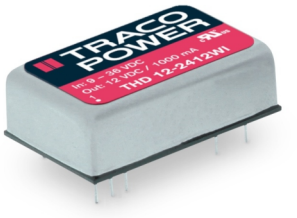
TRACO POWER

DC/DC Converter

THD 12WI Series, 12 Watt

- **Ultra-wide 4:1 input range**
- **High efficiency up to 85%**
- **I/O isolation 1500V**
- **Remote On/Off**
- **Under voltage lock-out circuit**
- **Shielded metal case with insulated Baseplate**
- **Continuous short-circuit protection**
- **Operating temp. range –40°C to +85°C**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

The THD 12WI series is a range of high performance, isolated 12W DC/DC converter modules featuring ultra wide 4:1 input voltage ranges in a DIP-24 package with industry-standard footprint. Overload and overvoltage protection as well as remote On/Off are included as standard. Built-in filters for both input and output minimizes the need of external filtering. Full SMD-design with exclusive use of ceramic capacitors guarantees a high reliability and long product lifetime. Typical applications for these converters are industrial electronics, instrumentation, data communication systems and battery operated equipment with limited space available on the PCB.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
THD 12-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	3'500 mA			84 %
THD 12-2411WI		5.1 VDC	2'400 mA			87 %
THD 12-2412WI		12 VDC	1'000 mA			87 %
THD 12-2413WI		15 VDC	800 mA			87 %
THD 12-2421WI		+5 VDC	1'200 mA	–5 VDC	1'200 mA	84 %
THD 12-2422WI		+12 VDC	500 mA	–12 VDC	500 mA	87 %
THD 12-2423WI		+15 VDC	400 mA	–15 VDC	400 mA	87 %
THD 12-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	3'500 mA			84 %
THD 12-4811WI		5.1 VDC	2'400 mA			87 %
THD 12-4812WI		12 VDC	1'000 mA			87 %
THD 12-4813WI		15 VDC	800 mA			88 %
THD 12-4821WI		+5 VDC	1'200 mA	–5 VDC	1'200 mA	85 %
THD 12-4822WI		+12 VDC	500 mA	–12 VDC	500 mA	87 %
THD 12-4823WI		+15 VDC	400 mA	–15 VDC	400 mA	87 %

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Input Specifications

Input Current	- At no load	24 Vin models:	**55 mA typ.** (3.3 Vout model)
			55 mA typ. (5.1 Vout model)
			15 mA typ. (12 Vout model)
			15 mA typ. (15 Vout model)
			15 mA typ. (5 / -5 Vout model)
			15 mA typ. (12 / -12 Vout model)
			15 mA typ. (15 / -15 Vout model)
		48 Vin models:	**20 mA typ.** (3.3 Vout model)
			20 mA typ. (5.1 Vout model)
			7 mA typ. (12 Vout model)
			7 mA typ. (15 Vout model)
			7 mA typ. (5 / -5 Vout model)
			7 mA typ. (12 / -12 Vout model)
			7 mA typ. (15 / -15 Vout model)
	- At full load	24 Vin models:	**610 mA typ.**
		48 Vin models:	**310 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 VDC min. / 8 VDC typ. / 8.8 VDC max.**
		48 Vin models:	**15 VDC min. / 16 VDC typ. / 17.5 VDC max.**
Recommended Input Fuse		24 Vin models:	**2'500 mA** (slow blow)
		48 Vin models:	**1'250 mA** (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Pi-Type

Output Specifications

Voltage Set Accuracy			±1.2% max.
Regulation	- Input Variation (Vmin - Vmax)	single output models:	**0.2% max.**
		dual output models:	**0.2% max.**
	- Load Variation (0 - 100%)	single output models:	**0.5% max.**
		dual output models:	**1% max.** (Output 1)
			1% max. (Output 2)
	- Cross Regulation (25% / 100% asym. load)	dual output models:	**5% max.**
Ripple and Noise	- 20 MHz Bandwidth		**85 mVp-p typ.**
Capacitive Load	- single output	3.3 Vout models:	**2'000 µF max.**
		5.1 Vout models:	**2'000 µF max.**
		12 Vout models:	**430 µF max.**
		15 Vout models:	**300 µF max.**
	- dual output	5 / -5 Vout models:	**1'250 / 1'250 µF max.**
		12 / -12 Vout models:	**200 / 200 µF max.**
		15 / -15 Vout models:	**120 / 120 µF max.**
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Start-up Time			**450 ms typ.** (Power On)
			5 ms typ. (Remote On)
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			150% typ. of Iout max.
Overvoltage Protection			**118 - 125% of Vout nom.** (depending on model)
			3.9 VDC typ. (3.3 Vout models)
			6.2 VDC typ. (5.1 Vout models)
			15 VDC typ. (12 Vout models)
			18 VDC typ. (15 Vout models)

