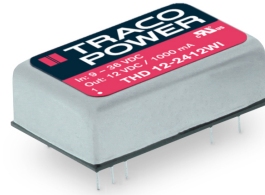


- Ultra-wide 4:1 input range
- Very high efficiency up to 85%
- I/O isolation 1500V
- Input filter meets EN 55032, class A without ext. Components
- Remote On/Off
- Under voltage lock-out circuit
- Shielded metal case with insulated Baseplate
- Continuous short-circuit protection
- Operating temp. range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- 3-year product warranty



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 typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
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 %

## Input Specifications

Input Current	- At no load	24 Vin models: <b>55 mA typ.</b> (3.3 Vout model) <b>55 mA typ.</b> (5.1 Vout model) <b>15 mA typ.</b> (12 Vout model) <b>15 mA typ.</b> (15 Vout model) <b>15 mA typ.</b> (5 / -5 Vout model) <b>15 mA typ.</b> (12 / -12 Vout model) <b>15 mA typ.</b> (15 / -15 Vout model)
	- At full load	24 Vin models: <b>610 mA typ.</b> 48 Vin models: <b>310 mA typ.</b>
Surge Voltage		24 Vin models: <b>50 VDC max.</b> (100 ms max.) 48 Vin models: <b>100 VDC max.</b> (100 ms max.)
Under Voltage Lockout		24 Vin models: <b>7 VDC min. / 8 VDC typ. / 8.8 VDC max.</b> 48 Vin models: <b>15 VDC min. / 16 VDC typ. / 17.5 VDC max.</b>
Recommended Input Fuse		24 Vin models: <b>2'500 mA</b> (slow blow) 48 Vin models: <b>1'250 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		<b>Internal Pi-Type</b>

## Output Specifications

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

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

Transient Response	- Response Deviation	5% max. (75% to 100% Load Step)
	- Response Time	250 $\mu$ s typ. (75% to 100% Load Step)

### Safety Specifications

Safety 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/thd12wi">www.tracopower.com/overview/thd12wi</a>
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:	<a href="http://www.tracopower.com/overview/thd12wi">www.tracopower.com/overview/thd12wi</a>
EMS Immunity	- Electrostatic Discharge	EN 55024 (IT Equipment) Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 1$ kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: Nippon chemi-con KY 220 $\mu$ F, 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 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	2.2 %/K above 60°C (3.3 & 5.1 Vout models) 2.5 %/K above 65°C (other models)
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	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.
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 M $\Omega$ min.
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		Allowed (hermetical product)
	See Cleaning Guideline:	<a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>

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

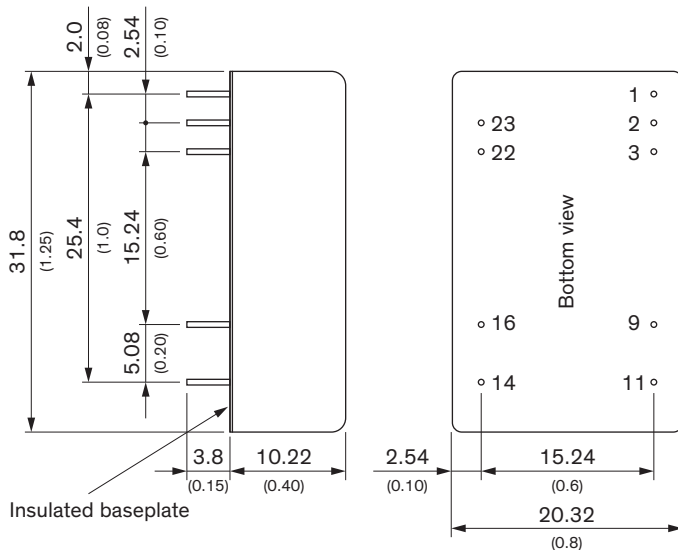
Environment	- Vibration - Thermal Shock	MIL-STD-810F MIL-STD-810F
Housing Material		Copper, Nickel plated
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Epoxy (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		DIP24
Soldering Profile		245°C / 10 s max.
Weight		18 g
Thermal Impedance		20 K/W
Environmental Compliance	- REACH Declaration  - RoHS 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 <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). The SCIP number is provided on request.)

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/thd12wi](http://www.tracopower.com/overview/thd12wi)

### 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