TRACO POWER

DC/DC Converter

TVN 3 Series, 3 Watt

- **Ultra low ripple and noise 10mVp-p typ.**
- **Compact SIP-8 package**
- **Input Voltage range 4.5-13.2, 9-18, 18-36, 36-75 VDC**
- **I/O isolation 1600 VDC**
- **Operating temperature range -40 to +75°C without derating**
- **Fully regulated outputs**
- **Short circuit protection**
- **3-year product warranty**

The TVN 3 Series comprises ultra low ripple and noise 3 Watt DC/DC converters. They come in a compact SIP-8 package with fully regulated outputs. Apart from the standard 2:1 input voltage range, the low input voltage models feature an extened input voltage range from 4.5-13.2 VDC (3:1). Full load operation is reliable up tp 75°C environment temperature without derating and up to 90°C with 50% derating. With 1'600 VDC I/O-isolation voltage, and short current protection they cover a wide range of applications when space is limited.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
TVN 3-0910	4.5 - 13.2 VDC (9 VDC nom.)	3.3 VDC	700 mA			75 %
TVN 3-0911		5 VDC	600 mA			79 %
TVN 3-0919		9 VDC	333 mA			81 %
TVN 3-0912		12 VDC	250 mA			83 %
TVN 3-0913		15 VDC	200 mA			83 %
TVN 3-0915		24 VDC	125 mA			82 %
TVN 3-0921		+5 VDC	300 mA	–5 VDC	300 mA	78 %
TVN 3-0922		+12 VDC	125 mA	–12 VDC	125 mA	82 %
TVN 3-0923		+15 VDC	100 mA	–15 VDC	100 mA	82 %
TVN 3-1210	9 - 18 VDC (12 VDC nom.)	3.3 VDC	700 mA			77 %
TVN 3-1211		5 VDC	600 mA			81 %
TVN 3-1219		9 VDC	333 mA			83 %
TVN 3-1212		12 VDC	250 mA			85 %
TVN 3-1213		15 VDC	200 mA			85 %
TVN 3-1215		24 VDC	125 mA			84 %
TVN 3-1221		+5 VDC	300 mA	–5 VDC	300 mA	80 %
TVN 3-1222		+12 VDC	125 mA	–12 VDC	125 mA	84 %
TVN 3-1223		+15 VDC	100 mA	–15 VDC	100 mA	83 %
TVN 3-2410	18 - 36 VDC (24 VDC nom.)	3.3 VDC	700 mA			77 %
TVN 3-2411		5 VDC	600 mA			82 %
TVN 3-2419		9 VDC	333 mA			85 %
TVN 3-2412		12 VDC	250 mA			85 %
TVN 3-2413		15 VDC	200 mA			85 %
TVN 3-2415		24 VDC	125 mA			85 %
TVN 3-2421		+5 VDC	300 mA	–5 VDC	300 mA	80 %
TVN 3-2422		+12 VDC	125 mA	–12 VDC	125 mA	85 %
TVN 3-2423		+15 VDC	100 mA	–15 VDC	100 mA	85 %
TVN 3-4810	36 - 75 VDC (48 VDC nom.)	3.3 VDC	700 mA			75 %
TVN 3-4811		5 VDC	600 mA			80 %
TVN 3-4819		9 VDC	333 mA			83 %
TVN 3-4812		12 VDC	250 mA			84 %
TVN 3-4813		15 VDC	200 mA			85 %
TVN 3-4815		24 VDC	125 mA			84 %
TVN 3-4821		+5 VDC	300 mA	–5 VDC	300 mA	80 %
TVN 3-4822		+12 VDC	125 mA	–12 VDC	125 mA	85 %
TVN 3-4823		+15 VDC	100 mA	–15 VDC	100 mA	83 %

Input Specifications

Input Current	- At no load	9 Vin models:	55 mA typ.
		12 Vin models:	30 mA typ.
		24 Vin models:	16 mA typ.
		48 Vin models:	12 mA typ.
Surge Voltage		9 Vin models:	15 VDC max. (1 s max.)
		12 Vin models:	25 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:	2 VDC min. / 3 VDC typ. / 4 VDC max.
		12 Vin models:	6 VDC min. / 7 VDC typ. / 8 VDC max.
		24 Vin models:	13 VDC min. / 15 VDC typ. / 17 VDC max.
		48 Vin models:	29 VDC min. / 32 VDC typ. / 35 VDC max.
Recommended Input Fuse			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Capacitor

