

Features

- ◆ Compact SMD package
- ◆ 33.4 x 18.8 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
- ◆ 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 ultra-wide 4:1 input ranges with tightly regulated output voltage. High efficiency allows an operating temperature range of -40°C 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				
Ordercode	Input voltage	Output voltage	Output current max.	Efficiency typ.
TES 3-2410WI	9 – 36 VDC (nominal 24 VDC)	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	78 %
TES 3-2422WI		± 12 VDC	± 125 mA	81 %
TES 3-2423WI		± 15 VDC	± 100 mA	81 %
TES 3-4810WI	18 – 75 VDC (nominal 48 VDC)	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	80 %
TES 3-4822WI		± 12 VDC	± 125 mA	83 %
TES 3-4823WI		± 15 VDC	± 100 mA	83 %

Input Specifications

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: 8.5 VDC / 8 VDC typ. 48 V models: 17 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	±1 %
Regulation	– Input variation $V_{in \text{ min.}}$ to $V_{in \text{ max.}}$: 0.5 % max. – Load variation 10 – 100 % single output models: 1.0 % max. dual output models balanced load: 2.0 % 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	50 mVpk-pk max.
Transient Response (25% load step change)	– Recovery time: 500 μ s max. – Deviation: 6 % max.
Current limitation	>120 % of $I_{out \text{ max.}}$
Short circuit protection	continuous, automatic recovery
Capacitive load	single output models: 3000 μ F dual output models: 180 μ F (each output)
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: 5 mA

General Specifications

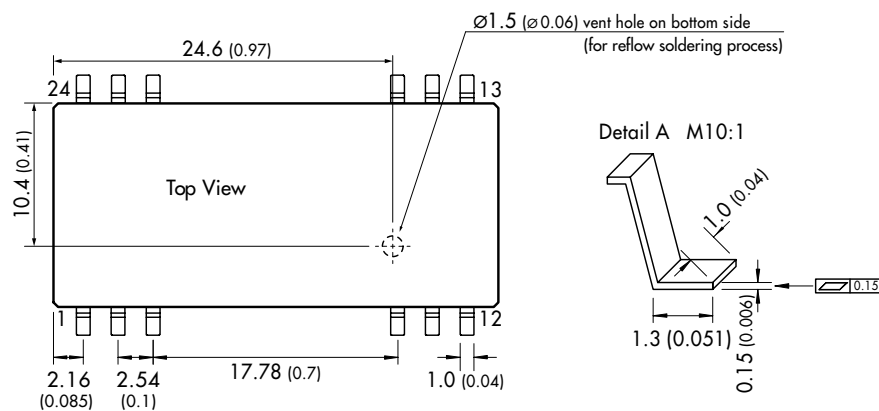
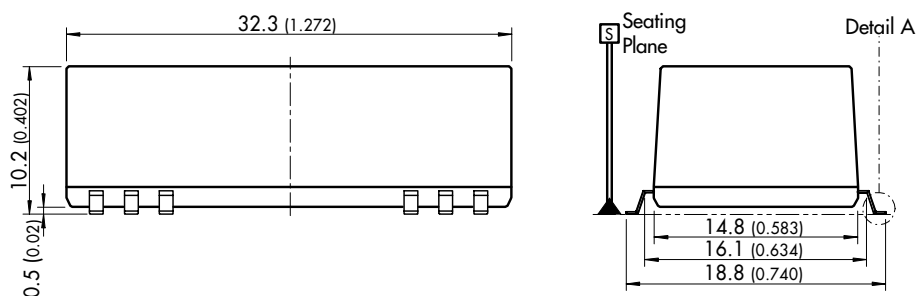
Temperature ranges	– Operating: –40°C to +71°C – Case temperature: +100°C max. – Storage: –40°C to +125°C
Humidity (non condensing)	95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)	>1'000'000 h
Isolation voltage (60 sec.)	– Input/Output: 1'500 VDC
Isolation capacitance	– Input/Output: 500 pF max.
Isolation resistance	– Input/Output: >1'000 Mohm
Switching frequency	300 kHz typ. (frequency modulation PFM)
Safety approvals	CSA File No. 226037 http://directories.csa-international.org
Environmental compliance	– Reach – RoHS: RoHS Directive 2011/65/EU

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

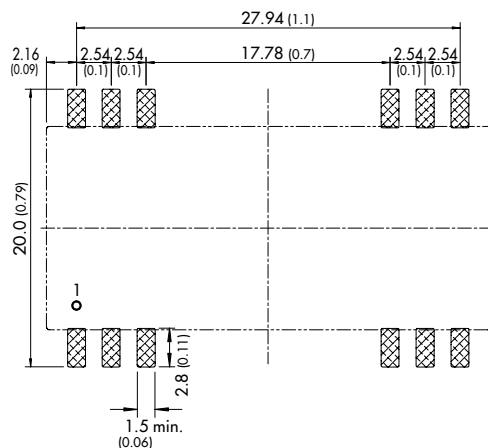
Physical Specifications

Casing material	non conductive plastic (UL 94V-0 rated)
Package weight	8.8 g (0.31 oz)
Lead-free reflow solder process	as per J-STD-020D.1 (to find at: www.jedec.org - free registration required)
Moisture sensivity level (MSL)	level 2 as per J-STD-033B.1 (to find at: www.jedec.org - free registration required)
Washing process	not recommended. Product non-hermetical.
Packaging	

Outline Dimensions



Solder Pad Dimension



Pin-Out

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

No con. = Pin to be isolated from circuitry

Dimensions in [mm], () = Inch
Tolerances ± 0.25 (± 0.01)
Pin pitch tolerances ± 0.13 (± 0.005)