

#### Features

- ◆ Single-in-line (SIP) package
- ◆ Single and dual output models
- ◆ I/O isolation 1'000 VDC
- ◆ High efficiency up to 81%
- ◆ Operating temp. range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- ◆ Industry standard pinout
- ◆ 100% Burn-in (8 h)
- ◆ Lead free design, RoHS compliant
- ◆ 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 cm<sup>2</sup> 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

| Ordercode | Input voltage    | Output voltage | Output current max. | Efficiency typ. |
|-----------|------------------|----------------|---------------------|-----------------|
| TMA 0505S | 5 VDC $\pm$ 10%  | 5 VDC          | 200 mA              | 71 %            |
| TMA 0512S |                  | 12 VDC         | 80 mA               | 78 %            |
| TMA 0515S |                  | 15 VDC         | 65 mA               | 78 %            |
| TMA 0505D |                  | $\pm$ 5 VDC    | $\pm$ 100 mA        | 72 %            |
| TMA 0512D |                  | $\pm$ 12 VDC   | $\pm$ 40 mA         | 78 %            |
| TMA 0515D |                  | $\pm$ 15 VDC   | $\pm$ 35 mA         | 79 %            |
| TMA 1205S | 12 VDC $\pm$ 10% | 5 VDC          | 200 mA              | 73 %            |
| TMA 1212S |                  | 12 VDC         | 80 mA               | 80 %            |
| TMA 1215S |                  | 15 VDC         | 65 mA               | 80 %            |
| TMA 1205D |                  | $\pm$ 5 VDC    | $\pm$ 100 mA        | 74 %            |
| TMA 1212D |                  | $\pm$ 12 VDC   | $\pm$ 40 mA         | 81 %            |
| TMA 1215D |                  | $\pm$ 15 VDC   | $\pm$ 35 mA         | 81 %            |
| TMA 1505S | 15 VDC $\pm$ 10% | 5 VDC          | 200 mA              | 73 %            |
| TMA 1512S |                  | 12 VDC         | 80 mA               | 80 %            |
| TMA 1515S |                  | 15 VDC         | 65 mA               | 80 %            |
| TMA 1505D |                  | $\pm$ 5 VDC    | $\pm$ 100 mA        | 74 %            |
| TMA 1512D |                  | $\pm$ 12 VDC   | $\pm$ 40 mA         | 81 %            |
| TMA 1515D |                  | $\pm$ 15 VDC   | $\pm$ 35 mA         | 81 %            |
| TMA 2405S | 24 VDC $\pm$ 10% | 5 VDC          | 200 mA              | 71 %            |
| TMA 2412S |                  | 12 VDC         | 80 mA               | 78 %            |
| TMA 2415S |                  | 15 VDC         | 65 mA               | 79 %            |
| TMA 2405D |                  | $\pm$ 5 VDC    | $\pm$ 100 mA        | 72 %            |
| TMA 2412D |                  | $\pm$ 12 VDC   | $\pm$ 40 mA         | 79 %            |
| TMA 2415D |                  | $\pm$ 15 VDC   | $\pm$ 35 mA         | 80 %            |

## Input Specifications

|                                  |                                                                                                                                                   |
|----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Input current no load /full load | 5 Vin models: 30 mA / 260 mA typ.<br>12 Vin models: 12 mA / 110 mA typ.<br>15 Vin models: 12 mA / 100 mA typ.<br>24 Vin models: 7 mA / 55 mA typ. |
| Surge voltage (1 sec. max.)      | 5 Vin models: 9 V max.<br>12 Vin models: 18 V max.<br>15 Vin models: 21 V max.<br>24 Vin models: 30 V max.                                        |
| Reverse voltage protection       | 0.3 A max.                                                                                                                                        |
| Reflected input ripple current   | can be reduced by ext. 1–3.3 µF polyester film capacitor                                                                                          |
| Input filter                     | internal capacitors                                                                                                                               |

## Output Specifications

|                                      |                                                  |
|--------------------------------------|--------------------------------------------------|
| Voltage set accuracy                 | ±3 %                                             |
| Voltage balance (dual output models) | ±1 % max.                                        |
| Regulation                           | – Input variation<br>– Load variation 20 – 100 % |
|                                      | ±1.2 % / 1 % change Vin<br>±10 % max.            |
| Ripple and noise (20 MHz Bandwidth)  | 100 mVp-p typ.                                   |
| Temperature coefficient              | ±0.02 %/K                                        |
| Short circuit protection             | limited 1 sec. max.                              |
| Capacitive load                      | – Single output models<br>– Dual output models   |
|                                      | 220 µF max.<br>100 µF max.                       |

