

# 15/20 Watts

## JCM Series



- Very High Power Density
- 2:1 Input Range
- Operating Temperature  $-40^{\circ}\text{C}$  to  $+105^{\circ}\text{C}$
- Single & Dual Outputs
- 1600 VDC Isolation
- 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, 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, JCM20: 1000 pF max</li> </ul>                                                        |
| Switching Frequency   | <ul style="list-style-type: none"> <li>• JCM15: 375 kHz typical, JCM20: 330 kHz typical</li> </ul>                                                |
| Power Density         | <ul style="list-style-type: none"> <li>• JCM15: 38.4 W/in<sup>3</sup>, 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 <math>25^{\circ}\text{C}</math>, GB</li> </ul>             |

#### Environmental

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

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

## Models and Ratings

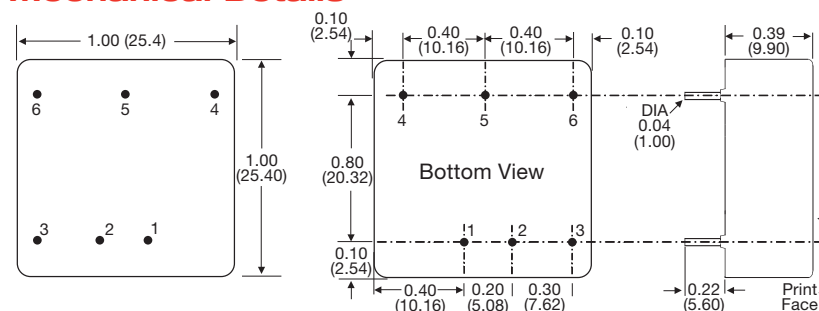
JCM15/20 **XP**

| 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       | $\pm 15.0$ V   | $\pm 0.500$ A  | 20 mA                        | 1437 mA   | $\pm 100$ $\mu$ F       | 89%        | JCM1512D15   |
|               | 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   |
| 36-75 V       | $\pm 12.0$ V   | $\pm 0.625$ A  | 15 mA                        | 718 mA    | $\pm 220$ $\mu$ F       | 88%        | JCM1524D12   |
|               | $\pm 15.0$ V   | $\pm 0.500$ A  | 15 mA                        | 710 mA    | $\pm 100$ $\mu$ F       | 89%        | JCM1524D15   |
|               | 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   |
| 9-18 V        | $\pm 5.0$ 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   |
|               | $\pm 15.0$ V   | $\pm 0.500$ A  | 10 mA                        | 359 mA    | $\pm 100$ $\mu$ F       | 88%        | JCM1548D15   |
|               | 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   |
| 18-36 V       | 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   |
|               | 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   |
| 36-75 V       | 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   |
|               | 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   |
| 36-75 V       | 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



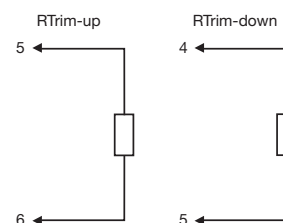
| Pin Connections |               |               |     |        |       |
|-----------------|---------------|---------------|-----|--------|-------|
| Pin             | Single        | Dual          | Pin | Single | Dual  |
| 1               | +Vin          | +Vin          | 4   | +Vout  | +Vout |
| 2               | -Vin          | -Vin          | 5   | Trim   | Com   |
| 3               | Remote On/Off | Remote On/Off | 6   | -Vout  | -Vout |

## Notes

- All dimensions are in inches (mm).
- Weight: 0.04 lbs (20 g) approx.
- Pin diameter: 0.004  $\pm$  0.002 (1.0  $\pm$  0.05)
- Pin pitch tolerance:  $\pm$  0.014 ( $\pm$  0.35)
- Case tolerance:  $\pm$  0.02 ( $\pm$  0.5)

## Application Notes

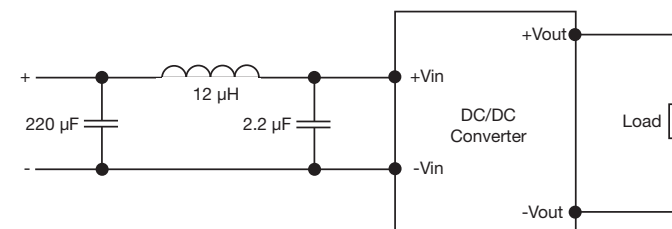
## Output Trim



| 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