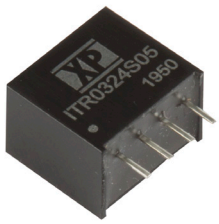
ITR03 series

3W

DC-DC converters

The ITR03 series of single output unregulated converters are ideal for use in portable industrial and laboratory equipment.

Offering 3W in a small lightweight SIP4 package, the ITR03 provides a useful increase in power density over the similarly packaged 2W IL series and a cost saving over the semi-regulated IR series of more than 20% based on resales.



Features

- Unregulated single outputs from 5.0 to 15VDC
- ±10% input range
- SIP4 package
- 3kVDC functional isolation
- High efficiency up to 91%
- Complies with EN55032 class B
- -40°C to +100°C operating temperature
- Full power to +85°C
- 3 year warranty

Applications

Autonomous equipment

Industrial

Technology

Dimensions

11.8 x 9.66 x 7.5mm (0.46” x 0.38” x 0.29”)

Models & ratings

Model number	Input voltage	Output voltage	Output current (full load)	Efficiency	Input current[1]		Maximum capacitive load[2]
					No load	Full load	
ITR0305S05	4.5-5.5VDC	5.0VDC	600mA	83%	50mA	723mA	3300µF
ITR0305S09		9.0VDC	333mA	87%	60mA	690mA	1200µF
ITR0305S12		12.0VDC	250mA	88%	55mA	682mA	1000µF
ITR0305S15		15.0VDC	200mA	88%	60mA	682mA	820µF
ITR0312S05	10.8-13.2VDC	5.0VDC	600mA	85%	25mA	294mA	3300µF
ITR0312S09		9.0VDC	333mA	89%	30mA	281mA	1200µF
ITR0312S12		12.0VDC	250mA	90%	30mA	278mA	1000µF
ITR0312S15		15.0VDC	200mA	91%	30mA	275mA	820µF

Continued on page 2

Notes:

1. Input currents measured at nominal input voltage.
2. All specifications at Ta = 25°C.
3. Standard tube quantity 40 pcs.

ITR03 series

Models & ratings

Model number	Input voltage	Output voltage	Output current (full load)	Efficiency	Input current[1]		Maximum capacitive load[2]
					No load	Full load	
ITR0324S05	21.6-26.4VDC	5.0VDC	600mA	83%	50mA	723mA	3300μF
ITR0324S09		9.0VDC	333mA	87%	60mA	690mA	1200μF
ITR0324S12		12.0VDC	250mA	88%	55mA	682mA	1000μF
ITR0324S15		15.0VDC	200mA	88%	60mA	682mA	820μF

Notes:

1. Input currents measured at nominal input voltage.
2. All specifications at Ta = 25°C.
3. Standard tube quantity 40 pcs.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	4.5	5	4.5	VDC	ITR0305 series
	10.8	12	13.2		ITR0312 series
	21.6	24	26.4		ITR0324 series
Input filter	Integrated capacitor				
Input reflected ripple			20	mA pk-pk	Through 12μH inductor and 47μF capacitor
Input surge			7	VDC for 100ms	ITR0305 series
			15		ITR0312 series
			28		ITR0324 series

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	5		15	VDC	See models and ratings table
Initial set accuracy			±3	%	See load regulation curves
Minimum load	10			%	Minimum load required for regulation
Line regulation			±1.2	%	Per 1% change in input voltage
Load regulation			±10	%	From 0 to 100% load
Transient response deviation			±5	% deviation	Recovery time 500μs, 25% load step change
Ripple & noise			100	mV pk-pk	Single output. 20MHz bandwidth. Measured using 0.1μF ceramic capacitor and 10μF electrolytic capacitor
Maximum capacitive load	See models and ratings table				
Temperature coefficient			0.02	%/°C	20MHz bandwidth, measured using 0.1μF ceramic capacitor

ITR03 series

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		88		%	See models and ratings table
Isolation: input to output	3000			VDC	Functional insulation. Working voltage 100Vrms
Switching frequency	40		70	kHz	
Isolation resistance	10^9			Ω	Variable
Isolation capacitance			65	pF	
Power density			3.6 (59)	W/cm³ (W/in³)	MIL-HDBK-217F, +25°C GB
Mean time between failure	6.7			Mhrs	
Case material	Non conductive black plastic (UL94V-0 rated)				
Potting material	Silicon (UL94V-0 rated)				
Pin material	C5191R-H Solder-coated				
Solder process	JEDEC J-STD 020D.1. 260°C max. 1.5mm from case 10s max.				
Weight		2.2 (0.0048)		g (lb)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+100	°C	See derating curve
Storage temperature	-55		+125	°C	
Case temperature			+115	°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	

