

- Industry standard pinout
- Unregulated outputs
- Single and dual output models
- I/O isolation voltage 1000VDC
- High efficiency
- Operating temperature range $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$
- 3-year product warranty



The TMA series are miniature, isolated 1 W DC/DC-converters in a Single-in-Line package (SIP). Requiring only 1.2 cm² board space they offer the ideal solution in many space critical applications for board level power distribution. The use of SMD technology makes it possible to offer a product with high performance at low cost.

| Models | | | | | | |
|------------|----------------------------------|----------|------------------|----------|------------------|-----------------|
| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency typ. |
| | | Vnom | I _{max} | Vnom | I _{max} | |
| TMA 0505S | 4.5 - 5.5 VDC (5 VDC nom.) | 5 VDC | 200 mA | | | 71 % |
| TMA 0512S | | 12 VDC | 84 mA | | | 78 % |
| TMA 0515S | | 15 VDC | 67 mA | | | 78 % |
| TMA 0505D | | +5 VDC | 100 mA | -5 VDC | 100 mA | 72 % |
| TMA 0512D | | +12 VDC | 42 mA | -12 VDC | 42 mA | 78 % |
| TMA 0515D | | +15 VDC | 34 mA | -15 VDC | 34 mA | 79 % |
| TMA 1205S | 10.8 - 13.2 VDC (12 VDC nom.) | 5 VDC | 200 mA | | | 73 % |
| TMA 1212S | | 12 VDC | 84 mA | | | 80 % |
| TMA 1215S | | 15 VDC | 67 mA | | | 80 % |
| TMA 1205D | | +5 VDC | 100 mA | -5 VDC | 100 mA | 74 % |
| TMA 1212D | | +12 VDC | 42 mA | -12 VDC | 42 mA | 81 % |
| TMA 1215D | | +15 VDC | 34 mA | -15 VDC | 34 mA | 81 % |
| TMA 1505S | 13.5 - 16.5 VDC (15 VDC nom.) | 5 VDC | 200 mA | | | 72 % |
| TMA 1512S | | 12 VDC | 84 mA | | | 79 % |
| TMA 1515S | | 15 VDC | 67 mA | | | 79 % |
| TMA 1505D | | +5 VDC | 100 mA | -5 VDC | 100 mA | 72 % |
| TMA 1512D | | +12 VDC | 42 mA | -12 VDC | 42 mA | 80 % |
| TMA 1515D | | +15 VDC | 34 mA | -15 VDC | 34 mA | 80 % |
| TMA 2405S | 21.6 - 26.4 VDC (24 VDC nom.) | 5 VDC | 200 mA | | | 71 % |
| TMA 2412S | | 12 VDC | 84 mA | | | 78 % |
| TMA 2415S | | 15 VDC | 67 mA | | | 79 % |
| TMA 2405D | | +5 VDC | 100 mA | -5 VDC | 100 mA | 72 % |
| TMA 2412D | | +12 VDC | 42 mA | -12 VDC | 42 mA | 79 % |
| TMA 2415D | | +15 VDC | 34 mA | -15 VDC | 34 mA | 80 % |

Input Specifications

| | | |
|------------------------|----------------|--|
| Input Current | - At no load | 5 Vin models: 30 mA typ. 12 Vin models: 12 mA typ. 15 Vin models: 11 mA typ. 24 Vin models: 7 mA typ. |
| | - At full load | 5 Vin models: 270 mA typ. 12 Vin models: 110 mA typ. 15 Vin models: 90 mA typ. 24 Vin models: 55 mA typ. |
| Surge Voltage | | 5 Vin models: 9 VDC max. (1 s max.) 12 Vin models: 18 VDC max. (1 s max.) 15 Vin models: 18 VDC max. (1 s max.) 24 Vin models: 30 VDC max. (1 s max.) |
| Recommended Input Fuse | | (The need of an external fuse has to be assessed in the final application.) |
| Input Filter | | Internal Capacitor |

Output Specifications

| | | |
|-----------------------------|---|---|
| Voltage Set Accuracy | | ±3% max. |
| Regulation (Unregulated) | - Input Variation (1% Vin step) | single output models: 1.5% max. dual output models: 1.5% max. |
| | - Load Variation - Voltage Balance (symmetrical load) | See application note: www.tracopower.com/tma-cc dual output models: 1% max. |
| Ripple and Noise | - 20 MHz Bandwidth | 75 mVp-p max. 50 mVp-p typ. |
| Capacitive Load | - single output | 5 Vout models: 220 µF max. 12 Vout models: 220 µF max. 15 Vout models: 220 µF max. |
| | - dual output | 5 / -5 Vout models: 100 / 100 µF max. 12 / -12 Vout models: 100 / 100 µF max. 15 / -15 Vout models: 100 / 100 µF max. |
| Minimum Load | | See application note: www.tracopower.com/tma-cc (Operation at lower load will not damage the converter, but it may not meet all specifications) |
| Temperature Coefficient | | ±0.02 %/K max. |
| Short Circuit Protection | | Limited 0.5 s max., Automatic recovery |

