

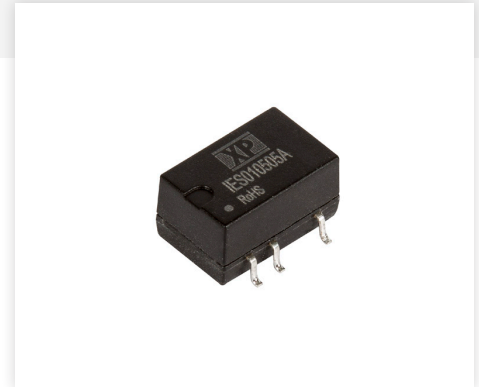
# 1W

## DC-DC POWER SUPPLIES

The single output IES01 series is an ideal solution for isolating voltage rails in a distributed power supply architecture such as analog, digital, data and relay circuits. This product family offers a compact design with high efficiency, 1.5kV isolation with 3.0kV optional, short circuit protection and high operating temperature.

### Features

- Unregulated single output
- ±10% input range
- Single outputs 3.3 to 24VDC
- SMD8 DIP package
- 1.5kVDC isolation, 3kVDC option
- UL62368-1 safety approvals<sup>(3)</sup>
- Continuous short circuit protection
- Operating temperature -40°C to +105°C
- Full load to 100°C
- 3 year warranty



### Applications



Industry 4.0



Instrumentation



Laboratory

### Dimensions

0.52" x 0.335" x 0.285" (13.2 x 8.5 x 7.25 mm)

### Models & Ratings

Model Number <sup>(5,6)</sup>	Input Voltage	Output Voltage	Input Current <sup>(1)</sup>		Output Current		Maximum Capacitive Load	Efficiency <sup>(2)</sup>
			No Load	Full Load	Minimum	Maximum		
IES0103S3V3 <sup>(3)</sup>	3V3 (2.97 - 3.63V)	3.3V	12mA	394mA	30mA	303mA	2400µF	77%
IES0103S05 <sup>(3)</sup>		5V	12mA	370mA	20mA	200mA	2400µF	82%
IES0103S09 <sup>(3)</sup>		9V	12mA	361mA	11mA	111mA	1000µF	84%
IES0103S12 <sup>(3)</sup>		12V	12mA	361mA	8mA	83mA	560µF	84%
IES0103S15 <sup>(3)</sup>		15V	12mA	361mA	7mA	67mA	560µF	84%
IES0103S24 <sup>(3)</sup>		24V	12mA	361mA	4mA	42mA	220µF	84%
IES0105S03	5V (4.5-5.5V)	3.3V	5mA	270mA	30mA	303mA	2400µF	74%
IES0105S05		5V	5mA	270mA	20mA	200mA	2400µF	82%
IES0105S06 <sup>(3)</sup>		6V	5mA	270mA	17mA	167mA	2400µF	82%
IES0105S09		9V	12mA	241mA	12mA	111mA	1000µF	83%
IES0105S12		12V	12mA	241mA	9mA	84mA	560µF	83%
IES0105S15		15V	18mA	241mA	7mA	67mA	560µF	83%
IES0105S24	24V	18mA	241mA	4mA	42mA	220µF	85%	
IES0112S3V3 <sup>(3)</sup>	12V (10.8 - 13.2V)	3.3V	8mA	102mA	30mA	303mA	2400µF	76%
IES0112S05		5V	8mA	107mA	20mA	200mA	2400µF	82%
IES0112S09		9V	8mA	106mA	12mA	111mA	1000µF	83%
IES0112S12		12V	8mA	106mA	9mA	84mA	560µF	83%
IES0112S15		15V	8mA	106mA	7mA	67mA	560µF	83%
IES0112S24		24V	8mA	103mA	4mA	42mA	220µF	85%
IES0115S05	15V (13.5-16.5V)	5V	8mA	86mA	20mA	200mA	2400µF	82%
IES0115S09		9V	8mA	82mA	12mA	111mA	1000µF	82%
IES0115S15		15V	8mA	85mA	7mA	67mA	560µF	83%
IES0124S3V3 <sup>(3)</sup>	24V (21.6 - 26.4V)	3.3V	8mA	53mA	30mA	303mA	2400µF	80%
IES0124S05		5V	8mA	55mA	20mA	200mA	2400µF	82%
IES0124S09		9V	8mA	55mA	12mA	111mA	1000µF	83%
IES0124S12		12V	8mA	55mA	9mA	84mA	560µF	83%
IES0124S15		15V	8mA	55mA	7mA	67mA	560µF	83%
IES0124S24		24V	8mA	53mA	4mA	42mA	220µF	85%

#### Notes:

1. Typical input currents measured at nominal input voltage.
2. Typical value at full load.
3. Designed to meet UL62368-1.
4. Standard tube quantity = 38.

