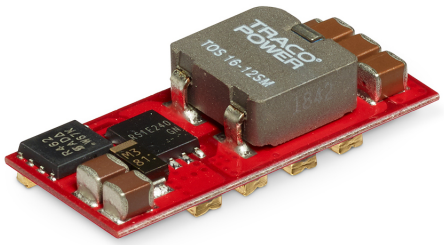
TRACO POWER

Non-Isolated DC/DC Converter (POL)

TOS 16SM Series, 16 A

End of life

- **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 16 A with minimal derating**
- **Ultra high efficiency to 95 %**
- **Fast transient response**
- **Remote On/Off control**
- **Wide temperature range –40°C to +85°C**
- **3-year product warranty**



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UL 62368-1

The TOS 16SM series is a range of high performance non-isolated DC/DC converters with very high efficiency that can supply up to 16 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 SMD package. The TOS 16SM 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 16-05SM *	16'000 mA	2.4 - 5.5 VDC (5 VDC nom.)	0.75 VDC (0.75 - 3.3 VDC)	95 %
TOS 16-12SM *		8.3 - 14 VDC (12 VDC nom.)	0.75 VDC (0.75 - 5.0 VDC)	92 %

Note * End of life

Input Specifications

Input Current	- At no load	5 Vin models:	130 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:	100 mAp-p typ.
		12 Vin models:	30 mAp-p typ.
			(with input filter, see application note)
Recommended Input Fuse		5 Vin models:	25'000 mA (fast acting)
		12 Vin models:	15'000 mA (fast acting)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter		See application note:	www.tracopower.com/overview/tos16sm

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:	www.tracopower.com/overview/tos16sm
			(Vin must be at least 0.5 V higher than Vout)
Voltage Set Accuracy			±2% max.
Regulation	- Input Variation (Vmin - Vmax)		0.3% max.
	- Load Variation (0 - 100%)		0.4% max.
Ripple and Noise	- 20 MHz Bandwidth		50 mVp-p max.
Capacitive Load			5'000 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			180% typ. of Iout max.
Transient Response	- Peak Variation		300 mV typ. (50% Load Step) (5 Vin model)
			200 mV typ. (50 % Load Step) (12 Vin model)
	- Response Time		100 µs typ. (50% Load Step)
			(with 1 µF MLCC || 10 µF TC)

Safety Specifications

Standards	- IT / Multimedia Equipment	UL 60950-1
		UL 62368-1

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +85°C
	- Case Temperature	+115°C max.
	- Storage Temperature	–55°C to +125°C
Power Derating	- High Temperature	Depending on model
	See application note:	www.tracopower.com/overview/tos16sm
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 (passive = on)	On: open circuit or Vin max. Off: 0 to 0.3 VDC Refers to 'Remote' and 'GND' Pin
	- Off Idle Input Current	2 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	3'200'000 h (MIL-HDBK-217F, ground benign)
Moisture Sensitivity (MSL)		Level 2a (J-STD-033C)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
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		Lead-Free Reflow Soldering (acc. J-STD-020E) 245°C max. (Tp) 30 s max. (tp, at Tp - 5°C) 100 s max. (tL, time above 217°C) See application note: www.tracopower.com/info/reflow-soldering.pdf
Weight		6 g
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	079f4e6d-f477-452e-b08f-e5200bef275e

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tos16sm

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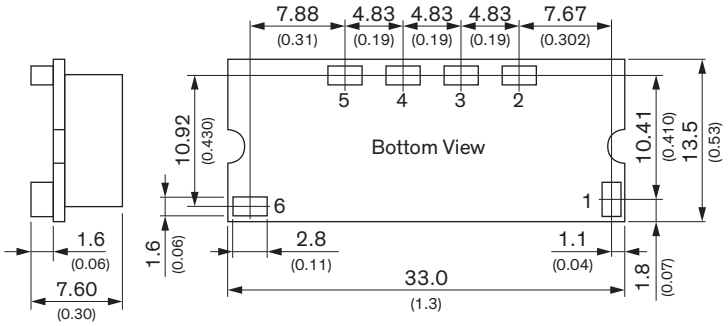
Outline Dimensions



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

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

Recommended Solder Pad Layout