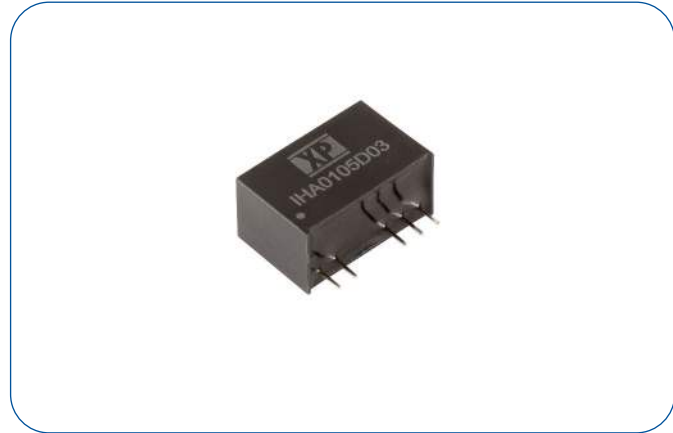


### 1 Watt

- High Isolation, 6000 V
- 250 VAC Working Voltage
- Single and Dual Outputs
- Bipolar Outputs for MOSFET and IGBT Drives
- SIP7 Package
- -40 °C to +85 °C Operation
- Full Load at 85 °C Ambient
- MTBF 2.5 Mhrs
- 3 Year Warranty



#### Dimensions:

**IHA01:**  
0.77 x 0.39 x 0.49" (19.5 x 9.8 x 12.5 mm)

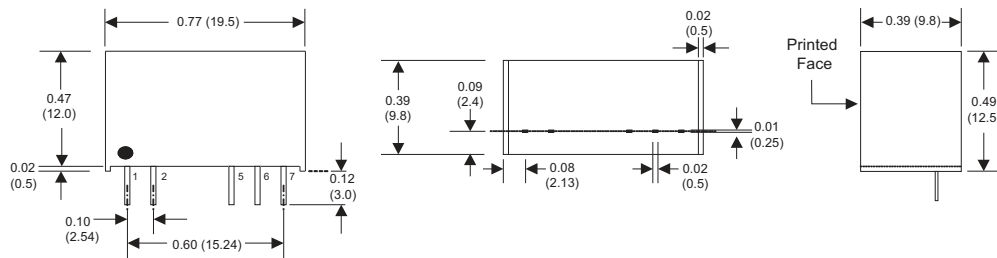
### Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	4.5		5.5	VDC	5 V nominal
	8.1		9.9		9 V nominal
	10.8		13.2		12 V nominal
	13.5		16.5		15 V nominal
	21.6		26.4		24 V nominal
Input Reflected Ripple Current		20		mA pk-pk	Through 12 µH inductor and 47 µF capacitor
Input Surge			7	VDC for 100 ms	5 V nominal
			12		9 V nominal
			15		12 V nominal
			18		15 V nominal
			28		24 V nominal

### Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	3.3		30	VDC	See Models and Ratings table
Initial Set Accuracy			±3	%	At full load
Minimum Load	10			%	Minimum load required to meet specified regulation
Line Regulation			±1.2	%/1%	Output changes by max of 1.2% for each 1% change in input voltage
Load Regulation			10	%	From 10% to full load, see application note
Cross Regulation		±4		%	On dual output models, when one output is at 25% load and other is varied from 10% load to full load
Ripple & Noise			200	mV pk-pk	20 MHz bandwidth. Measured using 10 µF electrolytic in parallel with 0.1 µF ceramic capacitor
Short Circuit Protection					Continuous
Maximum Capacitive Load					See Models and Ratings table
Temperature Coefficient			0.03	%/°C	

### Mechanical Details



Pin Connections		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	No Pin	Common
7	+Vout	+Vout

