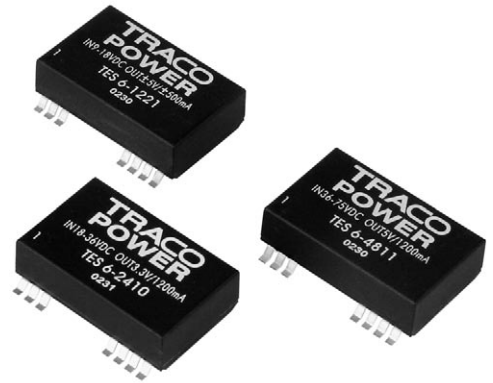


Features

- ◆ Surface Mount DIL-Package
- ◆ Wide 2:1 Input Range
- ◆ 21 Standard Models
- ◆ High Efficiency up to 85%
- ◆ I/O-Isolation 1'500 VDC
- ◆ Indefinite Short-Circuit Protection
- ◆ Input Filter meets EN 55022, Class A and FCC, Level A without external Components
- ◆ High Accuracy of Pin Co-Planarity
- ◆ High Reliability, MTBF >1 Mio. h
- ◆ 3 Year Product Warranty



The TES 6 converter series is intended for all applications where PCB's are assembled on an automated SMD production line. The light weight DIL-package allows easy handling by pick and place machines. High efficiency allows an operating temperature range of -40°C to +71°C without derating. I/O-isolation of 1'500 VDC together with conducted noise compliance to EN 55022-A and FCC, level A makes these converters ideal for a wide range of applications in communications, mobile battery powered equipments and industrial systems.

Models

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TES 6-1210	9 – 18 VDC	3.3 VDC	1200 mA	77 %
TES 6-1211		5 VDC	1200 mA	81 %
TES 6-1212		12 VDC	625 mA	83 %
TES 6-1213		15 VDC	500 mA	83 %
TES 6-1221		± 5 VDC	± 500 mA	81 %
TES 6-1222		± 12 VDC	± 312 mA	83 %
TES 6-1223		± 15 VDC	± 250 mA	83 %
TES 6-2410	18 – 36 VDC	3.3 VDC	1200 mA	79 %
TES 6-2411		5 VDC	1200 mA	83 %
TES 6-2412		12 VDC	625 mA	85 %
TES 6-2413		15 VDC	500 mA	85 %
TES 6-2421		± 5 VDC	± 500 mA	83 %
TES 6-2422		± 12 VDC	± 312 mA	85 %
TES 6-2423		± 15 VDC	± 250 mA	85 %
TES 6-4810	36 – 75 VDC	3.3 VDC	1200 mA	79 %
TES 6-4811		5 VDC	1200 mA	83 %
TES 6-4812		12 VDC	625 mA	85 %
TES 6-4813		15 VDC	500 mA	85 %
TES 6-4821		± 5 VDC	± 500 mA	83 %
TES 6-4822		± 12 VDC	± 312 mA	85 %
TES 6-4823		± 15 VDC	± 250 mA	85 %

Input Specifications

Input current no load	12 Vin models	20 mA
	24 Vin models	5 mA
	48 Vin models	3 mA
Input current full load	12 Vin models with 3.3/±5 Vout	430 mA / 510 mA typ.
	12 Vin models with other outputs	600 mA typ.
	24 Vin models with 3.3/±5 Vout	210 mA / 250 mA typ.
	24 Vin models with other outputs	600 mA typ.
	48 Vin models with 3.3/±5 Vout	100 mA / 130 mA typ.
	48 Vin models with other outputs	150 mA typ.
Start-up voltage / under voltage shut down	12 Vin models	6 VDC / 8 VDC typ.
	24 Vin models	12 VDC / 16 VDC typ.
	48 Vin models	24 VDC / 32 VDC typ.
Surge voltage (1 sec. max.)	12 Vin models	25 V max.
	24 Vin models	50 V max.
	48 Vin models	100 V max.
Reverse voltage protection		1.0 A max.
Conducted noise (input)		EN 55022 level A, FCC part 15, class A

Output Specifications

Voltage set accuracy		± 1 %
Regulation	– Input variation Vin min. to Vin max.	0.3 % max.
	– Load variation 10 – 100 %	
	– single output models	1 % max.
	– dual output models balanced load	1 % max.
	– dual output models unbalanced load	2.5 % max.
Ripple and noise (20 MHz Bandwidth)		75 mVpk-pk max.
Temperature coefficient		± 0.02 % / °C
Output current limitation		>120 % of Iout max., constant current
Short circuit protection		fold back, automatic recovery
Capacitive load	3.3 VDC output models	680 µF max.
	5 VDC single output models	1'500 µF max.
	other models	100 µF max.

