TRACO POWER

DC/DC Converter

TVN 5WI Series, 5 Watt

- **Ultra low ripple and noise 10mVp-p typ.**
- **DIP-24 Package**
- **Regulated**
- **I/O isolation 1600 VDC functional**
- **Operating temperature range -40 to +90°C**
- **Remote On/Off**
- **3-year product warranty**



The TVN 5WI series is a ultra low ripple and noise 5 Watt DC/DC converter featuring wide 4:1 input voltage ranges in a DIP-24 package. Standard features include remote On/Off, over voltage protection, under voltage lockout and short circuit protection. High efficiency across load range and low input current characteristics at no load make these converters the ideal solution for many operations which require low ripple and noise characteristics.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
TVN 5-0910WI	4.5 - 12 VDC (9 VDC nom.)	3.3 VDC	1'515 mA			79 %
TVN 5-0911WI		5 VDC	1'000 mA			82 %
TVN 5-0912WI		12 VDC	416 mA			87 %
TVN 5-0913WI		15 VDC	333 mA			87 %
TVN 5-0915WI		24 VDC	208 mA			88 %
TVN 5-0921WI		+5 VDC	500 mA	−5 VDC	500 mA	84 %
TVN 5-0922WI		+12 VDC	208 mA	−12 VDC	208 mA	85 %
TVN 5-0923WI		+15 VDC	166 mA	−15 VDC	166 mA	86 %
TVN 5-0925WI		+24 VDC	104 mA	−24 VDC	104 mA	87 %
TVN 5-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	1'515 mA			81 %
TVN 5-2411WI		5 VDC	1'000 mA			83 %
TVN 5-2412WI		12 VDC	416 mA			88 %
TVN 5-2413WI		15 VDC	333 mA			88 %
TVN 5-2415WI		24 VDC	208 mA			89 %
TVN 5-2421WI		+5 VDC	500 mA	−5 VDC	500 mA	84 %
TVN 5-2422WI		+12 VDC	208 mA	−12 VDC	208 mA	85 %
TVN 5-2423WI		+15 VDC	166 mA	−15 VDC	166 mA	86 %
TVN 5-2425WI		+24 VDC	104 mA	−24 VDC	104 mA	87 %
TVN 5-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	1'515 mA			80 %
TVN 5-4811WI		5 VDC	1'000 mA			83 %
TVN 5-4812WI		12 VDC	416 mA			86 %
TVN 5-4813WI		15 VDC	333 mA			87 %
TVN 5-4815WI		24 VDC	208 mA			88 %
TVN 5-4821WI		+5 VDC	500 mA	−5 VDC	500 mA	83 %
TVN 5-4822WI		+12 VDC	208 mA	−12 VDC	208 mA	85 %
TVN 5-4823WI		+15 VDC	166 mA	−15 VDC	166 mA	86 %
TVN 5-4825WI		+24 VDC	104 mA	−24 VDC	104 mA	87 %

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Input Specifications

Input Current	- At no load	9 Vin models:	35 mA typ.
		24 Vin models:	8 mA typ.
		48 Vin models:	5 mA typ.
Surge Voltage		9 Vin models:	16 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		9 Vin models:	3 VDC min. / 4 VDC typ. / 4.4 VDC max.
		24 Vin models:	7 VDC min. / 8 VDC typ. / 8.8 VDC max.
		48 Vin models:	15 VDC min. / 16 VDC typ. / 17.5 VDC max.
Recommended Input Fuse		9 Vin models:	2'500 mA (slow blow)
		24 Vin models:	1'250 mA (slow blow)
		48 Vin models:	1'600 mA (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Pi-Type (5 Vin models)
			Common Choke (other models)

Output Specifications

Output Voltage Adjustment			−10% to +20% (single models)
			±10% (dual models)
			(By external trim resistor)
		See application note:	www.tracopower.com/tvn5wi-adj/
			Output power must not exceed rated power!
Voltage Set Accuracy			±1% max.
Regulation	- Input Variation (Vmin - Vmax)	single output models:	0.2% max.
		dual output models:	0.2% max.
	- Load Variation (0 - 100%)	single output models:	0.5% max.
		dual output models:	1% max. (Output 1)
			1% max. (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models:	3% max.
Ripple and Noise	- 20 MHz Bandwidth		15 mVp-p max.
			10 mVp-p typ.
Capacitive Load	- single output	3.3 Vout models:	2'200 µF max.
		5 Vout models:	1'000 µF max.
		12 Vout models:	220 µF max.
		15 Vout models:	150 µF max.
		24 Vout models:	100 µF max.
	- dual output	5 / -5 Vout models:	680 / 680 µF max.
		12 / -12 Vout models:	150 / 150 µF max.
		15 / -15 Vout models:	150 / 150 µF max.
		24 / -24 Vout models:	100 / 100 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			50 ms typ. / 75 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			170% typ. of Iout max.
Overvoltage Protection			135% typ. of Vout nom.
Transient Response	- Response Time		250 µs typ. (50% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	Designed for IEC/EN/UL 62368-1 (not certified)
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.

