

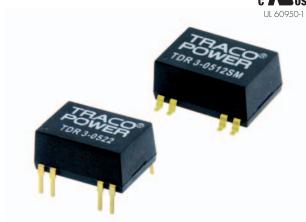
DC/DC Converters

TDR 3 Series, 3 Watt

c**FL**us

Features

- ◆ Compact design in SMD or DIP package
- ◆ Wide 2:1 input voltage range
- Fully regulated outputs
- Low ripple and noise
- ◆ No minimum load required
- ◆ Temperature range -40°C to +85°C
- ◆ I/O isolation 1500 VDC
- Continuous short-circuit protection
- ◆ Remote On/Off control
- Fully RoHS compliant
- 3-year product warranty



The TDR-3 series is a family of compact 3 W dc/dc-converters with 2:1 input voltage ranges and tightly regulated output voltages even under no load conditions. The product is available in SMD-package or in DIP-package. They work with high efficiency over the full load range and come with a remote On/Off input.

The usability in temperature ranges of up to 85°C, continuous short circuit protection and excellent immunity against environmental influences make these converters very reliable.

A TDR-3 converter is the ideal solution for space critical high end applications in communication equipment, instrumentation and industrial electronics.

Models					
Order code DIP models	Order code SMD models	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TDR 3-0511	TDR 3-0511SM		5.0 VDC	600 mA	79 %
TDR 3-0512	TDR 3-0512SM		12 VDC	250 mA	80 %
TDR 3-0513	TDR 3-0513SM	4.5 – 9.0 VDC	15 VDC	200 mA	81 %
TDR 3-0522	TDR 3-0522SM	(5 VDC nominal)	±12 VDC	±125 mA	80 %
TDR 3-0523	TDR 3-0523SM		±15 VDC	±100 mA	81 %
TDR 3-1211	TDR 3-1211SM		5.0 VDC	600 mA	81 %
TDR 3-1212	TDR 3-1212SM	9 – 18 VDC (12 VDC nominal)	12 VDC	250 mA	82 %
TDR 3-1213	TDR 3-1213SM		15 VDC	200 mA	82 %
TDR 3-1222	TDR 3-1222SM		±12 VDC	±125 mA	82 %
TDR 3-1223	TDR 3-1223SM		±15 VDC	±100 mA	83 %
TDR 3-2411	TDR 3-2411SM		5.0 VDC	600 mA	81 %
TDR 3-2412	TDR 3-2412SM	10 0/ \/DC	12 VDC	250 mA	82 %
TDR 3-2413	TDR 3-2413SM	18 – 36 VDC	15 VDC	200 mA	83 %
TDR 3-2422	TDR 3-2422SM	(24 VDC nominal)	±12 VDC	±125 mA	83 %
TDR 3-2423	TDR 3-2423SM		±15 VDC	±100 mA	83 %
TDR 3-4811	TDR 3-4811SM		5.0 VDC	600 mA	81 %
TDR 3-4812	TDR 3-4812SM	2/ 75 VDC	12 VDC	250 mA	82 %
TDR 3-4813	TDR 3-4813SM	36 - 75 VDC (48 VDC nominal)	15 VDC	200 mA	82 %
TDR 3-4822	TDR 3-4822SM		±12 VDC	±125 mA	83 %
TDR 3-4823	TDR 3-4823SM		±15 VDC	±100 mA	83 %



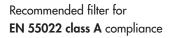
Input Specificati	ons		
Input current at no lo	ad (nominal input voltage)	5 Vin models: 12 Vin models: 24 Vin models: 48 Vin models:	50 mA typ. 30 mA typ. 13 mA typ. 10 mA typ.
Input current at full load (nominal input voltage)		5 Vin models: 12 Vin models: 24 Vin models: 48 Vin models:	/ 1
Surge voltage (1 sec. max.)		5 Vin models: 12 Vin models: 24 Vin models: 48 Vin models:	25 V max. 50 V max.
Input filter			capacitor type (see EMC considerations page 3 for compliance to EN 55022 class A/B)
ESD (electrostatic disc	harge)		EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
Radiated immunity			EN 61000-4-3 10 V/m, perf. criteria A
Fast transient / Surge	•		EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV perf. criteria A with external input capacitor e.g. Nippon chemi-con KY 220 µF, 100 V, ESR 48 mOhm
Conducted immunity			EN 61000-4-6, 10 Vrms, perf. criteria A
Reflected ripple current (measured with input filter according class A)		5 Vin models: 12 Vin models: 24 Vin models: 48 Vin models:	40 mAp-p typ. 30 mAp-p typ.
Output Specifico	ations		
Voltage set accuracy			±1 % max
Regulation	 Input variation Vin min. to Vir Load variation 0 – 100 % Load variation 10 – 90 % Load cross regulation 25/100 	single output models: dual output models: single output models: dual output models:	1.0 % max. balanced load
Minimum load	<u> </u>		0 % of rated max. load
Temperature coefficient			±0.02 %/K
Ripple and noise (20			30 mVp-p typ.
Start up time (constant resistive load	– Power On – Remote On		5 ms typ. 5 ms typ.
Transient response setting time (25 % load step change)			250 µs typ.
Short circuit protection			continuous, automatic recovery
Capacitive load		5 VDC models: 12 VDC models: 15 VDC models: ±12 VDC models: ±15 VDC models:	820 μF max. 680 μF max. ±470 μF max.