Output Specifications

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:	1% max.
		dual output models:	1% max. (Output 1)
			1% max. (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models:	5% max.
Ripple and Noise	- 20 MHz Bandwidth		10 mVp-p typ.
			15 mVp-p max.
Capacitive Load	- single output	3.3 Vout models:	4'400 µF max.
		5 Vout models:	2'200 µF max.
		9 Vout models:	1'300 µF max.
		12 Vout models:	1'000 µF max.
		15 Vout models:	820 µF max.
		24 Vout models:	470 µF max.
	- dual output	5 / -5 Vout models:	1'200 / 1'200 µF max.
		12 / -12 Vout models:	520 / 520 µF max.
		15 / -15 Vout models:	440 / 440 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			30 ms typ.
Short Circuit Protection			Continuous, Automatic recovery
Transient Response	- Response Time		500 µs typ. (25% Load Step)

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	Designed for EN 62368-1 (no certification)

EMC Specifications

EMI Emissions	- Conducted Emissions		EN 55032 class A (with external filter)
			EN 55032 class B (with external filter)
	- Radiated Emissions		EN 55032 class A (with external filter)
			EN 55032 class B (with external filter)
		External filter proposal:	www.tracopower.com/overview/tvn3

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

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:	220 µF, 100 V
	- 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 +90°C
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	3.33 %/K above 75°C
	See application note:	www.tracopower.com/overview/tvn3
Cooling System		Natural convection (20 LFM)
Remote Control	- Current Controlled Remote	On: open circuit Off: 2 to 4 mA current (internal 1 kΩ resistor)
	- Off Idle Input Current	2.5 mA max.
Switching Frequency		100 kHz min. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'600 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 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	1'500 pF max.
Reliability	- Calculated MTBF	5'600'000 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
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (1 - 2 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		SIP8
Weight		5.9 g
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	ce8b5bb4-e67d-46c3-91a3-fc42031b3311

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tvn3

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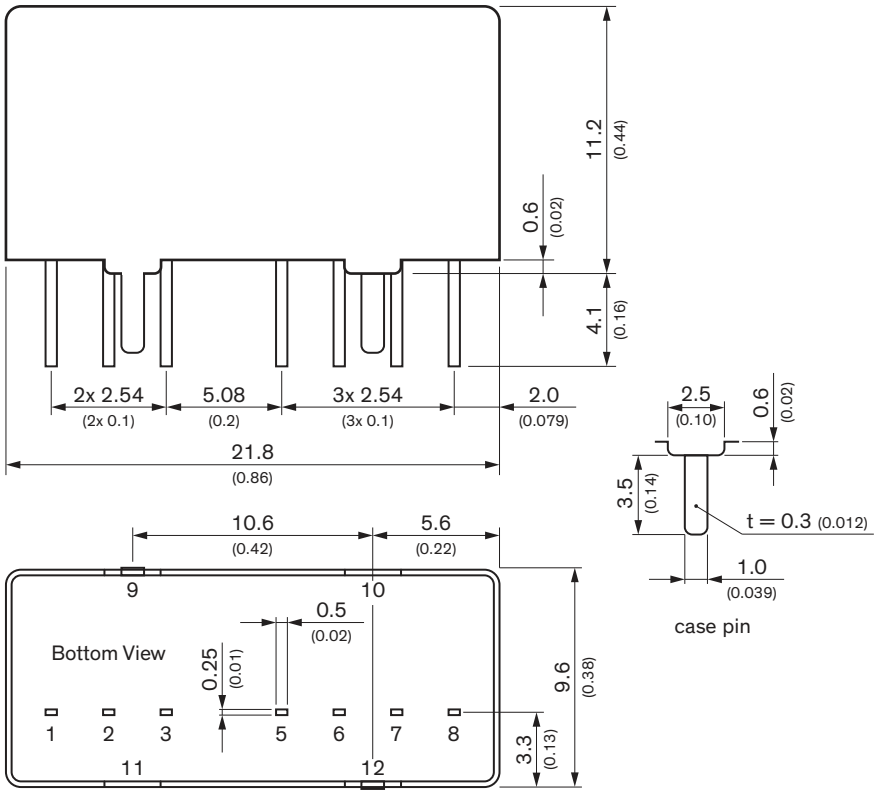
Outline Dimensions



Dimensions in [mm], () = Inch
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 (GND)	–Vin (GND)
2	+Vin (VCC)	+Vin (VCC)
3	Remote On/Off	Remote On/Off
5	NC	NC
6	+Vout	+Vout
7	–Vout	Common
8	NC	–Vout
9	Case	Case
10	Stand off	Stand off
11	Stand off	Stand off
12	Case	Case

NC: Not connected