5. For tape & reel option add suffix -TR. Reel quantity = 500.
6. Optional 3kVDC isolation add suffix '-H'.
7. Results measured at +25°C unless stated otherwise.

## Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	2.97		26.4	VDC	See models and ratings table
Input Reflected Ripple		15/30	63	mA pk-pk	Through 4.7µH inductor and 220µF capacitor, others / 3V3 input
Input Surge			5	VDC	IES0103 for max 1s
			9		IES0105 for max 1s
			18		IES0112 for max 1s
			21		IES0115 for max 1s
			30		IES0124 for max 1s
Input Current	See models and ratings table				
Input Filter	Capacitor				

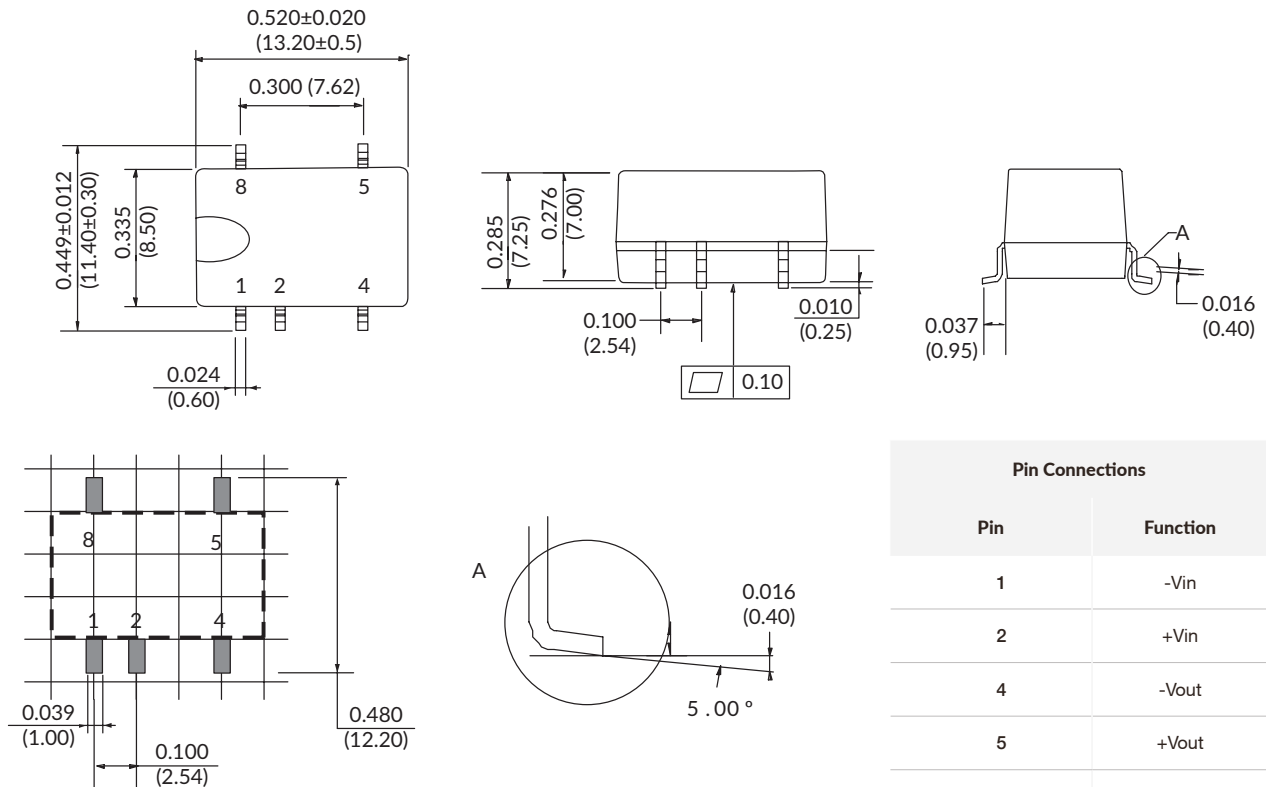
## Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	3.3		24	VDC	See models and ratings table
Initial Set Accuracy	See Load Regulation curves				
Minimum Load	10			%	
Line Regulation			±1.2 / ±1.5	%	Per ±1% change of input voltage Others / 3V3 output
Load Regulation	See Load Regulation curves				
Ripple and Noise		30/50	75/100	mV pk-pk	For models ≤15V/24V output, 20 MHz bandwidth, measured using 10µF capacitor at +25°C
Short Circuit Protection	Continuous, with auto recovery				
Maximum Capacitive Load	See Models and Ratings table				
Temperature Coefficient			±0.02	%/°C	

