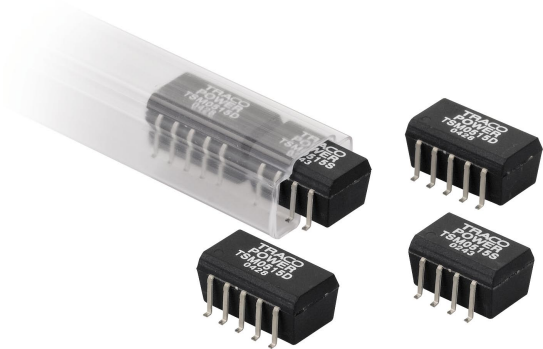




#### Features

- ◆ SMD Package (SOIC-14/18)
- ◆ Construction in Lead Frame Technology
- ◆ Isolated Single and Dual Output
- ◆ I/O-Isolation 1'000 VDC
- ◆ High Efficiency
- ◆ Operating Temperature  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- ◆ Reflow Solder Temperature up to  $245^{\circ}\text{C}$
- ◆ High Accuracy of Pin Co-Planarity
- ◆ Available in Tape and Reel Package
- ◆ Lead free Design, RoHS compliant
- ◆ 3 Year Product Warranty



The TSM series are isolated DC/DC converters with 1W output power implemented in a molded plastic package with a pin accuracy suitable for automated SMD-production. The devices can be soldered without any problems in a high temperature lead free solder process. With their small footprint these converters are the economical solution for point of load power conversion, ground loop elimination, noise reduction and digital interface applications.

Models				
Ordercode	Input voltage	Output voltage	Output current max.	Efficiency typ.
TSM 0505S	5 VDC $\pm 10\%$	5 VDC	200 mA	80 %
TSM 0509S		9 VDC	110 mA	78 %
TSM 0512S		12 VDC	80 mA	80 %
TSM 0515S		15 VDC	65 mA	81 %
TSM 0505D		$\pm 5$ VDC	$\pm 100$ mA	75 %
TSM 0512D		$\pm 12$ VDC	$\pm 40$ mA	79 %
TSM 0515D		$\pm 15$ VDC	$\pm 30$ mA	79 %
TSM 1205S	12 VDC $\pm 10\%$	5 VDC	200 mA	81 %
TSM 1209S		9 VDC	110 mA	78 %
TSM 1212S		12 VDC	80 mA	81 %
TSM 1215S		15 VDC	65 mA	82 %
TSM 1205D		$\pm 5$ VDC	$\pm 100$ mA	75 %
TSM 1212D		$\pm 12$ VDC	$\pm 40$ mA	80 %
TSM 1215D		$\pm 15$ VDC	$\pm 30$ mA	80 %

### Input Specifications

Input current no load /full load	5 Vin models: 30 mA / 260 mA typ. 12 Vin models: 15 mA / 110 mA typ.
Surge voltage (1 sec. max.)	5 Vin models: 9 V max. 12 Vin models: 18 V max.
Reverse voltage protection	0.3 A max.
Reflected input ripple current	can be reduced by ext. 1–2.2 µF polyester film capacitor
Input filter	internal capacitors

### Output Specifications

Voltage set accuracy	± 3 %
Voltage balance (dual output models)	± 1 % max.
Regulation	– Input variation      ± 1.2 % / 1 % change Vin – Load variation 20 – 100 %      ± 10 % max.
Ripple and noise (20 MHz Bandwidth)	120 mVpk-pk max.
Temperature coefficient	± 0.02 % / °C
Short circuit protection	limited 1 sec. max.
Capacitive load	– Single output models      22 µF max. – Dual output models      10 µF max.