#### Notes

1. All dimensions are in inches (mm)
2. Weight: 0.009 lbs (4.3 g) approx.
3. Pin diameter: 0.02±0.002 (0.5±0.05)

4. Pin pitch and length tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)

### Models & Ratings

Input Voltage	Output Voltage	Output Current	Input current		Max. capacitive load	Efficiency	Model Number
			No Load	Full Load			
4.5-5.5 V	3V3	303 mA	30 mA	280 mA	220 µF	71%	IHA0105S3V3
	5 V	200 mA	30 mA	265 mA	220 µF	75%	IHA0105S05
	9 V	111 mA	30 mA	260 mA	220 µF	77%	IHA0105S09
	12 V	83 mA	45 mA	265 mA	220 µF	76%	IHA0105S12
	15 V	67 mA	40 mA	260 mA	220 µF	77%	IHA0105S15
	±3V3	±151 mA	30 mA	275 mA	±100 µF	73%	IHA0105D03
	±5 V	±100 mA	30 mA	265 mA	±100 µF	75%	IHA0105D05
	±9 V	±56 mA	30 mA	260 mA	±100 µF	77%	IHA0105D09
	±12 V	±42 mA	45 mA	265 mA	±100 µF	76%	IHA0105D12
	±15 V	±33 mA	40 mA	260 mA	±100 µF	77%	IHA0105D15
	+15 V / -9 V	+33 mA / -55 mA	40 mA	265 mA	±100 µF	76%	IHA0105D1509
8.1-9.9 V	3V3	303 mA	20 mA	155 mA	220 µF	72%	IHA0109S3V3
	5 V	200 mA	25 mA	145 mA	220 µF	77%	IHA0109S05
	9 V	111 mA	25 mA	140 mA	220 µF	79%	IHA0109S09
	12 V	83 mA	25 mA	145 mA	220 µF	77%	IHA0109S12
	15 V	67 mA	25 mA	140 mA	220 µF	79%	IHA0109S15
	±3V3	±151 mA	25 mA	155 mA	±100 µF	73%	IHA0109D03
	±5 V	±100 mA	25 mA	150 mA	±100 µF	75%	IHA0109D05
	±9 V	±56 mA	25 mA	140 mA	±100 µF	79%	IHA0109D09
	±12 V	±42 mA	25 mA	145 mA	±100 µF	77%	IHA0109D12
	±15 V	±33 mA	25 mA	140 mA	±100 µF	79%	IHA0109D15
	+15 V / -9 V	+33 mA / -55 mA	25 mA	140 mA	±100 µF	78%	IHA0109D1509
10.8-13.2 V	3V3	303 mA	20 mA	120 mA	220 µF	70%	IHA0112S3V3
	5 V	200 mA	20 mA	115 mA	220 µF	73%	IHA0112S05
	9 V	111 mA	20 mA	110 mA	220 µF	77%	IHA0112S09
	12 V	83 mA	20 mA	115 mA	220 µF	73%	IHA0112S12
	15 V	67 mA	20 mA	110 mA	220 µF	76%	IHA0112S15
	±3V3	±151 mA	20 mA	115 mA	±100 µF	72%	IHA0112D03
	±5 V	±100 mA	20 mA	115 mA	±100 µF	73%	IHA0112D05
	±9 V	±56 mA	20 mA	110 mA	±100 µF	77%	IHA0112D09
	±12 V	±42 mA	20 mA	115 mA	±100 µF	74%	IHA0112D12
	±15 V	±33 mA	20 mA	110 mA	±100 µF	76%	IHA0112D15
	+15 V / -9 V	+33 mA / -55 mA	20 mA	110 mA	±100 µF	76%	IHA0112D1509
13.5-16.5 V	3V3	303 mA	15 mA	91 mA	220 µF	73%	IHA0115S3V3
	5 V	200 mA	15 mA	87 mA	220 µF	77%	IHA0115S05
	9 V	111 mA	15 mA	83 mA	220 µF	80%	IHA0115S09
	12 V	83 mA	15 mA	83 mA	220 µF	80%	IHA0115S12
	15 V	67 mA	15 mA	84 mA	220 µF	79%	IHA0115S15
	±3V3	±151 mA	15 mA	89 mA	±100 µF	75%	IHA0115D03
	±5 V	±100 mA	15 mA	84 mA	±100 µF	79%	IHA0115D05
	±9 V	±56 mA	15 mA	82 mA	±100 µF	81%	IHA0115D09
	±12 V	±42 mA	15 mA	83 mA	±100 µF	80%	IHA0115D12
	±15 V	±33 mA	15 mA	83 mA	±100 µF	80%	IHA0115D15
	+15 V / -9 V	+33 mA / -55 mA	12 mA	79 mA	±100 µF	84%	IHA0115D1509
21.6-26.4 V	3V3	303 mA	15 mA	60 mA	220 µF	70%	IHA0124S3V3
	5 V	200 mA	15 mA	59 mA	220 µF	71%	IHA0124S05
	9 V	111 mA	15 mA	60 mA	220 µF	70%	IHA0124S09
	12 V	83 mA	15 mA	58 mA	220 µF	72%	IHA0124S12
	15 V	67 mA	15 mA	57 mA	220 µF	73%	IHA0124S15
	±3V3	±151 mA	10 mA	61 mA	±100 µF	68%	IHA0124D03
	±5 V	±100 mA	15 mA	60 mA	±100 µF	69%	IHA0124D05
	±9 V	±56 mA	15 mA	57 mA	±100 µF	73%	IHA0124D09
	±12 V	±42 mA	15 mA	58 mA	±100 µF	72%	IHA0124D12
	±15 V	±33 mA	15 mA	56 mA	±100 µF	75%	IHA0124D15
	+15 V / -9 V	+33 mA / -55 mA	15 mA	56 mA	±100 µF	74%	IHA0124D1509

