DC/DC Converters

TEN 20 Series, 20 Watt

UL 60950-1

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 (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 (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 (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.
	24 Vin models:	17 mA typ.
	48 Vin models:	10 mA typ.
Surge voltage (100 msec. max.)	12 Vin models:	25 V max.
	24 Vin models:	50 V max.
	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.
	– Load variation 10 – 100 %	0.5 % max.
		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 Iout 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.
	12 / 15 VDC models:	680 µF max.
	±12 / ±15 VDC models:	270 µF max.

General Specifications

Temperature ranges	– Operating	–40°C to +85°C
	– Case temperature	+100°C max.
	– Storage	–55°C to +125°C
Load derating	– without heatsink	2.3 %/K above 60°C
	– 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.
	– Off:	–1 ... 1.0 VDC or short circuit pin 2 and pin 6
	– Off standby input current:	5 mA max.
	– Control common:	referenced to negativ input
	– 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 http://directories.csa-international.org

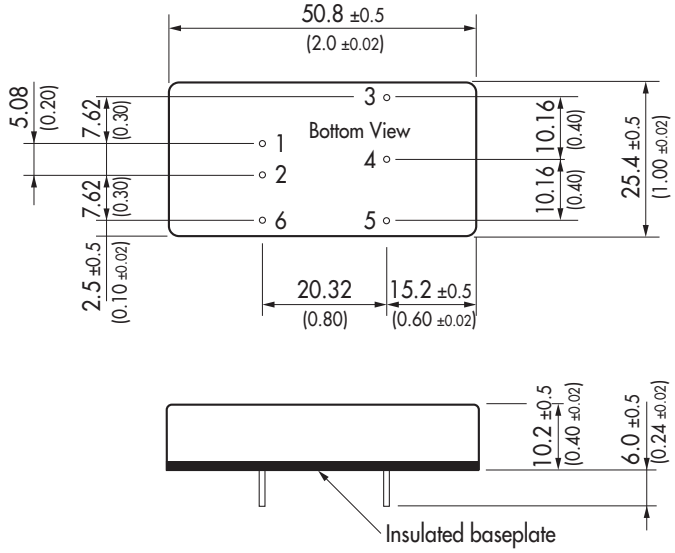
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

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 – RoHS	www.tracopower.com/products/ten20-reach.pdf RoHS directive 2011/65/EU

Application note: www.tracopower.com/products/ten20-application.pdf

Outline Dimensions

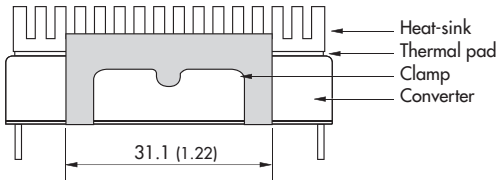


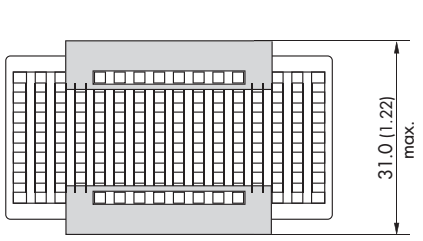
Pin-Out		
Pin	**Single**	**Dual**
1	+Vin (Vcc)	+Vin (Vcc)
2	–Vin (GND)	–Vin (GND)
3	+Vout	+Vout
4	No pin	Common
5	–Vout	–Vout
6	Remote On/Off	

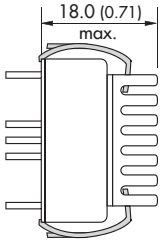
Dimensions in [mm], () = Inch
Pin diameter: 1.0 ±0.05 (0.02 ±0.002)
Pin pitsch tolerances: ±0.25 (±0.01)
Case tolerances: ±0.5 (±0.02)

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.