

## JCJ Series



- 2:1 Input Range
- DIP-24 Metal Package
- Operating Temperature  $-40^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$
- Single & Dual Outputs
- Continuous Short Circuit Protection
- 1500 VDC Isolation
- 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>• JCJ08: 35 mA, JCJ10: 20 mA pk-pk through 12 <math>\mu\text{H}</math> inductor</li> </ul>                                          |
| Input Surge                    | <ul style="list-style-type: none"> <li>• 12 V models 24/25 VDC for 100 ms</li> <li>• 24 V models 40/50 VDC for 100 ms</li> <li>• 48 V models 100 VDC for 100 ms</li> </ul> |
| Undervoltage Lockout           | <ul style="list-style-type: none"> <li>• None</li> </ul>                                                                                                                   |
| Reverse Voltage Protection     | <ul style="list-style-type: none"> <li>• None</li> </ul>                                                                                                                   |

## Output

|                          |                                                                                                                                                                                                                                                                                                       |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Voltage           | <ul style="list-style-type: none"> <li>• See table</li> </ul>                                                                                                                                                                                                                                         |
| Output Voltage Balance   | <ul style="list-style-type: none"> <li>• <math>\pm 1\%</math> max, dual output models</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>                                                                                                                                                                                                                          |
| 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>• <math>\pm 0.7\%</math> for 2.5-3.3 V models, <math>\pm 0.5\%</math> for all other models (see note 2)</li> </ul>                                                                                                                                             |
| Cross Regulation         | <ul style="list-style-type: none"> <li>• <math>\pm 5\%</math> on dual output models (see note 3)</li> </ul>                                                                                                                                                                                           |
| Transient Response       | <ul style="list-style-type: none"> <li>• <math>&lt; 3\%</math> max deviation, recovery to within 1% in 200 <math>\mu\text{s}</math> for a 25% load change</li> </ul>                                                                                                                                  |
| Ripple & Noise           | <ul style="list-style-type: none"> <li>• 75 mV pk-pk, 20 MHz bandwidth, (see note 4)</li> </ul>                                                                                                                                                                                                       |
| Overvoltage Protection   | <ul style="list-style-type: none"> <li>• JCJ10: 3.3 V models: 3.9 V typ., 5 V models: 6.2 V typ., 12 V models: 15.0 V typ., 15 V models: 18.0 V typ., <math>\pm 12</math> V models: <math>\pm 15.0</math> V typ., <math>\pm 15</math> V models: <math>\pm 18.0</math> V typ. JCJ08: No OVP</li> </ul> |
| Overload Protection      | <ul style="list-style-type: none"> <li>• <math>&gt; 150\%</math> of full load</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 tables</li> </ul>                                                                                                                                                                                                                                        |
| Temperature Coefficient  | <ul style="list-style-type: none"> <li>• <math>\pm 0.02/^{\circ}\text{C}</math> max</li> </ul>                                                                                                                                                                                                        |

## General

|                       |                                                                                                                                                   |
|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Efficiency            | <ul style="list-style-type: none"> <li>• See tables</li> </ul>                                                                                    |
| Isolation             | <ul style="list-style-type: none"> <li>• 1500 VDC Input to Output</li> <li>• 1000 VDC Input to Case</li> <li>• 1000 VDC Output to Case</li> </ul> |
| Isolation Capacitance | <ul style="list-style-type: none"> <li>• 1200 pF max</li> </ul>                                                                                   |
| Switching Frequency   | <ul style="list-style-type: none"> <li>• 330 kHz typical</li> </ul>                                                                               |
| Power Density         | <ul style="list-style-type: none"> <li>• JCJ10: 25 W/in<sup>3</sup></li> <li>• JCJ08: 20 W/in<sup>3</sup></li> </ul>                              |
| MTBF                  | <ul style="list-style-type: none"> <li>• <math>&gt; 900</math> KHrs to MIL-HDBK-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>+100^{\circ}\text{C}</math>, derate from 100% load at <math>+60^{\circ}\text{C}</math> to no load at <math>+100^{\circ}\text{C}</math></li> </ul> |
| Case Temperature      | <ul style="list-style-type: none"> <li>• <math>+100^{\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 95% RH, 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, 8 kV air discharge, 4 kV contact discharge</li> <li>• JCJ10: 6 kV contact discharge, Perf Criteria A</li> </ul> |
| EFT/Burst          | <ul style="list-style-type: none"> <li>• EN61000-4-4, level 1</li> <li>• JCJ10: level 3, Perf Criteria A, (see note 5)</li> </ul>                                     |
| Surge              | <ul style="list-style-type: none"> <li>• JCJ08: EN61000-4-5, installation class 2, JCJ10: installation class 3, Perf Criteria A, (see note 5)</li> </ul>              |
| Conducted Immunity | <ul style="list-style-type: none"> <li>• EN61000-4-6, 3 Vrms</li> <li>• JCJ10: 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

