

## JCK Series



- 2:1 Input Range
- Very High Power Density
- Single and Dual Outputs
- High Efficiency – Up to 92%
- Remote On/Off
- 1600 VDC Isolation
- 3 Year Warranty

## Specification

## Input

|                                |  |
|--------------------------------|--|
| Input Voltage Range            | <ul style="list-style-type: none"> <li>• 12 V (9-18 VDC), 24 V (18-36 VDC), 48 V (36-75 VDC)</li> </ul>  |
| Input Current                  | <ul style="list-style-type: none"> <li>• See table</li> </ul>  |
| Input Reflected Ripple Current | <ul style="list-style-type: none"> <li>• 20 mA pk-pk through 12 <math>\mu</math>H inductor, 5 Hz to 20 MHz</li> </ul>  |
| Undervoltage Lockout           | <ul style="list-style-type: none"> <li>• 12 V models: ON 8.6 V, OFF 7.9 V typical</li> <li>• 24 V models: ON 17.8 V, OFF 16 V typical</li> <li>• 48 V models: ON 33.5 V, OFF 30.5 V typical</li> </ul> |
| Input Surge                    | <ul style="list-style-type: none"> <li>• 12 V models 25 VDC for 1000 ms</li> <li>• 24 V models 50 VDC for 1000 ms</li> <li>• 48 V models 100 VDC for 1000 ms</li> </ul>                                |

## Output

|                          |  |
|--------------------------|--|
| Output Voltage           | <ul style="list-style-type: none"> <li>• See table</li> </ul>  |
| Output Voltage Trim      | <ul style="list-style-type: none"> <li>• <math>\pm 10\%</math> on single outputs models only, contact sales for details</li> </ul>   |
| Minimum Load             | <ul style="list-style-type: none"> <li>• No minimum load required</li> </ul>   |
| Line Regulation          | <ul style="list-style-type: none"> <li>• <math>\pm 0.5\%</math> max</li> </ul>   |
| Load Regulation          | <ul style="list-style-type: none"> <li>• Single output models: <math>\pm 0.5\%</math> max</li> <li>• Dual output models: <math>\pm 1\%</math> max balanced outputs</li> </ul>  |
| Cross Regulation         | <ul style="list-style-type: none"> <li>• <math>\pm 5\%</math> (see note 2)</li> </ul>  |
| Setpoint Accuracy        | <ul style="list-style-type: none"> <li>• <math>\pm 1\%</math></li> </ul>   |
| Start Up Time            | <ul style="list-style-type: none"> <li>• 30 ms typical</li> </ul>  |
| Ripple & Noise           | <ul style="list-style-type: none"> <li>• 100 mV for 3V3 +5 V models, 150 mV for other models (see note 3)</li> </ul>   |
| Transient Response       | <ul style="list-style-type: none"> <li>• 3% max deviation, recovery to within 1% in <math>&lt;250 \mu</math>s for a 25% load change</li> </ul>   |
| Temperature Coefficient  | <ul style="list-style-type: none"> <li>• 0.02%/<math>^{\circ}</math>C</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 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>• 115-130% of output current</li> </ul>   |
| Short Circuit Protection | <ul style="list-style-type: none"> <li>• Trip &amp; restart (Hiccup mode), auto recovery</li> </ul>  |
| Remote On/Off            | <ul style="list-style-type: none"> <li>• On = Logic High (<math>&gt;3.0</math>) or Open</li> <li>• Off = Logic Low (<math>&lt;1.2</math> V) or short pin 2 to 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>• 1000 pF typical</li> </ul>   |
| Switching Frequency   | <ul style="list-style-type: none"> <li>• 270 kHz typical</li> </ul>   |
| Power Density         | <ul style="list-style-type: none"> <li>• 50 W/in<sup>3</sup></li> </ul>   |
| MTBF                  | <ul style="list-style-type: none"> <li>• 330 kHrs min to MIL-HDBK-217F at 25 <math>^{\circ}</math>C, GB</li> </ul>                                |

