

- Fully encapsulated low profile plastic case
- Ultra wide 4:1 input voltage range
- Operating temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- I/O isolation 2500 VDC
- Excellent efficiency up to 92 %
- Input filter to meet EN 55022, class A
- Optional DIN-Rail mount adapter
- Power good LED indicator
- Remote on/off function
- 3-year product warranty



The TMDC 60 Series is a range of encapsulated high performance DC/DC converter modules with ultra wide input voltage ranges. With a very high efficiency of up to 92% and the use of highest grade components these 60 W converters can be operated in an ambient temperature range of  $-40^{\circ}\text{C}$  up to  $70^{\circ}\text{C}$  with full load and up to  $85^{\circ}\text{C}$  with 50% load reduction. The EMC immunity is aligned for industrial applications and DIN-rail mount adapters are available as option. Remote On/Off function and power good LED indicator makes this unit a practical and reliable DC source for any application - Fit and forget!

### Models

Order Code	Input Voltage Range	Output Voltage nom.	Output Current max.	Efficiency typ.
TMDC 60-2411	9 - 36 VDC (24 VDC nom.)	5.1 VDC	12'000 mA	90 %
TMDC 60-2412		12 VDC	5'000 mA	91 %
TMDC 60-2415		24 VDC	2'500 mA	91 %
TMDC 60-2418		48 VDC	1'250 mA	91 %
TMDC 60-4811	18 - 75 VDC (48 VDC nom.)	5.1 VDC	12'000 mA	91 %
TMDC 60-4812		12 VDC	5'000 mA	92 %
TMDC 60-4815		24 VDC	2'500 mA	91 %
TMDC 60-4818		48 VDC	1'250 mA	91 %

### Options

TMP-MK2	- Optional DIN-Rail Mounting Kit: <a href="http://www.tracopower.com/products/tmp-mk2.pdf">www.tracopower.com/products/tmp-mk2.pdf</a>
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### Input Specifications

Input Current	- At no load	24 Vin models: 100 mA typ. 48 Vin models: 50 mA typ.
	- At full load	24 Vin models: 2'770 mA typ. 48 Vin models: 1'380 mA typ.
Surge Voltage		24 Vin models: 50 VDC max. (100 ms max.) 48 Vin models: 100 VDC max. (100 ms max.)
Under Voltage Lockout		24 Vin models: 7.5 VDC typ. 48 Vin models: 16 VDC typ.
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Pi-Type

### Output Specifications

Voltage Set Accuracy		±2% max.
Regulation	- Input Variation (Vmin - Vmax)	1.5% max.
	- Load Variation (0 - 100%)	1% max.
Ripple and Noise (20 MHz Bandwidth)	5.1 Vout models:	100 mVp-p max.
	12 Vout models:	150 mVp-p max.
	24 Vout models:	150 mVp-p max.
	48 Vout models:	200 mVp-p max.
Capacitive Load	5.1 Vout models:	20'400 µF max.
	12 Vout models:	3'540 µF max.
	24 Vout models:	890 µF max.
	48 Vout models:	220 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Start-up Time		50 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		150% typ. of Iout max.
Overvoltage Protection		120% typ. of Vout nom. (By Zener diode)
Transient Response	- Response Deviation	5% max. (75% to 100% Load Step)
	- Response Time	250 µs typ. (75% to 100% Load Step)

### 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	<a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>
Pollution Degree		PD 2

### EMC Specifications

EMI Emissions	- Conducted Emissions	EN 61000-6-4 (Generic Industrial) EN 61204-3 (Low Voltage Power Supplies) EN 55032 class A (internal filter) FCC Part 15 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (with external filter) FCC Part 15 class A (with external filter)
	External filter proposal:	<a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>

