

50W Convection cooled

DC-DC converters

The JCK50 series is housed in a 50.8 x 25.4 x 11.5mm (2" x 1" x 0.45) PCB mount metal case. Featuring a 2:1 input voltage range of 9 to 18VDC, 18 to 36VDC or 36 to 75VDC with regulated single outputs of 3.3, 5, 12 & 15VDC adjustable $\pm 10\%$ with a trim resistor.

The 50W JCK50 has 1.6kVDC isolation between input and output, over voltage, overload & short circuit protection is standard as is remote On/Off, an optional heatsink (suffix -HK) can be specified. The operating temperature range is from -40°C to +95°C, with derating above +50°C.



Features

- ▶ Regulated single outputs 3.3, 5, 12 & 15VDC
- ▶ Outputs trimmable $\pm 10\%$
- ▶ 2:1 input range
- ▶ 50.8 x 25.4mm (2" x 1") footprint, 11.5mm (0.45") package
- ▶ 1.6kVDC isolation
- ▶ Remote On/Off
- ▶ Continuous short circuit protection
- ▶ Optional heatsink
- ▶ -40°C to +95°C operating temperature
- ▶ Full power to +50°C
- ▶ 3 year warranty

Applications



Autonomous equipment



Industrial electronics & robotics



Technology

Dimensions

50.8 x 25.4 x 11.5mm (2.0" x 1.0" x 0.45")

Models & ratings

Model number ⁽⁴⁾	Input voltage	Output voltage	Output current	Efficiency	Input current ^(1,2)		Maximum capacitive load ⁽³⁾
					No load	Full load	
JCK5012S3V3	9-18VDC	3V3VDC	10.00A	90%	110 mA	3.06 A	26000 μ F
JCK5012S05		5VDC	10.00A	89%	200 mA	4.68 A	17000 μ F
JCK5012S12		12VDC	4.17A	89%	60 mA	4.68 A	3300 μ F
JCK5012S15		15VDC	3.33A	89%	60 mA	4.68 A	2200 μ F

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Notes:

1. Input currents measured at nominal input voltage.
2. Input current is typically 5.0mA at nominal input voltage when output is turned off using remote on/off.

3. Maximum capacitive load is per output.
4. Add suffix "-HK" for optional heatsink.

Models & ratings

Model number ⁽⁴⁾	Input voltage	Output voltage	Output current	Efficiency	Input current ^(1,2)		Maximum capacitive load ⁽³⁾
					No load	Full load	
JCK5024S3V3	18-36VDC	3V3VDC	10.00A	91%	70 mA	1.51 A	26000μF
JCK5024S05		5VDC	10.00A	91%	90 mA	2.29 A	17000μF
JCK5024S12		12VDC	4.17A	91%	40 mA	2.29 A	3300μF
JCK5024S15		15VDC	3.33A	91%	40 mA	2.29 A	2200μF
JCK5048S3V3	36-75VDC	3V3VDC	10.00A	91%	50 mA	0.76 A	26000μF
JCK5048S05		5VDC	10.00A	92%	60 mA	1.13 A	17000μF
JCK5048S12		12VDC	4.17A	91%	40 mA	1.14 A	3300μF
JCK5048S15		15VDC	3.33A	92%	40 mA	1.17 A	2200μF

Notes:

1. Input currents measured at nominal input voltage.
2. Input current is typically 5.0mA at nominal input voltage when output is turned off using remote on/off.
3. Maximum capacitive load is per output.
4. Add suffix "-HK" for optional heatsink.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	9		18	VDC	12VDC nominal
	18		36		24VDC nominal
	36		75		48VDC nominal
Input filter	Internal Pi type				
Input surge			25	VDC	12VDC models (for 100ms)
			50		24VDC models (for 100ms)
			100		48VDC models (for 100ms)
Remote on/off	ON: Logic high (3.0-12V) or open circuit				
	OFF: Logic low (<1.2V) or short pin 2 to pin 3				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	3.3		15	VDC	See models & ratings table
Initial set accuracy			±1.0	%	At full load
Output trim			±10	%	See application notes
Minimum load	0			%	No minimum load required
Line regulation			±0.5	%	From minimum to maximum input at full load
Load regulation			±0.5	%	From 0 to full load
Transient response			±3.0	%	Recovery within 1% in less than 250μs for a 25% load change.
Ripple & noise			100	mV pk-pk	20 MHz bandwidth. Measured using 1μF MLCC
Short circuit protection	Continuous trip & restart (hiccup mode), with auto recovery				
Temperature coefficient		0.02		%/°C	
Overload protection	120		140	%	
Maximum capacitive load	See models & ratings table				
Temperature coefficient			0.02	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency		91		%	See models and ratings table
Isolation: input to output	1600			VDC	60s
Isolation: input to case	1600			VDC	60s
Isolation: output to case	1600			VDC	60s
Isolation Resistance	10 ⁹			Ω	At 500VDC
Isolation capacitance			2000	pF	
Switching frequency		250/270		kHz	12V input models / other models
Power density			3.81 (62.5)	W/cm ³ (W/in ³)	
Mean time between failure		220		khrs	MIL-HDBK-217F, +25°C GB
Weight		45.0 (0.1)		g (lb)	

