

- 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 package
- Unregulated outputs
- 3-year product warranty



The TBA 2 is a 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°C to 80°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 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TBA 2-0511	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	400 mA			78 %
TBA 2-0512		12 VDC	165 mA			82 %
TBA 2-0513		15 VDC	130 mA			82 %
TBA 2-0521		+5 VDC	200 mA	-5 VDC	200 mA	79 %
TBA 2-0522		+12 VDC	80 mA	-12 VDC	80 mA	82 %
TBA 2-0523		+15 VDC	65 mA	-15 VDC	65 mA	82 %
TBA 2-1211	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	400 mA			79 %
TBA 2-1212		12 VDC	165 mA			82 %
TBA 2-1213		15 VDC	130 mA			84 %
TBA 2-1221		+5 VDC	200 mA	-5 VDC	200 mA	79 %
TBA 2-1222		+12 VDC	80 mA	-12 VDC	80 mA	83 %
TBA 2-1223		+15 VDC	65 mA	-15 VDC	65 mA	84 %
TBA 2-2411	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	400 mA			78 %
TBA 2-2412		12 VDC	165 mA			84 %
TBA 2-2413		15 VDC	130 mA			84 %
TBA 2-2421		+5 VDC	200 mA	-5 VDC	200 mA	80 %
TBA 2-2422		+12 VDC	80 mA	-12 VDC	80 mA	84 %
TBA 2-2423		+15 VDC	65 mA	-15 VDC	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		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		5 Vin models: 1'000 mA (slow blow) 12 Vin models: 400 mA (slow blow) 24 Vin models: 200 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Capacitor (add. external 22 μ F, ESR <0.1 Ω , recommended)

Output Specifications

Voltage Set Accuracy		$\pm 3\%$ max. (at 60% for 5VDC models) $\pm 3\%$ max. (at 80% for other models)
Regulation	- Input Variation (1% Vin step) - Load Variation - Voltage Balance (symmetrical load)	single output models: 1.5% max. dual output models: 1.5% max. See application note: www.tracopower.com/overview/tba2 dual output models: 1% max.
Ripple and Noise	- 20 MHz Bandwidth	250 mVp-p max. 120 mVp-p typ.
Capacitive Load	- single output - dual output	5 Vout models: 470 μF max. 12 Vout models: 470 μF max. 15 Vout models: 470 μF max. 5 / -5 Vout models: 220 / 220 μF max. 12 / -12 Vout models: 220 / 220 μF max. 15 / -15 Vout models: 220 / 220 μF max.
Minimum Load		10 % of Iout max. (Operation at lower load will not damage the converter, but it may not meet all specifications)
Temperature Coefficient		± 0.02 %/K max.
Start-up Time		10 ms max.
Short Circuit Protection		Continuous, Automatic recovery

Safety Specifications

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

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +90°C +95°C max. -55°C to +125°C
Power Derating	- High Temperature	6.67 %/K above 80°C See application note: www.tracopower.com/overview/tba2
Cooling System		Natural convection (20 LFM)
Switching Frequency		30 - 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	20 pF max.
Reliability	- Calculated MTBF	2'000'000 h (MIL-HDBK-217F, ground benign)

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

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
Housing Type	Plastic Case
Mounting Type	PCB Mount
Connection Type	THD (Through-Hole Device)
Footprint Type	SIP7
Soldering Profile	Lead-Free Wave Soldering 265 °C / 5 s max.
Weight	2.8 g
Environmental Compliance	<p>- REACH Declaration www.tracopower.com/info/reach-declaration.pdf</p> <p>REACH SVHC list compliant</p> <p>REACH Annex XVII compliant</p> <p>- RoHS Declaration www.tracopower.com/info/rohs-declaration.pdf</p> <p>Exemptions: 7a, 7c-I</p> <p>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)</p> <p>- SCIP Reference Number 374bcf02-a65e-4583-a8ac-ef81e512a6a2</p>

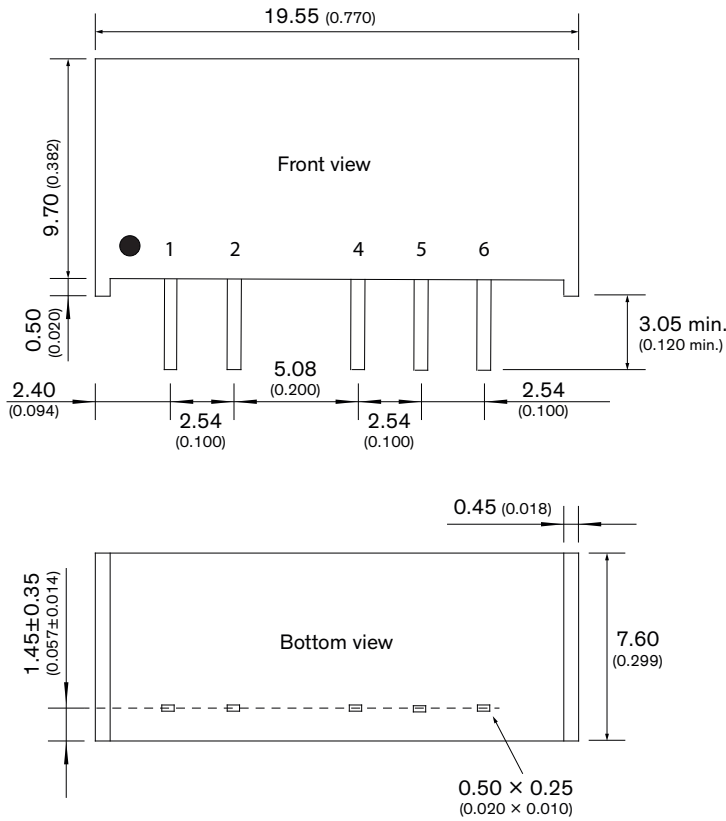
Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tba2

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

Outline Dimensions



Pinout		
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 (x.xxx ±0.01)
 Pin dimension tolerance: ±0.1 (±0.004)