## General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	See Models and Ratings table				
Isolation: Input to Output	1500/3000			VDC	IES/IES-H functional
Switching Frequency	240	270	275	kHz	Low input voltage 10% load to high input voltage at full load
	195	220	245		3V3 input
Isolation Resistance	10 <sup>9</sup>			Ω	Input to output, tested at 500VDC
Isolation Capacitance		20		pF	Input to output
Power Density			20.8	W/in <sup>3</sup>	
Mean Time Between Failure	3500			khrs	MIL-HDBK-217F, 25°C GB.
Weight	0.003 (1.4)			lb(g)	
Recommended Solder Profile	IPC/JEDEC J-STD-020D.1, peak temp ≤245°C, max duration, ≤60s at 217°C				
MSL	Level 1				
Case Material	Black plastic, flame retardant UL94V-0				
Pin Material	Phosphor bronze, solder coated				
Water Wash	Non-soaking water wash with de-ionised water. Dry thoroughly.				

### Mechanical Details



Pin Connections	
Pin	Function
1	-Vin
2	+Vin
4	-Vout
5	+Vout
8	No Connection <sup>(5)</sup>

Recommended Footprint  
Top View grid: 0.1 x 0.1 in (2.54 x 2.54 mm)

### Notes:

1. All dimensions are in inches (mm).
2. Weight: 0.003lbs (1.4g) typical.
3. Pin pitch and length tolerance: ±0.004 (±0.10).
4. Case tolerance: ±0.02 (±0.5).
5. Pin 8 leave floating.

### Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+105	°C	Derate from 100% load at +100°C to 80% load at 105°C. For 3V3 input derate from +85°C.
Storage Temperature	-55		+125	°C	
Case Temperature			+115	°C	Ambient +85°C
Case Temperature Rise		25/15		°C	Ambient 25°C, 3V3 output/others
Operating Humidity			95	%RH	Non-condensing
Cooling	Natural convection				

EMC: Emissions

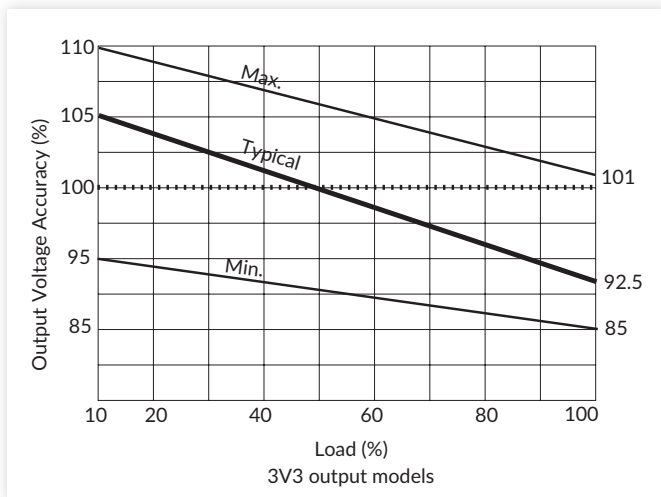
Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55032	Class B	See Application Note for Class B filter
Radiated	EN55032	Class B	

