Features

- **Highest power density: 40 W in 1" x 2" x 0.4" package**
- **Ultra wide 4:1 input range**
- **Excellent efficiency up to 90 %**
- **Output voltage adjustable**
- **Remote On/Off**
- **Protection against short circuit and over voltage**
- **I/O isolation 1500 VDC**
- **Operating temperature range –40°C to +75°C**
- **3-year product warranty**

The TEN 40WIN Series is a new range of isolated high performance DC/DC-converter modules. Due to the very high efficiency of up to 90% these 40 W converters come with a footprint of only 1.0" x 2.0". The 12 models have an ultra wide 4:1 input voltage range and a tight output voltage regulation. The output voltage is adjustable by external resistor. Remote On/Off and protection against overpower and over voltage are standard features of these converters.
Typical applications are in mobile equipment, instrumentation, distributed power architectures in communication and industrial electronics and everywhere where space on the PCB is limited.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency
TEN 40-2410WIN	**9 – 36 VDC** (nominal 24 VDC)	3.3 VDC	8'000 mA	89 %
TEN 40-2411WIN		5.0 VDC	8'000 mA	90 %
TEN 40-2412WIN		12 VDC	3'330 mA	89 %
TEN 40-2413WIN		15 VDC	2'670 mA	89 %
TEN 40-2415WIN		24 VDC	1'670 mA	91 %
TEN 40-2422WIN		±12 VDC	±1'670 mA	88 %
TEN 40-2423WIN		±15 VDC	±1'330 mA	88 %
TEN 40-4810WIN	**18 – 75 VDC** (nominal 48 VDC)	3.3 VDC	8'000 mA	89 %
TEN 40-4811WIN		5.0 VDC	8'000 mA	90 %
TEN 40-4812WIN		12 VDC	3'330 mA	90 %
TEN 40-4813WIN		15 VDC	2'670 mA	90 %
TEN 40-4815WIN		24 VDC	1'670 mA	89 %
TEN 40-4822WIN		±12 VDC	±1'670 mA	88 %
TEN 40-4823WIN		±15 VDC	±1'330 mA	88 %

Input Specifications

Input current at no load (nominal input voltage)	24 Vin;	3.3 & 5.0 VDC models:	90 mA typ.
	24 Vin;	12 VDC models:	95 mA typ.
	24 Vin;	15 & 24 VDC models:	105 mA typ. / 115 mA typ.
	24 Vin;	dual output models:	65 mA typ.
	48 Vin;	3.3 & 5.0 VDC models:	55 mA typ.
	48 Vin;	12 & 15 VDC models:	60 mA typ. / 65 mA typ.
	48 Vin;	24 VDC models:	75 mA typ.
	48 Vin;	dual output models:	45 mA typ.
Surge voltage (100 msec. max.)		24 V models:	50 V max.
		48 V models:	100 V max.
Reflected input ripple current		24 V models:	30 mA typ.
		48 V models:	20 mA typ.
Conducted noise (input)			EN 55022 level A, FCC part 15, level A with external capacitor see: application note
Start-up voltage / under voltage shut down		24 V models:	9 VDC / 8.3 VDC (or lower)
		48 V models:	18 VDC / 16.5 VDC (or lower)
Recommended input fuse (slow blow)		24 V models:	8000 mA
		48 V models:	4000 mA

Output Specifications

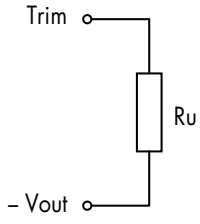
Voltage set accuracy		single output models:	±1.0 %
		dual output models (balanced load):	±2.0 %
Output voltage adjustment range			±10 % with external resistor (see page 3)
Regulation	– Input variation	Vin min. to Vin max.	±0.5 % max.
	– Load variation	single output models (0 – 100%):	±0.5 % max.
		dual output models (9 – 100%):	±1.0 % max.
Minimum load		single output models:	0 %
		dual output models:	9 % of rated max current (operation at lower load condition will not damage the converters. However, they may not meet all listed specifications)
Temperature coefficient			±0.02 %/K
Ripple and noise (20 MHz Bandwidth) with external capacitors 1 µF M/C 10 µF T/C		3.3 & 5.0 VDC models:	100 mVpk-pk. typ.
		other models:	150 mVpk-pk typ.
Transient response (25 % load step change)			250 µs typ.
Short circuit protection			hiccup mode, indefinite (automatic recovery)
Over power protection			at 150 %
Over voltage protection			at 120 % of Vout nom. typ.
Capacitive load		3.3 VDC models:	21'000 µF max.
		5.0 VDC models:	13'600 µF max.
		12.0 VDC models:	2'400 µF max.
		15.0 VDC models:	1'500 µF max.
		24.0 VDC models:	600 µF max.
		±12.0 VDC models:	1'200 µF max. (each output)
		±15.0 VDC models:	750 µF max. (each output)

