

### Features

- ◆ Compact SMD package
- ◆ 33.4 x 18.8 mm footprint
- ◆ Ultra-wide 4:1 input voltage range
- ◆ I/O isolation 1500 VDC
- ◆ Operating temp. range  $-40^{\circ}\text{C}$  to  $+71^{\circ}\text{C}$
- ◆ Short circuit protection
- ◆ Input filter to meet EN 55022, class A
- ◆ Remote On/Off
- ◆ High accuracy of pin co-planarity
- ◆ Qualified for leadfree reflow solder process according IPC/JEDEC J-STD-020D
- ◆ Available in tape & reel package
- ◆ 3-year product warranty



The TES-3WI series is a family of high performance 3W dc/dc-converter modules in a low profile SMD package with compact dimensions. The 14 modules feature ultra-wide 4:1 input ranges with tightly regulated output voltage. High efficiency allows an operating temperature range of  $-40^{\circ}\text{C}$  to  $+71^{\circ}\text{C}$  at full load.

Further features are built-in EMI-filter to meet EN 55022 class A without external components and remote On/Off control. The products comply with IPC J-STD-020D and are qualified for high temperature lead-free reflow solder process.

### Models

Ordercode	Input voltage	Output voltage	Output current max.	Efficiency typ.
TES 3-2410WI	9 – 36 VDC (nominal 24 VDC)	3.3 VDC	750 mA	75 %
TES 3-2411WI		5 VDC	600 mA	79 %
TES 3-2412WI		12 VDC	250 mA	81 %
TES 3-2413WI		15 VDC	200 mA	81 %
TES 3-2421WI		$\pm 5$ VDC	$\pm 300$ mA	78 %
TES 3-2422WI		$\pm 12$ VDC	$\pm 125$ mA	81 %
TES 3-2423WI		$\pm 15$ VDC	$\pm 100$ mA	81 %
TES 3-4810WI	18 – 75 VDC (nominal 48 VDC)	3.3 VDC	750 mA	76 %
TES 3-4811WI		5 VDC	600 mA	80 %
TES 3-4812WI		12 VDC	250 mA	83 %
TES 3-4813WI		15 VDC	200 mA	83 %
TES 3-4821WI		$\pm 5$ VDC	$\pm 300$ mA	80 %
TES 3-4822WI		$\pm 12$ VDC	$\pm 125$ mA	83 %
TES 3-4823WI		$\pm 15$ VDC	$\pm 100$ mA	83 %

**Input Specifications**

Input current (no load)	24 V models: 20 mA typ. 48 V models: 10 mA typ.
Start-up voltage / under voltage shut down	24 V models: 8.5 VDC / 8 VDC typ. 48 V models: 17 VDC / 16 VDC typ.
Surge voltage (1 sec. max.)	24 V models: 50 V max. 48 V models: 100 V max.
Reverse voltage protection	1.0 A max.
Reflected input ripple current	24 V models: 10 mA typ. 48 V models: 5 mA typ.
Input filter	EN 55022 class A, FCC part 15, level A

**Output Specifications**

Voltage set accuracy	±1 %
Regulation	– Input variation Vin min. to Vin max. 0.5 % max. – Load variation 10 – 100 % single output models: 1.0 % max. dual output models balanced load: 2.0 % max.
Minimum load	10 % of rated max current (operation at lower load condition is safe but a higher output ripple will be experienced)
Temperature coefficient	±0.02 %/°C max.
Ripple and noise	75 mVpk-pk max.
Dynamic load response (25% load change)	6 % max. peak variation 500 µS max. response time
Transient response (25% load step change)	200 µs typ.
Current limitation	>120 % of Iout max.
Short circuit protection	continuous, automatic recovery
Capacitive load	single output models: 3000 µF dual output models: ±180 µF
Remote On/Off	– On: 2.5 to 5.5 V or open circuit – Off: –0.7 to 0.8 V or short circuit pin 3 and pin 1/2 – Off idle current: 5 mA

