DC/DC Converters

TES 1V Series, 1 Watt

Features

- Small SMD package with standard footprint
- I/O isolation voltage 3000 VDC
- Single- and dual output models
- High efficiency up to 80%
- Operating temperature range –40°C to +85°C
- High accuracy of pin co-planarity
- Qualified for leadfree reflow solder process according IPC/JEDEC J-STD-020D
- Available in tape and reel package
- 3-year product warranty

The TES-1V series are miniature, 1W DC/DC-converters with high isolation in a SMD package. With a new package design these converters are qualified for the higher temperatures requested by lead-free reflow solder processes. With the small footprint, these converters are the ideal solution for board level power distribution, mainly for applications in the industrial- and telecom field. For automated SMD production lines the devices can be supplied in standard tape and reel package.

Models

Order code	Input voltage	Output voltage	Output current max.	Efficiency typ.
TES 1-0510V	**5 VDC ±10%** (nominal 5 VDC)	3.3 VDC	260 mA	72 %
TES 1-0511V		5.0 VDC	200 mA	75 %
TES 1-0512V		12 VDC	84 mA	79 %
TES 1-0513V		15 VDC	67 mA	80 %
TES 1-0521V		±5 VDC	±100 mA	75 %
TES 1-0522V		±12 VDC	±42 mA	79 %
TES 1-0523V		±15 VDC	±34 mA	80 %
TES 1-1210V	**12 VDC ±10%** (nominal 12 VDC)	3.3 VDC	260 mA	73 %
TES 1-1211V		5.0 VDC	200 mA	76 %
TES 1-1212V		12 VDC	84 mA	80 %
TES 1-1213V		15 VDC	67 mA	81 %
TES 1-1221V		±5 VDC	±100 mA	76 %
TES 1-1222V		±12 VDC	±42 mA	80 %
TES 1-1223V		±15 VDC	±34 mA	80 %
TES 1-2410V	**24 VDC ±10%** (nominal 24 VDC)	3.3 VDC	260 mA	70 %
TES 1-2411V		5.0 VDC	200 mA	73 %
TES 1-2412V		12 VDC	84 mA	79 %
TES 1-2413V		15 VDC	67 mA	79 %
TES 1-2421V		±5 VDC	±100 mA	73 %
TES 1-2422V		±12 VDC	±42 mA	79 %
TES 1-2423V		±15 VDC	±34 mA	79 %

Input Specifications

Input current no load / full load	5 Vin models:	30 mA / 260 mA typ.
	12 Vin models:	15 mA / 110 mA typ.
	24 Vin models:	8 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.
Input filter		internal capacitor

Output Specifications

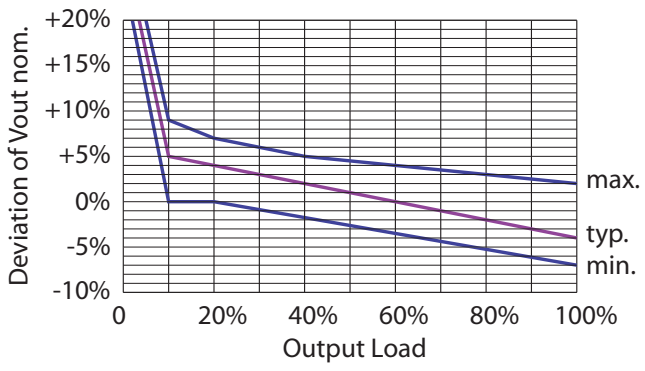
Voltage set accuracy		see graphs below
Voltage balance (dual output models, balanced load)		±1.0 % max.
Regulation	– Input variation	1.2 % / 1 % change Vin
	– Load variation	see graphs below
Ripple and noise (20 MHz Bandwidth)		100 mVpp max.
Temperature coefficient		±0.02 %/K max.
Short circuit protection		limited 0.5 sec. max.
Capacitive load	3.3 & 5.0 VDC models:	33 µF max.
	12 & 15 VDC models:	4.7 µF max.
	±5.0 VDC models:	10 µF max.
	±12 & ±15 VDC models:	2.2 µF max.