### General Specifications

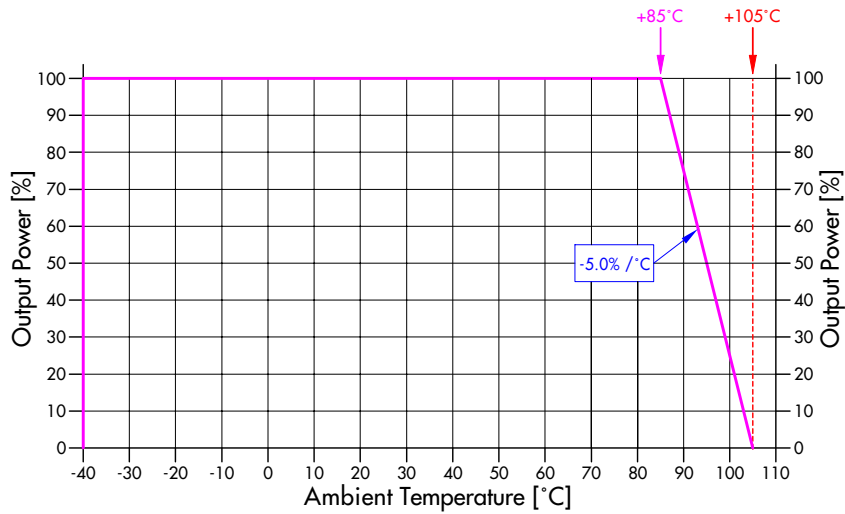
Temperature ranges	– Operating (see also enclosed derating curve)      –40 °C ... +85 °C (no derating) – Storage      –55 °C ... +125 °C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217E)	>2'000'000 h @ 25 °C
Isolation voltage	– Input/Output      1'000 VDC
Isolation capacity	– Input/Output      40 pF typ.
Isolation resistance	– Input/Output      >1'000 Mohm
Switching frequency	100 kHz typ. (frequency modulation)
Frequency change over line and load	± 30 %

### Physical Specifications

Case material	epoxy molding compound (flammability to UL 94-V0)
Package weight	single output models: 1.2 g (0.04 oz) dual output models: 1.5 g (0.05 oz)
Reflow soldering profile	peak temp. 245°C (10 sec max.) 217°C for 90 sec. max. Convection reflow solder process is recommended

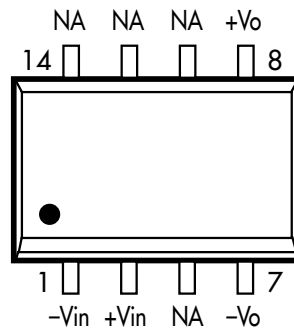
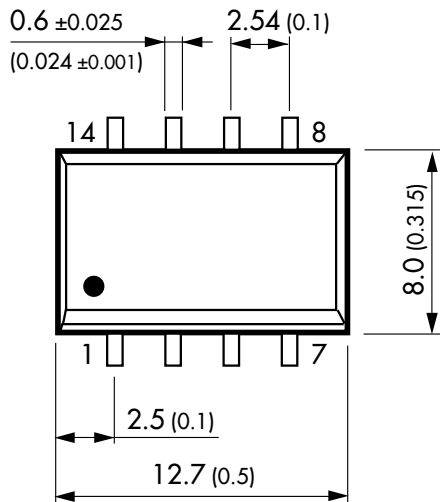
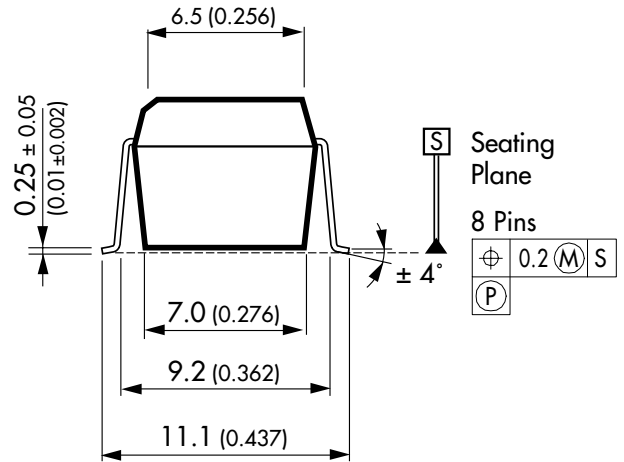
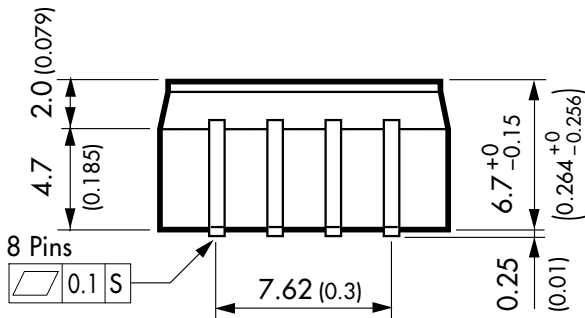
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

