TRACO POWER

Unregulated DC/DC Converter

TBA 1 Series, 1 Watt

- **Continuous short circuit protection**
- **I/O isolation: 1'500 VDC**
- **Operating temperature range -40 to +85 °C without derating**
- **Input voltage ranges (±10%): 3.3, 5, 12, 24 VDC**
- **High efficiency up to 82%**
- **SIP-4 package**
- **Unregulated outputs**
- **3-year product warranty**

The TBA 1 is a 1 Watt DC/DC SIP converter series which is specifically designed to offer a low-cost solution with no concession on quality and lifetime. The new design improves on the industry standard features and offers an integrated continuous short circuit protection circuit, an operating temperature range from –40°C to 85°C without derating and I/O-isolation of 1'500 VDC. It offers a broad application range in any space and cost critical application.

Models

Order Code	Input Voltage Range	Output Voltage nom.	Output Current max.	Efficiency typ.
TBA 1-0310	2.97 - 3.63 VDC (3.3 VDC nom.)	3.3 VDC	260 mA	73 %
TBA 1-0311		5 VDC	200 mA	76 %
TBA 1-0510	4.5 - 5.5 VDC (5 VDC nom.)	3.3 VDC	260 mA	75 %
TBA 1-0511		5 VDC	200 mA	79 %
TBA 1-0519		9 VDC	110 mA	80 %
TBA 1-0512		12 VDC	80 mA	82 %
TBA 1-0513		15 VDC	65 mA	82 %
TBA 1-1211	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	200 mA	79 %
TBA 1-1219		9 VDC	110 mA	79 %
TBA 1-1212		12 VDC	80 mA	80 %
TBA 1-1213		15 VDC	65 mA	80 %
TBA 1-2411	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	200 mA	79 %
TBA 1-2419		9 VDC	110 mA	80 %
TBA 1-2412		12 VDC	80 mA	82 %
TBA 1-2413		15 VDC	65 mA	82 %

Input Specifications

Surge Voltage		3.3 Vin models:	**5 VDC max.** (1 s max.)
		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		3.3 Vin models:	**800 mA** (slow blow)
		5 Vin models:	**500 mA** (slow blow)
		12 Vin models:	**200 mA** (slow blow)
		24 Vin models:	**100 mA** (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			**Internal Capacitor** (add. external 22 µF, ESR <0.1Ω, recommended)

Output Specifications

Voltage Set Accuracy			**±3% max.** (at 60% for 5VDC models)
			±3% max. (at 80% for other models)
Regulation	- Input Variation (1% Vin step)		1.5% max.
(Unregulated)	- Load Variation	See application note:	www.tracopower.com/overview/tba1
Ripple and Noise	- 20 MHz Bandwidth		200 mVp-p max.
			65 mVp-p typ.
Capacitive Load		3.3 Vout models:	3'300 µF max.
		5 Vout models:	2'200 µF max.
		9 Vout models:	1'000 µF max.
		12 Vout models:	470 µF max.
		15 Vout models:	470 µF max.
Minimum Load		See application note:	www.tracopower.com/overview/tba1
Temperature Coefficient			±0.02 %/K max.
Start-up Time			30 ms max.
Short Circuit Protection			Continuous, Automatic recovery

Safety Specifications

Standards	- IT / Multimedia Equipment	**Designed for IEC/EN/UL 62368-1** (not certified)

General Specifications

Relative Humidity			**95% max.** (non condensing)
Temperature Ranges	- Operating Temperature		–40°C to +95°C
	- Case Temperature		+105°C max.
	- Storage Temperature		–55°C to +125°C
Power Derating	- High Temperature		5 %/K above 85°C
		See application note:	www.tracopower.com/overview/tba1
Cooling System			**Natural convection** (20 LFM)
Regulator Topology			Push-Pull Converter
Switching Frequency			**50 - 200 kHz** (PWM)
Insulation System			Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s		1'500 VDC
Isolation Resistance	- Input to Output, 500 VDC		1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V		30 pF typ.
Reliability	- Calculated MTBF		2'000'000 h (MIL-HDBK-217F, ground benign)
Washing Process			Not allowed
Housing Material			**Plastic** (UL 94 V-0 rated)
Potting Material			**Epoxy** (UL 94 V-0 rated)
Pin Material			**Nickel-Iron** (Alloy 42)
Pin Foundation Plating			**Nickel** (1.5 µm min.)
Pin Surface Plating			**Tin** (3 µm min.), **bright**