General Specifications

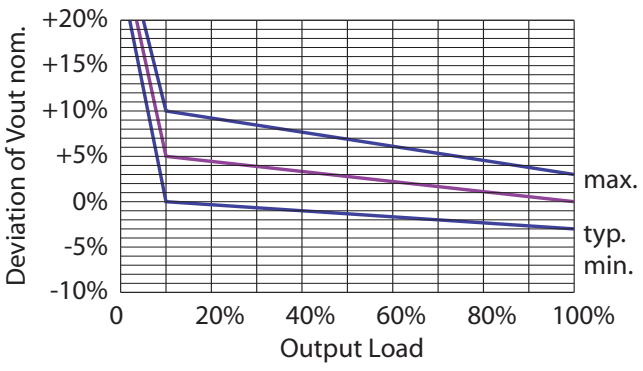
Temperature ranges	– Operating	–40°C to +85°C
	– Storage	–40°C to +125°C
	– Case	+95°C max.
Derating (convection cooling)		4 %/K above +75°C
Humidity (non condensing)		95 % rel. H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>2 Mio h
I/O isolation voltage (60 sec.)		3000 VDC
I/O isolation capacitance (100 kHz, 1 V)		60 pF typ.
I/O isolation resistance (500 VDC)		>10 Gohm
Switching frequency		50 to 150 kHz (depending on load)

Output voltage variation dependent on load (at nominal input voltage)

3.3 & 5.0 VDC models:



other models:



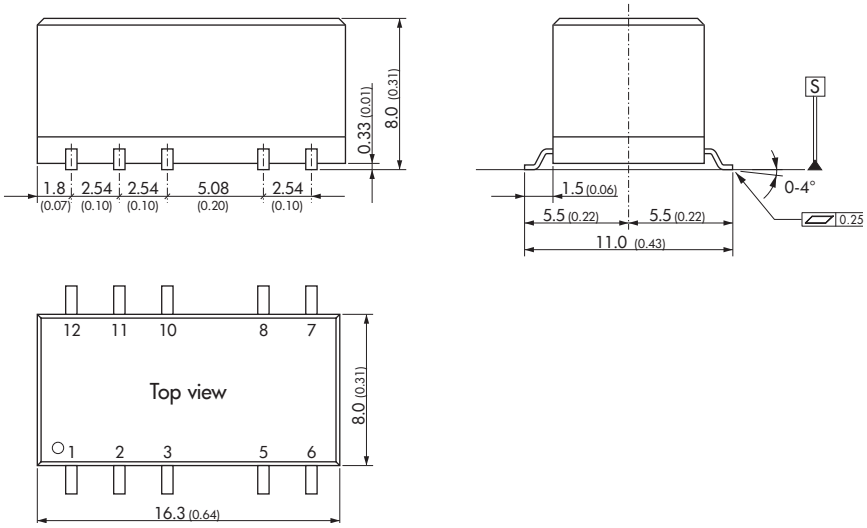
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

Casing material	non-conductive plastic (UL 94V-0 rated)
Weight	2.0 g (0.07oz)
Lead-free reflow solder process	as per J-STD-020D.01 (to find at: www.jedec.org - free registration rqueired)
Moisture sensitivity level (MSL)	level 2 as per J-STD-033B.01 (to find at: www.jedec.org - free registration required)
Washing process	www.tracopower.com/products/smd-wash.pdf
Packaging	www.tracopower.com/products/tes1v-pack.pdf
Environmental compliance – Reach – RoHS	www.tracopower.com/products/tes1v-reach.pdf RoHS directive 2002/95/EC

Application note: www.tracopower.com/products/tes1v-application.pdf

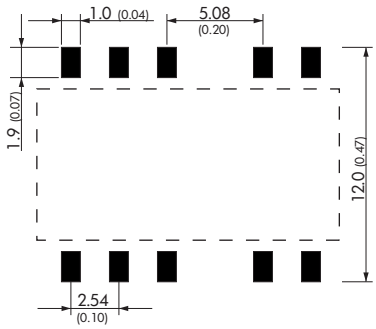
Outline Dimensions



Pin-Out		
Pin	**Single**	**Dual**
1	–Vin (GND)	–Vin (GND)
2	+Vin	+Vin
3	No con.	No con.
5	–Vout	Common
6	No con.	–Vout
7	No con.	No con.
8	+Vout	+Vout
10	No con.	No con.
11	No con.	No con.
12	No con.	No con.

No con. = Pin to be isolated from circuitry

Solder Pad Dimension



Dimensions in [mm], () = Inch
Pin pitch tolerances: ±0.13 (±0.005)
Other tolerances: ±0.25 (±0.01)

Specifications can be changed any time without notice.