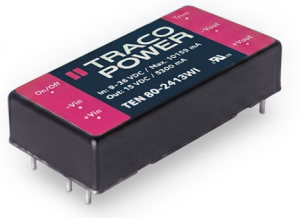
TRACO POWER

DC/DC Converter

TEN 80WI Series, 80 Watt

- **2" x 1" metal package**
- **Wide 4:1 input voltage range 9–36, 18–75 VDC**
- **Minimal heat development due to high efficiencies up to 92%**
- **Remote On/Off and Trim function**
- **Operating temperature range –40°C to +85°C**
- **EN 55032 class A (with external components)**
- **Protection against short circuit, overvoltage and overtemperature**
- **Under voltage lockout**
- **3-year product warranty**



UL 62368-1 IEC 62368-1

The TEN 80WI series is a family of high performance 80 Watt DC/DC converter modules featuring ultra wide 4:1 input voltage ranges in a six side shielded 2" x 1" metal package with industry standard footprint. High efficiencies of up to 92% allow for an operating temperature range (natural convection) of -40 to +60°C without power derating. Certified according to the latest IT standard (IEC/EN/UL 62368-1) and equipped with additional features like remote on/off function and protection against short circuit, overvoltage and over temperature the TEN 80WI series is suitable for many industrial applications.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency
		Vnom	Imax	Vnom	Imax	typ.
TEN 80-2412WI	9 - 36 VDC (24 VDC nom.)	12 VDC	6'600 mA			92 %
TEN 80-2413WI		15 VDC	5'300 mA			92 %
TEN 80-2415WI		24 VDC	3'300 mA			92 %
TEN 80-2422WI		+12 VDC	3'300 mA	–12 VDC	3'300 mA	92 %
TEN 80-2423WI		+15 VDC	2'660 mA	–15 VDC	2'660 mA	92 %
TEN 80-4812WI	18 - 75 VDC (48 VDC nom.)	12 VDC	6'600 mA			92 %
TEN 80-4813WI		15 VDC	5'300 mA			92 %
TEN 80-4815WI		24 VDC	3'300 mA			92 %
TEN 80-4822WI		+12 VDC	3'300 mA	–12 VDC	3'300 mA	92 %
TEN 80-4823WI		+15 VDC	2'660 mA	–15 VDC	2'660 mA	92 %

➡ **Available soon: Models with 5 Vout and 48 Vout**

Options

TEN-HS11	- Optional Heat Sink: www.tracopower.com/overview/ten-hs11
on demand (backorder with MOQ non stocking item)	- Optional model with 54 VDC and 1'480 mA Output, and 9 - 36 VDC Input - Optional model with 54 VDC and 1'480 mA Output, and 18 - 75 VDC Input - Optional models with inverse Remote On/Off function (passive = off) - Optional models with pre-assembled heatsink

Input Specifications

Input Current	- At no load	24 Vin models:	45 mA typ. / 50 mA max.
		48 Vin models:	35 mA typ. / 40 mA max.
	- At full load	24 Vin models:	3'611 mA typ. / 3'704 mA max.
		48 Vin models:	1'805 mA typ. / 1'852 mA max.
Surge Voltage		24 Vin models:	50 VDC max. (100 ms max.)
		48 Vin models:	100 VDC max. (100 ms max.)
Start-up Voltage		24 Vin models:	8.3 VDC min. / 8.6 VDC typ. / 9 VDC max.
		48 Vin models:	17.1 VDC min. / 17.5 VDC typ. / 18 VDC max.
Under Voltage Lockout		24 Vin models:	7.5 VDC min. / 7.8 VDC typ. / 8.1 VDC max.
		48 Vin models:	15 VDC min. / 16 VDC typ. / 17 VDC max.
Recommended Input Fuse		24 Vin models:	16'000 mA (slow blow)
		48 Vin models:	8'000 mA (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Capacitor

