

# 10 Watts

## JCJ10 Series



- 2:1 Input Range
- DIP-24 Metal Package
- Operating Temperature -40 °C to +100 °C
- Single & Dual Outputs
- Continuous Short Circuit Protection
- 1500 VDC Isolation
- High Efficiency - Up to 90%

### 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 | <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>                                                |
| Input Surge            | <ul style="list-style-type: none"> <li>• 12 V models 25 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 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>                                                                                                                                                                                                                                                                     |
| Start Up Delay           | <ul style="list-style-type: none"> <li>• &lt;20 ms</li> </ul>                                                                                                                                                                                                                                                                                    |
| Start Up Rise Time       | <ul style="list-style-type: none"> <li>• &lt;10 ms</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 others, 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>• &lt;3% max deviation, recovery to within 1% in 250 <math>\mu</math>s for a 25% load change</li> </ul>                                                                                                                                                                                                   |
| Ripple & Noise           | <ul style="list-style-type: none"> <li>• 85 mV pk-pk, 20 MHz BW, with 1 <math>\mu</math>F ceramic capacitor, see note 4</li> </ul>                                                                                                                                                                                                               |
| Overload Protection      | <ul style="list-style-type: none"> <li>• &gt;150%</li> </ul>                                                                                                                                                                                                                                                                                     |
| Overvoltage Protection   | <ul style="list-style-type: none"> <li>• 2.5-3.3 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> |
| 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>• 1000 pF max</li> </ul>                                                                                   |
| Switching Frequency   | <ul style="list-style-type: none"> <li>• 330 kHz typical</li> </ul>                                                                               |
| MTBF                  | <ul style="list-style-type: none"> <li>• &gt;1.1 Mhrs to MIL-STD-217F</li> </ul>                                                                  |

#### Environmental

|                       |                                                                                                                              |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------|
| Operating Temperature | <ul style="list-style-type: none"> <li>• -40 °C to +100 °C, derate from 100% load at +60 °C to no load at +100 °C</li> </ul> |
| Case Temperature      | <ul style="list-style-type: none"> <li>• +100 °C max</li> </ul>                                                              |
| Storage Temperature   | <ul style="list-style-type: none"> <li>• -40 °C to +125 °C</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 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 3 Perf Criteria B*</li> </ul>                                     |
| Surge              | <ul style="list-style-type: none"> <li>• EN61000-4-5, level 3 Perf Criteria B*</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>                                        |

\* See note 5.

## Models and Ratings

JCJ10 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        | 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       | $\pm 15.0$ V   | $\pm 0.333$ A  | 10 mA                        | 0.97 A    | $\pm 150$ $\mu$ F       | 88%        | JCJ1012D15   |
|               | 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   |
| 36-75 V       | $\pm 12.0$ V   | $\pm 0.416$ A  | 10 mA                        | 0.49 A    | $\pm 220$ $\mu$ F       | 88%        | JCJ1024D12   |
|               | $\pm 15.0$ V   | $\pm 0.333$ A  | 10 mA                        | 0.47 A    | $\pm 150$ $\mu$ F       | 90%        | JCJ1024D15   |
|               | 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   |
|               | $\pm 15.0$ V   | $\pm 0.333$ A  | 10 mA                        | 0.25 A    | $\pm 150$ $\mu$ F       | 87%        | JCJ1048D15   |

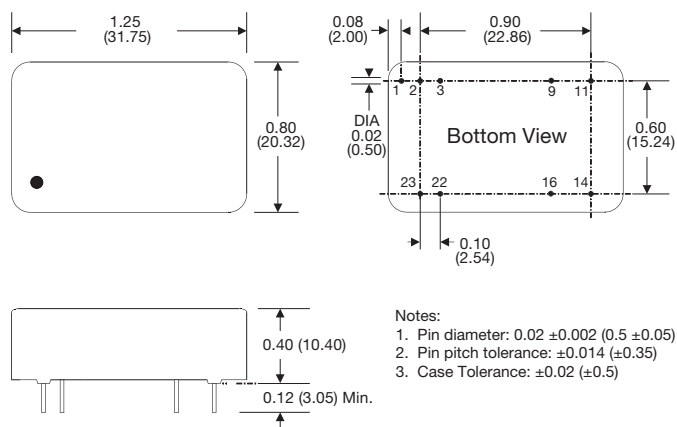
## Notes

1. Input current measured at nominal input voltage.
2. From 10% to 100% load.
3. When one output is set at 100% and the other varied between 25% and 100% load.
4. Measured with 20 MHz BW and 1  $\mu$ F ceramic capacitor across output rails.
5. External input capacitor required, Nippon Chemi-Con KY series, 220  $\mu$ F/100 V or equivalent.

## Mechanical Details

All dimensions are in inches (mm) Weight: 0.04 lbs (20 g) approx.

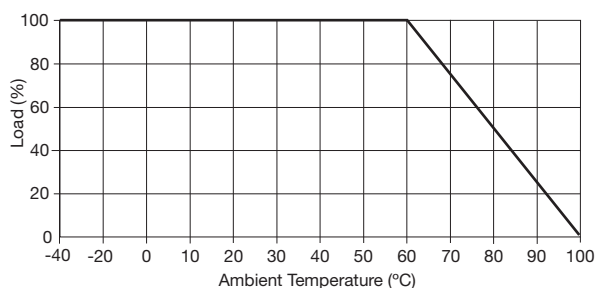
## 24 Pin DIL Package - Nickel Coated Copper



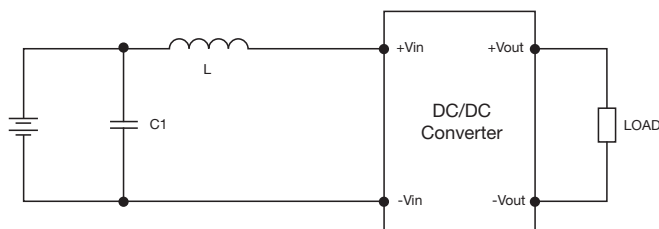
| Pin Connections |               |        |
|-----------------|---------------|--------|
| Pin             | Single        | Dual   |
| 2               | -Vin          | -Vin   |
| 3               | -Vin          | -Vin   |
| 9               | No Pin        | Common |
| 11              | Not Connected | -Vout  |
| 14              | +Vout         | +Vout  |
| 16              | -Vout         | Common |
| 22              | +Vin          | +Vin   |
| 23              | +Vin          | +Vin   |

## Application Notes

## Derating Curve



## Input Filter



| Model | L          | C1                 |
|-------|------------|--------------------|
| 12 V  | 12 $\mu$ H | 100 $\mu$ F, 100 V |
| 24 V  | 12 $\mu$ H | 100 $\mu$ F, 100 V |
| 48 V  | 12 $\mu$ H | 100 $\mu$ F, 100 V |