ICH50 series

50W Baseplate cooled

DC-DC converters

The ICH50 series offers a compact 50W DC-DC converter solution in an industry standard ½ brick package, with integral baseplate for conduction cooling.

Available in 2:1 input ranges, covering 9 to 18VDC, 18 to 36VDC & 36 to 75VDC, and 4:1 input ranges, 9 to 36VDC & 18 to 75VDC.

Standard features are: ±10% output voltage trim, remote sense, remote On/Off, a wide operating temperature range and includes protection for over current, over temperature and over voltage.

Features

- Regulated single outputs 3.3 to 24VDC
- 2:1 & 4:1 input ranges
- Baseplate cooled ½ brick package
- 1.5kVDC isolation
- Output trim ±10%
- Remote sense
- Remote On/Off
- Continuous short circuit protection
- -40°C to +100°C operating temperature
- 3 year warranty

Applications

Technology

Autonomous equipment

Industrial printing

Instrumentation

Process control

Robotics

Dimensions

61.0 x 57.9 x 12.7mm (2.40" x 2.28" x 0.5")
½ brick package

Models & ratings

Model number[2,5]	Input voltage	Output voltage	Output current	Input current[4]		Efficiency
				No load	Full load	
ICH5012S3V3	9-18VDC (12V nominal)	3.3VDC	10.00A	50mA	3525mA	78%
ICH5012S05		5.0VDC	10.00A		5145mA	81%
ICH5012S12		12.0VDC	4.16A		4950mA	84%
ICH5012S15		15.0VDC	3.33A		4950mA	84%
ICH5012S24		24.0VDC	2.08A		4950mA	84%
ICH5024S3V3	18-36VDC (24V nominal)	3.3VDC	10.00A	50mA	1740mA	79%
ICH5024S05		5.0VDC	10.00A		2540mA	82%
ICH5024S12		12.0VDC	4.16A		2450mA	85%
ICH5024S15		15.0VDC	3.33A		2450mA	85%
ICH5024S24		24.0VDC	2.08A		2419mA	86%

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Notes:

1. Logic compatibility: Module On = Open circuit, Module Off = <0.8VDC
2. Add suffix 'N' to the model number to receive the unit with negative logic Remote On/Off.
3. Ripple & noise is measured with a 10µF tantalum capacitor and 0.1µF ceramic capacitor across output.
4. Input current specified at 24V for 18-36 & 9-36VDC and 48V for 36-75 & 18-75VDC models.
5. For dual output models available, contact sales.

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Models & ratings

Model number[2,5]	Input voltage	Output voltage	Output current	Input current[4]		Efficiency
				No load	Full load	
ICH5048S3V3	36-75VDC (48V nominal)	3.3VDC	10.00A	50mA	870mA	79%
ICH5048S05		5.0VDC	10.00A		1250mA	83%
ICH5048S12		12.0VDC	4.16A		1220mA	85%
ICH5048S15		15.0VDC	3.33A		1220mA	85%
ICH5048S24		24.0VDC	2.08A		1209mA	86%
ICH5024WS3V3	9-36VDC (24V nominal)	3.3VDC	10.00A	50mA	1785 mA	77%
ICH5024WS05		5.0VDC	10.00A		2570 mA	81%
ICH5024WS12		12.0VDC	4.16A		2510 mA	83%
ICH5024WS15		15.0VDC	3.33A		2510 mA	83%
ICH5024WS24		24.0VDC	2.08A		2510 mA	83%
ICH5048WS3V3	18-75VDC (48V nominal)	3.3VDC	10.00A	50mA	880 mA	78%
ICH5048WS05		5.0VDC	10.00A		1270 mA	82%
ICH5048WS12		12.0VDC	4.16A		1240 mA	84%
ICH5048WS15		15.0VDC	3.33A		1240 mA	84%
ICH5048WS24		24.0VDC	2.08A		1240 mA	84%
ICH5048WS48		48.0VDC	1.048A		1238 mA	84%

Notes:

1. Logic compatibility: Module On = Open circuit, Module Off = <0.8VDC
2. Add suffix 'N' to the model number to receive the unit with negative logic Remote On/Off.
3. Ripple & noise is measured with a 10µF tantalum capacitor and 0.1µF ceramic capacitor across output.
4. Input current specified at 24V for 18-36 & 9-36VDC and 48V for 36-75 & 18-75VDC models.
5. For dual output models available, contact sales.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	See models and ratings table				
Input current (no load)	See models and ratings table				
Input reverse voltage protection	None				
Input filter	Pi network				
Undervoltage lockout	Power up: 8.8V, down: 8.0V				2:1 input, 12Vin
	Power up: 17.0V, down: 16.0V				2:1 input, 24Vin
	Power up: 34.0V, down: 32.5V				2:1 input, 48Vin
	Power up: 8.8V, down: 8.0V				4:1 input, 24Vin
	Power up: 17.0V, down: 16.0V				4:1 input, 48Vin

