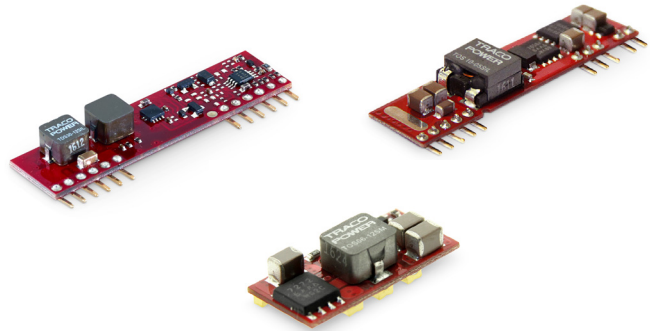


### Features

- ◆ 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  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- ◆ 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 <sup>3)</sup>	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 %
<b>SIL-version</b>				
TOS 06-05SIL	2.4 – 5.5 VDC	0.75 – 3.3 VDC <sup>2)</sup>	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](http://www.tracopower.com/products/tos30.pdf)

Order code <sup>1)</sup> 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 <sup>4)</sup>	92 %
<b>SIL-version</b>				
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 <sup>2)</sup>	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.
Stand by input current (at remote Off)	– Vin 12 VDC (at Vout min./Vout max.)	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 max. peak variation / response time	– 50 % load change (upper half) with external 1 µF ceramic- and 10 µF tantalum capacitors	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

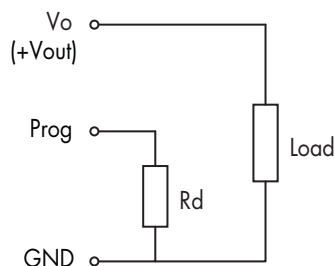
Temperature ranges	- Operating - Storage	-40°C to +85°C -55°C to +125°C
Derating		see application note
Over temperature protection		at +125°C typ.
Humidity (non condensing)		5 – 95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground begin)	6 A models: 10 A / 16 A models:	> 9 mio. 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](http://www.tracopower.com/overview/tos)

### Output Voltage Adjustment



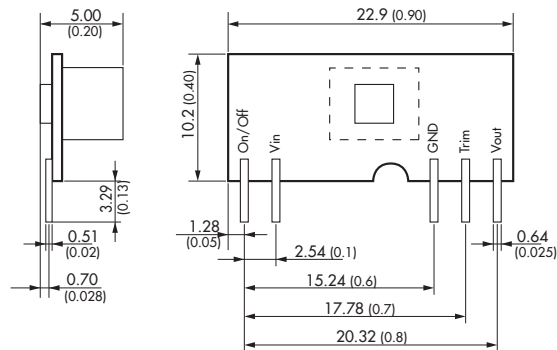
$$5 \text{ VDC input models: } R_d [\text{Ohm}] = \frac{21070}{V_o - 0.7525} - 5110$$

$$12 \text{ VDC input models: } R_d [\text{Ohm}] = \frac{10570}{V_o - 0.7525} - 1000$$

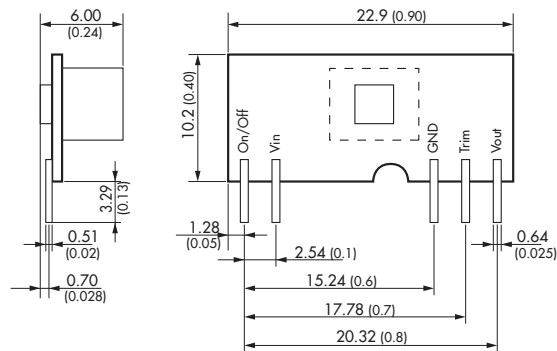
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