Output Specifications

Output Voltage Adjustment			−15% to +5% (54 Vout models) ±10% (other models) (single output models only) (By external trim resistor)
		See application note:	www.tracopower.com/ten80wi-adj/
			Output power must not exceed rated power!
Voltage Set Accuracy			±1% max.
Regulation	- Input Variation (Vmin - Vmax)	single output models:	0.2% max.
		dual output models:	0.2% max.
	- Load Variation (0 - 100%)	single output models:	0.3% max.
		dual output models:	0.3% max. (Output 1)
			0.3% max. (Output 2)
	- Voltage Balance (symmetrical load)	dual output models:	2% max.
	- Cross Regulation (25% / 100% asym. load)	dual output models:	5% max.
Ripple and Noise (20 MHz Bandwidth)	- single output	12 Vout models:	125 mVp-p max. (w/ 22 µF MLCC)
		15 Vout models:	125 mVp-p max. (w/ 22 µF MLCC)
		24 Vout models:	200 mVp-p max. (w/ 22 µF MLCC)
		54 Vout models:	330 mVp-p max. (w/ 22 µF MLCC)
	- dual output	12 / -12 Vout models:	125 / 125 mVp-p max. (w/ 22 µF MLCC)
		15 / -15 Vout models:	125 / 125 mVp-p max. (w/ 22 µF MLCC)
	- single output	12 Vout models:	100 mVp-p typ. (w/ 22 µF MLCC)
		15 Vout models:	100 mVp-p typ. (w/ 22 µF MLCC)
		24 Vout models:	150 mVp-p typ. (w/ 22 µF MLCC)
		54 Vout models:	280 mVp-p typ. (w/ 22 µF MLCC)
	- dual output	12 / -12 Vout models:	100 / 100 mVp-p typ. (w/ 22 µF MLCC)
		15 / -15 Vout models:	100 / 100 mVp-p typ. (w/ 22 µF MLCC)
Capacitive Load	- single output	12 Vout models:	4'950 µF max.
		15 Vout models:	3'150 µF max.
		24 Vout models:	1'250 µF max.
		54 Vout models:	250 µF max.
	- dual output	12 / -12 Vout models:	2'500 / 2'500 µF max.
		15 / -15 Vout models:	1'600 / 1'600 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Hold-up Time			1 ms min. (24 Vin models)
			6 ms min. (48 Vin models)
Start-up Time			35 ms typ. / 50 ms max.

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

Start-up Overshoot Voltage		5% max.
Short Circuit Protection		Continuous, Automatic recovery
Overload Protection		Switch off after 4 s delay, automatic restart
Output Current Limitation		110 - 160% of Iout max. 135% typ. of Iout max.
Overvoltage Protection		112 - 122% of Vout nom. 117% typ. of Vout nom.
Transient Response	- Response Deviation	3% typ. / 5% max. (25% Load Step)
	- Response Time	300 µs typ. / 500 µs max. (25% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	www.tracopower.com/ten80wi-safety-cert/
Pollution Degree		PD 3
Over Voltage Category		Not mains connected

EMC Specifications

EMI (Emissions)	- Conducted Emissions		EN 55032 class A (with external filter) EN 55032 class B (with external filter)
	- Radiated Emissions		EN 55032 class A (with external filter) EN 55032 class B (with external filter)
		External filter proposal:	www.tracopower.com/ten80wi-emc-filter/
EMS (Immunity)			EN 55035 (Multimedia)
	- Electrostatic Discharge	Air:	EN 61000-4-2, ±8 kV, perf. criteria A
		Contact:	EN 61000-4-2, ±6 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV, perf. criteria A
		Ext. input component:	2x 1200µF / 50V / CHEMI-CON KY (24 Vin) 2x 470µF / 100V / CHEMI-CON KY (48 Vin)
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 100 A/m, perf. criteria A
		1 s:	EN 61000-4-8, 1000 A/m, perf. criteria A
EMC / Environmental	- Certification Documents		www.tracopower.com/ten80wi-emc-cert/