**General Specifications**

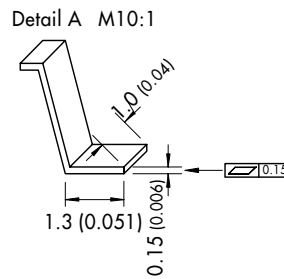
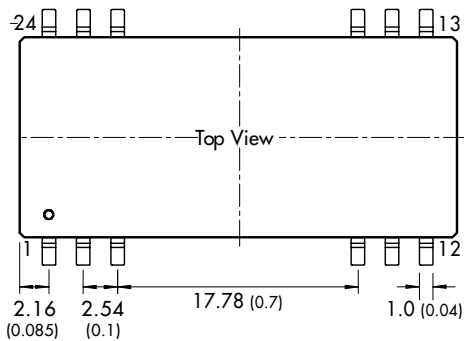
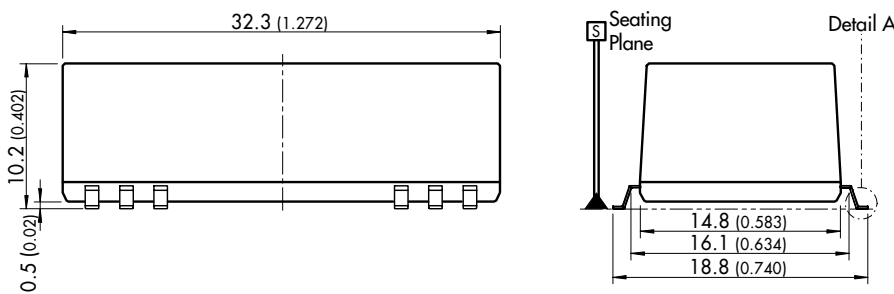
Temperature ranges	– Operating –40°C to +71°C – Case temperature +100°C max. – Storage –40°C to +125°C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)	>1'000'000 h
Isolation voltage (60 sec.) – Input/Output	1'500 VDC
Isolation capacitance – Input/Output	500 pF max.
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 <a href="http://directories.csa-international.org">http://directories.csa-international.org</a> (entry pending)
Environmental compliance	– Reach <a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a> – RoHS RoHS Directive 2011/65/EU

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

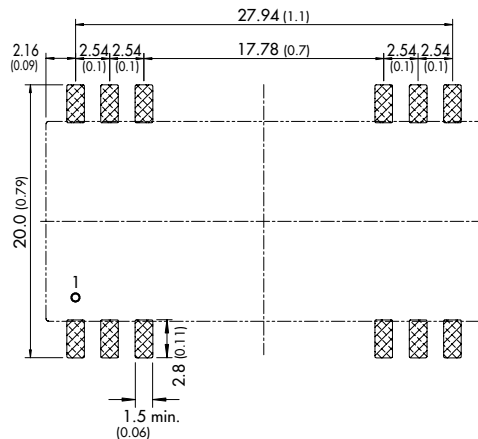
**Physical Specifications**

Casing material	non conductive plastic (UL 94V-0 rated)
Package weight	8.8 g (0.31oz)
Lead-free reflow solder process	as per J-STD-020D.1 (to find at: <a href="http://www.jedec.org">www.jedec.org</a> - free registration required)
Moisture sensitivity level (MSL)	level 2 as per J-STD-033B.1 (to find at: <a href="http://www.jedec.org">www.jedec.org</a> - free registration required)
Washing process	<a href="http://www.tracopower.com/products/smd-wash.pdf">www.tracopower.com/products/smd-wash.pdf</a>
Packaging	<a href="http://www.tracopower.com/products/tes3wi-pack.pdf">www.tracopower.com/products/tes3wi-pack.pdf</a>

**Outline Dimensions**



**Solder Pad Dimension**



Pin-Out		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
2	-Vin (GND)	-Vin (GND)
3	Remote On/Off	Remote On/Off
10	No con.	Common
11	No con.	No con.
12	No con.	-V Output
13	+V Output	+V Output
14	No con.	No con.
15	-V Output	Common
22	No con.	No con.
23	+Vin (Vcc)	+Vin (Vcc)
24	+Vin (Vcc)	+Vin (Vcc)

No con. = Pin to be isolated from circuitry

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

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)

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