General Specifications

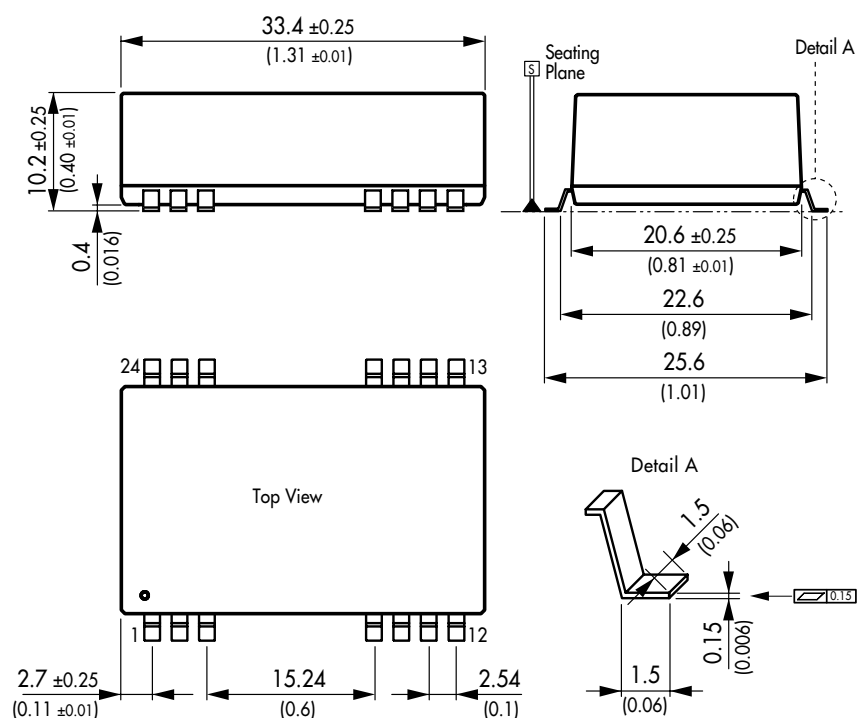
Temperature ranges	– Operating	– 40°C ... + 71 °C (no derating)
	– Case temperature	+ 105°C max.
	– Storage	– 40°C ... + 125 °C
Derating		4 %/K above 71 °C
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217 E)		>1 Mio. h @ + 25 °C
Isolation voltage	Input/Output	1'500 VDC
Isolation capacity	Input/Output	380 pF typ.
Isolation resistance	Input/Output (500 VDC)	> 1'000 MOhm
	Switching frequency	300 kHz
Safety standards		IEC / EN 60950, UL 60950
Safety approvals		UL / cUL, CB-report pending

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

Physical Specifications

Case material	non conductive black plastic
Potting material	Epoxy (UL 94V-0 rated)
Weight	14 g (0.55 oz)
Soldering temperature	Peak temp. 230°C (10 sec max.) 185°C for 90 sec max. Convection reflow solder process is recommended

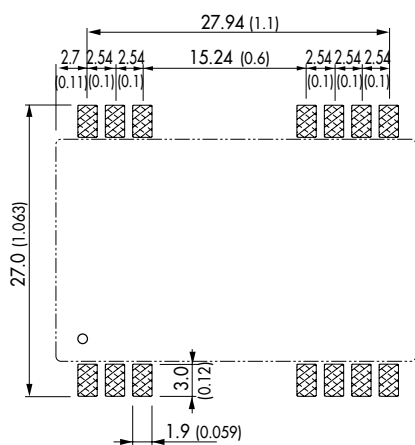
Outline Dimensions mm (inches)



Pin-Out

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

Connecting Pin Patterns:



() = inches

Tolerances: ± 0.1 mm (0.04 Inches)

Specifications can be changed without notice