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

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Transient Response	- Response Deviation	5% max. (75% to 100% Load Step)
	- Response Time	250 µs typ. (75% to 100% 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	www.tracopower.com/thd12wi-safety-cert/
Energy Source	- Output, acc. to 62368-1	ES1
Power Source	- Output, acc. to 62368-1	PS1
Pollution Degree		PD 2
Over Voltage Category		Not mains connected

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:	www.tracopower.com/thd12wi-emc-filter/
EMS (Immunity)			EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- 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
		Ext. input component:	Nippon chemi-con KY 220 µF, 100 V
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 100 A/m, perf. criteria A
		1 s:	EN 61000-4-8, 1000 A/m, perf. criteria A

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +85°C
	- Case Temperature	+105°C max.
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	Depending on model
	See application note:	www.tracopower.com/thd12wi-cc/
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)	On: 3.0 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	2.5 mA typ.
	- Remote Pin Input Current	-0.5 to 0.5 mA
Altitude During Operation		4'000 m max.
Regulator Topology		Flyback Converter
Switching Frequency		360 - 440 kHz (PWM) 400 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'600 VDC
	- Input to Case, 60 s	1'600 VDC
	- Output to Case, 60 s	1'600 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.

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Isolation Capacitance	- Input to Output, 100 kHz, 1 V	1'500 pF max.
Reliability	- Calculated MTBF	2'090'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Housing Material		Copper, Nickel plated
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Epoxy (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		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		DIP24
Soldering Profile		Lead-Free Wave Soldering 245°C / 10 s max.
Weight		18 g
Thermal Impedance	- Case to Ambient	20.0 K/W typ.
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: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	952e6754-9097-4042-a284-2f13a33dbf55

Additional Information

Supporting Documents	www.tracopower.com/overview/thd12wi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf
Service Portal	www.tracoserviceportal.com

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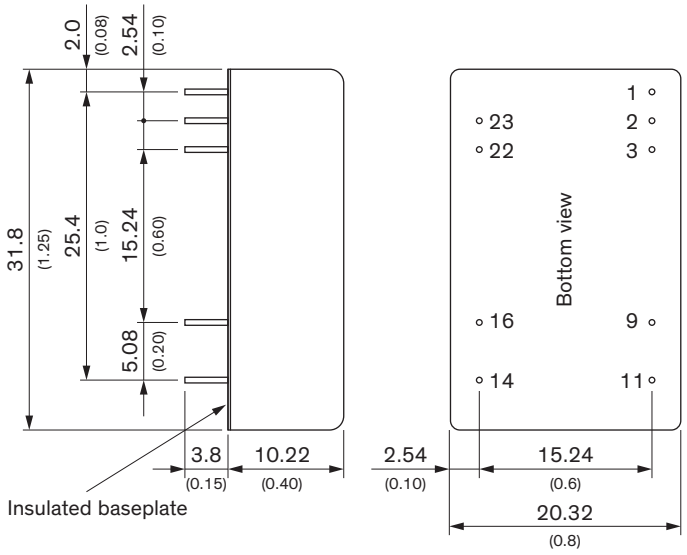
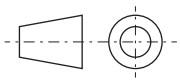
Outline Dimensions





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

Pinout		
Pin	**Single**	**Dual**
1	Remote On/Off	Remote On/Off
2	–Vin (GND)	–Vin (GND)
3	–Vin (GND)	–Vin (GND)
9	NC	Common
11	NC	–Vout
14	+Vout	+Vout
16	–Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

NC: Not connected

Avoid routing PCB traces under the converter.

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