

## 15/20 Watts

## JCM Series



- Very High Power Density
- 2:1 Input Range
- Operating Temperature  $-40\text{ }^{\circ}\text{C}$  to  $+105\text{ }^{\circ}\text{C}$
- Single & Dual Outputs
- 1600 VDC Isolation
- UL Approved
- High Efficiency – up to 89%
- 3 Year Warranty

## Specification

### Input

Input Voltage Range	<ul style="list-style-type: none"> <li>• 12 V (9-18 VDC)</li> <li>• 24 V (18-36 VDC)</li> <li>• 48 V (36-75 VDC)</li> </ul>
Input Current	<ul style="list-style-type: none"> <li>• See table</li> </ul>
Input Filter	<ul style="list-style-type: none"> <li>• Pi network</li> </ul>
Input Reflected Ripple Current	<ul style="list-style-type: none"> <li>• JCM15: 20 mA pk-pk, JCM20: 30 mA pk-pk through 12 <math>\mu\text{H}</math> inductor and 47 <math>\mu\text{F}</math> capacitor, 5 Hz to 20 MHz</li> </ul>
Input Surge	<ul style="list-style-type: none"> <li>• 12 V models: 36 VDC for 100 ms</li> <li>• 24 V models: 50 VDC for 100 ms</li> <li>• 48 V models: 100 VDC for 100 ms</li> </ul>

### Output

Output Voltage	<ul style="list-style-type: none"> <li>• See table</li> </ul>
Output Trim	<ul style="list-style-type: none"> <li>• <math>\pm 10\%</math> max on single output</li> </ul>
Minimum Load	<ul style="list-style-type: none"> <li>• No minimum load required</li> </ul>
Initial Set Accuracy	<ul style="list-style-type: none"> <li>• <math>\pm 1\%</math> max</li> </ul>
Start Up Delay	<ul style="list-style-type: none"> <li>• 20 ms typical</li> </ul>
Line Regulation	<ul style="list-style-type: none"> <li>• JCM15: <math>\pm 0.2\%</math> max single, <math>\pm 0.5\%</math> max dual</li> <li>• JCM20: <math>\pm 0.5\%</math></li> </ul>
Load Regulation	<ul style="list-style-type: none"> <li>• <math>\pm 0.5\%</math> max single, <math>\pm 1.0\%</math> max dual</li> </ul>
Cross Regulation	<ul style="list-style-type: none"> <li>• <math>\pm 5\%</math> on dual output models (see note 2)</li> </ul>
Transient Response	<ul style="list-style-type: none"> <li>• <math>&lt; 3\%</math> max deviation, recovery to within 1% in 250 <math>\mu\text{s}</math> for a 25% load change</li> </ul>
Ripple & Noise	<ul style="list-style-type: none"> <li>• 100 mV pk-pk, 20 MHz bandwidth, (see note 3)</li> </ul>
Overvoltage Protection	<ul style="list-style-type: none"> <li>• 3.3 V models: 3.9 V typical</li> <li>• 5 V models: 6.2 V typical</li> <li>• 12 V models: 15 V typical</li> <li>• 15 V models: 18 V typical</li> <li>• <math>\pm 5</math> V models: <math>\pm 6.2</math> V typical</li> <li>• <math>\pm 12</math> V models: <math>\pm 15</math> V typical</li> <li>• <math>\pm 15</math> V models: <math>\pm 18</math> V typical</li> </ul>
Overload Protection	<ul style="list-style-type: none"> <li>• 150% of full load typical</li> </ul>
Short Circuit Protection	<ul style="list-style-type: none"> <li>• Trip &amp; restart (hiccup) with auto recovery</li> </ul>
Maximum Capacitive Load	<ul style="list-style-type: none"> <li>• See table</li> </ul>
Temperature Coefficient	<ul style="list-style-type: none"> <li>• <math>\pm 0.02/^{\circ}\text{C}</math> max</li> </ul>
Remote On/Off	<ul style="list-style-type: none"> <li>• On <math>&gt; 3.0</math> VDC or open circuit</li> <li>• Off <math>&lt; 1.2</math> VDC or short circuit pins 2 &amp; 3</li> </ul>