**Derating all TSM Models**



**Outline Dimensions mm (inches)**

**TSM Single Output Models**



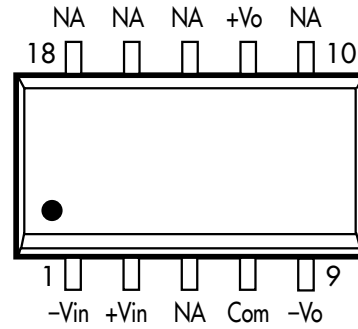
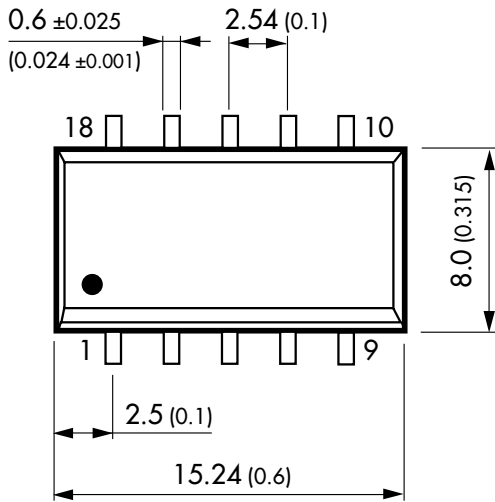
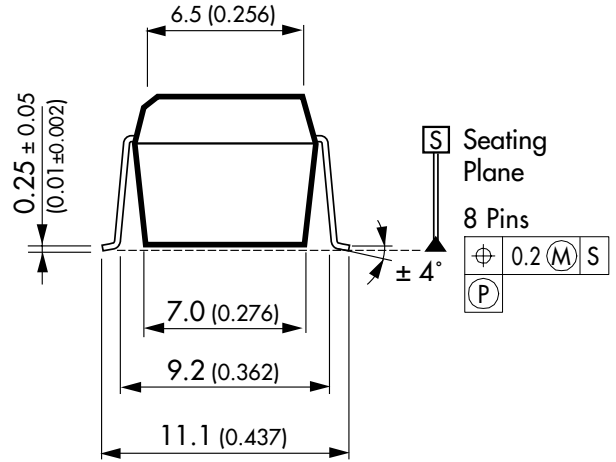
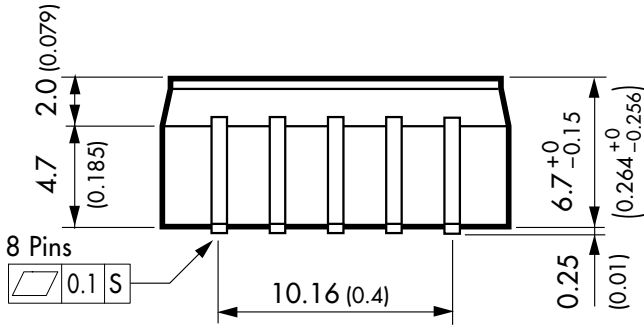
NA = not available for electrical connection

Tolerances: ± 0.25 mm (± 0.01)

