

- 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 ( $\pm 10\%$ ): 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 %

### 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) - Load Variation	1.5% max. See application note: <a href="http://www.tracopower.com/overview/tdu1">www.tracopower.com/overview/tdu1</a>
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: <a href="http://www.tracopower.com/overview/tdu1">www.tracopower.com/overview/tdu1</a>
EMS Immunity	- 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
	- Conducted RF Disturbances	External filter proposal: <a href="http://www.tracopower.com/overview/tdu1">www.tracopower.com/overview/tdu1</a> 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 - Case Temperature - Storage Temperature	-40°C to +85°C (without derating) +95°C max. -50°C to +125°C
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		20 - 95 kHz (Royer) 50 kHz typ. (Royer)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s - Input to Output, 1 s	1'500 VDC 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 <a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>
Environment	- Vibration - Mechanical Shock - Thermal Shock	IPC-9592B IPC-9592B 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		Wave Soldering 260°C / 4 s max.
Weight		2.1 g
Environmental Compliance	- REACH Declaration  - RoHS Declaration	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: No Exemptions

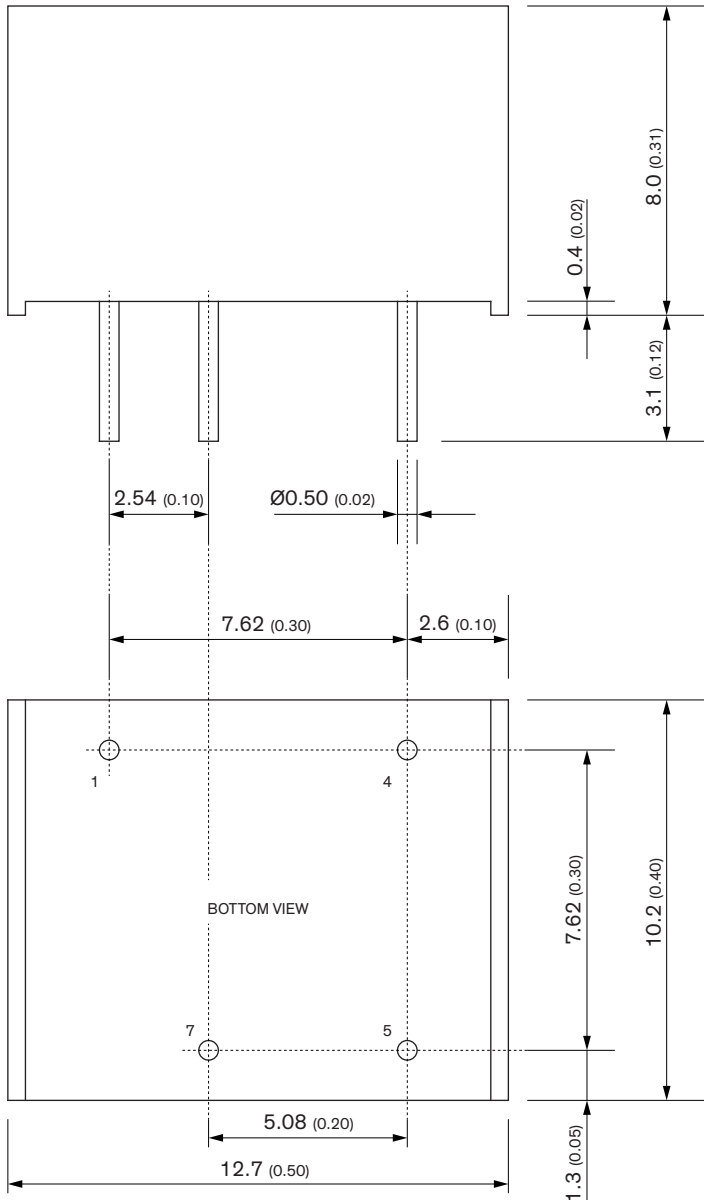
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tdu1](http://www.tracopower.com/overview/tdu1)

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

**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)