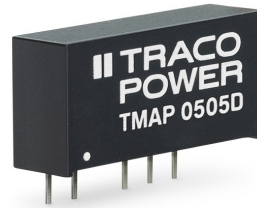


- 1 Watt DC/DC converter in SIP-7-package
- Overload and short circuit protection
- I/O isolation 3'000 VDC (functional)
- Extended operating temperature range -40°C to 85°C without derating
- High efficiency up to 84% typ.
- Industry standard pinout
- 3-year product warranty



The TMAP series is a range of 1 Watt DC/DC converters in compact SIP-7 package with overload and short circuit protection. An excellent efficiency allows these converters to operate up to +85°C without derating. In addition these converters offer a 3'000 VDC I/O isolation. This series is thus suitable for many industrial applications.

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TMAP 0505S	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	200 mA			78 %
TMAP 0509S		9 VDC	110 mA			81 %
TMAP 0512S		12 VDC	84 mA			82 %
TMAP 0515S		15 VDC	86 mA			83 %
TMAP 0505D		+5 VDC	100 mA	-5 VDC	100 mA	81 %
TMAP 0512D		+12 VDC	42 mA	-12 VDC	42 mA	81 %
TMAP 0515D		+15 VDC	34 mA	-15 VDC	34 mA	81 %
TMAP 1205S	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	200 mA			80 %
TMAP 1209S		9 VDC	110 mA			82 %
TMAP 1212S		12 VDC	84 mA			84 %
TMAP 1215S		15 VDC	86 mA			83 %
TMAP 1205D		+5 VDC	100 mA	-5 VDC	100 mA	81 %
TMAP 1212D		+12 VDC	42 mA	-12 VDC	42 mA	82 %
TMAP 1215D		+15 VDC	34 mA	-15 VDC	34 mA	82 %
TMAP 2405S	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	200 mA			81 %
TMAP 2409S		9 VDC	110 mA			79 %
TMAP 2412S		12 VDC	84 mA			82 %
TMAP 2415S		15 VDC	86 mA			82 %
TMAP 2405D		+5 VDC	100 mA	-5 VDC	100 mA	80 %
TMAP 2412D		+12 VDC	42 mA	-12 VDC	42 mA	81 %
TMAP 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: 17 mA typ. 24 Vin models: 10 mA typ.
	- At full load	5 Vin models: 250 mA typ. 12 Vin models: 102 mA typ. 24 Vin models: 52 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: 500 mA (slow blow) 12 Vin models: 200 mA (slow blow) 24 Vin models: 100 mA (slow blow) (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	- Input Variation (1% Vin step)	single output models: 1.5% max. dual output models: 1.5% max.
	- Load Variation	See application note: www.tracopower.com/overview/tmap
	- Voltage Balance (symmetrical load)	dual output models: 1% max.
Ripple and Noise	- 20 MHz Bandwidth	100 mVp-p max. 60 mVp-p typ.
Capacitive Load	- single output	5 Vout models: 200 µF max. 9 Vout models: 200 µF max. 12 Vout models: 200 µF max. 15 Vout models: 200 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		2 % 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.
Short Circuit Protection		Continuous, Automatic recovery

Safety Specifications

Standards	- IT / Multimedia Equipment	Designed for IEC/EN/UL 62368-1 (not certified)
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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/overview/tmap

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

EMS Immunity		EN 55024 (IT Equipment) EN 55035 (Multimedia)
- Electrostatic Discharge	Air:	EN 61000-4-2, ± 8 kV, perf. criteria A
- RF Electromagnetic Field	Contact:	EN 61000-4-2, ± 6 kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 1 kV, perf. criteria A
- EFT (Burst) / Surge	Ext. input component:	5 Vin: 100 μ F / 25 V KY 1.5KE7.5CA TVS 12 Vin: 560 μ F / 50 V KY 1.5KE18CA TVS 24 Vin: 820 μ F / 50 V KY
- Conducted RF Disturbances	Continuous:	EN 61000-4-6, 10 Vrms, perf. criteria A
- PF Magnetic Field		EN 61000-4-8, 3 A/m, perf. criteria A

General Specifications

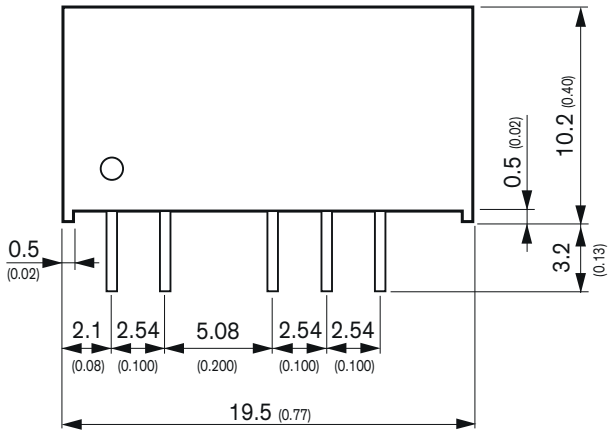
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +90°C +95°C max. -50°C to +125°C
Power Derating	- High Temperature	10 %/K above 85°C
	See application note:	www.tracopower.com/overview/tmap
Cooling System		Natural convection (20 LFM)
Switching Frequency		40 - 110 kHz (PWM) 75 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	3'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	10'000 M Ω min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	20 pF typ.
Reliability	- Calculated MTBF	3'700'000 h (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		Silicone (UL 94 V-0 rated)
Pin Material		Nickel-Iron (Alloy 42)
Pin Foundation Plating		Nickel (1 μ m min.)
Pin Surface Plating		Tin (3 - 5 μ m), 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		3.1 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: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule.))
	- SCIP Reference Number	1696b05b-2b76-4034-bfeb-ac1c83926f44

Supporting Documents

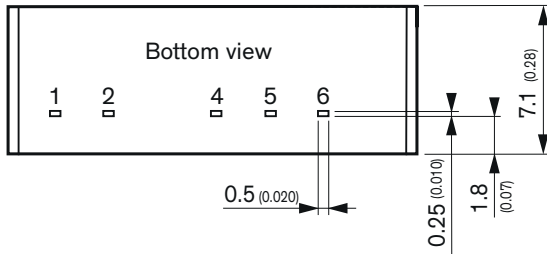
Overview Link (for additional Documents)	www.tracopower.com/overview/tmap
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All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Outline Dimensions



Pinout		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
4	-Vout	-Vout
5	No pin	Common
6	+Vout	+Vout



All dimensions in mm (inches)

Tolerance: X.X ±0.5 (X.XX±0.02)

X.XX ±0.25 (X.XXX±0.01)

Pin tolerance: ±0.05 (±0.002)