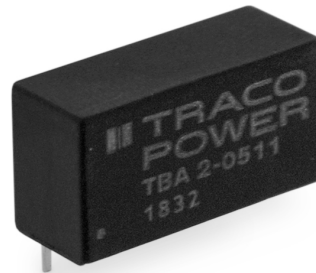


- Continuous short circuit protection
- I/O isolation: 1'500 VDC
- Operating temperature range  
-40 to +80 °C without derating
- Input voltage ranges ( $\pm 10\%$ ):  
5, 12, 24 VDC
- High efficiency up to 84%
- SIP-7 plastic package
- Unregulated outputs
- 3-year product warranty



The TBA 2 is an elementary 2 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  $-40^{\circ}\text{C}$  to  $80^{\circ}\text{C}$  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 2-0511	<b>4.5 – 5.5 VDC</b> (5 VDC nominal)	5 VDC	400 mA	78 %
TBA 2-0512		12 VDC	165 mA	82 %
TBA 2-0513		15 VDC	130 mA	82 %
TBA 2-0521		$\pm 5$ VDC	$\pm 200$ mA	79 %
TBA 2-0522		$\pm 12$ VDC	$\pm 80$ mA	82 %
TBA 2-0523		$\pm 15$ VDC	$\pm 65$ mA	82 %
TBA 2-1211	<b>10.8 – 13.2 VDC</b> (12 VDC nominal)	5 VDC	400 mA	79 %
TBA 2-1212		12 VDC	165 mA	82 %
TBA 2-1213		15 VDC	130 mA	84 %
TBA 2-1221		$\pm 5$ VDC	$\pm 200$ mA	79 %
TBA 2-1222		$\pm 12$ VDC	$\pm 80$ mA	83 %
TBA 2-1223		$\pm 15$ VDC	$\pm 65$ mA	84 %
TBA 2-2411	<b>21.6 – 26.4 VDC</b> (24 VDC nominal)	5 VDC	400 mA	78 %
TBA 2-2412		12 VDC	165 mA	84 %
TBA 2-2413		15 VDC	130 mA	84 %
TBA 2-2421		$\pm 5$ VDC	$\pm 200$ mA	80 %
TBA 2-2422		$\pm 12$ VDC	$\pm 80$ mA	84 %
TBA 2-2423		$\pm 15$ VDC	$\pm 65$ mA	84 %

## Input Specifications

Input current at no load	5 Vin models: 35 mA typ. 12 Vin models: 18 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: 1.0 A (slow blow type) 12 Vin models: 0.4 A (slow blow type) 24 Vin models: 0.2 A (slow blow type)

## Output Specifications

Voltage set accuracy	5 & $\pm 5$ Vout models: $\pm 3$ % max. (at 60 % load) other output models: $\pm 3$ % 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	$\pm 0.02$ %/K max.
Ripple and noise (20 MHz Bandwidth)	120 mVp-p typ. / 250 mVp-p max.
Short circuit protection	continuous, automatic recovery
Start up time	10 ms max.
Capacitive load	single output models: 470 $\mu$ F max. dual output models: 220 $\mu$ F max. (each output)

## General Specifications

Temperature ranges	– Operating (natural convection: 20 LFM, 0.1 m/s) –40°C to +90°C – Case temperature +95°C max. – Storage temperature –55°C to +125°C
Derating	6.67 %/K above 80°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)	20 pF max.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)	2'000'000 h
Switching frequency	30 – 200 kHz (pulse width modulation)
Environmental compliance	– Reach <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> – RoHS RoHS directive 2011/65/EU

## Physical Specifications

Casing material	Plastic (UL 94V-0 rated)
Potting material	Epoxy (UL 94V-0 rated)
Pin material	Tinned copper
Package weight	2.8 g (0.09 oz)

