

#### Features

- ◆ Ultra wide 4:1 input voltage range
- ◆ Adjustable output voltage
- ◆ Remote On/Off
- ◆ Continuous short circuit protection
- ◆ Over voltage protection
- ◆ Over temperature protection
- ◆ I/O isolation 1500 VDC
- ◆ Input filter meets EN 55022, class A and FCC, level A without external components
- ◆ Fully RoHS compliant
- ◆ 3-year product warranty



The TEN 25WI series is a family of high performance dc-dc converter modules up to 30 Watt featuring ultra wide 4:1 input voltage ranges in a compact low profile case with industry standard footprint. Standard features include remote On/Off, output voltage trimming, over voltage protection, under voltage lockout, over temperature and short circuit protection.

Another feature is the internal EMI-filter to meet EN 55022, class A. Typical applications for these converter modules are industrial electronics, communication systems, battery operated equipment and distributed power systems.

#### Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 25-2410WI	10 – 40 VDC (24 VDC nominal)	3.3 VDC	5'500 mA	82 %
TEN 25-2411WI		5 VDC	5'000 mA	85 %
TEN 25-2412WI		12 VDC	2'500 mA	89 %
TEN 25-2413WI		15 VDC	2'000 mA	89 %
TEN 25-2422WI		±12 VDC	±1'250 mA	89 %
TEN 25-2423WI		±15 VDC	±1'000 mA	89 %
TEN 25-4810WI	18 – 75 VDC (48 VDC nominal)	3,3 VDC	5'500 mA	82 %
TEN 25-4811WI		5 VDC	5'000 mA	85 %
TEN 25-4812WI		12 VDC	2'500 mA	89 %
TEN 25-4813WI		15 VDC	2'000 mA	89 %
TEN 25-4822WI		±12 VDC	±1'250 mA	89 %
TEN 25-4823WI		±15 VDC	±1'000 mA	89 %

### Input Specifications

Input current no load	24 V models: 20 mA max. 48 V models: 10 mA max.
Input current full load	24 V; 3.3 VDC models: 920 mA typ. 24 V; 5.0 VDC models: 1220 mA typ. 24 V; other output models: 1400 mA typ. 48 V; 3.3 VDC models: 460 mA typ. 48 V; 5.0 VDC models: 610 mA typ. 48 V; other output models: 700 mA typ.
Surge voltage (100 msec. max.)	24 V models: 50 V max. 48 V models: 100 V max.
Reverse polarity	2 A max.
Reflected input ripple current	24 V models: 50 mA typ. 48 V models: 25 mA typ.
Conducted noise (input)	EN 55022 level A, FCC part 15, level A
Start-up voltage / under voltage shut down	24 V models: 9.7 VDC / 9.3 VDC typ. 48 V models: 17.5 VDC / 16.5 VDC typ.

### Output Specifications

Voltage set accuracy	±1 %
Output voltage adj. range	±10 % with external resistor (see page 4)
Regulation	– Input variation $V_{in\ min.}$ to $V_{in\ max.}$ : 0.5 % max. – Load variation 10 – 100 % single output models: 1.0 % max. dual output models balanced load: 2.0 % max.
Minimum load	10 % of rated max current (operation at lower load condition is safe but a higher output ripple will be experienced)
Temperature coefficient	±0.02 %/°C max.
Ripple and noise (20 MHz Bandwidth)	80 mVpk-pk max.
Transient response (25 % load step change)	150 µs typ.
Output current limitation	>120 % of I <sub>out</sub> max.
Short circuit protection	indefinite, automatic recovery
Thermal shutdown	at 115°C typ.
Capacitive load	3.3 & 5 VDC models: 10'000 µF 12 & 15 VDC models: 1'000 µF dual output models: 330 µF

### General Specifications

Temperature ranges	– Operating: –40°C to +85°C (with derating) – Casing: +105°C max. – Storage: –50°C to +125°C
Load derating	– without heatsink: 2 %/K above 55°C – with heatsink: 2.5 %/K above 65°C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)	>550'000 h
Isolation voltage (60 sec.)	– Input/Output: 1'500 VDC
Isolation capacitance	– Input/Output (100 kHz, 1 V): 1200 pF typ.
Isolation resistance	– Input/Output (500 VDC): >1'000 MΩ
Switching frequency (fixed)	330 kHz typ. (puls width modulation)

