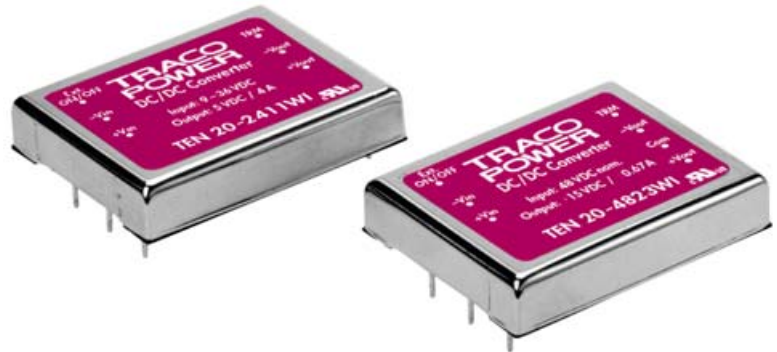


#### Features



- Ultra wide 4 : 1 Input Range
- Extended Operating Temperature Range – 40°C to +85°C
- I/O-Isolation 1500 VDC
- Input Filter meets EN 55022, Class A and FCC, Level A without external Components
- Remote On/Off
- Adjustable Output
- Industry Standard Footprint
- Shielded Metal Case with insulated Baseplate
- 3 Year Product Warranty



The TEN 20WI series is a family of high performance 20W DC/DC converter modules featuring ultra wide 4:1 input voltage ranges in a compact 2"x1.6" low profile package with industry-standard footprint. A very high efficiency allows an operating temperature range of –40°C to 85°C. A built-in EMI input filter complies with EN 55022, class A without external components. Further standard features include remote On/Off, output voltage trimming, over voltage protection and short-circuit protection.

Typical applications for these converters are battery operated equipment and distributed power architectures in communication and industrial electronics, everywhere where isolated, tightly regulated voltages are required.

#### Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 20-2411WI	9 – 36 VDC	5 VDC	4'000 mA	79 %
TEN 20-2412WI		12 VDC	1'670 mA	81 %
TEN 20-2413WI		15 VDC	1'330 mA	81 %
TEN 20-2421WI		± 5 VDC	± 2'000 mA	79 %
TEN 20-2422WI		± 12 VDC	± 835 mA	81 %
TEN 20-2423WI		± 15 VDC	± 665 mA	82 %
TEN 20-4811WI	18 – 75 VDC	5 VDC	4'000 mA	80 %
TEN 20-4812WI		12 VDC	1'670 mA	81 %
TEN 20-4813WI		15 VDC	1'330 mA	81 %
TEN 20-4821WI		± 5 VDC	± 2'000 mA	79 %
TEN 20-4822WI		± 12 VDC	± 835 mA	83 %
TEN 20-4823WI		± 15 VDC	± 665 mA	84 %

### Input Specifications

Input current no load /full load	12 Vin models: 24 Vin models: 48 Vin models:	40 mA typ. 35 mA typ. 25 mA typ.
Input current (full load)	24 Vin models: 48 Vin models:	1000 mA typ. 500 mA typ.
Surge voltage (100 msec. max.)	24 Vin models: 48 Vin models:	50 V max.. 100 V max.
Conducted noise (input)	EN 55022 level A, FCC part 15, level A	
ESD (input)	EN 61000-4-2, Perf. Criteria B	
Fast Transient (input)	EN 61000-4-4, Perf. Criteria B	
Surge (input)	EN 61000-4-5, Perf. Criteria B	

