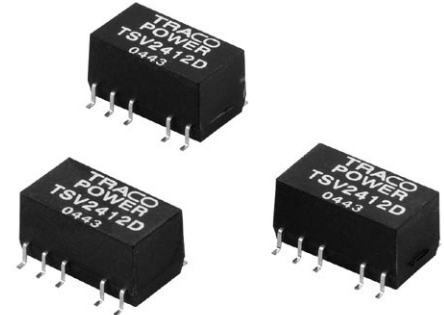




#### Features

- ◆ SMD Package (SOIC-22)
- ◆ Isolated Single and Dual Output Models
- ◆ I/O-Isolation 3'000 VDC
- ◆ High Efficiency up to 81%
- ◆ Extended Temperature Range  
-40°C to +85°C
- ◆ High Accuracy of Pin Co-Planarity
- ◆ Available in Tape and Reel Package
- ◆ Lead free Design, RoHS compliant
- ◆ 3 Year Product Warranty



The TSV series are miniature, 1W DC/DC-converters with high isolation in a SMD package. The devices can be soldered without any problems in a high temperature lead free solder process. With the small footprint, these converters are the ideal solution for board level power distribution, mainly for applications in the industrial- and telecom field.

#### Models

Ordercode	Input voltage	Output voltage	Output current max.	Efficiency typ.
TSV 0505S	5 VDC ±10%	5 VDC	200 mA	71 %
TSV 0512S		12 VDC	80 mA	78 %
TSV 0515S		15 VDC	65 mA	78 %
TSV 0505D		± 5 VDC	±100 mA	72 %
TSV 0512D		±12 VDC	± 40 mA	78 %
TSV 0515D		±15 VDC	± 30 mA	79 %
TSV 1205S	12 VDC ±10%	5 VDC	200 mA	71 %
TSV 1212S		12 VDC	80 mA	79 %
TSV 1215S		15 VDC	65 mA	80 %
TSV 1205D		± 5 VDC	±100 mA	74 %
TSV 1212D		±12 VDC	± 40 mA	80 %
TSV 1215D		±15 VDC	± 30 mA	81 %
TSV 2405S	24 VDC ±10%	5 VDC	200 mA	71 %
TSV 2412S		12 VDC	80 mA	78 %
TSV 2415S		15 VDC	65 mA	79 %
TSV 2405D		± 5 VDC	±100 mA	72 %
TSV 2412D		±12 VDC	± 40 mA	79 %
TSV 2415D		±15 VDC	± 30 mA	80 %

### Input Specifications

Input current no load /full load	5 Vin models: 30 mA / 260 mA typ. 12 Vin models: 12 mA / 110 mA typ. 24 Vin models: 7 mA / 55 mA typ.
Surge voltage (1 sec. max.)	5 Vin models: 9 V max. 12 Vin models: 18 V max. 24 Vin models: 30 V max.
Reverse voltage protection	0.3 A max.
Reflected input ripple current*	can be reduced by ext. 1–3.3 µF polyester film capacitor
Input filter	internal capacitor

### Output Specifications

Voltage set accuracy	± 3 %
Voltage balance (dual output models, balanced load)	± 1 % max.
Regulation	– Input variation ± 1.2 % / 1 % change Vin – Load variation 20 – 100 % ± 10 % max.
Ripple and noise (20 MHz Bandwidth)	75 mV pk-pk max.
Temperature coefficient	± 0.02 % / K
Short circuit protection	limited 0.5 sec. max.
Capacitive load	5 VDC single output models: 33 µF max. 5 VDC dual output models: 10 µF max. 12/15 VDC single output models: 4.7 µF max. 12/15 VDC dual output models: 2.2 µF max.

