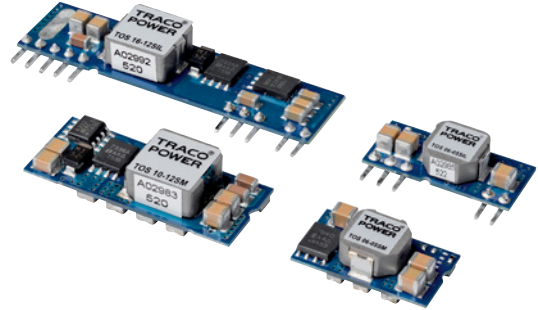


### Features

- ◆ 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<br>SMT-version | Input voltage<br>range | Output voltage<br>range | Output current max. | Efficiency typ. |
|---------------------------|------------------------|-------------------------|---------------------|-----------------|
| TOS 06-05SM               | 2.4 – 5.5 VDC          | 0.75 – 3.3 VDC**        | 6 A                 | 94 %            |
| TOS 10-05SM               |                        |                         | 10 A                | 93 %            |
| 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*         | 6 A                 | 94 %            |
| TOS 10-05SIL              |                        |                         | 10 A                | 93 %            |
| 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 30A Models see: [www.tracopower.com/products/tos30.pdf](http://www.tracopower.com/products/tos30.pdf)

| Order code<br>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*               | 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*               | 92 %            |

\* 25 A output voltage higher than 2.75 VDC

\*\* Max output voltage to be adjusted min. 0.5 VDC below impressed input voltage

## 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<br>(with input filter) | – Vin 5 VDC                           | 6 A models:         | 35 mA typ.                                                                |
|                                                 |                                       | 10 A / 16 A models: | 100 mA typ.                                                               |
|                                                 | – Vin 12 VDC                          | 6 A models:         | 30 mA typ.                                                                |
|                                                 |                                       | 10 A models:        | 20 mA typ.                                                                |
|                                                 |                                       | 16 A models:        | 20 mA typ.                                                                |
| Input filter external (recommended)             |                                       |                     | 2 x 150 µF low ESR polymer capacitors and<br>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<br>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 / 60 µS typ.                                              |
|                                                              | Vin 12 VDC, 6 A models:                                                                   | 200 mV / 35 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 / 100 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 mV pk-pk max.<br>12 Vin models: 75 mV pk-pk 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.                                                     |
|                                                              |                                                                                           | 6 A models: 3000 µF max.                                         |
|                                                              | – ESR <10 mOhm                                                                            | 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

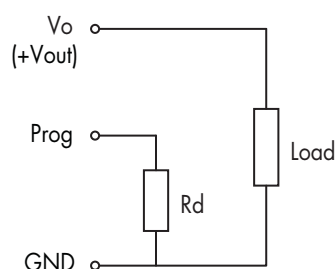
|                                                       |                                             |                     |
|-------------------------------------------------------|---------------------------------------------|---------------------|
| Temperature ranges                                    | – Operating                                 | –40°C to +85°C      |
|                                                       | – Storage                                   | –55°C to +125°C     |
| Derating                                              | see application note                        |                     |
| Over temperature protection                           | at +125°C typ.                              |                     |
| Humidity (non condensing)                             | 95 % rel H max.                             |                     |
| Reliability, calculated MTBF (Bellcore TR-NWT-000332) | 6 A models:                                 | >20 mio. h at +40°C |
|                                                       | 10 A / 16 A models:                         | >14 mio. h at +40°C |
| Switching frequency                                   | 300 kHz typ. (pulse width modulation - PWM) |                     |
| Remote On/Off<br>(reference to GND)                   | On: 1 VDC to Vin max. or open circuit.      |                     |
|                                                       | Off: 0 to 0.3 VDC                           |                     |

## Physical Specifications

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

**Application note:** [www.tracopower.com/products/tos-application.pdf](http://www.tracopower.com/products/tos-application.pdf)

## Output Voltage Adjustment



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

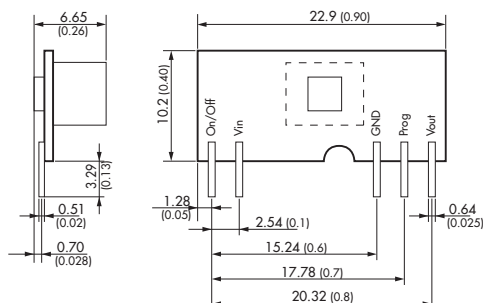
$$\text{12 VDC input models: } R_d [\text{Ohm}] = \frac{10570}{V_o - 0.7525} - 1000$$

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

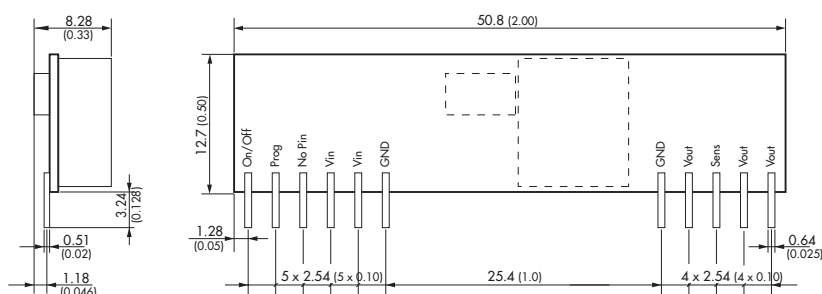
## Outline Dimensions mm (inches)

### Single-in-Line (SIL-Version)

#### 6 A output Models

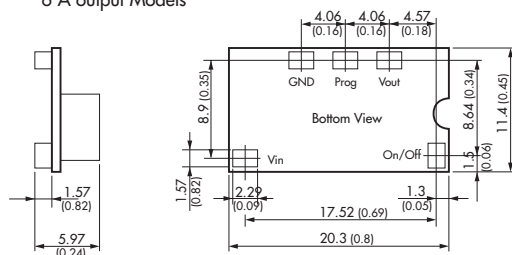


#### 10A & 16A output models

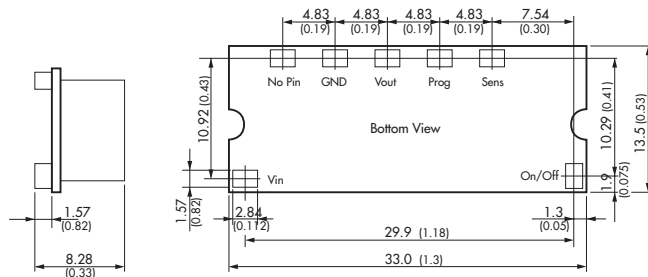


### Surface Mount (SMT-Version)

#### 6 A output Models



#### 10A & 16A output models



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