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

Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		SIP4
Soldering Profile		Lead-Free Wave Soldering 265 °C / 5 s max.
Weight		1.6 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: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	e7e14ecf-5433-4036-a2c8-8023072beea4

Additional Information

Supporting Documents	www.tracopower.com/overview/tba1
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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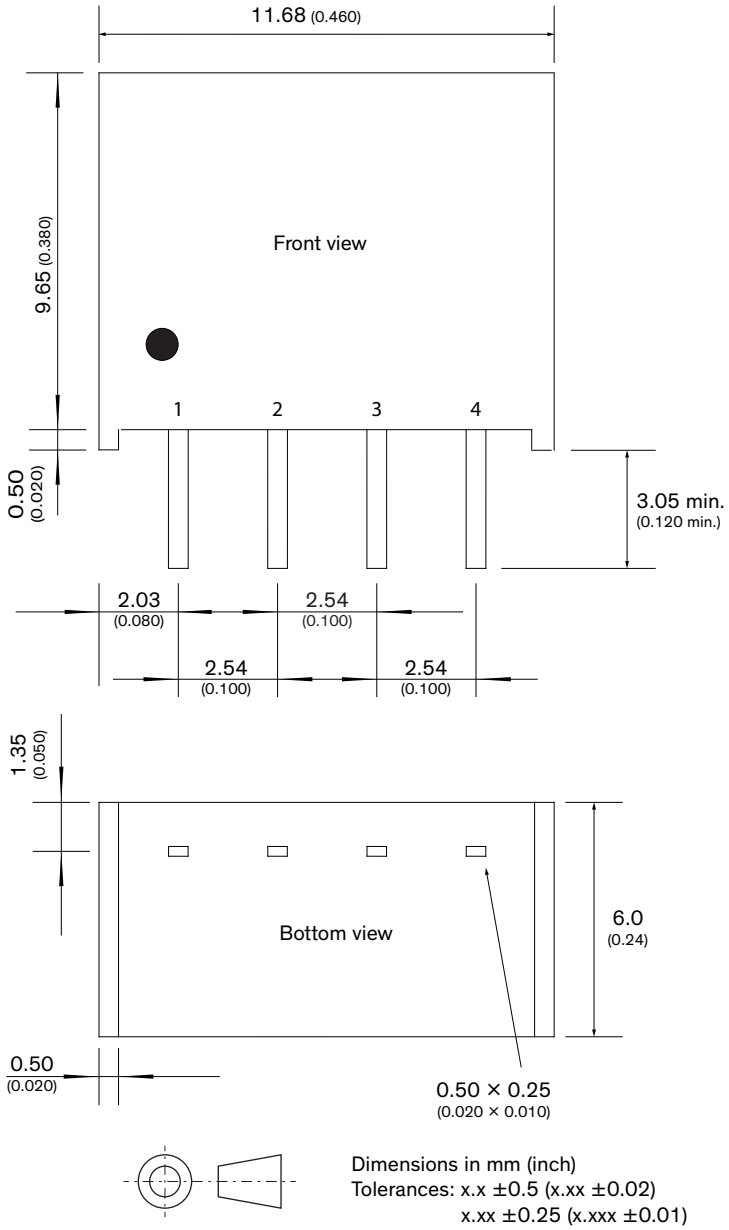
Outline Dimensions



Dimensions in mm (inch)
Tolerances: x.x ±0.5 (x.xx ±0.02)
x.xx ±0.25 (x.xxx ±0.01)
Pin dimension tolerance: ±0.1 (±0.004)

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