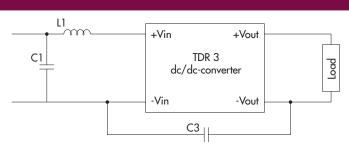
All specifications valid at nominal input voltage, full load and $\pm 25^{\circ}\text{C}$ after warm-up time unless otherwise stated.



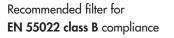
General Specification	ns	
Temperature ranges	OperatingStorageCase temperature	-40°C to +85°C -55°C to +125°C tba.
Load derating		3.3 %/K above +70°C
Humidity (non condensing)		5% to $90%$ rel. H max.
Thermal shock		acc. MIL-STD-810F
Vibration		acc. MIL-STD-810F
Reliability, calculated MTBF	(MIL-HDBK-217F, at+25°C, ground benign)	>2.4 Mio h
Isolation voltage (60 sec.)	- Input/Output	1500 VDC
Isolation capacitance	- Input/Output	50 pF max.
Isolation resistance	- Input/Output (500 VDC)	>10 GOhm
Altitude during operation		tba.
Safety standard (designed	to meet)	IEC/EN 60950-1, UL 60950-1
Safety approvals	– UL/cUL	www.ul.com -> certifications -> File e188913
Switching frequency		100 kHz (PWM)
Remote On/Off	On:Off:Off stand by input current	open or high impedance 24 mA current applied via 1KOhm resistor 2.5 mA max.

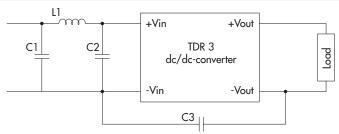
EMC Consideration





Input models	Cl	C3	L1		
			value	order code	datasheet
5 VDC	4.7 μF / 25 V 1812 MLCC		10 pH	TCK-047	www.tracopower.com/products/tck047.pdf
12 VDC	6.8 µF / 50 V 1812 MLCC	220pF / 3 kV 1808 MLCC	12 µH	TCK-062	www.tracopower.com/products/tck062.pdf
24 VDC	4.7 µF / 50 V 1812 MLCC		10 µH	TCK-047	www.tracopower.com/products/tck047.pdf
48 VDC	4.7 µF / 100 V 1812 MLCC		10 µH	TCK 047	www.nacopower.com/products/ texo4/.pur





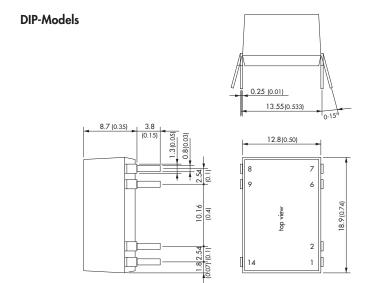
Input models	C1 & C2	С3	L1	order code (SMD type)	datasheet
			value	(SMD Type)	adiasileei
5 VDC	6.8 µF / 25 V 1812 MLCC		10 µH	TCK-047	www.tracopower.com/products/tck047.pdf
12 VDC	4.7 μF / 50 V 1812 MLCC	220pF / 3 kV 1808 MLCC	12 µH	TCK-062	www.tracopower.com/products/tck062.pdf
24 VDC			18 µH	TCK-046	/ / /
48 VDC	4.7 µF / 100 V 1812 MLCC		18 µH	TCK-046	www.tracopower.com/products/tck046.pdf

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



Pysical Specifications	5		
Casing material		non-conductive plastic (UL94V-0 rated)	
Package weight		4.5 g (0.16 oz)	
Soldering profile for DIP-pa	ckage models	max. 265°C / 10 sec. (wave soldering)	
Lead-free reflow solder process for SMD-package models		as per J-STD-020D.01 (to find at: www.jedec.org - free registration required)	
Moisture sensivity level (for	SMD-package models)	level 2a as per J-STD-033B.01 (to find at: www.jedec.org - free registration required)	
Environmental compliance	- Reach - RoHS	www.tracopower.com/products/tdr3-reach.pdf RoHS directive 2011/65/EU	
Packaging	– Tube – Tape & Reel (only SMD models, add suffix –TR)	10 pcs packing unit 200 pcs packing unit	

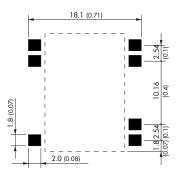
Outline Dimensions



Pin-Out				
Pin	Single	Dual		
1	-Vin (GND)	-Vin (GND)		
2	Remote On/Off	Remote On/Off		
6	NC	Common		
7	NC	-Vout		
8	+Vout	+Vout		
9	-Vout	Common		
14	+Vin (Vcc)	+Vin (Vcc)		

NC = not to connect

Recommended Solder Pad Dimension:



Dimensions in [mm], () = Inch Tolerances: ±0.5 (±0.02) Pin pich tolerances: ±0.25 (±0.01)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com