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, $\pm 8$ kV, perf. criteria A
	- RF Electromagnetic Field	Contact: EN 61000-4-2, $\pm 4$ kV, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-3, 10 V/m, perf. criteria A
	- Conducted RF Disturbances	EN 61000-4-4, $\pm 2$ kV, perf. criteria A
	- PF Magnetic Field	EN 61000-4-5, $\pm 2$ kV, perf. criteria A
		EN 61000-4-6, 10 Vrms, perf. criteria A
		Continuous: EN 61000-4-8, 30 A/m, perf. criteria A

## General Specifications

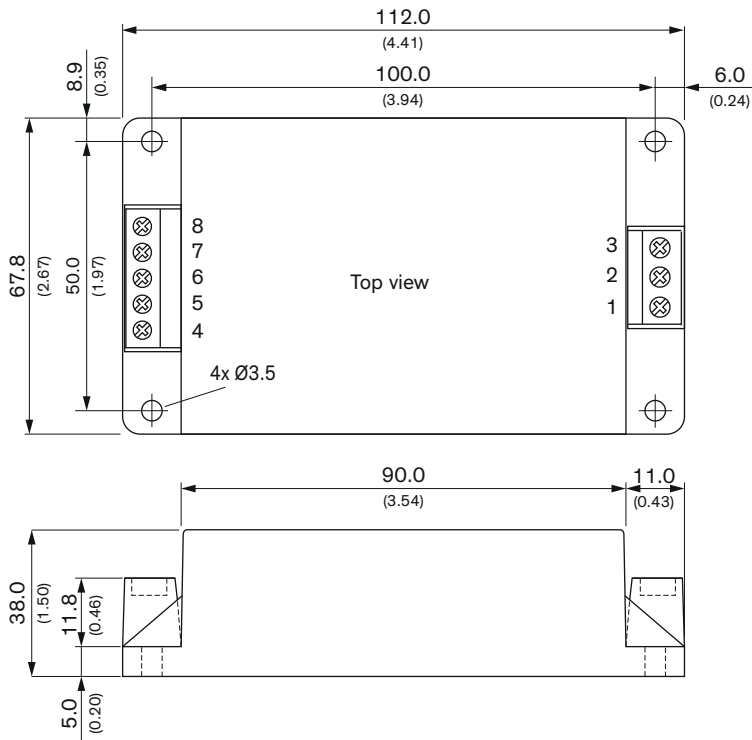
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Approved Ambient Temp.	+60°C max. (for compliance to 60950-1)
	- Case Temperature	+95°C max.
	- Storage Temperature	-50°C to +125°C
Power Derating	- High Temperature	3.3 %/K above 70°C (average)
		See application note: <a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	On: 3.5 to 12 VDC or open circuit
		Off: 0 to 1.2 VDC or short circuit
		Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	3 mA typ.
	- Remote Pin Input Current	-0.5 to 0.5 mA
Altitude During Operation		6'000 m max.
Switching Frequency		210 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	2'500 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M $\Omega$ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	3'000 pF max.
Reliability	- Calculated MTBF	242'029 h (MIL-HDBK-217F, ground benign)
Housing Material		Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Housing Type		Plastic Case
Mounting Type		Chassis Mount
Connection Type		Screw Terminal
Weight		300 g
Thermal Impedance	- Case to Ambient	3.5 K/W typ.
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>
		Exemptions: 6c, 7c-I
		(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	b8ea32d4-bc4d-4c30-88d6-db58d43308cc

## Supporting Documents

Overview Link (for additional Documents)	<a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>
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**Outline Dimensions**



Dimensions in mm (inch)  
Tolerances: x.x ±0.5 (±0.02)

Mounting screw locked torque: 0.49 Nm (5.0 kgfcm)

Pinout	
Pin*	Function
1	Remote
2	-Vin (GND)
3	+Vin (Vcc)
4	NC
5	+Vout
6	NC
7	-Vout
8	NC

NC: Not connected  
\* Wires 1.5 mm<sup>2</sup> max.

Terminal screw locked torque:  
0.5 Nm max.