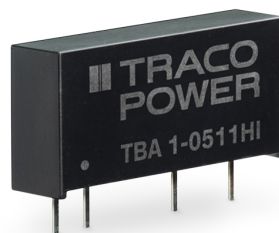


- Continuous short circuit protection
- I/O isolation: 2'121 VAC
- Operating temperature range  
-40 to +85 °C without derating
- Input voltage ranges ( $\pm 10\%$ ):  
5, 12, 24 VDC
- High efficiency up to 82%
- SIP-7 package
- Unregulated outputs
- 3-year product warranty



The TBA 1HI is 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  $-40^{\circ}\text{C}$  to  $85^{\circ}\text{C}$  without derating and I/O-isolations of either 2'121 VAC. 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<br>(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<br>(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<br>(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><br>12 Vin models: <b>15 mA typ.</b><br>24 Vin models: <b>10 mA typ.</b>                                    |
| Surge Voltage          |              | 5 Vin models: <b>9 VDC max.</b> (1 s max.)<br>12 Vin models: <b>18 VDC max.</b> (1 s max.)<br>24 Vin models: <b>30 VDC max.</b> (1 s max.) |
| Recommended Input Fuse |              | 5 Vin models: <b>500 mA</b> (slow blow)<br>12 Vin models: <b>200 mA</b> (slow blow)<br>24 Vin models: <b>100 mA</b> (slow blow)            |
| Input Filter           |              | <b>Internal Capacitor</b><br>(external capacitor recommended)                                                                              |

## Output Specifications

|                          |                                                                                                  |                                                                                                                                                                                                                                                                                                                |
|--------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage Set Accuracy     |                                                                                                  | <b>±3% max.</b> (at 60% for 5VDC models)<br><b>±3% max.</b> (at 80% for other models)                                                                                                                                                                                                                          |
| Regulation               | - Input Variation (Vmin - Vmax)<br>- Load Variation<br><br>- Cross Regulation (symmetrical load) | single output models: <b>1.5% max.</b> (at 1% change of Vin)<br>(see application note:<br><a href="http://www.tracopower.com/overview/tba1hi">www.tracopower.com/overview/tba1hi</a> )<br><br>dual output models: <b>1% max.</b>                                                                               |
| Ripple and Noise         | - 20 MHz Bandwidth                                                                               | <b>150 mVp-p max.</b><br><b>100 mVp-p typ.</b>                                                                                                                                                                                                                                                                 |
| Capacitive Load          | - single output<br><br>- dual output                                                             | 5 Vout models: <b>2'200 µF max.</b><br>9 Vout models: <b>1'000 µF max.</b><br>12 Vout models: <b>470 µF max.</b><br>15 Vout models: <b>470 µF max.</b><br>5 / -5 Vout models: <b>2'200 / 2'200 µF max.</b><br>12 / -12 Vout models: <b>470 / 470 µF max.</b><br>15 / -15 Vout models: <b>220 / 220 µF max.</b> |
| Minimum Load             |                                                                                                  | <b>10 % of Iout max.</b>                                                                                                                                                                                                                                                                                       |
| Temperature Coefficient  |                                                                                                  | <b>±0.02 %/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 (no certification)</b> |
|------------------|-----------------------------|---------------------------------------------------|

## General Specifications

|                        |                                                                        |                                                                       |
|------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Relative Humidity      |                                                                        | <b>95% max.</b> (non condensing)                                      |
| Temperature Ranges     | - Operating Temperature<br>- Case Temperature<br>- Storage Temperature | <b>-40°C to +95°C</b><br><b>+105°C max.</b><br><b>-55°C to +125°C</b> |
| Power Derating         | - High Temperature                                                     | <b>5 %/K above 85°C</b>                                               |
| Cooling System         |                                                                        | <b>Natural convection (20 LFM)</b>                                    |
| Switching Frequency    |                                                                        | <b>40 - 200 kHz (PWM)</b>                                             |
| Insulation System      |                                                                        | <b>Functional Insulation</b>                                          |
| Isolation Test Voltage | - Input to Output, 60 s                                                | <b>2'121 VAC</b>                                                      |
| Isolation Resistance   | - Input to Output, 500 VDC                                             | <b>1'000 MOhm min.</b>                                                |
| Isolation Capacitance  | - Input to Output, 100 kHz, 1 V                                        | <b>10 pF max.</b>                                                     |
| Reliability            | - Calculated MTBF                                                      | <b>2'000'000 h (MIL-HDBK-217F, ground benign)</b>                     |
| Housing Material       |                                                                        | <b>Plastic (UL 94 V-0 rated)</b>                                      |
| Potting Material       |                                                                        | <b>Epoxy (UL 94 V-0 rated)</b>                                        |
| Pin Material           |                                                                        | <b>Tinned Copper</b>                                                  |
| Connection Type        |                                                                        | <b>THD (Through-Hole Device)</b>                                      |

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

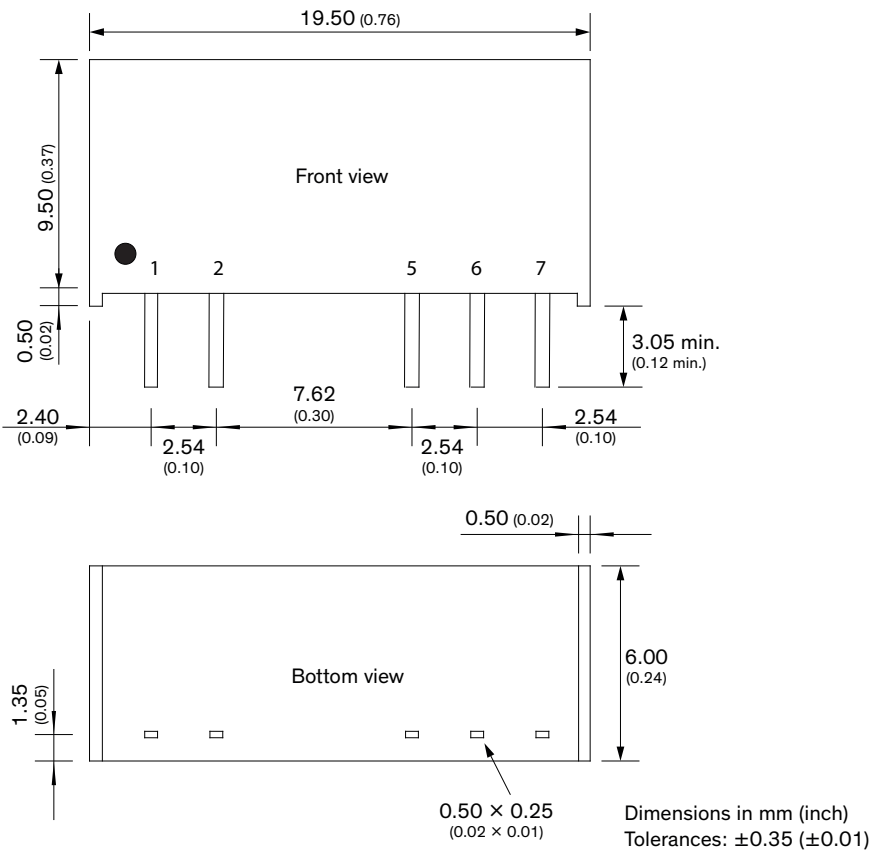
|                          |                                                                                                                                                                                                                                    |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weight                   | 2.3 g                                                                                                                                                                                                                              |
| Environmental Compliance | - Reach<br>- RoHS                                                                                                                                                                                                                  |
|                          | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br><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      |

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