### General

Efficiency	<ul style="list-style-type: none"> <li>• See table</li> </ul>
Isolation	<ul style="list-style-type: none"> <li>• 1600 VDC Input to Output</li> <li>• 1600 VDC Input to Case</li> <li>• 1600 VDC Output to Case</li> </ul>
Isolation Capacitance	<ul style="list-style-type: none"> <li>• JCM15: 1200 pF max,</li> <li>• JCM20: 1000 pF max</li> </ul>
Switching Frequency	<ul style="list-style-type: none"> <li>• JCM15: 375 kHz typical,</li> <li>• JCM20: 330 kHz typical</li> </ul>
Power Density	<ul style="list-style-type: none"> <li>• JCM15: 38.4 W/in<sup>3</sup>,</li> <li>• JCM20: 51.3 W/in<sup>3</sup></li> </ul>
MTBF	<ul style="list-style-type: none"> <li>• <math>&gt; 560</math> kHrs to MIL-STD-217F at 25 <math>^{\circ}\text{C}</math>, GB</li> </ul>

### Environmental

Operating Temperature	<ul style="list-style-type: none"> <li>• <math>-40\text{ }^{\circ}\text{C}</math> to <math>+105\text{ }^{\circ}\text{C}</math>, derate from 100% load at <math>+65\text{ }^{\circ}\text{C}</math> to no load at <math>+105\text{ }^{\circ}\text{C}</math> for JCM15 and 100% load at <math>+55\text{ }^{\circ}\text{C}</math> to no load at <math>105\text{ }^{\circ}\text{C}</math> for JCM20</li> </ul>
Case Temperature	<ul style="list-style-type: none"> <li>• <math>+105\text{ }^{\circ}\text{C}</math> max</li> </ul>
Storage Temperature	<ul style="list-style-type: none"> <li>• <math>-40\text{ }^{\circ}\text{C}</math> to <math>+125\text{ }^{\circ}\text{C}</math></li> </ul>
Humidity	<ul style="list-style-type: none"> <li>• Up to 90%, non-condensing</li> </ul>
Cooling	<ul style="list-style-type: none"> <li>• Natural convection</li> </ul>

### EMC

Emissions	<ul style="list-style-type: none"> <li>• EN55022 class A conducted &amp; radiated with external components, see application note</li> </ul>
ESD Immunity	<ul style="list-style-type: none"> <li>• EN61000-4-2, 6 kV contact discharge, 8 kV air discharge, Perf Criteria A</li> </ul>
Radiated Immunity	<ul style="list-style-type: none"> <li>• EN61000-4-3, 10 V/m, Perf Criteria A</li> </ul>
EFT/Burst	<ul style="list-style-type: none"> <li>• EN61000-4-4, level 2, Perf Criteria A*</li> </ul>
Surge	<ul style="list-style-type: none"> <li>• EN61000-4-5, level 2, Perf Criteria A</li> </ul>
Conducted Immunity	<ul style="list-style-type: none"> <li>• EN61000-4-6, 10 Vrms, Perf Criteria A</li> </ul>
Magnetic Field	<ul style="list-style-type: none"> <li>• EN61000-4-8, 1 A/m, Perf Criteria A</li> </ul>

### Safety

Safety Approvals	<ul style="list-style-type: none"> <li>• UL60950-1, CAN/CSA C22.2 No.60950-1, UL62368-1</li> </ul>
------------------	--

\*External input capacitor required, 220  $\mu\text{F}/100\text{ V}$ .

