

- Ultra low ripple and noise 10mVp-p typ.
- Compact SIP-8 package
- Input Voltage range 4.5-13.2, 9-18, 18-36, 36-75 VDC
- I/O isolation 1600 VDC
- Operating temperature range -40 to +75°C without derating
- Fully regulated outputs
- Short circuit protection
- 3-year product warranty



The TVN 3 Series comprises ultra low ripple and noise 3 Watt DC/DC converters. They come in a compact SIP-8 package with fully regulated outputs. Apart from the standard 2:1 input voltage range, the low input voltage models feature an extended input voltage range from 4.5-13.2 VDC (3:1). Full load operation is reliable up to 75°C environment temperature without derating and up to 90°C with 50% derating. With 1'600 VDC I/O-isolation voltage, and short current protection they cover a wide range of applications when space is limited.

### Models

| Order Code | Input Voltage Range            | Output 1 |                  | Output 2 |                  | Efficiency typ. |
|------------|--------------------------------|----------|------------------|----------|------------------|-----------------|
|            |                                | Vnom     | I <sub>max</sub> | Vnom     | I <sub>max</sub> |                 |
| TVN 3-0910 | 4.5 - 13.2 VDC<br>(9 VDC nom.) | 3.3 VDC  | 700 mA           |          |                  | 75 %            |
| TVN 3-0911 |                                | 5 VDC    | 600 mA           |          |                  | 79 %            |
| TVN 3-0919 |                                | 9 VDC    | 333 mA           |          |                  | 81 %            |
| TVN 3-0912 |                                | 12 VDC   | 250 mA           |          |                  | 83 %            |
| TVN 3-0913 |                                | 15 VDC   | 200 mA           |          |                  | 83 %            |
| TVN 3-0915 |                                | 24 VDC   | 125 mA           |          |                  | 82 %            |
| TVN 3-0921 |                                | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 78 %            |
| TVN 3-0922 |                                | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 82 %            |
| TVN 3-0923 |                                | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 82 %            |
| TVN 3-1210 | 9 - 18 VDC<br>(12 VDC nom.)    | 3.3 VDC  | 700 mA           |          |                  | 77 %            |
| TVN 3-1211 |                                | 5 VDC    | 600 mA           |          |                  | 81 %            |
| TVN 3-1219 |                                | 9 VDC    | 333 mA           |          |                  | 83 %            |
| TVN 3-1212 |                                | 12 VDC   | 250 mA           |          |                  | 85 %            |
| TVN 3-1213 |                                | 15 VDC   | 200 mA           |          |                  | 85 %            |
| TVN 3-1215 |                                | 24 VDC   | 125 mA           |          |                  | 84 %            |
| TVN 3-1221 |                                | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TVN 3-1222 |                                | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 84 %            |
| TVN 3-1223 |                                | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 83 %            |
| TVN 3-2410 | 18 - 36 VDC<br>(24 VDC nom.)   | 3.3 VDC  | 700 mA           |          |                  | 77 %            |
| TVN 3-2411 |                                | 5 VDC    | 600 mA           |          |                  | 82 %            |
| TVN 3-2419 |                                | 9 VDC    | 333 mA           |          |                  | 85 %            |
| TVN 3-2412 |                                | 12 VDC   | 250 mA           |          |                  | 85 %            |
| TVN 3-2413 |                                | 15 VDC   | 200 mA           |          |                  | 85 %            |
| TVN 3-2415 |                                | 24 VDC   | 125 mA           |          |                  | 85 %            |
| TVN 3-2421 |                                | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TVN 3-2422 |                                | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 85 %            |
| TVN 3-2423 |                                | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 85 %            |
| TVN 3-4810 | 36 - 75 VDC<br>(48 VDC nom.)   | 3.3 VDC  | 700 mA           |          |                  | 75 %            |
| TVN 3-4811 |                                | 5 VDC    | 600 mA           |          |                  | 80 %            |
| TVN 3-4819 |                                | 9 VDC    | 333 mA           |          |                  | 83 %            |
| TVN 3-4812 |                                | 12 VDC   | 250 mA           |          |                  | 84 %            |
| TVN 3-4813 |                                | 15 VDC   | 200 mA           |          |                  | 85 %            |
| TVN 3-4815 |                                | 24 VDC   | 125 mA           |          |                  | 84 %            |
| TVN 3-4821 |                                | +5 VDC   | 300 mA           | -5 VDC   | 300 mA           | 80 %            |
| TVN 3-4822 |                                | +12 VDC  | 125 mA           | -12 VDC  | 125 mA           | 85 %            |
| TVN 3-4823 |                                | +15 VDC  | 100 mA           | -15 VDC  | 100 mA           | 83 %            |

