

- Semi-regulated output (load)
- 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 a semi load regulation. 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 (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 (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 (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> 12 Vin models: <b>40 mA typ.</b> 24 Vin models: <b>30 mA typ.</b>
	- At full load	5 Vin models: <b>700 mA max.</b> 12 Vin models: <b>285 mA max.</b> 24 Vin models: <b>150 mA max.</b>
Surge Voltage		5 Vin models: <b>9 VDC max.</b> (1 s max.) 12 Vin models: <b>18 VDC max.</b> (1 s max.) 24 Vin models: <b>30 VDC max.</b> (1 s max.)
Recommended Input Fuse		5 Vin models: <b>2'000 mA</b> (slow blow) 12 Vin models: <b>1'000 mA</b> (slow blow) 24 Vin models: <b>500 mA</b> (slow blow) (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	- Input Variation (1% Vin step) - Load Variation	<b>1.2% max.</b> 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> (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

Safety Standards	- IT / Multimedia Equipment	CSA-C22.2, No. 60950-1 EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1 - 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 - Case Temperature - Storage Temperature	<b>-40°C to +95°C</b> <b>+100°C max.</b> <b>-50°C to +125°C</b>
Power Derating	- High Temperature	<b>5 %/K above 85°C</b> 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 - Input to Output, 1 s	<b>1'000 VDC</b> <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. 120 pF max.
Reliability	- Calculated MTBF	2'000'000 h (MIL-HDBK-217F, ground benign)
Washing Process		Allowed (hermetical product)
	See Cleaning Guideline:	<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		Wave Soldering 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> REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	<a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> <b>Exemptions: 7a, 7c-I</b> (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

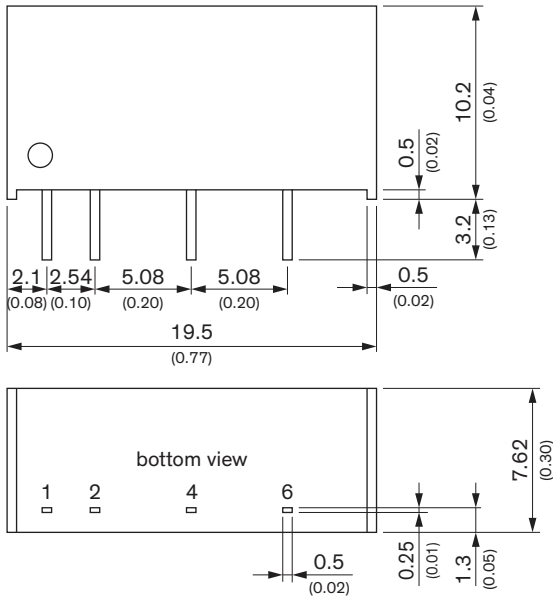
## Supporting Documents

Overview Link (for additional Documents)

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

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### 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)