

# 20 Watts

## JCK Series



- 2:1 Input Range
- -40 °C to +100 °C Operating Temperature
- Single & Dual Outputs
- Remote On/Off
- High Efficiency – up to 93%
- 1600 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>                                                                                                                                          |
| 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 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 Voltage Trim      | <ul style="list-style-type: none"> <li>• <math>\pm 10\%</math> max on single outputs</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> for dual outputs (see note 2)</li> </ul>                                                                                                                                                                                                                                       |
| Setpoint 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;5 ms</li> </ul>                                                                                                                                                                                                                                                                                 |
| Ripple & Noise           | <ul style="list-style-type: none"> <li>• 75 mV pk-pk (see note 3)</li> </ul>                                                                                                                                                                                                                                                                 |
| Transient Response       | <ul style="list-style-type: none"> <li>• <math>\pm 3\%</math> max deviation, recovery to within 1% in 250 <math>\mu</math>s for a 25% load change</li> </ul>                                                                                                                                                                                 |
| Temperature Coefficient  | <ul style="list-style-type: none"> <li>• 0.02%/°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>• &gt;140% of full load at nominal input</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 (&gt;3.0 V) or Open</li> <li>• Off = Logic Low (&lt;1.2 V) or short pin 2 to pin 6</li> </ul>                                                                                                                                                                                       |
| Capacitive Load          | <ul style="list-style-type: none"> <li>• See table</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>• 1200 pF typical</li> </ul>                                                                               |
| Isolation Resistance  | <ul style="list-style-type: none"> <li>• <math>10^9 \Omega</math> min</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>• 25 W/in<sup>3</sup></li> </ul>                                                                           |
| MTBF                  | <ul style="list-style-type: none"> <li>• &gt;680 kHrs minimum to MIL-HDBK-217F at 25 °C, GB</li> </ul>                                            |

#### Environmental

|                       |                                                                                                                              |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------|
| Operating Temperature | <ul style="list-style-type: none"> <li>• -40 °C to +100 °C, derate from 100% load at +70 °C to 0% load at +100 °C</li> </ul> |
| Case Temperature      | <ul style="list-style-type: none"> <li>• +100 °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>• Up to 95% RH, non-condensing</li> </ul>                                             |
| Storage Temperature   | <ul style="list-style-type: none"> <li>• -40 °C to +125 °C</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, 6 kV contact, 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 3, Perf Criteria B*</li> </ul>                                                    |
| Surge              | <ul style="list-style-type: none"> <li>• EN61000-4-5 level 2, Perf Criteria B*</li> </ul>                                                    |
| Conducted Immunity | <ul style="list-style-type: none"> <li>• EN61000-4-6 10 V/rms, 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