### Notes

Input currents measured at nominal input voltage.

### General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		77		%	See Models and Ratings table
Isolation: Input to Output	6000			VDC	
Isolation Working Voltage			250	VAC	
Isolation Resistance	10 <sup>9</sup>			Ω	
Isolation Capacitance			10	pF	
Switching Frequency	20		50	kHz	
Power Density			6.8	W/in <sup>3</sup>	
Mean Time Between Failure	2.39			MHrs	MIL-HDBK-217F, +25 °C GB
Weight		0.009 (4.2)		lb (g)	

### Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+85	°C	No thermal derating
Storage Temperature	-40		+125	°C	
Case Temperature			+100	°C	
Humidity	2.5		95	%RH	Non-condensing
Cooling					Natural convection

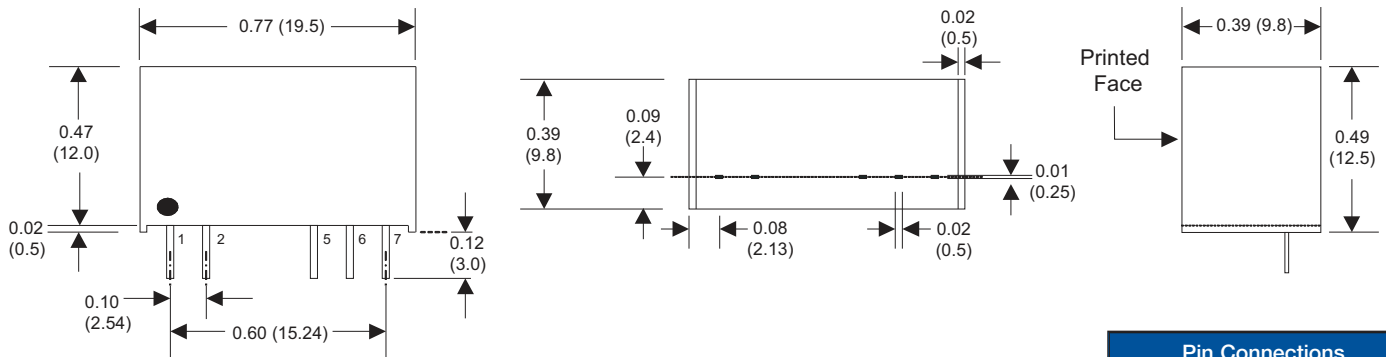
### EMC: Emissions

Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55022	Class B	See Application Note
Radiated	EN55022	Class B	

