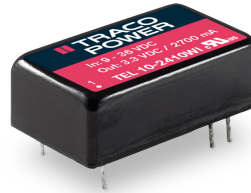


- Most compact 10 Watt converter in DIP-16 metal casing
- Highest power density of 3.83 W/cm<sup>3</sup>
- 6-side shielded metal case with insulated base plate
- Ultra wide 4:1 input voltage range
- High efficiency for low thermal loss
- Operating temperature range of -40°C to +88°C
- Built-in EN 55032 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/cm<sup>3</sup>.

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 <sub>max</sub>	Vnom	I <sub>max</sub>	
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		
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: <b>10 mA typ.</b> 48 Vin models: <b>7 mA typ.</b>
	- At full load	24 Vin models: <b>480 mA max.</b> 48 Vin models: <b>240 mA max.</b>
Surge Voltage		24 Vin models: <b>50 VDC max.</b> (1 s max.) 48 Vin models: <b>100 VDC max.</b> (1 s max.)
Under Voltage Lockout		24 Vin models: <b>7 VDC min. / 8 VDC typ.</b> 48 Vin models: <b>15 VDC min. / 16 VDC typ.</b>
Recommended Input Fuse		24 Vin models: <b>2'000 mA</b> (slow blow) 48 Vin models: <b>1'000 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		<b>Internal Pi-Type</b>

### Output Specifications

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

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

## Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	<a href="http://www.tracopower.com/overview/tel10wi">www.tracopower.com/overview/tel10wi</a>
Pollution Degree		PD 3

## EMC Specifications

EMI Emissions	- Conducted Emissions	EN 55032 class A (internal filter) EN 55032 class B (with external filter) FCC 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:	<a href="http://www.tracopower.com/overview/tel10wi">www.tracopower.com/overview/tel10wi</a>
EMS Immunity		EN 55024 (IT Equipment)
	- Electrostatic Discharge	Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 20 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 2$ kV, perf. criteria A
	- Conducted RF Disturbances	External filter proposal: <a href="http://www.tracopower.com/overview/tel10wi">www.tracopower.com/overview/tel10wi</a> EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous: EN 61000-4-8, 100 A/m, perf. criteria A

## General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +88°C
	- Case Temperature	+105°C max.
	- Storage Temperature	-50°C to +125°C
Power Derating	- High Temperature	See application note: <a href="http://www.tracopower.com/overview/tel10wi">www.tracopower.com/overview/tel10wi</a>
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	1'500 VDC
	- Input to Output, 1 s	1'800 VDC
	- Input to Case, 60 s	1'000 VDC
	- Output to Case, 60 s	1'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M $\Omega$ 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)
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 $\mu$ m)
Pin Surface Plating		Tin (3 - 5 $\mu$ m), matte
Soldering Profile		Wave Soldering
		260°C / 10 s max.
Connection Type		THD (Through-Hole Device)
Weight		6.5 g

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

Environmental Compliance - REACH Declaration

[www.tracopower.com/info/reach-declaration.pdf](http://www.tracopower.com/info/reach-declaration.pdf)

REACH SVHC list compliant

REACH Annex XVII compliant

- RoHS Declaration

[www.tracopower.com/info/rohs-declaration.pdf](http://www.tracopower.com/info/rohs-declaration.pdf)

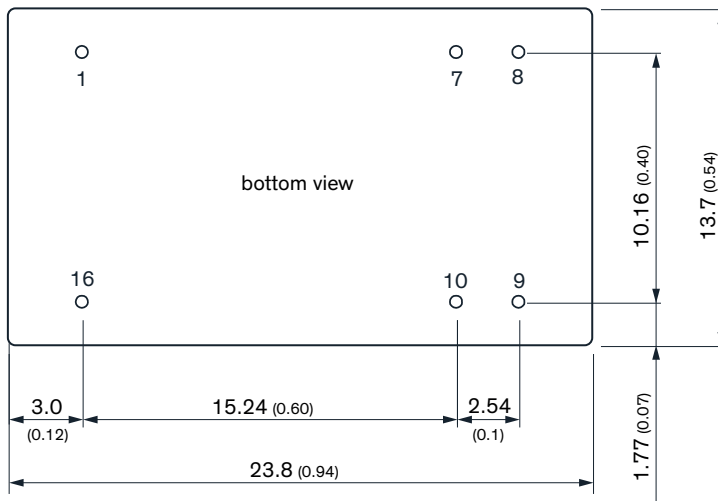
Exemptions: 7a

### Supporting Documents

Overview Link (for additional Documents)

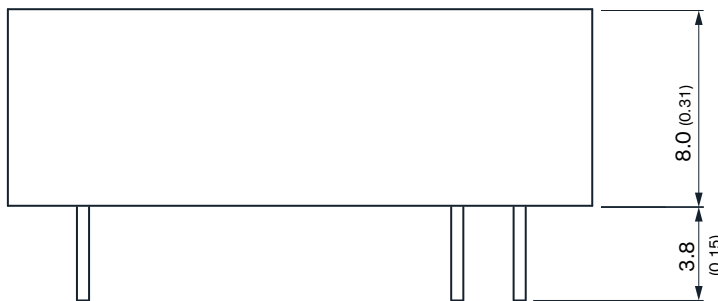
[www.tracopower.com/overview/tel10wi](http://www.tracopower.com/overview/tel10wi)

### Outline Dimensions



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



Dimensions in mm (inch)

Tolerances: x.x ±0.5 (±0.02)

x.xx ±0.25 (±0.01)

Pin diameter 0.5±0.05 (0.02 ±0.002)

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