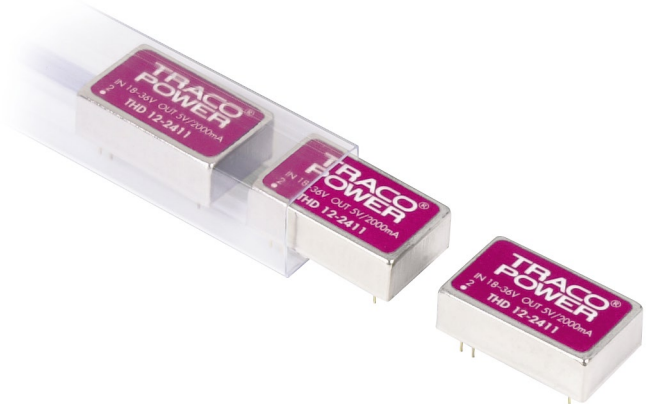




#### Features

- ◆ Highest Power Density: 12W in DIL-24 Package!
- ◆ Wide 2:1 Input Range
- ◆ Very high Efficiency up to 88%
- ◆ I/O-Isolation 1500V
- ◆ Input Filter meets EN 55022A without ext. Components
- ◆ Remote On/Off
- ◆ 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, DIL-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	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 12-1213		15 VDC	800 mA	86 %
THD 12-1221		±5 VDC	±1'200 mA	82 %
THD 12-1222		±12 VDC	±500 mA	87 %
THD 12-1223		±15 VDC	±400 mA	87 %
THD 12-2409	18 – 36 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 12-2413		15 VDC	800 mA	87 %
THD 12-2421		±5 VDC	±1'200 mA	83 %
THD 12-2422		±12 VDC	±500 mA	88 %
THD 12-2423		±15 VDC	±400 mA	88 %
THD 12-2409	36 – 75 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 12-2413		15 VDC	800 mA	87 %
THD 12-2421		±5 VDC	±1'200 mA	83 %
THD 12-2422		±12 VDC	±500 mA	88 %
THD 12-2423		±15 VDC	±400 mA	88 %

## Input Specifications

Input current (no load)	12 Vin models: t.b.a. 24 Vin models: t.b.a. 48 Vin models: t.b.a.
Input current (full load)	12 Vin; 2.5/ 3.3 & $\pm 5$ Vout models: 1'670 mA typ. 12 Vin; other single output models: 1'605 mA typ. 12 Vin; other dual output models: 1'630 mA typ. 24 Vin; 2.5/ 3.3 & $\pm 5$ Vout models: 840 mA typ. 24 Vin; other single output models: 800 mA typ. 24 Vin; other dual output models: 810 mA typ. 48 Vin; 2.5/ 3.3 & $\pm 5$ Vout models: 420 mA typ. 48 Vin; other single output models: 400 mA typ. 48 Vin; other dual output models: 405 mA typ.
Input voltage variation (dv/dt)	5 V / ms, max. (complies ETS 300 132 part. 4.4)
Start-up voltage / under voltage lockout	12 Vin models: 9 VDC / 8 VDC typ. 24 Vin models: 18 VDC / 16 VDC typ. 48 Vin models: 36 VDC / 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
ESD (input)	EN 61000-4-2, Perf. Criteria B
Fast Transient (input)	EN 61000-4-4, Perf. Criteria B
Surge (input)	EN 61000-4-5, Perf. Criteria B

## Output Specifications

Voltage set accuracy	$\pm 1.2$ %
Regulation	– Input variation Vin min. to Vin max. $\pm 0.5$ % max. – Load variation 10 – 100 % single output models: 1.0 % max. (1.5% max. for 2.5 Vout models) dual output models balanced load: 1.2 % max. dual output models unbalanced load: 5.0 % max.
Transient response setting time (25% load step change)	300 $\mu$ s
Ripple and noise (20 MHz Bandwidth)	85 mVpk-pk max.
Temperature coefficient	$\pm 0.02$ % /K
Output current limitation	150% typ. of Iout max., constant current
Short circuit protection	indefinite (automatic recovery)
Minimum load	10% of rated max current (operation at lower load condition will not damage these converters, however, they may not meet all listed specifications)
Capacitive load	2.5 Vout & 3.3 Vout models: 2000 $\mu$ F max. 5 Vout / $\pm 5$ Vout models: 2000 $\mu$ F max. / $\pm 1250$ $\mu$ F max. 12 Vout / $\pm 12$ Vout models: 430 $\mu$ F max. / $\pm 200$ $\mu$ F max. 15 Vout / $\pm 15$ Vout models: 300 $\mu$ F max. / $\pm 120$ $\mu$ F max.

## General Specifications

Temperature ranges	– Operating –40 °C ... +85 °C – Case temperature +100 °C max. – Storage –55 °C ... +105 °C
Derating	2.5%/K above 60°C
Humidity (non condensing)	95 % rel H max.

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

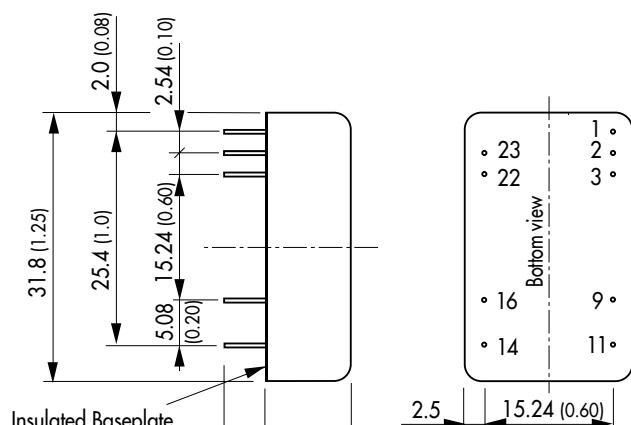
## General Specifications

Reliability, calculated MTBF	>2.75 Mio. h @ 40 °C (BELLCORE TR-MWVT-000332 Case I: 50% Stress)
Thermal shock	MIL-STB-810D
Isolation voltage Input/Output	1'500 VDC
Isolation capacity Input/Output	1'200 pF max.
Switching frequency (fixed)	400 kHz typ. (Pulse width modulation PWM)
Safety standards (Operational Insulation)	UL 60950, EN 60950, IEC 60950
Safety approvals	UL/cUL File: E188913
Remote On/Off	<div> <div>- ON:</div> <div>- OFF:</div> <div>- OFF idle current:</div> </div> <div> <div>3.0 ... 12 VDC or open circuit (referenced to -Vin)</div> <div>0 ... 1.2 VDC or short circuit pin 1 and pin 2/3</div> <div>2.5 mA</div> </div>

## Physical Specifications

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

## 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	No pin	Common
11	No con.	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

Dimensions in [mm], ( ) = Inch  
 Pin diameter  $\varnothing 0.5 \pm 0.05$  ( $0.02 \pm 0.002$ )  
 Tolerances  $\pm 0.5$  (0.02)  
 Pin pitch tolerances  $\pm 0.35$  (0.014)

Specifications can be changed without notice