Emissions - EMC

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55032	Class B	External components required. See application notes.
Radiated	EN55032	Class B	

Immunity - EMC

Phenomenon	Standard	Test level	Criteria	Notes & conditions
ESD Immunity	EN61000-4-2	±8 kV	A	Air discharge
Radiated immunity	EN61000-4-3	10V/M	A	
EFT/Burst	EN61000-4-4	±2kV	A	External input capacitors required 100µF/250V
Surge	EN61000-4-5	±2kV	A	External input capacitors required 100µF/250V
Conducted immunity	EN61000-4-6	10 Vrms	A	
Magnetic fields	EN61000-4-8	100A/m	A	

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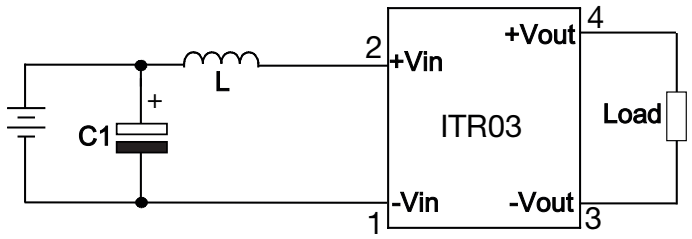
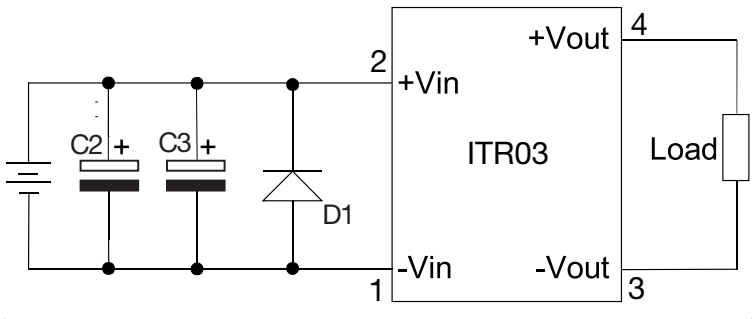
Application notes

EMI filter



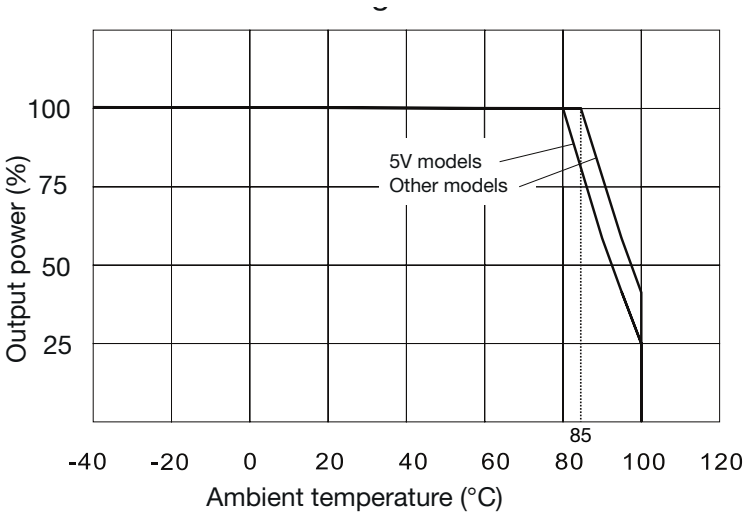
Model	C1	L
ITR0305	1206, 2.2μF, 50V	2.2μH
ITR0312	1206, 4.7μF, 50V	4.7μH
ITR0324	1206, 4.7μF, 50V	4.7μH

