

Features

- ◆ 2" x 1" metal package
- ◆ Wide 2:1 input voltage range
9–18, 18–36, 36–75 VDC
- ◆ High efficiency up to 92%
- ◆ Adjustable output voltage
- ◆ No minimum load required
- ◆ Operating temperature range
–40°C to +85°C
- ◆ Input filter to meet EN55022, class A
- ◆ Remote On/Off
- ◆ Under voltage lockout
- ◆ Lead free design, RoHS compliant
- ◆ 3-year product warranty



The TEN 60N series is a family of high performance 60 Watt dc/dc converter modules featuring wide 2:1 input voltage ranges in a six side shielded 2" x 1" metal package with industry standard footprint. Standard features include remote On/Off, over voltage protection, under voltage lockout and short circuit protection. High efficiency across load range and low input current characteristics at no load make these converters the ideal solution for battery-operated systems. Typical applications are in wireless networks, telecom/datacom, industry control systems and measurement equipment.

Models

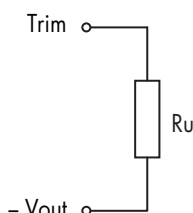
Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 60-1211N	9 – 18 VDC (12 VDC nominal)	5.0 VDC	12'000 mA	90.5 %
TEN 60-1212N		12 VDC	5000 mA	90.5 %
TEN 60-1213N		15 VDC	4000 mA	91.5 %
TEN 60-1215N		24 VDC	2500 mA	91.5 %
TEN 60-1222N		±12 VDC	±2500 mA	90 %
TEN 60-1223N		±15 VDC	±2000 mA	90 %
TEN 60-1225N		±24 VDC	±1250 mA	91 %
TEN 60-2411N	18 – 36 VDC (24 VDC nominal)	5.0 VDC	12'000 mA	92 %
TEN 60-2412N		12 VDC	5000 mA	92 %
TEN 60-2413N		15 VDC	4000 mA	92 %
TEN 60-2415N		24 VDC	2500 mA	92 %
TEN 60-2422N		±12 VDC	±2500 mA	90 %
TEN 60-2423N		±15 VDC	±2000 mA	90 %
TEN 60-2425N		±24 VDC	±1250 mA	91 %
TEN 60-4811N	36 – 75 VDC (48 VDC nominal)	5.0 VDC	12'000 mA	92 %
TEN 60-4812N		12 VDC	5000 mA	92 %
TEN 60-4813N		15 VDC	4000 mA	92 %
TEN 60-4815N		24 VDC	2500 mA	92 %
TEN 60-4822N		±12 VDC	±2500 mA	91 %
TEN 60-4823N		±15 VDC	±2000 mA	91 %
TEN 60-4825N		±24 VDC	±1250 mA	91 %

General Specifications

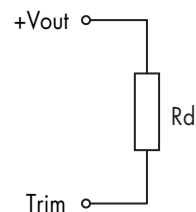
Temperature ranges	<ul style="list-style-type: none"> - Operating - Casing temperature - Storage 	-40°C to +85°C (with derating) +105°C max. -55°C to +125°C
Power derating	<ul style="list-style-type: none"> - Natural convection - Natural convection with heat sink (optional) 	2.5 %/K above +50°C 2.25 %/K above +55°C
Thermal impedance	<ul style="list-style-type: none"> - Natural convection - Natural convection with heat sink (optional) 	10.8 K/W 10.3 K/W
Over-temperature protection		at 115°C
Humidity (non condensing)		5 – 95 % rel. H
Isolation voltage (60 sec.)	- Input / Output	1500 VDC
Isolation resistance	- Input / Output	>1 GOhm
Isolation capacitance	- Input / Output	2'200 pF max.
Altitude during operation		5'000 m max.
Switching frequency		250 kHz typ. (pulse width modulation PWM)
Thermal shock, mechanical shock & vibration		MIL-STD-810F
	- Test conditions	www.tracopower.com/products/mil810.pdf
Safety standards		UL/cUL 60950-1, IEC/EN 60950-1 UL 62368-1, IEC/EN 62368-1
	- Certification documents	www.tracopower.com/overview/ten60n
Remote On/Off	<ul style="list-style-type: none"> - On: - Off: - Off idle current: 	3.0 ... 12 VDC or open circuit 0 ... 1.2 VDC or short circuit pin 3 and pin 2 3.0 mA
Reliability, calculated MTBF (MIL-HDBK-217F, at +70°C, ground benign)		880'000 h
Environmental compliance	<ul style="list-style-type: none"> - Reach - RoHS 	www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU

Output Voltage Adjustment (for single output models only)

Trim up



Trim down



Nominal output voltage at open Trim input
Ru, Rd for adjustment to be advised

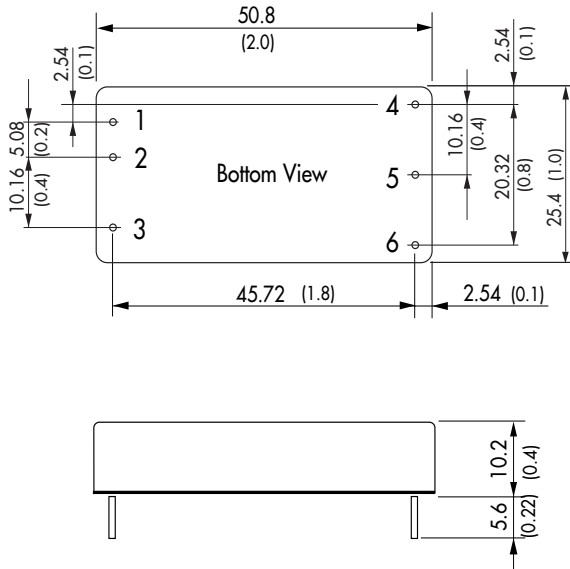
Supporting documents: www.tracopower.com/overview/ten60n

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

Physical Specifications

Casing material	copper
Baseplate material	non conductive FR4
Potting material	silicone (UL94V-0 rated)
Weight	33 g (1.16oz)
Soldering temperature	max. +265°C / 10 sec.

Outline Dimensions

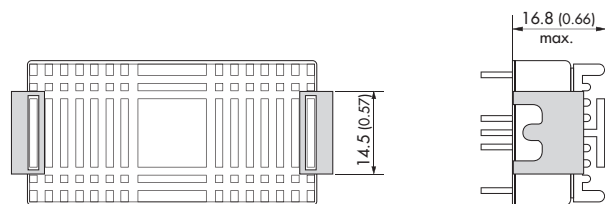
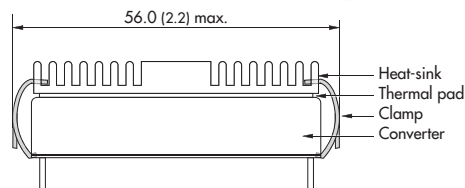
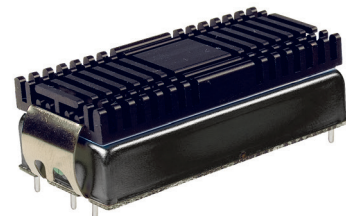


Pin-Out		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin (GND)	-Vin (GND)
3	Remote On/Off	
4	+Vout	+Vout
5	-Vout	Common
6	TRIM	-Vout

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: 17 g (0.60oz) without converter
 Thermal impedance after assembling: 10.3 K/W



Note:
 Before attaching the heatsink, the product label on converter has to be removed for optimal performance.
 For volume orders we can supply the converters with heatsink already mounted.
 Please contact us for a relative quotation.

Dimensions in mm, () = Inch

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