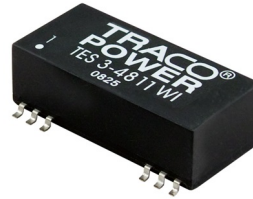


- Ultra-wide 4:1 input voltage range
- I/O isolation 1500 VDC
- Operating temp. range -40°C to $+70^{\circ}\text{C}$
- Short circuit protection
- Input filter to meet EN 55032, conducted class A
- Remote On/Off
- High accuracy of pin co-planarity
- Qualified for leadfree reflow solder process according IPC/JEDEC J-STD-020E
- 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 ultrawide 4:1 input ranges with tightly regulated output voltage. High efficiency allows an operating temperature range of -40°C to $+70^{\circ}\text{C}$ at full load. Further features are built-in EMI-filter to meet EN 55032 conducted class A without external components and remote On/Off control. The products comply with IPC J-STD-020E and are qualified for high temperature lead-free reflow solder process.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TES 3-2410WI	9 - 36 VDC (24 VDC nom.)	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		+5 VDC	300 mA	-5 VDC	300 mA	78 %
TES 3-2422WI		+12 VDC	125 mA	-12 VDC	125 mA	81 %
TES 3-2423WI		+15 VDC	100 mA	-15 VDC	100 mA	81 %
TES 3-4810WI	18 - 75 VDC (48 VDC nom.)	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		+5 VDC	300 mA	-5 VDC	300 mA	80 %
TES 3-4822WI		+12 VDC	125 mA	-12 VDC	125 mA	83 %
TES 3-4823WI		+15 VDC	100 mA	-15 VDC	100 mA	83 %

Input Specifications

Input Current	- At no load	24 Vin models: 20 mA typ. 48 Vin models: 10 mA typ.
	- At full load	24 Vin models: 155 mA typ. 48 Vin models: 75 mA typ.
Surge Voltage		24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.)
Start-up Voltage		24 Vin models: 4.5 VDC min. / 6 VDC typ. / 8.5 VDC max. 48 Vin models: 8.5 VDC min. / 12 VDC typ. / 17 VDC max.
Under Voltage Lockout		24 Vin models: 8 VDC max. 48 Vin models: 16 VDC max.
Reflected Ripple Current		24 Vin models: 10 mA_{p-p} typ. 48 Vin models: 5 mA_{p-p} typ.
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)
Short Circuit Input Power		2 W max.

Output Specifications

Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (V _{min} - V _{max})	single output models: 0.5% max. dual output models: 0.5% max.
	- Load Variation (10 - 100%)	single output models: 1% max. dual output models: 1% max. (Output 1) 1% max. (Output 2)
	- Voltage Balance (symmetrical load)	dual output models: 2% max.
Ripple and Noise	- 20 MHz Bandwidth	75 mV_{p-p} max.
Capacitive Load	- single output	3.3 V _{out} models: 3'000 µF max.
		5 V _{out} models: 3'000 µF max.
		12 V _{out} models: 3'000 µF max.
		15 V _{out} models: 3'000 µF max.
		- dual output
Minimum Load		10 % of I_{out} max. (Operation at lower load will not damage the converter, but it may not meet all specifications)
Temperature Coefficient		±0.02 %/K max.
Start-up Time		16 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Overload Protection		Foldback Mode
Output Current Limitation		120% min. of I_{out} max.
Transient Response	- Response Deviation	2% typ. / 6% max. (75% to 100% Load Step)
	- Response Time	150 µs typ. / 500 µs max. (75% to 100% Load Step)

EMC Specifications

EMI Emissions	- Conducted Emissions	EN 55032 class A (internal filter) FCC Part 15 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (internal filter) FCC Part 15 class A (internal filter)

General Specifications

Relative Humidity	95% max. (non condensing)
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All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Temperature Ranges	- Operating Temperature - Case Temperature - Storage Temperature	-40°C to +70°C (without derating) +100°C max. -50°C to +125°C
Power Derating	- High Temperature	3.3 %/K above 70°C
	See application note:	www.tracopower.com/overview/tes3wi
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote - Off Idle Input Current - Remote Pin Input Current	On: 2.5 to 5.5 VDC or open circuit Off: -0.7 to +0.8 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 5 mA max. -0.4 mA max.
Switching Frequency		180 - 580 kHz (PFM) 300 kHz typ. (PFM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'500 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	350 pF typ. 500 pF max.
Reliability	- Calculated MTBF	1'000'000 h (MIL-HDBK-217F, ground benign)
Moisture Sensitivity (MSL)		Level 2 (J-STD-033C)
Washing Process		Allowed (vent-hole with membrane)
	See Cleaning Guideline:	www.tracopower.com/info/cleaning.pdf
Housing Material		Plastic resin (UL 94 V-0 rated)
Pin Material		Phosphor Bronze (C5191)
Pin Foundation Plating		Copper (1 - 3 μm)
Pin Surface Plating		Tin (7.5 μm min.), matte
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		SMD (Surface-Mount Device)
Footprint Type		SMD24
Soldering Profile		Reflow Soldering (J-STD-020E)
Weight		8.8 g
Environmental Compliance	- REACH Declaration - RoHS Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

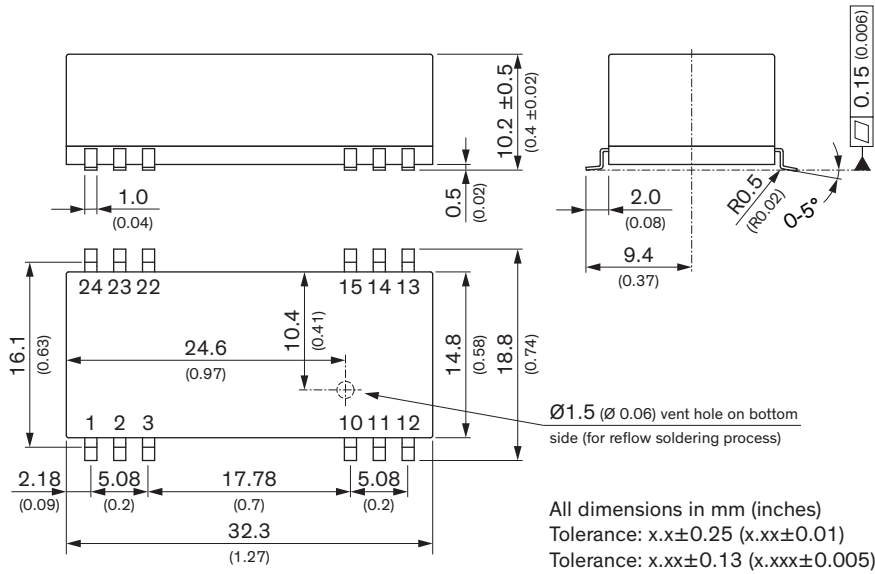
Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tes3wi

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

Outline Dimensions



Pinout		
Pin	Single	Dual
1	-Vin (GND)	-Vin (GND)
2	-Vin (GND)	-Vin (GND)
3	Remote On/Off	Remote On/Off
10	NC	Common
11	NC	NC
12	NC	-Vout
13	+Vout	+Vout
14	NC	NC
15	-Vout	Common
22	NC	NC
23	+Vin (Vcc)	+Vin (Vcc)
24	+Vin (Vcc)	+Vin (Vcc)

NC: Pin to be isolated from circuitry

Recommended Solder Pad Layout