Specifications can be changed without notice

**Outline Dimensions mm (inches)**

**TSM Dual Output Models**

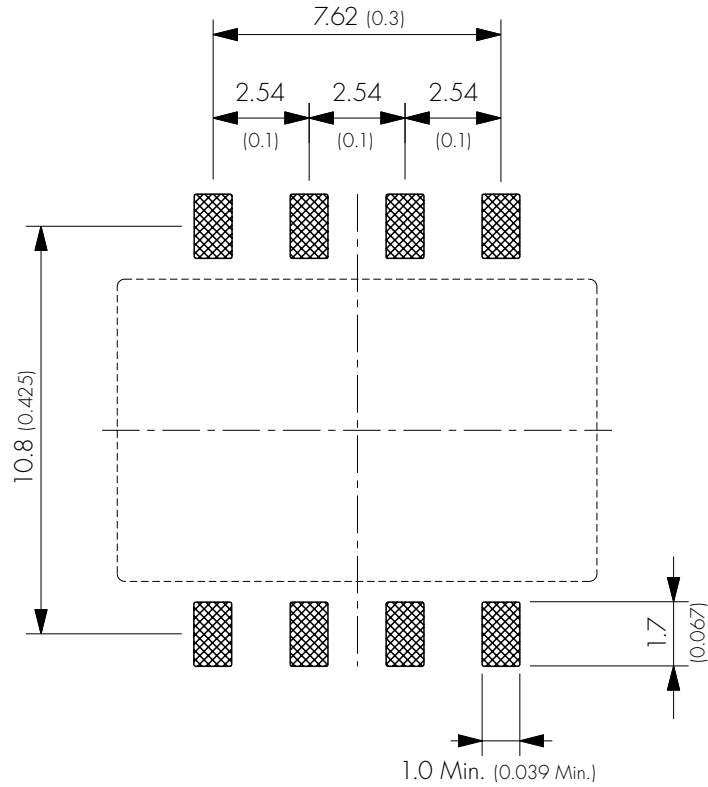


NA = not available for electrical connection

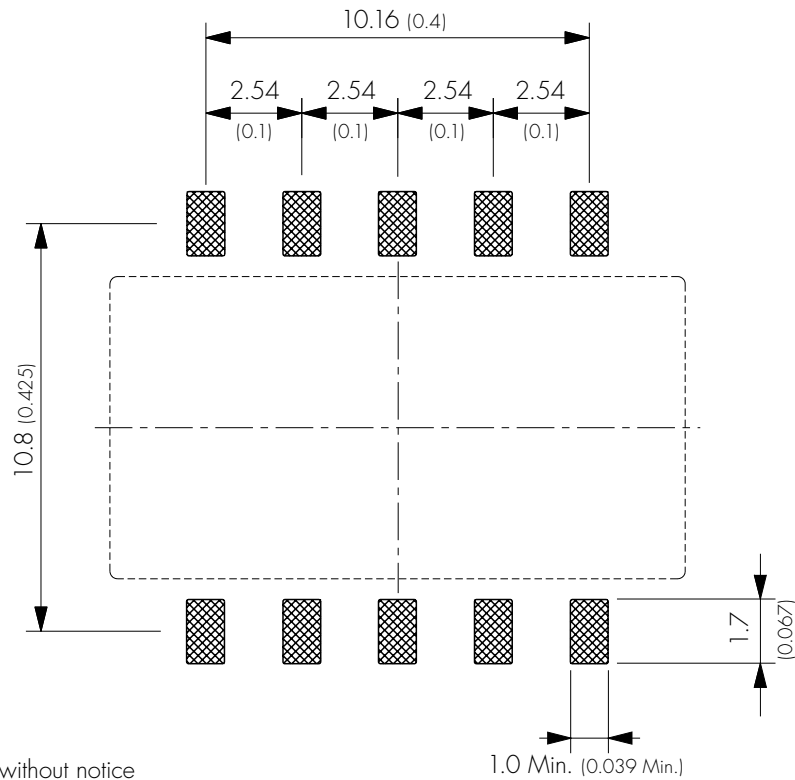
Tolerances: ± 0.25 mm (± 0.01)

**Solder Pad Dimensions mm (inches)**

**TSM Single Output Models**



**TSM Dual Output Models**



Specifications can be changed without notice