EFT/surge filter



Model	C2 & C3	D1
ITR0305	100μF, 250V	SMDJ8.0A
ITR0312	100μF, 250V	SMDJ16A
ITR0324	100μF, 250V	SMDJ30A

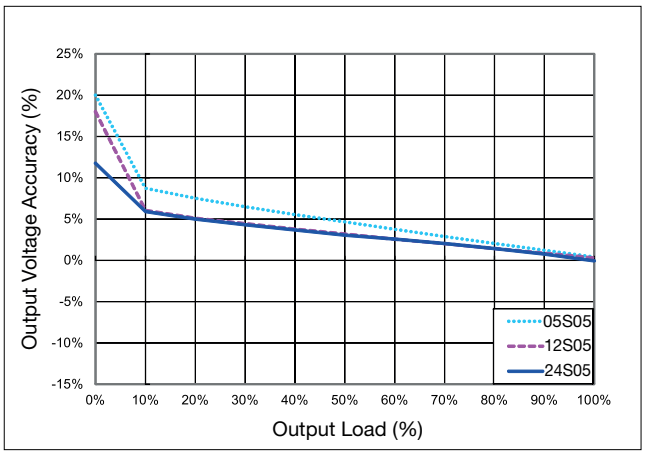
Derating curve



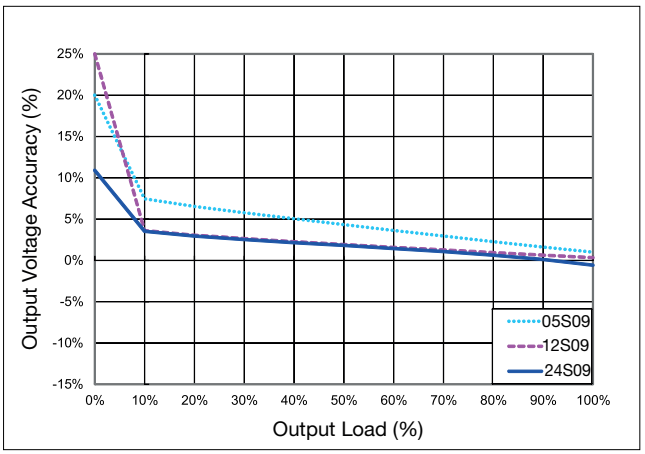
Application notes

Voltage regulation curves

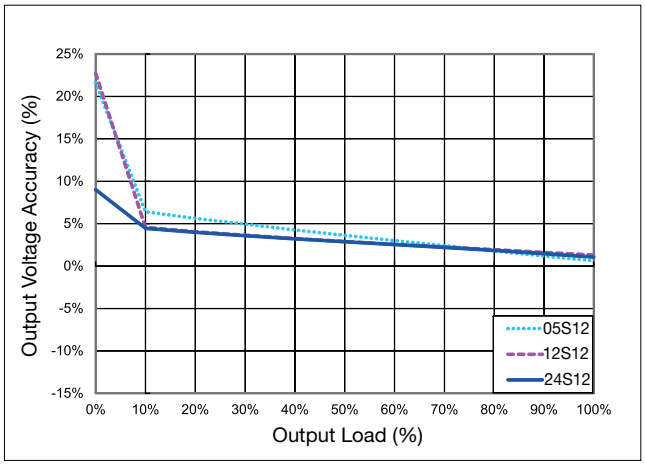
ITR03xxS05



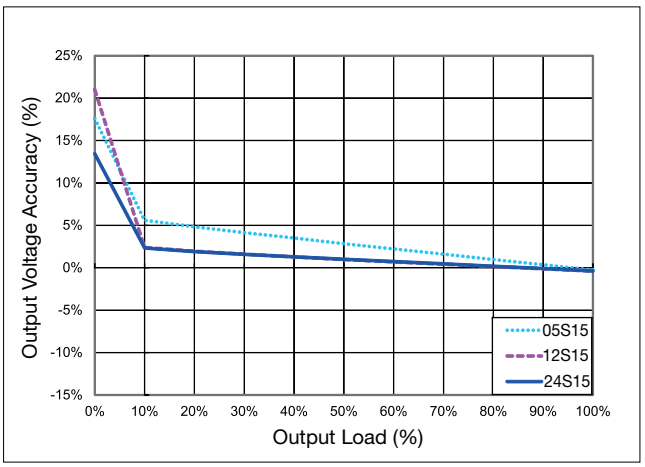
ITR03xxS09



ITR03xxS12



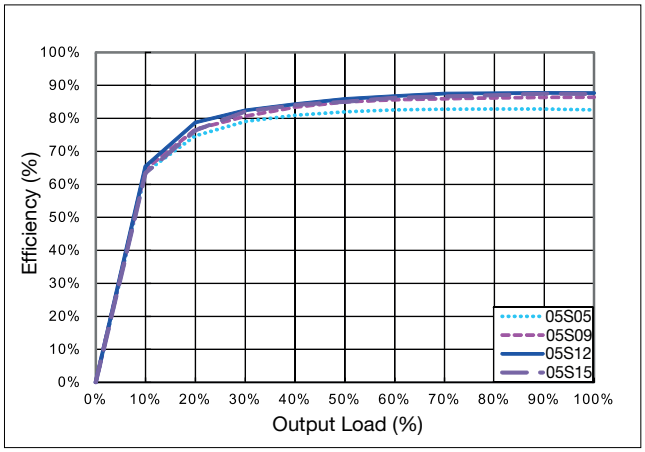
ITR03xxS15



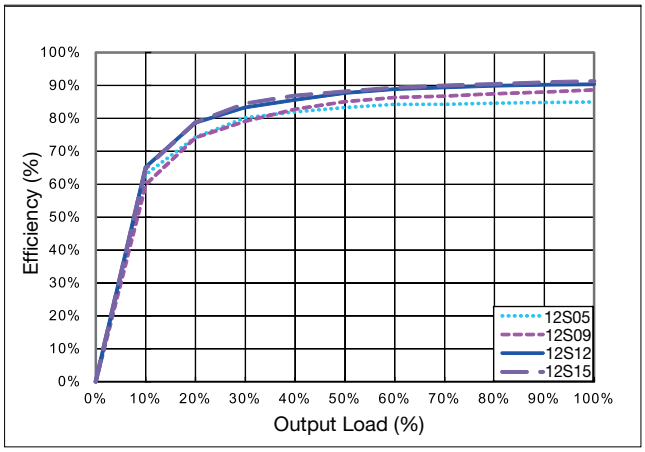