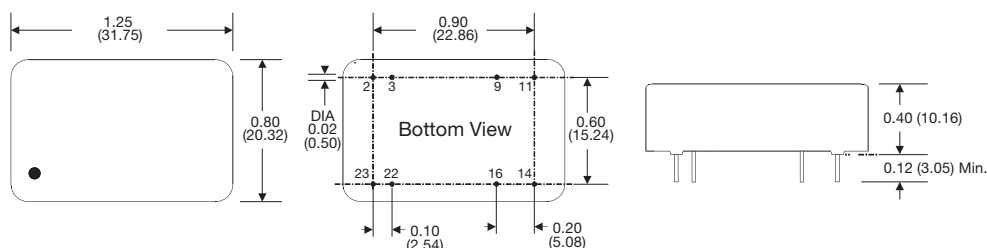
|                  |                                                                                                    |
|------------------|----------------------------------------------------------------------------------------------------|
| Safety Approvals | <ul style="list-style-type: none"> 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

| 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          | 2.000 A        | 20 mA                        | 0.69 A    | 3300 $\mu$ F            | 80%        | JCJ0812S3V3  |
|               | 5.0 V          | 1.500 A        | 20 mA                        | 0.76 A    | 2200 $\mu$ F            | 82%        | JCJ0812S05   |
|               | 12.0 V         | 0.665 A        | 20 mA                        | 0.78 A    | 470 $\mu$ F             | 85%        | JCJ0812S12   |
|               | 15.0 V         | 0.535 A        | 20 mA                        | 0.80 A    | 220 $\mu$ F             | 83%        | JCJ0812S15   |
|               | $\pm 5.0$ V    | $\pm 0.800$ A  | 20 mA                        | 0.81 A    | $\pm 1000$ $\mu$ F      | 82%        | JCJ0812D05   |
|               | $\pm 12.0$ V   | $\pm 0.335$ A  | 20 mA                        | 0.79 A    | $\pm 220$ $\mu$ F       | 84%        | JCJ0812D12   |
| 18-36 V       | 3.3 V          | 2.000 A        | 15 mA                        | 0.34 A    | 3300 $\mu$ F            | 80%        | JCJ0824S3V3  |
|               | 5.0 V          | 1.500 A        | 15 mA                        | 0.38 A    | 2200 $\mu$ F            | 82%        | JCJ0824S05   |
|               | 12.0 V         | 0.665 A        | 15 mA                        | 0.39 A    | 470 $\mu$ F             | 85%        | JCJ0824S12   |
|               | 15.0 V         | 0.535 A        | 15 mA                        | 0.40 A    | 220 $\mu$ F             | 84%        | JCJ0824S15   |
|               | $\pm 5.0$ V    | $\pm 0.800$ A  | 15 mA                        | 0.41 A    | $\pm 1000$ $\mu$ F      | 82%        | JCJ0824D05   |
|               | $\pm 12.0$ V   | $\pm 0.335$ A  | 15 mA                        | 0.40 A    | $\pm 220$ $\mu$ F       | 83%        | JCJ0824D12   |
| 36-75 V       | 3.3 V          | 2.000 A        | 15 mA                        | 0.17 A    | 3300 $\mu$ F            | 80%        | JCJ0848S3V3  |
|               | 5.0 V          | 1.500 A        | 15 mA                        | 0.19 A    | 2200 $\mu$ F            | 82%        | JCJ0848S05   |
|               | 12.0 V         | 0.665 A        | 15 mA                        | 0.20 A    | 470 $\mu$ F             | 84%        | JCJ0848S12   |
|               | 15.0 V         | 0.535 A        | 15 mA                        | 0.20 A    | 220 $\mu$ F             | 84%        | JCJ0848S15   |
|               | $\pm 5.0$ V    | $\pm 0.800$ A  | 15 mA                        | 0.20 A    | $\pm 1000$ $\mu$ F      | 82%        | JCJ0848D05   |
|               | $\pm 12.0$ V   | $\pm 0.335$ A  | 15 mA                        | 0.20 A    | $\pm 220$ $\mu$ F       | 85%        | JCJ0848D12   |
| 9-18 V        | 2.5 V          | 3.000 A        | 10 mA                        | 0.79 A    | 2200 $\mu$ F            | 81%        | JCJ1012S2V5  |
|               | 3.3 V          | 3.000 A        | 10 mA                        | 1.01 A    | 2200 $\mu$ F            | 84%        | JCJ1012S3V3  |
|               | 5.0 V          | 2.000 A        | 10 mA                        | 0.99 A    | 2200 $\mu$ F            | 86%        | JCJ1012S05   |
|               | 12.0 V         | 0.833 A        | 10 mA                        | 0.98 A    | 820 $\mu$ F             | 87%        | JCJ1012S12   |
|               | 15.0 V         | 0.667 A        | 10 mA                        | 0.96 A    | 470 $\mu$ F             | 89%        | JCJ1012S15   |
|               | $\pm 12.0$ V   | $\pm 0.416$ A  | 10 mA                        | 0.98 A    | $\pm 220$ $\mu$ F       | 87%        | JCJ1012D12   |
| 18-36 V       | 2.5 V          | 3.000 A        | 10 mA                        | 0.38 A    | 2200 $\mu$ F            | 84%        | JCJ1024S2V5  |
|               | 3.3 V          | 3.000 A        | 10 mA                        | 0.50 A    | 2200 $\mu$ F            | 85%        | JCJ1024S3V3  |
|               | 5.0 V          | 2.000 A        | 10 mA                        | 0.48 A    | 2200 $\mu$ F            | 89%        | JCJ1024S05   |
|               | 12.0 V         | 0.833 A        | 10 mA                        | 0.49 A    | 820 $\mu$ F             | 88%        | JCJ1024S12   |
|               | 15.0 V         | 0.667 A        | 10 mA                        | 0.49 A    | 470 $\mu$ F             | 88%        | JCJ1024S15   |
|               | $\pm 12.0$ V   | $\pm 0.416$ A  | 10 mA                        | 0.49 A    | $\pm 220$ $\mu$ F       | 88%        | JCJ1024D12   |
| 36-75 V       | 2.5 V          | 3.000 A        | 10 mA                        | 0.19 A    | 2200 $\mu$ F            | 84%        | JCJ1048S2V5  |
|               | 3.3 V          | 3.000 A        | 10 mA                        | 0.25 A    | 2200 $\mu$ F            | 85%        | JCJ1048S3V3  |
|               | 5.0 V          | 2.000 A        | 10 mA                        | 0.24 A    | 2200 $\mu$ F            | 88%        | JCJ1048S05   |
|               | 12.0 V         | 0.833 A        | 10 mA                        | 0.25 A    | 820 $\mu$ F             | 87%        | JCJ1048S12   |
|               | 15.0 V         | 0.667 A        | 10 mA                        | 0.24 A    | 470 $\mu$ F             | 88%        | JCJ1048S15   |
|               | $\pm 12.0$ V   | $\pm 0.416$ A  | 10 mA                        | 0.25 A    | $\pm 220$ $\mu$ F       | 87%        | JCJ1048D12   |
| 36-75 V       | 2.5 V          | 3.000 A        | 10 mA                        | 0.19 A    | 2200 $\mu$ F            | 84%        | JCJ1048S2V5  |
|               | 3.3 V          | 3.000 A        | 10 mA                        | 0.25 A    | 2200 $\mu$ F            | 85%        | JCJ1048S3V3  |
|               | 5.0 V          | 2.000 A        | 10 mA                        | 0.24 A    | 2200 $\mu$ F            | 88%        | JCJ1048S05   |
|               | 12.0 V         | 0.833 A        | 10 mA                        | 0.25 A    | 820 $\mu$ F             | 87%        | JCJ1048S12   |
|               | 15.0 V         | 0.667 A        | 10 mA                        | 0.24 A    | 470 $\mu$ F             | 88%        | JCJ1048S15   |
|               | $\pm 12.0$ V   | $\pm 0.416$ A  | 10 mA                        | 0.25 A    | $\pm 220$ $\mu$ F       | 87%        | JCJ1048D12   |

