

- Cost optimized design in DIP-24 package
- Fully regulated output
- Output ripple & noise 30 mVp-p typ.
- Short circuit protection
- Operating temperature range  $-40^{\circ}\text{C}$  to  $+75^{\circ}\text{C}$  at full load
- I/O isolation 1'500 VDC
- Input filter meet EN 55022, class A
- No minimum load required
- Industry standard pinout
- 3-year product warranty



The TEM 3N series is a range of isolated DC/DC converters in a DIP-24 package. They offer tight output regulation and very low output noise. Operating temperature range is  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ . This product series provides a cost effective solution for many industrial or consumer electronics applications.

### Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I <sub>max</sub>	Vnom	I <sub>max</sub>	
TEM 3-0511N	4.5 - 5.5 VDC (5 VDC nom.)	5 VDC	600 mA			70 %
TEM 3-0512N		12 VDC	250 mA			78 %
TEM 3-0513N		15 VDC	200 mA			78 %
TEM 3-0522N		+12 VDC	125 mA	-12 VDC	125 mA	78 %
TEM 3-0523N		+15 VDC	100 mA	-15 VDC	100 mA	78 %
TEM 3-1211N	10.8 - 13.2 VDC (12 VDC nom.)	5 VDC	600 mA			74 %
TEM 3-1212N		12 VDC	250 mA			80 %
TEM 3-1213N		15 VDC	200 mA			80 %
TEM 3-1222N		+12 VDC	125 mA	-12 VDC	125 mA	81 %
TEM 3-1223N		+15 VDC	100 mA	-15 VDC	100 mA	82 %
TEM 3-2411N	21.6 - 26.4 VDC (24 VDC nom.)	5 VDC	600 mA			75 %
TEM 3-2412N		12 VDC	250 mA			80 %
TEM 3-2413N		15 VDC	200 mA			80 %
TEM 3-2422N		+12 VDC	125 mA	-12 VDC	125 mA	81 %
TEM 3-2423N		+15 VDC	100 mA	-15 VDC	100 mA	82 %

### Input Specifications

Input Current	- At no load	5 Vin models: <b>90 mA typ.</b> 12 Vin models: <b>45 mA typ.</b> 24 Vin models: <b>22 mA typ.</b>
	- At full load	5 Vin models: <b>800 mA typ.</b> 12 Vin models: <b>320 mA typ.</b> 24 Vin models: <b>160 mA typ.</b>
Surge Voltage		5 Vin models: <b>7.5 VDC max.</b> (1 s max.) 12 Vin models: <b>15 VDC max.</b> (1 s max.) 24 Vin models: <b>30 VDC max.</b> (1 s max.)
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)
Input Filter		<b>Internal Pi-Type</b>
Short Circuit Input Power		<b>2 W max.</b>

### Output Specifications

Voltage Set Accuracy		<b>±2% max.</b>
Regulation	- Input Variation (Vmin - Vmax)	single output models: <b>0.5% max.</b> dual output models: <b>0.5% max.</b>
	- Load Variation (10 - 100%)	single output models: <b>0.5% max.</b> dual output models: <b>0.5% max.</b> (Output 1) <b>0.5% max.</b> (Output 2)
	- Voltage Balance (symmetrical load)	dual output models: <b>3% max.</b>
Ripple and Noise	- 20 MHz Bandwidth	<b>30 mVp-p typ.</b> <b>60 mVp-p max.</b>
Capacitive Load	- single output	5 Vout models: <b>470 µF max.</b> 12 Vout models: <b>100 µF max.</b> 15 Vout models: <b>100 µF max.</b>
	- dual output	12 / -12 Vout models: <b>100 / 100 µF max.</b> 15 / -15 Vout models: <b>100 / 100 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>120% max. of Iout max.</b>

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	<b>CSA-C22.2, No. 60950-1</b> <b>EN 60950-1</b> <b>EN 62368-1</b> <b>IEC 60950-1</b> <b>IEC 62368-1</b> <b>UL 60950-1</b> <b>UL 62368-1</b>
	- Certification Documents	<a href="http://www.tracopower.com/overview/tem3n">www.tracopower.com/overview/tem3n</a>
Pollution Degree		<b>PD 2</b>

### EMC Specifications

EMI Emissions	- Conducted Emissions	<b>EN 55032 class A</b> (internal filter) <b>FCC Part 15 class A</b> (internal filter)
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### General Specifications

Relative Humidity		<b>95% max.</b> (non condensing)
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All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +85°C +95°C max. -50°C to +125°C
Power Derating	- High Temperature	5 %/K above 75°C
	See application note:	<a href="http://www.tracopower.com/overview/tem3n">www.tracopower.com/overview/tem3n</a>
Cooling System		Natural convection (20 LFM)
Altitude During Operation		6'000 m max.
Switching Frequency		300 kHz typ. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s - Input to Output, 1 s	1'500 VDC 1'800 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	300 pF typ.
Reliability	- Calculated MTBF	700'000 h (MIL-HDBK-217F, ground benign)
Washing Process		Allowed (hermetical product)
	See Cleaning Guideline:	<a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>
Housing Material		Non-conductive Plastic (UL 94 V-0 rated)
Potting Material		Epoxy (UL 94 V-0 rated)
Pin Material		Phosphor Bronze (C5191)
Pin Foundation Plating		Nickel (2 - 4 μm)
Pin Surface Plating		Gold (75 - 125 nm), glossy
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		DIP24
Soldering Profile		Wave Soldering 260°C / 10 s max.
Weight		12.4 g
Environmental Compliance	- REACH Declaration  - RoHS Declaration	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

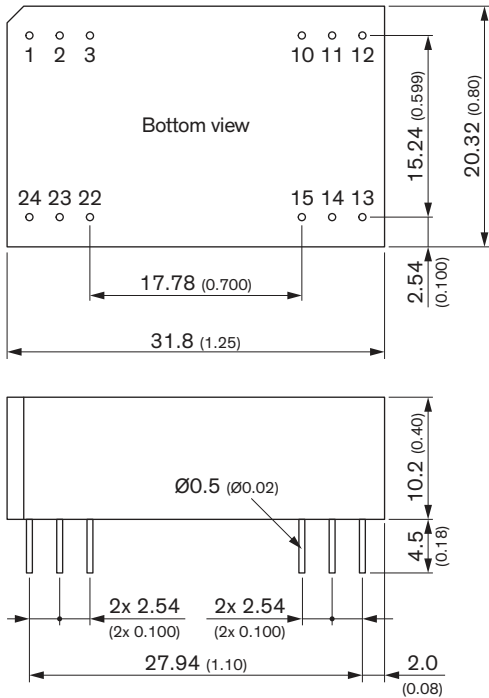
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tem3n](http://www.tracopower.com/overview/tem3n)

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

### Outline Dimensions



Dimensions in mm (inch)  
 Tolerances: x.x  $\pm 0.5$  (x.xx  $\pm 0.02$ )  
 x.xx  $\pm 0.25$  (x.xxx  $\pm 0.01$ )  
 Pin tolerance: x.x  $\pm 0.05$  (x.xx  $\pm 0.002$ )

Pinout		
Pin	Single	Dual
1	+Vin (Vcc)	+Vin (Vcc)
2	NC	-Vout
3	NC	Common
10	-Vout	Common
11	+Vout	+Vout
12	-Vin (GND)	-Vin (GND)
13	-Vin (GND)	-Vin (GND)
14	+Vout	+Vout
15	-Vout	Common
22	NC	Common
23	NC	-Vout
24	+Vin (Vcc)	+Vin (Vcc)

NC: Not connected