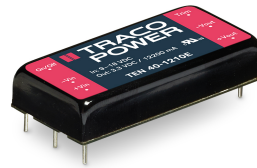


- Developed to maximize quality in a cost efficient design
- Excellent temperature capabilities
- 2" x 1" metal package (6-side shielded)
- Wide 2:1 input voltage range:  
9-18, 18-36, 36-75 VDC
- Minimal heat development due to high efficiencies up to 93%
- Operating temperature range -40 to +85°C
- 1600 VDC I/O-isolation
- Remote On/Off and Trim function
- Protection against short circuit, overvoltage and overtemperature
- 3-year product warranty



The TEN 40E is rounding out Traco Power's existing 40 Watt product range. Driven by current market trends this series was developed to maximize quality and cost efficiency in one product. Due to a new design approach the TEN 40E thus offers a cost efficient solution with not only no concession on quality or reliability but even improved specifications compared to its predecessor. It comes in a standard 2" x 1" metal package with a 2:1 input voltage range. High efficiencies of up to 93% allow for an operating temperature range (natural convection) of -40 to +70°C without power derating (model dependent). Certified according to the latest IT standard (IEC/EN/UL 62368-1) and equipped with additional features like remote on/off function and protection against short circuit, overvoltage and over temperature the TEN 40E series is suitable for many industrial applications.

### Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
TEN 40-1210E	9 - 18 VDC (12 VDC nom.)	3.3 VDC	12'200 mA			89 %
TEN 40-1211E		5 VDC	8'000 mA			90 %
TEN 40-1212E		12 VDC	3'333 mA			91 %
TEN 40-1213E		15 VDC	2'666 mA			91 %
TEN 40-1215E		24 VDC	1'666 mA			90 %
TEN 40-1222E		+12 VDC	1'666 mA	-12 VDC	1'666 mA	90 %
TEN 40-1223E		+15 VDC	1'333 mA	-15 VDC	1'333 mA	90 %
TEN 40-1225E		+24 VDC	833 mA	-24 VDC	833 mA	91 %
TEN 40-2410E	18 - 36 VDC (24 VDC nom.)	3.3 VDC	12'200 mA			90 %
TEN 40-2411E		5 VDC	8'000 mA			92 %
TEN 40-2412E		12 VDC	3'333 mA			92 %
TEN 40-2413E		15 VDC	2'666 mA			93 %
TEN 40-2415E		24 VDC	1'666 mA			91 %
TEN 40-2422E		+12 VDC	1'666 mA	-12 VDC	1'666 mA	91 %
TEN 40-2423E		+15 VDC	1'333 mA	-15 VDC	1'333 mA	91 %
TEN 40-2425E		+24 VDC	833 mA	-24 VDC	833 mA	91 %
TEN 40-4810E	36 - 75 VDC (48 VDC nom.)	3.3 VDC	12'200 mA			90 %
TEN 40-4811E		5 VDC	8'000 mA			91 %
TEN 40-4812E		12 VDC	3'333 mA			92 %
TEN 40-4813E		15 VDC	2'666 mA			92 %
TEN 40-4815E		24 VDC	1'666 mA			92 %
TEN 40-4822E		+12 VDC	1'666 mA	-12 VDC	1'666 mA	91 %
TEN 40-4823E		+15 VDC	1'333 mA	-15 VDC	1'333 mA	91 %
TEN 40-4825E		+24 VDC	833 mA	-24 VDC	833 mA	92 %

## Options

<b>TEN-HS1</b>	- Optional Heat Sink: <a href="http://www.tracopower.com/products/ten-hs1.pdf">www.tracopower.com/products/ten-hs1.pdf</a>
<b>on demand</b> (backorder with MOQ non stocking item)	- Models with factory assembled heat-sink - Models with inverse remote control

## Input Specifications

Input Current	- At no load	12 Vin models: <b>20 mA typ.</b> 24 Vin models: <b>15 mA typ.</b> 48 Vin models: <b>10 mA typ.</b>
Surge Voltage		12 Vin models: <b>25 VDC max.</b> (1 s max.) 24 Vin models: <b>50 VDC max.</b> (1 s max.) 48 Vin models: <b>100 VDC max.</b> (1 s max.)
Under Voltage Lockout		12 Vin models: <b>7 VDC min. / 8 VDC typ. / 8.8 VDC max.</b> 24 Vin models: <b>15 VDC min. / 16 VDC typ. / 17.5 VDC max.</b> 48 Vin models: <b>32 VDC min. / 33 VDC typ. / 35 VDC max.</b>
Recommended Input Fuse		12 Vin models: <b>8'000 mA</b> (fast acting) 24 Vin models: <b>4'000 mA</b> (slow blow) 48 Vin models: <b>2'000 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		<b>Internal Pi-Type</b>

## Output Specifications

Output Voltage Adjustment		-10% to +20% (15 & 24 Vout models) <b>±10%</b> (other models) (Single models only) (By external trim resistor) See application note: <a href="http://www.tracopower.com/overview/ten40e">www.tracopower.com/overview/ten40e</a> Output power must not exceed rated power!
Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%)  - Cross Regulation (25% / 100% asym. load)	single output models: <b>0.2% max.</b> single output models: <b>0.3% max.</b> dual output models: <b>0.5% max.</b> (Output 1) <b>0.5% max.</b> (Output 2) dual output models: <b>5% max.</b>
Ripple and Noise (20 MHz Bandwidth)	- single output  - dual output	3.3 Vout models: <b>75 mVp-p typ.</b> 5 Vout models: <b>75 mVp-p typ.</b> 12 Vout models: <b>100 mVp-p typ.</b> 15 Vout models: <b>100 mVp-p typ.</b> 24 Vout models: <b>150 mVp-p typ.</b> 12 / -12 Vout models: <b>100 / 100 mVp-p typ.</b> 15 / -15 Vout models: <b>100 / 100 mVp-p typ.</b> 24 / -24 Vout models: <b>150 / 150 mVp-p typ.</b>
Capacitive Load	- single output  - dual output	3.3 Vout models: <b>22'000 µF max.</b> 5 Vout models: <b>12'000 µF max.</b> 12 Vout models: <b>2'000 µF max.</b> 15 Vout models: <b>1'300 µF max.</b> 24 Vout models: <b>490 µF max.</b> 12 / -12 Vout models: <b>980 / 980 µF max.</b> 15 / -15 Vout models: <b>630 / 630 µF max.</b> 24 / -24 Vout models: <b>250 / 250 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>30 ms typ. / 60 ms max.</b>

