Temperature Ranges | -40°C to +85°C |
| | -40°C to +85°C |
| Power Derating | - High Temperature - Low Input Voltage |
| | See application note: www.tracopower.com/overview/tpp65a |
| | 4 %/V below 90 VAC |
| Cooling System | Natural convection (20 LFM) |
| Altitude During Operation | 5'000 m max. |
| Switching Frequency | 50 - 140 kHz (PWM) |
| Insulation System | Reinforced Insulation |
| Working Voltage (rated) | 258 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 2'500 VAC 2'500 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 |
| | 1'500'000 h (MIL-HDBK-217F, ground benign) |
| Environment | - Vibration |
| | IEC 60068-2-6 |
| | 5 g, 3 axis, sine sweep, 5-500 Hz, 1 oct/min |
| | - Mechanical Shock |
| | IEC 60068-2-27 |
| | 50 g, 3 axis, half sine, 11 ms |
| Housing Type | Open Frame |
| Mounting Type | Chassis Mount |
| Connection Type | Pin Connector |

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

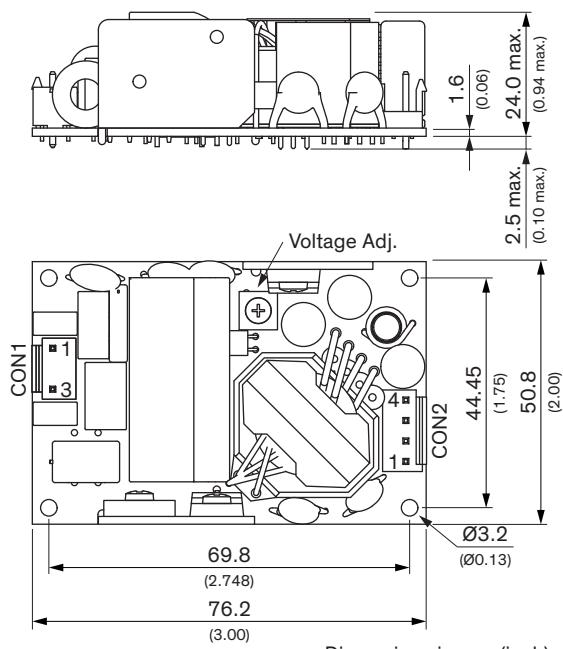
| | |
|--------------------------|--|
| Weight | 117 g |
| Environmental Compliance | <p>- REACH Declaration www.tracopower.com/info/reach-declaration.pdf</p> <p>- RoHS Declaration www.tracopower.com/info/rohs-declaration.pdf</p> <p>Exemptions: 7a, 7c-l (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)</p> |

Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tpp65a

Outline Dimensions



| Pin connectors | | | |
|----------------|----------|---------------|----------|
| Input (CON1) | | Output (CON2) | |
| Pin | Function | Pin | Function |
| 1 | Line | 1,2* | -Vout |
| 3 | Neutral | 3,4 | +Vout |

*Terminal rated for 10 A max.
(at higher current connection has to be split)

Input: JST series
mates with JST crimp terminal: SVH-21T-P1.1
and terminal housing: VHR-3N

Output: JST series
mates with JST crimp terminal: SVH-21T-P1.1
and terminal housing: VHR-4N