

- 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 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 (Unregulated) | - 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) |
|-----------|-----------------------------|---|

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 | www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant 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).) 374bcf02-a65e-4583-a8ac-ef81e512a6a2 |
| | - REACH Declaration |
| | - RoHS Declaration |
| | - SCIP Reference Number |

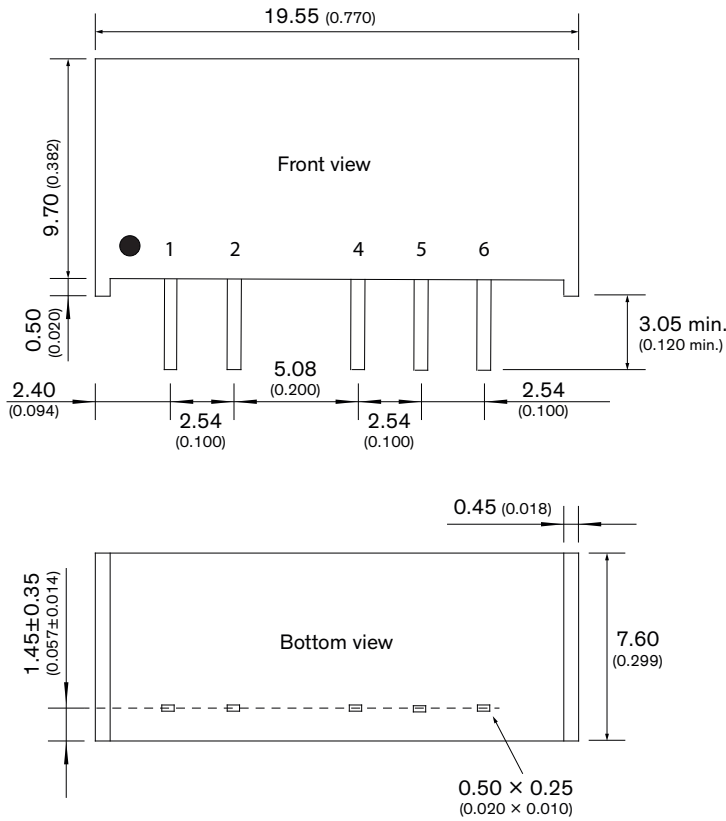
Supporting Documents

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)