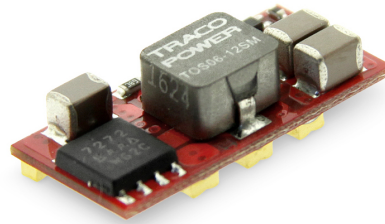


- Small size, low profile
- SMT package
- Cost-efficient open frame design
- Wide input voltage ranges
- Output voltages trim from 0.75 VDC to 5.0 VDC
- Delivers up to 6 A with minimal derating
- Ultra high efficiency to 94 %
- Fast transient response
- Remote On/Off control
- Wide temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$



UL 60950-1

The TOS 06SM series is a range of high performance non-isolated DC/DC converters with very high efficiency that can supply up to 6 A 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 5.0 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 and over current protection. These products have an open-frame construction with very small footprint and are available in a SMT package. The TOS 06SM 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	Output Current max.	Input Voltage Range	Output Voltage nom. (adjustable)	Efficiency typ.
TOS 06-05SM	6'000 mA	2.4 - 5.5 VDC (5 VDC nom.)	0.75 VDC (0.75 - 3.3 VDC)	94 %
TOS 06-12SM		8.3 - 14 VDC (12 VDC nom.)	0.75 VDC (0.75 - 5.0 VDC)	89 %

## Input Specifications

Input Current	- At no load	5 Vin models: 45 mA typ. 12 Vin models: 100 mA typ. (at Vout max.)
Start-up Voltage		5 Vin models: 2.2 VDC typ. / 2.4 VDC max. 12 Vin models: 7.9 VDC typ. / 8.3 VDC max.
Under Voltage Lockout		5 Vin models: 1.6 VDC min. / 2 VDC typ. / 2.2 VDC max. 12 Vin models: 6.5 VDC min. / 7.5 VDC typ. / 8 VDC max.
Reflected Ripple Current		5 Vin models: 35 mAp-p typ. 12 Vin models: 30 mAp-p typ. (with input filter, see application note)
Recommended Input Fuse		5 Vin models: 8'000 mA (fast acting) 12 Vin models: 6'300 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		See application note: <a href="http://www.tracopower.com/overview/tos06sm">www.tracopower.com/overview/tos06sm</a>

## Output Specifications

Output Voltage Adjustment		0.75 Vout models: 0.75 - 3.3 VDC 0.75 - 5.0 VDC (By external trim resistor) See application note: <a href="http://www.tracopower.com/overview/tos06sm">www.tracopower.com/overview/tos06sm</a> (Vin must be at least 0.5 V higher than Vout)
Voltage Set Accuracy		±2% max.
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%)	0.3% max. 0.4% max.
Ripple and Noise	- 20 MHz Bandwidth	50 mVp-p max.
Capacitive Load		3'000 µF max. (ESR >10 mOhm)
Minimum Load		Not required
Temperature Coefficient		±0.4 %/K max.
Start-up Time		8 ms typ.
Start-up Overshoot Voltage		3% max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		210% typ. of Iout max.
Transient Response	- Peak Variation  - Response Time	130 mV typ. (50% Load Step) (5 Vin model) 200 mV typ. (50 % Load Step) (12 Vin model) 25 µs typ. (50% Load Step) (with 1 µF MLCC // 10 µF TC)

## Safety Specifications

Safety Standards	- IT / Multimedia Equipment	UL 60950-1
------------------	-----------------------------	------------

## General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +85°C +125°C max. -55°C to +125°C
Power Derating	- High Temperature	See application note: <a href="http://www.tracopower.com/overview/tos06sm">www.tracopower.com/overview/tos06sm</a>
Cooling System		Natural convection (20 LFM)

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

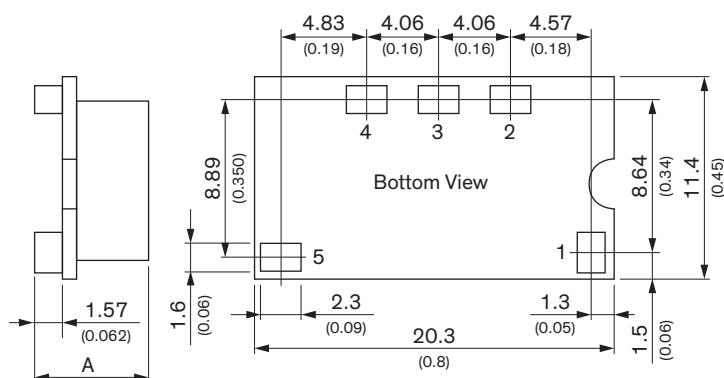
Remote Control	- Voltage Controlled Remote	On: open circuit or Vin max. Off: 0 to 0.3 VDC Refers to 'Remote' and 'GND' Pin
	- Off Idle Input Current	1 mA typ. (12 Vin model: Open circuit or (Vin – 4 V) to Vin max. for on state)
Switching Frequency		270 - 330 kHz (PWM) 300 kHz typ. (PWM)
Insulation System		Non-isolated
Reliability	- Calculated MTBF	9'300'000 h (MIL-HDBK-217F, ground benign)
Moisture Sensitivity (MSL)		Level 2a (J-STD-033C)
Washing Process		Allowed (open product)
	See Cleaning Guideline:	<a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>
Environment	- Vibration	MIL-STD-810F
	- Thermal Shock	MIL-STD-810F
Pin Material		Copper
Pin Foundation Plating		Nickel (3 - 5 µm)
Pin Surface Plating		Gold (50 - 75 nm), matte
Housing Type		Open Frame
Mounting Type		PCB Mount
Connection Type		SMD (Surface-Mount Device)
Soldering Profile		Reflow Soldering (J-STD-020E) 245°C / 10 s max.
Weight		2.8 g
Environmental Compliance	- REACH Declaration	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	<a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (Q5A rule). The SCIP number is provided on request.)

## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tos06sm](http://www.tracopower.com/overview/tos06sm)

## Outline Dimensions



TOS 06-05SM:  $A = 5.40$  (0.21)  
TOS 06-12SM:  $A = 6.40$  (0.25)

Dimensions in mm (inch)  
Tolerances x.x  $\pm 0.5$  (x.xx  $\pm 0.02$ )  
Tolerances x.xx  $\pm 0.25$  (x.xxx  $\pm 0.01$ )  
Pin dimension tolerance  $\pm 0.1$  ( $\pm 0.004$ )

Pinout	
Pin	Function
1	Remote On/Off
2	+ Vout
3	Trim
4	GND
5	+ Vin

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

**Recommended Solder Pad Layout**
