

TRACO POWER

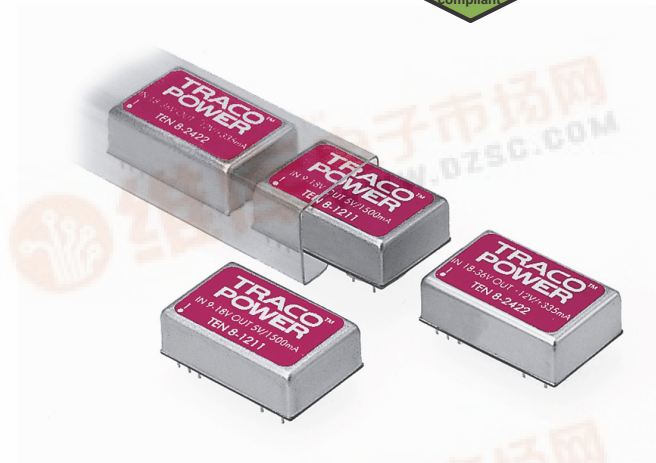
DC/DC Converters

TEN 8 Series, 8 Watt



Features

- ◆ DIP-24 package with industry standard footprint
- ◆ Wide 2:1 input voltage range
- ◆ Input filter meets EN 55022, class A
- ◆ Extended operating temperature range: -40°C to +85°C
- ◆ Remote On/Off
- ◆ Shielded metal case with insulated baseplate
- ◆ Lead free design, RoHS compliant
- ◆ 3 Year product warranty



The TEN 8 series is a family of high performance 8 W DC/DC converter modules featuring wide 2:1 input voltage ranges in a DIP-24 package with industry standard footprint. A very high efficiency allows an operating temperature range of -40°C to +85°C. A built-in EMI input filter complies with EN 55022, class A without external components. Further standard features include remote On/Off and short-circuit protection.

Typical applications for these converters are battery operated equipment, instrumentation, communication and industrial electronics, everywhere where isolated, tightly regulated voltages are required and space is limited on the PCB.

Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency typ.
TEN 8-1210	9 – 18 VDC	3.3 VDC	2'000 mA	80 %
TEN 8-1211		5 VDC	1'500 mA	83 %
TEN 8-1212		12 VDC	665 mA	88 %
TEN 8-1213		15 VDC	535 mA	87 %
TEN 8-1221		± 5 VDC	± 800 mA	83 %
TEN 8-1222		±12 VDC	± 335 mA	87 %
TEN 8-1223		±15 VDC	± 265 mA	85 %
TEN 8-2410	18 – 36 VDC	3.3 VDC	2'000 mA	80 %
TEN 8-2411		5 VDC	1'500 mA	83 %
TEN 8-2412		12 VDC	665 mA	86 %
TEN 8-2413		15 VDC	535 mA	85 %
TEN 8-2421		± 5 VDC	± 800 mA	82 %
TEN 8-2422		±12 VDC	± 335 mA	86 %
TEN 8-2423		±15 VDC	± 265 mA	85 %
TEN 8-4810	36 – 75 VDC	3.3 VDC	2'000 mA	80 %
TEN 8-4811		5 VDC	1'500 mA	83 %
TEN 8-4812		12 VDC	665 mA	86 %
TEN 8-4813		15 VDC	535 mA	86 %
TEN 8-4821		± 5 VDC	± 800 mA	85 %
TEN 8-4822		±12 VDC	± 335 mA	87 %
TEN 8-4823		±15 VDC	± 265 mA	87 %

Input Specifications

Input current (no load)	12 Vin models: 20 mA typ. 24 Vin models: 15 mA typ. 48 Vin models: 10 mA typ.												
Input current (full load)	<table> <tr> <td>12 Vin;</td><td>3.3 Vout models: 700 mA typ.</td></tr> <tr> <td>12 Vin;</td><td>other output models: 820 mA typ.</td></tr> <tr> <td>24 Vin;</td><td>3.3 Vout models: 350 mA typ.</td></tr> <tr> <td>24 Vin;</td><td>other output models: 400 mA typ.</td></tr> <tr> <td>48 Vin;</td><td>3.3 Vout models: 170 mA typ.</td></tr> <tr> <td>48 Vin;</td><td>other output models: 200 mA typ.</td></tr> </table>	12 Vin;	3.3 Vout models: 700 mA typ.	12 Vin;	other output models: 820 mA typ.	24 Vin;	3.3 Vout models: 350 mA typ.	24 Vin;	other output models: 400 mA typ.	48 Vin;	3.3 Vout models: 170 mA typ.	48 Vin;	other output models: 200 mA typ.
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24 Vin;	other output models: 400 mA typ.												
48 Vin;	3.3 Vout models: 170 mA typ.												
48 Vin;	other output models: 200 mA typ.												
Surge voltage (100 msec. max.)	12 Vin models: 36 V max.. 24 Vin models: 50 V max.. 48 Vin models: 100 V max..												
Conducted noise (input)	EN 55022 level A, FCC part 15, level A												
ESD (input)	EN 61000-4-2, Perf. Criteria B												
Fast Transient (input)	EN 61000-4-4, Perf. Criteria B												
Surge (input)	EN 61000-4-5, Perf. Criteria B												

