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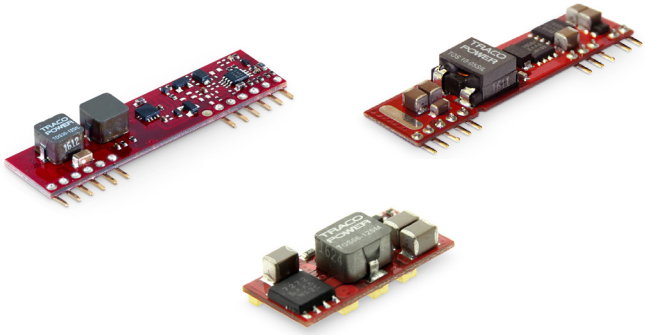
DC/DC Converters

TOS Series, Point-of-Load (POL) Converter

Features

- Small size, low profile
- SMT package or SIP version
- Cost-efficient open frame design
- Wide input voltage ranges
- Output voltages trim from 0.75 VDC to 5.5 VDC
- Delivers up to 30 A with minimal derating
- Ultra high efficiency to 96 %
- Fast transient response
- Remote On/Off control
- Wide temperature range –40°C to +85°C
- SMT package fully DOSA compatible
- Lead free design – RoHS compliant



The TOS series is a range of high performance non-isolated dc-dc converters With very high efficiency that can supply up to 30A of output current. These modules provide precisely regulated output voltages which can be set via an external resistor to a value from 0.75 VDC to 5.5 VDC. These converters work over a wide input voltage range of 2.4 to 5.5 VDC or 8.3 to 14.0 VDC.Further features include remote On/Off, under voltage lockout, over temperature and over current protection.
These products have an open-frame construction with very small footprint and are available in an industry standard SIP or in a SMT package. The TOS series is fully RoHS compliant and can withstand industry standard handling, cleaning and the high temperatures of lead-free reflow solder processes.

Models

Order code SMT-version	Input voltage range	Output voltage range	Output current max.	Efficiency typ.
TOS 06-05SM	2.4 – 5.5 VDC	0.75 – 3.3 VDC [3]	6 A	94 %
TOS 10-05SM			10 A	95 %
TOS 16-05SM			16 A	95 %
TOS 06-12SM	8.3 – 14.0 VDC	0.75 – 5.0 VDC	6 A	89 %
TOS 10-12SM			10 A	93 %
TOS 16-12SM			16 A	92 %
SIL-version				
TOS 06-05SIL	2.4 – 5.5 VDC	0.75 – 3.3 VDC [2]	6 A	94 %
TOS 10-05SIL			10 A	95 %
TOS 16-05SIL			16 A	95 %
TOS 06-12SIL	8.3 – 14 VDC	0.75 – 5.0 VDC	6 A	89 %
TOS 10-12SIL			10 A	93 %
TOS 16-12SIL			16 A	92 %

Models

Datasheet for 30 A Models see: www.tracopower.com/products/tos30.pdf

Order code [1] SMT-version	Input voltage range	Output voltage range	Output current max.	Efficiency typ.
TOS 30-05SM	4.5 – 5.5 VDC	0.80 – 3.6 VDC	30 A	93 %
TOS 30-12SM	6.0 – 14.0 VDC	0.80 – 3.6 VDC	30 A [4]	92 %
SIL-version				
TOS 30-05SIL	4.5 – 5.5 VDC	0.80 – 5.5 VDC	30 A	93 %
TOS 30-12SIL	6.0 – 14.0 VDC	0.80 – 5.5 VDC	30 A [2]	92 %

1) No stocking item, availability may be subject to MOQ
2) 25 A output voltage higher than 2.75 VDC
3) Max output voltage to be adjusted min. 0.5 VDC below impressed input voltage
4) 20 A output voltage higher than 2.75 VDC

Input Specifications

Input current no load	– Vin 5 VDC (at Vout min./Vout max.)	6 A models:	20 mA / 45 mA typ.
		10 A / 16 A models:	100 mA / 130 mA typ.
	– Vin 12 VDC (at Vout min./Vout max.)	6 A models:	17 mA / 100 mA typ.
		10 A models:	40 mA / 100 mA typ.
		16 A models:	40 mA / 100 mA typ.
Stand by input current (at remote Off)		6 A models:	1 mA typ.
		10 A / 16 A models:	2 mA typ.
Max. input current	– Vin 5 VDC	6 A models:	6 A
		10 A models:	10 A
		16 A models:	16 A
	– Vin 12 VDC	6 A models:	4.5 A
		10 A models:	7 A
		16 A models:	10 A
Start up voltage / under voltage lockout		5 Vin models:	2.2 VDC / 2.0 VDC typ.
		12 Vin models:	7.9 VDC / 7.8 VDC typ.
Start up time (power / remote On till Vout set)			8 ms typ.
Reflected ripple current (with input filter)	– Vin 5 VDC	6 A models:	35 mAp-p typ.
		10 A / 16 A models:	100 mAp-p typ.
	– Vin 12 VDC	6 A models:	30 mAp-p typ.
		10 A models:	20 mAp-p typ.
		16 A models:	30 mAp-p typ.
Input filter external (recommended)			2 x 150 µF low ESR polymer capacitors and 2 x 47 µF ceramic capacitors

