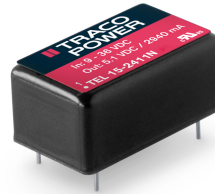


- Ultra compact 15 Watt converter in DIP-16 metal casing
- Highest power density of 4.51 W/cm³
- Operating temperature range -40°C to +85°C
- Wide 2:1 input voltage ranges: 9-18, 18-36, 36-75 VDC
- High efficiency (up to 87%) for low thermal loss
- 6-side shielded metal case with insulated baseplate
- Built-In EN 55032 class A filter (conducted)
- Protection against short circuit
- 3-year product warranty



The TEL 15N is a series of isolated 15 Watt converters which come in an ultra compact DIP-16 metal package. The design purpose of this series was to miniaturized low power DC/DC converters to the maximum without sacrificing high efficiency. It solidifies the new standard for power density with 4.51 W/cm³ and effectively doubles the power density compared to 15 Watt converters in DIP-24 packages. The TEL 15N offers a wide 2:1 input voltage range and features a high efficiency of up to 87% which enables an operation temperature of up to +55°C at full load and up to 85°C with 50% load. The converters also have an internal input filter to comply with conducted emission standard EN 55032 class A. It's an economical solution for space critical and cost sensitive applications in instrumentation, IT and industrial electronics.

| Models | | | | | | |
|--------------|------------------------------|----------|------------------|----------|------------------|-----------------|
| Order Code | Input Voltage Range | Output 1 | | Output 2 | | Efficiency typ. |
| | | Vnom | I _{max} | Vnom | I _{max} | |
| TEL 15-1211N | 9 - 18 VDC (12 VDC nom.) | 5.1 VDC | 2'940 mA | | | 86 % |
| TEL 15-1212N | | 12 VDC | 1'250 mA | | | 87 % |
| TEL 15-1213N | | 15 VDC | 1'000 mA | | | 87 % |
| TEL 15-1215N | | 24 VDC | 625 mA | | | 87 % |
| TEL 15-1222N | | +12 VDC | 625 mA | -12 VDC | 625 mA | 87 % |
| TEL 15-1223N | | +15 VDC | 500 mA | -15 VDC | 500 mA | 87 % |
| TEL 15-2411N | 18 - 36 VDC (24 VDC nom.) | 5.1 VDC | 2'940 mA | | | 86 % |
| TEL 15-2412N | | 12 VDC | 1'250 mA | | | 87 % |
| TEL 15-2413N | | 15 VDC | 1'000 mA | | | 87 % |
| TEL 15-2415N | | 24 VDC | 625 mA | | | 87 % |
| TEL 15-2422N | | +12 VDC | 625 mA | -12 VDC | 625 mA | 87 % |
| TEL 15-2423N | | +15 VDC | 500 mA | -15 VDC | 500 mA | 87 % |
| TEL 15-4811N | 36 - 75 VDC (48 VDC nom.) | 5.1 VDC | 2'940 mA | | | 86 % |
| TEL 15-4812N | | 12 VDC | 1'250 mA | | | 87 % |
| TEL 15-4813N | | 15 VDC | 1'000 mA | | | 87 % |
| TEL 15-4815N | | 24 VDC | 625 mA | | | 87 % |
| TEL 15-4822N | | +12 VDC | 625 mA | -12 VDC | 625 mA | 87 % |
| TEL 15-4823N | | +15 VDC | 500 mA | -15 VDC | 500 mA | 87 % |

Note - 48 Vin models: If the input will be switched electromechanically, use an external 27 µF / 200 V / KXY capacitor to reduce voltage transient.

