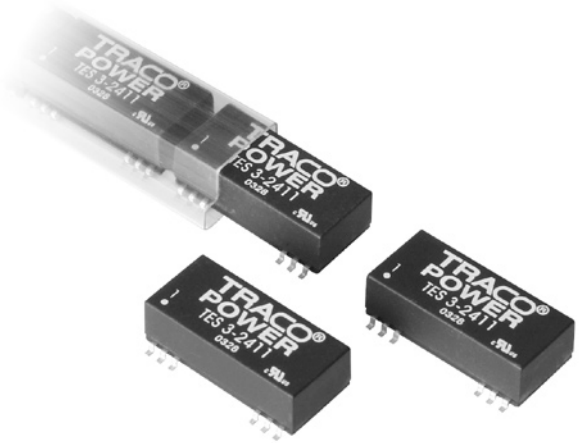
DC/DC Converters

TES 3 Series, 3 Watt

CB Scheme c SP us UL 60950-1

Features

- SMD package
- Wide 2:1 input voltage range
- I/O isolation 1500VDC
- Under voltage lockout
- Operating temp. range –40°C to +85°C
- Short circuit protection
- High accuracy of pin co-planarity
- Lead free design – RoHS compliant
- 3-years product warranty



The TES-3 series is a family of high performance 3W dc-dc converter modules featuring wide 2:1 input voltage ranges. The 15 models come in a low profile SMD package with dimensions of 32.3 x 14.8 x 10.2 mm. A high efficiency allows an operating temperature range of –40°C to +85°C at full load.
This product is qualified for soldering in a high temperature lead-free reflow solder process. Typical applications for the converters are battery operated equipment, instrumentation, communication and industrial electronics, everywhere where an isolated, tightly regulated voltage is required.

Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TES 3-1210	9 – 18 VDC (12 VDC nominal)	3.3 VDC	700 mA	75 %
TES 3-1211		5 VDC	600 mA	79 %
TES 3-1212		12 VDC	250 mA	82 %
TES 3-1222		±12 VDC	±125 mA	81 %
TES 3-1223		±15 VDC	±100 mA	81 %
TES 3-2410	18 – 36 VDC (24 VDC nominal)	3.3 VDC	700 mA	76 %
TES 3-2411		5 VDC	600 mA	80 %
TES 3-2412		12 VDC	250 mA	83 %
TES 3-2422		±12 VDC	±125 mA	82 %
TES 3-2423		±15 VDC	±100 mA	82 %
TES 3-4810	36 – 75 VDC (48 VDC nominal)	3.3 VDC	700 mA	76 %
TES 3-4811		5 VDC	600 mA	80 %
TES 3-4812		12 VDC	250 mA	83 %
TES 3-4822		±12 VDC	±125 mA	82 %
TES 3-4823		±15 VDC	±100 mA	82 %

Input Specifications

Input current no load / full load	12 Vin models: 24 Vin models: 48 Vin models:	20 mA / 300 mA typ. 5 mA / 150 mA typ. 3 mA / 75 mA typ.
Start-up voltage / under voltage shut down	12 Vin models: 24 Vin models: 48 Vin models:	6 VDC / 8 VDC typ. 12 VDC / 16 VDC typ. 24 VDC / 32 VDC typ
Surge voltage (1 sec. max.)	12 Vin models: 24 Vin models: 48 Vin models:	25 V max. 50 V max. 100 V max.
Reverse voltage protection		0.5 A max.
Reflected input ripple current		can be reduced by ext. 1–2.2 µF polyester film capacitor
Input filter		Pi filter

Output Specifications

Voltage set accuracy		±1 %
Regulation	– Input variation Vin min. to Vin max. – Load variation 10 – 100 % single output models: dual output models balanced load: dual output models unbalanced load:	0.3 % max. 1.0 % max. 1.0 % max. 2.0 % max.
Ripple and noise		50 mVpk-pk max.
Temperature coefficient		±0.02 %/°C
Current limitation		>110 % of Iout max., continuouse
Short circuit protection		hiccup mode, indefinite (no automatic recovery)
Capacitive load	– single output models – dual output models	4700 µF 180 µF

