



**THE DATASHEET OF  
TDL 3-2411**



- Compact 3W Converter in DIP package
- I/O-isolation 1'500 VDC
- Fully regulated outputs
- Wide 2 : 1 input voltage range
- Operating temperature range -40°C to +80°C
- Short circuit protection
- 3-year product warranty



The TDL 3 series with 2:1 input voltage range is a selection of 3 Watt regulated dc/dc-converters. They come in a very compact DIP package (0.55 × 0.55 × 0.31 inch).

Models				
Order code	Input voltage	Output voltage	Output current max.	Efficiency typ.
TDL 3-0510	<b>4.5 – 10 VDC</b> (5 VDC nominal)	3.3 VDC	600 mA	79 %
TDL 3-0511		5.0 VDC	600 mA	81 %
TDL 3-0512		12 VDC	250 mA	85 %
TDL 3-0513		15 VDC	200 mA	85 %
TDL 3-0521		±5.0 VDC	±300 mA	82 %
TDL 3-0522		±12 VDC	±125 mA	84 %
TDL 3-0523		±15 VDC	±100 mA	85 %
TDL 3-1210	<b>9 – 18 VDC</b> (12 VDC nominal)	3.3 VDC	600 mA	80 %
TDL 3-1211		5.0 VDC	600 mA	83 %
TDL 3-1212		12 VDC	250 mA	87 %
TDL 3-1213		15 VDC	200 mA	87 %
TDL 3-1221		±5.0 VDC	±300 mA	84 %
TDL 3-1222		±12 VDC	±125 mA	86 %
TDL 3-1223		±15 VDC	±100 mA	87 %
TDL 3-2410	<b>18 – 36 VDC</b> (24 VDC nominal)	3.3 VDC	600 mA	80 %
TDL 3-2411		5.0 VDC	600 mA	83 %
TDL 3-2412		12 VDC	250 mA	87 %
TDL 3-2413		15 VDC	200 mA	87 %
TDL 3-2421		±5.0 VDC	±300 mA	84 %
TDL 3-2422		±12 VDC	±125 mA	86 %
TDL 3-2423		±15 VDC	±100 mA	87 %
TDL 3-4810	<b>36 – 75 VDC</b> (48 VDC nominal)	3.3 VDC	600 mA	79 %
TDL 3-4811		5.0 VDC	600 mA	82 %
TDL 3-4812		12 VDC	250 mA	86 %
TDL 3-4813		15 VDC	200 mA	86 %
TDL 3-4821		±5.0 VDC	±300 mA	82 %
TDL 3-4822		±12 VDC	±125 mA	85 %
TDL 3-4823		±15 VDC	±100 mA	85 %

## Input Specifications

Input current no load	5 Vin models: 45 mA typ. 12 Vin models: 27 mA typ. 24 Vin models: 16 mA typ. 48 Vin models: 10 mA typ.
Surge voltage (1 sec. max.)	5 Vin models: 12 V max. 12 Vin models: 25 V max. 24 Vin models: 50 V max. 48 Vin models: 100 V max.
Start-up voltage	5 Vin models: 4.5 VDC max. 12 Vin models: 9.0 VDC max. 24 Vin models: 18 VDC max. 48 Vin models: 36 VDC max.
Input filter	internal capacitor
Conducted noise	EN 55022 class A or B (with ext. components)
ESD (electrostatic discharge)	EN 61000-4-2, air $\pm 8$ kV, contact $\pm 6$ kV, perf. criteria A
Radiated immunity	EN 61000-4-3, 10 V/m, perf. criteria A
Fast transient / surge (with external input capacitor)	EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 1$ kV perf. criteria A all models: Nippon chemi-con KY 220 $\mu$ F/100V –external input capacitor
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A
Magnetic field immunity	EN 61000-4-8, 3 A/m, perf. criteria A

## Output Specifications

Voltage set accuracy	$\pm 1.5$ % max.
Voltage balance (dual output models)	2 % max.
Regulation	– Input variation 0.2 % max. – Load variation 0 – 100 % 1 % max. dual output: 2 % max. (balanced load) cross regulation - dual output: 5 % max. (asymmetrical load 25 % / 100 %)
Minimum load	no minimum load required
Ripple and noise (20 MHz Bandwidth)	70 mVp-p typ.
Transient response	– Recovery time ( 25% load step change) 500 $\mu$ s max. – Response deviation ( 25% load step change) 5 % max.
Short circuit protection	continuous, automatic recovery
Over load protection	at 170% of lout nom. (foldback)
Capacitive load	–Single output all models: 100 $\mu$ F max. –Dual output all models: 100 $\mu$ F max. (each output)

## General Specifications

Temperature ranges	– Operating (convection cooling 20LFM, 0,1m/s) –40°C to +70°C (without derating) – Case temperature +95°C max. – Storage temperature –50°C to +125°C
Derating	4.0%/K above 70°C
Humidity (non condensing)	95 % rel H max.
Isolation voltage	– I/O isolation voltage (60 sec.) 1'500 VDC
Isolation capacitance (input/output)	100 pF typ.
Isolation resistance (input/output)	>1 Gohm
Altitude during operation	5'000 m
Temperature coefficient	$\pm 0.02$ %/K max.

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

### General Specifications (continued)

Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)	>3'450'000 h
Switching frequency	100 kHz min.
Safety standards	UL 60950-1 IEC/EN 60950-1 <a href="http://www.tracopower.com/overview/tdl3">www.tracopower.com/overview/tdl3</a>
Environmental compliance	– Reach – RoHS <a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a> RoHS directive 2011/65/EU

### Physical Specifications

Casing material	non-conducting black plastic (UL 94V-0 rated)
Potting material	Epoxy (UL 94 V-0 rated)
Pin material	tinned copper
Package weight	3.9 g (0.137 oz)
Soldering temperature	max. 260°C / 10 sec.

### Outline Dimensions



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
4	+Vin (Vcc)	+Vin (Vcc)
5	+Vout	+Vout
6	no pin	Common
7	-Vout	-Vout





Dimensions in [mm], ( ) = Inch  
Tolerances: x.x ±0.5 (±0.02)  
                  x.xx ±0.25 (±0.01)  
pin dimension tolerance ±0.05 (±0.002)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)

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