## Input Specifications

|                        |              |                                                                                                                                                                                                                               |
|------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Current          | - At no load | 9 Vin models: 55 mA typ.<br>12 Vin models: 30 mA typ.<br>24 Vin models: 16 mA typ.<br>48 Vin models: 12 mA typ.                                                                                                               |
| Surge Voltage          |              | 9 Vin models: 15 VDC max. (1 s max.)<br>12 Vin models: 25 VDC max. (1 s max.)<br>24 Vin models: 50 VDC max. (1 s max.)<br>48 Vin models: 100 VDC max. (1 s max.)                                                              |
| Under Voltage Lockout  |              | 9 Vin models: 2 VDC min. / 3 VDC typ. / 4 VDC max.<br>12 Vin models: 6 VDC min. / 7 VDC typ. / 8 VDC max.<br>24 Vin models: 13 VDC min. / 15 VDC typ. / 17 VDC max.<br>48 Vin models: 29 VDC min. / 32 VDC typ. / 35 VDC max. |
| Recommended Input Fuse |              | (The need of an external fuse has to be assessed in the final application.)                                                                                                                                                   |
| Input Filter           |              | Internal Capacitor                                                                                                                                                                                                            |

## Output Specifications

|                          |                                                                                                              |                                                                                                                                                                                                                                                                                                                                  |
|--------------------------|--------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Voltage Set Accuracy     |                                                                                                              | ±1% max.                                                                                                                                                                                                                                                                                                                         |
| Regulation               | - Input Variation (Vmin - Vmax)<br>- Load Variation (0 - 100%)<br>- Cross Regulation (25% / 100% asym. load) | single output models: 0.2% max.<br>dual output models: 0.2% max.<br>single output models: 1% max.<br>dual output models: 1% max. (Output 1)<br>1% max. (Output 2)<br>dual output models: 5% max.                                                                                                                                 |
| Ripple and Noise         | - 20 MHz Bandwidth                                                                                           | 10 mVp-p typ.<br>15 mVp-p max.                                                                                                                                                                                                                                                                                                   |
| Capacitive Load          | - single output<br>- dual output                                                                             | 3.3 Vout models: 4'400 µF max.<br>5 Vout models: 2'200 µF max.<br>9 Vout models: 1'300 µF max.<br>12 Vout models: 1'000 µF max.<br>15 Vout models: 820 µF max.<br>24 Vout models: 470 µF max.<br>5 / -5 Vout models: 1'200 / 1'200 µF max.<br>12 / -12 Vout models: 520 / 520 µF max.<br>15 / -15 Vout models: 440 / 440 µF max. |
| Minimum Load             |                                                                                                              | Not required                                                                                                                                                                                                                                                                                                                     |
| Temperature Coefficient  |                                                                                                              | ±0.02 %/K max.                                                                                                                                                                                                                                                                                                                   |
| Start-up Time            |                                                                                                              | 30 ms typ.                                                                                                                                                                                                                                                                                                                       |
| Short Circuit Protection |                                                                                                              | Continuous, Automatic recovery                                                                                                                                                                                                                                                                                                   |
| Transient Response       | - Response Time                                                                                              | 500 µs typ. (25% Load Step)                                                                                                                                                                                                                                                                                                      |

## Safety Specifications

|                  |                             |                                            |
|------------------|-----------------------------|--------------------------------------------|
| Safety Standards | - IT / Multimedia Equipment | Designed for EN 62368-1 (no certification) |
|------------------|-----------------------------|--------------------------------------------|

