

ISE Series

DC-DC Converter

1 Watt

FEATURES

Single Output
SMD Package
Industry Standard Pinout
Operating Temperature -40 °C to +105 °C
1500 VDC Isolation, 3000 VDC Option
3 Year Warranty

Dimensions: ISE: 0.500 x 0.44 x 0.285" (12.7 x 11.2 x 7.25 mm)



MODELS & RATINGS

Model Number	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Input Current - No Load (mA)	Input Current - Full Load (mA)	Maximum Capacitive Load	Efficiency
ISE0303A(1)	2.97-3.63	3.3	303	25	404	220 µF	72%
ISE0305A(1)	2.97-3.63	5	200	25	404	220 µF	74%
ISE0312A	2.97-3.63	12	84	25	404	220 µF	80%
ISE0315A	2.97-3.63	15	67	25	404	220 µF	80%
ISE0324A	2.97-3.63	24	42	25	404	220 µF	80%
ISE0503A(1)	4.5-5.5	3.3	303	20	250	220 µF	74%
ISE0505A(1)	4.5-5.5	5	200	20	250	220 µF	80%
ISE0506A(1)	4.5-5.5	6	167	20	250	220 µF	80%
ISE0509A(1)	4.5-5.5	9	111	20	250	220 µF	80%
ISE0512A(1)	4.5-5.5	12	84	20	250	220 µF	80%
ISE0515A(1)	4.5-5.5	15	67	20	250	220 µF	80%
ISE0524A(1)	4.5-5.5	24	42	20	250	220 µF	80%
ISE1203A(1)	10.8-13.2	3.3	303	15	104	220 µF	74%
ISE1205A(1)	10.8-13.2	5	200	15	104	220 µF	80%
ISE1209A(1)	10.8-13.2	9	111	15	104	220 µF	80%
ISE1212A(1)	10.8-13.2	12	84	15	104	220 µF	81%
ISE1215A(1)	10.8-13.2	15	67	15	104	220 µF	81%
ISE1505A	13.5-16.5	5	200	10	82	220 µF	80%
ISE1515A(1)	13.5-16.5	15	67	10	82	220 µF	81%
ISE2405A(1)	21.6-26.4	5	200	7	52	220 µF	80%
ISE2409A(1)	21.6-26.4	9	111	7	52	220 µF	80%
ISE2412A(1)	21.6-26.4	12	84	7	52	220 µF	80%
ISE2415A(1)	21.6-26.4	15	67	7	52	220 µF	81%
ISE2424A(1)	21.6-26.4	24	42	7	52	220 µF	81%

1. For optional 3000 VDC isolation add suffix '-H' to end of part number e.g. ISE1224A-H.
2. Input currents measured at nominal input voltage.
3. Typical value at full load.

SPECIFICATIONS

INPUT

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	2.97		3.63	VDC	3.3 V nominal
	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 Current					See Models and Ratings table
Input Reflected Ripple		15		mA pk-pk	Through 12 µH inductor and 47 µF capacitor

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Surge		5		VDC for 1 s	3.3 V models
		9		VDC for 1 s	5 V models
		18		VDC for 1 s	12 V models
		21		VDC for 1 s	15 V models
		30		VDC for 1 s	24 V models
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	-7.5, +2.5			%	At 70% load
Minimum Load	10			%	
Line Regulation	±1.2			%	Per 1% change of input voltage (±1.5% for 3V3 output)
Load Regulation				%	See graph
Start Up Delay				ms	
Ripple and Noise	30/60			mV pk-pk	For models ≤12 V/ For 15 V & 24 V models, 20 MHz bandwidth, measured using 0.1 µF capacitor
Transient Response	3			% deviation	Recovery to within 1% in 500 µs for a 25% load change (5% max. deviation for 3.3 & 5 V models)
Short Circuit Protection					Continuous, with auto recovery, except 1 s max for 24 input V models
Maximum Capacitive Load	220			µF	
Temperature Coefficient	0.02			%/° C	

GENERAL

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency					See Models and Ratings table
Isolation: Input to Output	1500			VDC	For optional high isolation versions, 3000 VDC input to output add suffix -H to model number
Switching Frequency	50		300	kHz	Full load, nominal input
Isolation Resistance	109			Ω	Input to output, tested at 500 VDC
Isolation Capacitance	20			pF	Input to output
Power Density	15.9			Win3	
Mean Time Between Failure	3500			kHrs	MIL-HDBK-217F, +25 °C GB
Weight	0.003 (1.5)			lb (g)	

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
Storage Temperature	-55		+125	°C	
Case Temperature			+115	°C	
Operating Humidity			95	% RH	Non-condensing
Cooling					Natural convection

