

Features

- ◆ Smallest encapsulated 30 W converter
- ◆ 2" x 1" x 0.4" shielded metal package with isolated baseplate
- ◆ Single- and dual output models
- ◆ I/O isolation voltage 1500 VDC
- ◆ Excellent efficiency up to 91 %
- ◆ Operating temperature range -40°C to +85°C
- ◆ Remote On/Off
- ◆ Over-temperature protection
- ◆ 3-year product warranty



The TEN-30 series is the latest generation of high performance dc-dc converter modules setting a new standard concerning power density. This product with 30W comes in an encapsulated, shielded metal package with a footprint of only 1.0" x 2.0". All models have wide 2:1 input voltage range and precisely regulated, isolated output voltages. Advanced circuit topology provides high efficiency up to 91% which allows an industrial operating temperature range of -40°C to +85°C (with derating).

Further features include remote On/Off, trimmable output, under-voltage lockout and overtemperature protection. Typical applications for these converters are mobile equipment, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on the PCB is critical.

Models

Ordercode	Input voltage	Output voltage	Output current max.	Efficiency typ.
TEN 30-1210 TEN 30-1211 TEN 30-1212 TEN 30-1213 TEN 30-1221 TEN 30-1222 TEN 30-1223	9 – 18 VDC (nominal 12 VDC)	3.3 VDC 5.1 VDC 12 VDC 15 VDC ±5 VDC ±12 VDC ±15 VDC	8'000 mA 6'000 mA 2'500 mA 2'000 mA ±3'000 mA ±1'250 mA ±1'000 mA	85 % 87 % 89 % 89 % 87 % 87 % 87 %
TEN 30-2410 TEN 30-2411 TEN 30-2412 TEN 30-2413 TEN 30-2421 TEN 30-2422 TEN 30-2423	18 – 36 VDC (nominal 24 VDC)	3.3 VDC 5.1 VDC 12 VDC 15 VDC ±5 VDC ±12 VDC ±15 VDC	8'000 mA 6'000 mA 2'500 mA 2'000 mA ±3'000 mA ±1'250 mA ±1'000 mA	87 % 90 % 91 % 91 % 90 % 89 % 90 %
TEN 30-4810 TEN 30-4811 TEN 30-4812 TEN 30-4813 TEN 30-4821 TEN 30-4822 TEN 30-4823	36 – 75 VDC (nominal 48 VDC)	3.3 VDC 5.1 VDC 12 VDC 15 VDC ±5 VDC ±12 VDC ±15 VDC	7'500 mA 6'000 mA 2'500 mA 2'000 mA ±3'000 mA ±1'250 mA ±1'000 mA	87 % 89 % 91 % 91 % 90 % 88 % 89 %

Input Specifications

Input current at no load	– 12 Vin models	±12 / ±15 Vout models:	50 mA typ.
		other output models:	110 mA typ.
	– 24 Vin models	5.1 / ±5 Vout models:	70 mA typ.
		other output models:	40 mA typ.
	– 48 Vin models	±15 Vout model:	20 mA typ.
		other output models:	50 mA typ.
Input current at full load	– 12 Vin models	3.3 Vout models:	2700 mA typ.
		other output models:	3000 mA typ.
	– 24 Vin models	3.3 Vout models:	1300 mA typ.
		other output models:	1500 mA typ.
	– 48 Vin models	3.3 Vout models:	650 mA typ.
		other output models:	750 mA typ.
Start-up voltage / under voltage shut down		12 V models:	9 VDC / 8 VDC typ.
		24 V models:	18 VDC / 16 VDC typ.
		48 V models:	36 VDC / 32 VDC typ.
Surge voltage (100 ms max.)		12 V models:	25 V max.
		24 V models:	50 V max..
		48 V models:	100 V max.
Conducted noise (input)			EN 55032 class A (with external components)
Please refer to Application note:			www.tracopower.com/overview/ten30

Output Specifications

Voltage set accuracy		±1 %
Output voltage adj. range		±10 % (only for single output models)
Regulation	– Input variation Vin min. to Vin max.	0.2 % max.
	– Load variation 0 – 100 %	single output models: 0.5 % max.
		dual output models balanced load: 1.0 % max.
		dual output models unbalanced load (25% /100%): 5.0 % max.
Minimum load		not required
Temperature coefficient		±0.02 %/K
Ripple and noise (20 MHz Bandwidth)		100 mVpk-pk max. (150 mVpk-pk for 12/±12/15/±15V models)
Start up time (nominal Vin and constant resistive load)		30 ms typ.
Transient response time (25% load change)		250 µs typ.
Short circuit protection		indefinite, automatic recovery
Over load protection		150 % of lout max. typ.
Over voltage protection	3.3 VDC models:	3.9 V
	5.1 VDC models:	6.2 V
	12 VDC models:	15 V
	15 VDC models:	18 V
Capacitive load (max.)	3.3 Vout models:	20'000 µF
	5.1 Vout models:	14'400 µF
	12 Vout models:	3'000 µF
	15 Vout models:	2'000 µF
	±5 Vout models:	3'000 µF (each output)
	±12 Vout models:	2'000 µF (each output)
	±15 Vout models:	1'300 µF (each output)

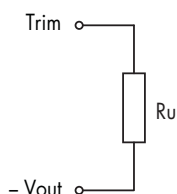
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

