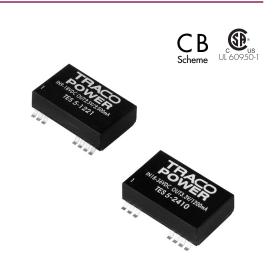


DC/DC Converters

TES 5 Series, 5 Watt

Features

- Compact low profile SMD package
- ◆ Wide 2:1 input voltage range
- ◆ I/O isolation 1500VDC
- ◆ Operating temp. range -40°C to +85°C max.
- ◆ Short circuit protection
- ◆ Remote On/Off
- High accuracy of pin co-planarity
- Lead free design RoHS compliant
- 3-years product warranty



The TES-5 series is a new range of high performance 5W dc-dc converter modules in low profile SMD package with compact dimensions of only $33.4 \times 20.6 \times 10.2$ mm. The 18 available models feature wide 2:1 input voltage range and tightly regulated output voltage. High efficiency allows operating temperatures up to $71^{\circ}C$ at full load.

Further features are built-in EMI-filter to meet EN 55022, class A and FCC, level A without additional components and remote On/Off control. The products are qualified for soldering in a high temperature lead-free reflow solder process. Typical applications for these converters are battery powered equipment, instrumentation, communication systems and industrial controls.

Ordercode	Input voltage range	Output voltage	Output current max.	Efficiency typ.
	input voltage range	·	-	
TES 5-1210		3.3 VDC	1200 mA	76 %
TES 5-1211		5 VDC	1000 mA	80 %
TES 5-1212	0 10 1/00	12 VDC	420 mA	83 %
TES 5-1213	9 – 18 VDC	15 VDC	335 mA	83 %
TES 5-1221	(12 VDC nominal)	±5 VDC	±500 mA	80 %
TES 5-1222		±12 VDC	±210 mA	83 %
TES 5-1223		±15 VDC	±165 mA	83 %
TES 5-2410		3.3 VDC	1200 mA	78 %
TES 5-2411		5 VDC	1000 mA	82 %
TES 5-2412		12 VDC	420 mA	85 %
TES 5-2413	18 – 36 VDC	15 VDC	335 mA	85 %
TES 5-2421	(24 VDC nominal)	±5 VDC	±500 mA	82 %
TES 5-2422		±12 VDC	±210 mA	85 %
TES 5-2423		±15 VDC	±165 mA	85 %
TES 5-4810		3.3 VDC	1200 mA	78 %
TES 5-4811		5 VDC	1000 mA	82 %
TES 5-4812		12 VDC	420 mA	85 %
TES 5-4813	36 – 75 VDC	15 VDC	335 mA	85 %
TES 5-4821	(48 VDC nominal)	±5 VDC	±500 mA	82 %
TES 5-4822		±12 VDC	±210 mA	85 %
TES 5-4823		±15 VDC	±165 mA	85 %



Input Specifications				
Input current no load				
Input current full load		12 Vin models 24 Vin models 48 Vin models	500 mA typ. 250 mA typ. 125 mA typ.	
Start-up voltage / under voltage shut down	12 Vin models 8 VDC / 7 VDC typ. 24 Vin models 16 VDC / 15 VDC typ. 48 Vin models 33 VDC / 31 VDC typ.			
Surge voltage (1 sec. max.)				
Reverse voltage protection			1.0 A max.	
Conducted noise (input)			EN 55022 level A, FCC part 15, class A	
Output Specifications	S			
Voltage set accuracy			±1 %	
Regulation	- Load variation 20 - 100 % single output models		0.3 % max. 1 % max. 2 % max.	
Ripple and noise (20 MHz	Bandwidth)		85 mVpk-pk max.	
Temperature coefficient			±0.02 %/°C	
Output current limitation			>115 % of lout max., constant current	
Short circuit protection			indefinite, automatic recovery	
Capacitive load	single output models dual output models		680 μF max. 100 μF max. (each output)	
General Specification	ns			
Temperature ranges	OperatingCase temperatureStorage		−40°C to +85°C +100°C max. −40°C to +125°C	
Derating			3.5 %/K above 70°C	
Humidity (non condensing)			95 % rel H max.	
Reliability, calculated MTBF	(MIL-HDBK-217F, at +25°C, ground	d benign)	>1 Mio. h	
Isolation voltage (60sec.)	- Input/Output		1′500 VDC	
Isolation capacitance	- Input/Output		650 pF typ.	
Isolation resistance	- Input/Output (500 VDC)		>1′000 MOhm	
Switching frequency			260 kHz typ.	
Safety standards			UL 60950-1, IEC/EN 60950-1	
Environmental compliance	- Reach - RoHS		www.tracopower.com/info/reach-declaration.pdf RoHS directive 2011/65/EU	
Remote On/Off	- On: - Off: - Off idle current:		2.5 5.5 VDC or open circuit -0.7 0.8 VDC or short circuit pin 1 and 2(/3) 10 mA	

All specifications valid at nominal input voltage, full load and $+25^{\circ}\text{C}$ after warm-up time unless otherwise stated.

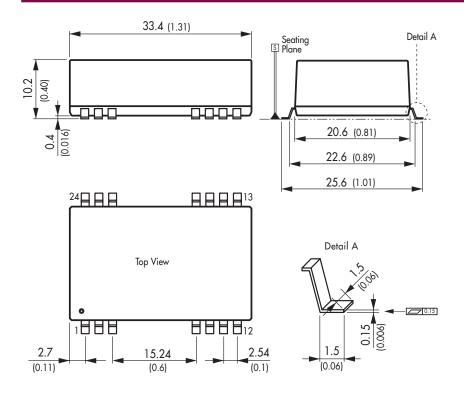




Physical Specifications	
Casing material	non conductive plastic
Weight	14 g (0.55oz)
Moisture sensivity level (MSL)	level 2 as per J-STD-020D.1 (to find at: www.jedec.org - free registration required)

Supporting documents: www.tracopower.com/overview/tes5

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.		

Pin Patterns:	1	2 x 2.54 (2 x 0.1)	(0.6)	3 x 2.54 (3 x 0.1)
	27.0 (1.06)	2.7 (0.11)		
			1.7 (0.07) 	

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

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

