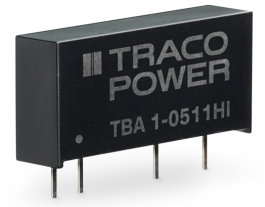
TRACO POWER

DC/DC Converter

TBA 1HI Series, 1 Watt

- **Continuous short circuit protection**
- **I/O isolation: 2'121 VAC**
- **Operating temperature range -40 to +85 °C without derating**
- **Input voltage ranges (±10%): 5, 12, 24 VDC**
- **High efficiency up to 82%**
- **SIP-7 package**
- **Unregulated outputs**
- **3-year product waranty**



The TBA 1HI 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 3'00 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
		Vnom	Imax	Vnom	Imax	typ.
TBA 1-0511HI	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	200 mA			79 %
TBA 1-0519HI		9 VDC	111 mA			80 %
TBA 1-0512HI		12 VDC	84 mA			82 %
TBA 1-0513HI		15 VDC	66 mA			82 %
TBA 1-0521HI		+5 VDC	100 mA	–5 VDC	100 mA	79 %
TBA 1-0522HI		+12 VDC	41 mA	–12 VDC	41 mA	82 %
TBA 1-0523HI		+15 VDC	33 mA	–15 VDC	33 mA	82 %
TBA 1-1211HI	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	200 mA			79 %
TBA 1-1219HI		9 VDC	111 mA			79 %
TBA 1-1212HI		12 VDC	84 mA			80 %
TBA 1-1213HI		15 VDC	66 mA			80 %
TBA 1-1221HI		+5 VDC	100 mA	–5 VDC	100 mA	79 %
TBA 1-1222HI		+12 VDC	41 mA	–12 VDC	41 mA	80 %
TBA 1-1223HI		+15 VDC	33 mA	–15 VDC	33 mA	80 %
TBA 1-2411HI	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	200 mA			79 %
TBA 1-2419HI		9 VDC	111 mA			80 %
TBA 1-2412HI		12 VDC	84 mA			82 %
TBA 1-2413HI		15 VDC	66 mA			82 %
TBA 1-2421HI		+5 VDC	100 mA	–5 VDC	100 mA	79 %
TBA 1-2422HI		+12 VDC	41 mA	–12 VDC	41 mA	82 %
TBA 1-2423HI		+15 VDC	33 mA	–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		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:	**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)	single output models:	**1.5% max.**
		dual output models:	**1.5% max.**
	- Load Variation	See application note:	www.tracopower.com/overview/tba1hi
	- Voltage Balance (symmetrical load)	dual output models:	**1% max.**
Ripple and Noise	- 20 MHz Bandwidth		**100 mVp-p typ.**
			150 mVp-p max.
Capacitive Load	- single output	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.**
	- dual output	5 / -5 Vout models:	**2'200 / 2'200 µF max.**
		12 / -12 Vout models:	**470 / 470 µF max.**
		15 / -15 Vout models:	**220 / 220 µF max.**
Minimum Load			**10 % of Iout max.**
Temperature Coefficient			**±0.02 %/K max.**
Start-up Time			**10 ms max.**
Short Circuit Protection			**Continuous, Automatic recovery**

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	**Designed for EN 62368-1** (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		**40 - 200 kHz** (PWM)
Insulation System		**Functional Insulation**
Isolation Test Voltage	- Input to Output, 60 s	**3'000 VDC**
Isolation Resistance	- Input to Output, 500 VDC	**1'000 MΩ min.**
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	**10 pF max.**
Reliability	- Calculated MTBF	**2'000'000 h** (MIL-HDBK-217F, ground benign)
Washing Process		**Not allowed**
Housing Material		**Plastic** (UL 94 V-0 rated)

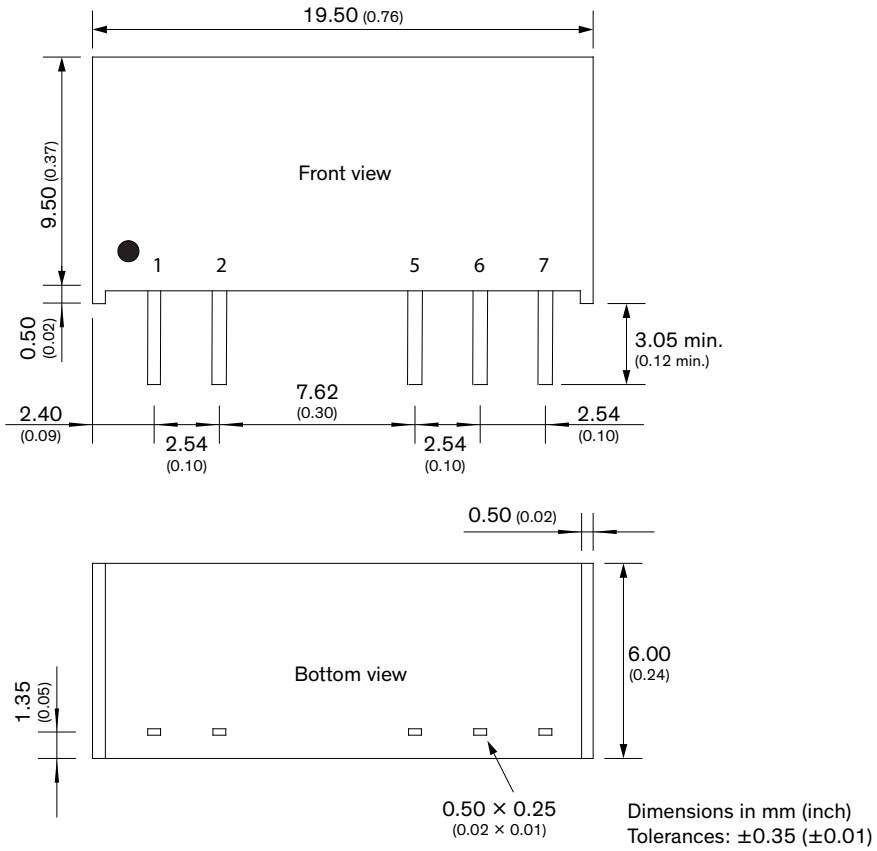
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

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
Weight	2.3 g
Environmental Compliance - REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tba1hi

Outline Dimensions



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

Pinout		
Pin	**Single**	**Dual**
1	+Vin (Vcc)	+Vin (Vcc)
2	–Vin (GND)	–Vin (GND)
5	–Vout	–Vout
6	No pin	Common
7	+Vout	+Vout

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