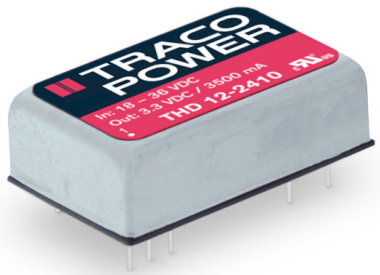
DC/DC Converters

THD 12 Series, 12 Watt

Features

- High power density
- DIP-24 metal package
- Wide 2:1 input range
- Very high efficiency up to 88%
- I/O isolation 1500V
- Input filter to meet EN 55022, class A
- 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 (with derating)
- Lead free design, RoHS compliant
- 3-year product warranty



The THD-12 series is a range of high performance, isolated 12W dc/dc converters. They come in a low profile, DIP-24 package with standard industry pin-out. 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 voltage	Output current max.	Efficiency typ.
THD 12-1209	**9 – 18 VDC** (nominal 12 VDC)	2.5 VDC	3'500 mA	82 %
THD 12-1210		3.3 VDC	3'500 mA	84 %
THD 12-1211		5.1 VDC	2'400 mA	86 %
THD 12-1212		12 VDC	1'000 mA	86 %
THD 12-1222		±12 VDC	±500 mA	87 %
THD 12-1223		±15 VDC	±400 mA	87 %
THD 12-2409	**18 – 36 VDC** (nominal 24 VDC)	2.5 VDC	3'500 mA	83 %
THD 12-2410		3.3 VDC	3'500 mA	85 %
THD 12-2411		5.1 VDC	2'400 mA	87 %
THD 12-2412		12 VDC	1'000 mA	87 %
THD 12-2422		±12 VDC	±500 mA	88 %
THD 12-2423		±15 VDC	±400 mA	88 %
THD 12-4809	**36 – 75 VDC** (nominal 48 VDC)	2.5 VDC	3'500 mA	83 %
THD 12-4810		3.3 VDC	3'500 mA	85 %
THD 12-4811		5.1 VDC	2'400 mA	87 %
THD 12-4812		12 VDC	1'000 mA	87 %
THD 12-4822		±12 VDC	±500 mA	88 %
THD 12-4823		±15 VDC	±400 mA	88 %

Input Specifications

Input current (no load)	12 Vin; 2.5/ 3.3 / 5.1 Vout models:	55 mA typ.
	12 Vin other models:	20 mA typ.
	24 Vin; 2.5/ 3.3 / 5.1 Vout models:	35 mA typ.
	24 Vin other models:	15 mA typ.
	48 Vin; 2.5/ 3.3 / 5.1 Vout models:	20 mA typ.
	24 Vin other models:	6 mA typ.
Input current (full load)	12 Vin; 2.5 Vout models:	935 mA typ.
	12 Vin other models:	1250 mA typ.
	24 Vin; 2.5 Vout models:	460 mA typ.
	24 Vin other models:	600 mA typ.
	48 Vin; 2.5 Vout models:	230 mA typ.
	48 Vin other models:	300 mA typ.
Start-up voltage	12 Vin models:	9 VDC (or lower)
	24 Vin models:	18 VDC (or lower)
	48 Vin models:	36 VDC (or lower)
Under voltage shut down (lock-out circuit)	12 Vin models:	8 VDC typ.
	24 Vin models:	16 VDC typ.
	48 Vin models:	33 VDC typ.
Surge voltage (100 msec. max.)	12 Vin models:	36 V max.
	24 Vin models:	50 V max.
	48 Vin models:	100 V max.
Conducted noise (input)		EN 55022 level A, FCC part 15, level A with external capacitor
ESD (electrostatic discharge)		EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
Radiated immunity		EN 61000-4-3 10 V/m, perf. criteriy A
Fast transient / Surge		EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV perf. criteria A with external input capacitor e.g. Nippon chemi-con KY 220 µF, 100 V, ESR 48 mOhm
Conducted immunity		EN 61000-4-6, 10 Vrms, perf. criteria A
Reflected ripple current		20 mAp-p typ.

