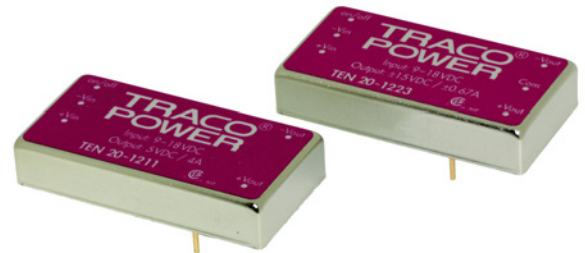


#### Features

- ◆ Wide 2:1 input range
- ◆ High efficiency up to 89 %
- ◆ Extended operating temperature range  
-40°C to +85°C
- ◆ Indefinite short circuit protection
- ◆ I/O isolation 1500VDC
- ◆ Remote On/Off
- ◆ Input filter meets EN 55022, Class A and  
FCC, level A without external components
- ◆ Industry standard pinout
- ◆ Shielded metal case with insulated  
baseplate
- ◆ 3-year product warranty



The TEN 20 series of DC/DC converters, comprising 18 different models, has been designed for a wide range of applications including communications, industrial systems and battery powered equipments. Full SMD-design with use of ceramic chip capacitors guarantees a high reliability and a long lifetime. Other features of this converters are internal filter to meet EN 55022, class A and FCC, level A and an extended temperature range of -40°C to +85°C.

#### Models

| Order code  | Input voltage range             | Output voltage | Output current max. | Efficiency typ. |
|-------------|---------------------------------|----------------|---------------------|-----------------|
| TEN 20-1210 | 9 – 18 VDC<br>(12 VDC nominal)  | 3,3 VDC        | 4'000 mA            | 81 %            |
| TEN 20-1211 |                                 | 5 VDC          | 4'000 mA            | 84 %            |
| TEN 20-1212 |                                 | 12 VDC         | 1'670 mA            | 88 %            |
| TEN 20-1213 |                                 | 15 VDC         | 1'340 mA            | 88 %            |
| TEN 20-1222 |                                 | ±12 VDC        | ±835 mA             | 88 %            |
| TEN 20-1223 |                                 | ±15 VDC        | ±670 mA             | 88 %            |
| TEN 20-2410 | 18 – 36 VDC<br>(24 VDC nominal) | 3,3 VDC        | 4'000 mA            | 82 %            |
| TEN 20-2411 |                                 | 5 VDC          | 4'000 mA            | 85 %            |
| TEN 20-2412 |                                 | 12 VDC         | 1'670 mA            | 89 %            |
| TEN 20-2413 |                                 | 15 VDC         | 1'340 mA            | 89 %            |
| TEN 20-2422 |                                 | ±12 VDC        | ±835 mA             | 89 %            |
| TEN 20-2423 |                                 | ±15 VDC        | ±670 mA             | 89 %            |
| TEN 20-4810 | 36 – 75 VDC<br>(48 VDC nominal) | 3,3 VDC        | 4'000 mA            | 82 %            |
| TEN 20-4811 |                                 | 5 VDC          | 4'000 mA            | 85 %            |
| TEN 20-4812 |                                 | 12 VDC         | 1'670 mA            | 89 %            |
| TEN 20-4813 |                                 | 15 VDC         | 1'340 mA            | 89 %            |
| TEN 20-4822 |                                 | ±12 VDC        | ±835 mA             | 89 %            |
| TEN 20-4823 |                                 | ±15 VDC        | ±670 mA             | 89 %            |

### Input Specifications

|                                   |   |
|-----------------------------------|---|
| Input current no load             | 12 Vin models: 30 mA typ.<br>24 Vin models: 17 mA typ.<br>48 Vin models: 10 mA typ. |
| Surge voltage<br>(100 msec. max.) | 12 Vin models: 25 V max.<br>24 Vin models: 50 V max.<br>48 Vin models: 100 V max.   |
| Conducted noise (input)           | EN 55022 Class A, FCC part 15, level A  |

### Output Specifications

|                                     |   |
|-------------------------------------|---|
| Voltage set accuracy                | ±1 %  |
| Regulation                          | – Input variation Vin min. to Vin max. 0.3 % max.<br>– Load variation 10 – 100 % 0.5 % max.<br>1.0 % max. for 3.3 VDC output models |
| Ripple and noise (20 MHz Bandwidth) | 80 mVpk-pk max.   |
| Temperature coefficient             | ±0.02 %/K   |
| Output current limitation           | 110–160 % of lout max., constand current  |
| Short circuit protection            | indefinite (automatic recovery)   |
| Minimum load                        | 10 % of rated max. current (operation at lower load condition is safe but output ripple will increase)                              |
| Capacitive load                     | 3.3 / 5 VDC models: 6'800 µF max.<br>12 / 15 VDC models: 680 µF max.<br>±12 / ±15 VDC models: 270 µF max.                           |

