TRACO POWER

DC/DC Converter
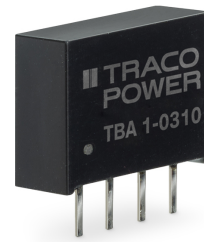
TBA 1 Series, 1 Watt

- **Continuous short circuit protection**
- **I/O isolation: 1'060 VAC**
- **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 waranty**

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

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		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.
	- Load Variation		(see application note: www.tracopower.com/overview/tba1)
Ripple and Noise	- 20 MHz Bandwidth		65 mVp-p typ.
			200 mVp-p 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 Vout models:	470 µF max.
		15 Vout models:	470 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			30 ms max.
Short Circuit Protection			Continuous, Automatic recovery

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	Designed for EN 60950-1 (no certification)

General Specifications

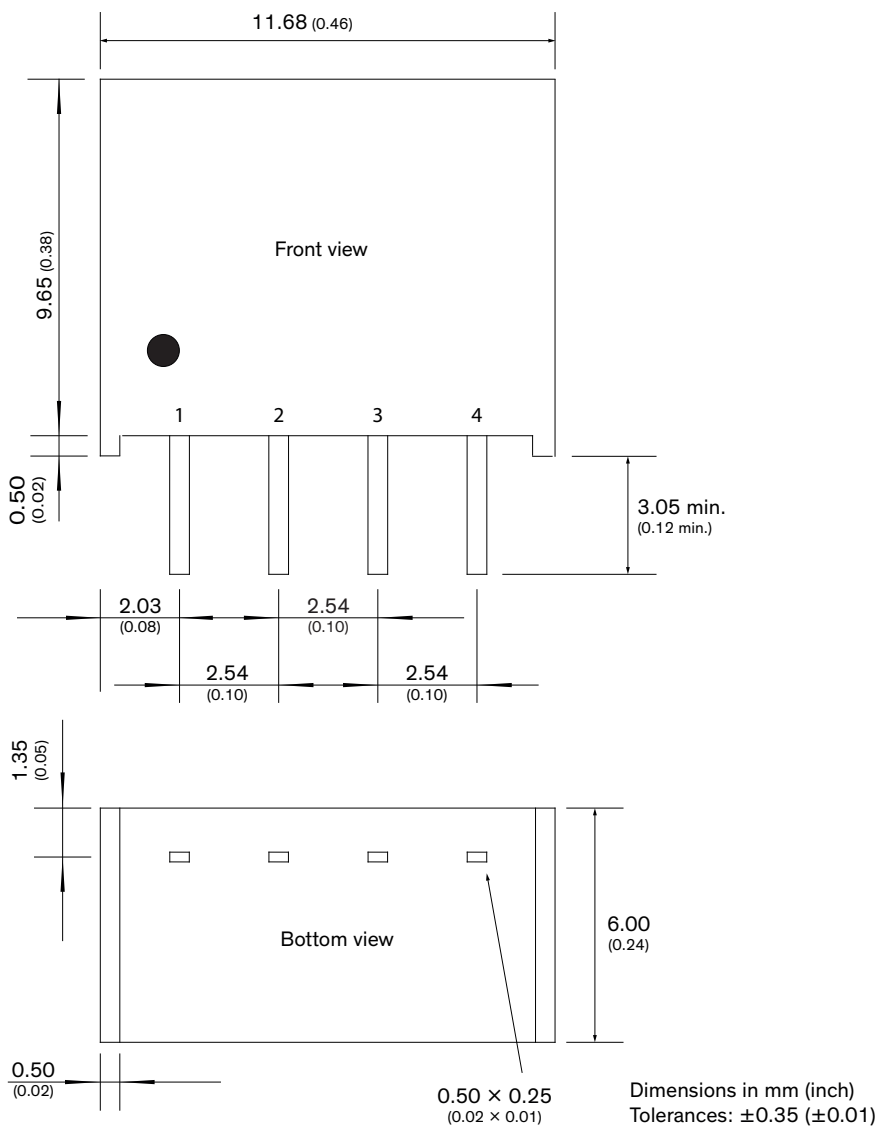|		
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	−40°C to +95°C
	- Case Temperature	+105°C max.
	- Storage Temperature	−55°C to +125°C
Power Derating	- High Temperature	5 %/K above 85°C
Cooling System		Natural convection (20 LFM)
Switching Frequency		50 - 200 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 max.
Reliability	- Calculated MTBF	2'000'000 h (MIL-HDBK-217F, ground benign)
Housing Material		Plastic (UL 94 V-0 rated)
Potting Material		Epoxy (UL 94 V-0 rated)

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

Pin Material	Nickel-Iron (Alloy 42)
Pin Foundation Plating	Nickel (1.5 µm min.)
Pin Surface Plating	Tin (3 µm min.), bright
Connection Type	THD (Through-Hole Device)
Weight	1.6 g
Environmental Compliance - Reach	www.tracopower.com/info/reach-declaration.pdf
- RoHS	www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tba1

Outline Dimensions

11.68 (0.46)

9.65 (0.38)

Front view

1 2 3 4

0.50 (0.02)

3.05 min. (0.12 min.)

2.03 (0.08) 2.54 (0.10)
2.54 (0.10) 2.54 (0.10)

1.35 (0.05)

Bottom view

6.00 (0.24)

0.50 (0.02)

0.50 × 0.25 (0.02 × 0.01)

Dimensions in mm (inch)
Tolerances: ±0.35 (±0.01)

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

Specifications can be changed without notice.