Output Specifications

Voltage set accuracy	± 2 %										
Regulation	<table> <tr> <td>– Input variation Vin min. to Vin max</td><td>0.2 % max.</td></tr> <tr> <td>– Load variation 25 – 100 %</td><td></td></tr> <tr> <td>single output models:</td><td>1 % max.</td></tr> <tr> <td>dual output models:</td><td>1 % max.</td></tr> <tr> <td>– Load cross variation 25 % / 100 %</td><td>5 % max.</td></tr> </table>	– Input variation Vin min. to Vin max	0.2 % max.	– Load variation 25 – 100 %		single output models:	1 % max.	dual output models:	1 % max.	– Load cross variation 25 % / 100 %	5 % max.
– Input variation Vin min. to Vin max	0.2 % max.										
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single output models:	1 % max.										
dual output models:	1 % max.										
– Load cross variation 25 % / 100 %	5 % max.										
Temperature coefficient	0.02 % /K										
Ripple and noise (20 MHz Bandwidth)	50 mVpk-pk max.										
Start up time (nominal Vin and constant resistive load)	600 ms typ.										
Transient response (25% load step change)	200 µs typ.										
Short circuit protection	indefinite (automatic recovery)										
Over load protection	150% of Iout max typ. foldback										
Minimum load (only for dual output models)	10% of rated max current (operation at lower load condition will not damage these converters, however, they may not meet all listed specifications)										
Capacitive load	<table> <tr> <td>3.3 Vout models:</td><td>3300 µF max.</td></tr> <tr> <td>5 Vout models / ± 5 Vout models:</td><td>1600 µF max. / ± 1000 µF max.</td></tr> <tr> <td>12 Vout models / ± 12 Vout models:</td><td>350 µF max. / ± 160 µF max.</td></tr> <tr> <td>15 Vout models / ± 15 Vout models:</td><td>240 µF max. / ± 100 µF max.</td></tr> </table>	3.3 Vout models:	3300 µF max.	5 Vout models / ± 5 Vout models:	1600 µF max. / ± 1000 µF max.	12 Vout models / ± 12 Vout models:	350 µF max. / ± 160 µF max.	15 Vout models / ± 15 Vout models:	240 µF max. / ± 100 µF max.		
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General Specifications

Temperature ranges	<table> <tr> <td>– Operating</td><td>–40 °C to +85 °C</td></tr> <tr> <td>– Case temperature</td><td>+100 °C max.</td></tr> <tr> <td>– Storage</td><td>–55 °C to +105 °C</td></tr> </table>	– Operating	–40 °C to +85 °C	– Case temperature	+100 °C max.	– Storage	–55 °C to +105 °C
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– Storage	–55 °C to +105 °C						
Derating	3.3% /K above 70°C						
Humidity (non condensing)	95 % rel H max.						

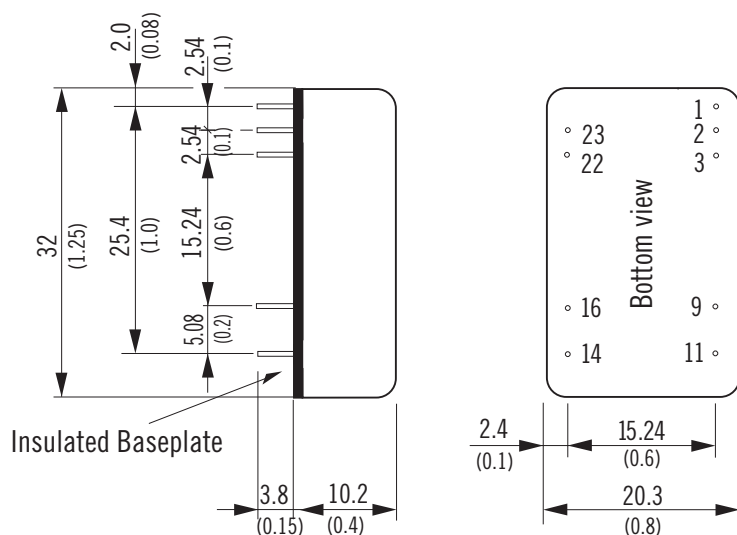
General Specifications

Reliability, calculated MTBF (MIL-HDBK-217F ground benign)	>715'000 h @ +25°C	
Isolation voltage (60sec.) – Input/Output	1'500 VDC	
Isolation capacity – Input/Output	300 pF max.	
Isolation Resistance – Input/Output	> 1'000 M Ohm	
Switching frequency	300 kHz typ. (pulse width modulation PWM)	
Vibration	10-55Hz, 2G, 30 minutes along X,Y,Z	
Safety standards	UL/cUL 60950-1, IEC/EN 60950-1 compliance up to 60 VDC input voltage (SELV limit)	
Safety approvals – UL/cUL	www.ul.com -> certifications -> File E188913	
Remote On/Off	On: 3.5 ... 12 VDC or open circuit	Off: 0 ... 1.2 VDC or short circuit pin 1 and pin 2/3
	Off idle current: 2.5 mA	

Physical Specifications

Case material	copper, nickel plated
Baseplate material	non conductive FR4
Potting material	epoxy (UL94V-0 rated)
Weight	17 g (0.60 oz)
Soldering temperature	max. 265 °C / 10 sec.

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
11	No con.	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

Dimensions in [mm], () = Inch

Pin diameter $\varnothing 0.5 \pm 0.05$ (0.02 $\pm$ 0.002)

Tolerances ± 0.5 (0.02)

Pin pitch tolerances ± 0.35 (0.014)

Specifications can be changed any time without notice