EMC: Immunity

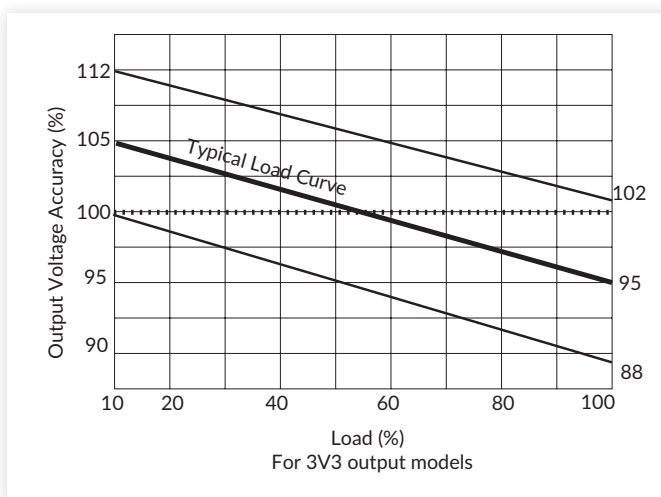
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD Immunity	EN61000-4-2	±4kV contact / ±8kV air discharge	B	

Load Regulation

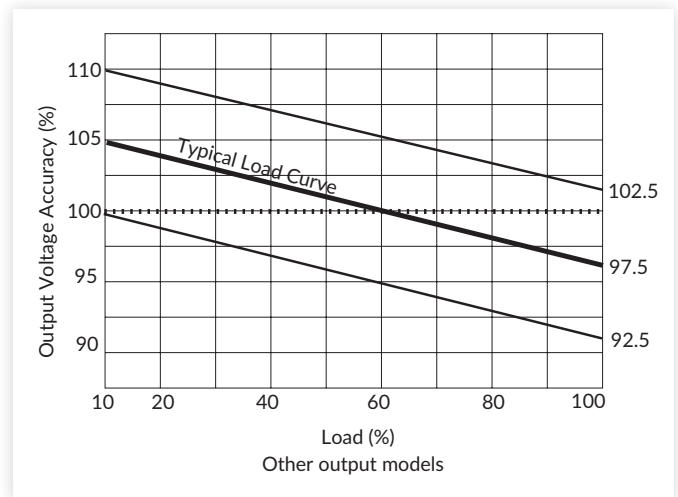
3V3 input series



5V input series

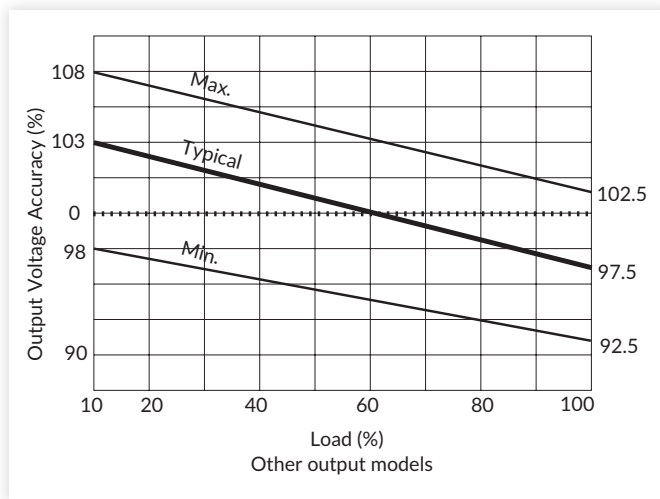


3V3 & 5V input series

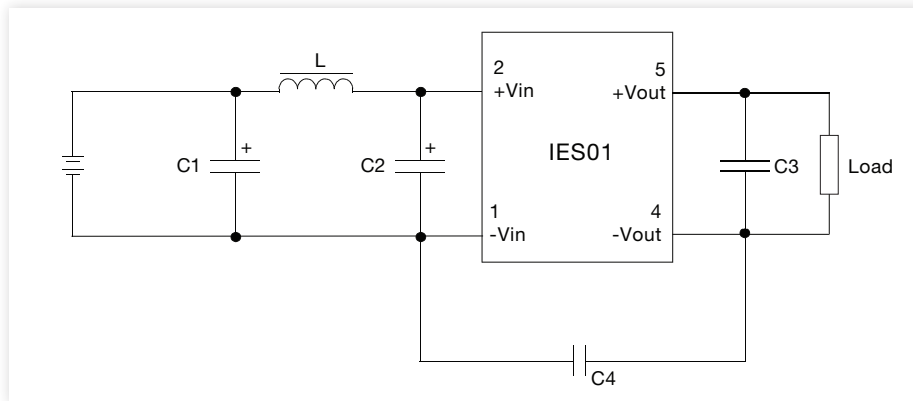


### Application Notes

#### Other Input Series



#### EMI Filter for Class B Emissions



#### 3V3/5V Input:

Output Voltage	C1, C2	C3	C4	L
3V3	4.7μF, 25V	10μF, 16V	Not fitted	6.8μH
5V		10μF, 16V		
9V		2.2μF, 25V		
12V		2.2μF, 25V	1nF	
15V		1μF, 25V		
24V		0.47μF, 50V		

C4: 2kV, ceramic. Upgrade C4 to 4kV for 3kV isolation option -H.