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

Short Circuit Protection	Continuous, Automatic recovery
Output Current Limitation	150% typ. of I <sub>out</sub> max.
Overvoltage Protection	125% typ. of V <sub>out</sub> nom. (By Zener diode)
Transient Response - Response Time	250 μs typ. (25% Load Step)

### Safety Specifications

Safety Standards - IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
- Certification Documents	<a href="http://www.tracopower.com/overview/ten40e">www.tracopower.com/overview/ten40e</a>

### EMC Specifications

EMI Emissions - Conducted Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter)
- Radiated Emissions	EN 55032 class A (with external filter) EN 55032 class B (with external filter)
	External filter proposal: <a href="http://www.tracopower.com/overview/ten40e">www.tracopower.com/overview/ten40e</a>
EMS Immunity - Electrostatic Discharge	Air: EN 61000-4-2, ±8 kV, perf. criteria A Contact: EN 61000-4-2, ±6 kV, perf. criteria A
- RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
- EFT (Burst) / Surge	EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV, perf. criteria A
	Ext. input component: 2 x KY 220 μF // SMDJ36A (12 V <sub>in</sub> models) 2 x KY 220 μF // SMDJ58A (24 V <sub>in</sub> models) 2 x KY 220 μF // SMDJ120A (48 V <sub>in</sub> models)
- Conducted RF Disturbances	EN 61000-4-6, 10 V <sub>rms</sub> , perf. criteria A
- PF Magnetic Field	Continuous: EN 61000-4-8, 100 A/m, perf. criteria A 1 s: EN 61000-4-8, 1000 A/m, perf. criteria A

### General Specifications

Relative Humidity	95% max. (non condensing)
Temperature Ranges - Operating Temperature	-40°C to +85°C
- Case Temperature	+105°C max.
- Storage Temperature	-55°C to +125°C
Power Derating - High Temperature	See application note: <a href="http://www.tracopower.com/overview/ten40e">www.tracopower.com/overview/ten40e</a>
Over Temperature Protection Switch Off - Protection Mode	115°C typ. (Automatic recovery)
Cooling System	Natural convection (20 LFM)
Remote Control - Voltage Controlled Remote	On: 3.0 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin
- Off Idle Input Current	3 mA typ.
- Remote Pin Input Current	-0.5 to 1.0 mA (Inverse Remote On/Off logic on demand)
Switching Frequency	225 - 275 kHz (PWM) 250 kHz typ. (PWM)
Insulation System	Functional Insulation
Isolation Test Voltage - Input to Output, 60 s	1'600 VDC
- Input to Case, 60 s	1'600 VDC
- Output to Case, 60 s	1'600 VDC
Isolation Resistance - Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance - Input to Output, 100 kHz, 1 V	1'500 pF max.
Reliability - Calculated MTBF	1'245'000 h (MIL-HDBK-217F, ground benign)

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

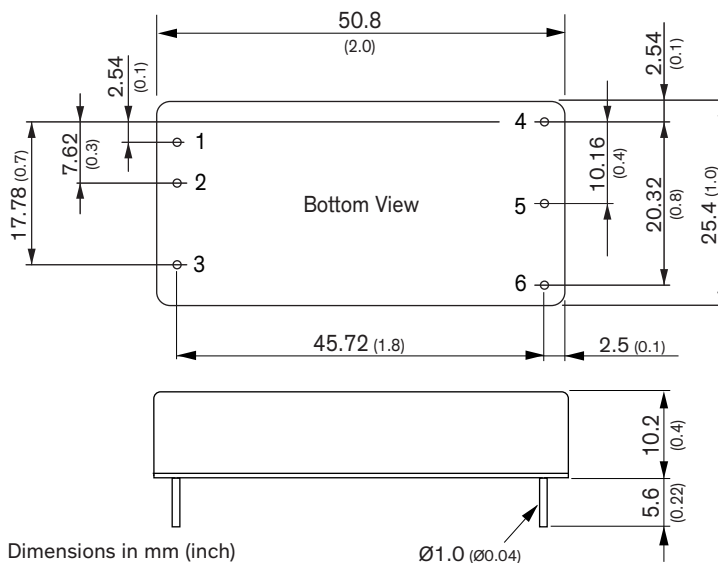
Environment	- Vibration - Mechanical Shock - Thermal Shock	MIL-STD-810F MIL-STD-810F MIL-STD-810F
Housing Material		Copper
Base Material		Non-conductive FR4 (UL94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Connection Type		THD (Through-Hole Device)
Weight		34 g
Thermal Impedance		10.8 K/W 10.3 K/W (with Heat Sink)
Environmental Compliance	- Reach - RoHS	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/ten40e](http://www.tracopower.com/overview/ten40e)

### Outline Dimensions



Dimensions in mm (inch)  
Tolerances: x.x ±0.5 (±0.02)  
              x.xx ±0.25 (±0.01)  
Pin dimension tolerance ±0.1 (±0.004)

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