## General Specifications

|                                                                       |                                                |                                                                                                                                                       |
|-----------------------------------------------------------------------|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature ranges                                                    | – Operating<br>– Case temperature<br>– Storage | –40°C to +85°C<br>+95°C max.<br>–40°C to +105°C                                                                                                       |
| Humidity (non condensing)                                             |                                                | 95 % rel H max.                                                                                                                                       |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) |                                                | >2'000'000 h                                                                                                                                          |
| Isolation voltage (input/output)                                      |                                                | 1'000 VDC                                                                                                                                             |
| Isolation capacitance (input/output)                                  |                                                | 60 pF typ.                                                                                                                                            |
| Isolation resistance (input/output)                                   |                                                | >1'000 Mohm                                                                                                                                           |
| Switching frequency                                                   |                                                | 100 kHz typ. (frequency modulation)                                                                                                                   |
| Frequency change over line and load                                   |                                                | ±30 % max.                                                                                                                                            |
| Environmental compliance                                              | – Reach<br>– RoHS                              | <a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a><br>RoHS directive 2011/65/EU |

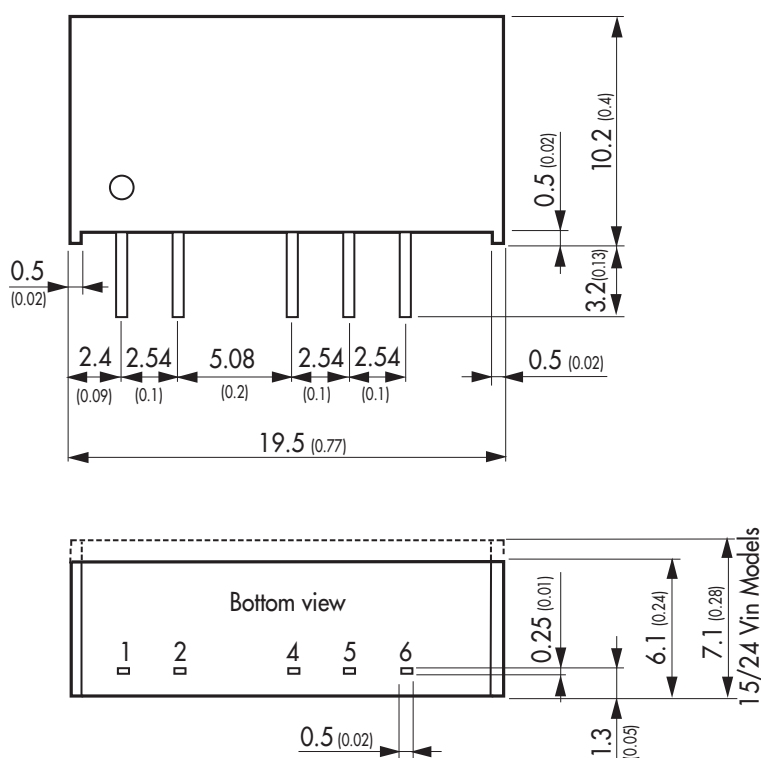
**Application note:** [www.tracopower.com/products/tma-application.pdf](http://www.tracopower.com/products/tma-application.pdf)

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

## Physical Specifications

|                       |                                               |                 |
|-----------------------|-----------------------------------------------|-----------------|
| Casing material       | non conductive black plastic (UL 94V-0 rated) |                 |
| Package weight        | Single output models:                         | 2.1 g (0.07 oz) |
|                       | Dual output models:                           | 2.6 g (0.09 oz) |
| Soldering temperature | max. 265°C / 10 sec                           |                 |

## Outline Dimensions mm (inches)



| Pin-Out |            |            |
|---------|------------|------------|
| Pin     | Single     | Dual       |
| 1       | +Vin (Vcc) | +Vin (Vcc) |
| 2       | -Vin (GND) | -Vin (GND) |
| 4       | -Vout      | -Vout      |
| 5       | No pin     | Common     |
| 6       | +Vout      | +Vout      |

Tolerances  $\pm 0.25$  ( $\pm 0.01$ )

Pin pitch tolerances  $\pm 0.13$  ( $\pm 0.005$ )

pins  $\pm 0.05$  ( $\pm 0.002$ )

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)