

- High power density power supply (encapsulated)
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP
- Low leakage current <75 µA 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 <75 mW
- 5-year product warranty



The TPP 15-J 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 µA what makes the units suitable for BF (body floating) applications. The excellent efficiency of up to 88.5% offers a high power density in the packaging format 1.1" x 2.8". The full load operating temperature range covers -40°C to +70°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.	Output Current max.	Efficiency typ.
TPP 15-103-J	13.2 W	3.3 VDC	4'000 mA	84 %
TPP 15-105-J	15 W	5 VDC	3'000 mA	86 %
TPP 15-109-J		9 VDC	1'670 mA	86 %
TPP 15-112-J		12 VDC	1'250 mA	87 %
TPP 15-115-J		15 VDC	1'000 mA	87 %
TPP 15-124-J		24 VDC	625 mA	88 %
TPP 15-136-J		36 VDC	417 mA	88 %
TPP 15-148-J		48 VDC	313 mA	89 %

Input Specifications

Input Voltage	- AC Range	85 - 264 VAC (Full Range)
	- DC Range	120 - 370 VDC (Designed for, no certification)
Input Frequency		47 - 63 Hz
Input Current	- Full Load & Vin = 230 VAC	300 mA max.
	- Full Load & Vin = 115 VAC	450 mA max.
Power Consumption	- At no load	75 mW max. (Ready to meet ErP directive)
Input Inrush Current	- at 230 VAC	40 A max.
Input Protection		T 1.6 A / 250 VAC (Internal Fuse)

Output Specifications

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:	40 mVp-p typ. (with 10 µF X5R)
	5 VDC model:	40 mVp-p typ. (with 10 µF X5R)
	9 VDC model:	70 mVp-p typ. (with 10 µF X5R)
	12 VDC model:	70 mVp-p typ. (with 10 µF X5R)
	15 VDC model:	70 mVp-p typ. (with 10 µF X5R)
	24 VDC model:	100 mVp-p typ. (with 10 µF X5R)
	36 VDC model:	100 mVp-p typ. (with 10 µF X5R)
	48 VDC model:	140 mVp-p typ. (with 1 µF X7R)
Capacitive Load	3.3 VDC model:	6'000 µF max.
	5 VDC model:	4'000 µF max.
	9 VDC model:	1'860 µF max.
	12 VDC model:	1'200 µF max.
	15 VDC model:	820 µF max.
	24 VDC model:	470 µF max.
	36 VDC model:	220 µF max.
	48 VDC model:	150 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Hold-up Time	- at 115 VAC	8 ms min.
Start-up Time	- at 230 VAC	500 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		120 - 200% of Iout max.
		145% typ. of Iout max.
Overvoltage Protection		125 - 140% of Vout nom.
Transient Response	- Response Deviation	8% max. (75% to 100% Load Step)
	- Response Time	500 µs typ. (75% to 100% Load Step)

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Household	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/tp15-j
Protection Class		Class II (Prepared): Reinforced Insulation