### EMC: Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD Immunity	EN61000-4-2	$\pm 6/\pm 8$ kV	A	Contact/Air Discharge
Radiated Immunity	EN61000-4-3	10 Vrms	A	
EFT/Burst	EN61000-4-4	2 kV	A	External components required, see application notes
Conducted Immunity	EN61000-4-6	10 V rms	A	
Magnetic Fields	EN61000-4-8	1 A/m	A	

### Mechanical Details



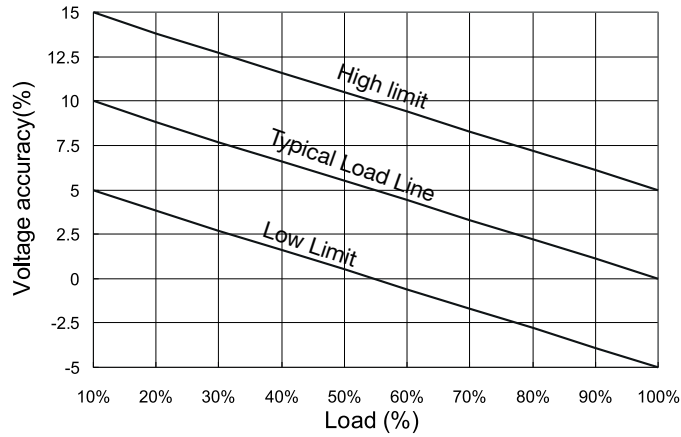
### Notes

- All dimensions are in inches (mm)
- Weight: 0.009 lbs (4.3 g) approx.
- Pin diameter:  $0.02 \pm 0.002$  (0.5  $\pm$  0.05)
- Pin pitch and length tolerance:  $\pm 0.014$  ( $\pm 0.35$ )
- Case tolerance:  $\pm 0.02$  ( $\pm 0.5$ )

Pin Connections		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
5	-Vout	-Vout
6	No Pin	Common
7	+Vout	+Vout

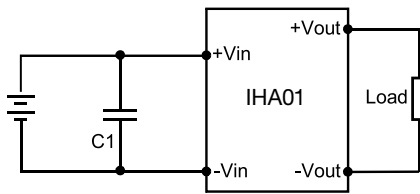
### Application Note

#### Regulation



#### EFT Filter

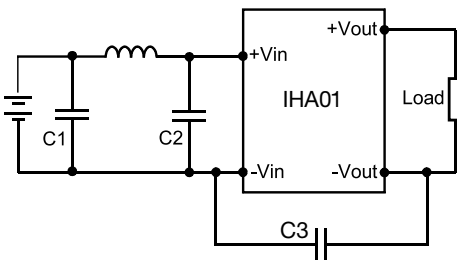
Input component C1 is used to help meet EFT test requirements for the module.



	C1
IHA0105XXXX	470 μF/35 V
IHA0109XXXX	470 μF/35 V
IHA0112XXXX	470 μF/35 V
IHA0115XXXX	470 μF/35 V
IHA0124XXXX	470 μF/35 V

#### EMI Filter

Input filter components (C1, C2, C3 and L) are used to help meet conducted emissions requirements for the module. These components should be mounted as close as possible to the module, and all leads should be minimised to decrease radiated noise.



	C1	L	C2	C3
IHA0105XXXX	1206, 4.7 μF/ 50 V	18 μH		
IHA0109XXXX	1206, 4.7 μF/ 50 V	18 μH		
IHA0112XXXX	1206, 4.7 μF/ 50 V	18 μH		
IHA0115XXXX	1206, 4.7 μF/ 50 V	18 μH		
IHA0124XXXX	1206, 4.7 μF/ 50 V	18 μH	1210, 2.2 μF/ 100 V	1206, 470 pF/ 2 kV