

Unregulated DC/DC Converter

TMV Series, 1 Watt

- Industry standard pinout
- Unregulated outputs
- I/O isolation voltage 3000 VDC
- Operating temperature range -40°C to $+85^{\circ}\text{C}$
- Efficiency up to 81 %
- 3-year product warranty



The TMV series are miniature, isolated 1 W DC/DC-converters with high isolation in a single-in-line package (SIP). Requiring only 1.2 cm² board space they offer the ideal solution in many space critical applications for board level power distribution. The use of SMD-technology makes it possible to offer a product with high performance at low cost

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TMV 0505S	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	200 mA			71 %
TMV 0509S		9 VDC	110 mA			76 %
TMV 0512S		12 VDC	84 mA			78 %
TMV 0515S		15 VDC	67 mA			78 %
TMV 0505D		+5 VDC	100 mA	-5 VDC	100 mA	72 %
TMV 0512D		+12 VDC	42 mA	-12 VDC	42 mA	78 %
TMV 0515D		+15 VDC	34 mA	-15 VDC	34 mA	79 %
TMV 1205S	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	200 mA			73 %
TMV 1212S		12 VDC	84 mA			80 %
TMV 1215S		15 VDC	67 mA			80 %
TMV 1205D		+5 VDC	100 mA	-5 VDC	100 mA	74 %
TMV 1212D		+12 VDC	42 mA	-12 VDC	42 mA	81 %
TMV 1215D		+15 VDC	34 mA	-15 VDC	34 mA	81 %
TMV 2405S	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	200 mA			71 %
TMV 2412S		12 VDC	84 mA			78 %
TMV 2415S		15 VDC	67 mA			79 %
TMV 2405D		+5 VDC	100 mA	-5 VDC	100 mA	72 %
TMV 2412D		+12 VDC	42 mA	-12 VDC	42 mA	79 %
TMV 2415D		+15 VDC	34 mA	-15 VDC	34 mA	80 %

Input Specifications

Input Current	- At no load	5 Vin models: 30 mA typ. 12 Vin models: 12 mA typ. 24 Vin models: 7 mA typ.
	- At full load	5 Vin models: 270 mA typ. 12 Vin models: 110 mA typ. 24 Vin models: 55 mA typ.
Surge Voltage		5 Vin models: 9 VDC max. (1 s max.) 12 Vin models: 18 VDC max. (1 s max.) 24 Vin models: 30 VDC max. (1 s max.)
Recommended Input Fuse		5 Vin models: 500 mA (slow blow) 12 Vin models: 200 mA (slow blow) 24 Vin models: 100 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Capacitor

Output Specifications

Voltage Set Accuracy		±3% max.
Regulation (Unregulated)	- Input Variation (1% Vin step)	single output models: 1.5% max. dual output models: 1.5% max.
	- Load Variation	See application note: www.tracopower.com/tmv-cc/
	- Voltage Balance (symmetrical load)	dual output models: 1% max.
Ripple and Noise	- 20 MHz Bandwidth	100 mVp-p max. 65 mVp-p typ. (To further reduce Ripple and Noise, a capacitor with 1.0 µF X7R is recommended.)
Capacitive Load	- single output	5 Vout models: 220 µF max. 9 Vout models: 220 µF max. 12 Vout models: 220 µF max. 15 Vout models: 220 µF max.
	- dual output	5 / -5 Vout models: 100 / 100 µF max. 12 / -12 Vout models: 100 / 100 µF max. 15 / -15 Vout models: 100 / 100 µF max.
Minimum Load		See application note: www.tracopower.com/tmv-cc/ (Operation at lower load will not damage the converter, but it may not meet all specifications)
Temperature Coefficient		±0.02 %/K max.
Start-up Time		230 ms max.
Short Circuit Protection		Limited 0.5 s max., Automatic recovery

Safety Specifications

Over Voltage Category	Not mains connected
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EMC Specifications

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

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Case Temperature	+105°C max.
	- Storage Temperature	-50°C to +125°C

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

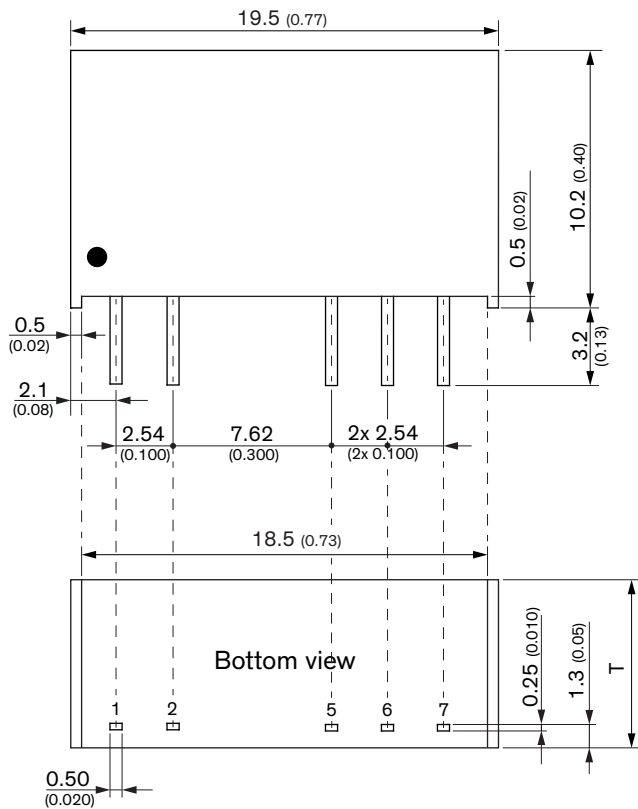
Power Derating	- High Temperature	4.0 %/K above 75°C (5 & ±5 Vout models) 4.0 %/K above 80°C (other models)
See application note: www.tracopower.com/tmv-cc/		
Cooling System		Natural convection (20 LFM)
Regulator Topology		Push-Pull Converter
Switching Frequency		70 - 120 kHz (PFM) 100 kHz typ. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	3'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	10'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	60 pF typ. 100 pF max.
Reliability	- Calculated MTBF	2'000'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to 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		Nickel-Iron (Alloy 42)
Pin Foundation Plating		Nickel (1 µm min.)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		SIP7
Soldering Profile		Lead-Free Wave Soldering 260°C / 10 s max.
Weight	5 Vin models: 12 Vin models: 24 Vin models:	2.2 g 2.2 g 2.6 g
Thermal Impedance	- Case to Ambient	61.2 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) (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	ab1a3185-a9a1-432f-ae3c-de2d13eba41b

Additional Information

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

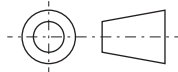
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Outline Dimensions



T: 6.1 (0.24) for 5 Vin & 12 Vin Models
T: 7.1 (0.28) for 24 Vin Models

Dimensions in mm (inch)
Tolerance: x.x ± 0.25 (x.xx ± 0.01)
 x.xx ± 0.13 (x.xxx ± 0.005)
Pin tolerance: ± 0.05 (± 0.002)



Pinout		
Pin	Single	Dual
1	+Vin (Vcc)	
2	-Vin (GND)	
5	-Vout	
6	No pin	Common
7	+Vout	

Avoid routing PCB traces under the converter.