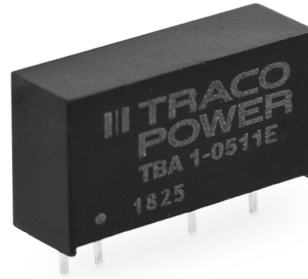


DC/DC Converter

TBA 1E 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 ($\pm 10\%$):
5, 12, 24 VDC
- High efficiency up to 82%
- SIP-7 plastic package
- Unregulated outputs
- 3-year product warranty



The TBA 1E 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 1-0511E	4.5 – 5.5 VDC (5 VDC nominal)	5 VDC	200 mA	79 %
TBA 1-0512E		12VDC	84 mA	82 %
TBA 1-0513E		15 VDC	66 mA	82 %
TBA 1-0521E		± 5 VDC	± 100 mA	79 %
TBA 1-0522E		± 12 VDC	± 41 mA	82 %
TBA 1-0523E		± 15 VDC	± 33 mA	82 %
TBA 1-1211E	10.8 – 13.2 VDC (12 VDC nominal)	5 VDC	200 mA	79 %
TBA 1-1212E		12 VDC	84 mA	80 %
TBA 1-1213E		15 VDC	66 mA	80 %
TBA 1-1221E		± 5 VDC	± 100 mA	79 %
TBA 1-1222E		± 12 VDC	± 41 mA	80 %
TBA 1-1223E		± 15 VDC	± 33 mA	80 %
TBA 1-2411E	21.6 – 26.4 VDC (24 VDC nominal)	5 VDC	200 mA	79 %
TBA 1-2412E		12 VDC	84 mA	82 %
TBA 1-2413E		15 VDC	66 mA	82 %
TBA 1-2421E		± 5 VDC	± 100 mA	79 %
TBA 1-2422E		± 12 VDC	± 41 mA	82 %
TBA 1-2423E		± 15 VDC	± 33 mA	82 %

Input Specifications

Input current at no load	5 Vin models: 25 mA typ. 12 Vin models: 15 mA typ. 24 Vin models: 10 mA typ.
Surge voltage (1 s 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	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 & ± 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 on page 3 – Cross regulation (at full load) dual output models: 1 % max.
Temperature coefficient	± 0.02 %/K max.
Ripple and noise (20 MHz Bandwidth)	100 mVp-p typ. / 150 mVp-p max. (for further reduction of ripple and noise, 10 μ F capacitor on output is recommended)
Short circuit protection	continuous, automatic recovery
Start up time	10 ms max.
Minimum load	10 % of full load
Capacitive load	– Single output models 5 Vout models: 2'200 μ F max. 12 Vout models: 470 μ F max. 15 Vout models: 470 μ F max. – Dual output models ± 5 Vout models: 2'200 μ F max. (each output) ± 12 Vout models: 470 μ F max. (each output) ± 15 Vout models: 220 μ F max. (each output)

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)	10 pF max.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)	2'000'000 h
Switching frequency	40 – 200 kHz (pulse width modulation)
Environmental compliance	– Reach – 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 (22 μ F) close to the converter's input pins.

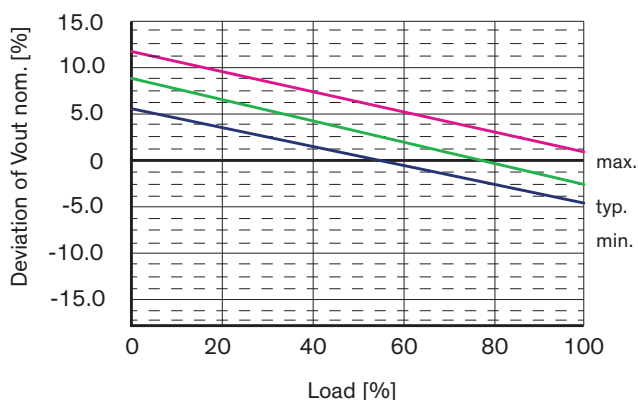
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