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +75°C –40°C to +83°C (with heatsink TEN-HS11)
	- Case Temperature	+105°C max.
	- Storage Temperature	–50°C to +125°C
Power Derating	- High Temperature	2.22 %/K above 60°C (average) 2.86 %/K above 70°C (average) (with heatsink TEN-HS11)
	See application note:	www.tracopower.com/ten80wi-cc/
Over Temperature Protection Switch Off	- Protection Mode	106°C min. / 110°C typ. / 115°C max. (Automatic recovery at 95°C typ.)
	- Measurement Point	Base-Plate
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)	On: 3.5 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	4 mA typ. / 8 mA max.
	- Remote Pin Input Current	-0.5 to 0.5 mA

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

Altitude During Operation		5'000 m max.
Regulator Topology		Flyback Converter, QR Flyback Converter
Switching Frequency		150 - 500 kHz (PWM, PWM QR) 200 kHz typ. (PWM, PWM QR)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'500 VDC
	- Input to Output, 1 s	1'800 VDC
	- Output to Case, 60 s	1'000 VDC
Creepage	- Input to Output	1.8 mm min.
Clearance	- Input to Output	1.8 mm min.
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	1'500 pF typ. 2'500 pF max.
Reliability	- Calculated MTBF	98'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
Environment	- Vibration	IPC-9592B 2.4 g, 3 axis, random waveform, 30 min
	- Mechanical Shock	IPC-9592B 30 g, 3 axis, half sine, 11 ms
	- Thermal Shock	IPC-9592B -40 to +125°C, 100 cycles, 30 min each
Housing Material		Copper
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 4 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		2" x 1"
Soldering Profile		Lead-Free Wave Soldering 260°C / 10 s max.
Weight		46 g (standard models) 76 g (models with pre-assembled heatsink)
Thermal Impedance	- Case to Ambient	7.3 K/W typ. 4.3 K/W typ. (with heatsink TEN-HS11)
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	5e30c91a-683f-4999-90e0-dab190e6a531

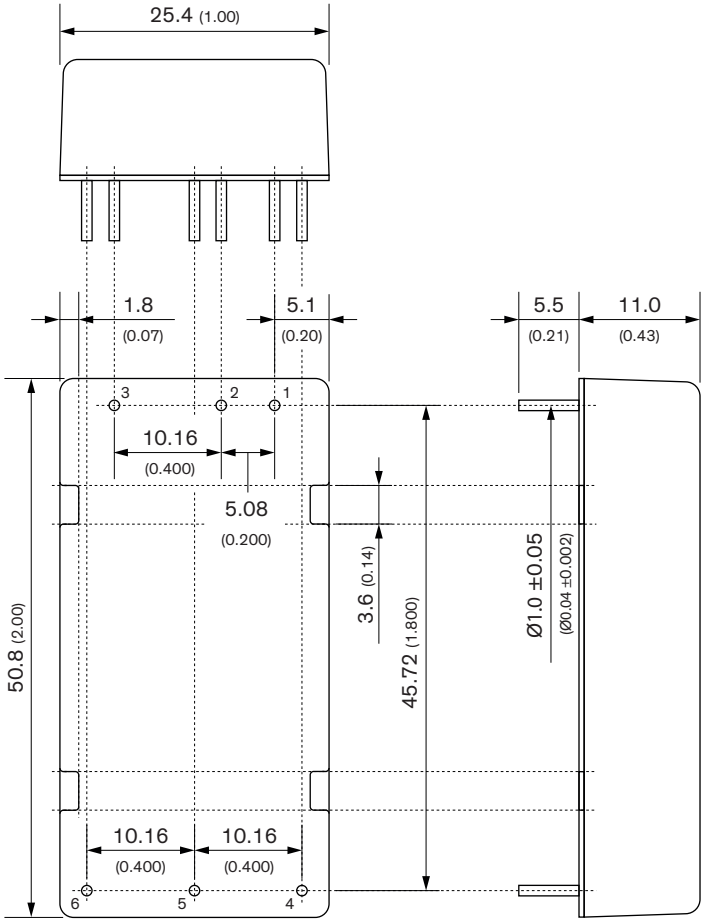
Additional Information

Supporting Documents	www.tracopower.com/overview/ten80wi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf
Service Portal	www.tracoserviceportal.com