## Environmental

|                       |   |
|-----------------------|---|
| Operating Temperature | <ul style="list-style-type: none"> <li>• -40 <math>^{\circ}</math>C to +70 <math>^{\circ}</math>C, derate from 100% load at 55 <math>^{\circ}</math>C to 60% load at 70 <math>^{\circ}</math>C</li> </ul> |
| Case Temperature      | <ul style="list-style-type: none"> <li>• +105 <math>^{\circ}</math>C max</li> </ul>   |
| Cooling               | <ul style="list-style-type: none"> <li>• Convection-cooled</li> </ul>   |
| Operating Humidity    | <ul style="list-style-type: none"> <li>• 5-95% RH, non-condensing</li> </ul>  |
| Storage Temperature   | <ul style="list-style-type: none"> <li>• -40 <math>^{\circ}</math>C to +125 <math>^{\circ}</math>C</li> </ul>   |

## EMC

|                    |   |
|--------------------|---|
| Emissions          | <ul style="list-style-type: none"> <li>• EN55022 class B conducted &amp; radiated with external components, see application note</li> </ul> |
| ESD Immunity       | <ul style="list-style-type: none"> <li>• EN61000-4-2, 4 kV contact discharge, Perf Criteria B</li> </ul>                                    |
| Radiated Immunity  | <ul style="list-style-type: none"> <li>• EN61000-4-3, 3 V/m, Perf Criteria A</li> </ul>   |
| EFT/Burst          | <ul style="list-style-type: none"> <li>• EN61000-4-4, level 1, Perf Criteria A*</li> </ul>  |
| Surge              | <ul style="list-style-type: none"> <li>• EN61000-4-5, level 1, Perf Criteria A</li> </ul>   |
| Conducted Immunity | <ul style="list-style-type: none"> <li>• EN61000-4-6, 3 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  $\mu$ F/100 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 VDC      | 3.3 V          | 8.00 A         | 100 mA                       | 2444 mA   | 21000 µF                | 90%        | JCK4012S3V3†^ |
|               | 5.0 V          | 8.00 A         | 150 mA                       | 3663 mA   | 13000 µF                | 91%        | JCK4012S05†^  |
|               | 12.0 V         | 3.33 A         | 40 mA                        | 3663 mA   | 2000 µF                 | 91%        | JCK4012S12†^  |
|               | 15.0 V         | 2.67 A         | 50 mA                        | 3663 mA   | 1500 µF                 | 91%        | JCK4012S15†^  |
|               | ±12.0 V        | ±1.67 A        | 30 mA                        | 3663 mA   | ±1200 µF                | 91%        | JCK4012D12†^  |
| 18-36 VDC     | 3.3 V          | 8.00 A         | 60 mA                        | 1208 mA   | 21000 µF                | 91%        | JCK4024S3V3†^ |
|               | 5.0 V          | 8.00 A         | 80 mA                        | 1811 mA   | 13000 µF                | 92%        | JCK4024S05†^  |
|               | 12.0 V         | 3.33 A         | 30 mA                        | 1831 mA   | 2000 µF                 | 91%        | JCK4024S12†^  |
|               | 15.0 V         | 2.67 A         | 40 mA                        | 1811 mA   | 1500 µF                 | 92%        | JCK4024S15†^  |
|               | ±12.0 V        | ±1.67 A        | 50 mA                        | 1831 mA   | ±1200 µF                | 91%        | JCK4024D12†^  |
| 36-75 VDC     | 3.3 V          | 8.00 A         | 40 mA                        | 604 mA    | 21000 µF                | 91%        | JCK4048S3V3†^ |
|               | 5.0 V          | 8.00 A         | 60 mA                        | 905 mA    | 13000 µF                | 92%        | JCK4048S05†^  |
|               | 12.0 V         | 3.33 A         | 20 mA                        | 915 mA    | 2000 µF                 | 91%        | JCK4048S12†^  |
|               | 15.0 V         | 2.67 A         | 20 mA                        | 905 mA    | 1500 µF                 | 92%        | JCK4048S15†^  |
|               | ±12.0 V        | ±1.67 A        | 30 mA                        | 906 mA    | ±1200 µF                | 92%        | JCK4048D12†^  |
|               | ±15.0 V        | ±1.33 A        | 40 mA                        | 906 mA    | ±750 µF                 | 92%        | JCK4048D15†^  |