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EMC Specifications

EMI (Emissions)	- Conducted Emissions		EN 55032 class A (internal filter)
			EN 55032 class B (internal filter)
	- Radiated Emissions		EN 55032 class A (internal filter)
			EN 55032 class B (internal filter)
		External filter proposal:	www.tracopower.com/tvn5wi-emc-filter/
			(48 Vin models: Filter proposal for class B)
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, 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
		Ext. input component:	220 µF, 100 V || SMDJ70A (9 & 24 Vin models)
			220 µF, 100 V || SMDJ120A (48 Vin models)
	- 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	–40°C to +95°C
	- Case Temperature	+105°C max.
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	Depending on model
	See application note:	www.tracopower.com/tvn5wi-cc/
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)	On: 3.0 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	3 mA typ.
	- Remote Pin Input Current	-0.5 to 1.0 mA
Switching Frequency		300 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'600 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	1'200 pF max.
Reliability	- Calculated MTBF	4'400'000 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		Copper
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Epoxy (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		DIP24
Soldering Profile		Lead-Free Wave Soldering 265°C / 10 s max.
Weight		15.3 g

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

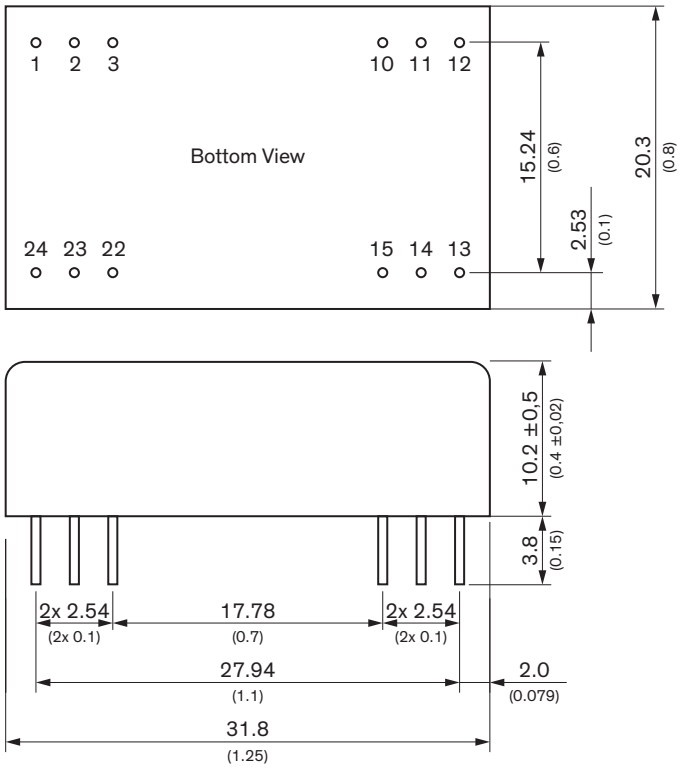
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Thermal Impedance	- Case to Ambient	20.0 K/W typ.
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf
		REACH SVHC list compliant
		REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf
		Exemptions: 7(a), 7(c)-I
		(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	198adf48-ca9d-49dc-9953-5bade6cd60e5

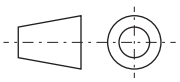
Additional Information

Supporting Documents	www.tracopower.com/overview/tvn5wi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf
Service Portal	www.tracoserviceportal.com

Outline Dimensions



Dimensions in [mm], () = Inch
Pin diameter: 0.6 (±0.024)
Tolerances: x.x ±0.5 (±0.02)
Tolerances: x.xx ±0.25 (±0.01)
Pin pitch tolerances ±0.25 (±0.01)
Pin dimension tolerance ±0.1 (±0.004)



Pinout		
Pin	**Single**	**Dual**
1	+Vin (VCC)	+Vin (VCC)
2	+Vin (VCC)	+Vin (VCC)
3	Case	Case
10	No pin	Common
11	No pin	+Vout 1
12	Case	Case
13	Trim	Trim
14	–Vout	–Vout 2
15	+Vout	Common
22	Remote On/Off	Remote On/Off
23	–Vin (GND)	–Vin (GND)
24	–Vin (GND)	–Vin (GND)

NC: Not connected

Avoid routing PCB traces under the converter.

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