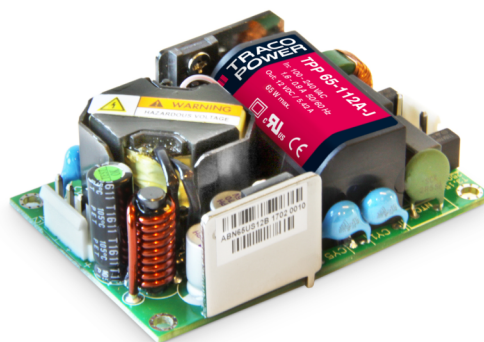


- Open frame power supply with pin connection
- Certification according to IEC/EN/ES 60601-1 edition 3.2 for 2 x MOPP
- Low leakage current <75 µA rated for BF applications
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc. 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 edition 3.2, 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	65 W	12 VDC (10.8 - 13.2 VDC)	5'420 mA	93 %
TPP 65-124A-J		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 %

Options	
on demand (backorder with MOQ non stocking item)	- Optional model with 15 VDC and 4'340 mA

Note - Other output models are available on request.

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
Power Consumption	- No load & Vin = 230 VAC	150 mW max. (Ready to meet ErP directive)
	- No load & Vin = 115 VAC	150 mW max.
Input Current	- Full load & Vin = 230 VAC	950 mA max.
	- Full load & Vin = 115 VAC	1'650 mA max.
Input Inrush Current	- At 230 VAC	60 A max.
	- At 115 VAC	35 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)	0.2% max.
	- Load Variation (0 - 100%)	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)
	15 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.
	15 VDC model:	2'895 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	- At 115 VAC	16 ms min.
Start-up Time	- At 230 VAC	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	3% max. (50% to 75% Load Step)
	- Response Time	600 µs typ. (50% to 75% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Medical Equipment	EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1
		2 x MOPP (Means Of Patient Protection)
	- Certification Documents	www.tracopower.com/overview/tpp65a
Protection Class		Class I & II (Prepared): Reinforced Insulation

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

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 55032 class B (internal filter) FCC 47 Part 18 class B (internal filter)
	- Radiated Emissions	EN 55011 class B (internal filter) EN 55032 class B (internal filter) FCC 47 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	Air: EN 60601-1-2 edition 4 (Medical Devices) Contact: EN 61000-4-2, ± 15 kV, perf. criteria A 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
	- RF Electromagnetic Field	L to L: EN 61000-4-5, ± 1 kV, perf. criteria A EN 61000-4-6, 20 Vrms, perf. criteria A
	- EFT (Burst) / Surge	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
	- Conducted RF Disturbances	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
	- PF Magnetic Field	
	- Voltage Dips & Interruptions	
EMC / Environmental	- Certification Documents	www.tracopower.com/overview/tpp65a

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Storage Temperature	-40°C to +85°C
Power Derating	- High Temperature	Depending on model
	- Low Input Voltage	4 %/V below 90 VAC
	See application note: www.tracopower.com/overview/tpp65a	
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Regulator Topology		Flyback Converter
Switching Frequency		50 - 140 kHz (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		258 VAC
Isolation Test Voltage	- Input to Output, 60 s	4'000 VAC
	- Input to Case or PE, 60 s	2'500 VAC
	- Output to Case or PE, 60 s	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 M Ω min.
Leakage Current (at 264 VAC)	- Touch Current	75 μ A max.
Reliability	- Calculated MTBF	1'500'000 h (MIL-HDBK-217F, ground benign)

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

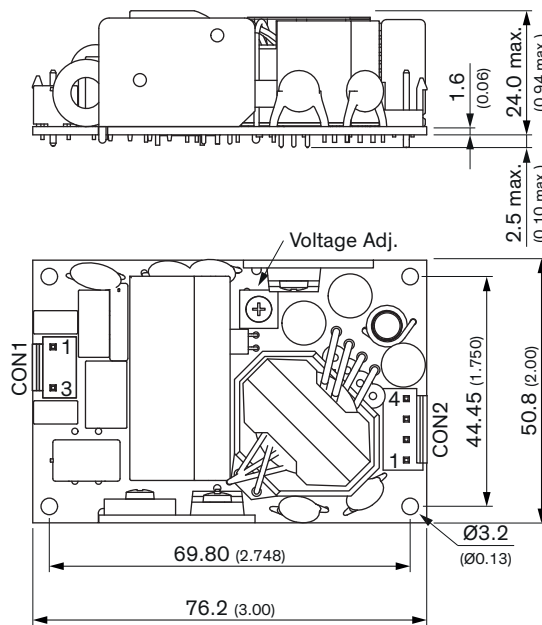
Environment	- Vibration - Mechanical Shock	IEC 60068-2-6 5 g, 3 axis, sine sweep, 5-500 Hz, 1 oct/min IEC 60068-2-27 50 g, 3 axis, half sine, 11 ms
Housing Type		Open Frame
Mounting Type		Chassis Mount
Connection Type		Pin Connector
Weight		117 g
Environmental Compliance	- REACH Declaration - RoHS Declaration - SCIP Reference Number	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).) 4b1cc295-c90c-4971-8d48-2678e0b46d7b

Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tp65a

Outline Dimensions



Dimensions in mm (inch)

Tolerances: x.x ±0.5 (x.x ±0.02)

x.xx ±0.25 (x.xxx ±0.010)

Mounting screw lock torque: Max. 0.33 Nm (3.4 kgfcm)

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

Mouser Electronics

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