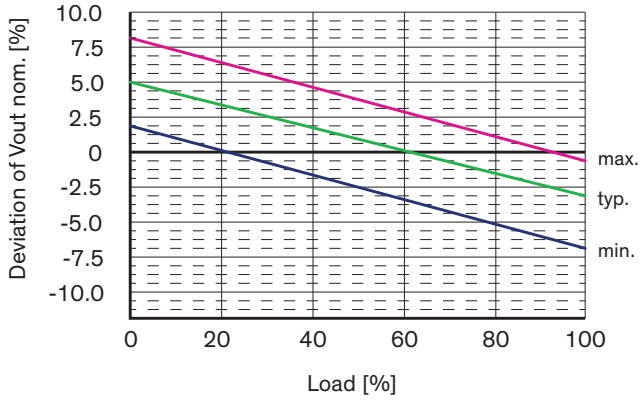
\*In case of long input lines or hot plug-in requirements, we recommended to use an external low ESR capacitor (22 $\mu$ F) near to the converter's input pins.

**Supporting Documents:** [www.tracopower.com/overview/tba2](http://www.tracopower.com/overview/tba2)

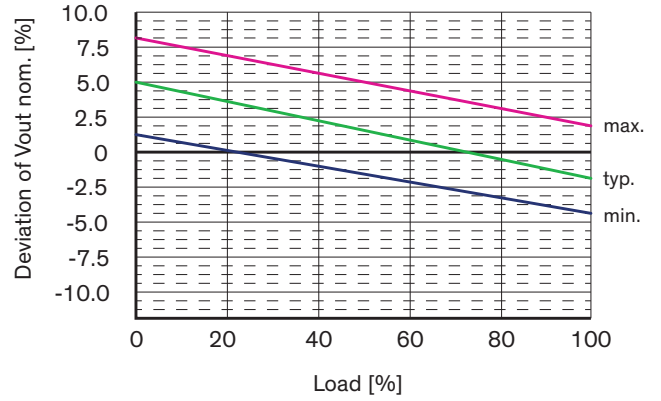
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

### Load Variation

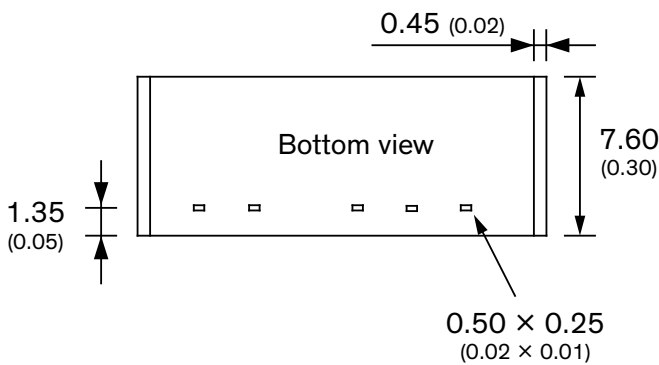
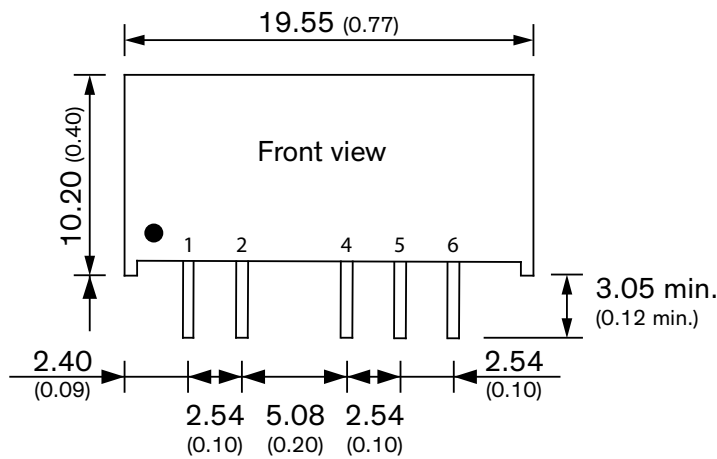
5 & ±5 Vout models



Other output models



### 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 ±0.25 (±0.01)