



ISH Series DC-DC Converter

Key Features

- Output Power: 2 Watts
- Single Output Configuration
- SMD Package Design
- Industry Standard Pinout
- Wide Operating Temperature Range: -40 °C to +105 °C
- Isolation: 1500 VDC (3000 VDC High-Isolation Option Available)
- 3-Year Warranty
- Compact Dimensions: 0.500 x 0.44 x 0.285" (12.7 x 11.2 x 7.25 mm)

Models & Ratings

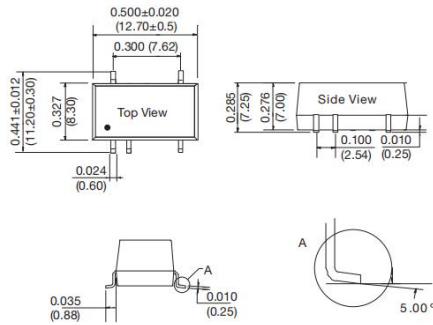
Input Voltage Range (VDC)	Output Voltage (VDC)	Output Current (mA)	Input Current (mA) No Load	Full Load	Maximum Capacitive Load (μF)	Efficiency Typ., Full Load	Model Number
4.5-5.5 (5V)	3.3V	400	30	506	220	72%	ISH0503A
4.5-5.5 (5V)	5V	400	30	506	220	79%	ISH0505A
4.5-5.5 (5V)	9V	222	30	506	220	82%	ISH0509A
4.5-5.5 (5V)	12V	167	30	506	220	82%	ISH0512A
4.5-5.5 (5V)	15V	133	30	506	220	83%	ISH0515A
10.8-13.2 (12V)	5V	400	25	212	220	79%	ISH1205A

10.8-13.2 (12V)	9V	222	25	212	220	82%	ISH1209A
10.8-13.2 (12V)	12V	167	25	212	220	82%	ISH1212A
10.8-13.2 (12V)	15V	133	25	212	220	83%	ISH1215A
10.8-13.2 (12V)	24V	83	25	212	220	84%	ISH1224A
13.5-16.5 (15V)	15V	133	18	169	220	83%	ISH1515A
21.6-26.4 (24V)	5V	400	15	105	220	79%	ISH2405A
21.6-26.4 (24V)	12V	167	15	105	220	82%	ISH2412A
21.6-26.4 (24V)	15V	133	15	105	220	83%	ISH2415A
21.6-26.4 (24V)	24V	83	15	105	220	86%	ISH2424A

Model Notes

1. High-Isolation Option: For 3000 VDC isolation, add suffix '-H' to the model number (e.g., ISH1224A-H).
2. Input currents are measured at nominal input voltage.
3. Efficiency values are typical at full load.

Mechanical Details

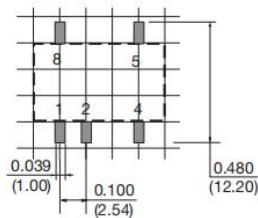


Dimensions (Inches / mm)

- Length: 0.500±0.020 (12.70±0.5)
- Width: 0.441±0.012 (11.20±0.30)
- Height: 0.285 (7.25)
- Other Key Dimensions:
 - 0.300 (7.62), 0.276 (7.00), 0.327 (8.30), 0.480 (12.20), 0.100 (2.54)
 - Pin Diameter: 0.02±0.002 (0.5±0.005)
 - Pin Pitch & Length Tolerance: ±0.014 (±0.35)
 - Case Tolerance: ±0.02 (±0.5)

Recommended Footprint

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



PIN CONNECTIONS	
Pin	Function
1	GND
2	+Vin
4	0 V
5	+Vout
8	No Connection

Notes

1. All dimensions are in inches (mm)
2. Weight: 0.003 lbs (1.5 g) typical.
3. Pin diameter: 0.02 ±0.002 (0.5 ±0.005)
4. Pin pitch and length tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)

- Top View Grid: 0.1 x 0.1 in (2.54 x 2.54 mm)
- Weight: 0.003 lbs (1.5 g) typical

Electrical Specifications

Input Characteristics

Characteristic	Minimum	Maximum	Units	Notes & Conditions
Input Voltage Range	4.50	5.50	VDC	5 V nominal
	10.80	13.20	VDC	12 V nominal
	13.50	16.50	VDC	15 V nominal
	21.60	26.40	VDC	24 V nominal
Input Reflected Ripple	-	15	mA pk-pk	Through 12 μ H inductor and 47 μ F capacitor
Input Surge (1s duration)	-	9	VDC	5 V models
	-	18	VDC	12 V models
	-	21	VDC	15 V models
	-	30	VDC	24 V models