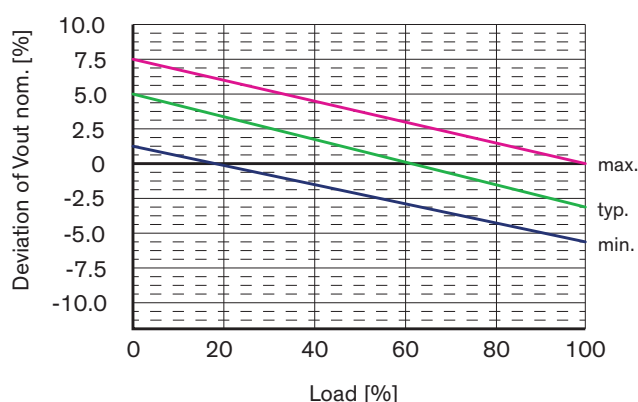
Casing material	Plastic (UL 94V-0 rated)
Potting material	Epoxy (UL 94V-0 rated)
Pin material	tinned copper
Package weight	2.3 g (0.08 oz)

Load Variation

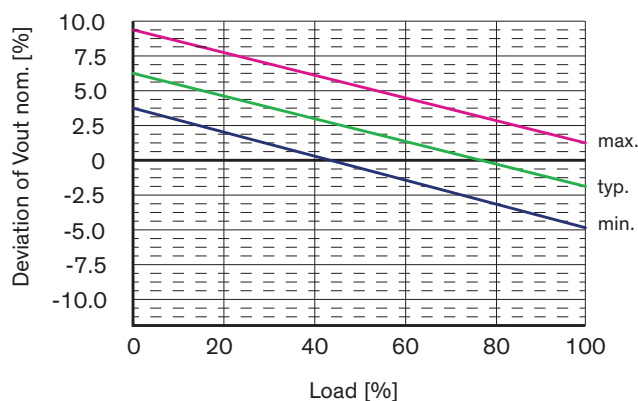
3.3 Vout models



5 Vout models

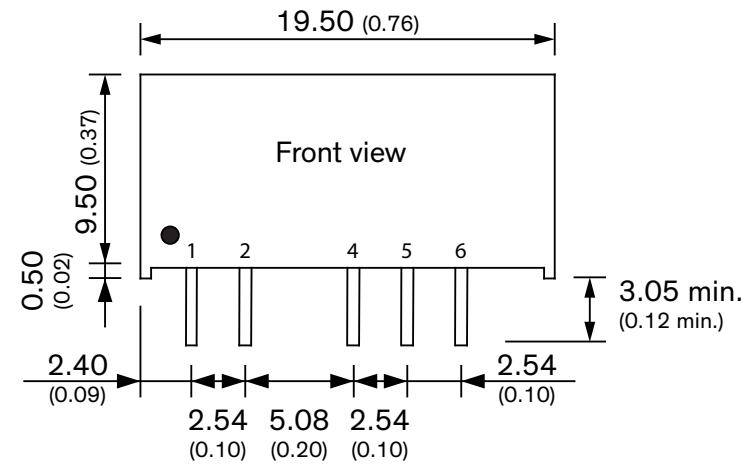


Other output models

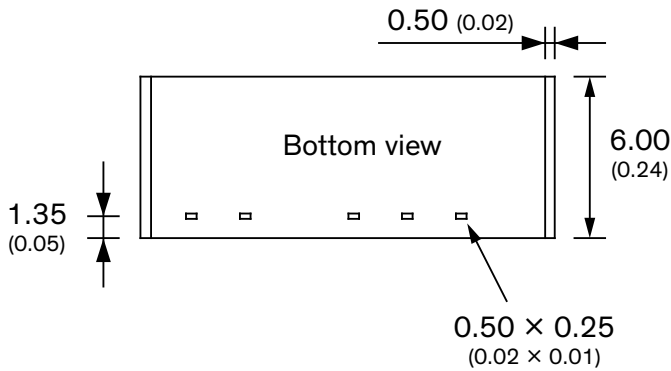


All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Outline Dimensions



Pin-Out		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin (GND)	-Vin (GND)
4	-Vout	-Vout
5	No Pin	Common
6	+Vout	+Vout



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

Specifications can be changed without notice!

Rev. May 10, 2019

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