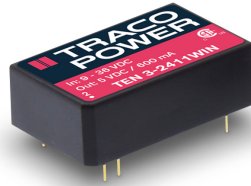


- Ultra wide 4:1 input range
- Input filter to meet EN 55032, Class A and FCC, level A without external components
- Extended operating temperature range -40°C to 85°C
- Models with 1'500 VDC and 3'000 VDC I/O isolation (functional insulation)
- DIP-24 package
- High reliability, MTBF >1.0 Mio. h
- 3-year product warranty



UL 62368-1 IEC 62368-1

The TEN 3WIN Series is a drop in replacement of the prevalent TEN 3WI Series. The up-to date design enables a cost reduction without any compromise to reliability and function. They come with an internal filter to meet EN55032 class A without external components. Increased EMC immunity and extended operating temperature range of -40°C to 85°C make these converters an ideal solution for cost critical but demanding applications. With the standard pinning it is a drop in replacement for common 3 Watt converters in DIP24 package.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TEN 3-2410WIN	9 - 36 VDC (24 VDC nom.)	3.3 VDC	750 mA			77 %
TEN 3-2411WIN		5 VDC	600 mA			79 %
TEN 3-2412WIN		12 VDC	250 mA			82 %
TEN 3-2413WIN		15 VDC	200 mA			83 %
TEN 3-2415WIN		24 VDC	125 mA			81 %
TEN 3-2421WIN		+5 VDC	250 mA	-5 VDC	250 mA	80 %
TEN 3-2422WIN		+12 VDC	125 mA	-12 VDC	125 mA	82 %
TEN 3-2423WIN		+15 VDC	100 mA	-15 VDC	100 mA	82 %
TEN 3-4810WIN	18 - 75 VDC (48 VDC nom.)	3.3 VDC	750 mA			77 %
TEN 3-4811WIN		5 VDC	600 mA			80 %
TEN 3-4812WIN		12 VDC	250 mA			83 %
TEN 3-4813WIN		15 VDC	200 mA			84 %
TEN 3-4815WIN		24 VDC	125 mA			82 %
TEN 3-4821WIN		+5 VDC	250 mA	-5 VDC	250 mA	80 %
TEN 3-4822WIN		+12 VDC	125 mA	-12 VDC	125 mA	82 %
TEN 3-4823WIN		+15 VDC	100 mA	-15 VDC	100 mA	82 %

Options

Suffix -HI	- Optional models with high isolation (3000 VDC), except 3.3 Vout models
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Input Specifications

Input Current	- At no load	24 Vin models: 30 mA typ. 48 Vin models: 20 mA typ.
	- At full load	24 Vin models: 150 mA typ. 48 Vin models: 75 mA typ.
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: 8.5 VDC max. 48 Vin models: 17.5 VDC max.
Reflected Ripple Current		24 Vin models: 15 mAp-p typ. 48 Vin models: 10 mAp-p typ.
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Pi-Type
Short Circuit Input Power		2 W max.

Output Specifications

Voltage Set Accuracy		±2% max.	
Regulation	- Input Variation (Vmin - Vmax)	single output models: 1% max. dual output models: 1% max.	
	- Load Variation (0 - 100%)	single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2)	
	- Voltage Balance (symmetrical load)	dual output models: 2% max.	
Ripple and Noise	- 20 MHz Bandwidth	70 mVp-p max.	
Capacitive Load	- single output	3.3 Vout models: 680 µF max. 5 Vout models: 470 µF max. 12 Vout models: 330 µF max. 15 Vout models: 220 µF max. 24 Vout models: 100 µF max.	
		- dual output	5 / -5 Vout models: 220 / 220 µF max. 12 / -12 Vout models: 150 / 150 µF max. 15 / -15 Vout models: 100 / 100 µF max.
	Minimum Load		Not required
	Temperature Coefficient		±0.02 %/K max.
Short Circuit Protection		Continuous, Automatic recovery	
Overload Protection		Foldback Mode	
Output Current Limitation		120% min. of Iout max. 150% typ. of Iout max.	
Transient Response	- Response Deviation	3% typ. / 5% max. (75% to 100% Load Step)	
	- Response Time	200 µs typ. / 500 µs max. (75% to 100% Load Step)	

