TRACO POWER

DC/DC Converter

TES 3WI Series, 3 Watt

- **Ultra-wide 4:1 input voltage range**
- **I/O isolation 1500 VDC**
- **Operating temp. range –40°C to +70°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°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
		Vnom	Imax	Vnom	Imax	typ.
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 mAp-p typ.
		48 Vin models:	5 mAp-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 (Vmin - Vmax)	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 mVp-p max.
Capacitive Load	- single output	3.3 Vout models:	3'000 µF max.
		5 Vout models:	3'000 µF max.
		12 Vout models:	3'000 µF max.
		15 Vout models:	3'000 µF max.
	- dual output	5 / -5 Vout models:	180 / 180 µF max.
		12 / -12 Vout models:	180 / 180 µF max.
		15 / -15 Vout models:	180 / 180 µF max.
Minimum Load			10 % of Iout 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 Iout 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)

Safety Specifications

Over Voltage Category		Not mains connected

EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 55032 class A (internal filter)
		FCC 47 Part 15 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (internal filter)
		FCC 47 Part 15 class A (internal filter)

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

General Specifications

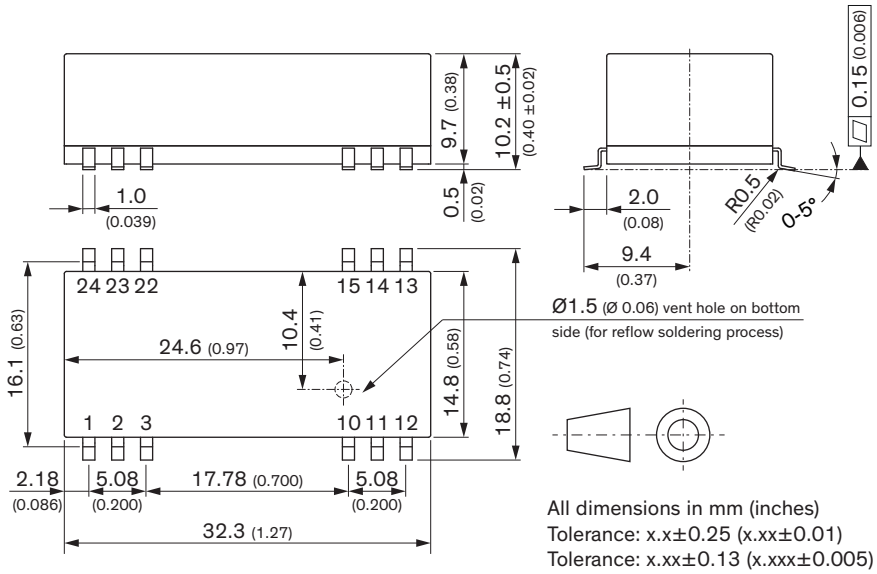
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +70°C (without derating)
	- Case Temperature	+100°C max.
	- Storage Temperature	–50°C to +125°C
Power Derating	- High Temperature	3.3 %/K above 70°C
	See application note:	www.tracopower.com/tes3wi-cc
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)	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
	- Off Idle Input Current	5 mA max.
	- Remote Pin Input Current	-0.4 mA max.
Regulator Topology		Push-Pull Converter
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		According to 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		Lead-Free Reflow Soldering (acc. J-STD-020E)
	See application note:	www.tracopower.com/info/reflow-soldering.pdf
Weight		8.8 g
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7(a) (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	e33565be-1414-415c-805c-ff0333727756

Additional Information

Supporting Documents	www.tracopower.com/overview/tes3wi
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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Outline Dimensions

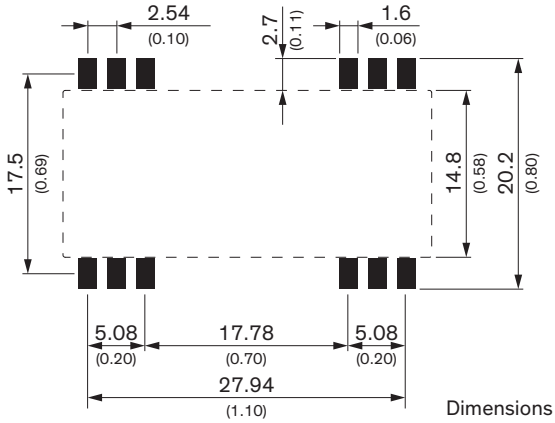


All dimensions in mm (inches)
Tolerance: x.x±0.25 (x.xx±0.01)
Tolerance: x.xx±0.13 (x.xxx±0.005)
Pin tolerance: ±0.05 (±0.002)

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: Not connected

Recommended Solder Pad Layout



Dimensions in mm (inch)

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