



**THE DATASHEET OF  
TRA 3-1212**



- Unregulated outputs
- Highest power density 3W SIP-Converter
- Industry standard pinout
- High efficiency up to 89%
- I/O isolation voltage 1000 VDC
- Operating temperature range -40°C to +95°C
- 3-year product warranty



UL 62368-1 IEC 62368-1

The TRA 3 series are miniature, I/O-isolated 3W DC/DC-converters with unregulated outputs. They are the ideal solution to power drivers and circuits where unregulated DC/DC converters do not meet the input voltage range at load change

| Models     |                                  |                     |                     |                 |
|------------|----------------------------------|---------------------|---------------------|-----------------|
| Order Code | Input Voltage Range              | Output Voltage nom. | Output Current max. | Efficiency typ. |
| TRA 3-0511 | 4.5 - 5.5 VDC<br>(5 VDC nom.)    | 5 VDC               | 600 mA              | 83 %            |
| TRA 3-0519 |                                  | 9 VDC               | 333 mA              | 87 %            |
| TRA 3-0512 |                                  | 12 VDC              | 250 mA              | 86 %            |
| TRA 3-0513 |                                  | 15 VDC              | 200 mA              | 88 %            |
| TRA 3-1211 | 10.8 - 13.2 VDC<br>(12 VDC nom.) | 5 VDC               | 600 mA              | 84 %            |
| TRA 3-1219 |                                  | 9 VDC               | 333 mA              | 88 %            |
| TRA 3-1212 |                                  | 12 VDC              | 250 mA              | 88 %            |
| TRA 3-1213 |                                  | 15 VDC              | 200 mA              | 89 %            |
| TRA 3-2411 | 21.6 - 26.4 VDC<br>(24 VDC nom.) | 5 VDC               | 600 mA              | 82 %            |
| TRA 3-2419 |                                  | 9 VDC               | 333 mA              | 85 %            |
| TRA 3-2412 |                                  | 12 VDC              | 250 mA              | 86 %            |
| TRA 3-2413 |                                  | 15 VDC              | 200 mA              | 85 %            |

### Input Specifications

|                        |                |                                                                                                                                                                                                                    |
|------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Current          | - At no load   | 5 Vin models: <b>50 mA typ.</b><br>12 Vin models: <b>40 mA typ.</b><br>24 Vin models: <b>30 mA typ.</b>                                                                                                            |
|                        | - At full load | 5 Vin models: <b>700 mA max.</b><br>12 Vin models: <b>285 mA max.</b><br>24 Vin models: <b>150 mA max.</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>2'000 mA</b> (slow blow)<br>12 Vin models: <b>1'000 mA</b> (slow blow)<br>24 Vin models: <b>500 mA</b> (slow blow)<br>(The need of an external fuse has to be assessed in the final application.) |
| Input Filter           |                | <b>Internal Capacitor</b>                                                                                                                                                                                          |

### Output Specifications

|                             |                                                     |                                                                                                                                  |
|-----------------------------|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Voltage Set Accuracy        |                                                     | <b>±3% max.</b> (at 80% load)                                                                                                    |
| Regulation<br>(Unregulated) | - Input Variation (1% Vin step)<br>- Load Variation | <b>1.2% max.</b><br>See application note: <a href="http://www.tracopower.com/overview/tra3">www.tracopower.com/overview/tra3</a> |
| Ripple and Noise            | - 20 MHz Bandwidth                                  | <b>100 mVp-p max.</b>                                                                                                            |
| Capacitive Load             |                                                     | <b>220 µF max.</b>                                                                                                               |
| Minimum Load                |                                                     | <b>2 % of Iout max.</b><br>(Operation at lower load will not damage the converter, but it may not meet all specifications)       |
| Temperature Coefficient     |                                                     | <b>±0.02 %/K max.</b>                                                                                                            |
| Short Circuit Protection    |                                                     | <b>Limited 0.5 s max., Automatic recovery</b>                                                                                    |

