CB Scheme cSAus
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

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: 12 Vin models: 24 Vin models:	30 mA / 230 mA typ. 12 mA / 100 mA typ. 11 mA / 50 mA typ.
Surge voltage (1 sec. max.)	5 Vin models: 12 Vin models: 24 Vin models:	9 V max. 18 V max. 30 V max.
Reflected input ripple current	5 Vin models: other models:	11 mA typ. 5 mA typ.
Input filter		internal capacitors
Reverse voltage protection		0.3 A max.
Recommended input fuse (slow blow type)	5 Vin models: 12 Vin models: 24 Vin models:	500 mA 200 mA 100 mA

Output Specifications

Regulation	– Input variation – Load variation	1.2 % / 1 % change Vin 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

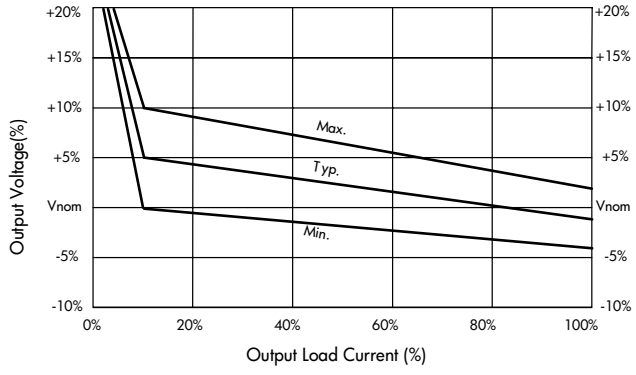
Temperature ranges	– Operating – Case temperature – Storage	–40°C to +85°C (without derating) +105°C max. –50°C to +125°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>2'000'000 h
Isolation voltage (60 sec.)	Input/Output	3'000 VDC
Isolation 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 standards		IEC 60950-1:2005 (2nd edition) + Am 1:2009 EN 60950-1:2006 + Am 1:2010 + Am 11:2009
Safety approvals	– CB test report (IEC 60950-1) – CSA certification (UL 60950-1, CSA 60950-1-07)	

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

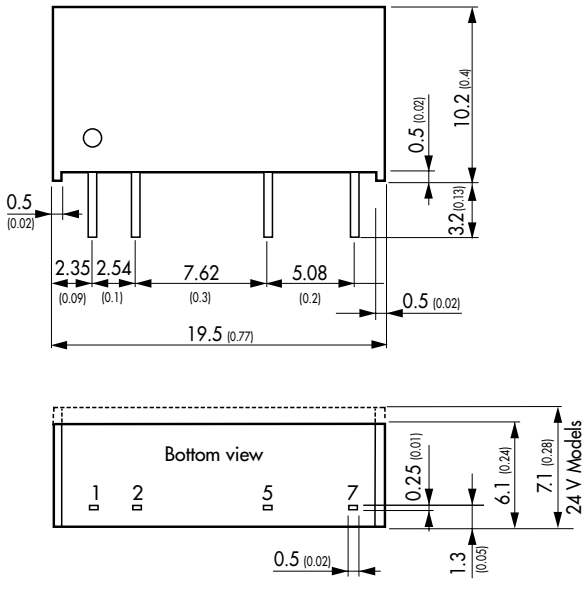
Physical Specifications

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	 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)