

Features

- ◆ High power density in 1" x 2" metal package
- ◆ Ultra wide 4 : 1 input range
- ◆ Extended operating temperature range – 40°C to +85°C max.
- ◆ No minimum load required
- ◆ I/O-isolation 1500 VDC
- ◆ Remote On/Off
- ◆ Adjustable output voltage
- ◆ Industry standard footprint
- ◆ Shielded metal case with insulated baseplate
- ◆ Optional heatsink
- ◆ Lead free design - RoHS compliant
- ◆ 3-year product warranty



The TEN 20WIN series is a family of high performance 20W DC/DC converter modules featuring ultra wide 4:1 input voltage ranges in a ultra compact 2" x 1" low profile package with industry-standard footprint. A very high efficiency allows an operating temperature range of –40°C to 85°C. 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

| Order code | Input voltage range | Output voltage | Output current max. | Efficiency typ. |
|----------------|---------------------------------|----------------|---------------------|-----------------|
| TEN 20-2410WIN | 9 – 36 VDC (24 VDC nominal) | 3.3 VDC | 5'500 mA | 85 % |
| TEN 20-2411WIN | | 5 VDC | 4'000 mA | 88 % |
| TEN 20-2412WIN | | 12 VDC | 1'670 mA | 86 % |
| TEN 20-2413WIN | | 15 VDC | 1'330 mA | 86 % |
| TEN 20-2421WIN | | ± 5 VDC | ± 2'000 mA | 88 % |
| TEN 20-2422WIN | | ± 12 VDC | ± 835 mA | 87 % |
| TEN 20-2423WIN | | ± 15 VDC | ± 665 mA | 87 % |
| TEN 20-4810WIN | 18 – 75 VDC (48 VDC nominal) | 3.3 VDC | 5'500 mA | 85 % |
| TEN 20-4811WIN | | 5 VDC | 4'000 mA | 88 % |
| TEN 20-4812WIN | | 12 VDC | 1'670 mA | 87 % |
| TEN 20-4813WIN | | 15 VDC | 1'330 mA | 87 % |
| TEN 20-4821WIN | | ± 5 VDC | ± 2'000 mA | 89 % |
| TEN 20-4822WIN | | ± 12 VDC | ± 835 mA | 88 % |
| TEN 20-4823WIN | | ± 15 VDC | ± 665 mA | 88 % |

Input Specifications

| | |
|--|---|
| Input current at no load | 24 Vin models: 50 mA typ. 48 Vin models: 35 mA typ. |
| Input current at full load | 24 Vin models: 1000 mA typ. 48 Vin models: 500 mA typ. |
| Surge voltage (100 msec. max.) | 24 Vin models: 50 V max. 48 Vin models: 100 V max. |
| Input voltage variation (dv/dt) | 5 V / ms, max. (complies to ETS 300 132 part. 4.4) |
| Start-up voltage / under voltage lockout | 24 Vin models: 9 VDC / 7.5 VDC typ. 48 Vin models: 18 VDC / 15 VDC typ. |
| Conducted noise (input) | EN 55022 level A, FCC part 15, level A with external capacitor (see application note) |
| 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 | ±1 % |
| Output voltage adjustment (single output models only) | ±10 % by external resistor, see application note: www.tracopower.com/products/ten20win_application.pdf |
| Regulation | <ul style="list-style-type: none"> - Input variation Vin min. to Vin max. 0.2 % max. - Load variation 0 – 100%: <ul style="list-style-type: none"> single output models: 0.5 % max. dual output models: 1 % max. (balanced load) - Load cross variation 25 % / 100 % 5 % max. |
| Temperature coefficient | 0.02 % /K |
| Ripple and noise (20 MHz Bandwidth) | <ul style="list-style-type: none"> single output models: 75 mVpk-pk max. dual output models: 100 mVpk-pk max. |
| Start up time (nominal Vin and constant resistive load) | 20 ms typ. |
| Transient Response (25% load step change) | 250 µs typ. |
| Short circuit protection | indefinite (automatic recovery) |
| Over load protection | 150% of Iout max typ. |
| Over voltage protection | <ul style="list-style-type: none"> 3.3 Vout models: 3.9 V 5 /±5 Vout models: 6.2 / ±6.2 V 12 /±12 Vout models: 15 / ±15 V 15 /±15 Vout models: 18 / ±18 V |
| Capacitive load | <ul style="list-style-type: none"> 3.3 Vout models: 18'000 µF max. 5 Vout models / ± 5 Vout models: 9'600 µF max. / ± 4'800 µF max. 12 Vout models / ±12 Vout models: 1'600 µF max. / ± 800 µF max. 15 Vout models / ±15 Vout models: 1'000 µF max. / ± 500 µF max. |

General Specifications

| | |
|---------------------------|---|
| Temperature ranges | <ul style="list-style-type: none"> - Operating -40 °C to +85 °C (see power derating) - Case temperature +105 °C max. - Storage -55 °C to +125 °C |
| Humidity (non condensing) | 95 % rel H max. |