Input Specifications

| | | |
|------------------------|----------------|---|
| Input Current | - At no load | 12 Vin models: 20 mA typ. 24 Vin models: 10 mA typ. 48 Vin models: 7 mA typ. |
| | - At full load | 12 Vin models: 1'450 mA typ. 24 Vin models: 720 mA typ. 48 Vin models: 360 mA typ. |
| Surge Voltage | | 12 Vin models: 25 VDC max. (1 s max.) 24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.) |
| Input Inrush Current | | 28.6 A typ. (12 Vin models) 38.8 A typ. (24 Vin models) 51.6 A typ. (48 Vin models) |
| Under Voltage Lockout | | 12 Vin models: 8 VDC typ. 24 Vin models: 16 VDC typ. 48 Vin models: 34 VDC typ. |
| Recommended Input Fuse | | 12 Vin models: 3'000 mA (slow blow) 24 Vin models: 1'500 mA (slow blow) 48 Vin models: 1'000 mA (slow blow) (The need of an external fuse has to be assessed in the final application.) |
| Input Filter | | Internal Pi-Type |

Output Specifications

| | | |
|---------------------------|--|---|
| Voltage Set Accuracy | | ±1% max. |
| Regulation | - Input Variation (Vmin - Vmax) | single output models: 0.8% max. dual output models: 0.8% max. |
| | - Load Variation (0 - 100%) | single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2) |
| | - Voltage Balance (symmetrical load) | dual output models: 2% max. |
| | - Cross Regulation (25% / 100% asym. load) | dual output models: 5% max. |
| Ripple and Noise | - 20 MHz Bandwidth | 70 mVp-p typ. (w/ 2.2 µF / 50 V MLCC) |
| Capacitive Load | - single output | 5.1 Vout models: 1'800 µF max. 12 Vout models: 820 µF max. 15 Vout models: 820 µF max. 24 Vout models: 270 µF max. |
| | - dual output | 12 / -12 Vout models: 560 / 560 µF max. 15 / -15 Vout models: 270 / 270 µF max. |
| Minimum Load | | Not required |
| Temperature Coefficient | | ±0.02 %/K max. |
| Start-up Time | | 40 ms max. |
| Short Circuit Protection | | Continuous, Automatic recovery (Hiccup Mode, Automatic Recovery) |
| Output Current Limitation | | 110% min. of Iout max. |
| | | 160% typ. of Iout max. |
| Transient Response | - Response Deviation | 3% typ. / 5% max. (75% to 100% Load Step) |
| | - Response Time | 500 µs max. (75% to 100% Load Step) |

Safety Specifications

| | | |
|-----------|-----------------------------|--|
| Standards | - IT / Multimedia Equipment | EN 62368-1 IEC 62368-1 UL 62368-1 |
| | - Certification Documents | www.tracopower.com/overview/tel15n |

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

| | |
|-----------------------|---------------------|
| Pollution Degree | PD 3 |
| Over Voltage Category | Not mains connected |

EMC Specifications

| | | |
|---------------|-----------------------------|---|
| EMI Emissions | - Conducted Emissions | EN 55032 class A (internal 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: www.tracopower.com/overview/tel15n |
| EMS Immunity | | EN 55024 (IT Equipment) EN 55035 (Multimedia) |
| | - 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, 20 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 |
| | - Conducted RF Disturbances | External filter proposal: www.tracopower.com/overview/tel15n EN 61000-4-6, 10 Vrms, perf. criteria A |
| | - PF Magnetic Field | Continuous: EN 61000-4-8, 30 A/m, perf. criteria A |

