Unregulated DC/DC Converters

TRV 1 Series, 1 Watt

UL 60950-1

Features

- Semi-regulated output (load)
- Industry standard pinout
- High efficiency up to 87%
- I/O isolation voltage 3000 VDC
- Operationally reliable up to 5'000m altitude
- Operating temperature range
- –40°C to +85°C
- 3-year product warranty



not recommended for new designs

The TRV-1 series are ultra miniature, 1 Watt DC/DC-converters with high 3000VDC I/O-isolation and semi load regulation. They are the ideal solution to power drivers and circuits where unregulated DC/DC converters do not meet the input voltage range at load change.

Models

Ordercode	Input voltage	Output voltage	Output current max.	Efficiency typ.
TRV 1-0511	5 VDC ±10%	5 VDC	200 mA	84 %
TRV 1-0519		9 VDC	110 mA	86.5 %
TRV 1-0512		12 VDC	84 mA	87 %
TRV 1-0513		15 VDC	67 mA	87.5 %
TRV 1-1211	12 VDC ±10%	5 VDC	200 mA	84 %
TRV 1-1219		9 VDC	110 mA	86 %
TRV 1-1212		12 VDC	84 mA	88 %
TRV 1-1213		15 VDC	67 mA	88 %
TRV 1-2411	24 VDC ±10%	5 VDC	200 mA	84 %
TRV 1-2419		9 VDC	110 mA	86.5 %
TRV 1-2412		12 VDC	84 mA	87.5 %
TRV 1-2413		15 VDC	67 mA	87.5 %

Input Specifications

Input current no load / full load	5 Vin models:	**30 mA / 230 mA typ.**
	12 Vin models:	**12 mA / 100 mA typ.**
	24 Vin models:	**11 mA / 50 mA typ.**
Surge voltage (1 sec. max.)	5 Vin models:	**9 V max.**
	12 Vin models:	**18 V max.**
	24 Vin models:	**30 V max.**
Reflected input ripple current	5 Vin models:	**11 mA typ.**
	other models:	**5 mA typ.**
Input filter		**internal capacitors**
Recommended input fuse (slow blow type)	5 Vin models:	**500 mA**
	12 Vin models:	**200 mA**
	24 Vin models:	**100 mA**

Output Specifications

Regulation (Unregulated)	– Input variation	**1.2 % / 1 % change Vin**
	– Load variation	**see graph 1 on page 3**
Ripple and noise (20 MHz Bandwidth)		**60 mV pk-pk max.**
Temperature coefficient		**±0.02 %/K**
Short circuit protection		**limited 0.5 sec. max.**
Capacitive load		**220 µF max.**

General Specifications

Temperature ranges	– Operating	**–40°C to +85°C** (without derating)
	– Case temperature	**+105°C max.**
	– Storage	**–50°C to +125°C**
Humidity (non condensing)		**95 % rel H max.**
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		**>2'000'000 h**
Isolation voltage (60 sec.)	– Input/Output	**3'000 VDC**
Isolation capacitance	– Input/Output	**60 pF typ.**
Isolation resistance	– Input/Output	**>1'000 Mohm**
Switching frequency		**100 kHz typ.** (frequency modulation)
Frequency change over line and load		**–50 / +20 kHz max.**
Altitude during operation		**up to 5'000 m** (16'400 ft) **approved**
Safety approvals		**IEC 60950-1:2005 (2nd edition) + Am 1:2009** **EN 60950-1:2006 + Am 1:2010 + Am 11:2009**
	– Certification documents	**www.tracopower.com/overview/trv1**

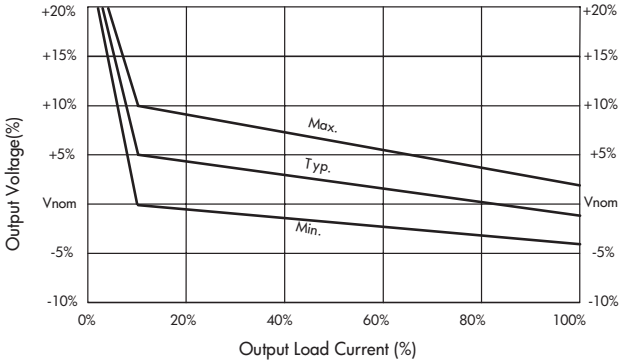
Supporting documents: www.tracopower.com/overview/trv1

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

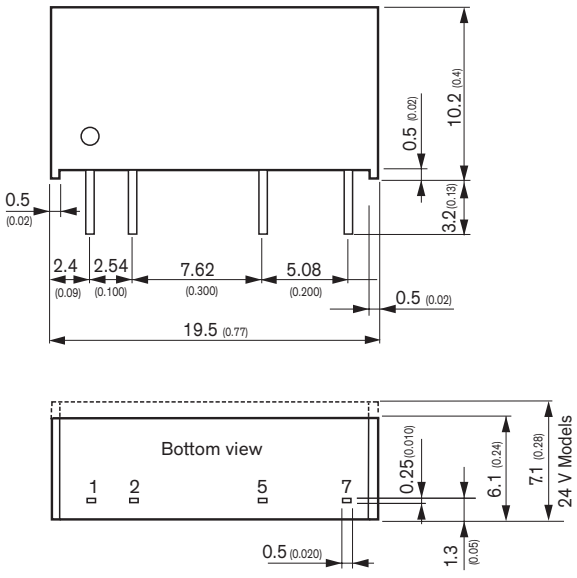
Physical Specifications

Casing material		non conductive plastic (UL 94V-0 rated)
Weight	– 5 & 12 Vin models – 24 Vin models	2.2 g (0.07 oz) 2.6 g (0.09 oz)
Soldering temperature		max. 260°C, 10 sec, 1.5 mm from case
Environmental compliance	– Reach – RoHS	www.tracopower.com/info/reach-declaration.pdf RoHS directive 2011/65/EU

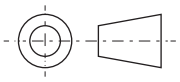
Graph 1: Load regulation



Outline Dimensions



Pin-Out	
Pin	
1	+Vin (Vcc)
2	–Vin (GND)
5	–Vout
7	+Vout



Dimensions in [mm], () = Inch
Pin pitch tolerances: ±0.13 (±0.005)
Case tolerances: ±0.25 (±0.01)