

DC/DC Converter

TEL 10WI Series, 10 Watt

- Most compact 10 Watt converter in DIP-16 metal casing
- Highest power density of 3.83 W/cm³
- 6-side shielded metal case with insulated base plate
- Ultra wide 4:1 input voltage range
- High efficiency for low thermal loss
- Operating temperature range of -40°C to +88°C
- Built-in EN 55032 class A filter
- Protection against short circuit and overload
- 3-year product warranty



The TEL 10WI series is a range of isolated 10 Watt converters which come in an ultra compact DIP-16 metal package. The design purpose of these series was to miniaturize low power DC/DC converters to the maximum without sacrificing high efficiency. The TEL 10WI series sets the new standard for power density with 3.83 W/cm³.

The TEL 10WI series offer an ultra wide 4:1 input voltage range and feature a high efficiency of up to 86% which enables an operation temperature of up to +70°C at full load and up to 88°C with 50% load.

The converters have an internal input filter to comply with conducted emission EN 55032 class A. The TEL 10WI Series models are an economical solution for space critical and cost sensitive applications in instrumentation, IT and industrial electronics.

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TEL 10-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	2'700 mA			80 %
TEL 10-2411WI		5.1 VDC	2'000 mA			83 %
TEL 10-2412WI		12 VDC	833 mA			87 %
TEL 10-2413WI		15 VDC	666 mA			88 %
TEL 10-2415WI		24 VDC	416 mA			88 %
TEL 10-2422WI		+12 VDC	416 mA	-12 VDC	416 mA	87 %
TEL 10-2423WI		+15 VDC	333 mA	-15 VDC	333 mA	87 %
TEL 10-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	2'700 mA			80 %
TEL 10-4811WI		5.1 VDC	2'000 mA			83 %
TEL 10-4812WI		12 VDC	833 mA			87 %
TEL 10-4813WI		15 VDC	666 mA			88 %
TEL 10-4815WI		24 VDC	416 mA			88 %
TEL 10-4822WI		+12 VDC	416 mA	-12 VDC	416 mA	87 %
TEL 10-4823WI		+15 VDC	333 mA	-15 VDC	333 mA	87 %

Input Specifications

Input Current	- At no load	24 Vin models: 10 mA typ. 48 Vin models: 7 mA typ.
	- At full load	24 Vin models: 480 mA max. 48 Vin models: 240 mA max.
Surge Voltage		24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.)
Under Voltage Lockout		24 Vin models: 7 VDC min. / 8 VDC typ. 48 Vin models: 15 VDC min. / 16 VDC typ.
Recommended Input Fuse		24 Vin models: 2'000 mA (slow blow) 48 Vin models: 1'000 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Pi-Type

Output Specifications

Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax)	single output models: 0.8% max. dual output models: 0.8% max.
	- Load Variation (0 - 100%)	single output models: 1% max. dual output models: 2% max. (Output 1) 2% max. (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models: 5% max.
Ripple and Noise (20 MHz Bandwidth)	- single output	3.3 Vout models: 75 mVp-p max. 5.1 Vout models: 75 mVp-p max. 12 Vout models: 100 mVp-p max. 15 Vout models: 100 mVp-p max. 24 Vout models: 100 mVp-p max.
		12 / -12 Vout models: 100 / 100 mVp-p max. 15 / -15 Vout models: 100 / 100 mVp-p max.
		3.3 Vout models: 60 mVp-p typ. 5.1 Vout models: 60 mVp-p typ. 12 Vout models: 80 mVp-p typ. 15 Vout models: 80 mVp-p typ. 24 Vout models: 80 mVp-p typ.
		12 / -12 Vout models: 80 / 80 mVp-p typ. 15 / -15 Vout models: 80 / 80 mVp-p typ.
	- dual output	
	- single output	
	- dual output	
Capacitive Load	- single output	3.3 Vout models: 2'600 µF max. 5.1 Vout models: 1'300 µF max. 12 Vout models: 560 µF max. 15 Vout models: 560 µF max. 24 Vout models: 200 µF max.
		12 / -12 Vout models: 390 / 390 µF max. 15 / -15 Vout models: 200 / 200 µF max.
	- dual output	
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Start-up Time		30 ms typ. / 60 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		195% max. of Iout max. 160% typ. of Iout max.
Transient Response	- Response Deviation	5% max. (25% Load Step)
	- Response Time	500 µs max. (25% Load Step)