### Notes

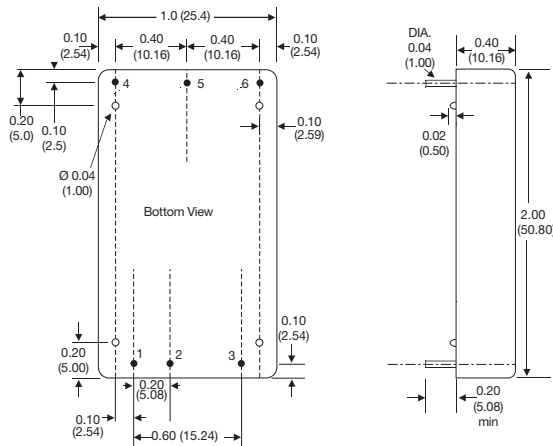
- Input current specified at nominal input.
- Cross regulation for duals is ±5% when one output is at 100% and the other is varied between 25% and 100%.

- Measured with 1 µF ceramic capacitor in parallel with a 10 µF electrolytic across output rails.

† Available from Farnell & element14. See pages 284-290.

^ Available from Newark. See pages 291-296.

## Mechanical Details



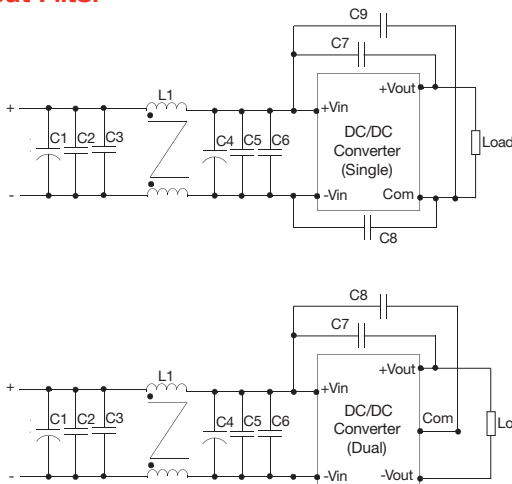
| PIN CONNECTIONS |               |               |
|-----------------|---------------|---------------|
| Pin             | Single        | Dual          |
| 1               | +Vin          | +Vin          |
| 2               | -Vin          | -Vin          |
| 3               | Remote On/Off | Remote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

### Notes

- All dimensions are in inches (mm).
- Weight: 0.07 lbs (30 g) approx
- Pin diameter: 0.04 ±0.002 (1.0 ±0.05)
- Pin pitch tolerance: ±0.014 (±0.35)
- Case tolerance: ±0.02 (±0.5)

## Application Notes

### Input Filter



| JCK40 Single | C1            | L1                         | C2/C3/C5/C6    | C4            |
|--------------|---------------|----------------------------|----------------|---------------|
| 12 V         | 220 µF, 100 V | Common Mode<br>Choke 68 µH | 6.8 µF, 50 V   | 330 µF, 100 V |
| 24 V         |               |                            | 4.7 µF, 50 V   | 220 µF, 100 V |
| 48 V         |               |                            | 1.5 µF, 1000 V | 220 µF, 100 V |
| JCK40 Dual   | C1            | L1                         | C2/C3/C5/C6    | C4            |
| 12 V         | 220 µF, 100 V | Common Mode<br>Choke 68 µH | 6.8 µF, 50 V   | 330 µF, 100 V |
| 24 V         |               |                            | 4.7 µF, 50 V   | 220 µF, 100 V |
| 48 V         |               |                            | 1.5 µF, 1000 V | 220 µF, 100 V |

| JCK40 Single | C7            | C8            | C9            |
|--------------|---------------|---------------|---------------|
| 12 V         |               |               | 1000 pF, 2 kV |
| 24 V         | 1000 pF, 2 kV | 1000 pF, 2 kV |               |
| 48 V         | 1000 pF, 2 kV | 1000 pF, 2 kV |               |
| JCK40 Dual   | C7            | C8            |               |
| 12 V         | 1000 pF, 2 kV | 1000 pF, 2 kV |               |
| 24 V         | 1000 pF, 2 kV | 1000 pF, 2 kV |               |
| 48 V         | 1000 pF, 2 kV | 1000 pF, 2 kV |               |

### External Output Trim

