

DC/DC Converter

TEP 100 Series, 100 Watt

- Rugged, compact metal case
- Screw terminal adaptor available for easy connection
- Wide 2:1 input voltage range
- Full load operation up to 60°C with convection cooling
- Soft start
- Under voltage lock-out circuit
- Input protection filter
- 3-year product warranty



The TEP 100 Series is a family of isolated high performance DC/DC converter modules with ultra-wide 2:1 input voltage ranges which come in a rugged, sealed metal case. These converters are suitable for a wide range of applications. For easy connection there is also a unique adaptor available with screw terminals. A very high efficiency allows an operating temperature up to +60°C with natural convection cooling without power derating. Further features include output voltage trimming, Remote On/Off and under voltage lockout. The very wide input voltage range make these converters also an interesting solution for battery operated systems.

Models				
Order Code	Input Voltage Range	Output Voltage nom. (adjustable)	Output Current max.	Efficiency typ.
TEP 100-1210	9 - 18 VDC (12 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	90 %
TEP 100-1211		5 VDC (4.0 - 5.5 VDC)	20'000 mA	91 %
TEP 100-1212		12 VDC (9.6 - 13.2 VDC)	8'400 mA	91 %
TEP 100-1213		15 VDC (12.0 - 16.5 VDC)	6'700 mA	91 %
TEP 100-1215		24 VDC (19.2 - 26.4 VDC)	4'200 mA	90 %
TEP 100-1216		28 VDC (22.4 - 30.8 VDC)	3'600 mA	90 %
TEP 100-1218		48 VDC (38.4 - 52.8 VDC)	2'100 mA	90 %
TEP 100-2410	18 - 36 VDC (24 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	91 %
TEP 100-2411		5 VDC (4.0 - 5.5 VDC)	20'000 mA	93 %
TEP 100-2412		12 VDC (9.6 - 13.2 VDC)	8'400 mA	93 %
TEP 100-2413		15 VDC (12.0 - 16.5 VDC)	6'700 mA	93 %
TEP 100-2415		24 VDC (19.2 - 26.4 VDC)	4'200 mA	92 %
TEP 100-2416		28 VDC (22.4 - 30.8 VDC)	3'600 mA	92 %
TEP 100-2418		48 VDC (38.4 - 52.8 VDC)	2'100 mA	92 %
TEP 100-4810	36 - 75 VDC (48 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	91 %
TEP 100-4811		5 VDC (4.0 - 5.5 VDC)	20'000 mA	93 %
TEP 100-4812		12 VDC (9.6 - 13.2 VDC)	8'400 mA	93 %
TEP 100-4813		15 VDC (12.0 - 16.5 VDC)	6'700 mA	93 %
TEP 100-4815		24 VDC (19.2 - 26.4 VDC)	4'200 mA	92 %
TEP 100-4816		28 VDC (22.4 - 30.8 VDC)	3'600 mA	92 %
TEP 100-4818		48 VDC (38.4 - 52.8 VDC)	2'100 mA	92 %

Options

Suffix -CM	- Chassis mount models w/o filter: www.tracopower.com/overview/tep100cm
Suffix -CMF	- Chassis mount models w/ filter to meet EN 55032 class A: www.tracopower.com/overview/tep100cmf
TEP-HS1	- Optional Heat Sink: www.tracopower.com/overview/tep-hs1
on demand (backorder with MOQ non stocking item)	- Optional models with inverse Remote On/Off function (passive = off)

Input Specifications

Input Current	- At no load	12 Vin models: 130 mA typ. 24 Vin models: 120 mA typ. 48 Vin models: 70 mA typ.
	- At full load	12 Vin models: 9'400 mA max. 24 Vin models: 4'600 mA max. 48 Vin models: 2'300 mA max.
Surge Voltage		12 Vin models: 36 VDC max. (1 s max.) 24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.)
Under Voltage Lockout		12 Vin models: 7.5 VDC typ. 24 Vin models: 16 VDC typ. 48 Vin models: 34 VDC typ.
Recommended Input Fuse		12 Vin models: 20'000 mA (fast acting) 24 Vin models: 10'000 mA (fast acting) 48 Vin models: 5'000 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Pi-Type

Output Specifications

Output Voltage Adjustment		-20% to +10% (By external trim resistor) See application note: www.tracopower.com/overview/tep100 Output power must not exceed rated power!
Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax)	0.1% max.
	- Load Variation (0 - 100%)	0.1% max.
Ripple and Noise (20 MHz Bandwidth)		3.3 Vout models: 75 mVp-p max. (w/ 4.7 µF X7R) 5 Vout models: 75 mVp-p max. (w/ 4.7 µF X7R) 12 Vout models: 100 mVp-p max. (w/ 4.7 µF X7R) 15 Vout models: 100 mVp-p max. (w/ 4.7 µF X7R) 24 Vout models: 200 mVp-p max. (w/ 4.7 µF X7R) 28 Vout models: 200 mVp-p max. (w/ 4.7 µF X7R) 48 Vout models: 300 mVp-p max. (w/ 2.2 µF X7R)
Capacitive Load		3.3 Vout models: 75'700 µF max. 5 Vout models: 40'000 µF max. 12 Vout models: 7'000 µF max. 15 Vout models: 4'460 µF max. 24 Vout models: 1'750 µF max. 28 Vout models: 1'280 µF max. 48 Vout models: 430 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Start-up Time		25 ms typ.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		110 - 140% of Iout max.

