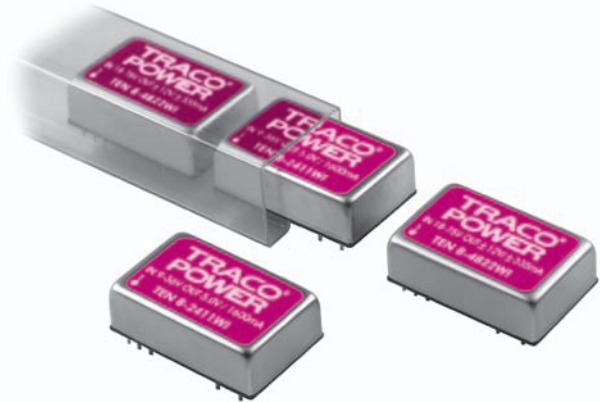


Features

- ◆ DIP-24 metal package
- ◆ Ultra wide 4:1 input voltage range
9–16, 18–75, 43–160 VDC
- ◆ EN 50155 approval for railway applications
- ◆ Thermal shock and vibration resistant according EN 61373
- ◆ High efficiency up to 88%
- ◆ No minimum load required
- ◆ Operating temperature range
–40°C to +85°C
- ◆ Remote On/Off
- ◆ Under voltage lockout
- ◆ Shielded metal case with insulated base plate
- ◆ Lead free design, RoHS compliant
- ◆ 3-year product warranty



The TEN 8WI series is a family of high performance 8 Watt dc/dc converter modules featuring ultra wide 4:1 input voltage ranges in a DIP-24 package with industry-standard footprint. Input voltages up to 160 VDC, excellent EMC characteristics and EN 50155 approval make this product the best choice for many demanding applications in railroad and transportation systems. Further standard features include remote On/Off, over voltage protection, under voltage lockout and short circuit protection. Typical applications for these converters are also in wireless networks, telecom/datacom, industry control systems and measurement equipments.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 8-2410WI	9 – 36 VDC (24 VDC nominal)	3.3 VDC	2'000 mA	85 %
TEN 8-2411WI		5 VDC	1'500 mA	87 %
TEN 8-2412WI		12 VDC	666 mA	86 %
TEN 8-2413WI		15 VDC	533 mA	86 %
TEN 8-2421WI		±5 VDC	±800 mA	84 %
TEN 8-2422WI		±12 VDC	±333 mA	86 %
TEN 8-2423WI		±15 VDC	±267 mA	86 %
TEN 8-4810WI		18 – 75 VDC (48 VDC nominal)	3.3 VDC	2'000 mA
TEN 8-4811WI	5 VDC		1'500 mA	87 %
TEN 8-4812WI	12 VDC		666 mA	87 %
TEN 8-4813WI	15 VDC		533 mA	88 %
TEN 8-4821WI	±5 VDC		±800 mA	84 %
TEN 8-4822WI	±12 VDC		±333 mA	87 %
TEN 8-4823WI	±15 VDC		±267 mA	87 %
TEN 8-7210WI	43 – 160 VDC (110 VDC nominal)		3.3 VDC	2'400 mA
TEN 8-7211WI		5 VDC	1'600 mA	85 %
TEN 8-7212WI		12 VDC	666 mA	86 %
TEN 8-7213WI		15 VDC	533 mA	86 %
TEN 8-7221WI		±5 VDC	±800 mA	82 %
TEN 8-7222WI		±12 VDC	±333 mA	85 %
TEN 8-7223WI		±15 VDC	±267 mA	85 %

Input Specifications

Input current (no load)	9–36 Vin, 3.3 VDC & 5 VDC models: 9–36 Vin other models: 18–75 Vin, 3.3 VDC & 5 VDC models: 18–75 Vin other models: 43–160 Vin, 3.3 VDC & 5 VDC models: 43–160 Vin other models:	40 mA typ. 25 mA typ. 20 mA typ. 13 mA typ. 8 mA typ. 5 mA typ.
Input current (full load)	9–36 Vin models: 18–75 Vin models: 43–160 Vin models:	410 mA typ. 210 mA typ. 90 mA typ.
Input voltage variation (dv/dt)		5 V/ms, max. (complies with ETS300 132 part 4.4)
Start-up voltage / under voltage lockout	9–36 Vin models: 18–75 Vin models: 43–160 Vin models:	9.0 VDC / 8.0 VDC (typ.) 18 VDC / 16 VDC (typ.) 43 VDC / 42 VDC (typ.)
Surge voltage (100 msec. max.)	9–36 Vin models: 18–75 Vin models: 43–160 Vin models:	50 V max. 100 V max. 170 V max.
Reflected ripple current		20 mA _{p-p} typ.
Conducted noise		EN 55022 class A with external components see application note: www.tracopower.com/products/ten8wi-application.pdf
ESD (electrostatic discharge)		EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
Radiated immunity		EN 61000-4-3, 20 V/m, perf. criteria A
Fast transient / surge (with external input capacitor)	– external input capacitor	EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV perf. criteria A 24/48 Vin models: Nippon chemi-con KY 220 µF, 100 V, ESR 48 mOhm 110 Vin models: Nippon chemi-con KXJ 150 µF, 200 V, ESR 48 mOhm
Conducted immunity		EN 61000-4-6, 10 Vrms, perf. criteria A

