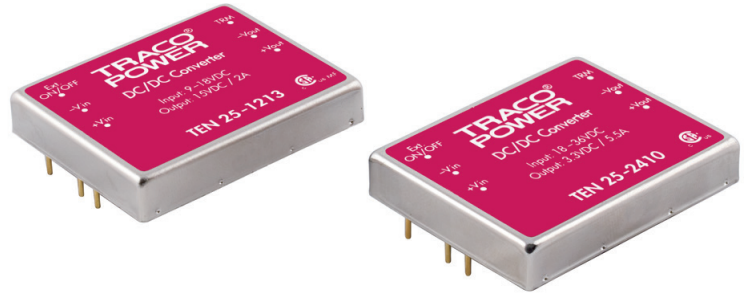


### Features

- ◆ Wide 2:1 input range
- ◆ Very high efficiency up to 89%
- ◆ Extended operating temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- ◆ Adjustable output voltage
- ◆ Remote On/Off
- ◆ Continuous short circuit protection
- ◆ Over voltage protection
- ◆ I/O isolation 1500 VDC
- ◆ Input filter meets EN 55022, Class A and FCC, Level A without external components
- ◆ Lead free design - RoHS compliant
- ◆ 3-year product warranty

*not recommended for new design in*



The TEN 25 series is a range of isolated DC/DC converters with high power density in a 51x41x9.5mm shielded metal case. All 18 models have a wide 2:1 input voltage range. The very high efficiency allows a safe operating temperature range of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ . Other features are internal EMI-filter to meet EN55022, class A and remote On/Off. Typical applications for these converter modules are industrial electronics, communication systems, battery operated equipment and distributed power systems.

### Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 25-1210	<b>9 – 18 VDC</b> (12 VDC nominal)	3.3 VDC	5'500 mA	81 %
TEN 25-1211		5 VDC	5'000 mA	84 %
TEN 25-1212		12 VDC	2'500 mA	88 %
TEN 25-1213		15 VDC	2'000 mA	88 %
TEN 25-1222		$\pm 12$ VDC	$\pm 1'250$ mA	88 %
TEN 25-1223		$\pm 15$ VDC	$\pm 1'000$ mA	88 %
TEN 25-2410	<b>18 – 36 VDC</b> (24 VDC nominal)	3.3 VDC	5'500 mA	82 %
TEN 25-2411		5 VDC	5'000 mA	85 %
TEN 25-2412		12 VDC	2'500 mA	89 %
TEN 25-2413		15 VDC	2'000 mA	89 %
TEN 25-2422		$\pm 12$ VDC	$\pm 1'250$ mA	89 %
TEN 25-2423		$\pm 15$ VDC	$\pm 1'000$ mA	89 %
TEN 25-4810	<b>36 – 75 VDC</b> (48 VDC nominal)	3,3 VDC	5'500 mA	82 %
TEN 25-4811		5 VDC	5'000 mA	85 %
TEN 25-4812		12 VDC	2'500 mA	89 %
TEN 25-4813		15 VDC	2'000 mA	89 %
TEN 25-4822		$\pm 12$ VDC	$\pm 1'250$ mA	89 %
TEN 25-4823		$\pm 15$ VDC	$\pm 1'000$ mA	89 %

### Input Specifications

Input current no load		12 Vin models: 40 mA max. 24 Vin models: 20 mA max. 48 Vin models: 10 mA max.
Input current (full load)	12 Vin; 12 Vin; 24 Vin; 24 Vin; 48 Vin; 48 Vin;	3.3/ 5 VDC models: 1870 mA typ. / 2480 mA typ. other output models: 2840 mA typ. 3.3/ 5 VDC models: 920 mA typ. / 1220 mA typ. other output models: 1400 mA typ. 3.3/ 5 VDC models: 460 mA typ. / 610 mA typ. other output models: 700 mA typ.
Start-up voltage / under voltage shut down		12 Vin models: 8.8 VDC / 8.3 VDC typ. 24 Vin models: 17.5 VDC / 16.5 VDC typ. 48 Vin models: 35.0 VDC / 33.0 VDC typ.
Surge voltage (1000 msec. max.)		12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Conducted noise (input)		EN 55022 class A, FCC part 15, level A

