TRACO POWER

DC/DC Converter

TMV-HI Series, 1 Watt

- **Ultra compact SIP-7 package**
- **Very high 5200 VDC I/O-isolation**
- **Unregulated device**
- **Dedicated for IGBT applications**
- **Operating temperature range –40 °C to +95 °C**
- **3-year product warranty**

UL 62368-1 IEC 62368-1

The TMV-HI series is a range of 1 Watt non regulated dc/dc-converters with very high I/O-isolation. They come in a very compact SIP-7 package.

Models

Order Code	Input Voltage Range	Output 1 Vnom	Output 1 Imax	Output 2 Vnom	Output 2 Imax	Efficiency typ.
TMV 0503SHI	4.5 - 5.5 VDC (5 VDC nom.)	3.3 VDC	303 mA			70 %
TMV 0505SHI		5 VDC	200 mA			70 %
TMV 0509SHI		9 VDC	111 mA			75 %
TMV 0512SHI		12 VDC	84 mA			77 %
TMV 0515SHI		15 VDC	66 mA			78 %
TMV 0505DHI		+5 VDC	100 mA	–5 VDC	100 mA	71 %
TMV 0509DHI		+9 VDC	56 mA	–9 VDC	56 mA	75 %
TMV 0512DHI		+12 VDC	42 mA	–12 VDC	42 mA	77 %
TMV 0515DHI		+15 VDC	33 mA	–15 VDC	33 mA	78 %
TMV 05159HI		+15 VDC	33 mA	–9 VDC	55 mA	76 %
TMV 1203SHI	10.8 - 13.2 VDC (12 VDC nom.)	3.3 VDC	303 mA			71 %
TMV 1205SHI		5 VDC	200 mA			71 %
TMV 1209SHI		9 VDC	111 mA			76 %
TMV 1212SHI		12 VDC	84 mA			78 %
TMV 1215SHI		15 VDC	66 mA			79 %
TMV 1205DHI		+5 VDC	100 mA	–5 VDC	100 mA	72 %
TMV 1209DHI		+9 VDC	56 mA	–9 VDC	56 mA	76 %
TMV 1212DHI		+12 VDC	42 mA	–12 VDC	42 mA	78 %
TMV 1215DHI		+15 VDC	33 mA	–15 VDC	33 mA	79 %
TMV 12159HI		+15 VDC	33 mA	–9 VDC	55 mA	77 %
TMV 1503SHI	13.5 - 16.5 VDC (15 VDC nom.)	3.3 VDC	303 mA			70 %
TMV 1505SHI		5 VDC	200 mA			70 %
TMV 1509SHI		9 VDC	111 mA			75 %
TMV 1512SHI		12 VDC	84 mA			75 %
TMV 1515SHI		15 VDC	66 mA			79 %
TMV 1505DHI		+5 VDC	100 mA	–5 VDC	100 mA	71 %
TMV 1509DHI		+9 VDC	56 mA	–9 VDC	56 mA	75 %
TMV 1512DHI		+12 VDC	42 mA	–12 VDC	42 mA	78 %
TMV 1515DHI		+15 VDC	33 mA	–15 VDC	33 mA	79 %
TMV 15159HI		+15 VDC	33 mA	–9 VDC	55 mA	76 %
TMV 2403SHI	21.6 - 26.4 VDC (24 VDC nom.)	3.3 VDC	303 mA			70 %
TMV 2405SHI		5 VDC	200 mA			70 %
TMV 2409SHI		9 VDC	111 mA			75 %
TMV 2412SHI		12 VDC	84 mA			78 %
TMV 2415SHI		15 VDC	66 mA			80 %
TMV 2405DHI		+5 VDC	100 mA	–5 VDC	100 mA	71 %
TMV 2409DHI		+9 VDC	56 mA	–9 VDC	56 mA	75 %
TMV 2412DHI		+12 VDC	42 mA	–12 VDC	42 mA	77 %
TMV 2415DHI		+15 VDC	33 mA	–15 VDC	33 mA	78 %
TMV 24159HI		+15 VDC	33 mA	–9 VDC	55 mA	75 %

