

Features

- ◆ Highest power density:
50 W in 1" x 2" x 0.4" package
- ◆ Ultra wide 4:1 input range
- ◆ Excellent efficiency up to 92 %
- ◆ Operating temperature range
-40°C to +60°C
- ◆ Protection against over-temperature
- ◆ No minimum load required
- ◆ Output voltage adjustable
- ◆ Remote On/Off
- ◆ I/O isolation 1500 VDC
- ◆ 3-year product warranty



The TEN 50WI Series is a range of isolated high performance dc-dc converter modules. Due to the very high efficiency of up to 92% and the use of highest reliable components these 50 W converters come with a footprint of only 1.0" x 2.0". The 10 models have a wide 4:1 input voltage range and a tight output voltage regulation. They do not need a minimum load and offer a high efficiency also at low load conditions. The output voltage is adjustable by external resistor. Remote On/Off and protection against overload and short circuit are standard features of these converters.

Typical applications are in mobile equipment, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on the PCB is critical.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency
TEN 50-2410WI	9 – 36 VDC (nominal 24 VDC)	3.3 VDC	10'000 mA	90 %
TEN 50-2411WI		5.0 VDC	10'000 mA	91 %
TEN 50-2412WI		12 VDC	4'170 mA	92 %
TEN 50-2413WI		15 VDC	3'333 mA	92 %
TEN 50-2415WI		24 VDC	2'080 mA	91 %
TEN 50-4810WI	18 – 75 VDC (nominal 48 VDC)	3.3 VDC	10'000 mA	90 %
TEN 50-4811WI		5.0 VDC	10'000 mA	91 %
TEN 50-4812WI		12 VDC	4'167 mA	92 %
TEN 50-4813WI		15 VDC	3'333 mA	92 %
TEN 50-4815WI		24 VDC	2'080 mA	91 %

Input Specifications

Input current at no load (nominal input voltage)		
-24 VDC input	3.3, 12, 15, 24 VDC models:	80 mA typ
	5.0 VDC models:	60 mA typ.
-48 VDC input	3.3 VDC models:	40 mA typ.
	5.0 VDC models:	30 mA typ.
	12, 15 VDC models:	60 mA typ.
	24 VDC models:	50 mA typ.
Surge voltage (100 msec. max.)	24 Vin models:	50 V max.
	48 Vin models:	30 V max.
Reflected input ripple current	24Vin models:	40 mA typ.
	48Vin models:	150 mA typ.
Conducted noise (input)		EN 55022 class A, FCC part 15 level A with external input capacitor (1210 MLCC):
	24 Vin models:	10 μ F /50 V
	48 Vin models:	3.3 μ F /100 V
Start-up voltage / under voltage shut down	24 Vin models:	9 VDC max./ 7.5 VDC (or lower)
	48 Vin models:	18 VDC max./ 16 VDC (or lower)
Recommended input fuse (slow blow)	24 Vin models:	10 A
	48 Vin models:	5 A

Output Specifications

Voltage set accuracy		± 1.0 % max.
Output voltage adjustment range	24 VDC models:	+20 / -10 %
	other models:	± 10 % with external resistor (see page 3)
Regulation	- Input variation Vin min. to Vin max.	0.5 % max.
	- Load variation 0 – 100 %	0.5 % max.
Minimum load		not required
Temperature coefficient		± 0.02 %/K
Ripple and noise (20 MHz Bandwidth)	3.3 & 5.0 VDC models:	100 mVpk-pk. typ.
(measured with 1 μ F MLCC and a 10 μ F tantalum capacitor)	12, 15 & 24 VDC models:	150 mVpk-pk typ.
Transient response (alignment to 1% at load step change 75% to 100%)		250 μ s typ.
Output current limitation		at 150% of Iout max.
Short circuit protection		hiccup mode, automatic recovery
Capacitive load	3.3 VDC models:	26'000 μ F max.
	5.0 VDC models:	17'000 μ F max.
	12.0 VDC models:	3'000 μ F max.
	15.0 VDC models:	2'000 μ F max.
	24.0 VDC models:	750 μ F 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 (natural convection cooling 20 LFM)	3.3 VDC models: -40°C to +61°C 12 & 15 VDC models: -40°C to +53°C 5.0 & 24 VDC models: -40°C to +46°C	
	– Case temperature	+105°C max.	
	– Thermal protection	+110 typ. (shutdown)	
	– Storage	-50°C to +125°C	
Load derating	– without heatsink	3.3 VDC models: 2.2 K/W above 60°C 12 & 15 VDC models: 1.9 K/W above 53°C 5.0 & 24 VDC models: 1.7 K/W above 45°C	
		– with heatsink	3.3 VDC models: 2.7 K/W above 68°C 12 & 15 VDC models: 2.3 K/W above 62°C 5.0 & 24 VDC models: 2.1 K/W above 57°C
			Thermal impedance
	Humidity (non condensing)		95 % rel H max.
	Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)	>233'500 h	
	Isolation voltage (60 sec.)	– Input/Output	1500 VDC
Isolation capacitance	– Input/Output	2200 pF max. (100 kHz, 1 V)	
Isolation resistance	– Input/Output	>1000 Mohm (500 VDC)	
Switching frequency		285 kHz typ.	
Remote On/Off	– On:	3.5 to 12 VDC to -Vin or open circuit.	
	– Off:	0 to +1.2 VDC or short circuit to -Vin	
	– Off idle current:	2.5 mA typ.	
Safety standards		UL/cUL 60950-1 2nd edition, IEC/EN 60950-1	
Safety approvals	– CSA certificate (UL/cUL 60950-1 2nd edition) – CB test certificate (IEC/EN 60950-1)	www.tracopower.com/products/ten50wi-csa.pdf www.tracopower.com/products/ten50wi-cb.pdf	

