

- Wide 2:1 input voltage range
- Fully regulated output voltage
- Compact SIP-8 package
- 3000 VDC I/O isolation (functional insulation)
- Small footprint
- Temperature range  $-40^{\circ}$  to  $+85^{\circ}\text{C}$
- High efficiency up to 85%
- Short-circuit protection
- Remote On/Off control
- 3-year product warranty



The TMR 3HI series is a new family of isolated 3 W DC/DC converter modules with regulated output, featuring wide 2:1 input voltage ranges. The product comes in a compact SIP-8 plastic package with a small footprint occupying only 2.0 cm<sup>2</sup> (0.3 square inch) of board space. An excellent efficiency allows  $-40^{\circ}$  to  $+85^{\circ}\text{C}$  operation temperatures. Further features include remote On/Off control and continuous short circuit protection. The compact dimensions of these converters make them an ideal solution for many space critical applications in communication equipment, instrumentation and industrial electronics.

### Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
TMR 3-0510HI	4.5 - 9 VDC (5 VDC nom.)	3.3 VDC	700 mA			75 %
TMR 3-0511HI		5 VDC	600 mA			79 %
TMR 3-0512HI		12 VDC	250 mA			81 %
TMR 3-0513HI		15 VDC	200 mA			82 %
TMR 3-0521HI		+5 VDC	300 mA	-5 VDC	300 mA	78 %
TMR 3-0522HI		+12 VDC	125 mA	-12 VDC	125 mA	81 %
TMR 3-0523HI		+15 VDC	100 mA	-15 VDC	100 mA	81 %
TMR 3-1210HI	9 - 18 VDC (12 VDC nom.)	3.3 VDC	700 mA			77 %
TMR 3-1211HI		5 VDC	600 mA			81 %
TMR 3-1212HI		12 VDC	250 mA			83 %
TMR 3-1213HI		15 VDC	200 mA			83 %
TMR 3-1221HI		+5 VDC	300 mA	-5 VDC	300 mA	82 %
TMR 3-1222HI		+12 VDC	125 mA	-12 VDC	125 mA	83 %
TMR 3-1223HI		+15 VDC	100 mA	-15 VDC	100 mA	83 %
TMR 3-2410HI	18 - 36 VDC (24 VDC nom.)	3.3 VDC	700 mA			76 %
TMR 3-2411HI		5 VDC	600 mA			82 %
TMR 3-2412HI		12 VDC	250 mA			83 %
TMR 3-2413HI		15 VDC	200 mA			84 %
TMR 3-2421HI		+5 VDC	300 mA	-5 VDC	300 mA	80 %
TMR 3-2422HI		+12 VDC	125 mA	-12 VDC	125 mA	83 %
TMR 3-2423HI		+15 VDC	100 mA	-15 VDC	100 mA	85 %
TMR 3-4810HI	36 - 75 VDC (48 VDC nom.)	3.3 VDC	700 mA			74 %
TMR 3-4811HI		5 VDC	600 mA			79 %
TMR 3-4812HI		12 VDC	250 mA			81 %
TMR 3-4813HI		15 VDC	200 mA			82 %
TMR 3-4821HI		+5 VDC	300 mA	-5 VDC	300 mA	79 %
TMR 3-4822HI		+12 VDC	125 mA	-12 VDC	125 mA	82 %
TMR 3-4823HI		+15 VDC	100 mA	-15 VDC	100 mA	83 %

**Input Specifications**

Input Current	- At no load	5 Vin models: <b>45 mA typ.</b> (3.3 Vout model) <b>45 mA typ.</b> (5 Vout model) <b>55 mA typ.</b> (12 Vout model) <b>55 mA typ.</b> (15 Vout model) <b>55 mA typ.</b> (5 / -5 Vout model) <b>60 mA typ.</b> (12 / -12 Vout model) <b>60 mA typ.</b> (15 / -15 Vout model)
		12 Vin models: <b>25 mA typ.</b> (3.3 Vout model) <b>25 mA typ.</b> (5 Vout model) <b>30 mA typ.</b> (12 Vout model) <b>30 mA typ.</b> (15 Vout model) <b>30 mA typ.</b> (5 / -5 Vout model) <b>30 mA typ.</b> (12 / -12 Vout model) <b>30 mA typ.</b> (15 / -15 Vout model)
		24 Vin models: <b>16 mA typ.</b> (3.3 Vout model) <b>16 mA typ.</b> (5 Vout model) <b>18 mA typ.</b> (12 Vout model) <b>18 mA typ.</b> (15 Vout model) <b>17 mA typ.</b> (5 / -5 Vout model) <b>18 mA typ.</b> (12 / -12 Vout model) <b>18 mA typ.</b> (15 / -15 Vout model)
		48 Vin models: <b>10 mA typ.</b> (3.3 Vout model) <b>10 mA typ.</b> (5 Vout model) <b>12 mA typ.</b> (12 Vout model) <b>12 mA typ.</b> (15 Vout model) <b>12 mA typ.</b> (5 / -5 Vout model) <b>12 mA typ.</b> (12 / -12 Vout model) <b>12 mA typ.</b> (15 / -15 Vout model)
	- At full load	5 Vin models: <b>810 mA max.</b> 12 Vin models: <b>330 mA max.</b> 24 Vin models: <b>160 mA max.</b> 48 Vin models: <b>85 mA max.</b>
Surge Voltage		5 Vin models: <b>15 VDC max.</b> (100 ms max.) 12 Vin models: <b>36 VDC max.</b> (100 ms max.) 24 Vin models: <b>50 VDC max.</b> (100 ms max.) 48 Vin models: <b>100 VDC max.</b> (100 ms max.)
Recommended Input Fuse		5 Vin models: <b>2'000 mA</b> (slow blow) 12 Vin models: <b>1'600 mA</b> (slow blow) 24 Vin models: <b>1'000 mA</b> (slow blow) 48 Vin models: <b>1'000 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>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax)	single output models: <b>0.2% max.</b> dual output models: <b>0.2% max.</b>
	- Load Variation (5 - 100%)	single output models: <b>0.5% max.</b> dual output models: <b>1% max.</b> (Output 1) <b>1% max.</b> (Output 2)
	- Cross Regulation	dual output models: <b>5% max.</b>
	(25% / 100% asym. load)	
Ripple and Noise	- 20 MHz Bandwidth	<b>50 mVp-p max.</b>

