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TRACO POWER

Unregulated DC/DC Converter

TMV-HI Series, 1 Watt

- **Ultra compact SIP-7 package**
- **Very high 5200 VDC I/O-isolation**
- **Unregulated outputs**
- **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 unregulated 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		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	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 %

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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 (Unregulated)	- 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/tmv-hi-cc/
	- 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		See application note:	www.tracopower.com/tmv-hi-cc/
			(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

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/tmv-hi-safety-cert/
Energy Source	- Output, acc. to 62368-1	ES1
Power Source	- Output, acc. to 62368-1	PS3

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

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Pollution Degree		PD 2
Over Voltage Category		Not mains connected

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
	See application note:	www.tracopower.com/tmv-hi-cc/
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	13 pF typ. 20 pF max.
Common Mode Transient Immunity		15 kV/µs min.
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		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: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	e9f91836-9388-4d22-a8b0-eacd0f555b58

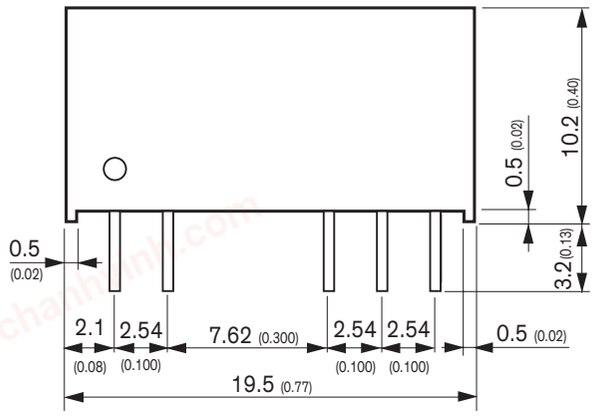
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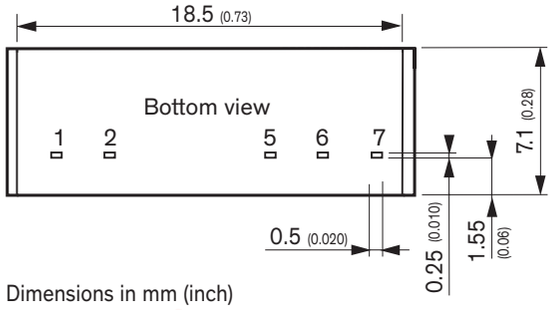
Supporting Documents	www.tracopower.com/overview/tmv-hi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf
Service Portal	www.tracoserviceportal.com

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

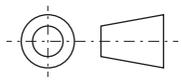
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Outline Dimensions





Dimensions in mm (inch)
Tolerances: x.x±0.5 (x.xx±0.02)
x.xx±0.25 (x.xxx±0.010)
Pin tolerances: ±0.05 (±0.002)



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

Avoid routing PCB traces under the converter.

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