#### Other Input Series:

Output Voltage	C1, C2	C3	C4	L
3V3/5V	4.7μF, 50V	10μF, 16V	270pF	6.8μH
9V		2.2μF, 16V		
12V		2.2μF, 25V		
15V		1μF, 25V		
24V		1μF, 50V		

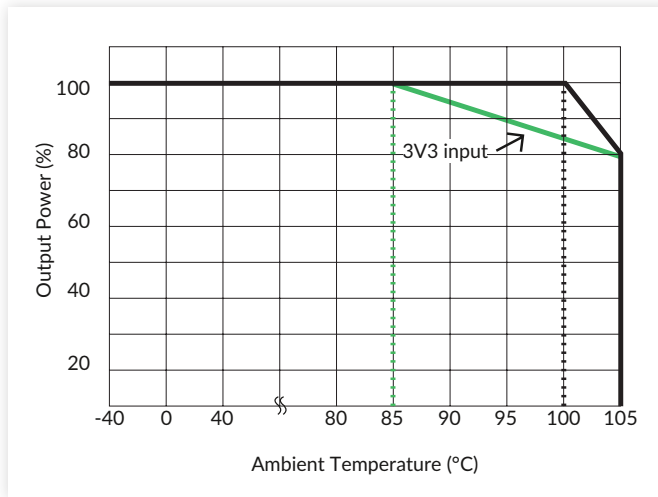
C4: 2kV, ceramic. Upgrade C4 to 4kV for 3kV isolation option -H.

**Safety Approvals**

Safety Agency	Standard	Notes & Conditions
UL	UL62368-1	
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

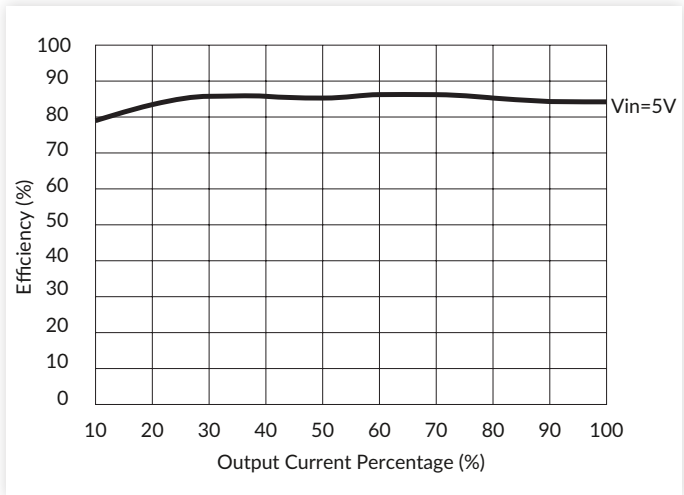
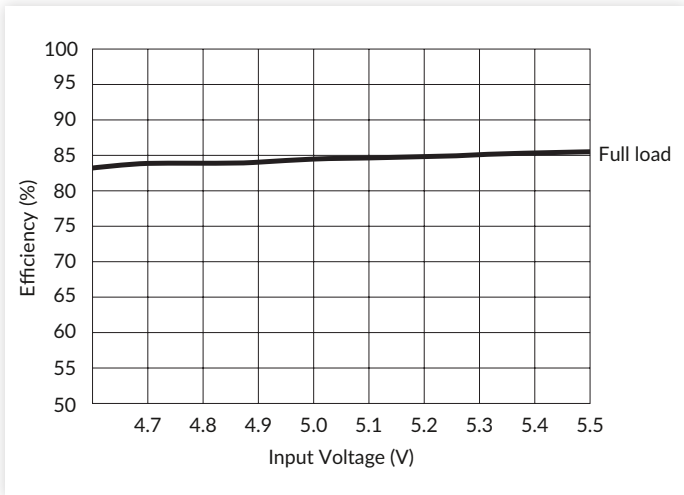
**Application Notes**

Temperature Derating Curve



Efficiency vs Input Voltage (IES0105S05)

Efficiency vs Output Load (IES0105S05)



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