### General Specifications

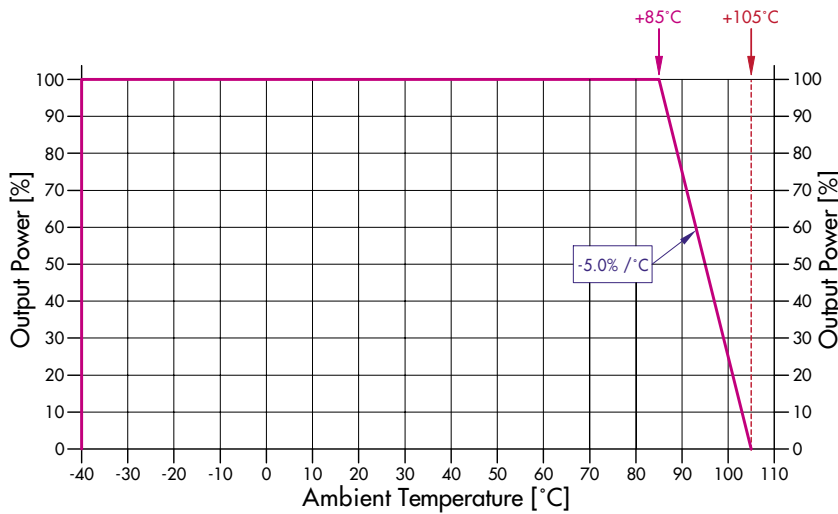
Temperature ranges	– Operating –40 °C ... +85 °C (no derating) – Case temperature +95 °C max. – Storage –40 °C ... +105 °C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F)	>2'000'000 h @ 25 °C
Isolation voltage (Input/Output)	3'000 VDC
Isolation capacity (Input/Output)	60 pF typ.
Isolation resistance (Input/Output)	>10'000 M Ohm (500VDC)
Switching frequency	100 kHz typ. (frequency modulation)
Frequency change over line and load	± 30 % max.

### Physical Specifications

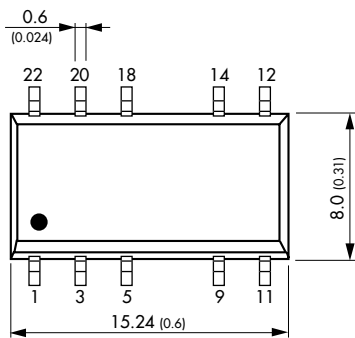
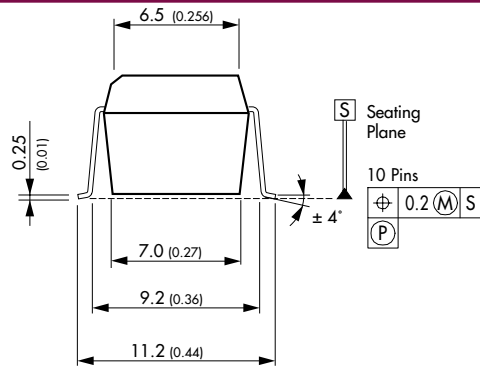
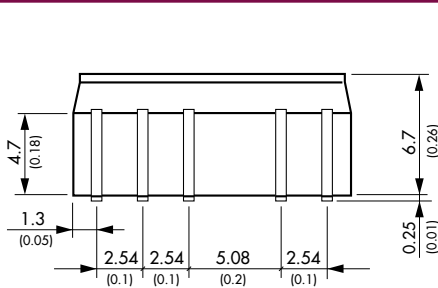
Case material	non conductive FR4 (UL 94V-0 rated)
Package weight	2.2 g (0.07 oz)
Reflow soldering profile	peak temp. 245°C (10 sec max.) 217°C for 90 sec. max. Convection reflow solder process is recommended

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

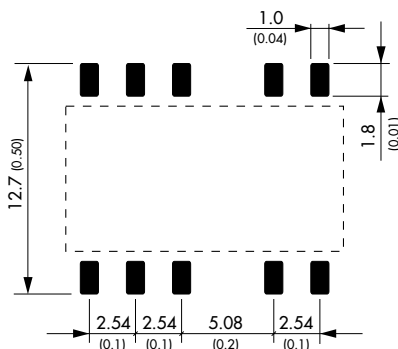
**Derating all Models**



**Outline Dimensions**



Solder pad



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
3	+Vin (Vcc)	+Vin (Vcc)
5	No con.	No con.
9	-Vout	Common
11	No con.	-Vout
12	No con.	No con.
14	+Vout	+Vout
18	No con.	No con.
20	No con.	No con.
22	No con.	No con.

Dimensions in [mm], ( ) = Inch  
 Pin diameter: 1.0 ±0.05 (0.02 ±0.002)  
 Pin pitch tolerances: ±0.13 (±0.005)  
 Case tolerances: ±0.25 (±0.01)

Specifications can be changed without notice