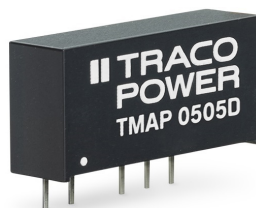


- 1 Watt DC/DC converter in SIP-7-package
- Overload and short circuit protection
- I/O isolation 3'000 VDC (functional)
- Extended operating temperature range -40°C to 85°C without derating
- High efficiency up to 84% typ.
- Industry standard pinout
- 3-year product warranty



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	60 mVp-p typ. 100 mVp-p max.
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

Safety Standards	- IT / Multimedia Equipment	Designed for EN 62368-1 (no certification)
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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.

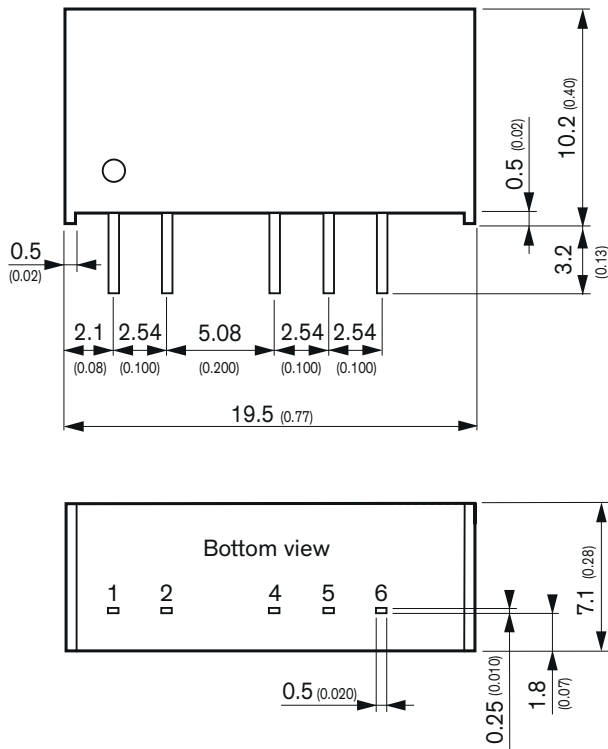
EMS Immunity		EN 55024 (IT Equipment)
		EN 55035 (Multimedia)
	Air:	EN 61000-4-2, ± 8 kV, perf. criteria A
	Contact:	EN 61000-4-2, ± 6 kV, perf. criteria A
		EN 61000-4-3, 10 V/m, perf. criteria A
		EN 61000-4-4, ± 2 kV, perf. criteria A
		EN 61000-4-5, ± 1 kV, perf. criteria A
	Ext. input component:	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
		EN 61000-4-6, 10 Vrms, perf. criteria A
	Continuous:	EN 61000-4-8, 3 A/m, perf. criteria A
	- Electrostatic Discharge	
	- RF Electromagnetic Field	
	- EFT (Burst) / Surge	
	- Conducted RF Disturbances	
	- PF Magnetic Field	

General Specifications		
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +90°C
	- Case Temperature	+95°C max.
	- Storage Temperature	-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		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). The SCIP number is provided on request.)

Supporting Documents	
Overview Link (for additional Documents)	www.tracopower.com/overview/tmap

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)