### Output Specifications

Voltage set accuracy		±1 %
Output voltage adj. range		±10 %
Regulation	– Input variation Vin min. to Vin max. – Load variation 10 – 100 %	0.3 % max. 0.5 % max. 1.0 % max. 2.0 % max.
Ripple and noise (20 MHz Bandwidth)		80 mVpk-pk max.
Temperature coefficient		±0.02 %/K
Output current limitation		>110 % of I <sub>out</sub> max., constant current
Short circuit protection		indefinite, automatic recovery
Capacitive load	single output models: dual output models:	470 µF 220 µF (for each output)

### General Specifications

Temperature ranges	– Operating – Case temperature – Storage	–40°C to +85°C +105°C max. –55°C to +125°C
Load derating	– without heatsink – with heatsink	2.2 %/K above +60°C 3.3 %/K above +70°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	1200 pF typ.
Isolation resistance	– Input/Output (500 VDC)	>1'000 MOhm
Switching frequency (fixed)		330 kHz typ. (puls width modulation)
Remote On/Off:	– On: – Off: – Standby current:	3.5...12 VDC or open circuit. 0...1.2 VDC or short circuit pin 3 and pin 2 5 mA max.
Safety standards		UL /cUL 60950, IEC/EN 60950 compliance up to 60 VDC input voltage (SELV limit)
Safety approvals		CSA File No. 226037 <a href="http://directories.csa-international.org">http://directories.csa-international.org</a>

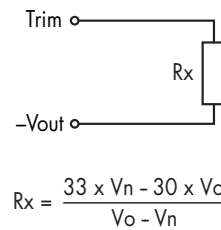
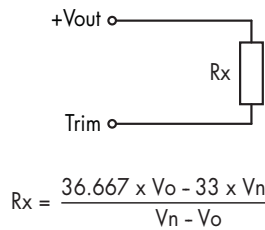
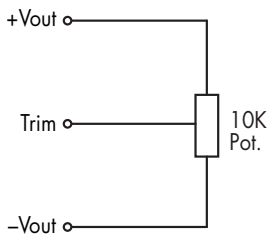
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

**Physical Specifications**

Casing material	copper, nickel plated
Baseplate	non conductive FR4
Potting material	silicon rubber (UL 94 V-0 rated)
Weight	48 g (1.69 oz)
Soldering temperature	max. 265°C / 10 sec.
Environmental compliance	- Reach - RoHS
	<a href="http://www.tracopower.com/products/ten25-reach.pdf">www.tracopower.com/products/ten25-reach.pdf</a> RoHS directive 2011/65/EU

**Application note:** [www.tracopower.com/products/ten25-application.pdf](http://www.tracopower.com/products/ten25-application.pdf)

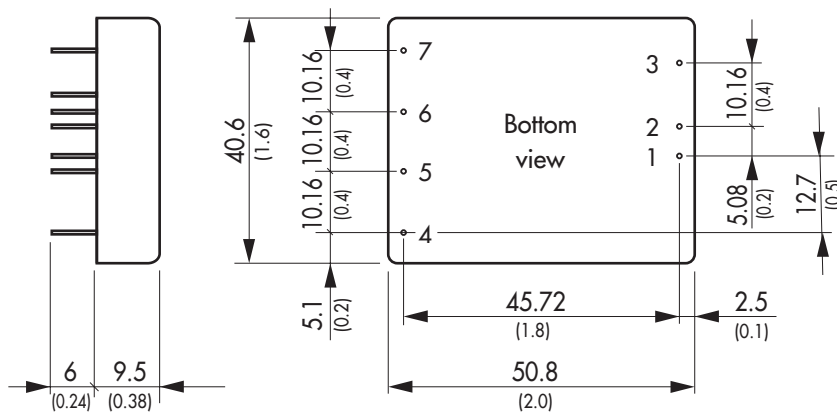
**Output Voltage Adjustments**



$V_o$  = adjusted output voltage [VDC]  
 $V_n$  = nominal output voltage [VDC]  
 $R_x$  = trim resistor [Kohm]

Nominal output voltage at open Trim input.

**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	

Dimensions in [mm], ( ) = Inch  
 Pin diameter: 1.0 ±0.05 (0.04 ±0.002)  
 Pin pitch tolerances: ±0.25 (±0.01)  
 Case tolerances: ±0.5 (±0.02)

Optional heat-sink see: [www.tracopower.com/products/heatsinks.pdf](http://www.tracopower.com/products/heatsinks.pdf)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)