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

Capacitive Load	- single output	3.3 Vout models: 3'300 µF max. 5 Vout models: 1'680 µF max. 12 Vout models: 820 µF max. 15 Vout models: 680 µF max.
	- dual output	5 / -5 Vout models: 1'000 / 1'000 µF max. 12 / -12 Vout models: 470 / 470 µF max. 15 / -15 Vout models: 330 / 330 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Start-up Time		30 ms typ.
Short Circuit Protection		Continuous, Automatic recovery
Transient Response	- Response Time	500 µs typ. (25% Load Step)

### Safety Specifications

Standards	- IT / Multimedia Equipment	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/tmr3hi">www.tracopower.com/overview/tmr3hi</a>

### EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter)
	- Radiated Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter)
	External filter proposal:	<a href="http://www.tracopower.com/overview/tmr3hi">www.tracopower.com/overview/tmr3hi</a>
EMS (Immunity)	- Electrostatic Discharge	Air: EN 61000-4-2, ±8 kV, perf. criteria A Contact: EN 61000-4-2, ±6 kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: Nippon chemi-con KY series, 220 µF / 100 V EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous: EN 61000-4-8, 100 A/m, perf. criteria A

### General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Case Temperature	+100°C max.
	- Storage Temperature	-55°C to +125°C
Power Derating	- High Temperature	3.3 %/K above 70°C
		See application note: <a href="http://www.tracopower.com/overview/tmr3hi">www.tracopower.com/overview/tmr3hi</a>
Cooling System		Natural convection (20 LFM)
Remote Control	- Current Controlled Remote (passive = on)	On: open circuit Off: 2 to 4 mA current (internal 1 kΩ resistor) Refers to 'Remote' and '-Vin' Pin
		External circuit proposal: <a href="http://www.tracopower.com/info/current-remote.pdf">www.tracopower.com/info/current-remote.pdf</a>
	- Off Idle Input Current	2.5 mA max.
Altitude During Operation		5'000 m max.
Switching Frequency		100 kHz min. (RCC)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	3'000 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	40 pF max.

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

Reliability	- Calculated MTBF	4'870'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline <a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>
Environment	- Vibration - Thermal Shock	MIL-STD-810F MIL-STD-810F
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		SIP8
Soldering Profile		Lead-Free Wave Soldering 260°C / 6 s max.
Weight		4.8 g
Environmental Compliance	- REACH Declaration  - RoHS Declaration  - SCIP Reference Number	<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 <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) af722d55-4791-4156-9af6-0330f3a1db9d

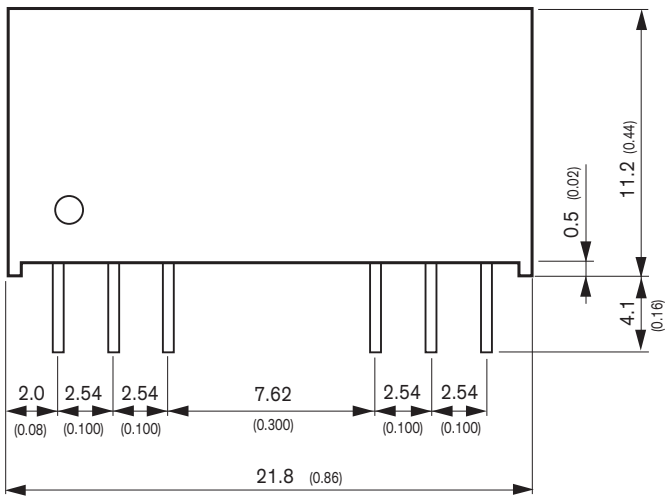
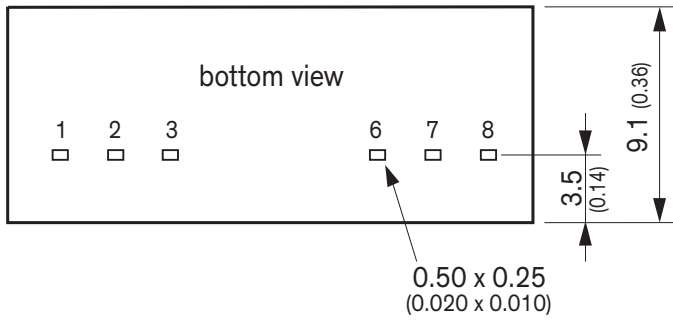
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tmr3hi](http://www.tracopower.com/overview/tmr3hi)

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**Outline Dimensions**



Dimensions in mm (inch)  
 Tolerances: x.x ±0.5 (x.xx ±0.02)  
 x.xx ±0.25 (x.xxx ±0.01)  
 Pin dimension tolerance: ±0.1 (±0.004)

Pinout		
Pin	Single Output	Dual Output
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote	Remote
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout

NC: Not connected