## EMC Specifications

|                                                                                                                  |                                               |                                                                                                                                                                          |
|------------------------------------------------------------------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMI Emissions                                                                                                    | - Conducted Emissions<br>- Radiated Emissions | EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter)<br>EN 55032 class A (with external filter)<br>EN 55032 class B (with external filter) |
| External filter proposal: <a href="http://www.tracopower.com/overview/tvn3">www.tracopower.com/overview/tvn3</a> |                                               |                                                                                                                                                                          |

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

|              |                             |                                                     |
|--------------|-----------------------------|-----------------------------------------------------|
| EMS Immunity | - Electrostatic Discharge   | Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A     |
|              | - RF Electromagnetic Field  | Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A |
|              | - EFT (Burst) / Surge       | EN 61000-4-3, 10 V/m, perf. criteria A              |
|              |                             | EN 61000-4-4, $\pm 2$ kV, perf. criteria A          |
|              |                             | EN 61000-4-5, $\pm 1$ kV, perf. criteria A          |
|              |                             | Ext. input component: 220 $\mu$ F, 100 V            |
|              | - Conducted RF Disturbances | EN 61000-4-6, 10 Vrms, 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

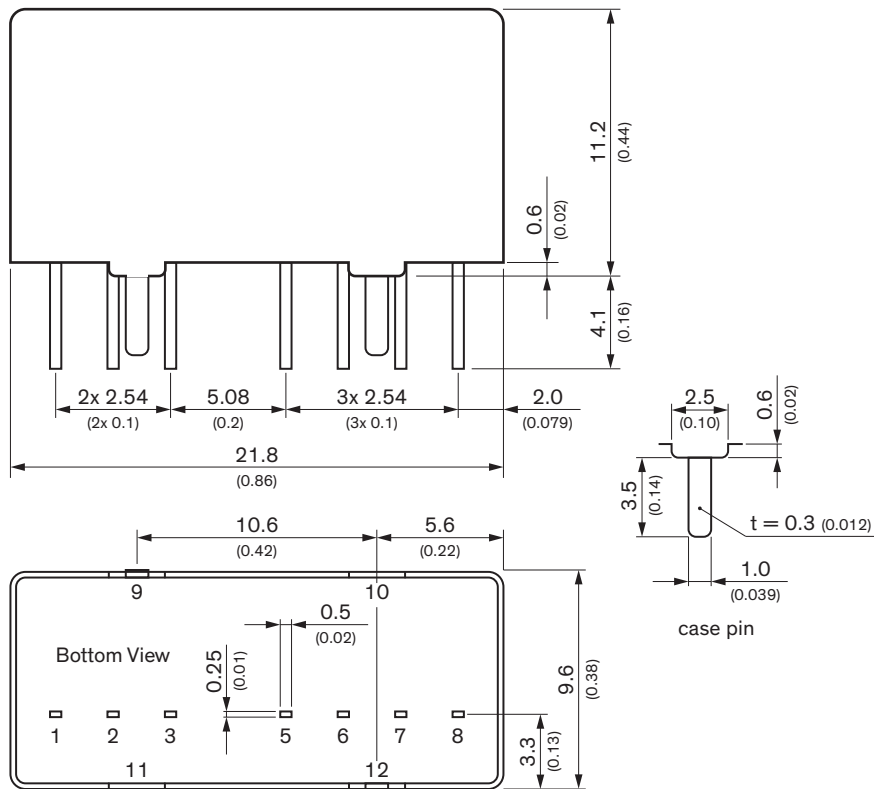
|                          |                                 |                                                                                                                                                                             |
|--------------------------|---------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relative Humidity        |                                 | 95% max. (non condensing)                                                                                                                                                   |
| Temperature Ranges       | - Operating Temperature         | -40°C to +90°C                                                                                                                                                              |
|                          | - Storage Temperature           | -55°C to +125°C                                                                                                                                                             |
| Power Derating           | - High Temperature              | 3.33 %/K above 75°C                                                                                                                                                         |
| Cooling System           |                                 | Natural convection (20 LFM)                                                                                                                                                 |
| Remote Control           | - Current Controlled Remote     | On: open circuit                                                                                                                                                            |
|                          | - Off Idle Input Current        | Off: 2 to 4 mA current (internal 1 k $\Omega$ resistor)<br>2.5 mA max.                                                                                                      |
| Switching Frequency      |                                 | 100 kHz min. (PFM)                                                                                                                                                          |
| Insulation System        |                                 | Functional Insulation                                                                                                                                                       |
| Isolation Test Voltage   | - Input to Output, 60 s         | 1'600 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 M $\Omega$ min.                                                                                                                                                       |
| Isolation Capacitance    | - Input to Output, 100 kHz, 1 V | 1'500 pF max.                                                                                                                                                               |
| Reliability              | - Calculated MTBF               | 5'600'000 h (MIL-HDBK-217F, ground benign)                                                                                                                                  |
| Environment              | - Vibration                     | MIL-STD-810F                                                                                                                                                                |
|                          | - Thermal Shock                 | MIL-STD-810F                                                                                                                                                                |
| Housing Material         |                                 | Copper                                                                                                                                                                      |
| Potting Material         |                                 | Silicone (UL 94 V-0 rated)                                                                                                                                                  |
| Pin Material             |                                 | Copper                                                                                                                                                                      |
| Pin Foundation Plating   |                                 | Nickel (1 - 2 $\mu$ m)                                                                                                                                                      |
| Pin Surface Plating      |                                 | Tin (3 - 5 $\mu$ m), matte                                                                                                                                                  |
| Connection Type          |                                 | THD (Through-Hole Device)                                                                                                                                                   |
| Weight                   |                                 | 5.9 g                                                                                                                                                                       |
| Environmental Compliance | - REACH Declaration             | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant |
|                          | - RoHS Declaration              | <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7a, 7c-I                                      |

