

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 extended input voltage range from 4.5-13.2 VDC (3:1). Full load operation is reliable up to 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 typ.
		Vnom	I _{max}	Vnom	I _{max}	
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) - Load Variation (0 - 100%) - Cross Regulation (25% / 100% asym. load)	single output models: 0.2% max. dual output models: 0.2% max. single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) dual output models: 5% max.
Ripple and Noise	- 20 MHz Bandwidth	10 mVp-p typ. 15 mVp-p max.
Capacitive Load	- single output - dual 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. 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)
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EMC Specifications

EMI Emissions	- Conducted Emissions - Radiated Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter) 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.

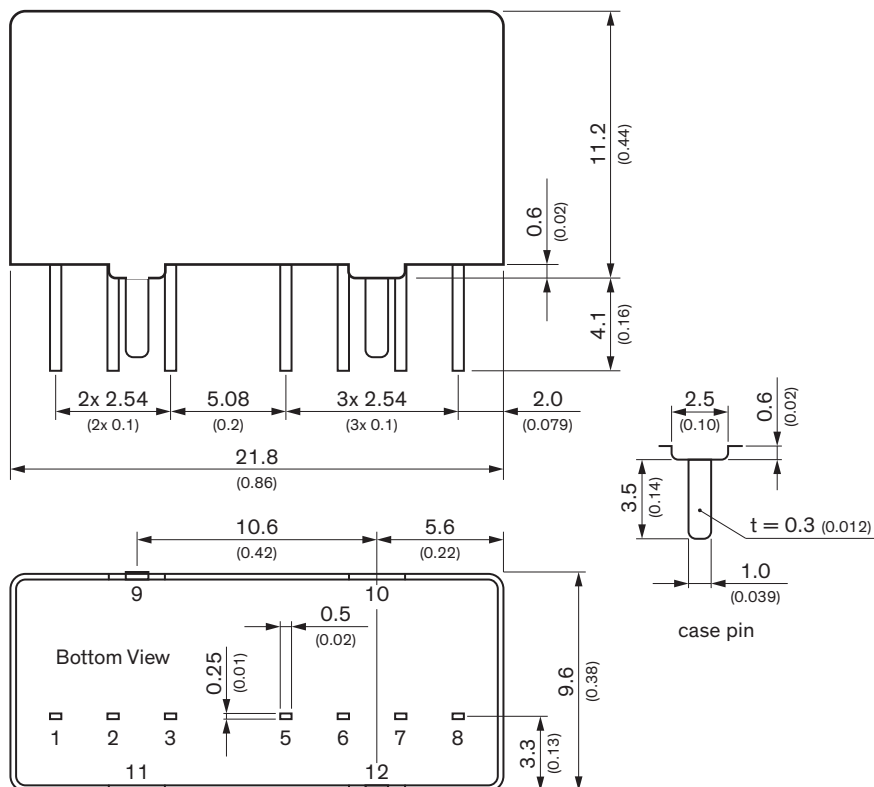
EMS Immunity	- Electrostatic Discharge	Air:	EN 61000-4-2, ± 8 kV, perf. criteria A
		Contact:	EN 61000-4-2, ± 6 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ± 2 kV, perf. criteria A
			EN 61000-4-5, ± 1 kV, perf. criteria A
		Ext. input component:	220 μ F, 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
Cooling System		Natural convection (20 LFM)
Remote Control	- Current Controlled Remote	On: open circuit Off: 2 to 4 mA current (internal 1 k Ω 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 M Ω 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		Allowed (hermetical product)
	See 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 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		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). The SCIP number is provided on request.)

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

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Outline Dimensions



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: No connection