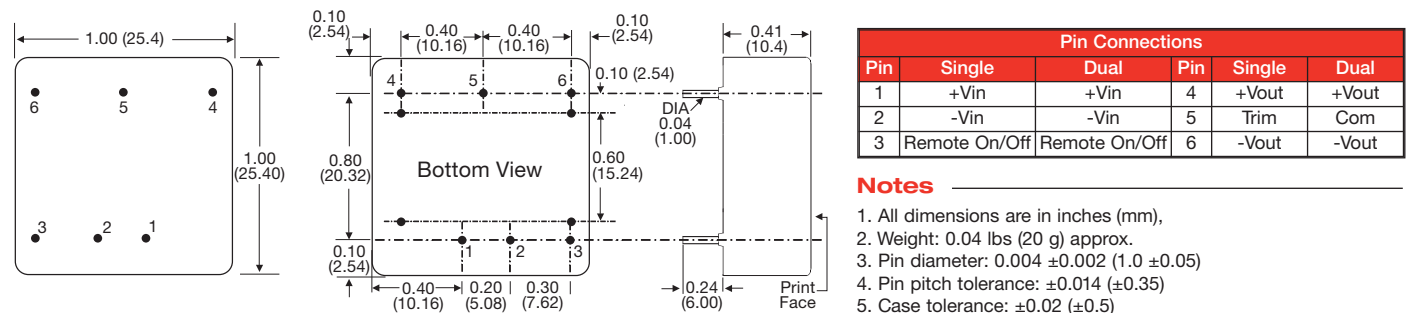
## Models and Ratings

Input Voltage	Output Voltage	Output Current	Input Current <sup>(1)</sup>		Maximum Capacitive Load	Efficiency	Model Number
			No Load	Full Load			
9-18 V	3.3 V	4.000 A	20 mA	1310 mA	1000 $\mu$ F	85%	JCM1512S3V3
	5.0 V	3.000 A	20 mA	1471 mA	1000 $\mu$ F	86%	JCM1512S05
	12.0 V	1.300 A	20 mA	1494 mA	330 $\mu$ F	88%	JCM1512S12
	15.0 V	1.000 A	20 mA	1420 mA	220 $\mu$ F	89%	JCM1512S15
	$\pm 5.0$ V	$\pm 1.500$ A	20 mA	1488 mA	$\pm 470$ $\mu$ F	85%	JCM1512D05
	$\pm 12.0$ V	$\pm 0.625$ A	20 mA	1420 mA	$\pm 220$ $\mu$ F	89%	JCM1512D12
18-36 V	3.3 V	4.000 A	15 mA	647 mA	1000 $\mu$ F	86%	JCM1524S3V3
	5.0 V	3.000 A	15 mA	727 mA	1000 $\mu$ F	87%	JCM1524S05
	12.0 V	1.300 A	15 mA	747 mA	330 $\mu$ F	88%	JCM1524S12
	15.0 V	1.000 A	15 mA	710 mA	220 $\mu$ F	89%	JCM1524S15
	$\pm 5.0$ V	$\pm 1.500$ A	15 mA	744 mA	$\pm 470$ $\mu$ F	85%	JCM1524D05
	$\pm 12.0$ V	$\pm 0.625$ A	15 mA	718 mA	$\pm 220$ $\mu$ F	88%	JCM1524D12
36-75 V	3.3 V	4.000 A	10 mA	327 mA	1000 $\mu$ F	85%	JCM1548S3V3
	5.0 V	3.000 A	10 mA	368 mA	1000 $\mu$ F	86%	JCM1548S05
	12.0 V	1.300 A	10 mA	374 mA	330 $\mu$ F	88%	JCM1548S12
	15.0 V	1.000 A	10 mA	359 mA	220 $\mu$ F	88%	JCM1548S15
	$\pm 5.0$ V	$\pm 1.500$ A	10 mA	377 mA	$\pm 470$ $\mu$ F	84%	JCM1548D05
	$\pm 12.0$ V	$\pm 0.625$ A	10 mA	363 mA	$\pm 220$ $\mu$ F	87%	JCM1548D12
9-18 V	3.3 V	4.500 A	60 mA	1439 mA	7000 $\mu$ F	86%	JCM2012S3V3
	5.0 V	4.000 A	60 mA	1852 mA	5000 $\mu$ F	90%	JCM2012S05
	12.0 V	1.670 A	30 mA	1873 mA	850 $\mu$ F	89%	JCM2012S12
	15.0 V	1.330 A	30 mA	1873 mA	700 $\mu$ F	89%	JCM2012S15
	$\pm 12.0$ V	$\pm 0.833$ A	30 mA	1873 mA	$\pm 470$ $\mu$ F	89%	JCM2012D12
	$\pm 15.0$ V	$\pm 0.667$ A	30 mA	1873 mA	$\pm 330$ $\mu$ F	89%	JCM2012D15
18-36 V	3.3 V	4.500 A	35 mA	720 mA	7000 $\mu$ F	86%	JCM2024S3V3
	5.0 V	4.000 A	35 mA	936 mA	5000 $\mu$ F	89%	JCM2024S05
	12.0 V	1.670 A	25 mA	936 mA	850 $\mu$ F	89%	JCM2024S12
	15.0 V	1.330 A	25 mA	936 mA	700 $\mu$ F	89%	JCM2024S15
	$\pm 12.0$ V	$\pm 0.833$ A	30 mA	936 mA	$\pm 470$ $\mu$ F	89%	JCM2024D12
	$\pm 15.0$ V	$\pm 0.667$ A	30 mA	936 mA	$\pm 330$ $\mu$ F	89%	JCM2024D15
36-75 V	3.3 V	4.500 A	25 mA	360 mA	7000 $\mu$ F	86%	JCM2048S3V3
	5.0 V	4.000 A	25 mA	468 mA	5000 $\mu$ F	89%	JCM2048S05
	12.0 V	1.670 A	15 mA	468 mA	850 $\mu$ F	89%	JCM2048S12
	15.0 V	1.330 A	15 mA	468 mA	700 $\mu$ F	90%	JCM2048S15
	$\pm 12.0$ V	$\pm 0.833$ A	20 mA	468 mA	$\pm 470$ $\mu$ F	89%	JCM2048D12
	$\pm 15.0$ V	$\pm 0.667$ A	20 mA	468 mA	$\pm 330$ $\mu$ F	89%	JCM2048D15