**Outline Dimensions mm (inches)**

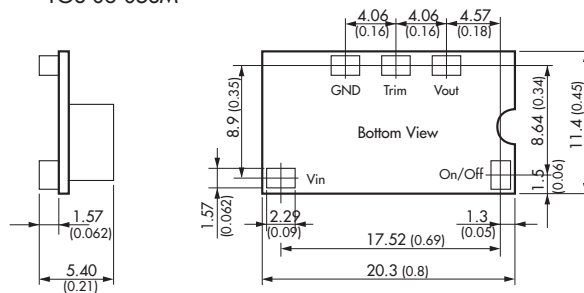
TOS 06-05SIL



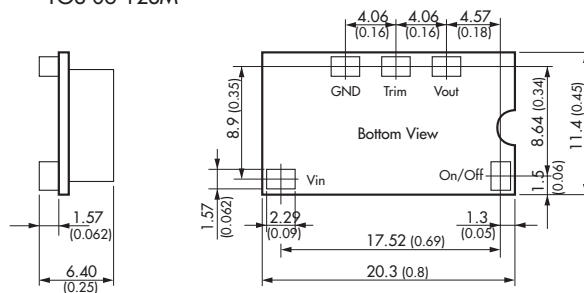
TOS 06-12SIL



TOS 06-05SM



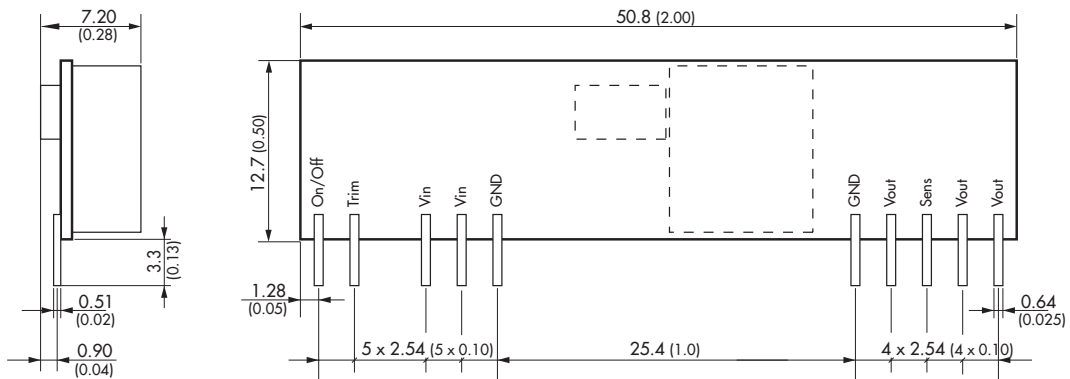
TOS 06-12SM



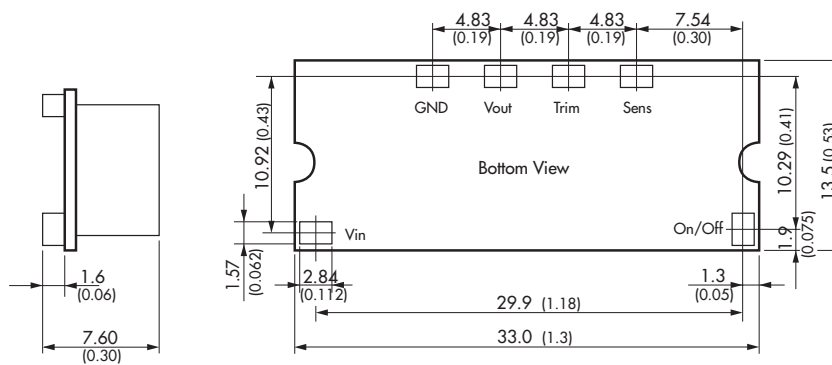
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

**Outline Dimensions mm (inches)**

TOS 10-xxSIL & TOS 16-xxSIL



TOS 10-xxSM & TOS 16-xxSM



Dimensions in [mm], ( ) = Inch  
Tolerances x.xx ±0.5 (±0.02)  
x.xxx ±0.25 (±0.01)  
Pin pitch tolerances ±0.25 (±0.01)  
Pin dimensions tolerance ±0.1 (±0.004)

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