

**60W** Conduction cooled

DC-DC converters 

The 60W JCK60 series is housed in a 50.8 x 50.8 x 10.2mm (2" x 2" x 0.4") PCB mount metal case. Featuring a 2:1 input voltage range of 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 JCK60 has 1.6kVDC isolation between input and output. Remote on/off is standard as are over current, over voltage and over temperature protection. Operating temperature range is from -40°C to +85°C, with derating above +40°C. An optional heatsink (-HK) extends the full power operating temperature when fitted.



## Features

- ▶ Regulated single outputs 3.3 to 15VDC
- ▶ 2:1 input range
- ▶ 50.4 x 50.4mm (2" x 2") Footprint, 10.2mm profile
- ▶ Output Trim  $\pm 10\%$
- ▶ 1.6kVDC isolation
- ▶ Over current, over voltage & over temperature protection
- ▶ Remote On/Off
- ▶ -40°C to +85°C operating temperature
- ▶ Full power to +50°C
- ▶ 3 year warranty

## Applications



Autonomous equipment



Industrial electronics & robotics



Technology

## Dimensions

50.8 x 50.8 x 10.16mm (2.00" x 2.00" x 0.40")

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## Models & ratings

Model number	Input voltage	Output voltage	Output current	Efficiency	Input current <sup>(1)</sup>		Maximum capacitive load
					No load	Full load	
JCK6024S3V3	18-36VDC	3.3VDC	14A	91%	80mA	2151mA	36000μF
JCK6024S05		5.0VDC	12A	92%	<b>100mA</b>	2762mA	20400μF
JCK6024S12		12.0VDC	5A	91%	<b>40mA</b>	2793mA	3550μF
JCK6024S15		15.0VDC	4A	91%	40mA	2793mA	2300μF
JCK6048S3V3	36-75VDC	3.3VDC	14A	91%	<b>50mA</b>	1075mA	36000μF
JCK6048S05		5.0VDC	12A	92%	<b>60mA</b>	1389mA	20400μF
JCK6048S12		12.0VDC	5A	91%	40mA	1397mA	3550μF
JCK6048S15		15.0VDC	4A	91%	40mA	1397mA	2300μF

### Notes:

1. Input current specified at nominal input.
2. Measured with 1μF ceramic capacitor in parallel with a 10μF electrolytic across output rails and 20MHz bandwidth.
3. For heatsink option, add '-HK' to the end of the part number

## General

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Efficiency	See models & ratings table				
Isolation: input to output	1600			VDC	
Isolation: input to case	1600			VDC	
Isolation: output to case	1600			VDC	
Isolation capacitance		2000		pF	
Switching frequency		270		kHz	
Power density		2.2 (37.5)		W/cm <sup>3</sup> (W/in <sup>3</sup> )	
Mean time between failure		>110		kHrs	MIL-HDBK-217F, +25°C GB

## Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Input voltage range	18		36	VDC	24VDC nominal
	36		75		28VDC nominal
Input current	See models & ratings table				
Input reflected ripple current		20		mA/pk-pk	12μH inductor, 5Hz to 20MHz
Input surge			50	VDC	24VDC models (for 100ms)
			100		48VDC models (for 100ms)
Undervoltage lockout	On at 17.8VDC Off at 16VDC				24VDC models
	On at 33.5VDC Off at 33.5VDC				48VDC models

## Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Output voltage	3.3		15	VDC	See models & ratings table
Output voltage trim			±10	%	
Minimum load	0			%	No minimum load required
Line regulation			±0.5	%	
Load regulation			±0.5	%	
Setpoint accuracy		±1		%	
Transient response			3	%	Deviation, recovery to within 1% in <250μs for a 25% load change
Ripple & noise			75	mV	For 3V3 & 5VDC models, 100mV for other models (see note 2 models and ratings table)
Short circuit protection	Trip & restart (hiccup mode), auto recovery				
Temperature coefficient		0.02		%/ °C	
Overload protection	115		130	%	
Remote on/off	On = Logic High (>3.0VDC) or Open				
	Off = Logic Low (<1.2VDC) or short pin 2 to 3				
Overvoltage protection		3.9		VDC	3.3VDC models
		6.2			5VDC models
		15			12VDC models
		18			15VDC models

## Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & conditions
Operating temperature	-40		+85	°C	See derating curve
Storage temperature	-40		+125	°C	
Case temperature			+105	°C	
Cooling	Natural convection				
Operating altitude	5		95	%	RH, non condensing

## Safety approvals

Safety agency	Standard	Notes & conditions
CE	Meets all applicable directives	
UKCA	Meets all applicable legislation	

## Emissions - EMC

Phenomenon	Standard	Test level	Notes & conditions
Conducted	EN55022	Level A	With no external components
Radiated	EN55022	Level A	

