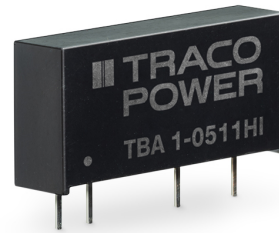


- Continuous short circuit protection
- I/O isolation: 2'121 VAC
- Operating temperature range  
-40 to +85 °C without derating
- Input voltage ranges ( $\pm 10\%$ ):  
5, 12, 24 VDC
- High efficiency up to 82%
- SIP-7 package
- Unregulated outputs
- 3-year product warranty



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  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  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 typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
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: <b>25 mA typ.</b> 12 Vin models: <b>15 mA typ.</b> 24 Vin models: <b>10 mA typ.</b>
Surge Voltage		5 Vin models: <b>9 VDC max.</b> (1 s max.) 12 Vin models: <b>18 VDC max.</b> (1 s max.) 24 Vin models: <b>30 VDC max.</b> (1 s max.)
Recommended Input Fuse		5 Vin models: <b>500 mA</b> (slow blow) 12 Vin models: <b>200 mA</b> (slow blow) 24 Vin models: <b>100 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		<b>Internal Capacitor</b> (add. external 22 $\mu$ F (ESR <0.1 $\Omega$ ) recommended)

### Output Specifications

Voltage Set Accuracy		<b><math>\pm 3\%</math> max.</b> (at 60% for 5VDC models) <b><math>\pm 3\%</math> max.</b> (at 80% for other models)
Regulation	- Input Variation (1% Vin step) - Load Variation - Voltage Balance (symmetrical load)	single output models: <b>1.5% max.</b> dual output models: <b>1.5% max.</b> (see application note: <a href="http://www.tracopower.com/overview/tba1hi">www.tracopower.com/overview/tba1hi</a> ) dual output models: <b>1% max.</b>
Ripple and Noise	- 20 MHz Bandwidth	<b>100 mVp-p typ.</b> <b>150 mVp-p max.</b>
Capacitive Load	- single output - dual output	5 Vout models: <b>2'200 <math>\mu</math>F max.</b> 9 Vout models: <b>1'000 <math>\mu</math>F max.</b> 12 Vout models: <b>470 <math>\mu</math>F max.</b> 15 Vout models: <b>470 <math>\mu</math>F max.</b> 5 / -5 Vout models: <b>2'200 / 2'200 <math>\mu</math>F max.</b> 12 / -12 Vout models: <b>470 / 470 <math>\mu</math>F max.</b> 15 / -15 Vout models: <b>220 / 220 <math>\mu</math>F max.</b>
Minimum Load		<b>10 % of Iout max.</b>
Temperature Coefficient		<b><math>\pm 0.02</math> %/K max.</b>
Start-up Time		<b>10 ms max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	<b>Designed for EN 60950-1</b> (no certification)
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### General Specifications

Relative Humidity		<b>95% max.</b> (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	<b>-40°C to +95°C</b> <b>+105°C max.</b> <b>-55°C to +125°C</b>
Power Derating	- High Temperature	<b>5 %/K above 85°C</b>
Cooling System		<b>Natural convection</b> (20 LFM)
Switching Frequency		<b>40 - 200 kHz</b> (PWM)
Insulation System		<b>Functional Insulation</b>
Isolation Test Voltage	- Input to Output, 60 s	<b>3'000 VDC</b>
Isolation Resistance	- Input to Output, 500 VDC	<b>1'000 M<math>\Omega</math> min.</b>
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	<b>10 pF max.</b>
Reliability	- Calculated MTBF	<b>2'000'000 h</b> (MIL-HDBK-217F, ground benign)
Housing Material		<b>Plastic</b> (UL 94 V-0 rated)

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

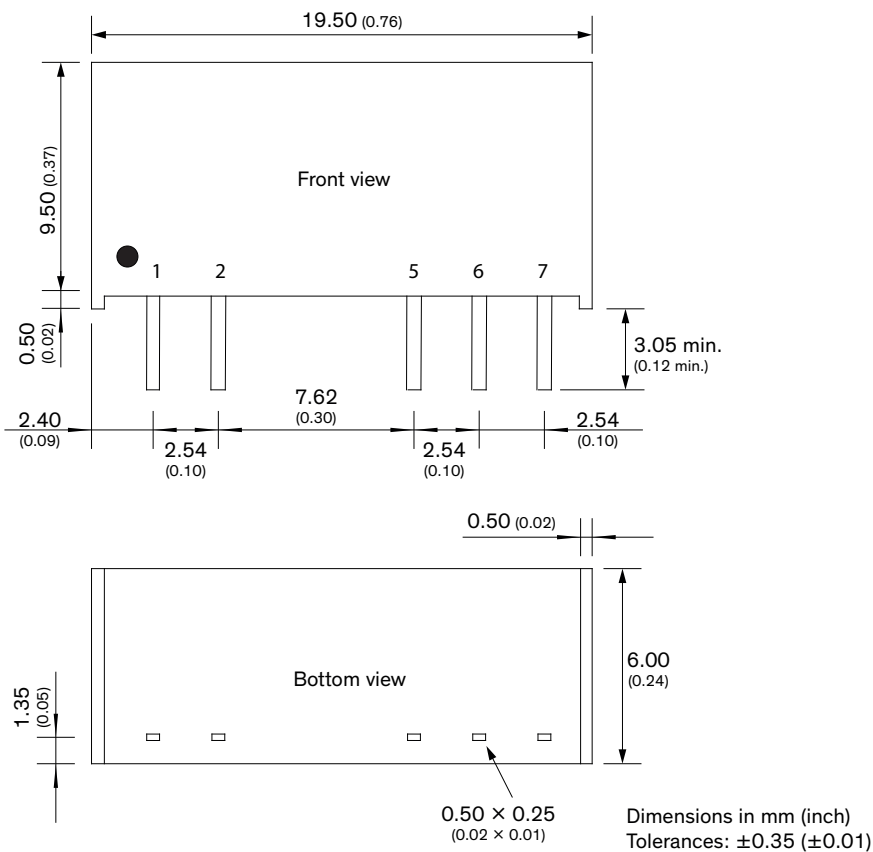
Potting Material	Epoxy (UL 94 V-0 rated)
Pin Material	Nickel-Iron (Alloy 42)
Pin Foundation Plating	Nickel (1.5 $\mu\text{m}$ min.)
Pin Surface Plating	Tin (3 $\mu\text{m}$ min.), bright
Connection Type	THD (Through-Hole Device)
Weight	2.3 g
Environmental Compliance	- Reach - RoHS
	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tba1hi](http://www.tracopower.com/overview/tba1hi)

### Outline Dimensions



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