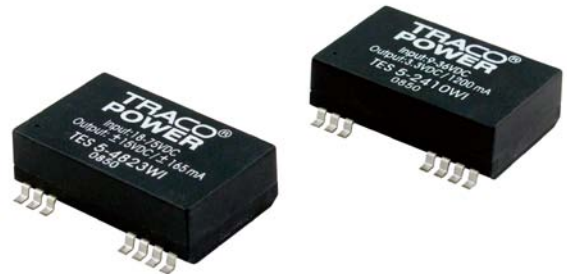


Features

- ◆ 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 $+71^{\circ}\text{C}$
- ◆ 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
- ◆ 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 ultra-wide 4:1 input ranges with tightly regulated output voltage. High efficiency allows an operating temperature range of -40 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				
Order code	Input voltage	Output voltage	Output current max.	Efficiency typ.
TES 5-2410WI	9 – 36 VDC (24 VDC nominal)	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	80 %
TES 5-2422WI		± 12 VDC	± 210 mA	83 %
TES 5-2423WI		± 15 VDC	± 165 mA	83 %
TES 5-4810WI	18 – 75 VDC (48 VDC nominal)	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	80 %
TES 5-4822WI		± 12 VDC	± 210 mA	83 %
TES 5-4823WI		± 15 VDC	± 165 mA	83 %

Input Specifications

Input current (full load)	24 V models: 250 mA typ. 48 V models: 125 mA typ.
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: 9 VDC / 8 VDC typ. 48 V models: 18 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	±2 %
Regulation	– Input variation $V_{in \text{ min.}}$ to $V_{in \text{ max.}}$: 1.0 % max. – Load variation 10 – 100 % single output models: 1.0 % max. dual output models balanced load: 3.0 % 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	85 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	>115 % of $I_{out \text{ max.}}$
Short circuit protection	indefinite, automatic recovery
Capacitive load	3.3 & 5 VDC models: 2000 µF 12 VDC models: 470 µF 15 VDC models: 330 µF ±5 VDC models: ±680 µF ±12 VDC models: ±330 µF ±15 VDC models: ±220 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: 10 mA

General Specifications

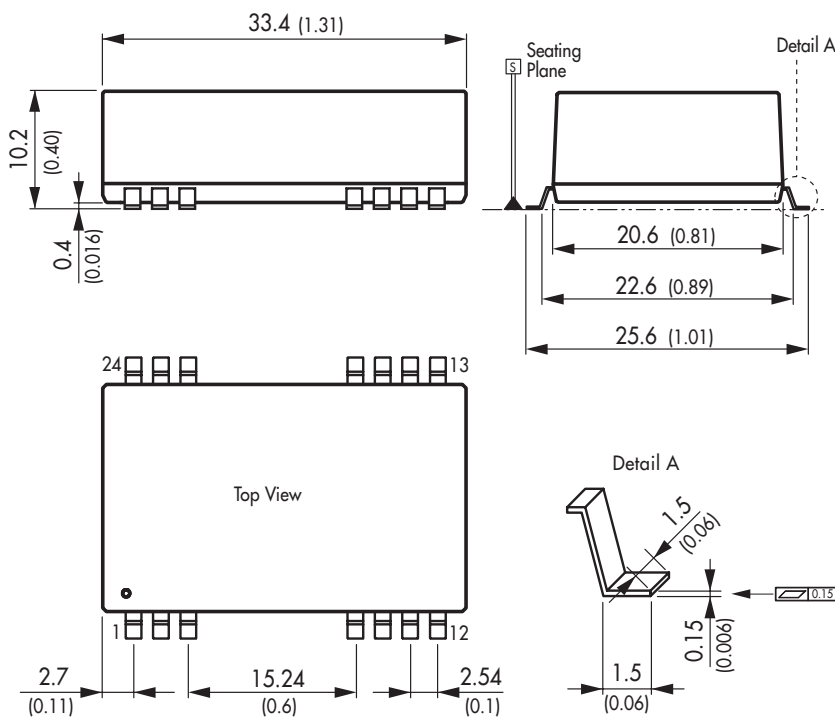
Temperature ranges	– Operating: –40°C to +71°C – Case temperature: +100°C max. – Storage: –40°C to +125°C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTF (MIL-HDBK-217F, @+25°C, ground benign)	>1'000'000 h
Isolation voltage (60 sec.)	– Input/Output: 1'500 VDC
Isolation capacitance	– Input/Output: 750 pF max.
Isolation resistance	– Input/Output: >1'000 Mohm
Switching frequency	340 kHz typ. (frequency modulation PFM)
Safety standards	UL 60950-1, IEC/EN 60950-1
Safety approvals	CSA File No. 226037 http://directories.csa-international.org (entry pending)

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

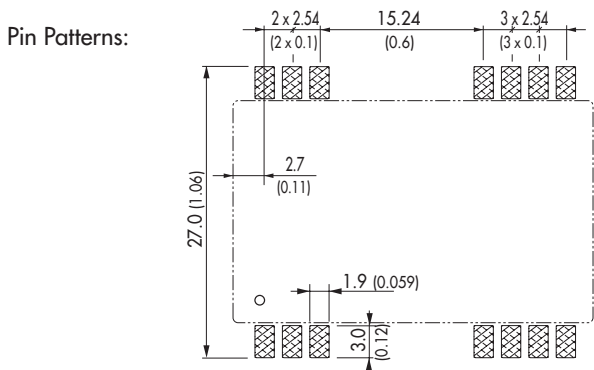
Physical Specifications

Casing material	non conductive plastic (UL 94V-0 rated)
Package weight	14 g (0.49 oz)
Lead-free reflow solder process	as per J-STD-020D.01 (to find at: www.jedec.org - free registration required)
Moisture sensivity level (MSL)	level 2 as per J-STD-033B.01 (to find at: www.jedec.org - free registration required)
Washing process	www.tracopower.com/products/smd-wash.pdf
Packaging	www.tracopower.com/products/tes5wi-pack.pdf

Outline Dimensions



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



Dimensions in [mm], () = Inch
Tolerances ±0.25 (±0.02)
Pin pitch tolerances ±0.13 (±0.005)

Specifications can be changed any time without notice.