General Specifications

| | | |
|---------------------------|---------------------------------|---|
| Relative Humidity | | 95% max. (non condensing) |
| Temperature Ranges | - Operating Temperature | -40°C to +80°C |
| | - Case Temperature | +110°C max. |
| | - Storage Temperature | -50°C to +125°C |
| Power Derating | - High Temperature | 1.9 %/K above 55°C (average) |
| | | See application note: www.tracopower.com/overview/tel15n |
| Cooling System | | Natural convection (20 LFM) |
| Altitude During Operation | | 6'000 m max. |
| Regulator Topology | | Flyback Converter |
| Switching Frequency | | 420 - 540 kHz (PWM) |
| Insulation System | | Functional Insulation |
| Isolation Test Voltage | - Input to Output, 60 s | 1'500 VDC |
| | - Input to Output, 1 s | 1'800 VDC |
| | - Input to Case, 60 s | 1'000 VDC |
| | - Output to Case, 60 s | 1'000 VDC |
| Isolation Resistance | - Input to Output, 500 VDC | 1'000 MΩ min. |
| Isolation Capacitance | - Input to Output, 100 kHz, 1 V | 2'200 pF max. |
| Reliability | - Calculated MTBF | 2'150'000 h (MIL-HDBK-217F, ground benign) |
| Washing Process | | According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf |
| Environment | - Vibration | 2.4 g, 3 axis, random waveform, 30 min |
| | - Mechanical Shock | 30 g, 3 axis, half sine, 11 ms |
| | - Thermal Shock | IPC-9592B |
| Housing Material | | Aluminum |
| Potting Material | | Silicone (UL 94 V-0 rated) |
| Pin Material | | Copper Alloy (C6801) |
| Pin Foundation Plating | | Nickel (2 - 4 μm) |
| Pin Surface Plating | | Tin (3 - 5 μm), matte |
| Housing Type | | Metal Case |
| Mounting Type | | PCB Mount |
| Connection Type | | THD (Through-Hole Device) |
| Footprint Type | | DIP16 |
| Soldering Profile | | Lead-Free Wave Soldering |
| | | 260°C / 10 s max. |
| Weight | | 8.8 g |

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

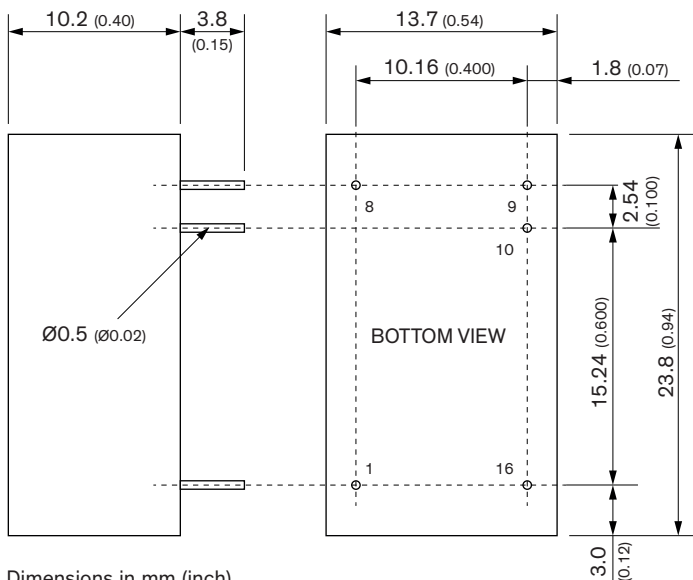
| | | |
|--------------------------|-------------------------|---|
| Thermal Impedance | - Case to Ambient | 24.6 K/W typ. |
| Environmental Compliance | - REACH Declaration | www.tracopower.com/info/reach-declaration.pdf |
| | - RoHS Declaration | REACH SVHC list compliant REACH Annex XVII compliant www.tracopower.com/info/rohs-declaration.pdf |
| | - SCIP Reference Number | Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule)) e74ab8fa-1d15-4362-954c-972163d70177 |

Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tel15n

Outline Dimensions



Dimensions in mm (inch)

Tolerances: X.X ±0.5 (X.XX ±0.02)

X.XX ±0.25 (X.XXX ±0.01)

Pin diameter tolerances: X.X ±0.05 (X.XX ±0.002)

| Pinout | | |
|--------|--------|--------|
| Pin | Single | Dual |
| 1 | | -Vin |
| 8 | NC | Common |
| 9 | | +Vout |
| 10 | | -Vout |
| 16 | | +Vin |

NC: Not connected