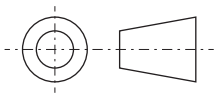
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Outline Dimensions

Standard model



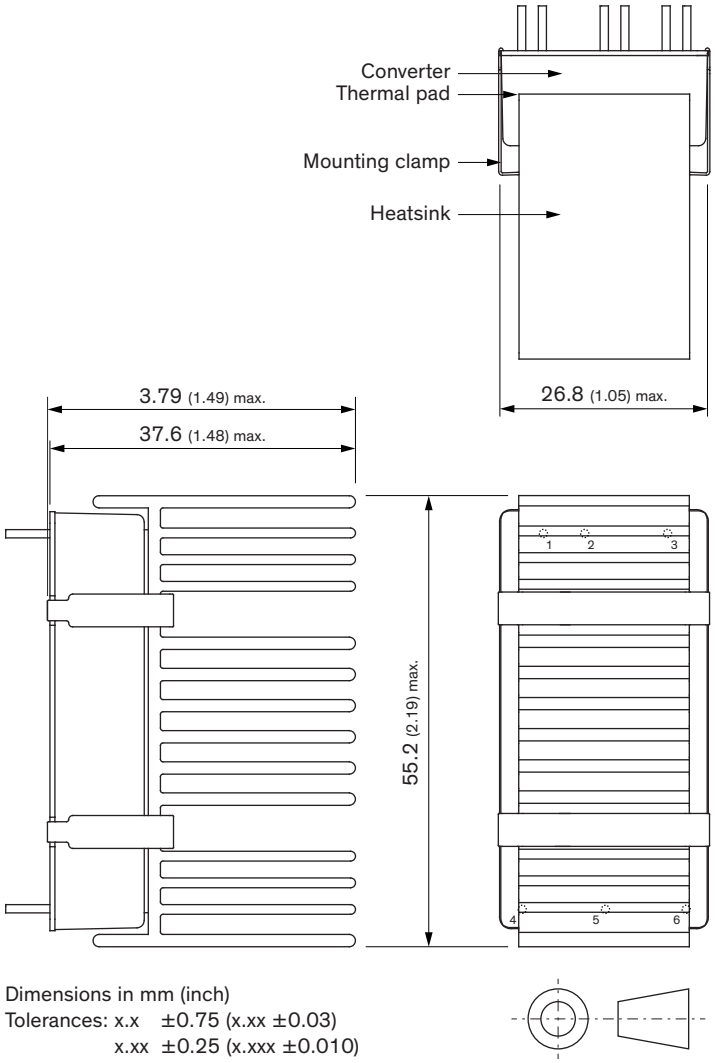
Dimensions in mm (inch)
Tolerances: x.x ±0.75 (x.xx ±0.03)
x.xx ±0.25 (x.xxx ±0.010)



Pinout		
Pin	**Single**	**Dual**
1	+Vin	
2	–Vin	
3	Remote On/Off	
4	+Vout	
5	–Vout	Common
6	Trim	–Vout

Avoid routing PCB traces under the converter.

Optional model with pre-assembled heatsink



Dimensions in mm (inch)
Tolerances: x.x ±0.75 (x.xx ±0.03)
x.xx ±0.25 (x.xxx ±0.010)

Pinout		
Pin	**Single**	**Dual**
1	+Vin	
2	–Vin	
3	Remote On/Off	
4	+Vout	
5	–Vout	Common
6	Trim	–Vout

Avoid routing PCB traces under the converter.

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