



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



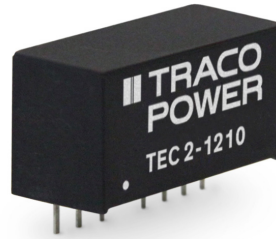
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- Compact SIP-8 package
- I/O-isolation voltage 1'600 VDC
- Fully regulated outputs
- Operating temperature range -40°C to +95°C
- Short circuit protection
- Remote On/Off
- 3-year product warranty
- Designed to meet UL 62368-1 (UL 60950-1)

TEC 2 is a new series with the design purpose to improve the prevalent 2 Watt SIP-8 DC/DC converters in terms of cost, efficiency and performance. The latest technology and components enable an increase in efficiency by more than 20%. With the reduction of thermal loss, the operating temperature range can be expanded from -40°C to +95°C. The converters are fully regulated over 0 - 100% load (no minimum load is required). The low input range is extended from 4.5 to 13.2 VDC while models are also available with the standard 2:1 input ranges of 9-18, 18-36 and 36-75 VDC (see TEC 2WI series for 4:1 input ranges). The functional I/O-isolation system is designed to meet IEC/EN 62368-1 with a test voltage (60 s) of 1600 VDC.

| Models | | | | |
|------------|-----------------------------------|----------------|---------------------|-----------------|
| Order code | Input voltage | Output voltage | Output current max. | Efficiency typ. |
| TEC 2-0910 | 4.5 – 13.2 VDC (9 VDC nominal) | 3.3 VDC | 500 mA | 78 % |
| TEC 2-0911 | | 5.0 VDC | 400 mA | 81 % |
| TEC 2-0919 | | 9.0 VDC | 222 mA | 84 % |
| TEC 2-0912 | | 12 VDC | 167 mA | 84 % |
| TEC 2-0913 | | 15 VDC | 134 mA | 84 % |
| TEC 2-0915 | | 24 VDC | 83 mA | 85 % |
| TEC 2-0921 | | ±5.0 VDC | ±200 mA | 81 % |
| TEC 2-0922 | | ±12 VDC | ±83 mA | 85 % |
| TEC 2-0923 | | ±15 VDC | ±67 mA | 84 % |
| TEC 2-1210 | 9 – 18 VDC (12 VDC nominal) | 3.3 VDC | 500 mA | 78 % |
| TEC 2-1211 | | 5.0 VDC | 400 mA | 82 % |
| TEC 2-1219 | | 9.0 VDC | 222 mA | 84 % |
| TEC 2-1212 | | 12 VDC | 167 mA | 85 % |
| TEC 2-1213 | | 15 VDC | 134 mA | 85 % |
| TEC 2-1215 | | 24 VDC | 83 mA | 85 % |
| TEC 2-1221 | | ±5.0 VDC | ±200 mA | 82 % |
| TEC 2-1222 | | ±12 VDC | ±83 mA | 85 % |
| TEC 2-1223 | | ±15 VDC | ±67 mA | 84 % |
| TEC 2-2410 | 18 – 36 VDC (24 VDC nominal) | 3.3 VDC | 500 mA | 78 % |
| TEC 2-2411 | | 5.0 VDC | 400 mA | 83 % |
| TEC 2-2419 | | 9.0 VDC | 222 mA | 85 % |
| TEC 2-2412 | | 12 VDC | 167 mA | 86 % |
| TEC 2-2413 | | 15 VDC | 134 mA | 85 % |
| TEC 2-2415 | | 24 VDC | 83 mA | 85 % |
| TEC 2-2421 | | ±5.0 VDC | ±200 mA | 83 % |
| TEC 2-2422 | | ±12 VDC | ±83 mA | 85 % |
| TEC 2-2423 | | ±15 VDC | ±67 mA | 86 % |
| TEC 2-4810 | 36 – 75 VDC (48 VDC nominal) | 3.3 VDC | 500 mA | 76 % |
| TEC 2-4811 | | 5.0 VDC | 400 mA | 80 % |
| TEC 2-4819 | | 9.0 VDC | 222 mA | 82 % |
| TEC 2-4812 | | 12 VDC | 167 mA | 84 % |
| TEC 2-4813 | | 15 VDC | 134 mA | 85 % |
| TEC 2-4815 | | 24 VDC | 83 mA | 85 % |
| TEC 2-4821 | | ±5.0 VDC | ±200 mA | 80 % |
| TEC 2-4822 | | ±12 VDC | ±83 mA | 85 % |
| TEC 2-4823 | | ±15 VDC | ±67 mA | 83 % |

Input Specifications

| | |
|--------------------------|--|
| Input current at no load | 9 Vin models: 45 mA typ. 12 Vin models: 25 mA typ. 24 Vin models: 10 mA typ. 48 Vin models: 8 mA typ. |
| Surge voltage (1 s max.) | 9 Vin models: 15 V max. 12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max. |
| Start up voltage | 9 Vin models: 4.5 V (or lower) 12 Vin models: 9 V (or lower) 24 Vin models: 18 V (or lower) 48 Vin models: 36 V (or lower) |
| Under voltage shut down | 9 Vin models: 2 - 4 V 12 Vin models: 6 - 8 V 24 Vin models: 13 - 17 V 48 Vin models: 29 - 35 V |
| Input filter | internal capacitor |
| Recommended input fuse | 9 Vin models: 1.0 A (slow blow type) 12 Vin models: 0.5 A (slow blow type) 24 Vin models: 0.315 A (slow blow type) 48 Vin models: 0.16 A (slow blow type) |
| Conducted noise | EN 55032 class A or B with external components www.tracopower.com/overview/tec2 – Application note for filter class A/B proposal |
| EMC immunity | EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV perf. criteria A all models: Nippon chemi-con KY 220µF/100V EN 61000-4-6, 10 Vrms, perf. criteria A EN 61000-4-8 100 A/m, continuous, perf. criteria A 1000 A/m, 1 sec., perf. criteria A – ESD (electrostatic discharge) – Radiated immunity – Fast transient / surge (with external input capacitor) – Conducted immunity – Magnetic field immunity |

