



- 2:1 Input Range
- Very High Power Density
- High Efficiency – Up to 92%
- Remote On/Off
- 1600 VDC Isolation
- OCP, OVP & OTP Functions
- 3 Year Warranty

## Specification

### Input

|                                |                                                                                                                                                    |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage Range            | <ul style="list-style-type: none"> <li>• 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>• 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>• 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></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>• <math>\pm 0.5\%</math> max</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>• 75 mV for 3V3 +5 V models, 100 mV for other models (see note 2)</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%/°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> </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>• 2000 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>• 37.5 W/in<sup>3</sup></li> </ul>                                                                         |
| MTBF                  | <ul style="list-style-type: none"> <li>• <math>&gt;110</math> kHrs min to MIL-HDBK-217F at 25 °C, GB</li> </ul>                                   |

### Environmental

|                       |                                                                                          |
|-----------------------|------------------------------------------------------------------------------------------|
| Operating Temperature | <ul style="list-style-type: none"> <li>• -40 °C to +85 °C, see derating curve</li> </ul> |
| Case Temperature      | <ul style="list-style-type: none"> <li>• +105 °C max</li> </ul>                          |
| Cooling               | <ul style="list-style-type: none"> <li>• Natural convection</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 °C to +125 °C</li> </ul>                    |

### EMC

|                    |                                                                                                                          |
|--------------------|--------------------------------------------------------------------------------------------------------------------------|
| Emissions          | <ul style="list-style-type: none"> <li>• EN55022 class A conducted &amp; radiated with no external components</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

