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TR20 series

XP Power

2A

DC-DC converters

The TR20 provides a compact efficient switching regulator solution operating from a wide range DC input.

Output voltages start from 1.2VDC and the TR20 consumes just 1mA when idle.



Features

- Non-isolated 2.0A switching regulator
- Regulated single outputs from 1.2 to 15VDC
- Wide input range to 36VDC
- SIP3 package
- Non isolated
- High efficiency to 96%
- Class B conducted & radiated emissions
- Short circuit protection
- Low 1mA standby input current
- -40°C to +100°C operation
- 3 year warranty

Applications

Robotics
Instrumentation
Technology
Industrial
Process control

Dimensions

14.0 x 7.5 x 10.1 mm (0.55 x 0.30 x 0.40")

Documentation

For further information click the link or scan the code

→ xppower.com

Models & ratings

Model number	Input voltage	Output voltage	Output current	Input current(1,2)	Efficiency(3)	Max. capacitive load
TR2005S1V2	3.0-5.5VDC	1.2VDC	2A	889mA	90%	2500µF
TR2005S1V5	3.0-5.5VDC	1.5VDC		1099mA	91%	2000µF
TR2005S1V8	3.0-5.5VDC	1.8VDC		1304mA	92%	1600µF
TR2005S2V5	3.8-5.5VDC	2.5VDC		1385mA	95%	1200µF

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Notes:

1. No load input current 1mA.
2. Input current measured at full load and minimum input voltage.
3. Efficiency measured at full load and minimum input voltage.
4. Standard tube quantity 30 pcs

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Models & ratings

Model number	Input voltage	Output voltage	Output current	Input current(1,2)	Efficiency(3)	Max. capacitive load
TR2024S1V2	4.6-36VDC	1.2VDC	2A	621mA	84%	2500µF
TR2024S1V5	4.6-36VDC	1.5VDC		758mA	86%	2000µF
TR2024S1V8	4.6-36VDC	1.8VDC		899mA	87%	1600µF
TR2024S2V5	4.6-36VDC	2.5VDC		1221mA	89%	1200µF
TR2024S3V3	4.75-36VDC	3.3VDC		1527mA	91%	900µF
TR2024S05	6.5-36VDC	5.0VDC		1637mA	94%	600µF
TR2024S6V5	9-36VDC	6.5VDC		1537mA	94%	470µF
TR2024S09	12-36VDC	9.0VDC		1579mA	95%	330µF
TR2024S12	15-36VDC	12.0VDC		1684mA	95%	270µF
TR2024S15	18-36VDC	15.0VDC		1736mA	96%	200µF

Notes:

1. No load input current 1mA.
2. Input current measured at full load and minimum input voltage.
3. Efficiency measured at full load and minimum input voltage.
4. Standard tube quantity 30 pcs

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	3		36	VDC	See models and ratings
Input filter	Capacitor				
Input reflected ripple			35	mA pk-pk	Measured with 12µH inductor and 10µF capacitor source values
Input surge			6/40	VDC for 100ms	TR2005/TR2024 series

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	1.2		15	VDC	See models and ratings
Initial set accuracy			±2.0	%	At full load
Minimum load	No minimum load required.				
Line regulation			±0.5	%	
Load regulation		±1.0	±1.5	%	From 0% to full load. Maximum variation applies to ≤3V3 output voltage
Transient response			±5	%	For 50% load change, recovery in 250µs
Ripple & noise		50/75		mV pk-pk	20MHz bandwidth. ≤6.5Vout / ≥9.0Vout
Short circuit protection	Continuous, with auto recovery				
Maximum Capacitive Load	See models and ratings				
Temperature coefficient			0.02	%/ °C	
Overload protection		8.5/3.5		A	TR2005/TR2024 series
Startup time		5		ms	Nominal Vin with resistive load.

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General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency			96	%	See models and ratings table
Isolation: input to output	0			VDC	Non isolated
Switching frequency		1200/410		kHz	TR2005/TR2024 series
Mean time between failure	2.6			Mhrs	TR2005/TR2024 series, MIL-HDBK-217F
Weight		2.4 (0.005)		g (lb)	
Case material	Non-conductive black plastic UL94V-0				
Pin material	Copper matte tin coated				
Potting material	Silicon, UL94V-0 rated				
Soldering temperature			+260	°C	Wave solder peak, 1.5mm from case 10s max. Not suitable for vapour phase soldering. For further details contact XP Power applications team.