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

Overvoltage Protection	115 - 130% of Vout nom.
Transient Response	- Response Time 200 μ s typ. / 250 μ s max. (25% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/tep100

EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 55011 class B (with external filter) EN 55032 class B (with external filter)
	- Radiated Emissions	EN 55011 class B (with external filter) EN 55032 class B (with external filter)
	External filter proposal:	www.tracopower.com/overview/tep100
EMS (Immunity)		EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- Electrostatic Discharge	Air: EN 61000-4-2, ± 8 kV, perf. criteria A Contact: EN 61000-4-2, ± 6 kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 2 kV, perf. criteria A
	Ext. input component:	2 x KY 220 μ F
	- Conducted RF Disturbances	EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous: EN 61000-4-8, 100 A/m, perf. criteria A 1 s: EN 61000-4-8, 1000 A/m, perf. criteria A

General Specifications

Relative Humidity	95% max. (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature
	-40°C to +75°C +105°C max. -55°C to +125°C
Power Derating	- High Temperature
	Depending on model See application note: www.tracopower.com/overview/tep100
Over Temperature Protection Switch Off	- Protection Mode - Measurement Point
	115°C typ. (Automatic recovery at 105°C typ.) See application note: www.tracopower.com/overview/tep100
Cooling System	Natural convection (20 LFM)
Sense Function	10% max. of Vout nom. (If sense function is not used, sense pins must be connected to corresponding polarity output pins.)
Remote Control	- Voltage Controlled Remote (passive = on) - Off Idle Input Current - Remote Pin Input Current
	On: 3.0 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 3 mA typ. -0.5 to 1.0 mA (Optional models with inverse Remote On/Off function (passive = off))
Altitude During Operation	2'000 m max. (for basic insulation) 5'000 m max. (for functional insulation)
Switching Frequency	270 - 330 kHz (PWM) 300 kHz typ. (PWM)
Insulation System	Basic Insulation

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Isolation Test Voltage	- Input to Output, 60 s	3'000 VDC
	- Input to Case, 60 s	1'600 VDC
	- Output to Case, 60 s	1'600 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	2'500 pF max.
Reliability	- Calculated MTBF	331'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Metal
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 μm)
Pin Surface Plating		Tin (3 - 5 μm), matte
Housing Type		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		Half-Brick
Soldering Profile		Lead-Free Wave Soldering 260°C / 6 s max.
Weight		97 g
Thermal Impedance	- Case to Ambient	6.7 K/W typ.
		4.7 K/W typ. (with Heat Sink)
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	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).)
	- SCIP Reference Number	2e6dfa6a-4f17-40f4-b141-727be8a4560e

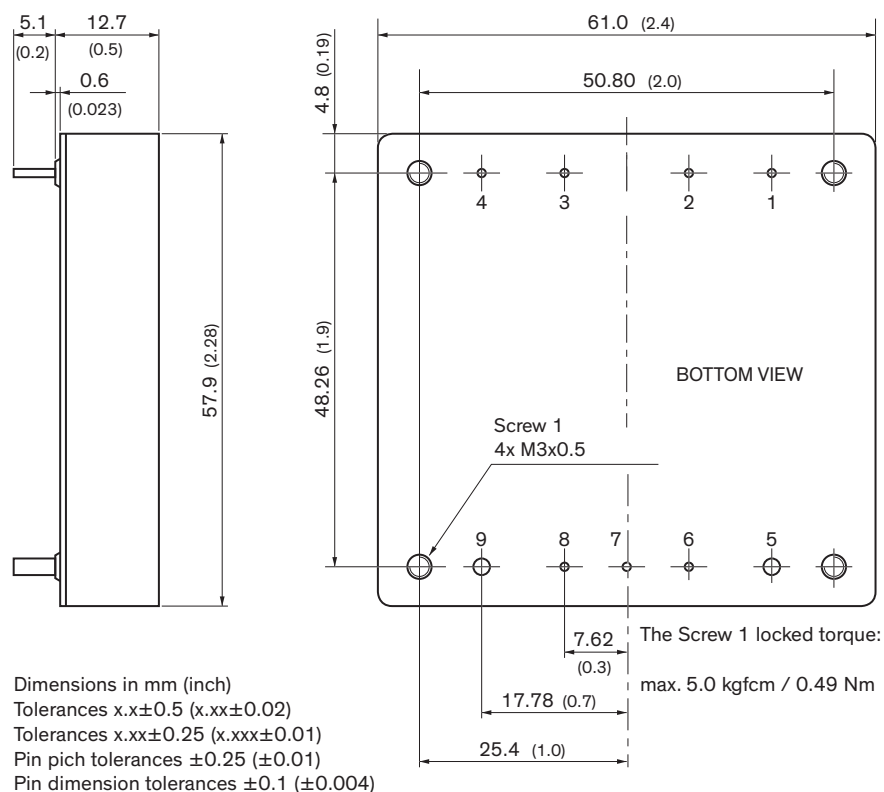
Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tep100

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

Outline Dimensions



Pinout		
Pin	Single	Pin Diameter
1	-Vin (GND)	1.0 mm (0.04 inch)
2	Case	1.0 mm (0.04 inch)
3	Remote On/Off	1.0 mm (0.04 inch)
4	+Vin (Vcc)	1.0 mm (0.04 inch)
5	-Vout	2.0 mm (0.08 inch)
6	-Sense	1.0 mm (0.04 inch)
7	Trim	1.0 mm (0.04 inch)
8	+Sense	1.0 mm (0.04 inch)
9	+Vout	2.0 mm (0.08 inch)