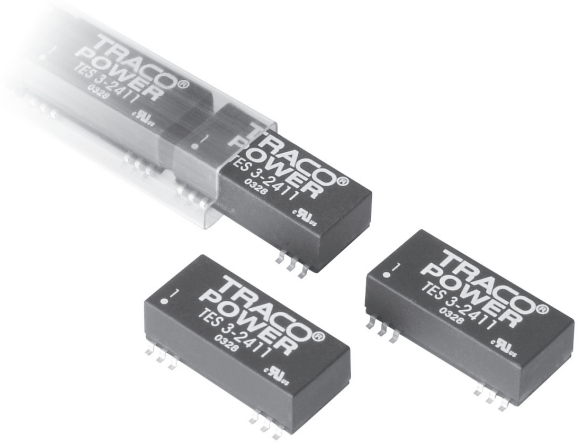
DC/DC Converters

TES 3 Series, 3 Watt

CB Scheme C 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**



not recommended for new designs

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 %

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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.
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 (each input)

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 MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>1'000'000 h
Isolation voltage (60 sec.)	– Input/Output	1'500 VDC
Isolation capacitance	– 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

Supporting documents: www.tracopower.com/overview/tes3

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

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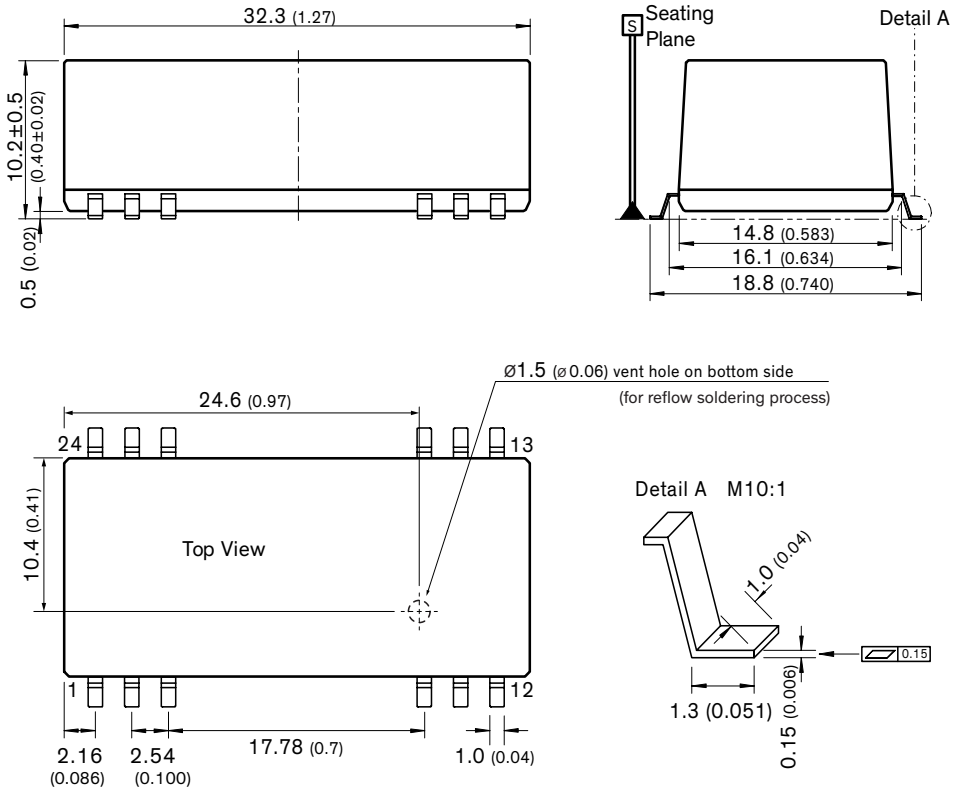
Physical Specifications

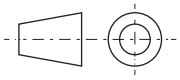
Casing material	non conductive black plastic (UL 94V-0-rated)
Pin material	Phosphor bronze
Package weight	8.8 g (0.31 oz)
Lead-free reflow solder process	as per J-STD-020D.1 (to find at: www.jedec.org - free registration required)
Moisture sensivity level (MSL)	level 2 as per J-STD-033B.1 (to find at: www.jedec.org - free registration required)
Washing process	Not allowed

Outline Dimensions mm (inches)



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)

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



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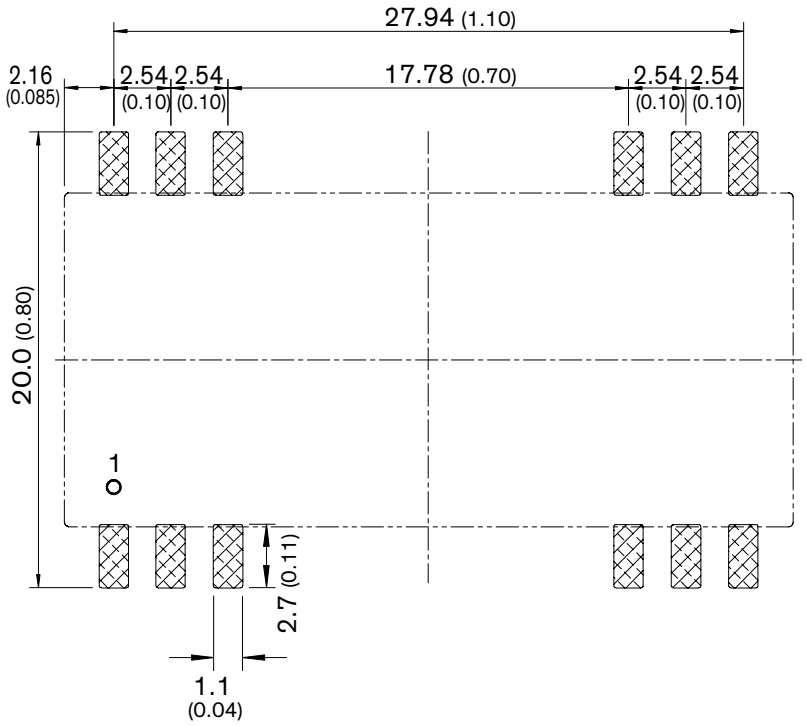

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