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+100	°C	See derating curves.
Storage temperature	-55		+125	°C	
Case temperature			+105	°C	
Humidity			95	%RH	Non-condensing
Cooling	Natural convection				

Safety approvals

Safety Agency	Standard	Notes & conditions
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

EMC: emissions

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55032	Class B	See application notes
Radiated	EN55032	Class B	

Emissions - immunity

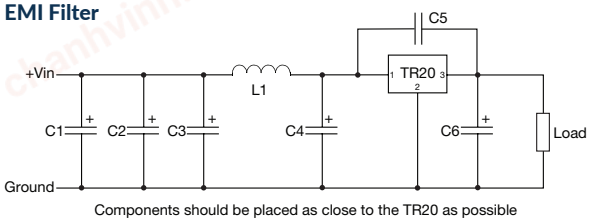
Phenomenon	Standard	Test level	Criteria	Notes & conditions
ESD immunity	EN61000-4-2	±6kV contact/±8kV air	A	
Radiated immunity	EN61000-4-3	20Vrms	A	
EFT/burst	EN61000-4-4	±2.0kV	A	See application notes
Surge	EN61000-4-5	±0.5kV	A	
Conducted	EN61000-4-6	10Vrms	A	
Magnetic fields	EN61000-4-8	100A/m	A	

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Application notes

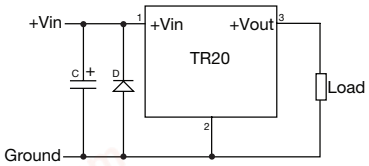
EMI Filter



Components should be placed as close to the TR20 as possible

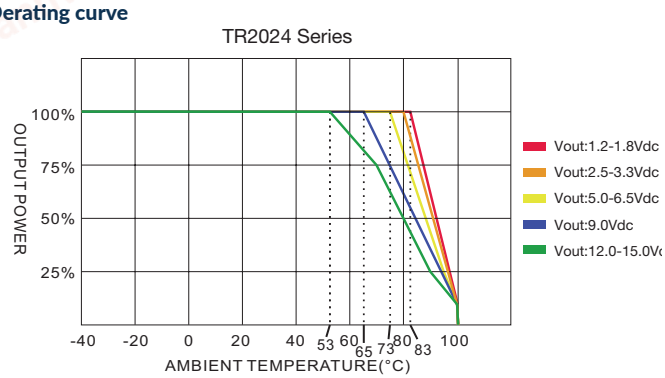
Part number	C1	C2	C3	C4	C5	L1
TR2005	10µF, 50VDC	Not fitted	Not fitted	10µF, 50VDC	1nF, 50VDC	22µH
TR2024	10µF, 50VDC	10µF, 50VDC	10µF, 50VDC	Not fitted	Not fitted	22µH

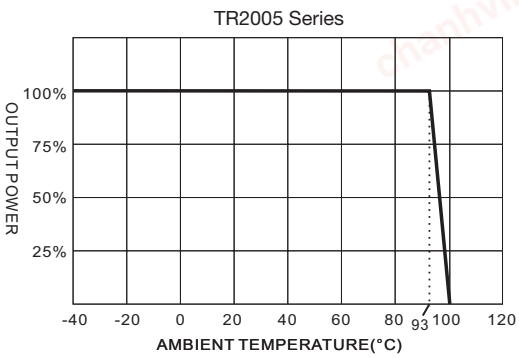
EFT Filter



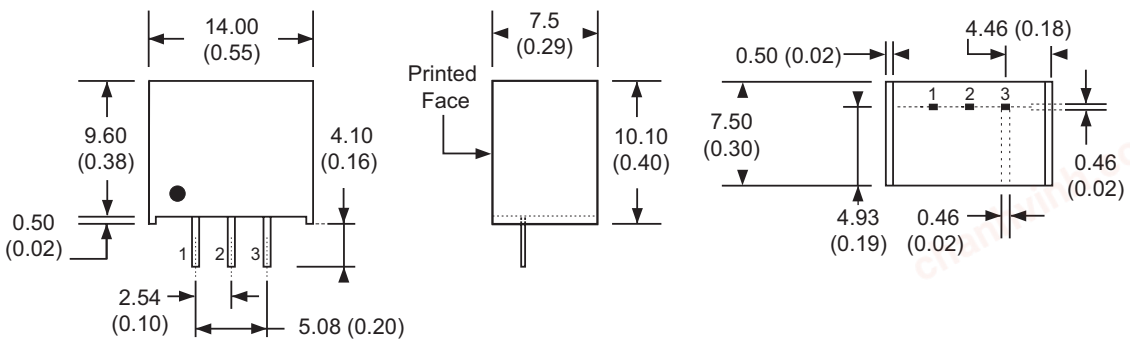
Part number	C	D
TR2005	3300µF/10VDC	SMDJ6.0A
TR2024	220µF/100VDC	SMDJ26A

Derating curve





Mechanical details



Pin connections	
Pin	**Function**
1	+Vin
2	Ground
3	+Vout

Notes:

1. All dimensions are in mm (inches).
2. Weight: 2.4g (0.005lbs) typical.
3. Pin diameter 0.55 ±0.15 (0.03±0.006)
3. Pin pitch tolerance: ±0.35 (±0.014)
5. Case and pin tolerances: ±0.5 (±0.02).