## Notes

1. Input current measured at nominal input voltage.
2. From 10% to 100% load.
3. When one output is set at 100% load and the other varied between 25% and 100% load
4. Measured with 20 MHz bandwidth and 1  $\mu$ F ceramic capacitor across output rails.
5. A 220  $\mu$ F/100 V capacitor across the input is required to meet EN61000-4-4 and EN61000-4-5

## Mechanical Details and Application Note



| Pin Connections |        |        |     |        |        |
|-----------------|--------|--------|-----|--------|--------|
| Pin             | Single | Dual   | Pin | Single | Dual   |
| 2               | -Vin   | -Vin   | 14  | +Vout  | +Vout  |
| 3               | -Vin   | -Vin   | 16  | -Vout  | Common |
| 9               | No Pin | Common | 22  | +Vin   | +Vin   |
| 11              | N.C.   | -Vout  | 23  | +Vin   | +Vin   |

## Notes

1. All dimensions are in inches (mm)
2. Weight: 0.04 lbs (17 g) approx.
3. Pin pitch and length tolerance:  $\pm 0.014$  ( $\pm 0.35$ )
4. Pin diameter tolerance:  $0.02 \pm 0.002$  ( $0.5 \pm 0.05$ )
5. Case tolerance:  $\pm 0.02$  ( $\pm 0.5$ )
6. Package: 24 in DIL nickel-coated copper.