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage trim		±10		%	See application notes
Initial set accuracy			±1.0	%	
Line regulation			±0.2	%	Measured from high line to low line
Load regulation			±0.2	%	Measured from 0-100% load
Transient response			5	%	Maximum deviation, recovery to within 1% in 500µs, 25% step load change
Ripple and noise			75	mV pk-pk	3.3 & 5VDC, 20MHz bandwidth, measured with a 10µF tantalum capacitor and 0.1µF ceramic capacitor across output
			100		12 & 15VDC, 20MHz bandwidth, measured with a 10µF tantalum capacitor and 0.1µF ceramic capacitor across output
			1	% pk-pk	24, 28 & 48VDC, 20MHz bandwidth
Overvoltage protection	115		140	%	
Short circuit protection	Trip & restart (hiccup mode) with auto recovery, ICH50W: current limit, auto recovery.				
Temperature coefficient		±0.03		%/°C	
Current Limit	110		160	%	Of nominal output
Remote On/Off	Logic compatibility: Module On = Open circuit, Module Off = <0.8VDC, add suffix 'N' to the model number to receive the unit with negative logic Remote On/Off.				
Thermal shutdown	Thermal shutdown when case temperature reaches +100°C, auto recovery when case temperature <+60°C				

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General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency	See models & ratings table				
Isolation: input to output	1500			VDC	
Isolation: input to case	1500			VDC	
Isolation: output to case	1500			VDC	
Isolation resistance	10^7			Ω	
Isolation capacitance		100		pF	
Switching frequency		400		kHz	12-24V models
		300			484V models
Power density		1.1 (18.3)		W/cm^3 (W/in^3)	
Mean time between failure		≥790		khrs	MIL-HDBK-217F, +25°C GB
Weight		88 (0.194)		g (lb)	
		94 (0.207)			ICH50W

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating base plate	-40		+100	°C	See derating curve
Storage temperature	-55		+105	°C	
Shock	30g pk, half sine wave for 18ms, 3 pulses per face, all 6 faces tested on all 3 axes				
Vibration	5-500 Hz at 3g, 10 mins per axis				

EMC: emissions

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55032	A	With external components
Radiated	EN55032	A	With external components

EMC: immunity

Phenomenon	Standard	Test level	Criteria	Notes & conditions
ESD immunity	EN61000-4-2	2	A	
EFT/burst	EN61000-4-4	Level 1	A	
Surges	EN61000-4-5	Inst. Class 1	A	
Conducted	EN61000-4-6	3Vrms	A	
Magnetic field	EN61000-4-8	1A/m	A	

Safety approvals

Safety agency	Standard	Test level	Notes & conditions
UL	UL60950-1		
CE	Meets all applicable directives		
UKCA	Meets all applicable legislation		

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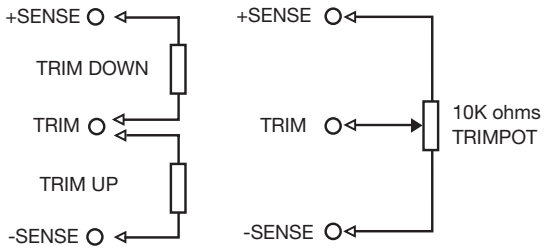
Application notes

Thermal resistances vs air flow

Air flow rate	Typical Rca
Natural Convection 6.0m/min (20ft/min) (0.1m/s)	7.12˚C/W
30.48 metres/min (100ft./min) (0.5m/s)	6.21˚C/W
60.96 metres/min (200ft./min) (1.0m/s)	5.17˚C/W
91.44 metres/min (300 ft./min) (1.5m/s)	4.29˚C/W
121.92 metres/min (400 ft./min) (2.0m/s)	3.64˚C/W
152.4 metres/min (500 ft./min) (2.5m/s)	2.96˚C/W
182.88 metres/min (600 ft./min) (3.0m/s)	2.53˚C/W
213.36 metres/min (700 ft./min) (3.5m/s)	2.37˚C/W
243.84 metres/min (800 ft./min) (4.0m/s)	2.19˚C/W

Temperature Rise:
Pd x Rca, Where Pd = Pin - Pout or Pout (1-η) / η, Where η= efficiency

