

- 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 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 | | 3000 W max. |

Output Specifications

| | | |
|---------------------------|--|--|
| Voltage Set Accuracy | | ±2% max. |
| Regulation | - Input Variation (V _{min} - V _{max}) | 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 mV_{p-p} max. |
| Capacitive Load | - single output | 3.3 V _{out} models: 2'000 µF max. |
| | | 5 V _{out} models: 2'000 µF max. |
| | | 12 V _{out} models: 470 µF max. |
| | | 15 V _{out} models: 330 µF max. |
| | | 5 / -5 V _{out} models: 680 / 680 µF max. |
| - dual output | 12 / -12 V _{out} models: 330 / 330 µF max. | |
| | 15 / -15 V _{out} models: 220 / 220 µF max. | |
| | | |
| 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 | | 10 ms max. |
| Short Circuit Protection | | Continuous, Automatic recovery |
| Overload Protection | | Foldback Mode |
| Output Current Limitation | | 115% min. of I_{out} 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) |
|------------------|-----------------------------|---|

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.) |

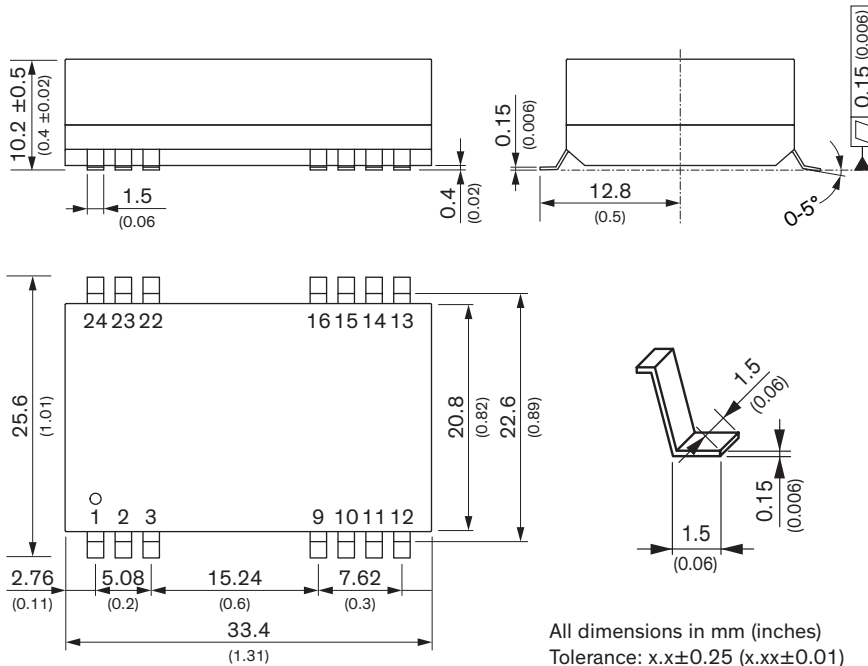
Supporting Documents

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

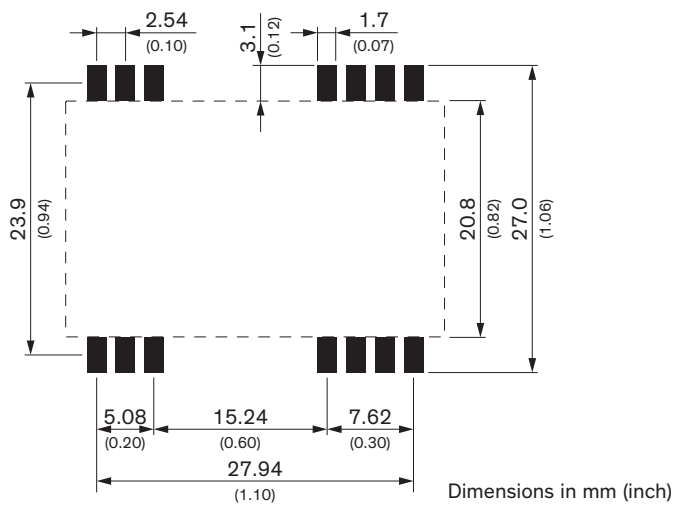


All dimensions in mm (inches)
 Tolerance: x.xx±0.25 (x.xx±0.01)
 Tolerance: x.xx±0.13 (x.xxx±0.005)

| 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



Dimensions in mm (inch)