## Supporting Documents

|                                          |                                                                                        |
|------------------------------------------|----------------------------------------------------------------------------------------|
| Overview Link (for additional Documents) | <a href="http://www.tracopower.com/overview/tvn3">www.tracopower.com/overview/tvn3</a> |
|------------------------------------------|----------------------------------------------------------------------------------------|

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

## Outline Dimensions



### Pinout

| Pin | Single        | Dual          |
|-----|---------------|---------------|
| 1   | –Vin (GND)    | –Vin (GND)    |
| 2   | +Vin (VCC)    | +Vin (VCC)    |
| 3   | Remote On/Off | Remote On/Off |
| 5   | NC            | NC            |
| 6   | +Vout         | +Vout         |
| 7   | –Vout         | Common        |
| 8   | NC            | –Vout         |
| 9   | Case          | Case          |
| 10  | Stand off     | Stand off     |
| 11  | Stand off     | Stand off     |
| 12  | Case          | Case          |

NC: No connection

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

## TRACO Power:

[TVN 3-4823](#) [TVN 3-4819](#) [TVN 3-4813](#) [TVN 3-2421](#) [TVN 3-4822](#) [TVN 3-4821](#) [TVN 3-1223](#) [TVN 3-2422](#) [TVN 3-0922](#) [TVN 3-2415](#) [TVN 3-2410](#) [TVN 3-0919](#) [TVN 3-1215](#) [TVN 3-4815](#) [TVN 3-1222](#) [TVN 3-4812](#) [TVN 3-1221](#) [TVN 3-2419](#) [TVN 3-1210](#) [TVN 3-4811](#) [TVN 3-0911](#) [TVN 3-1212](#) [TVN 3-1213](#) [TVN 3-0921](#) [TVN 3-2411](#) [TVN 3-2412](#) [TVN 3-0915](#) [TVN 3-0923](#) [TVN 3-0912](#) [TVN 3-1219](#) [TVN 3-0910](#) [TVN 3-1211](#) [TVN 3-2413](#) [TVN 3-4810](#) [TVN 3-0913](#) [TVN 3-2423](#)