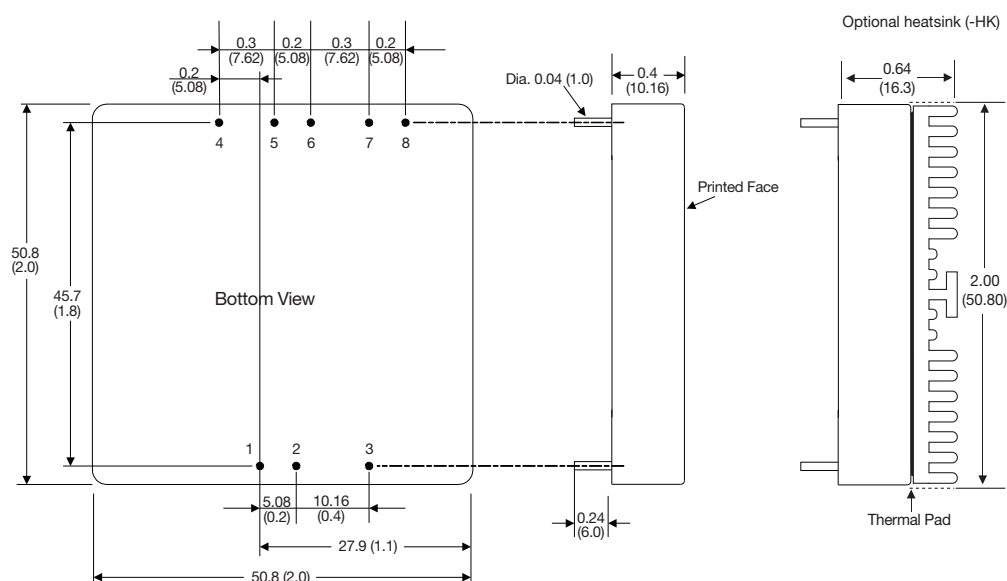
**JCK60 XP**

| Input Voltage | Output Voltage | Output Current | Input Current <sup>(1)</sup> |           | Maximum Capacitive Load | Efficiency | Model Number |
|---------------|----------------|----------------|------------------------------|-----------|-------------------------|------------|--------------|
|               |                |                | No Load                      | Full Load |                         |            |              |
| 18-36 VDC     | 3.3 V          | 14.0 A         | 80 mA                        | 2151 mA   | 36000 µF                | 91%        | JCK6024S3V3  |
|               | 5.0 V          | 12.0 A         | 100 mA                       | 2762 mA   | 20400 µF                | 92%        | JCK6024S05   |
|               | 12.0 V         | 5.0 A          | 40 mA                        | 2793 mA   | 3550 µF                 | 91%        | JCK6024S12   |
|               | 15.0 V         | 4.0 A          | 40 mA                        | 2793 mA   | 2300 µF                 | 91%        | JCK6024S15   |
| 36-75 VDC     | 3.3 V          | 14.0 A         | 50 mA                        | 1075 mA   | 36000 µF                | 91%        | JCK6048S3V3  |
|               | 5.0 V          | 12.0 A         | 60 mA                        | 1389 mA   | 20400 µF                | 92%        | JCK6048S05   |
|               | 12.0 V         | 5.0 A          | 40 mA                        | 1397 mA   | 3550 µF                 | 91%        | JCK6048S12   |
|               | 15.0 V         | 4.0 A          | 40 mA                        | 1397 mA   | 2300 µF                 | 91%        | JCK6048S15   |

## Notes

1. Input current specified at nominal input.
2. Measured with 1  $\mu\text{F}$  ceramic capacitor in parallel with a 10  $\mu\text{F}$  electrolytic across output rails and 20 MHz bandwidth.
3. For heatsink option, add '-HK' to the end of the part number

## Mechanical Details



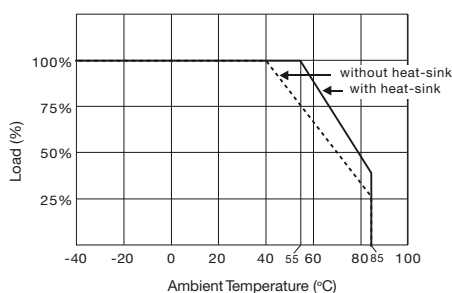
| PIN CONNECTIONS |               |
|-----------------|---------------|
| Pin             | Single        |
| 1               | +Vin          |
| 2               | -Vin          |
| 3               | Remote On/Off |
| 4               | -Sense        |
| 5               | +Sense        |
| 6               | +Vout         |
| 7               | -Vout         |
| 8               | Trim          |

## Notes

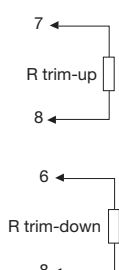
1. All dimensions are in inches (mm).
2. Weight: 0.154 lbs (70 g) approx
3. Pin diameter: 0.04  $\pm$  0.002 (1.0  $\pm$  0.05)
4. Pin pitch tolerance:  $\pm$  0.014 ( $\pm$  0.35)
5. Case tolerance:  $\pm$  0.02 ( $\pm$  0.5)

## Application Notes

## Derating Curve



## External Output Trim



$$R_{\text{trim-up}} = \frac{(R_2 + R_3) \times R_{TU}}{(R_2 + R_3) - R_{TU}} - R_4$$

$$\text{Where: } R_{TU} = \frac{R1 \times (R2 + R3) \times K}{V_{REQ} \times R3 - (R2 + R3) \times K}$$

$$R_{\text{trim-down}} = \frac{R1 \times R_{TD}}{R1 - R_{TD}} - R4$$

Where:  $R_{TD} = \frac{R_3 \times (V_{REQ} - K)}{K} - R_2$

| Model       | R1   | R2   | R3   | R4    | K     |
|-------------|------|------|------|-------|-------|
| JCK60XXS3V3 | 8200 | 330  | 5100 | 24000 | 1.24  |
| JCK60XXS05  | 5100 | 22   | 5100 | 15000 | 2.495 |
| JCK60XXS12  | 7500 | 6200 | 3600 | 20000 | 2.495 |
| JCK60XXS15  | 8200 | 6800 | 3000 | 24000 | 2.495 |

## Remote Sense

If Remote Sense is not required, the +Sense and -Sense pins should be locally connected to +Vout and -Vout respectively. Remote sense can compensate for a total volt drop of 10%. When remote sense is used, output power must not exceed rated power.