

- Compact SMD package
- 33.4 x 25.6 mm footprint
- 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
- 3-year product warranty



The TES 5WI series is a family of high performance 5W 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 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-020D 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 5-2410WI	9 - 36 VDC (24 VDC nom.)	3.3 VDC	1'200 mA			76 %
TES 5-2411WI		5 VDC	1'000 mA			80 %
TES 5-2412WI		12 VDC	420 mA			83 %
TES 5-2413WI		15 VDC	335 mA			83 %
TES 5-2421WI		+5 VDC	500 mA	–5 VDC	500 mA	80 %
TES 5-2422WI		+12 VDC	210 mA	–12 VDC	210 mA	83 %
TES 5-2423WI		+15 VDC	165 mA	–15 VDC	165 mA	83 %
TES 5-4810WI	18 - 75 VDC (48 VDC nom.)	3.3 VDC	1'200 mA			76 %
TES 5-4811WI		5 VDC	1'000 mA			80 %
TES 5-4812WI		12 VDC	420 mA			83 %
TES 5-4813WI		15 VDC	335 mA			83 %
TES 5-4821WI		+5 VDC	500 mA	–5 VDC	500 mA	80 %
TES 5-4822WI		+12 VDC	210 mA	–12 VDC	210 mA	83 %
TES 5-4823WI		+15 VDC	165 mA	–15 VDC	165 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: 250 mA typ. 48 Vin models: 125 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: 7 VDC min. / 8 VDC typ. / 9 VDC max. 48 Vin models: 14 VDC min. / 16 VDC typ. / 18 VDC max.
Under Voltage Lockout		24 Vin models: 6 VDC min. / 7 VDC typ. / 8 VDC max. 48 Vin models: 13 VDC min. / 15 VDC typ. / 17 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		3000 W max.

Output Specifications

Voltage Set Accuracy		±2% max.
Regulation	- Input Variation (Vmin - Vmax)	single output models: 1% max. dual output models: 1% 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: 3% max.
Ripple and Noise	- 20 MHz Bandwidth	85 mVp-p max.
Capacitive Load	- single output	3.3 Vout models: 2'000 µF max. 5 Vout models: 2'000 µF max. 12 Vout models: 470 µF max. 15 Vout models: 330 µF max.
		5 / -5 Vout models: 680 / 680 µF max. 12 / -12 Vout models: 330 / 330 µF max. 15 / -15 Vout models: 220 / 220 µF max.
	- dual output	
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		10 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Overload Protection		Foldback Mode
Output Current Limitation		115% min. of Iout max.
Transient Response	- Response Deviation	2% typ. / 6% max. (25% Load Step)
	- Response Time	250 µs typ. / 500 µs max. (25% Load Step)

Safety Specifications

Safety Standards	- IT / Multimedia Equipment	Designed for EN 62368-1 (no certification)
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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)

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 - 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
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 10 mA max. -0.7 mA max.
Switching Frequency		210 - 350 kHz (PFM) 340 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	650 pF typ. 750 pF max.
Reliability	- Calculated MTBF	1'000'000 h (MIL-HDBK-217F, ground benign)
Moisture Sensitivity (MSL)		Level 2 (J-STD-033C)
Washing Process		Not allowed (non-hermetical product)
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		SMD 24 Pin
Soldering Profile		Reflow Soldering (J-STD-020E)
Weight		14 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.)

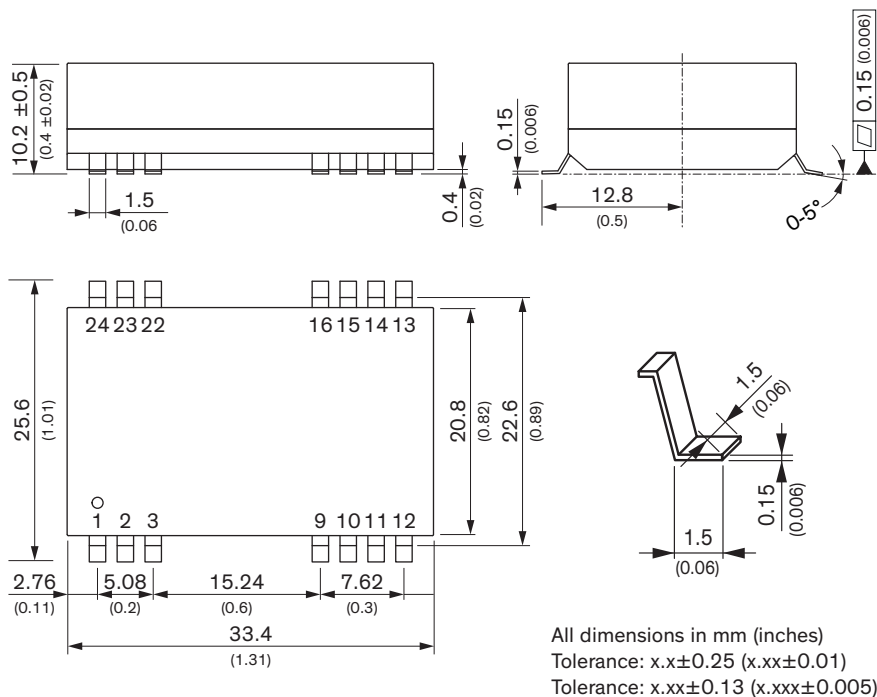
Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tes5wi

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

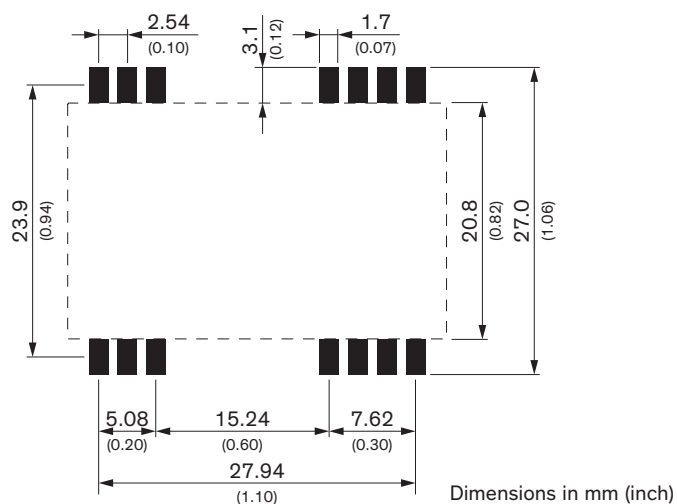
Outline Dimensions



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

NC: No Connection

Recommended Solder Pad Layout



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

TRACO Power:

[TES 5-2412WI](#) [TES 5-2421WI](#) [TES 5-2423WI](#) [TES 5-4811WI](#) [TES 5-2411WI](#) [TES 5-4810WI](#) [TES 5-4812WI](#) [TES](#)
[5-2413WI](#) [TES 5-4822WI](#) [TES 5-4813WI](#) [TES 5-2410WI](#) [TES 5-4823WI](#) [TES 5-4821WI](#) [TES 5-2422WI](#)