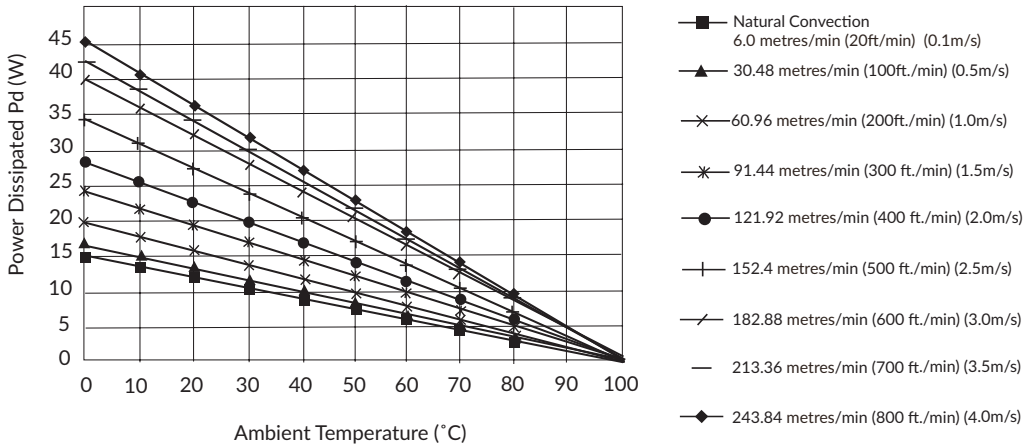
External output trimming



Output may be trimmed by ±10% (±5% for dual output models) with a fixed resistor or an external trimpot as shown. Contact sales for details.

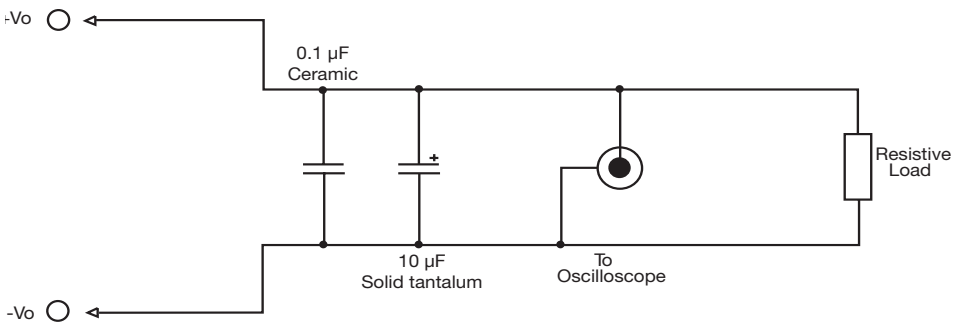
Logic table		
Logic State (Pin 2)	Positive Logic	Negative Logic (-N)
Logic Low Switch Closed	Module Off	Module On
Logic High Switch Open	Module On	Module Off

Maximum power dissipation vs ambient temperature and air flow (without heatsink)



Forced Convection Power Derating without Heatsink

Output noise



Output noise is measured with a 10 µF tantalum capacitor and 0.1 µF ceramic capacitor across output. Oscilloscope limited to 20 MHz bandwidth.

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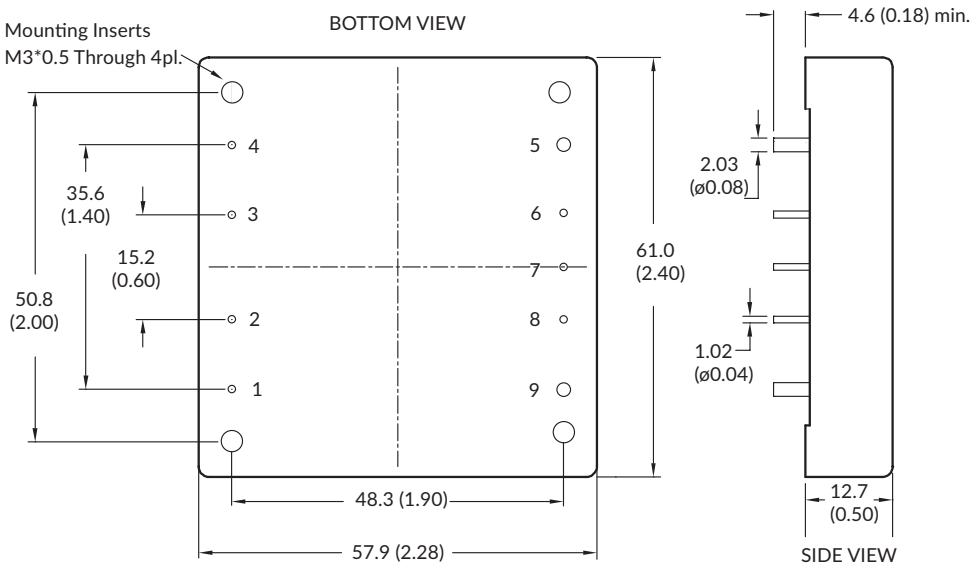
Mechanical details



Pin connections	
Pin	**Function**
1	+Vin
2	On/Off
3	Case
4	-Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

Notes:

1. Dimensions are in mm (inches)
2. Tolerances: x.xx (x.x) = ±0.5 (±0.02). x.xxx (x.xx) = ±0.25 (±0.01)
3. Case tolerance: ±0.50 (±0.02)
4. Pin diameter tolerance: ±0.05 (±0.002), ±0.1 (±0.004)
5. Case Material: Aluminium
6. Pin pitch tolerance: ±0.25 (±0.01)