EMC: IMMUNITY

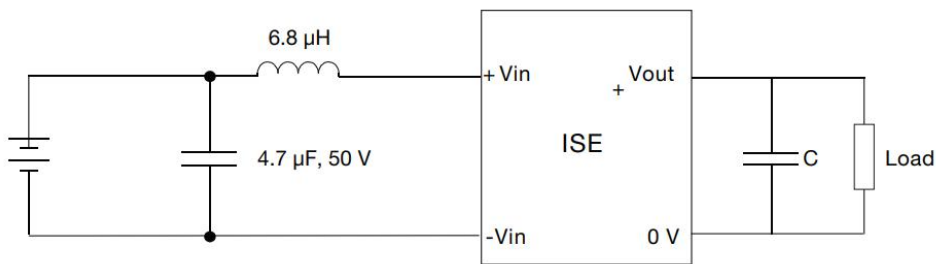
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD Immunity	EN61000-4-2	3	B	
Radiated Immunity	EN61000-4-3	3 V/m	A	
EFT/Burst	EN61000-4-4	2	B	External input capacitor required, 330 µF/100 V

Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
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	

EMC: 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

EMI FILTER FOR CLASS B EMISSIONS - APPLICATION NOTE



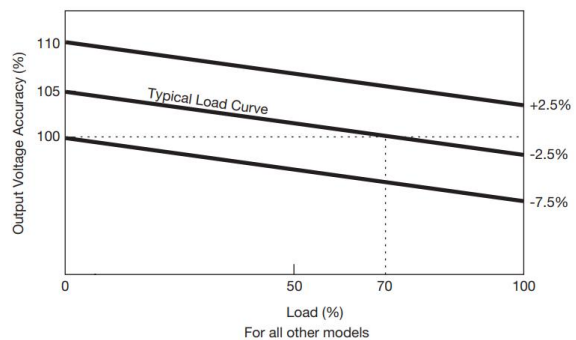
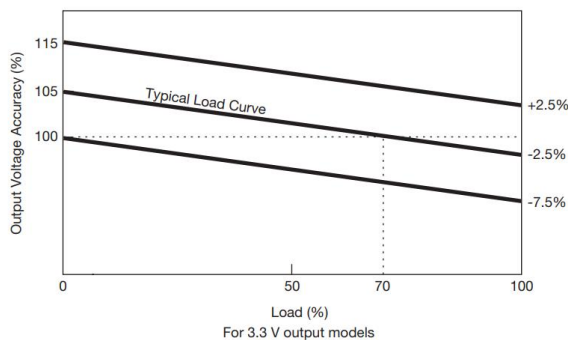
Output Voltage	C
3.3	10.00 μ F
5/6	10.00 μ F
9	4.70 μ F
12	2.20 μ F
15	1.00 μ F
24	0.47 μ F

Schematic: ISE + Vout, C, Load, 0 V, +Vin, -Vin, 6.8 μ H, 4.7 μ F, 50 V

LOAD REGULATION

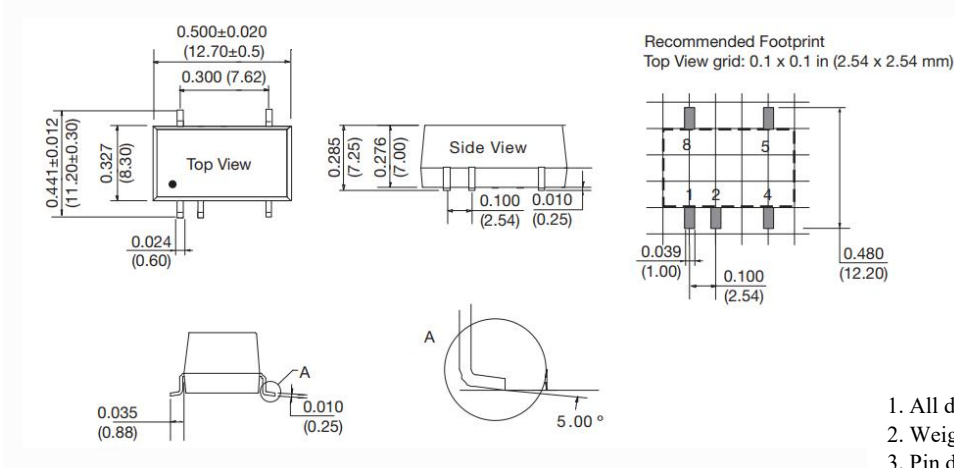
Typical Load Curve - For 3.3 V output models: Load (%) 0-50-70-100-105-115; Output Voltage Accuracy +2.5% / -2.5% / -7.5%

Typical Load Curve - For all other models: Load (%) 0-50-70-100-105-110; Output Voltage Accuracy +2.5% / -2.5% / -7.5%



MECHANICAL DETAILS

Dimensions (Top View / Side View / Recommended Footprint), 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

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