Output Specifications

Voltage set accuracy		±1 %
Regulation	– Input variation Vin min. to Vin max. – Load variation 0 – 100 % – Load cross variation 25 % / 100 %	0.2 % max. single output models: 0.5 % max. dual output models: 1 % max. 5 % max.
Minimum load		not required
Temperature coefficient		±0.02 %/K
Ripple and noise (20 MHz bandwidth)	24/48 Vin models: 110 Vin models:	50 mV _{p-p} typ. 75 mV _{p-p} typ.
Start up time (constant resistive load)	– Power On – Remote On	450 ms typ. 5 ms typ.
Transient Response (25% load step change)		250 µs typ.
Short circuit protection		continuous (automatic recovery)
Over load protection		150 % of lout max. typ.
Over voltage protection (only single output models)	3.3 V output: 5 V output: 12 V output: 15 V output:	3.9 V 6.2 V 15 V 18 V

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

Output Specifications

Capacitive load	3.3 VDC & 5 VDC models:	1330 μ F
	12 VDC models:	288 μ F
	15 VDC models:	200 μ F
	\pm 5 VDC models:	900 μ F (each output)
	\pm 12 VDC models:	133 μ F (each output)
	\pm 15 VDC models:	90 μ F (each output)

General Specifications

Temperature ranges	- Operating	-40°C to +85°C
	- Case temperature	+105°C max.
	- Storage	-55°C to +125°C
Power derating		3 %/K above +70°C
Thermal impedance	- Natural convection	18.2°C/W
	- Natural convection with heat sink	15.8°C/W
Humidity (non condensing)		5 – 95 % rel. H max.
Isolation voltage (60 sec.)	- Input / Output	1500 VDC
Isolation resistance	- Input / Output	>1000 M Ohm
Isolation capacitance	- Input / Output	1500 pF max.
Switching frequency		300 kHz typ. (pulse width modulation PWM)
Vibration and thermal shock		EN 61373, MIL-STD-810E
Safety standards		UL/cUL 60950-1, IEC/EN 60950-1, EN 50155
Safety approvals	- UL/cUL	www.ul.com -> certifications -> File E188913
Remote On/Off	- On:	3.0 ... 12 VDC or open circuit
	- Off:	0 ... 1.2 VDC or short circuit pin 1 and pin 2/3
	- Off idle current:	2.5 mA
Reliability, calculated MTTF (MIL-HDBK-217F, @+25°C, ground benign)		1 Mio. h

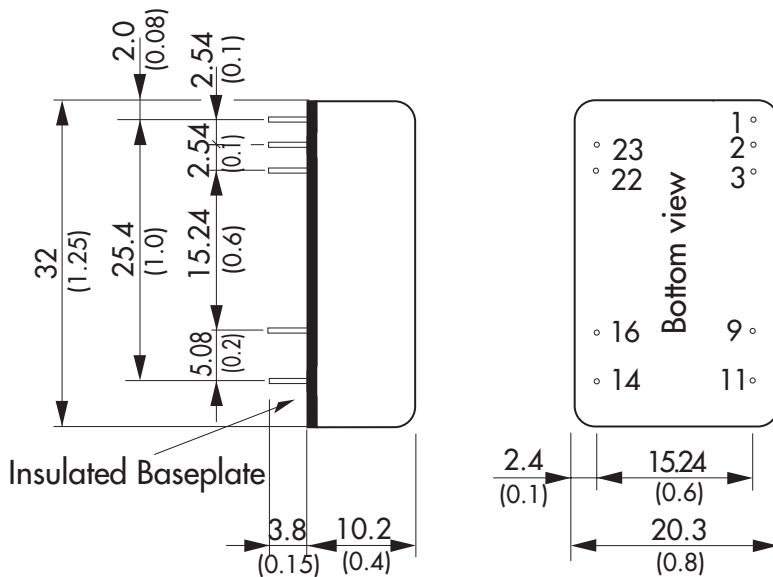
Application note: www.tracopower.com/products/ten8wi-application.pdf

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 material	non conductive FR4
Potting material	epoxy (UL94V-0 rated)
Weight	18 g (0.63 oz)
Soldering temperature	max. 265°C / 10 sec.

Outline Dimensions



Pin-Out		
Pin	Single	Dual
1	Remote On/Off	Remote On/Off
2	-Vin (GND)	-Vin (GND)
3	-Vin (GND)	-Vin (GND)
9	ntc	Common
11	ntc	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

ntc = not to connect

Dimensions in [mm], () = Inch
 Pin diameter $\varnothing 0.5 \pm 0.05$ (0.02 ± 0.002)
 Tolerances ± 0.5 (± 0.02)
 Pin pitch tolerances ± 0.25 (± 0.001)

Specifications can be changed any time without notice.