TRACO POWER

DC/DC Converter

TMV Series, 1 Watt

- **Industry standard pinout**
- **Unregulated device**
- **I/O isolation voltage 3000 VDC**
- **Operating temperature range –40 °C to +85 °C**
- **Efficiency up to 81 %**
- **3-years 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
		Vnom	Imax	Vnom	Imax	typ.
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	- 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/overview/tmv
	- Voltage Balance (symmetrical load)	dual output models:	1% max.
Ripple and Noise	- 20 MHz Bandwidth		65 mVp-p typ.
			100 mVp-p max.
			(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			2 % of Iout max.
			(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

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/overview/tmv

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
Power Derating	- High Temperature	4 %/K above 75°C (5 & ±5 Vout models)
		4 %/K above 80°C (other Vout models)
Cooling System		Natural convection (20 LFM)

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

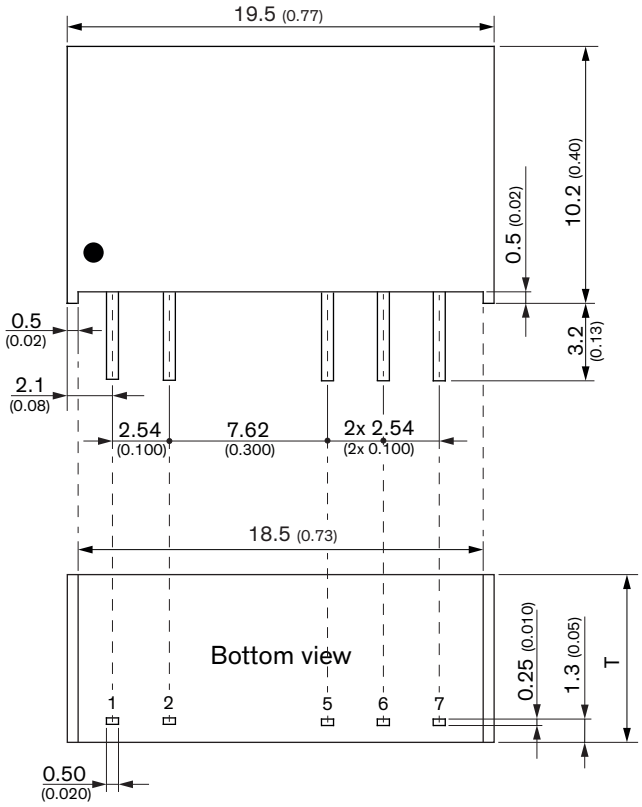
Switching Frequency			70 - 120 kHz (PFM) 100 kHz typ. (PFM)
Insulation System			Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s		3'000 VDC
Isolation Resistance	- Input to Output, 500 VDC		10'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V		60 pF typ. 100 pF max.
Reliability	- Calculated MTBF		2'000'000 h (MIL-HDBK-217F, ground benign)
Washing Process			Allowed (hermetical product)
		See Cleaning Guideline:	www.tracopower.com/info/cleaning.pdf
Housing Material			Non-conductive Plastic (UL 94 V-0 rated)
Base 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			Wave Soldering 260°C / 10 s max.
Weight		5 Vin models:	2.2 g
		12 Vin models:	2.2 g
		24 Vin models:	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: 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/tmv

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**
1	+Vin (Vcc)	
2	–Vin (GND)	
5	–Vout	
6	No Pin	Common
7	+Vout	

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)

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TRACO Power:

TMV 0512S TMV 1215S TMV 0515S TMV 0512D TMV 2412D TMV 1205S TMV 2412S TMV 1215D TMV 2415S TMV 2405S TMV 0515D TMV 0505S TMV 0505D TMV 1212D TMV 1212S TMV 0509S TMV 2415D TMV 1205D TMV 2405D