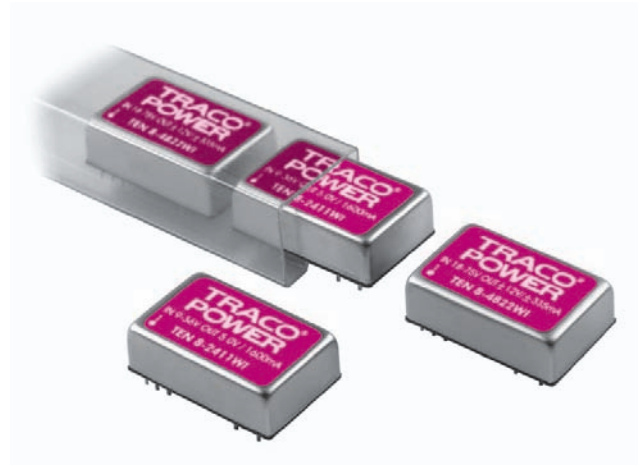


Features

- ◆ DIP-24 metal package
- ◆ Ultra wide 4:1 input voltage range
9–36, 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: 40 mA typ. 9–36 Vin other models: 25 mA typ. 18–75 Vin, 3.3 VDC & 5 VDC models: 20 mA typ. 18–75 Vin other models: 13 mA typ. 43–160 Vin, 3.3 VDC & 5 VDC models: 8 mA typ. 43–160 Vin other models: 5 mA typ. |
| Input current (full load) | 9–36 Vin models: 410 mA typ 18–75 Vin models: 210 mA typ 43–160 Vin models: 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: 9.0 VDC / 8.0 VDC (or lower) 18–75 Vin models: 18 VDC / 16 VDC (or lower) 43–160 Vin models: 43 VDC / 42 VDC (or lower) |
| Surge voltage (100 msec. max.) | 9–36 Vin models: 50 V max. 18–75 Vin models: 100 V max. 43–160 Vin models: 170 V max. |
| Reflected ripple current | 20 mA _{p-p} typ. |
| Conducted noise | EN 55022 class A with external components see application note: |
| 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) | EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV perf. criteria A – external input capacitor 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 V _{rms} , perf. criteria A |

Output Specifications

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

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

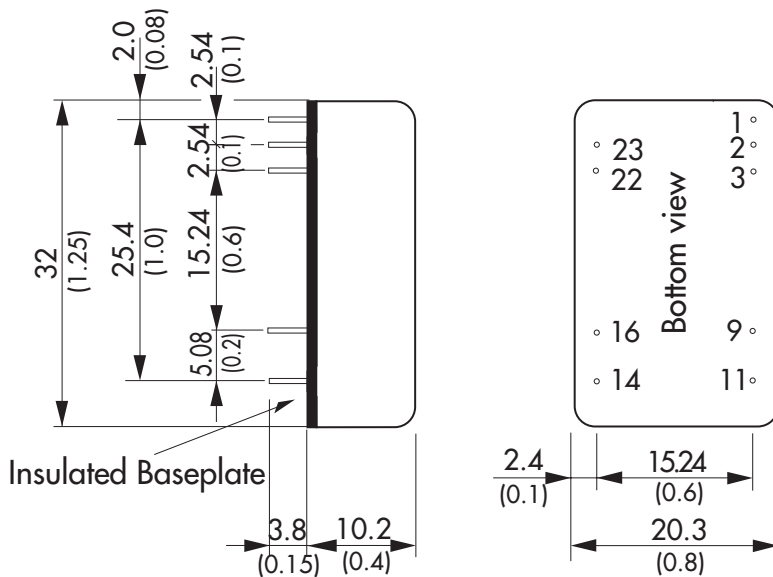
| | | |
|---|-------------------------------------|--|
| Temperature ranges | - Operating | -40°C to +85°C |
| | - Case temperature | +105°C max. |
| | - Storage | -55°C to +125°C |
| Power derating | | 3 %/K above +70°C |
| Thermal impedance | - Natural convection | 18.2°C/W |
| | - Natural convection 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 MTBF (MIL-HDBK-217F, at +25°C, ground benign) | | 1 Mio. h |
| Environmental compliance | - Reach | www.tracopower.com/products/ten8wi-reach.pdf |
| | - RoHS | RoHS directive 2002/95/EC |

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

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 \pm 0.002)
 Tolerances ± 0.5 (± 0.02)
 Pin pitch tolerances ± 0.25 (± 0.001)

Specifications can be changed any time without notice.