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TRACO POWER

DC/DC Converter

TMU 3 Series, 3 Watt

- **Compact 3 Watt converter in SIP-4 package**
- **Continuous short circuit protection**
- **Unregulated outputs**
- **Operating temperature range -40 to +75 °C without derating**
- **I/O isolation: 1’500 VDC**
- **Input voltage ranges (±10%): 5, 12, 24 VDC**
- **High efficiency up to 86%**
- **3-year product warranty**



The TMU 3 series consists of a set of isolated 3 Watt DC/DC converters with unregulated outputs in a standard SIP-4 package. They are designed to offer a compact low-cost alternative to regulated series with no concession on quality and lifetime. They feature a continuous short circuit protection circuit, I/O-isolation of 1500 VDC and an operating temperature range from –40°C to 75°C without derating. The compact dimensions of these converters make them an ideal solution for many space critical applications in communication equipment, instrumentation and industrial electronics.

Models

Order Code	Input Voltage Range	Output Voltage nom.	Output Current max.	Efficiency typ.
TMU 3-0511	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	600 mA	79 %
TMU 3-0512		12 VDC	250 mA	83 %
TMU 3-0513		15 VDC	200 mA	84 %
TMU 3-1211	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	600 mA	81 %
TMU 3-1212		12 VDC	250 mA	85 %
TMU 3-1213		15 VDC	200 mA	85 %
TMU 3-2411	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	600 mA	82 %
TMU 3-2412		12 VDC	250 mA	86 %
TMU 3-2413		15 VDC	200 mA	86 %

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Input Specifications

Input Current	- At no load	5 Vin models:	85 mA typ.
		12 Vin models:	45 mA typ.
		24 Vin models:	18 mA typ.
	- At full load	5 Vin models:	759 mA typ. (5 Vout model)
			723 mA typ. (12 Vout model)
			714 mA typ. (15 Vout model)
		12 Vin models:	309 mA typ. (5 Vout model)
			294 mA typ. (12 Vout model)
			294 mA typ. (15 Vout model)
		24 Vin models:	152 mA typ. (5 Vout model)
			145 mA typ. (12 Vout model)
			145 mA typ. (15 Vout model)
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:	1'500 mA (slow blow)
		12 Vin models:	1'000 mA (slow blow)
		24 Vin models:	500 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			±3.5% max. (60% load: 5 Vout models)
			±3.5% max. (80% load: 12 & 15 Vout models)
Regulation	- Input Variation (1% Vin step)		1.5% max.
	- Load Variation	See application note:	www.tracopower.com/overview/tmu3
Ripple and Noise	- 20 MHz Bandwidth		100 mVp-p typ.
Capacitive Load		12 Vout models:	1'000 µF max.
		15 Vout models:	820 µF max.
	- 5 Vin input	5 Vout models:	2'200 µF max.
	- 12 Vin input	5 Vout models:	2'000 µF max.
	- 24 Vin input	5 Vout models:	2'000 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			5 ms max.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			250% max. of Iout max.

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/tmu3
EMS Immunity			EN 55024 (IT Equipment)
			EN 55035 (Multimedia)
	- 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
		External filter proposal:	www.tracopower.com/overview/tmu3
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 30 A/m, perf. criteria A

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

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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		Depending on model
		See application note:	www.tracopower.com/overview/tmu3
Cooling System			Natural convection (20 LFM)
Regulator Topology			Push-Pull Converter
Switching Frequency			20 - 80 kHz (Royer)
			60 kHz typ. (Royer)
Insulation System			Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s		1'500 VDC
	- Input to Output, 1 s		1'800 VDC
Isolation Resistance	- Input to Output, 500 VDC		1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V		120 pF typ.
			160 pF max.
Distance Through Isolation			1.5 mm
Reliability	- Calculated MTBF		4'960'000 h (MIL-HDBK-217F, ground benign)
Washing Process			According to Cleaning Guideline
			www.tracopower.com/info/cleaning.pdf
Environment	- Vibration		IPC-9592B
			2.4 g, 3 axis, random waveform, 30 min
	- Mechanical Shock		IPC-9592B
			30 g, 3 axis, half sine, 11 ms
	- Thermal Shock		IPC-9592B
			-40 to +125°C, 100 cycles, 30 min each
Housing Material			Plastic (UL 94 V-0 rated)
Potting Material			Silicone (UL 94 V-0 rated)
Pin Material			Phosphor Bronze (C5191)
Pin Foundation Plating			Nickel (0.5 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			SIP4
Soldering Profile			Lead-Free Wave Soldering
			260°C / 10 s max.
Weight		5 Vin models:	3.2 g
		12 Vin models:	3.2 g
		24 Vin models:	3.4 g
Thermal Impedance	- Case to Ambient		52 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).)
	- SCIP Reference Number		70d92505-9bbe-4ae4-9430-a8ee6f687efc

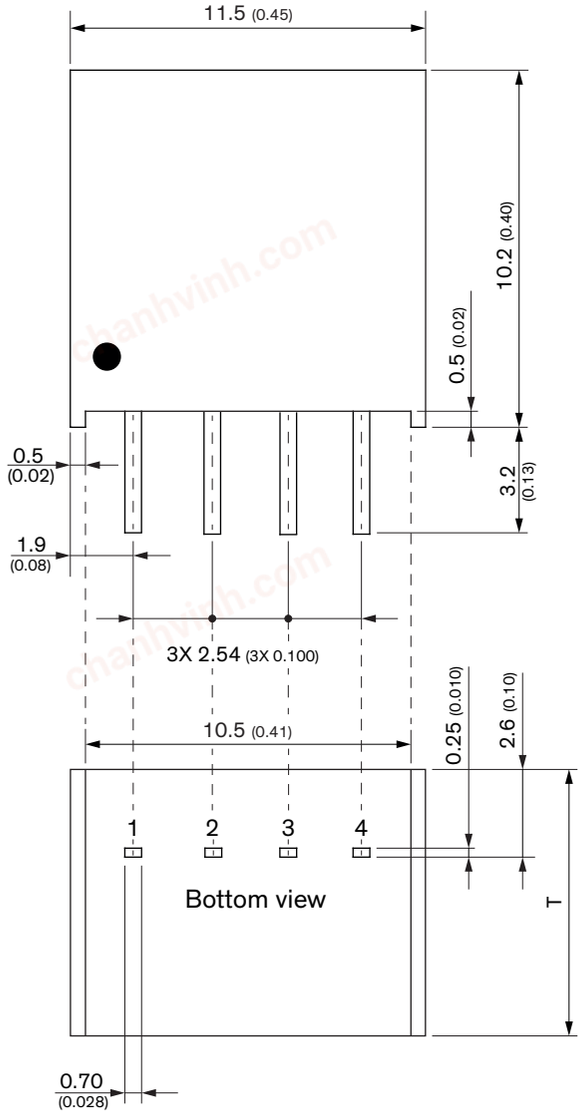
Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tmu3

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Outline Dimensions



Pinout	
Pin	**Single**
1	–Vin (GND)
2	+Vin (Vcc)
3	–Vout
4	+Vout

T: 8.6 (0.34) for 5Vin & 12Vin Models
T: 9.6 (0.38) for 24Vin Models

Dimensions in mm (inch)
Tolerance: x.x ±0.5 (x.xx ±0.02)
x.xx ±0.25 (x.xxx ±0.01)
Pins: ±0.05 (±0.002)

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