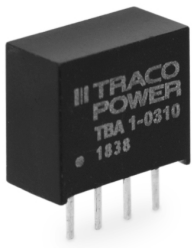
TRACO POWER

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 plastic package**
- **Unregulated outputs**
- **3-year product warranty**



The TBA 1 is an elementary 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-isolations of either 1'500 VDC. It offers a broad application range in any space and cost critical application.

Models

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

Input Specifications

Input current at no load	3.3 Vin models:	30 mA typ.
	5 Vin models:	25 mA typ.
	12 Vin models:	15 mA typ.
	24 Vin models:	10 mA typ.
Surge voltage (1 s max.)	3.3 Vin models:	5 V max.
	5 Vin models:	9 V max.
	12 Vin models:	18 V max.
	24 Vin models:	30 V max.
Input filter		internal capacitor (external capacitor recommended)*
Recommended input fuse	3.3 Vin models:	0.8 A (slow blow type)
	5 Vin models:	0.5 A (slow blow type)
	12 Vin models:	0.2 A (slow blow type)
	24 Vin models:	0.1 A (slow blow type)

Output Specifications

Voltage set accuracy	5 Vout models:	±3 % max. (at 60 % load)
	other output models:	±3 % max. (at 80 % load)
Regulation	– Input variation (at 1 % change of Vin)	±1.5 % max.
	– Load variation	See graphs below
Temperature coefficient		±0.02 %/K max.
Ripple and noise (20 MHz Bandwidth)		65 mVp-p typ. / 200 mVp-p max.
Short circuit protection		continuous, automatic recovery
Start up time		30 ms max.
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 & 15 Vout models:	470 µF max.

General Specifications

Temperature ranges	– Operating (natural convection: 20 LFM, 0.1 m/s)	–40°C to +95°C
	– Case temperature	+105°C max.
	– Storage temperature	–55°C to +125°C
Derating		5.0 %/K above 85°C
Humidity (non condensing)		95 % rel H max.
Isolation voltage	– I/O isolation voltage (60 s)	1‘500 VDC
Isolation resistance (input/output)		1 GOhm min.
Isolation capacitance (input/output)		30 pF max.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		2‘000‘000 h
Switching frequency		50 – 200 kHz (pulse width modulation)
Safety standards		IEC/EN 62368-1, EN 60950-1
Environmental compliance	– Reach	www.tracopower.com/info/reach-declaration.pdf
	– RoHS	RoHS directive 2011/65/EU

*In case of long input lines or hot plug-in requirements, we recommended to use an external low ESR capacitor (22uF) close to the converter’s input pins.

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

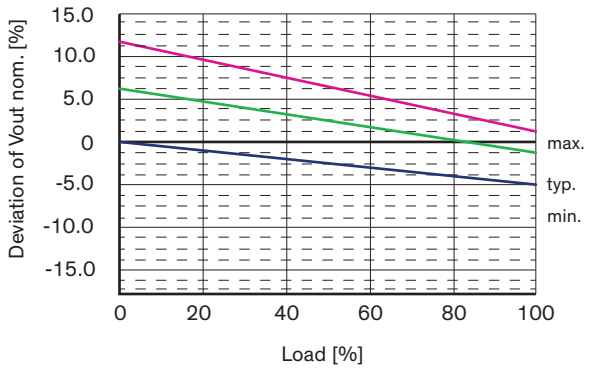
Physical Specifications

Casing material	Plastic (UL 94V-0 rated)
Potting material	Epoxy (UL 94V-0 rated)
Pin material	tinned copper
Package weight	1.6 g (0.05 oz)