Output Characteristics

Characteristic	Minimum	Typical	Maximum	Notes & Conditions
Output Voltage	3.3	-	24	See Models and Ratings table
Initial Set Accuracy	-	-	$\pm(2.5, -7.5)$	At 70% load
Minimum Load	10	-	-	-
Line Regulation	-	-	± 1.2	Per 1% change of input voltage ($\pm 1.5\%$ for 3.3V output)
Load	-	-	-	See Load Regulation

Regulation				Graphs
Start Up Delay	-	2	-	-
Ripple and Noise	-	100	-	20 MHz bandwidth, measured with 0.1 μ F capacitor
Transient Response	-	-	3	Recovery to within 1% in 500 μ s for 25% load change (5% max deviation for 3.3V & 5V models)
Short Circuit Protection	-	-	-	Continuous, auto recovery (1s max for 24V input models)
Maximum Capacitive Load	-	-	220	μ F
Temperature Coefficient	-	-	0.03	-

General Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency	-	-	-	-	See Models and Ratings table
Isolation (Input to Output)	1500	-	-	VDC	3000 VDC option available (add suffix -H)
Switching Frequency	50	-	300	kHz	-
Isolation Resistance	10 ⁹	-	-	Ω	Input to output, tested at 500 VDC

Isolation Capacitance	-	20	-	pF	Input to output
Power Density	-	-	31.8	W/in ³	-
Mean Time Between Failure (MTBF)	3500	-	-	kHrs	MIL-HDBK-217F, +25 °C GB

Environmental Specifications

Characteristic	Minimum	Maximum	Units	Notes & Conditions
Operating Temperature	-40	+105	°C	Derate: 100% load at +100 °C → 80% load at +105 °C
Storage Temperature	-55	+125	°C	-
Case Temperature	-	+115	°C	-
Operating Humidity	-	95	% RH	Non-condensing
Cooling	-	-	-	Natural convection

EMC Specifications

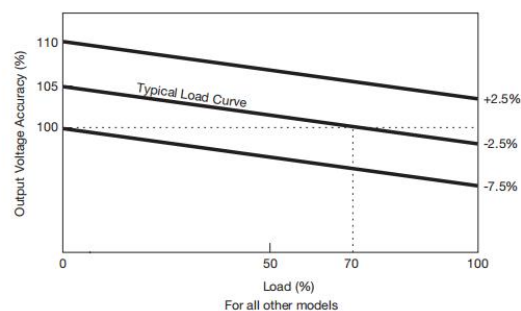
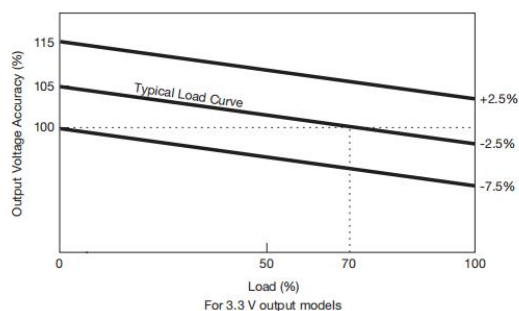
Emissions

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

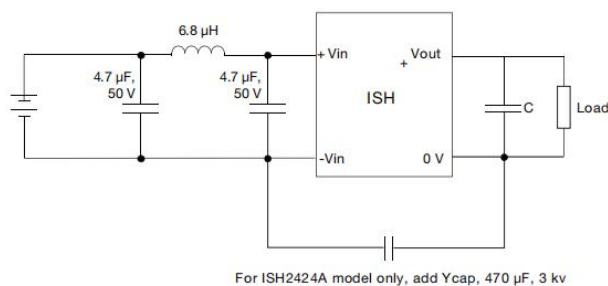
Immunity

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD Immunity	EN61000-4-2	3	B	-
Radiated Immunity	EN61000-4-3	3 V/m	A	-
EFT/Burst	EN61000-4-4	2	B	External input capacitor required (330 μ F/100 V)
Surge	EN61000-4-5	2	B	External input capacitor required (330 μ F/100 V)
Conducted Immunity	EN61000-4-6	3 V rms	A	-
Magnetic Fields	EN61000-4-8	1 A/m	A	-

Load Regulation Graphs



Application Note: EMI Filter for Class B Emissions



Output Voltage	C
3.3	10.00 μ F
5	10.00 μ F
9	4.70 μ F
12	2.20 μ F
15	1.00 μ F
24	0.47 μ F