Input Specifications

Input Current	- At no load	5 Vin models:	35 mA typ.
		12 Vin models:	17 mA typ.
		15 Vin models:	16 mA typ.
		24 Vin models:	12 mA typ.
	- At full load	5 Vin models:	270 mA typ.
		12 Vin models:	110 mA typ.
		15 Vin models:	90 mA typ.
		24 Vin models:	60 mA typ.
Surge Voltage		5 Vin models:	9 VDC max. (1 s max.)
		12 Vin models:	18 VDC max. (1 s max.)
		15 Vin models:	20 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)
		15 Vin models:	150 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			±5% max.
Regulation	- Input Variation (1% Vin step)	single output models:	1.2% max.
		dual output models:	1.2% max.
	- Load Variation	See application note:	www.tracopower.com/overview/tmv-hi
	- Voltage Balance (symmetrical load)	dual output models:	1% max.
Ripple and Noise	- 20 MHz Bandwidth		100 mVp-p max.
Capacitive Load	- single output	3.3 Vout models:	1'000 µF max.
		5 Vout models:	470 µF max.
		9 Vout models:	470 µF max.
		12 Vout models:	220 µF max.
		15 Vout models:	220 µF max.
	- dual output	5 / -5 Vout models:	220 / 220 µF max.
		9 / -9 Vout models:	220 / 220 µF max.
		12 / -12 Vout models:	100 / 100 µF max.
		15 / -15 Vout models:	100 / 100 µF max.
		15 / -9 Vout models:	100 / 220 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.
Short Circuit Protection			Continuous, Automatic recovery

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/tmv-hi
Pollution Degree		PD 2

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

General Specifications

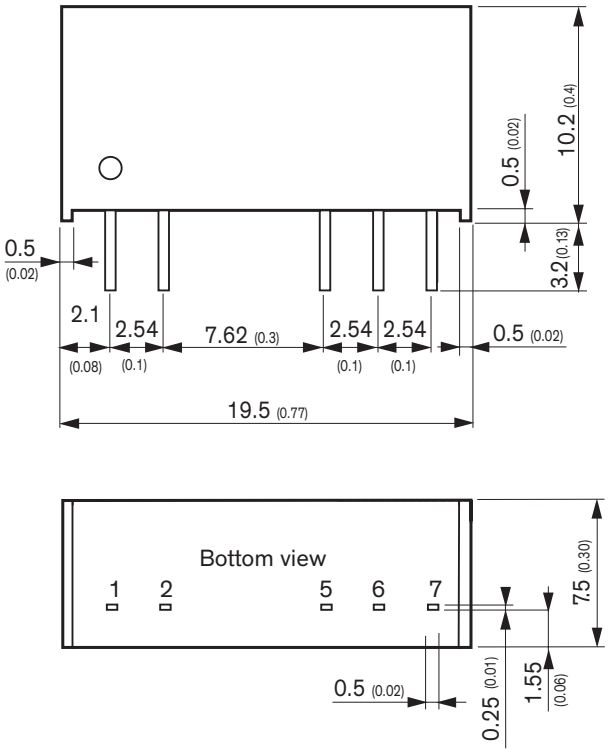
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +95°C
	- Case Temperature	+100°C max.
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	6.7 %/K above 85°C
Cooling System		Natural convection (20 LFM)
Altitude During Operation		6'000 m max.
Switching Frequency		100 kHz typ. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	5'200 VDC
	- Input to Output, 1 s	5'700 VDC
Isolation Resistance	- Input to Output, 500 VDC	10'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	7 pF typ.
Common Mode Transient Immunity		15 kV/µs min.
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)
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		2.4 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/tmv-hi

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)	+Vin (Vcc)
2	–Vin (GND)	–Vin (GND)
5	–Vout	–Vout
6	No pin	Common
7	+Vout	+Vout