### General Specifications

|   |  |
|---|--|
| Temperature ranges  | – Operating –40°C to +85°C<br>– Case temperature +100°C max.<br>– Storage –55°C to +125°C  |
| Load derating   | – without heatsink 2.3 %/K above 60°C<br>– with heatsink 2.9 %/K above 70°C  |
| Humidity (non condensing)   | 95 % rel H max.  |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign) | >1 Mio h   |
| Isolation voltage (60 sec.) – Input/Output                            | 1'500 VDC  |
| Isolation capacitance – Input/Output                                  | 1'200 pF typ.  |
| Isolation resistance – Input/Output (500 VDC)                         | >1'000 MOhm  |
| Switching frequency (fixed)   | 330 kHz typ. (pulse width modulation PWM)  |
| Remote On/Off:  | – On: 2.5 ... 100 VDC or open circuit.<br>– Off: –1 ... 1.0 VDC or short circuit pin 2 and pin 6<br>– Off standby input current: 5 mA max.<br>– Control common: referenced to negativ input<br>– Start-up delay: 15 ms |
| Safety standards  | UL 60950-1, IEC/EN 60950-1 Compliance up to 60 VDC input voltage (SELV limit)  |
| Safety approvals  | CSA File No. 226037<br><a href="http://directories.csa-international.org">http://directories.csa-international.org</a>   |

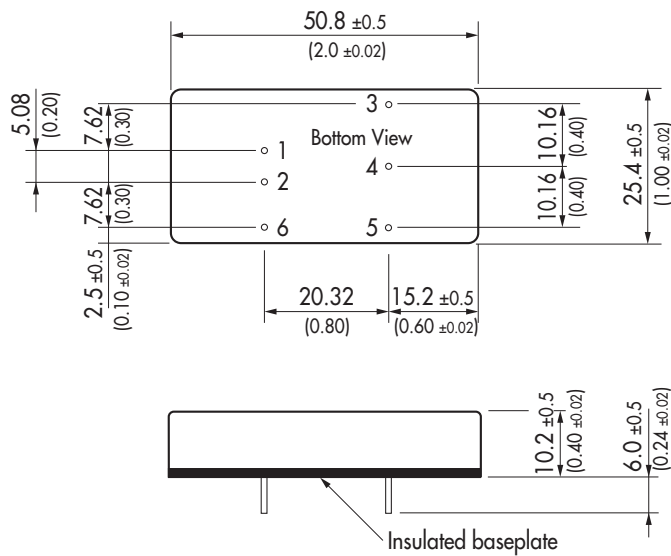
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

**Physical Specifications**

|                          |   |
|--------------------------|---|
| Casing material          | copper, nickel plated   |
| Baseplate material       | non conductive FR4  |
| Potting material         | silicon rubber TSE (UL 94V-0 rated)   |
| Weight                   | 30 g (1.05 oz)  |
| Soldering temperature    | max. 260°C / 10 sec.  |
| Environmental compliance | - Reach<br>- RoHS   |
|                          | <a href="http://www.tracopower.com/products/ten20-reach.pdf">www.tracopower.com/products/ten20-reach.pdf</a><br>RoHS directive 2011/65/EU |

**Application note:** [www.tracopower.com/products/ten20-application.pdf](http://www.tracopower.com/products/ten20-application.pdf)

**Outline Dimensions**

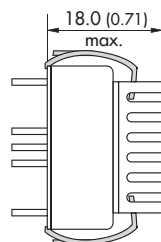
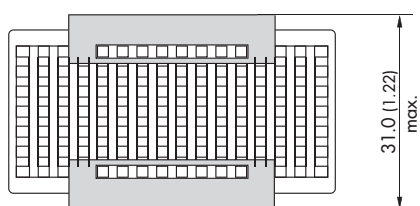
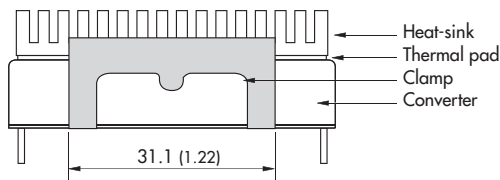


| Pin-Out |               |            |
|---------|---------------|------------|
| Pin     | Single        | Dual       |
| 1       | +Vin (Vcc)    | +Vin (Vcc) |
| 2       | -Vin (GND)    | -Vin (GND) |
| 3       | +Vout         | +Vout      |
| 4       | No pin        | Common     |
| 5       | -Vout         | -Vout      |
| 6       | Remote On/Off |            |

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

**Heat-Sink (Option)**

**Heat-sink TEN-HS4 (optional)**



**Order code:** TEN-HS4

(cont.: heat-sink, thermal pad, 2 clamps)

**Material:** Aluminum

**Finish:** Anodic treatment (black)

**Weight:** 9 g (0.31oz) without converter

Thermal impedance after assembling: 10 K/W

**Note:**

Before attaching the heatsink, the product label on converter has to be removed for optimal performance.

For volume orders we can supply the converters with heatsink already mounted. Please contact us for a relative quotation.

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



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.