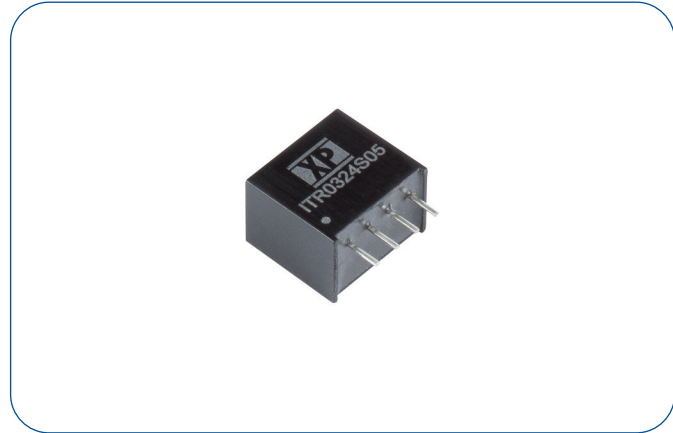


### 3 Watts

- Unregulated Single Outputs from 5 to 15VDC
- $\pm 10\%$  Input Range, Nominal 5V, 12V and 24VDC
- Compact SIP4 Package
- 3.0kVDC Input/Output Isolation
- High Efficiency
- Complies with EN55032 Class B
- $-40^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$  Operating Temperature
- Full Power Operating Temperature up to  $+85^{\circ}\text{C}$
- MTBF  $>6.7$  Mhrs (MIL-HDBK-217F,  $+25^{\circ}\text{C}$  GB)
- 3 Year Warranty



#### Dimensions:

ITR03: 0.46 x 0.38 x 0.29" (11.8 x 9.66 x 7.5mm)

The ITR series offers a 3W compact isolated, cost effective DC-DC module with a practical range of input voltages and output voltages. Features include high efficiency, industrial temperature range and a robust encapsulated construction.

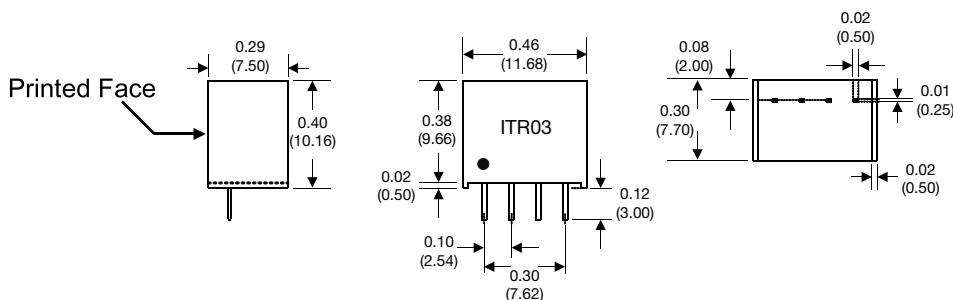
### Models & Ratings

Input Voltage	Output Voltage	Output Current (Full Load)	Input Current <sup>(1)</sup>		Maximum Capacitive Load <sup>(2)</sup>	Efficiency	Model Number
			No Load	Full Load			
5V (4.5 - 5.5V)	5V	600mA	50mA	723mA	3300 $\mu\text{F}$	83%	ITR0305S05
	9V	333mA	60mA	690mA	1200 $\mu\text{F}$	87%	ITR0305S09
	12V	250mA	55mA	682mA	1000 $\mu\text{F}$	88%	ITR0305S12
	15V	200mA	60mA	682mA	820 $\mu\text{F}$	88%	ITR0305S15
12V (10.8 - 13.2V)	5V	600mA	25mA	294mA	3300 $\mu\text{F}$	85%	ITR0312S05
	9V	333mA	30mA	281mA	1200 $\mu\text{F}$	89%	ITR0312S09
	12V	250mA	30mA	278mA	1000 $\mu\text{F}$	90%	ITR0312S12
	15V	200mA	30mA	275mA	820 $\mu\text{F}$	91%	ITR0312S15
24V (21.6 - 26.4V)	5V	600mA	15mA	147mA	3300 $\mu\text{F}$	85%	ITR0324S05
	9V	333mA	15mA	141mA	1200 $\mu\text{F}$	89%	ITR0324S09
	12V	250mA	15mA	139mA	1000 $\mu\text{F}$	90%	ITR0324S12
	15V	200mA	15mA	138mA	820 $\mu\text{F}$	91%	ITR0324S15

### Notes

1. Input currents measured at nominal input voltage.
2. All specifications at  $T_a = 25^{\circ}\text{C}$ .
3. Standard tube quantity 40 pcs.

### Mechanical Details



Pin Connections	
Pin	Single
1	-Vin
2	+Vin
3	-Vout
4	+Vout

### Notes

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

### 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 27 $\mu$ H inductor and 47 $\mu$ F 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			$\pm 3$	%	See load regulation curves
Minimum Load	10			%	Minimum load required for regulation
Line Regulation			$\pm 1.2$	%	Per 1% change in input voltage
Load Regulation			$\pm 10$	%	From 0 to 100% load
Transient Response Deviation			$\pm 5$	% deviation	Recovery time 500 $\mu$ s, 25% load step change
Ripple & Noise			100	mV pk-pk	Single Output. 20MHz bandwidth. Measured using 0.1 $\mu$ F ceramic capacitor and 10 $\mu$ F electrolytic capacitor
Maximum Capacitive Load					See Models and Ratings table
Temperature Coefficient			0.02	%/ $^{\circ}$ C	