Application notes

Efficiency curves

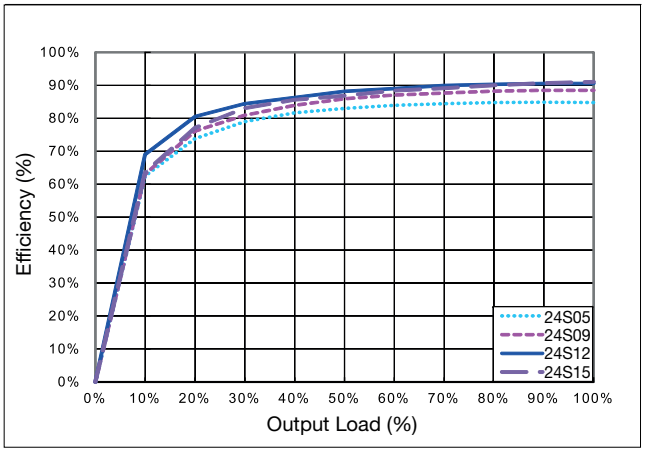
ITR0305xxx



ITR0312xxx



ITR0324xxx



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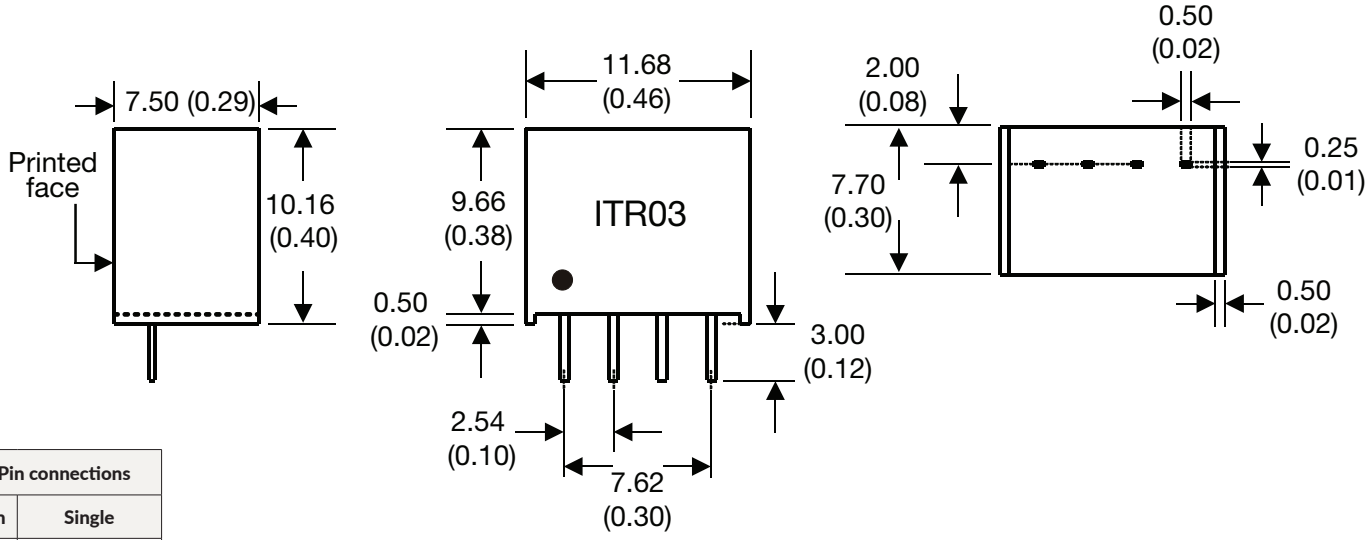
Mechanical details



Pin connections	
Pin	**Single**
1	-Vin
2	+Vin
3	-Vout
4	+Vout

Notes:

1. All dimensions are in mm (inches)
2. Weight: 2.2 (0.0048) g (lb) approx.
3. Pin pitch tolerance: ±0.35 (±0.014)
4. Pin diameter: 0.5 ±0.05 (0.02 ±0.002)
5. Case tolerance: ±0.5 (±0.02)