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

General Specifications

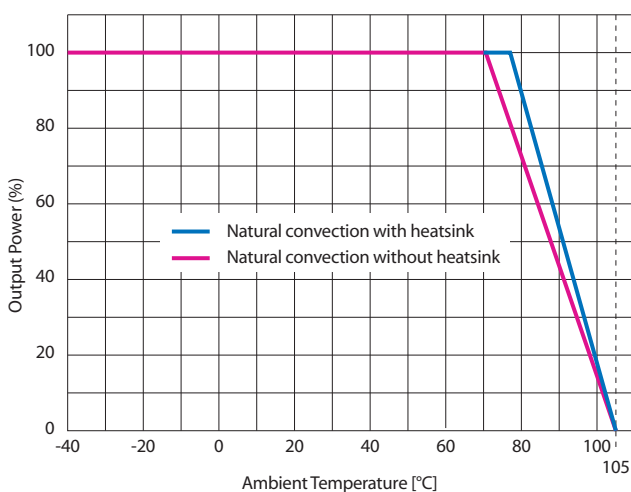
| | |
|--|--|
| Reliability, calculated MTBF (MIL-HDBK-217F ground benign) | >560'000 h @ + 25 °C |
| Isolation voltage (60 sec.) – Input/Output | 1'500 VDC |
| Isolation capacity – Input/Output | 1500 pF max |
| Isolation resistance – Input/Output | >1'000 M Ohm |
| Switching frequency (fixed) | 400 kHz typ. (pulse width modulation PWM) |
| Vibration | 10-55Hz, 10G, 30 minutes along X,Y,Z |
| Remote On/Off – On: – Off: – Off idle current: | 3.0 to 12 VDC or open circuit. 0 to 1.2 VDC or short circuit pin 2 and pin 6 2.5 mA typ. |
| Safety standards | UL 60950,-1 EN 60950-1, IEC 60950-1 |
| Safety approvals – UL/cUL | www.ul.com -> certifications -> File E188913 |

Physical Specifications

| | |
|-----------------------|--------------------------|
| Case material | copper, nickel plated |
| Baseplate material | non conductive FR4 |
| Potting material | epoxy (UL 94V-0 - rated) |
| Weight | 27 g (0.95 oz) |
| Soldering temperature | max. 265 °C / 10 sec. |

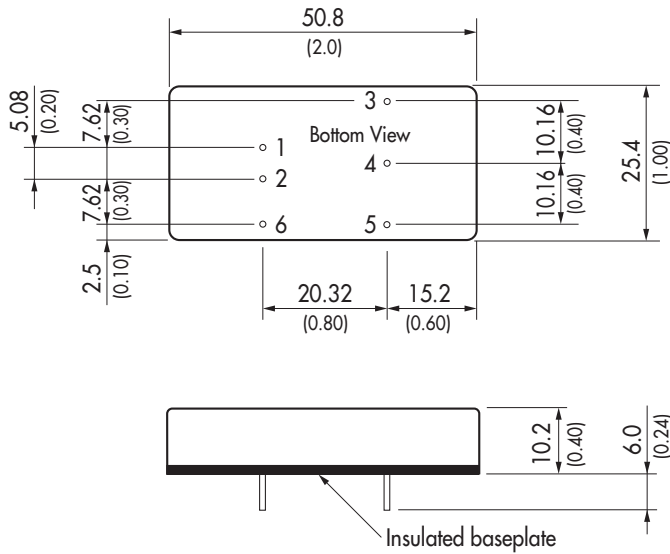
Application note can be downloaded under:
www.tracopower.com/products/ten20win_application.pdf

Power Derating



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

Outline Dimensions

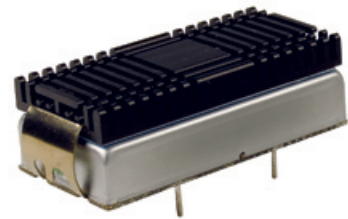


| Pin-Out | | |
|---------|---------------|------------|
| Pin | Single | Dual |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 2 | -Vin (GND) | -Vin (GND) |
| 3 | + Vout | + Vout |
| 4 | Trim | Common |
| 5 | -Vout | -Vout |
| 6 | Remote On/Off | |

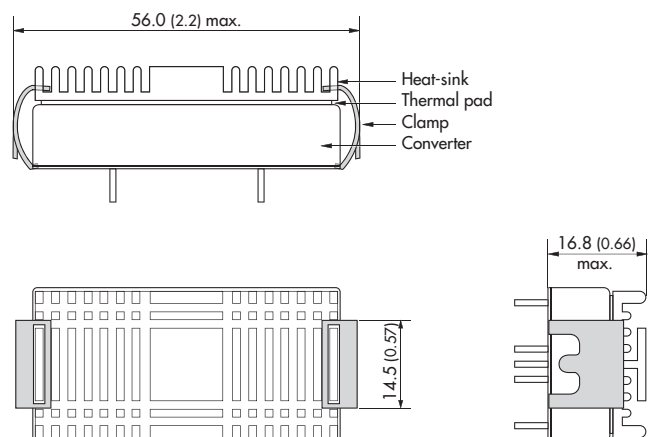
Dimensions in [mm], () = Inch
 Pin diameter: 1.0 ±0.05 (0.039 ±0.002)
 Pin pitch tolerances: ±0.35 (±0.014)
 Case tolerances: ±0.5 (±0.02)

Heat-Sink (Option)

Order code: TEN-HS1
 (cont.: heat-sink, thermal pad, 2 clamps)
Material: Aluminum
Finish: Anodic treatment (black)
Weight: 17g (0.60oz) without converter
 Thermal impedance after assembling: 10 K/W



Note:
 The product label on converter has to be removed before mounting the heat-sink.
 For volume orders converters will be supplied with heat-sinks already mounted. Please contact factory for quotation.
 Separate heat-sinks are only available for prototypes and small quantity orders.



Specifications can be changed any time without notice.