All specifications valid at nominal voltage, 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		EN 60601-1-2 edition 4 (Medical Devices)
- Conducted Emissions		EN 55011 class B (internal filter)
		EN 55014-1
- Radiated Emissions		EN 55032 class B (internal filter)
		FCC Part 15, class B
- Harmonic Current Emissions		FCC Part 18, class B
		EN 55011 class B (internal filter)
- Voltage Fluctuations & Flicker		EN 55014-1
		EN 55032 class B (internal filter)
- Voltage Fluctuations & Flicker		FCC Part 15, class B
		FCC Part 18, class B
- Voltage Fluctuations & Flicker		EN 61000-3-2, class A
		EN 61000-3-3
EMS Immunity		EN 55024 (IT Equipment)
- Electrostatic Discharge		EN 60601-1-2 edition 4 (Medical Devices)
		EN 55014-2 (Household Appliances Tools)
- RF Electromagnetic Field	Air:	EN 61000-4-2, ± 15 kV, perf. criteria A
	Contact:	EN 61000-4-2, ± 8 kV, perf. criteria A
- EFT (Burst)		EN 61000-4-3, 20 V/m, perf. criteria A
		EN 61000-4-4, ± 2 kV, perf. criteria A
- Surge	L to L:	EN 61000-4-5, ± 1 kV, perf. criteria A
		EN 61000-4-6, 20 Vrms, perf. criteria A
- Conducted RF Disturbances	Continuous:	EN 61000-4-8, 30 A/m, perf. criteria A
	230 VAC / 50 Hz:	EN 61000-4-11
- PF Magnetic Field		30%, 25 periods, perf. criteria A
		60%, 1 period, perf. criteria A
- Voltage Dips & Interruptions		>95%, 1 period, perf. criteria A
		>95%, 250 periods, perf. criteria A
- Voltage Dips & Interruptions	115 VAC / 60 Hz:	EN 61000-4-11
		30%, 25 periods, perf. criteria A
- Voltage Dips & Interruptions		60%, 1 period, perf. criteria A
		>95%, 1 period, perf. criteria A
- Voltage Dips & Interruptions		>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
Power Derating	- High Temperature - Low Input Voltage	See application note: www.tracopower.com/overview/tpp15-j 4 %/V below 90 VAC
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Switching Frequency		75 - 95 kHz (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		250 VAC
Isolation Test Voltage	- Input to Output, 60 s	4'000 VAC
	- Input to Case or PE, 60 s	1'500 VAC
	- Output to Case or PE, 60 s	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 MOhm min.
Leakage Current (at 264 VAC)	- Touch Current	75 µA max.

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

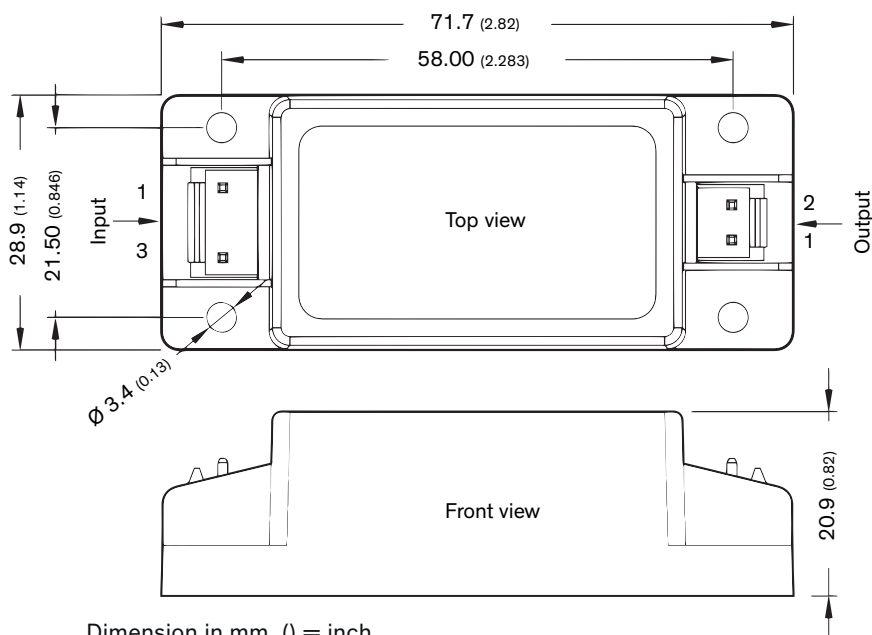
Reliability	- Calculated MTBF	3'100'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	IEC 60068-2-6
	- Mechanical Shock	IEC 60068-2-27
Connection Type		JST
Weight		48 g
Environmental Compliance	- Reach	www.tracopower.com/info/reach-declaration.pdf
	- RoHS	www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tpp15-j

Outline Dimensions



Dimension in mm, () = inch
Tolerances: x.x ±0.50 (±0.02)
x.xx ±0.25 (±0.01)

Pin connectors

Input		Output	
Pin	Function	Pin	Function
1	Line	1	-Vout
3	Neutral	2	+Vout

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-2N