Output Specifications

| | |
|--|---|
| Voltage set accuracy | ±1 % max. |
| Regulation | 0.2 % max. 1 % max. 1 % max. (balanced load) 0.5 % max. 0.8 % max. (balanced load) 5 % max. (asymmetrical load 25 % / 100 %) |
| Temperature coefficient | ±0.02 %/K max. |
| Ripple and noise (20 MHz Bandwidth) | 75 mVp-p typ. |
| Current limitation | 140 - 240 % of Iout max. |
| Short circuit protection | continuous, automatic recovery |
| Start up time (constant resistive load) | 10 ms typ. / 20 ms max. 10 ms typ. / 20 ms max. |
| Transient response time (25% load step change) | 500 µs typ. |

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

Output Specifications (continued)

| | | |
|-----------------|-----------------|--|
| Capacitive load | – Single output | 3.3 Vout models: 3300 µF max. 5.0 Vout models: 1680 µF max. 9.0 Vout models: 1000 µF max. 12 Vout models: 820 µF max. 15 Vout models: 680 µF max. 24 Vout models: 220 µF max. |
| | – Dual output | ±5.0 Vout models: 1000 µF max. (each output) ±12 Vout models: 470 µF max. (each output) ±15 Vout models: 330 µF max. (each output) |

General Specifications

| | | |
|--|--|---|
| Temperature ranges | – Operating (natural convection: 20 LFM, 0.1 m/s) – Case temperature – Storage temperature | –40°C to +95°C +105°C max. –55°C to +125°C |
| Derating | | 5.9 %/K above 88°C |
| Humidity (non condensing) | | 5 – 95 % rel H max. |
| Isolation voltage | – I/O isolation voltage (60 s) | 1'600 VDC |
| Isolation resistance (input/output) | | 1 GOhm min. |
| Isolation capacitance (input/output) | | 50 pF max. |
| Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign) | | 6'621'000 h |
| Switching frequency | | 100 kHz min. (pulse frequency modulation) |
| Shock, vibration and thermal shock | | MIL-STD-810F |
| Remote On/Off | – On: – Off: – Off idle current: | open circuit or high impedance 2 – 4 mA current applied via 1kOhm resistor 2.5 mA typ. |
| Safety standards | – Designed to meet (no certification) | IEC/EN/UL 62368-1, UL 60950-1 |
| Environmental compliance | – Reach – RoHS | www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU |

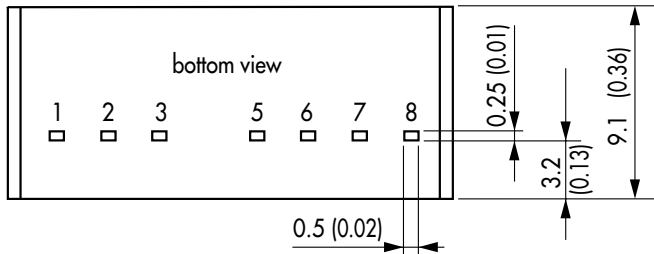
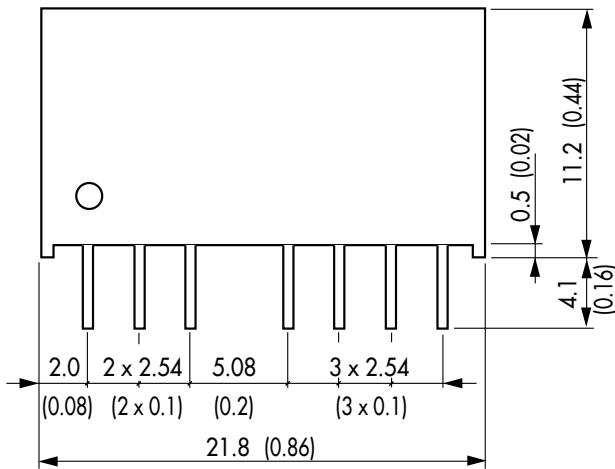
Physical Specifications

| | |
|-------------------|------------------------------------|
| Casing material | non-conducting black plastic |
| Potting material | Silicone (UL 94V-0 rated) |
| Pin material | tinned copper |
| Package weight | 4.5 g (0.16 oz) |
| Soldering profile | 260°C / 10 s max. (wave soldering) |

Supporting Documents: www.tracopower.com/overview/tec2

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 (GND) | -Vin (GND) |
| 2 | +Vin (VCC) | +Vin (VCC) |
| 3 | On/Off | On/Off |
| 5 | NC | NC |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
| 8 | NC | -Vout |

NC: not connected

Dimensions in [mm], () = Inch

Tolerances: x.xx ±0.5 (±0.02)

Pin pitch tolerances ±0.25 (±0.01)

Pin dimension tolerance ±0.1 (±0.004)