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+95	°C	See derating curve
Storage temperature	-40		+125	°C	
Case temperature			+110	°C	
Thermal protection		115		°C	Measured at centre of case
Humidity			95	%RH	Non-condensing
Cooling	Natural convection				
Thermal impedance to air	9.5/8.5			°C/W	No heatsink / with heatsink

Safety approvals

Safety agency	Standard	Notes & conditions
UL	UL60950-1, UL62368-1	Information technology
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

Emissions - EMC

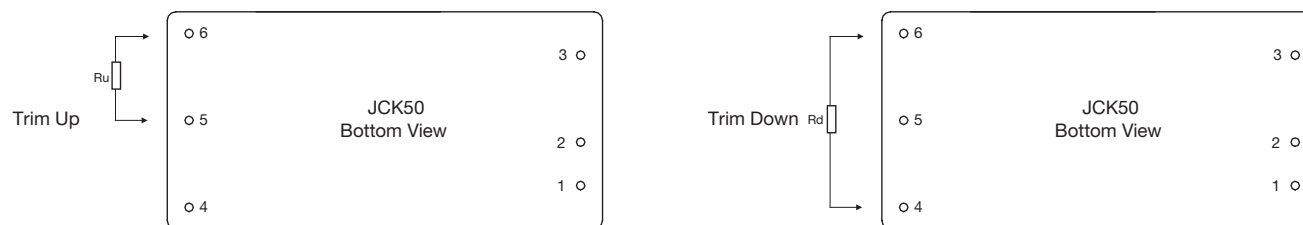
Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55022	Class A	

Immunity - EMC

Phenomenon	Standard	Test level	Criteria	Notes & conditions
ESD immunity	EN61000-4-2	±8kV air discharge, ±6kV contact	A	
Radiated immunity	EN61000-4-3	10 V/m	A	
EFT/Burst	EN61000-4-4	±2 kV	A	With external capacitor, suggested part is CHEMI-CON KY 220µF/100V
Surge	EN61000-4-5	±1 kV	A	With external capacitor, suggested part is CHEMI-CON KY 220µF/100V
Conducted immunity	EN61000-4-6	10 V rms	A	

Application notes

External output trimming



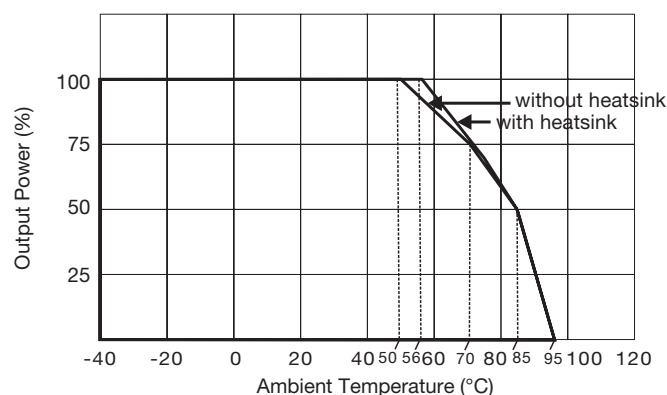
Trim down resistor values (Rd)

Model	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
	Voutx0.99	Voutx0.98	Voutx0.97	Voutx0.96	Voutx0.95	Voutx0.94	Voutx0.93	Voutx0.92	Voutx0.91	Voutx0.90
3V3	315.932kΩ	172.257kΩ	112.528kΩ	79.806kΩ	59.153kΩ	44.930kΩ	34.539kΩ	26.616kΩ	20.374kΩ	15.330kΩ
5V	230.566kΩ	106.182kΩ	64.301kΩ	43.281kΩ	30.643kΩ	22.207kΩ	16.177kΩ	11.651kΩ	8.129kΩ	5.310kΩ
12V	327.351kΩ	142.100kΩ	83.928kΩ	55.470kΩ	38.591kΩ	27.418kΩ	19.477kΩ	13.542kΩ	8.939kΩ	5.264kΩ
15V	433.811kΩ	174.916kΩ	100.946kΩ	65.907kΩ	45.468kΩ	32.077kΩ	29.96kΩ	15.596kΩ	10.165kΩ	5.842kΩ