General Specifications

Temperature ranges	– Operating – Case temperature – Storage	– 40°C to +85°C +105°C max. – 55°C to +125°C
Load derating		3.3 %/K above +60°C
Over temperature protection		at +115°C typ.
Humidity (non condensing)		5 % to 95 % rel H max.
Thermal impedance	– Natural convection – Natural convection with heat sink	12 °C/W 10 °C/W
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		1.4 Mio. h
Isolation voltage (60 s)	– Input/Output	1'500 VDC
Isolation capacitance	– Input/Output	1500 pF max.
Isolation resistance	– Input/Output (500 VDC)	>1'000 MOhm
Remote On/Off:	– On: – Off: – Standby current:	3 to 12 VDC or open circuit. 0 to 1.2 VDC or short circuit pin 3 and pin 2 3 mA max.
Switching frequency (fixed)		430 kHz typ. (puls width modulation)
Vibration and thermal shock		MIL-STD-810F
Safety approvals	– Certification documents	cUL/UL 60950-1, IEC/EN 60950-1 www.tracopower.com/overview/ten30

Output Voltage Adjustment

Trim up

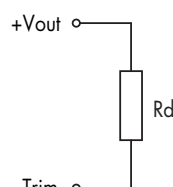


Nominal output voltage at open Trim input!

Ru [kohm]

output	1.5	2.5	3.3V	5.1V	12V	15V
+5%	0.56	4.3	6.8	5.1	43	47
+10%	0.051	0.33	0.75	0.75	4.3	1.8

Trim down



Rd [kohm]

output	1.5	2.5	3.3V	5.1V	12V	15V
–5%	0.68	6.2	8.2	6.2	56	56
–10%	0.062	0.75	0.62	0.82	5.6	2.2

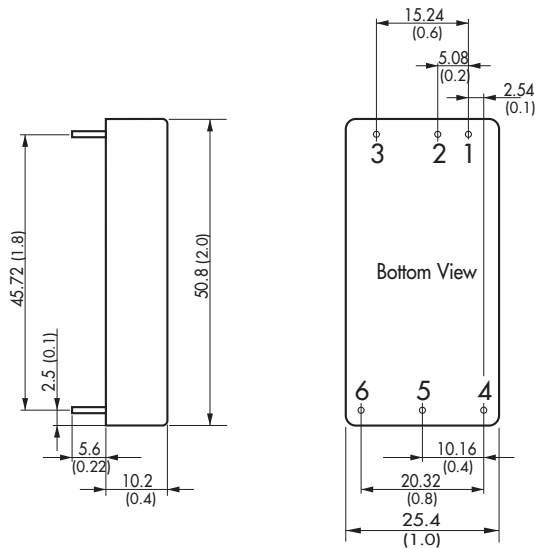
Physical Specifications

Casing material	copper, nickel plated
Baseplate	non conductive FR4
Potting material	epoxy (UL 94V-0 -rated)
Weight	31 g (1.1 oz)
Soldering temperature	max. 265°C / 10 s
Environmental compliance	– Reach – RoHS www.tracopower.com/info/reach-declaration.pdf RoHS directive 2011/65/EU

Supporting documents: www.tracopower.com/overview/ten30

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

Outline Dimensions



Pin-Out		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin (GND)	-Vin (GND)
3	Remote On/Off	
4	+ Vout	+ Vout
5	-Vout	Common
6	Trim	-Vout

Dimensions in [mm], () = Inch
Pin diameter: 1.0 ± 0.1 (0.04 ± 0.004)
Pin pitch tolerances: ± 0.25 (± 0.01)
Case tolerances: ± 0.5 (± 0.02)

Heat-Sink (Option)

Order code: TEN-HS1

(cont.: heat-sink, thermal pad, 2 clamps)

Material: Aluminum

Finish: Anodic treatment (black)

Weight: 17g (0.60oz) without converter

Thermal impedance after assembling: 10 K/W

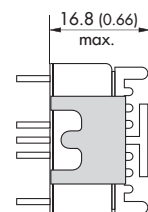
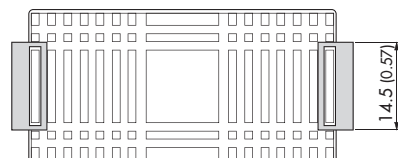
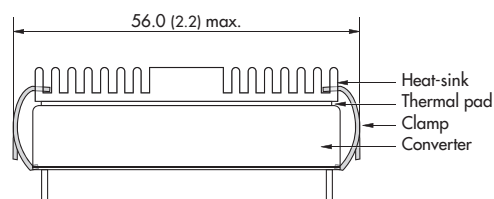


Note:

The product label on converter has to be removed before mounting the heat-sink.

For volume orders converters will be supplied with heat-sinks already mounted. Please contact factory for quotation.

Separate heat-sinks are only available for prototypes and small quantity orders.



Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com

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TRACO Power:

<u>TEN 30-2412</u>	<u>TEN 30-2422</u>	<u>TEN 30-2411</u>	<u>TEN 30-2413</u>	<u>TEN 30-2423</u>	<u>TEN 30-2410</u>	<u>TEN 30-1222</u>	<u>TEN 30-1212</u>
<u>TEN 30-1223</u>	<u>TEN 30-1210</u>	<u>TEN 30-1211</u>	<u>TEN 30-4812</u>	<u>TEN 30-4810</u>	<u>TEN 30-4821</u>	<u>TEN 30-1221</u>	<u>TEN 30-2421</u>
<u>TEN 30-4807</u>	<u>TEN 30-4823</u>	<u>TEN 30-1209</u>	<u>TEN 30-4811</u>	<u>TEN 30-2407</u>	<u>TEN 30-1213</u>	<u>TEN 30-4809</u>	<u>TEN 30-2409</u>
<u>TEN 30-1207</u>	<u>TEN 30-4813</u>	<u>TEN 30-4822</u>					