Output Specifications

Voltage set accuracy			±2 % max. (see page 3 for set up)
Voltage balance (dual output models)			±1 % max.
Regulation	– Input variation		±0.3 % max.
	– Load variation 0 – 100 %		±0.4 % max.
Dynamic load response	– 50 % load change (upper half) with external 1 µF ceramic- and 10 µF tantalum capacitors		
max. peak variation / response time		Vin 5 VDC, 6 A models:	130 mV / 25 µs typ.
		Vin 12 VDC, 6 A models:	200 mV / 25 µs typ.
		Vin 5 VDC, 10 A models:	200 mV / 25 µs typ.
		Vin 12 VDC, 10 A models:	200 mV / 25 µs typ.
		Vin 5 VDC, 16 A models:	300 mV / 25 µs typ.
		Vin 12 VDC, 16 A models:	200 mV / 25 µs typ.
	– 50 % load change (upper half) with external 2 x 150 µF polymer capacitors		
		Vin 5 VDC, 6 A models:	50 mV / 50 µs typ.
		Vin 12 VDC, 6 A models:	50 mV / 50 µs typ.
		Vin 5 VDC, 10 A models:	100 mV / 100 µs typ.
		Vin 12 VDC, 10 A models:	100 mV / 25 µs typ.
		Vin 5 VDC, 16 A models:	150 mV / 100 µs typ.
		Vin 12 VDC, 16 A models:	100 mV / 50 µs typ.
Ripple and noise (20 MHz Bandwidth)		5 Vin models:	50 mVp-p max.
		12 Vin models:	50 mVp-p max.
Temperature coefficient			±0.4 % typ.
Over current protection			at +200 % of Iout max. typ.
Short circuit protection			indefinite, automatic recovery
Capacitive load	– ESR <1 mOhm		1000 µF max.
	– ESR <10 mOhm	6 A models:	3000 µF max.
		10 A / 16 A models:	5000 µF max.

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

General Specifications

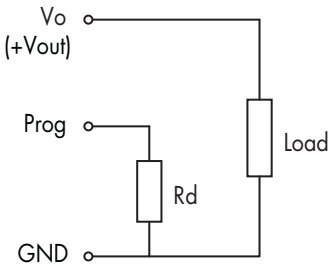
Temperature ranges	– Operating – Storage		–40°C to +85°C –55°C to +125°C
Derating			see application note
Over temperature protection			at +125°C typ.
Humidity (non condensing)			5 – 95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground begin)		6 A models: 10 A / 16 A models:	> 9 mio. h > 3.3 mio. h
Switching frequency			300 kHz typ. (pulse width modulation - PWM)
Remote On/Off (reference to GND)			On: 1 VDC to Vin max. or open circuit. Off: 0 to 0.3 VDC

Physical Specifications

Weight		6 A models: 10 A / 16 A models:	2.8 g 6.0 g
Soldering profile	– SIL - Version – SMT - Version		max. 265°C / 10 sec. (wave soldering) peak temp. 245°C for 10 sec. max., 217°C for 90 sec. max. (Convection reflow solder process is recommended)
Moisture Sensitivity Level	– SMT - Version		2a

Supporting documents: www.tracopower.com/overview/tos

Output Voltage Adjustment



5 VDC input models: $Rd\,[Ohm] = \frac{21070}{Vo - 0.7525} - 5110$

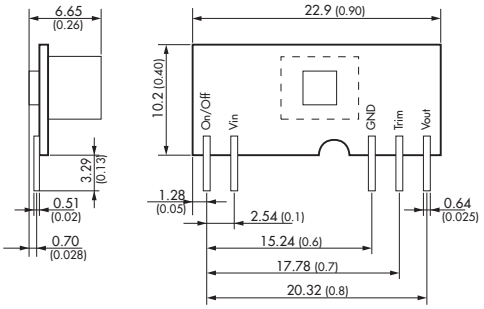
12 VDC input models: $Rd\,[Ohm] = \frac{10570}{Vo - 0.7525} - 1000$

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

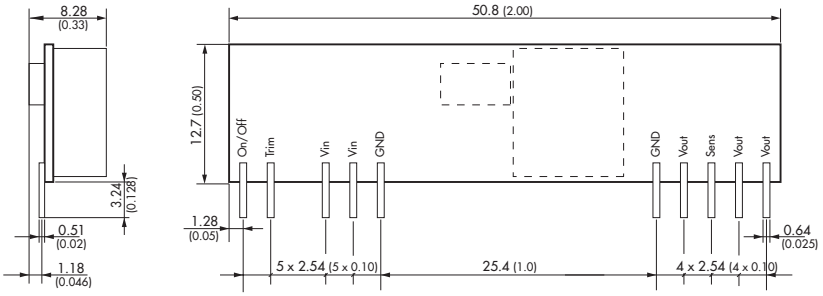
Outline Dimensions mm (inches)

Single-in-Line (SIL-Version)

6 A output Models

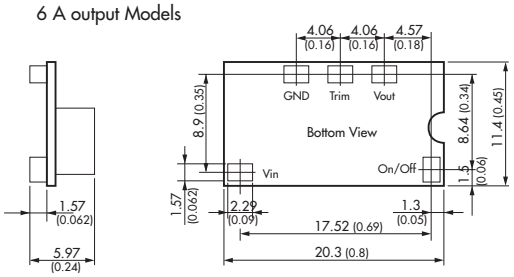


10A & 16A output models



Surface Mount (SMT-Version)

6 A output Models



10A & 16A output models