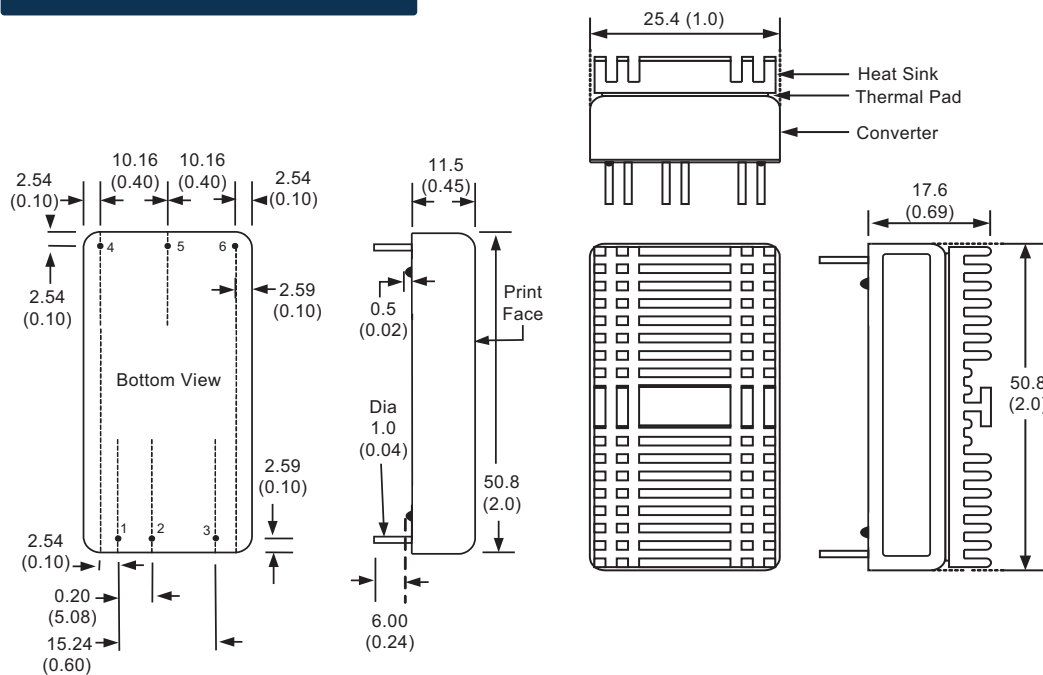
Trim up resistor values (Ru)

Model	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
	Voutx1.01	Voutx1.02	Voutx1.03	Voutx1.04	Voutx1.05	Voutx1.06	Voutx1.07	Voutx1.08	Voutx1.09	Voutx1.10
3V3	544.612kΩ	184.034kΩ	103.305kΩ	67.715kΩ	47.676kΩ	34.824kΩ	25.880kΩ	19.297kΩ	14.249kΩ	10.255kΩ
5V	244.527kΩ	113.776kΩ	70.631kΩ	49.142kΩ	36.274kΩ	27.707kΩ	21.592kΩ	17.010kΩ	13.447kΩ	10.598kΩ
12V	371.425kΩ	183.645kΩ	117.623kΩ	83.929kΩ	63.489kΩ	49.767kΩ	39.919kΩ	32.508kΩ	26.728kΩ	22.094kΩ
15V	347.293kΩ	178.523kΩ	115.235kΩ	82.084kΩ	61.683kΩ	47.863kΩ	37.863kΩ	30.336kΩ	24.430kΩ	19.682kΩ

Derating curve



Mechanical details



Pin connections	
Pin	Single
1	+Vin
2	-Vin
3	Remote on/off
4	+Vout
5	-Vout
6	Trim

Notes:

1. All dimensions are in mm (inches).
2. Weight: 45g (0.1lb) approx
3. Tolerance: x.x (x.xx) = ± 0.5 (± 0.02). x.xx (x.xxx) = ± 0.25 (± 0.01)

4. Pin Tolerance: ± 0.05 (± 0.002)