### Notes

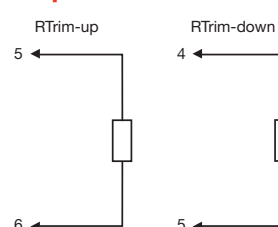
- Input current specified at nominal input.
- Cross regulation for duals is  $\pm 5\%$  when one output is at 100% and the other is varied between 25% and 100%.
- Measured with 1  $\mu$ F ceramic capacitor in parallel with a 10  $\mu$ F electrolytic across output rails on single output models or 1  $\mu$ F ceramic capacitor only on dual output models.

## Mechanical Details



## Application Notes

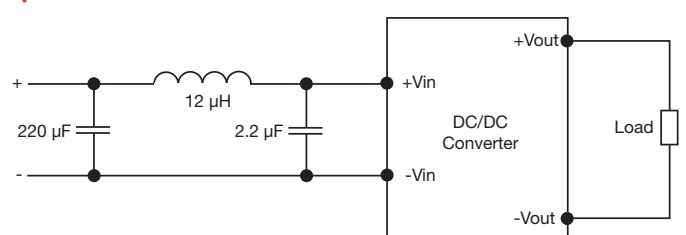
### Output Trim



Trim Resistor Values		
Model Number	Trim up 10%	Trim down 10%
JCM-S3V3	8 k $\Omega$	12 k $\Omega$
JCM-S05	10 k $\Omega$	5 k $\Omega$
JCM-S12	20 k $\Omega$	7 k $\Omega$
JCM-S15	20 k $\Omega$	6 k $\Omega$

Approximate values.

### Input Filter



Output can be externally trimmed by using the method above. (Single output models only). For variable trimming, use 100 k $\Omega$  potentiometer