### 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	From 10% to full load
Isolation Resistance	10 <sup>9</sup>			$\Omega$	
Isolation Capacitance			65	pF	
Power Density			59	Win <sup>3</sup>	
Mean Time Between Failure	6.7			Mhrs	MIL-HDBK-217F, +25 $^{\circ}$ C GB
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 $^{\circ}$ C max. 1.5mm from case 10s max.				
Weight		0.0048 (2.2)		lb (g)	

### Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+100	$^{\circ}$ C	See derating curve
Storage Temperature	-55		+125	$^{\circ}$ C	
Case Temperature			+115	$^{\circ}$ C	
Humidity			95	%RH	Non-condensing
Cooling	Natural convection				

### EMC: Emissions

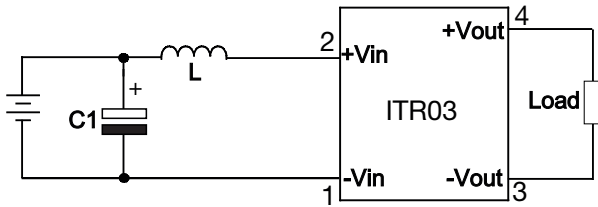
Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55032	Class B	External components required. See application notes.
Radiated	EN55032	Class B	

### EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	±8 kV	A	Air Discharge
Radiated	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	EN61000-4-6	10 Vrms	A	
Magnetic Fields	EN61000-4-8	100A/m	A	

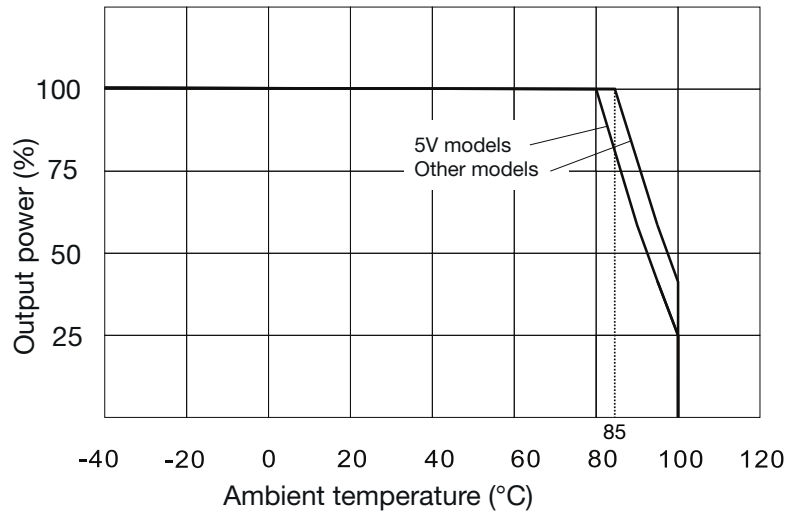
### Application Notes

#### EMI Filter

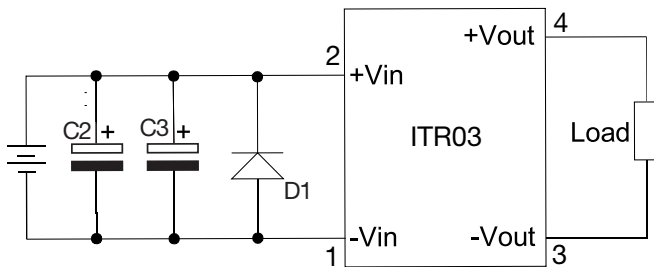


Model	C1	L
ITR0305	1206, 2.2µF, 50V	2.2µH
ITR0312	1206, 4.7µF, 50V	4.7µH
ITR0324		

#### Derating Curve



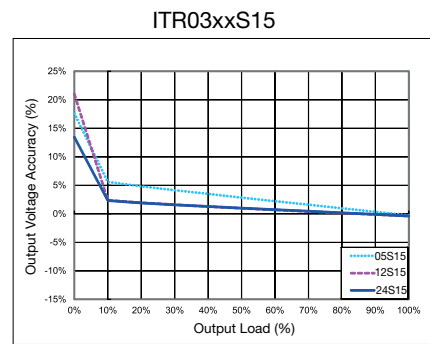
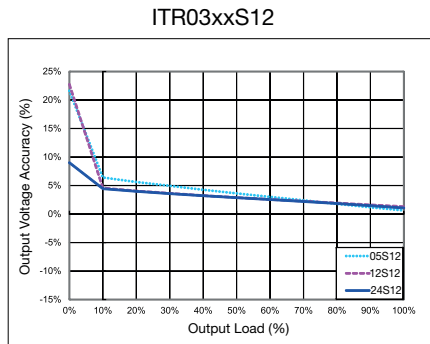
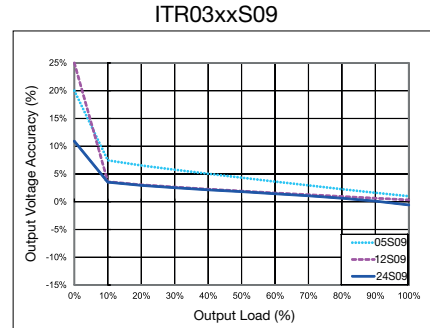
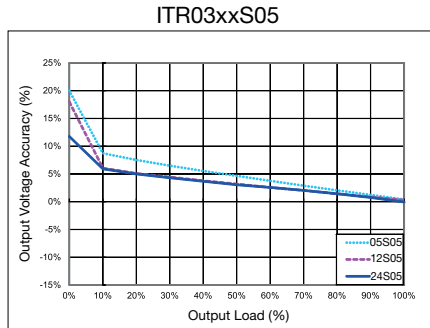
#### EFT/Surge Filter



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

### Application Notes

### Voltage Regulation Curves



### Efficiency Curves