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

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/tel10wi
Pollution Degree		PD 3

EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 55032 class A (internal filter) EN 55032 class B (with external filter) FCC 47 Part 15 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter)
		External filter proposal: www.tracopower.com/overview/tel10wi
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, 20 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
		External filter proposal: www.tracopower.com/overview/tel10wi
	- 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
EMC / Environmental	- Certification Documents	www.tracopower.com/overview/tel10wi

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +88°C +105°C max. -50°C to +125°C
Power Derating	- High Temperature	Depending on model
		See application note: www.tracopower.com/overview/tel10wi
Cooling System		Natural convection (20 LFM)
Altitude During Operation		6'000 m max.
Switching Frequency		355 - 485 kHz (PWM) 420 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s - Input to Output, 1 s - Input to Case, 60 s - Output to Case, 60 s	1'500 VDC 1'800 VDC 1'000 VDC 1'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M Ω min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	1'500 pF max.
Reliability	- Calculated MTBF	2'540'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Housing Material		Alu alloy, black anodized coating
Potting Material		Epoxy (UL 94 V-0 rated)
Pin Material		Copper Alloy (C6801)
Pin Foundation Plating		Nickel (2 - 4 μ m)
Pin Surface Plating		Tin (3 - 5 μ m), matte
Housing Type		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		DIP16

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

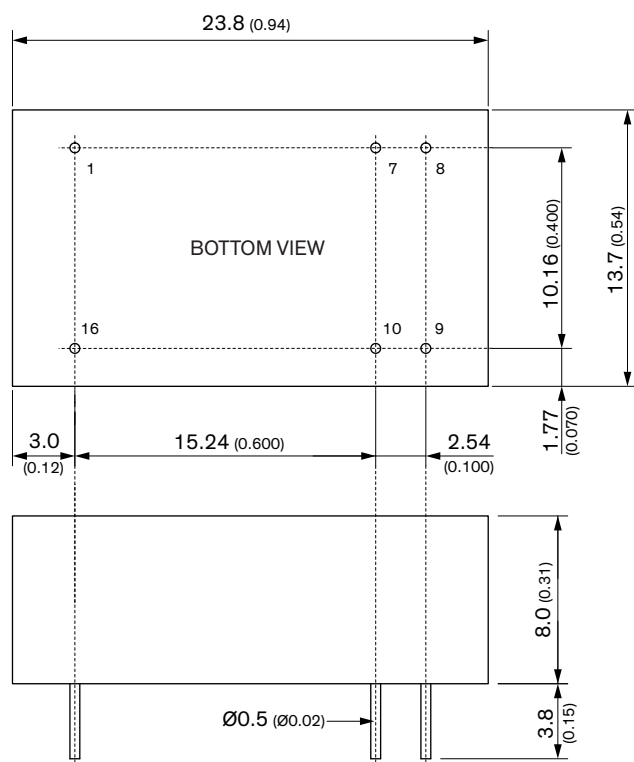
Soldering Profile	Lead-Free Wave Soldering 260°C / 10 s max.
Weight	6.5 g
Environmental Compliance	- REACH Declaration www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) - RoHS Declaration www.tracopower.com/info/rohs-declaration.pdf - SCIP Reference Number c1598f02-e0c9-47ad-96d8-66e56e0a4f69

Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tel10wi

Outline Dimensions



Dimensions in mm (inch)
 Tolerances: x.x ±0.5 (x.xx ±0.02)
 x.xx ±0.25 (x.xxx ±0.01)
 Pin diameter tolerances: x.x ±0.05 (x.xx ±0.002)

Pinout		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
7	NC	NC
8	NC	Common
9	+Vout	+Vout
10	-Vout	-Vout
16	+Vin (Vcc)	+Vin (Vcc)

NC: Not connected