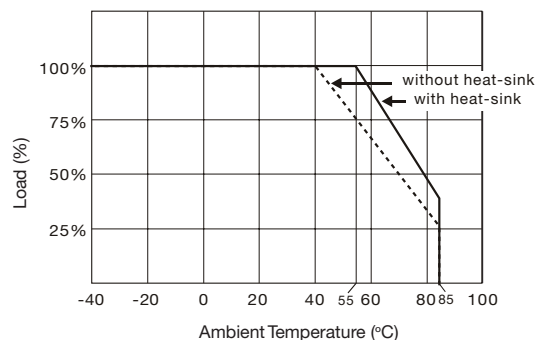
## Immunity - EMC

Phenomenon	Standard	Test level	Criteria	Notes & conditions
Immunity	IEC60601-1-2			With external components. See application notes.
ESD immunity	EN61000-4-2	4	B	4kV contact discharge
Radiated immunity	EN61000-4-3	3V/m	A	
EFT/Burst	EN61000-4-4	1	A*	
Surge	EN61000-4-5	1	A	
Conducted immunity	EN61000-4-6	3Vrms	A	
Magnetic fields	EN61000-4-8	1A/m	A	

\*External input capacitor required, 220µF/100V.

## Application notes

### Derating curve



### External output trim

$$R_{\text{trim-up}} = \frac{(R2 + R3) \times R_{\text{TU}}}{(R2 + R3) - R_{\text{TU}}} - R4$$
 Where:  $R_{\text{TU}} = \frac{R1 \times (R2 + R3) \times K}{V_{\text{REQ}} \times R3 - (R2 + R3) \times K}$

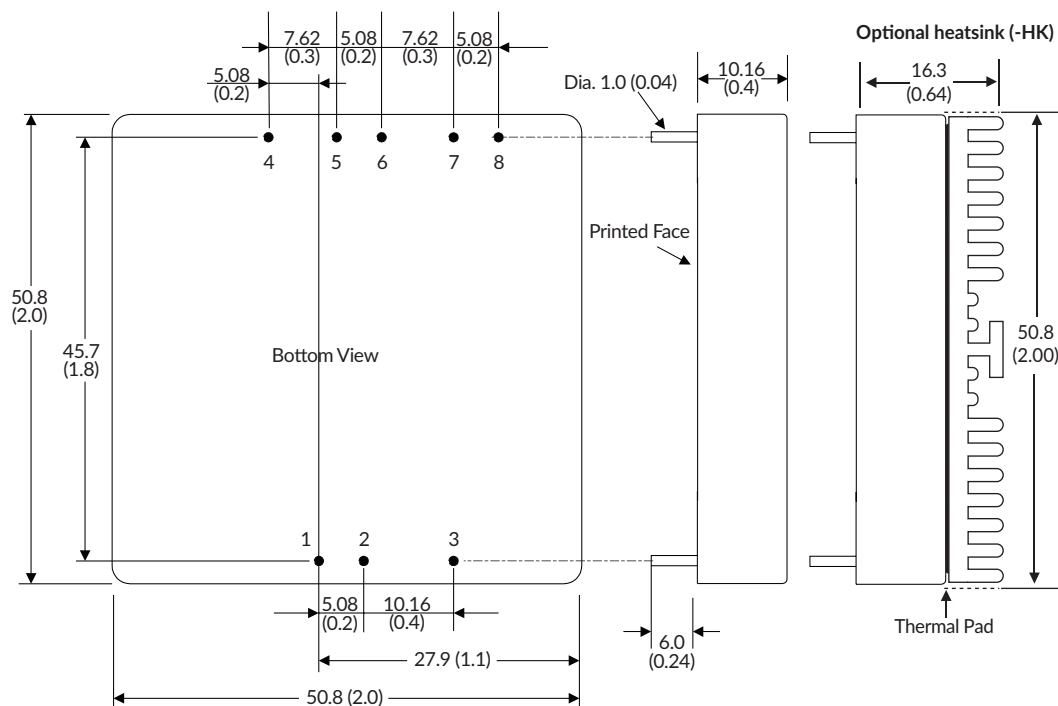
$$R_{\text{trim-down}} = \frac{R1 \times R_{\text{TD}}}{R1 - R_{\text{TD}}} - R4$$
 Where:  $R_{\text{TD}} = \frac{R3 \times (V_{\text{REQ}} - K)}{K} - R2$

Model	R1	R2	R3	R4	K
JCK60XXS3V3	8200	330	5100	24000	1.24
JCK60XXS05	5100	22	5100	15000	2.495
JCK60XXS12	7500	6200	3600	20000	2.495
JCK60XXS15	8200	6800	3000	24000	2.495

### Remote Sense

If Remote Sense is not required, the +Sense and -Sense pins should be locally connected to +Vout and -Vout respectively. Remote sense can compensate for a total volt drop of 10%. When remote sense is used, output power must not exceed rated power.

## Mechanical details



Pin connections	
Pin	Single
1	+Vin
2	-Vin
3	Remote On/Off
4	-Sense
5	+Sense
6	+Vout
7	-Vout
8	Trim

### Notes:

- All dimensions are in mm (inches).
- Weight: 70g (0.154lbs) approx
- Pin diameter: 1.0 ±0.05 (0.04 ±0.002)

- Pin pitch tolerance: ±0.35 (±0.014)
- Case tolerance: ±0.5 (±0.02)