### Safety Specifications

|                       |                             |                                                                                                                                           |
|-----------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Standards             | - IT / Multimedia Equipment | CSA-C22.2, No. 60950-1<br>EN 60950-1<br>EN 62368-1<br>IEC 60950-1<br>IEC 62368-1<br>UL 60950-1<br>UL 62368-1<br>- Certification Documents |
| Pollution Degree      |                             | <b>PD 3</b>                                                                                                                               |
| Over Voltage Category |                             | <b>Not mains connected</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>+100°C max.</b><br><b>-50°C to +125°C</b>                                                                   |
| Power Derating            | - High Temperature                                                     | <b>5 %/K above 85°C</b><br>See application note: <a href="http://www.tracopower.com/overview/tra3">www.tracopower.com/overview/tra3</a> |
| Cooling System            |                                                                        | <b>Natural convection</b> (20 LFM)                                                                                                      |
| Altitude During Operation |                                                                        | <b>6'000 m max.</b>                                                                                                                     |
| Switching Frequency       |                                                                        | <b>60 kHz min.</b> (PWM)                                                                                                                |
| Insulation System         |                                                                        | <b>Functional Insulation</b>                                                                                                            |
| Isolation Test Voltage    | - Input to Output, 60 s<br>- Input to Output, 1 s                      | <b>1'000 VDC</b><br><b>1'200 VDC</b>                                                                                                    |
| Isolation Resistance      | - Input to Output, 500 VDC                                             | <b>1'000 MΩ min.</b>                                                                                                                    |

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

|                          |                                 |                                                                                                                                                                                                                                                                    |
|--------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Isolation Capacitance    | - Input to Output, 100 kHz, 1 V | 60 pF typ.<br>120 pF max.                                                                                                                                                                                                                                          |
| Reliability              | - Calculated MTBF               | 2'000'000 h (MIL-HDBK-217F, ground benign)                                                                                                                                                                                                                         |
| Washing Process          |                                 | According to Cleaning Guideline<br><a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>                                                                                                                                  |
| Housing Material         |                                 | Non-conductive Plastic (UL 94 V-0 rated)                                                                                                                                                                                                                           |
| Potting Material         |                                 | Silicone (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<br>260°C / 10 s max.                                                                                                                                                                                                                      |
| Weight                   |                                 | 2.2 g                                                                                                                                                                                                                                                              |
| Environmental Compliance | - REACH Declaration             | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant                                                                                        |
|                          | - RoHS Declaration              | <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule),) |
|                          | - SCIP Reference Number         | 482311f2-60f6-4845-a3ce-39ba02ae88f0                                                                                                                                                                                                                               |

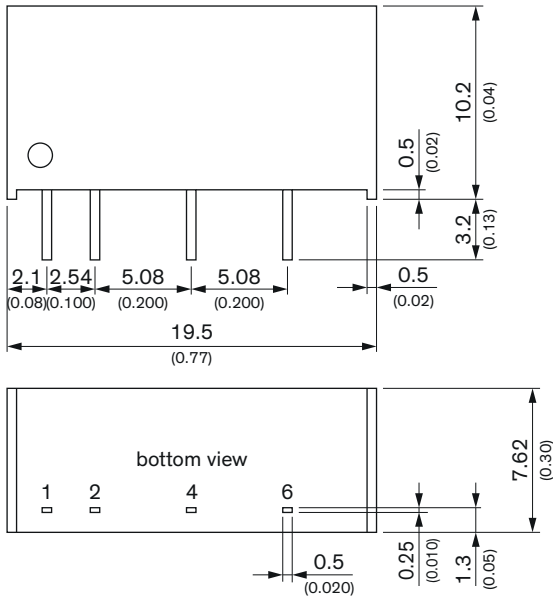
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tra3](http://www.tracopower.com/overview/tra3)

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

**Outline Dimensions**





| Pinout |            |
|--------|------------|
| Pin    | Function   |
| 1      | +Vin (Vcc) |
| 2      | -Vin (GND) |
| 4      | -Vout      |
| 6      | +Vout      |

Dimensions in mm (inch)  
 Tolerance: x.x ±0.25 (x.xx ±0.01)  
               x.xx ±0.13 (x.xxx ±0.005)  
 Pins: ±0.05 (±0.002)

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View TRA 3-1212 on WIN SOURCE](#)
-  [Traco Power Information](#)

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