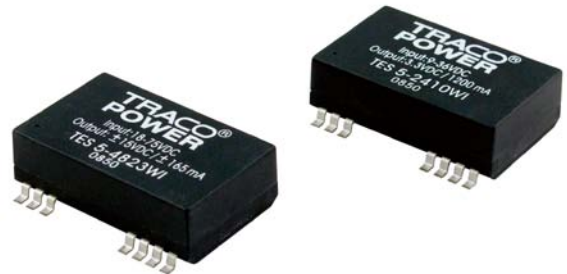


Features

- ◆ 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: 48 V models:	250 mA typ. 125 mA typ.
Input current (no load)	24 V models: 48 V models:	20 mA typ. 10 mA typ.
Start-up voltage / under voltage shut down	24 V models: 48 V models:	9 VDC / 8 VDC typ. 18 VDC / 16 VDC typ
Surge voltage (1 sec. max.)	24 V models: 48 V models:	50 V max. 100 V max.
Reverse voltage protection		1.0 A max.
Reflected input ripple current	24 V models: 48 V models:	10 mA typ. 5 mA typ.
Input filter		EN 55022 class A, FCC part 15, level A

Output Specifications

Voltage set accuracy		±2 %
Regulation	– Input variation Vin min. to Vin max. – Load variation 10 – 100 % single output models: dual output models balanced load:	1.0 % max. 1.0 % max. 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 Iout max.
Short circuit protection		indefinite, automatic recovery
Capacitive load	3.3 & 5 VDC models: 12 VDC models: 15 VDC models: ±5 VDC models: ±12 VDC models: ±15 VDC models:	2000 µF 470 µF 330 µF ±680 µF ±330 µF ±220 µF
Remote On/Off	– On: – Off: – Off idle current:	2.5 to 5.5 V or open circuit –0.7 to 0.8 V or short circuit pin 3 and pin 1/2 10 mA

General Specifications

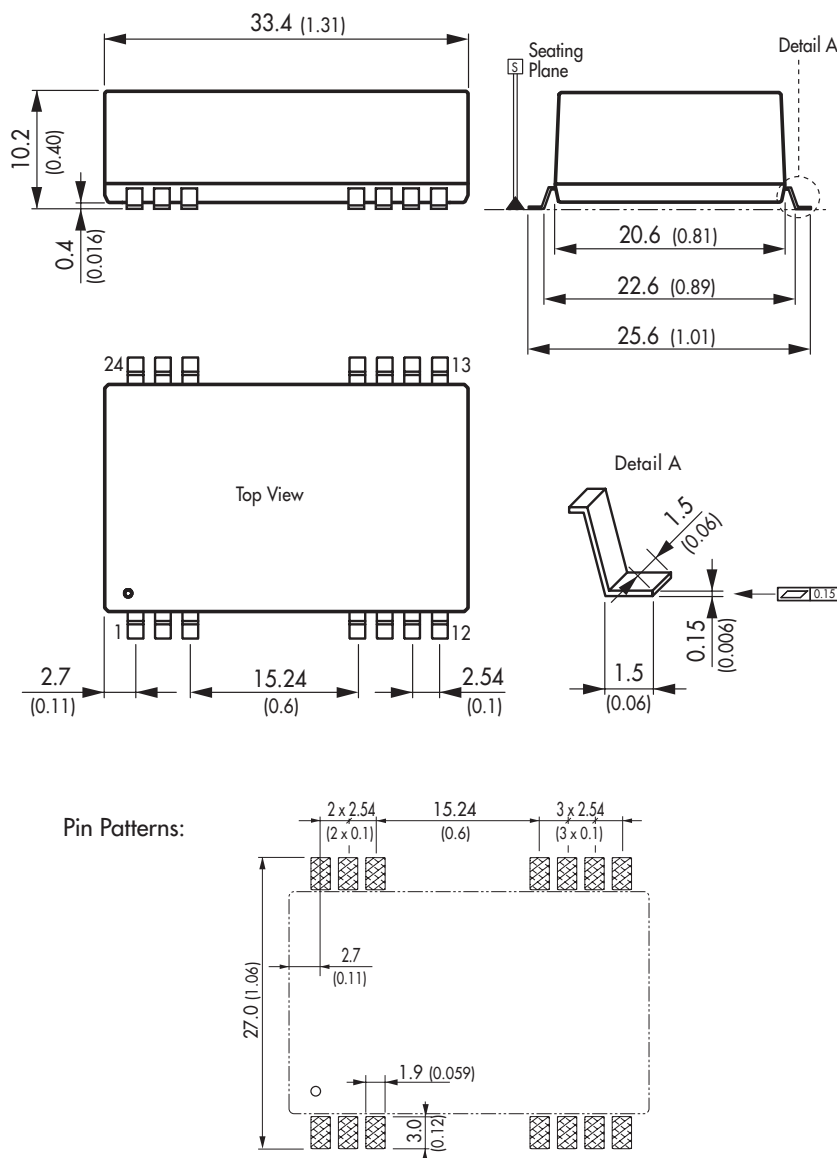
Temperature ranges	– Operating – Case temperature – Storage	–40°C to +71°C +100°C max. –40°C to +125°C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTTF (MIL-HDBK-217F, @+25°C, ground benign)		>1'000'000 h
Isolation voltage (60 sec.)	– Input/Output	1'500 VDC
Isolation capacitance	– 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 sensitivity 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.