Safety Specifications

| | | |
|-----------------------|-----------------------------|--|
| Standards | - IT / Multimedia Equipment | Designed for IEC/EN/UL 62368-1 (not certified) |
| Over Voltage Category | | Not mains connected |

EMC Specifications

| | | |
|-----------------|---------------------------|--|
| EMI (Emissions) | - Conducted Emissions | EN 55032 class A (with external filter) |
| | - Radiated Emissions | EN 55032 class A (with external filter) |
| | External filter proposal: | www.tracopower.com/tma-emc-filter |

General Specifications

| | | |
|--------------------|-------------------------|----------------------------------|
| Relative Humidity | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | -40°C to +85°C |
| | - Case Temperature | +105°C max. |
| | - Storage Temperature | -50°C to +125°C |

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

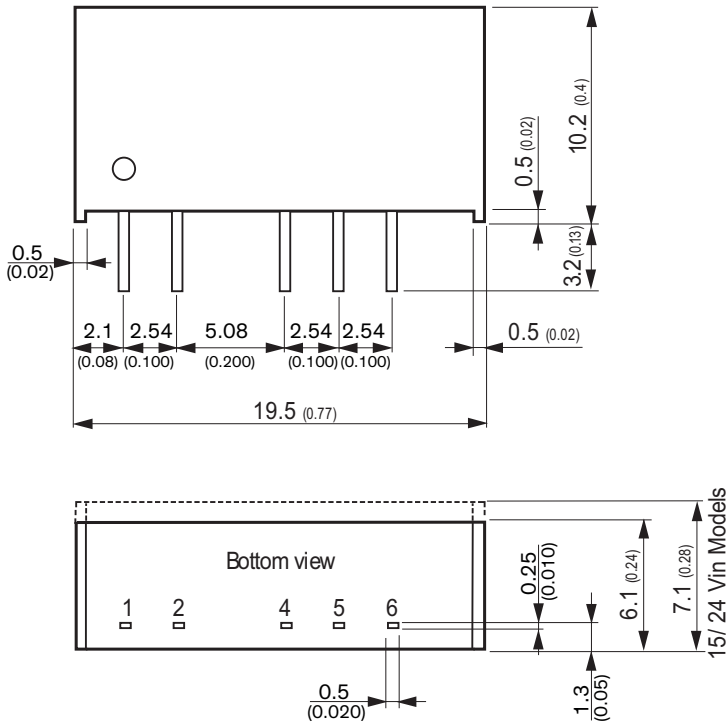
| | | |
|--------------------------|---|---|
| Power Derating | - High Temperature | 4.0 %/K above 75°C (5 Vout models) 4.0 %/K above 80°C (other models) |
| | | See application note: www.tracopower.com/tma-cc |
| Cooling System | | Natural convection (20 LFM) |
| Switching Frequency | | 70 - 120 kHz (PFM) 100 kHz typ. (PFM) |
| Insulation System | | Functional Insulation |
| Isolation Test Voltage | - Input to Output, 60 s | 1'000 VDC |
| Isolation Resistance | - Input to Output, 500 VDC | 1'000 MΩ min. |
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V | 60 pF typ. 100 pF max. |
| Reliability | - Calculated MTBF | 5'000'000 h (3.3 & 5 Vout models) 4'000'000 h (9 Vout models) 2'300'000 h (other models) (MIL-HDBK-217F, ground benign) |
| Washing Process | | According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf |
| Housing Material | | Non-conductive 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 μm min.) |
| Pin Surface Plating | | Tin (3 - 5 μm), matte |
| Housing Type | | Plastic Case |
| Mounting Type | | PCB Mount |
| Connection Type | | THD (Through-Hole Device) |
| Footprint Type | | SIP7 |
| Soldering Profile | | Lead-Free Wave Soldering 260°C / 10 s max. |
| Weight | 5 Vin models: 12 Vin models: 15 Vin models: 24 Vin models: | 2.2 g 2.2 g 2.6 g 2.6 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: No Exemptions |

Additional Information

| | |
|----------------------------|--|
| Supporting Documents | www.tracopower.com/overview/tma |
| Frequently Asked Questions | www.tracopower.com/glossary-faq |
| Glossary | www.tracopower.com/info/glossary.pdf |

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)
 Tolerance: x.x ±0.25 (x.xx ±0.01)
 x.xx ±0.13 (x.xxx ±0.005)
 Pin tolerance: ±0.05 (±0.002)