Output Specifications

Voltage set accuracy			±1.2 %
Regulation	– Input variation	single output models:	±0.2 % max. (Vin min. to Vin max)
		dual output models:	±0.5 % max. (Vin min. to Vin max)
	– Load variation 0 – 100 %		0.5 % max. (1.0% max. for 2.5 Vout models)
		dual output models balanced load:	1.0 % max.
	– Load cross regulation 25/100%		5.0 % max. (dual output models)
Minimum load			not required
Ripple and noise (20 MHz Bandwidth)			85 mVp-p typ.
Temperature coefficient			±0.02 %/K
Output current limitation			150 % typ. of Iout max.
Short circuit protection			continuous, automatic recovery
Start up time (nominal Vin and constant resistive load)			450 ms typ.
Transient response setting time (25% load step change)			250 µs
Over voltage protection (single output models only)		2.5 & 3.3 VDC models:	3.9 VDC
		5.1 VDC models:	6.2 VDC
		12 VDC models:	15 VDC
		15 VDC models:	18 VDC
Capacitive load		2.5/ 3.3/ 5.1 Vout models:	2000 µF max.
		12 Vout models:	430 µF max.
		±12 Vout models:	±200 µF max.
		±15 Vout models:	±120 µF max.

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

General Specifications

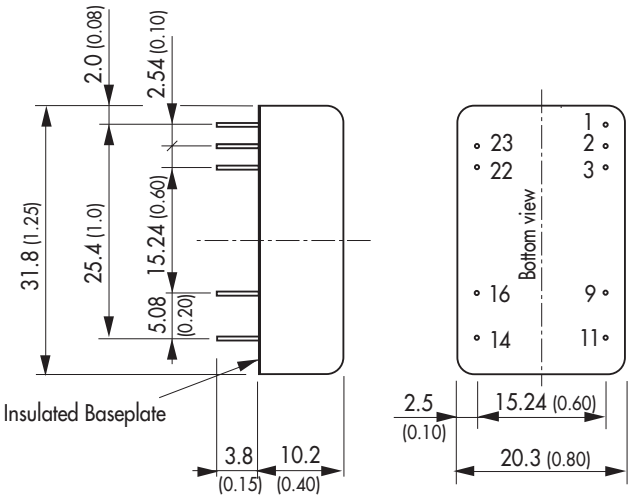
Temperature ranges	– Operating – Case temperature – Storage	–40°C to +85°C +100°C max. –55°C to +105°C
Derating		2.5 %/K above 65°C
Thermal impedance	– Natural convection	20°C/W
Humidity (non condensing)		5 % to 95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>2.0 Mio h
Thermal shock & vibration		MIL–STD–810F
Isolation voltage (60sec.)	– Input/Output	1'500 VDC
Isolation capacity	– Input/Output	1'200 pF typ.
Isolation resistance	– Input/Output (500 VDC)	>1'000 MOhm
Switching frequency		400 kHz typ. (pulse width modulation PWM)
Safety applrovals (operational Insulation)	– Certification documents	UL 60950-1, EN 60950-1, IEC 60950-1 www.tracopower.com/overview/thd12
Remote On/Off	– On: – Off: – Off idle current:	3.0 ... 12 VDC or open circuit (referenced to -Vin) 0 ... 1.2 VDC or short circuit pin 1 and pin 2/3 2.5 mA

Physical Specifications

Casing material	nickel coated copper
Baseplate material	non conductive FR4
Potting material	epoxy (UL94V-0 rated)
Weight	18 g (0.62oz)
Soldering temperature	max. 265°C / 10 sec.

Supporting documents: www.tracopower.com/overview/thd12

Outline Dimensions



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

ntc. = not to connect

Dimensions in [mm], () = Inch
Pin diameter ⌀ 0.5 ±0.1 (0.02 ±0.004)
Tolerances ±0.5 (±0.02)
Pin pich tolerances ±0.25 (±0.01)