



THE DATASHEET OF TMA 2412D



- Industry standard pinout
- Non-regulated output
- Single and dual output models
- I/O isolation voltage 1000VDC
- High efficiency
- Operating temperature range $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$
- 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 cm² 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						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TMA 0505S	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	200 mA			71 %
TMA 0512S		12 VDC	84 mA			78 %
TMA 0515S		15 VDC	67 mA			78 %
TMA 0505D		+5 VDC	100 mA	-5 VDC	100 mA	72 %
TMA 0512D		+12 VDC	42 mA	-12 VDC	42 mA	78 %
TMA 0515D		+15 VDC	34 mA	-15 VDC	34 mA	79 %
TMA 1205S	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	200 mA			73 %
TMA 1212S		12 VDC	84 mA			80 %
TMA 1215S		15 VDC	67 mA			80 %
TMA 1205D		+5 VDC	100 mA	-5 VDC	100 mA	74 %
TMA 1212D		+12 VDC	42 mA	-12 VDC	42 mA	81 %
TMA 1215D		+15 VDC	34 mA	-15 VDC	34 mA	81 %
TMA 1505S	13.5 - 16.5 VDC (15 VDC nom.)	5 VDC	200 mA			72 %
TMA 1512S		12 VDC	84 mA			79 %
TMA 1515S		15 VDC	67 mA			79 %
TMA 1505D		+5 VDC	100 mA	-5 VDC	100 mA	72 %
TMA 1512D		+12 VDC	42 mA	-12 VDC	42 mA	80 %
TMA 1515D		+15 VDC	34 mA	-15 VDC	34 mA	80 %
TMA 2405S	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	200 mA			71 %
TMA 2412S		12 VDC	84 mA			78 %
TMA 2415S		15 VDC	67 mA			79 %
TMA 2405D		+5 VDC	100 mA	-5 VDC	100 mA	72 %
TMA 2412D		+12 VDC	42 mA	-12 VDC	42 mA	79 %
TMA 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: 12 mA typ. 15 Vin models: 11 mA typ. 24 Vin models: 7 mA typ.
	- At full load	5 Vin models: 270 mA typ. 12 Vin models: 110 mA typ. 15 Vin models: 90 mA typ. 24 Vin models: 55 mA typ.
Surge Voltage		5 Vin models: 9 VDC max. (1 s max.) 12 Vin models: 18 VDC max. (1 s max.) 15 Vin models: 18 VDC max. (1 s max.) 24 Vin models: 30 VDC max. (1 s max.)
Recommended Input Fuse		(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/tma
	- Voltage Balance (symmetrical load)	dual output models: 1% max.
Ripple and Noise	- 20 MHz Bandwidth	75 mVp-p max. 50 mVp-p typ.
Capacitive Load	- single output	5 Vout models: 220 µF max. 12 Vout models: 220 µF max. 15 Vout models: 220 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		Limited 0.5 s max., Automatic recovery

Safety Specifications

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

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/tma

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Case Temperature	+105°C max.
	- Storage Temperature	-50°C to +125°C
Power Derating	- High Temperature	4 %/K above 75°C (5 & ±5 Vout models) 4 %/K above 80°C (other models)
		See application note: www.tracopower.com/overview/tma
Cooling System		Natural convection (20 LFM)

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

Switching Frequency		70 - 120 kHz (PFM) 100 kHz typ. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	60 pF typ. 100 pF max.
Reliability	- Calculated MTBF	5'000'000 h (3.3 & 5 Vout models) 4'000'000 h (9 Vout models) 2'300'000 h (other models) (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		Epoxy (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 260°C / 10 s max.
Weight	5 Vin models: 12 Vin models: 15 Vin models: 24 Vin models:	2.2 g 2.2 g 2.6 g 2.6 g
Environmental Compliance	- REACH Declaration - RoHS Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant www.tracopower.com/info/rohs-declaration.pdf Exemptions: No Exemptions

Supporting Documents



Overview Link (for additional Documents)

www.tracopower.com/overview/tma

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

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View TMA 2412D on WIN SOURCE](#)
-  [Traco Power Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management