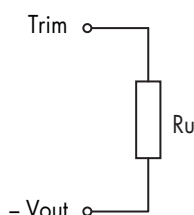
Physical Specifications

Casing material	aluminium alloy, 6-side shielded, insulating baseplate	
Potting material	epoxy (UL 94V-0 rated)	
Weight	30 g (1.05 oz)	
Soldering temperature	max. 260°C / 10 sec. (1.5 mm from casing)	
Environmental compliance	– Reach – RoHS	www.tracopower.com/products/ten50wi-reach.pdf directive 2011/65/EU

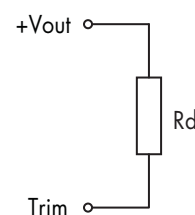
Application note: www.tracopower.com/products/ten50wi-application.pdf

Output Voltage Adjustment

Trim up



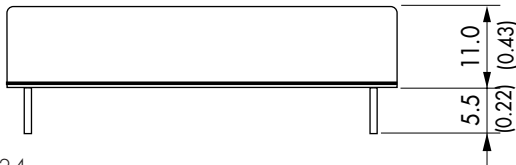
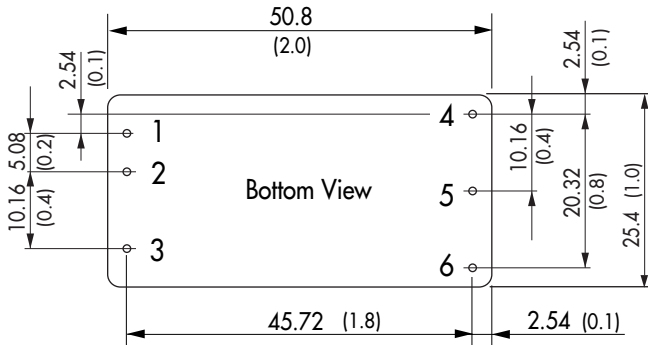
Trim down



for resistor values see application note

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

Outline Dimensions

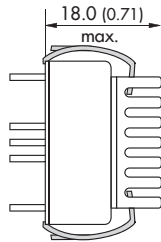
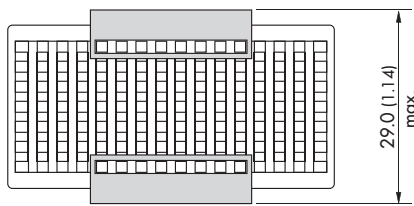
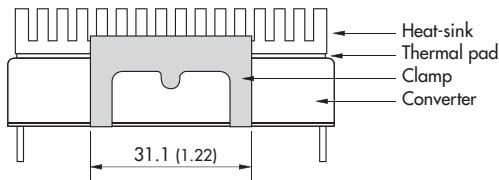


Weight: 34g

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

Dimensions in [mm], () = Inch
Pin diameter: 1.0 ±0.05 (0.04 ±0.002)
Pin pitch tolerance: ±0.13 (±0.005)
Case tolerances: ±0.25 (±0.01)

Heat-sink TEN-HS4 (optional)



Order code: TEN-HS4

(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 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.

Specifications can be changed any time without notice.

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