General Specifications

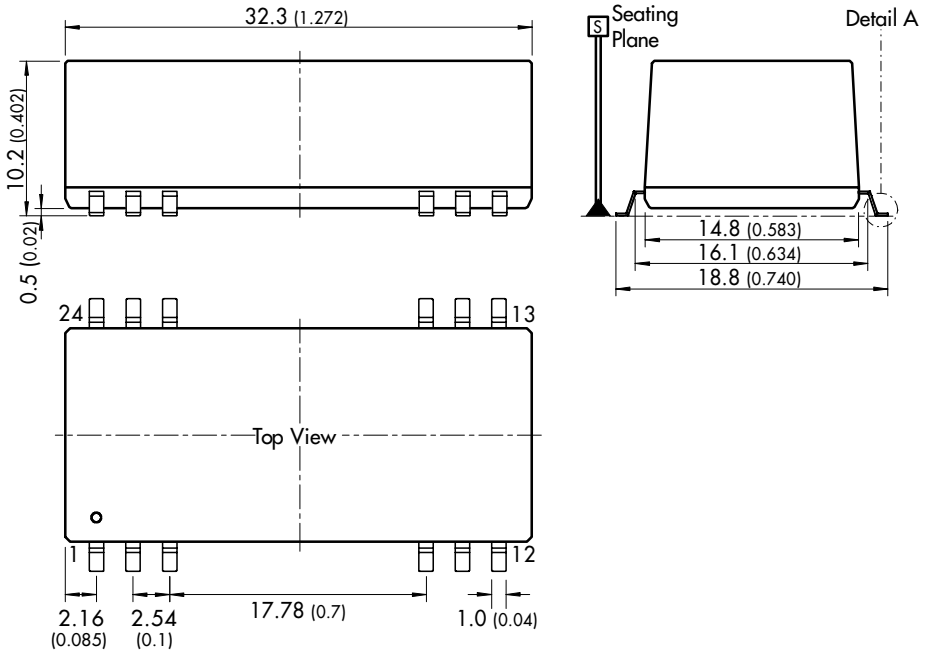
Temperature ranges	– Operating – Case temperature – Storage	–40°C to +85°C +100°C max. –40°C to +125°C
Derating (convection cooling)		3.5 %/K above 70°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTTF (MIL-HDBK-217F, @ +25°C, ground benign)		>1'000'000 h
Isolation voltage (60 sec.)	– Input/Output	1'500 VDC
Isolation capacity	– Input/Output	65 pF typ.
Isolation resistance	– Input/Output	>1'000 Mohm
Switching frequency		300 kHz typ. (frequency modulation PFM)
Safety standards		UL 60950-1, IEC/EN 60950-1
Safety approvals		CSA File No. 226037 http://directories.csa-international.org

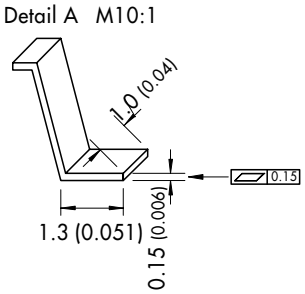
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

Casing material	non conductive black plastic (UL 94V-0-rated)
Package weight	6 g (0.21 oz)
Lead-free reflow solder process	as per J-STD-020D.01 (to find at: www.jedec.org - free registration required)
Moisture sensivity 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/tes3-pack.pdf

Outline Dimensions mm (inches)



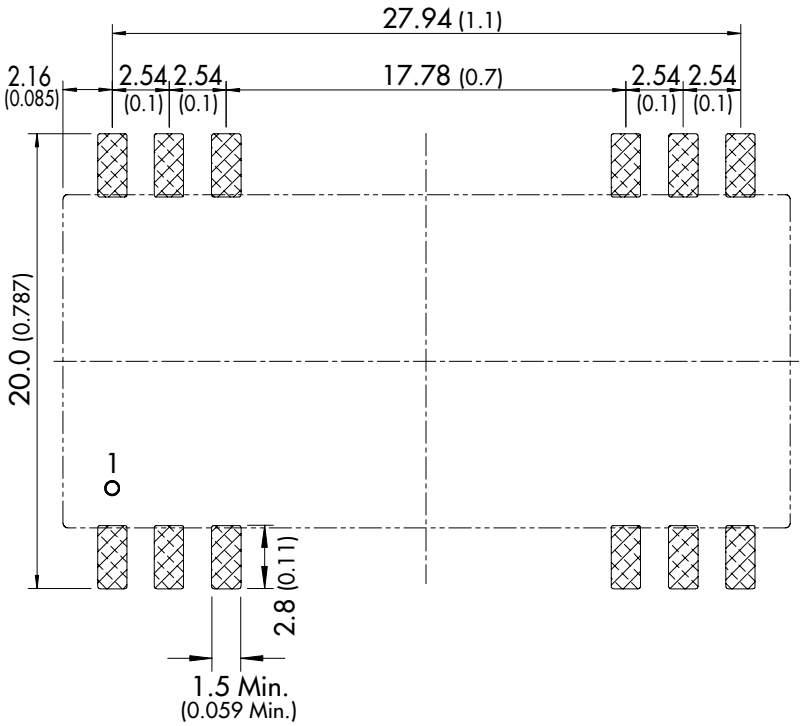


Dimensions in [mm], () = Inch
Tolerances ±0.25 (±0.01)
Pin pitch tolerances ±0.05 (±0.002)

Pin-Out		
Pin	**Single**	**Dual**
1	–Vin (GND)	–Vin (GND)
2	–Vin (GND)	–Vin (GND)
3	NC	NC
10	NC	Common
11	NC	NC
12	NC	–V Output
13	+V Output	+V Output
14	NC	NC
15	–V Output	Common
22	NC	NC
23	+Vin (Vcc)	+Vin (Vcc)
24	+Vin (Vcc)	+Vin (Vcc)

Specifications can be changed any time without notice.

Solder Pad Dimensions mm (inches)



Dimensions in [mm], () = Inch
Tolerances ±0.25 (±0.01)
Pin pitch tolerances ±0.05 (±0.002)

TRACO ELECTRONIC AG
Jenatschstrasse 1 · CH-8002 Zurich · Switzerland
Tel. +41 43 311 45 11 · Fax +41 43 311 45 45 · info@traco.ch · www.tracopower.com