### Output Specifications

Voltage set accuracy	± 2 %	
Output voltage adjustment	± 10 %	
Regulation	– Input variation Vin min. to Vin max. – Load variation 25 – 100%: single output models: dual output models: – Load cross variation 25 % / 100 %	± 0.2 % max.  ± 0.5 % max. ± 3 % max. ± 5 % max.
Temperature coefficient	± 0.02 % /K	
Ripple and noise (20 MHz Bandwidth)	single output models: dual output models:	75 mVpk-pk max. 100 mVpk-pk max.
Start up time (nominal Vin and constant resistive load)	20 ms typ.	
Transient Response (25% load step change)	500 µs typ.	
Short circuit protection	indefinite (automatic recovery)	
Over load protection	150% of Iout max typ. foldback	
Over voltage protection	5 Vout models: 12 Vout models: 15 Vout models:	6.2 V 15 V 18 V
Minimum load (only for dual output models)	10% of rated max current (operation at lower load condition will not damage these converters, however, they may not meet all listed specifications)	
Capacitive load	5 Vout models / ± 5 Vout models: 12 Vout models / ± 12 Vout models: 15 Vout models / ± 15 Vout models:	6'800 µF max. / ± 3'400 µF max. 2'200 µF max. / ± 680 µF max. 755 µF max. / ± 450 µF max.

### General Specifications

Temperature ranges	– Operating – Case temperature – Storage	– 40 °C ... + 85 °C + 100 °C max. – 55 °C ... + 105 °C
Derating	2.0 %/K above 60°C typ. download model specific derating curves under: <a href="http://www.tracopower.com/products/ten20wi_derating.pdf">www.tracopower.com/products/ten20wi_derating.pdf</a>	

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

**General Specifications**

Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217 E)		> 440'000 h @ + 25°C
Isolation (Input/Output)	- Voltage - Capacity - Resistance	1'500 VDC 300 pF max. > 1'000 M Ohm
Switching frequency (fixed)		300 kHz typ. (Pulse width modulation PWM)
Vibration		10-55Hz, 2G, 30 minutes along X,Y,Z
Remote on/off	ON: OFF: OFF idle current:	3.5 ... 12 VDC or open circuit. 0 ... 1.2 VDC or short circuit pin 3 and pin 2 20 mA typ.
Safety standards		UL 1950, EN 60950, IEC 60950 Compliance up to 60 VDC input voltage (SELV limit)
Safety approvals		UL /cUL File E 188913

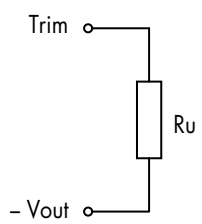
**Physical Specifications**

Case material	Copper, Nickel plated
Baseplate material	none conductive FR4
Potting material	epoxy (UL 94V-0 – rated)
Weight	50 g (1.2 oz)

**Output Voltage Adjustment**

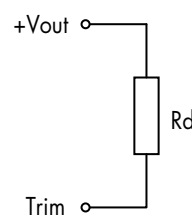
**Output Voltage Adjustment**

Trim up



	Ru [kohm]*		
output	5V	12V	15V
+5%	3.9	56	470
+10%	0.47	6.8	2.2
output	±5V	±12V	±15V
+5%	10	22	39
+10%	0.82	1.5	6.8

Trim down

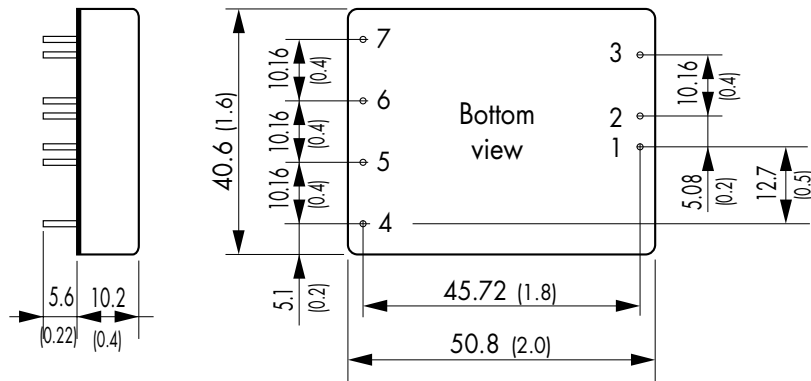


	Rd [kohm]*		
output	5V	12V	15V
-5%	5.6	47	56
-10%	0.68	2.7	1.8
output	±5V	±12V	±15V
-5%	15	47	47
-10%	1.2	10	8.2

\* approximate values

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

**Outline Dimensions mm (inches)**



Pin diameter  $\varnothing 1.0 \pm 0.05$  (0.039  $\pm 0.002$ )

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

Specifications can be changed without notice