Features

- Compact metal package
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 93%
- No minimum load
- Soft start
- Adjustable output voltage +10/-20%
- Sense line
- Remote On/Off input
- Under voltage lock-out circuit
- Reverse input voltage protection
- Over temperature protection
- Optional heatsink
- Optional as chassis mount models with screw terminal block and EMI Filter
- 3-year product warranty

(Models pictured with optional heatsink)

The TEP 100WIR Series is a family of isolated high performance dc-dc converter modules with ultra-wide 4:1 input voltage ranges which come in a rugged, sealed industry standard half brick package.
A very high efficiency allows full power operation without forced air cooling at 60°C This temperature can be increased to 70°C with optional mounted heatsink or up to 85°C when mounted on an iron base plate. The very wide input voltage range and reverse input voltage protection make these converters interesting solution for battery operated systems. Typical applications are in telecom/datacom, industry control and railway systems for on board power distribution.
These series is available in many optional designs on demand --> see options.

Standard Models

Order code	Input voltage	Output voltage	Output current max.	Efficiency typ.
TEP 100-2411WIR	9 – 36 VDC (24 VDC nominal)	5 VDC	20 A	93 %
TEP 100-2412WIR		12 VDC	8.4 A	90 %
TEP 100-2415WIR		24 VDC	4.2 A	90 %
TEP 100-2416WIR		28 VDC	3.6 A	90 %
TEP 100-2418WIR		48 VDC	2.1 A	90 %
TEP 100-4812WIR	18 – 75 VDC (48 VDC nominal)	12 VDC	8.4 A	90 %
TEP 100-4815WIR		24 VDC	4.2 A	90 %
TEP 100-4816WIR		28 VDC	3.6 A	92 %
TEP 100-4818WIR		48 VDC	2.1 A	91 %
TEP 100-7212WIR	43 – 160 VDC (110 VDC nominal)	12 VDC	8.4 A	90 %
TEP 100-7215WIR		24 VDC	4.2 A	90 %
TEP 100-7216WIR		28 VDC	3.6 A	90 %
TEP 100-7218WIR		48 VDC	2.1 A	91 %

Options

TEP-HS1	Heat-sink for standard version (incl. mounting screws and thermal pad)
TEP-MK1	Din-rail mounting kit for chassis mount models (incl. mounting screws)
TCK-xxx	Common mode chokes for filter proposals to meet EN55022 class A/B --> see application note
on demand	Models with 3.3 VDC/~ 25 A or 5.0 VDC/~ 20 A or 15 VDC/~ 6.7 A output
	Chassis mount models with screw terminal block
	Chassis mount models with screw terminal block and input filter to meet EN 555022 class A
	Negative (passive = Off) Remote On/Off function (standard is passive = On)

Input Specifications

Input current at no load (nominal input voltage)	24 Vin models:	25 mA typ.
	48 Vin models:	20 mA typ.
	110 Vin models:	10 mA typ.
Start-up voltage	24 Vin models:	9.0 VDC max.
	48 Vin models:	18 VDC max.
	110 Vin models:	43 VDC max.
Under voltage shut down (lock-out circuit)	24 Vin models:	7.3 – 8.1 VDC
	48 Vin models:	15.5 – 16.3 VDC
	110 Vin models:	33.0 – 36.0 VDC
Surge voltage (1 sec. max.)	24 Vin models:	50 VDC
	48 Vin models:	100 VDC
	110 Vin models:	185 VDC
Conducted noise		EN 55022 class A/B with external components see application note
EMC immunity		EN 50121-3-2
– 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
	24 / 48 Vin models:	2 chemi-con KY 220 µF, 100 V, ESR 48 mOhm
	110 Vin models:	2 chemi-con KXJ 150 µF, 250 V
– Conducted immunity		EN 61000-4-6, 10 Vrms, perf. criteria A
Reverse voltage protection		parallel diode
Recommended input fuse (slow blow)	24 Vin models:	20 A
	48 / 110 Vin models:	10 A

Output Specifications

Voltage set accuracy (at full load, nominal input)		±1 %
Output voltage adjustment		+10 % / –20 % by external resistor see application note
Regulation – Input variation Vin min. to Vin max.		0.1 % max.
– Load variation (0 – 100%)		0.1 % max.
Temperature coefficient		±0.02 %/K
Minimum load		not required
Remote sense		10 % max. of Vout nom. (trim up value to subtract)
Ripple and noise (20 MHz bandwidth)	5 VDC model:	75 mVp-p typ.
	12 VDC models:	100 mVp-p typ.
	24 / 28 VDC models:	200 mVp-p typ.
	48 VDC models:	300 mVp-p typ.
Start up time (nominal Vin and constant resistive load)		75 ms typ. (at power On or remote On)
Transient response (25% load step change)		250 µs max.
Output current limitation		at 120 – 150 % of Iout max.
Over voltage protection		at 115 – 130 % of Vout nom.
Short circuit protection		continuous, automatic recovery.
Max. capacitive load	5 VDC model:	40'000 µF
	12 VDC models:	7'000 µF
	24 VDC models:	1'750 µF
	28 VDC models:	1'280 µF
	48 VDC models:	430 µF