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	CSA-C22.2, No. 60950-1 EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/ten3win
Pollution Degree		PD 3
Over Voltage Category		Not mains connected

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

EMC Specifications

EMI Emissions	- Conducted Emissions	EN 55032 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (internal filter)
EMS Immunity	- 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, ±1 kV, perf. criteria A
		Ext. input component: 200 µF, 100 V, ESR 48 mΩ
	- Conducted RF Disturbances	EN 61000-4-6, 10 Vrms, perf. criteria A

General Specifications

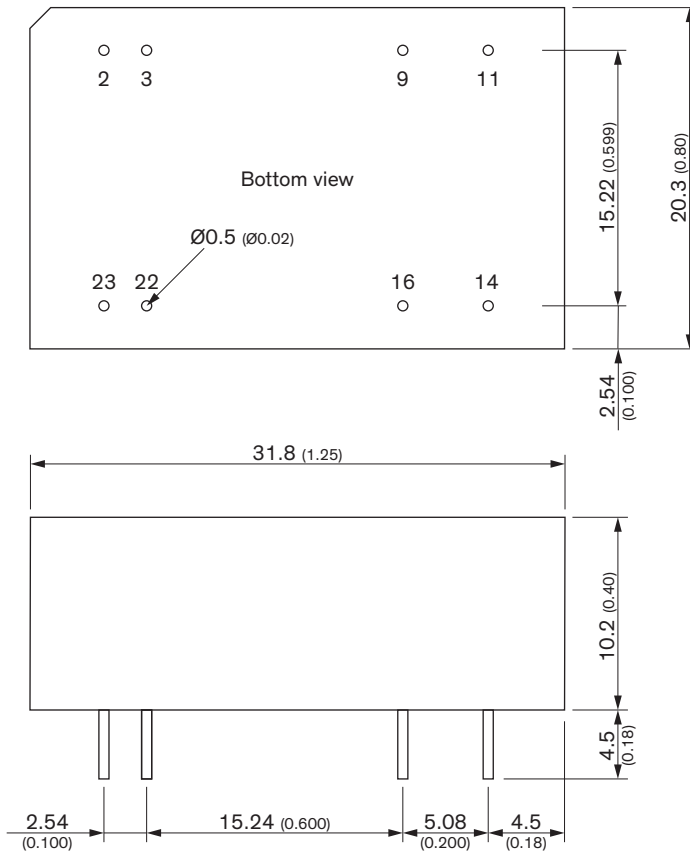
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Case Temperature	+100°C max.
	- Storage Temperature	-55°C to +125°C
Power Derating	- High Temperature	3.3 %/K above 70°C
		See application note: www.tracopower.com/overview/ten3win
Cooling System		Natural convection (20 LFM)
Altitude During Operation		6'000 m max.
Switching Frequency		90 kHz min. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'500 VDC (Standard models)
		3'000 VDC (suffix -HI, except 3.3 Vout models)
	- Input to Output, 1 s	1'800 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	300 pF max.
Reliability	- Calculated MTBF	1'000'000 h (MIL-HDBK-217F, ground benign)
Washing Process		Allowed (hermetical product)
		See Cleaning Guideline: www.tracopower.com/info/cleaning.pdf
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Epoxy (UL 94 V-0 rated)
Pin Material		Copper Alloy (C6801)
Pin Foundation Plating		Nickel (2.5 µm min.)
Pin Surface Plating		Gold (75 - 125 nm), glossy
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		DIP24
Soldering Profile		Wave Soldering
		260°C / 10 s max.
Weight		12.8 g
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf
	- RoHS Declaration	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). The SCIP number is provided on request.)

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/ten3win
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All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Outline Dimensions



Pinout		
Pin	Single	Dual
2	-Vin (GND)	-Vin (GND)
3	-Vin (GND)	-Vin (GND)
9	no Pin	Common
11	NC	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

NC: Not connected

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