JCK20 **XP**

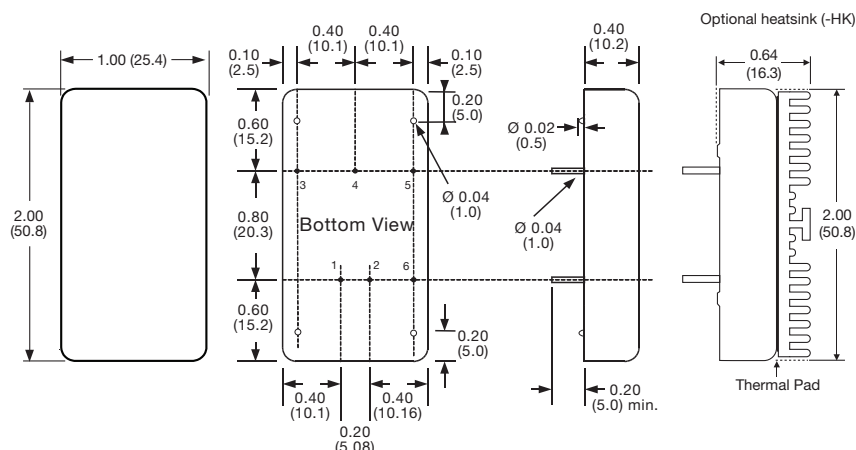
| Input Voltage | Output Voltage | Output Current | Input Current <sup>(1)</sup> |           | Maximum Capacitive Load | Efficiency | Model Number |
|---------------|----------------|----------------|------------------------------|-----------|-------------------------|------------|--------------|
|               |                |                | No Load                      | Full Load |                         |            |              |
| 9-18 VDC      | 3.3 VDC        | 5.500 A        | 60 mA                        | 1.74 A    | 10,000 $\mu$ F          | 90%        | JCK2012S3V3  |
|               | 5.0 VDC        | 4.000 A        | 60 mA                        | 1.87 A    | 6,800 $\mu$ F           | 92%        | JCK2012S05   |
|               | 12.0 VDC       | 1.670 A        | 30 mA                        | 1.92 A    | 1,000 $\mu$ F           | 90%        | JCK2012S12   |
|               | 15.0 VDC       | 1.330 A        | 30 mA                        | 1.92 A    | 680 $\mu$ F             | 90%        | JCK2012S15   |
|               | $\pm 12.0$ VDC | $\pm 0.835$ A  | 30 mA                        | 1.94 A    | $\pm 470$ $\mu$ F       | 89%        | JCK2012D12   |
| 18-36 VDC     | 3.3 VDC        | 5.500 A        | 35 mA                        | 0.86 A    | 10,000 $\mu$ F          | 91%        | JCK2024S3V3  |
|               | 5.0 VDC        | 4.000 A        | 35 mA                        | 0.93 A    | 6,800 $\mu$ F           | 93%        | JCK2024S05   |
|               | 12.0 VDC       | 1.670 A        | 25 mA                        | 0.95 A    | 1,000 $\mu$ F           | 91%        | JCK2024S12   |
|               | 15.0 VDC       | 1.330 A        | 25 mA                        | 0.95 A    | 680 $\mu$ F             | 91%        | JCK2024S15   |
|               | $\pm 12.0$ VDC | $\pm 0.835$ A  | 30 mA                        | 0.96 A    | $\pm 470$ $\mu$ F       | 90%        | JCK2024D12   |
| 36-75 VDC     | 3.3 VDC        | 5.500 A        | 25 mA                        | 0.43 A    | 10,000 $\mu$ F          | 91%        | JCK2048S3V3  |
|               | 5.0 VDC        | 4.000 A        | 25 mA                        | 0.46 A    | 6,800 $\mu$ F           | 93%        | JCK2048S05   |
|               | 12.0 VDC       | 1.670 A        | 15 mA                        | 0.47 A    | 1,000 $\mu$ F           | 91%        | JCK2048S12   |
|               | 15.0 VDC       | 1.330 A        | 15 mA                        | 0.47 A    | 680 $\mu$ F             | 91%        | JCK2048S15   |
|               | $\pm 12.0$ VDC | $\pm 0.835$ A  | 20 mA                        | 0.48 A    | $\pm 470$ $\mu$ F       | 90%        | JCK2048D12   |
|               | $\pm 15.0$ VDC | $\pm 0.665$ A  | 20 mA                        | 0.48 A    | $\pm 330$ $\mu$ F       | 89%        | JCK2048D15   |

## Notes

1. Input current specified at nominal 12, 24 V or 48 V input.
2. Cross regulation is  $\pm 5\%$  when one output is at 100% and the other is varied between 25% and 100%.

3. Measured with 20 MHz bandwidth and 1  $\mu$ F ceramic capacitor across output rails.
4. For heatsink option add '-HK' to the end of the part number.

## Mechanical Details



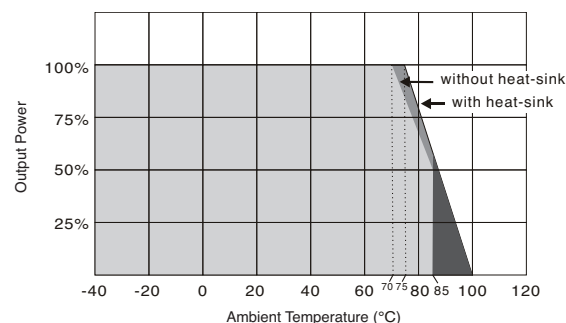
| PIN CONNECTIONS |               |               |
|-----------------|---------------|---------------|
| Pin             | Single        | Dual          |
| 1               | +Vin          | +Vin          |
| 2               | -Vin          | -Vin          |
| 3               | +Vout         | +Vout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

## Notes

1. All dimensions are in inches (mm).
2. Weight: 0.07 lbs (30 g)
3. Pin diameter:  $0.04 \pm 0.002$  ( $1.0 \pm 0.05$ )
4. Pin pitch tolerance:  $\pm 0.014$  ( $\pm 0.35$ )
5. Case tolerance:  $\pm 0.02$  ( $\pm 0.5$ )

## Application Notes

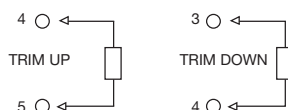
## Derating Curve



## Remote On/Off Control

Output On >3.0 VDC or open circuit  
 Output Off <1.2 VDC or short circuit pins 2 & 6

## External Output Trim



For 3.3 V output:  
 Trim +10%, R = 10 k typical  
 Trim - 10%, R = 15 k typical

For 5 V output:  
 Trim +10%, R = 10 k typical  
 Trim - 10%, R = 5 k typical

For 12 V output:  
 Trim +10%, R = 22 k typical  
 Trim - 10%, R = 5 k typical

For 15 V output:  
 Trim +10%, R = 20 k typical  
 Trim - 10%, R = 5 k typical

## Input Filter