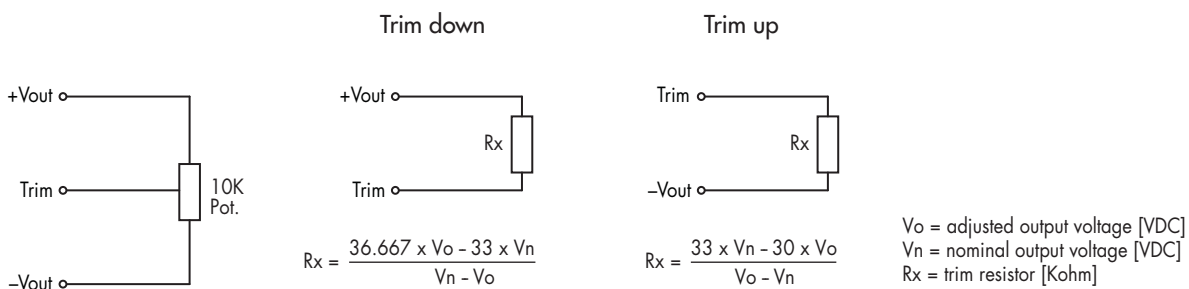
**General Specifications**

Remote On/Off:	- On: - Off: - Standby current:	2.5 to 100 VDC or open circuit. -1.0 to +1.0 VDC or short circuit pin 3 and 2 5 mA max.
Safety standards		UL/cUL 60950-1, IEC/EN 60950-1
Safety approvals	- UL/cUL	<a href="http://www.ul.com">www.ul.com</a> -> certifications -> File e188913

**Physical Specifications**

Casing material		copper, nickel plated
Baseplate		non conductive FR4
Potting material		silicon (UL 94 V-0 rated)
Weight		48 g (1.69oz)
Soldering temperature		max. 265°C / 10 sec.
Environmental compliance	- Reach - RoHS	<a href="http://www.tracopower.com/products/ten25wi-reach.pdf">www.tracopower.com/products/ten25wi-reach.pdf</a> RoHS directive 2011/65/EU

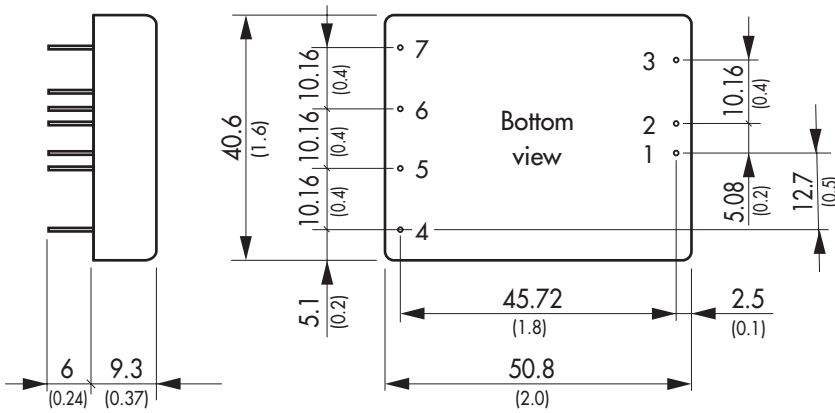
**Output Voltage Adjustments**



Nominal output voltage at open Trim input.

**Application note:** [www.tracopower.com/products/ten25wi-application.pdf](http://www.tracopower.com/products/ten25wi-application.pdf)

**Outline Dimensions**



Pin-Out		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	-Vin (GND)	-Vin (GND)
3	Remote On/Off	
4	No pin	+ Vout
5	+ Vout	Common
6	-Vout	-Vout
7	Trim	

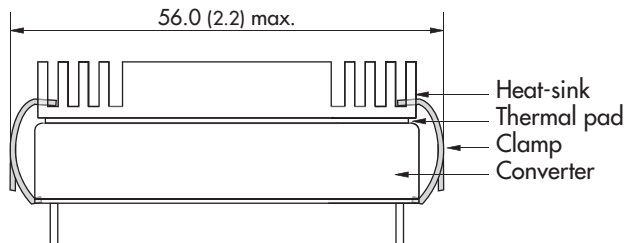
**\*Optional versions:**

- without remote and trim pins add suffix **-B** (e.g. TEN 25-2412WI-B)
- without remote pin add suffix **-B1** (e.g. TEN 25-2413WI-B1)
- without trim pin add suffix **-B2** (e.g. TEN-25-4811WI-B2)

Dimensions in [mm], ( ) = Inch  
 Pin diameter: 1.0 ±0.05 (0.02 ±0.002)  
 Pin pitch tolerances: ±0.35 (±0.014)  
 Case tolerances: ±0.5 (±0.02)

**Heat-Sink (Option)**

**Heat-sink TEN-HS5 (optional)**



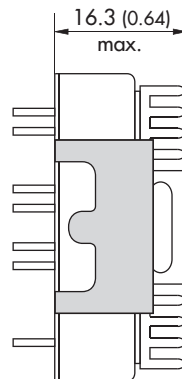
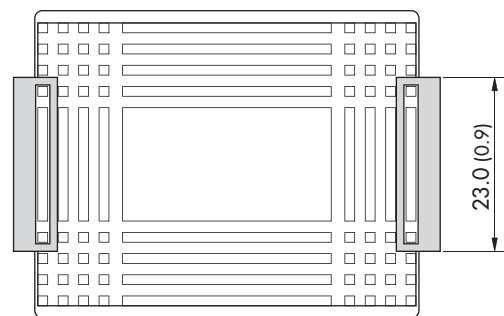
**Order code:** TEN-HS5

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

**Material:** Aluminum

**Finish:** Anodic treatment (black)

**Weight:** 19 g (0.67oz) (without converter)



**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](http://www.tracopower.com)