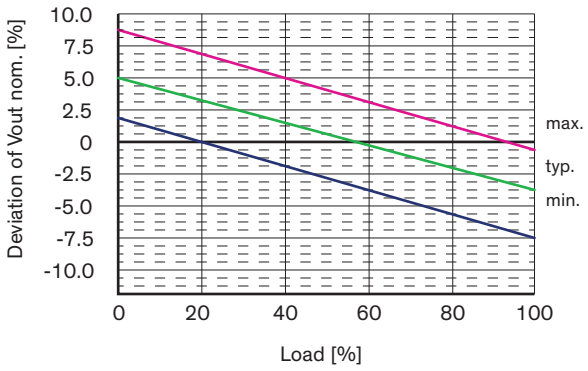
Supporting Documents: www.tracopower.com/overview/tba1

Load Variation

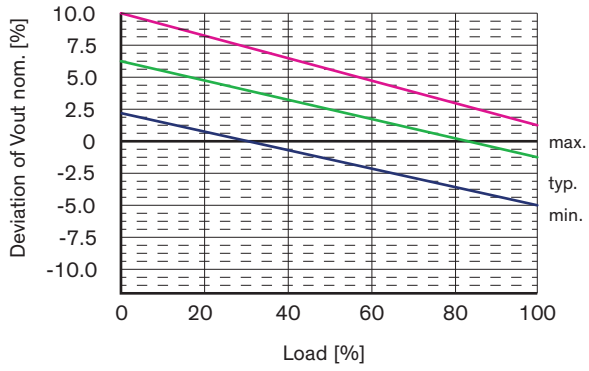
3.3 Vout models



5 Vout models



Other Vout models



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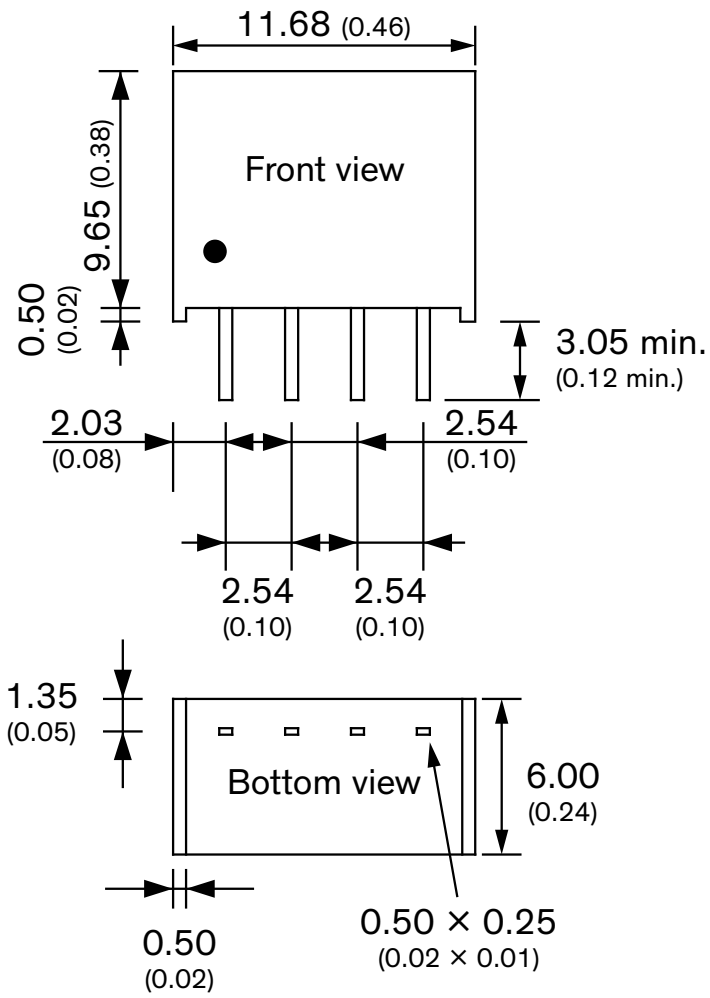
Outline Dimensions



Pin-Out	
Pin	**Single**
1	-Vin (GND)
2	+Vin (Vcc)
4	–Vout
5	+Vout

Dimensions in mm (Inch)
Tolerances: x.xx ±0.35 (±0.01)