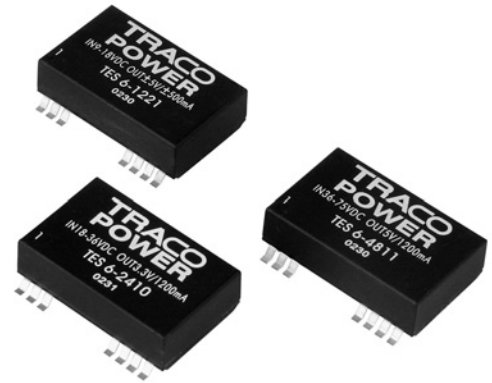


Features

- ◆ 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 (12 VDC nominal)	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		±2 VDC	±310 mA	83 %
TES 6-1223		±15 VDC	±250 mA	83 %
TES 6-2410	18 – 36 VDC (24 VDC nominal)	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	±310 mA	85 %
TES 6-2423		±15 VDC	±250 mA	85 %
TES 6-4810	36 – 75 VDC (48 VDC nominal)	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	±310 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

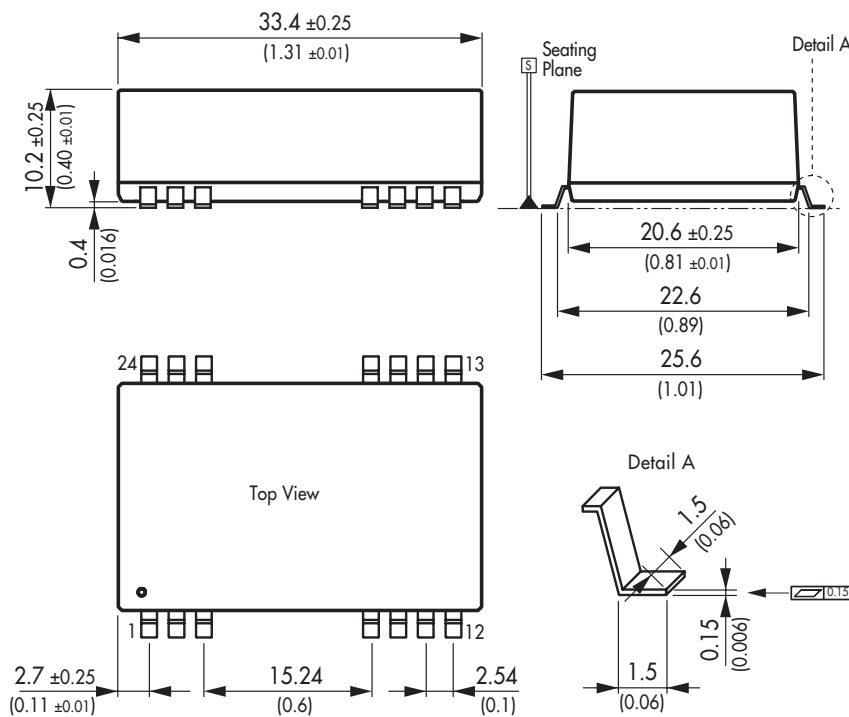
Temperature ranges	– Operating	–40°C to +71°C (no derating)
	– Case temperature	+105°C max.
	– Storage	–40°C to +125°C
Derating		4 %/K above +71°C
Humidity (non condensing)		95 % rel. H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>1 Mio. h
Isolation voltage	Input/Output	1'500 VDC
Isolation capacitance	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
Environmental compliance	– Reach	www.tracopower.com/products/reach-declaration.pdf
	– 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

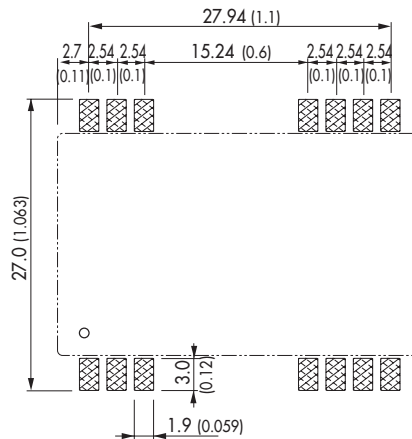
Case material	non conductive black plastic
Potting material	Epoxy (UL 94V-0 rated)
Weight	14 g (0.55 oz)
Soldering temperature	Peak temp. 230°C (10 sec max.) 185°C for 90 sec max. Convection reflow solder process is recommended

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: ±0.1mm (0.04 Inches)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com