General Specifications

Temperature ranges	– Operating		–40°C to +75°C (with derating)
	– Case temperature		+115°C max.
	– Storage		–55°C to +125°C
Thermal impedance	– without heat-sink		6.7°C/W
	– with heat-sink		4.7°C/W
Power Derating			depending on installation!
	– without heat-sink		3.3 %/K above +55°C
	– with heat-sink		4.0 %/K above +65°C
	– with iron base plate (19" x 3.5" x 0.063")		6.7 %/K above +85°C
			please refer to application note for temperature measure point that should not exceed 115°C.
Over temperature protection			at +120°C
Thermal shock, mechanical shock & vibration	– Test conditions		EN 61373, MIL-STD-810F
Humidity (non condensing)			95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)			400'000 h
Isolation voltage (60sec.)	– Input/Output	110 Vin models:	3'000 VDC (reinforced insulation)
	– Input/ Case		1'500 VDC
	– Input/Ouput	other models:	2'250 VDC (basic insulation)
	– Input/Case		1'600 VDC
Isolation capacitance	– Input/Output		2500 pF max.
Isolation resistance	– Input/Output (500 VDC)		>1 GOhm min.
Switching frequency		24 / 48 Vin models:	250 kHz typ. (pulse width modulation)
		110 Vin models:	300 kHz typ. (pulse width modulation)
Safety standards	– Railway immunity		EN 50155,
	– UL online certification E188913, QQGQ2		UL 60950-1 2nd edition + AM1
			IEC/EN 60950-1
	– Flammability identified acc.		EN45545-2
	– Certification documents		
Remote On/Off	– positive logic (standard)	– On:	3 to 12 VDC or open circuit
		– Off:	0 to 1.2 VDC or short circuit pin 1 and 3
	– negative logic (option)	– On:	0 to 1.2 VDC or short circuit pin 1 and 3
		– Off:	3 to 12 VDC or open circuit
	– Off idle current:		3 mA
Environmental compliance	– Reach		
	– RoHS		RoHS directive 2011/65/EU

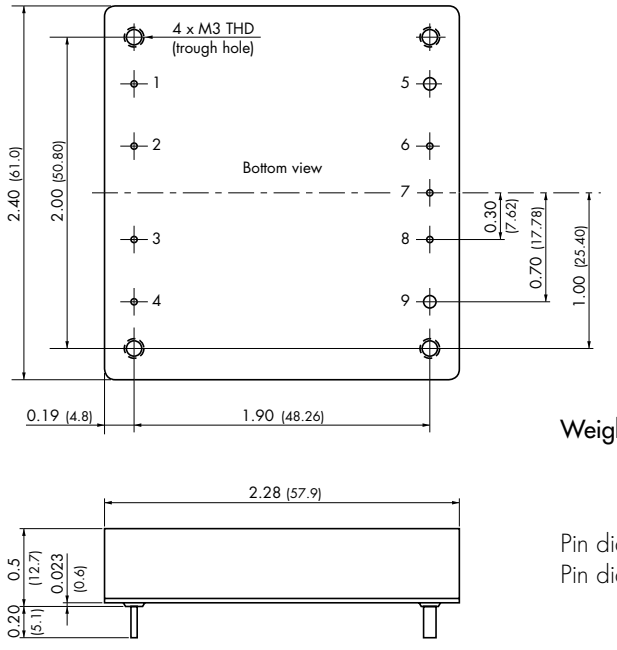
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

General Specifications

Casing material	24 / 48 Vin models: 110 Vin models:	metal aluminium base-plate with plastic case
Potting material		silicone (UL94V-0 rated)
Base material		FR4

Dimensions

TEP 100WIR module



Weight: 105 g (3.70oz)

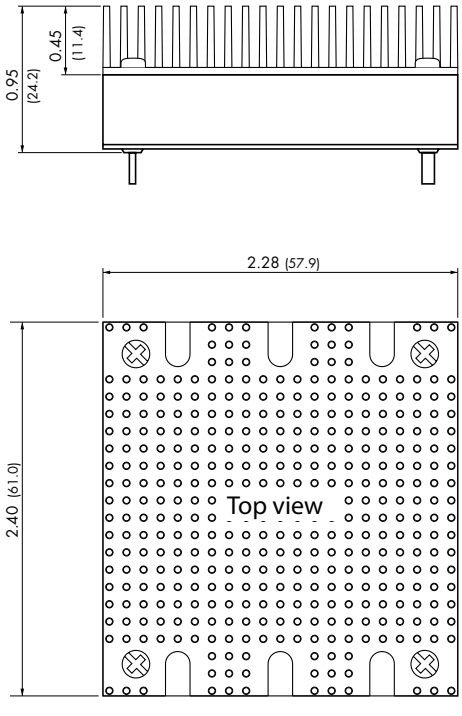
Pin diameter pin 5 & 9: 0.08 (2.0)
Pin diameter other pins: 0.04 (1.0)

Pin-Out

Pin	
1	– Vin
2	Case
3	Remote On/Off
4	+ Vin
5	– Vout
6	– Sense*
7	Trim
8	+ Sense*
9	+ Vout

*Sense line to be connected to the output either at the module or at the load under regard of polarity.

TEP-HS1 Heatsink (pictured with heatsink mounted)



Order code: TEP-HS1
Includes heatsink with termal pad and mounting screws
To order modules with mounted heatsink ask factory.

Weight: 142 g (5.01oz)
(Heatsink + Converter)

Dimensions in Inch, () = mm
Tolerances ±0.02 (±0.5)
Pin pich tolerances ±0.01 (±0.25)
Mounting hole pich tolerances ±0.01 (±0.25)

Options (on demand)

Chassis mount models with screw terminal block

Chassis mount models with screw terminal block and input filter to meet EN 555022 class A

TEP-MK1 DIN-rail clip for chassis mount models