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

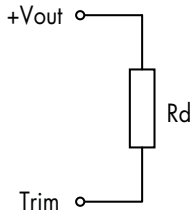
Output Voltage Adjustment

Single output models only (open = nominal output voltage)

Trim up



Trim down



Ru [kOhm]*

output	3.3V	5V	12V	15V	24V
+5%	7.34	12.30	41.40	50.15	27.38
+10%	0.65	0.48	2.70	3.58	0.34

Rd [kOhm]*

output	3.3V	5V	12V	15V	24V
–5%	8.51	16.53	47.15	63.35	38.04
–10%	0.50	1.24	1.35	4.92	1.12

*approximate values

General Specifications

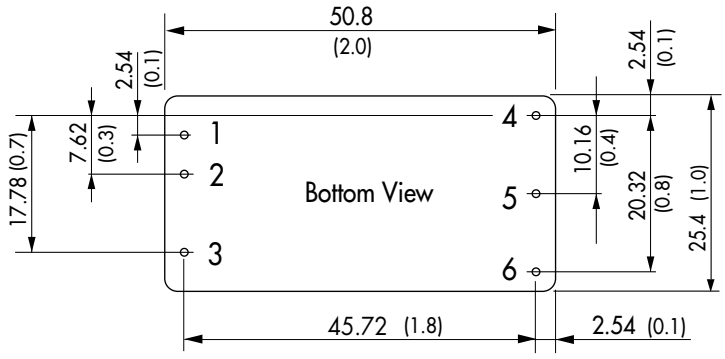
Temperature ranges	– Operating (natural convection cooling 20 LFM) – Case temperature – Storage	–40°C to +75°C (see load derating) +105°C max. –50°C to +125°C
Load derating	– without heatsink – with heatsink	2.5 %/K above 55°C 2.5 %/K above 65°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		330'000 h
Isolation voltage (60 sec.)	– Input/Output	1500 VDC
Isolation capacitance	– Input/Output	1500 pF typ
Isolation resistance	– Input/Output	>1000 Mohm
Switching frequency (fixed)		320 kHz typ. (pulse width modulation PWM)
Safety standards	– Certification documents	CAN/CSA-C22.2 No 60950-1-07 Incl. AM1 (2011) ANSI/UL Std No 60950-1, 2nd Ed. Incl. AM1 (2011) IEC 60950-1:2005 (2nd Edition); +A1:2009
Remote On/Off	– On: – Off: – Off idle current:	4.7 to 12 VDC or open circuit. 0 to +1.2 VDC or short circuit pin 3 and pin 2 2.5 mA max.

Physical Specifications

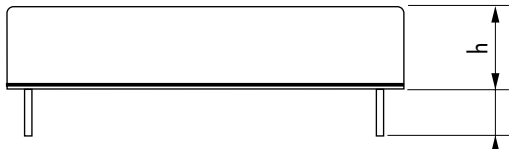
Casing material		aluminum black anodized
Potting material		epoxy (UL 94V-0 rated)
Weight		30 g (1.05 oz)
Soldering temperature		max. 260°C / 10 sec.
Environmental compliance	– Reach – RoHS	RoHS directive 2011/65/EU

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

Outline Dimensions



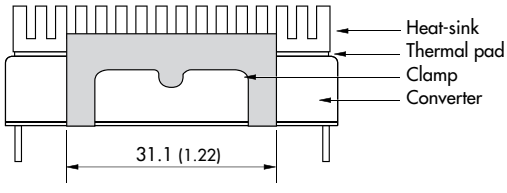
Pin-Out		
Pin	**Single**	**Dual**
1	+Vin (Vcc)	+Vin (Vcc)
2	–Vin (GND)	–Vin (GND)
3	Remote On/Off	
4	+Vout	+Vout
5	–Vout	Common
6	Trim	–Vout

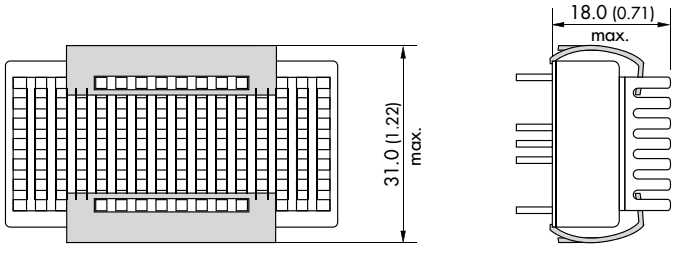


h= 11.0 (0.43) for 24 VDC output models
10.2 (0.40) for other models

Dimensions in [mm], () = Inch
Pin diameter: 1.0 ±0.05 (0.04 ±0.002)
Pin pitch tolerance: ±0.25 (±0.01)
Case tolerances: ±0.25 (±0.01)

Heat-sink TEN-HS4 (optional)





Order code: **TEN-HS4**
(cont.: heat-sink, thermal pad, 2 clamps)
Material: Aluminum
Finish: Anodic treatment (black)
Weight: 9.0 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.