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TRACO POWER

DC/DC Converter

TDU 1 Series, 1 Watt

- **Compact 1 Watt converter in DIP-8 package**
- **Continuous short circuit protection**
- **Unregulated outputs**
- **Operating temperature range -40 to +85 °C without derating**
- **I/O isolation 1’500 VDC**
- **Input voltage ranges (±10%): 5, 12, 24 VDC**
- **Efficiency up to 83%**
- **3-year product warranty**



The TDU 1 series consists of a set of isolated 1 Watt DC/DC converters with unregulated outputs in a compact DIP-8 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 85°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.
TDU 1-0511	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	200 mA	80 %
TDU 1-0512		12 VDC	84 mA	82 %
TDU 1-0513		15 VDC	67 mA	83 %
TDU 1-1211	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	200 mA	79 %
TDU 1-1212		12 VDC	84 mA	81 %
TDU 1-1213		15 VDC	67 mA	82 %
TDU 1-2411	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	200 mA	78 %
TDU 1-2412		12 VDC	84 mA	80 %
TDU 1-2413		15 VDC	67 mA	81 %

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Input Specifications

Input Current	- At no load	5 Vin models:	30 mA typ. / 45 mA max.
		12 Vin models:	17 mA typ. / 25 mA max.
		24 Vin models:	10 mA typ. / 15 mA max.
	- At full load	5 Vin models:	256 mA max. (5 Vout model)
			250 mA max. (12 Vout model)
			247 mA max. (15 Vout model)
		12 Vin models:	108 mA max. (5 Vout model)
			106 mA max. (12 Vout model)
			104 mA max. (15 Vout model)
		24 Vin models:	55 mA max. (5 Vout model)
			54 mA max. (12 Vout model)
			53 mA max. (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:	600 mA (slow blow)
		12 Vin models:	250 mA (slow blow)
		24 Vin models:	150 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)		1.5% max.
	- Load Variation	See application note:	www.tracopower.com/overview/tdu1
Ripple and Noise	- 20 MHz Bandwidth		100 mVp-p max.
Capacitive Load			220 µF max.
Minimum Load			2 % of Iout max.
Temperature Coefficient			±0.02 %/K max.
Short Circuit Protection			Continuous, Automatic recovery

EMC Specifications

EMI Emissions	- Conducted Emissions		EN 55032 class B (with external filter)
	- Radiated Emissions		EN 55032 class B (with external filter)
		External filter proposal:	www.tracopower.com/overview/tdu1
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/tdu1
	- 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

General Specifications

Relative Humidity			95% max. (non condensing)
Temperature Ranges	- Operating Temperature		–40°C to +85°C (without derating)
	- Case Temperature		+95°C max.
	- Storage Temperature		–50°C to +125°C
Cooling System			Natural convection (20 LFM)
Regulator Topology			Push-Pull Converter

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

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Switching Frequency		20 - 95 kHz (Royer) 50 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
Creepage	- Input to Output	1.38 mm min.
Clearance	- Input to Output	1.38 mm min.
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	20 pF typ.
Reliability	- Calculated MTBF	5'000'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	IPC-9592B
	- Mechanical Shock	IPC-9592B
	- Thermal Shock	IPC-9592B
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Base Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Phosphor Bronze (C5191)
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		DIP8
Soldering Profile		Lead-Free Wave Soldering 260°C / 4 s max.
Weight		2.1 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: No Exemptions

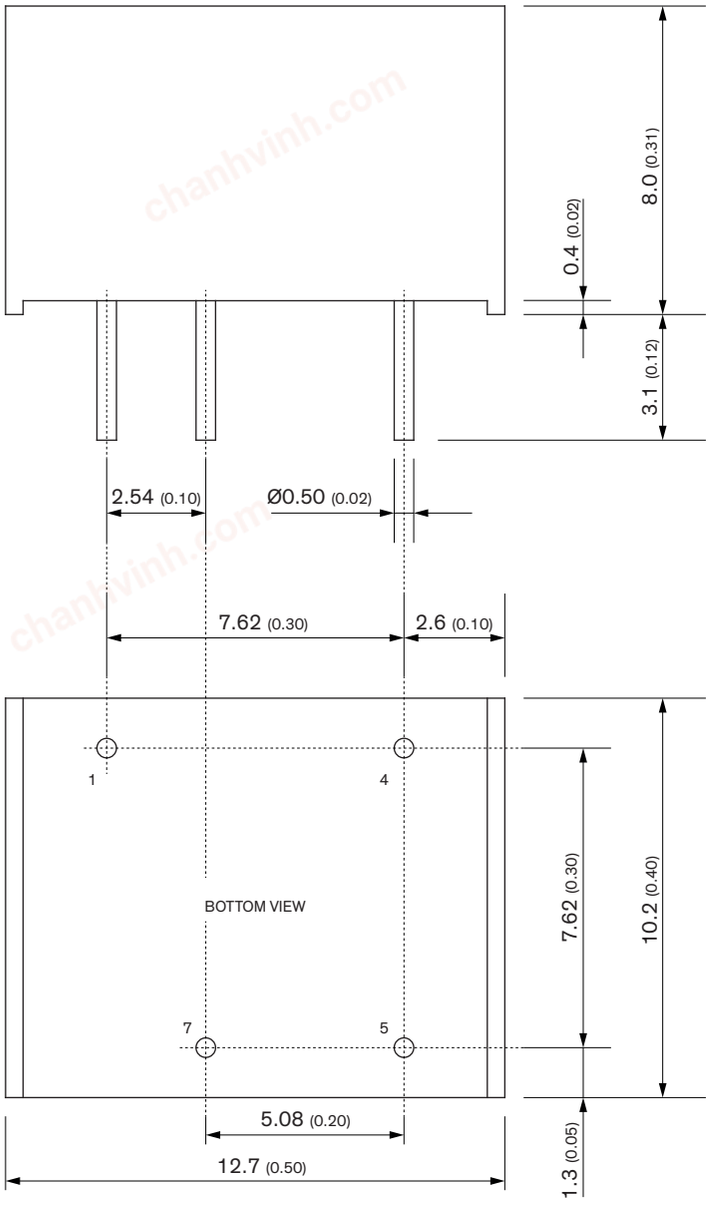
Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tdu1

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Outline Dimensions



Pinout	
Pin	**Function**
1	–Vin
4	+Vin
5	+Vout
7	–Vout

Dimensions in mm (inch)
Tolerances: x.x ±0.5 (±0.02)
x.xx ±0.25 (±0.01)
Pin tolerances: ±0.05 (±0.002)

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