



# THE DATASHEET OF JTK2024S12



## JTK Series



- Very High Power Density
- Wide 4:1 Input Range
- Operating Temperature  $-40\text{ }^{\circ}\text{C}$  to  $+100\text{ }^{\circ}\text{C}$
- Single & Dual Outputs
- 1600 VDC Isolation
- UL Approved
- High Efficiency – up to 89%
- 3 Year Warranty

## Specification

## Input

Input Voltage Range	<ul style="list-style-type: none"> <li>• 24 V (9-36 VDC)</li> <li>• 48 V (18-75 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>• JTK15: 20 mA pk-pk</li> <li>• JTK20: 30 mA pk-pk through 12 <math>\mu\text{H}</math> inductor and 47 <math>\mu\text{F}</math> capacitor, 5 Hz to 20 MHz</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 Trim	<ul style="list-style-type: none"> <li>• <math>\pm 10\%</math> max on single output</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>• 20 ms typical</li> </ul>
Line Regulation	<ul style="list-style-type: none"> <li>• JTK15: <math>\pm 0.2\%</math> max single, <math>\pm 0.5\%</math> max dual</li> <li>• JTK20: <math>\pm 0.5\%</math> max</li> </ul>
Load Regulation	<ul style="list-style-type: none"> <li>• <math>\pm 0.5\%</math> max single, <math>\pm 1.0\%</math> max dual</li> </ul>
Cross Regulation	<ul style="list-style-type: none"> <li>• <math>\pm 5\%</math> on dual output models, (see note 2)</li> </ul>
Transient Response	<ul style="list-style-type: none"> <li>• <math>&lt; 3\%</math> max deviation, recovery to within 1% in 250 <math>\mu\text{s}</math> for a 25% load change</li> </ul>
Ripple & Noise	<ul style="list-style-type: none"> <li>• 100 mV pk-pk, 20 MHz bandwidth, (see note 3)</li> </ul>
Overload Protection	<ul style="list-style-type: none"> <li>• JTK15: 170% of full load typical, JTK20: 150% of full load typical</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 5\text{ V}</math> models: <math>\pm 6.2\text{ V}</math> typical</li> <li>• <math>\pm 12\text{ V}</math> models: <math>\pm 15\text{ V}</math> typical</li> <li>• <math>\pm 15\text{ V}</math> models: <math>\pm 18\text{ V}</math> 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 table</li> </ul>
Temperature Coefficient	<ul style="list-style-type: none"> <li>• <math>\pm 0.02\%/^{\circ}\text{C}</math> max</li> </ul>
Remote On/Off	<ul style="list-style-type: none"> <li>• On <math>&gt; 3.0\text{ VDC}</math> or open circuit</li> <li>• Off <math>&lt; 1.2\text{ VDC}</math> or short circuit pins 2 &amp; 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>• JTK15: 1200 pF max</li> <li>• JTK20: 1000 pF max</li> </ul>
Switching Frequency	<ul style="list-style-type: none"> <li>• JTK15: 375 kHz typical</li> <li>• JTK20: 330 kHz typical</li> </ul>
Power Density	<ul style="list-style-type: none"> <li>• JTK15: 38.4 W/in<sup>3</sup>,</li> <li>• JTK20: 51.3 W/in<sup>3</sup></li> </ul>
MTBF	<ul style="list-style-type: none"> <li>• <math>&gt; 560\text{ K}</math>Hrs to MIL-STD-217F at 25 <math>^{\circ}\text{C}</math>, GB</li> </ul>

## Environmental

Operating Temperature	<ul style="list-style-type: none"> <li>• <math>-40\text{ }^{\circ}\text{C}</math> to <math>+100\text{ }^{\circ}\text{C}</math>, JTK15: derate from 100% load at <math>+65\text{ }^{\circ}\text{C}</math> to no load at <math>+100\text{ }^{\circ}\text{C}</math>, JTK20: derate from 100% load at <math>+55\text{ }^{\circ}\text{C}</math> to no load at <math>+100\text{ }^{\circ}\text{C}</math></li> </ul>
Case Temperature	<ul style="list-style-type: none"> <li>• <math>+105\text{ }^{\circ}\text{C}</math> max</li> </ul>
Storage Temperature	<ul style="list-style-type: none"> <li>• <math>-40\text{ }^{\circ}\text{C}</math> to <math>+125\text{ }^{\circ}\text{C}</math></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, Level A conducted &amp; radiated with external components - see applications note</li> </ul>
ESD Immunity	<ul style="list-style-type: none"> <li>• EN61000-4-2, Level 2 Perf Criteria A</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 A*</li> </ul>
Conducted Immunity	<ul style="list-style-type: none"> <li>• EN61000-4-6, 3 V rms Perf Criteria A</li> </ul>
Magnetic Fields	<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>
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\*External input capacitor required 220  $\mu\text{F}$  / 100 V.

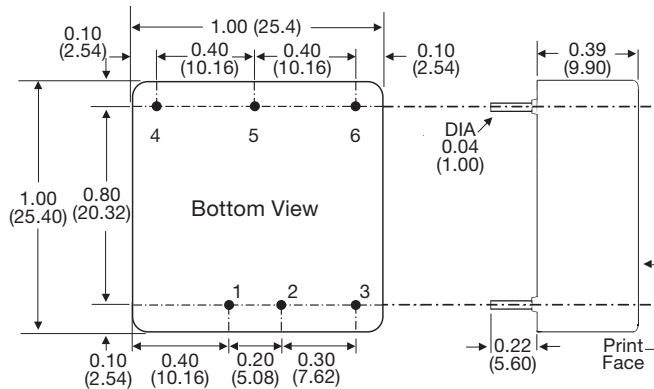
## Models and Ratings

Input Voltage	Output Voltage	Output Current	Input Current <sup>(1)</sup>		Maximum Capacitive Load	Efficiency	Model Number
			No Load	Full Load			
9-36 V	3.3 V	4.000 A	15 mA	647 mA	1000 $\mu$ F	86%	JTK1524S3V3
	5.0 V	3.000 A	15 mA	727 mA	1000 $\mu$ F	87%	JTK1524S05
	12.0 V	1.300 A	15 mA	747 mA	330 $\mu$ F	88%	JTK1524S12
	15.0 V	1.000 A	15 mA	710 mA	220 $\mu$ F	89%	JTK1524S15
	$\pm 5.0$ V	$\pm 1.500$ A	15 mA	744 mA	$\pm 470$ $\mu$ F	85%	JTK1524D05
	$\pm 12.0$ V	$\pm 0.625$ A	15 mA	720 mA	$\pm 220$ $\mu$ F	88%	JTK1524D12
18-75 V	3.3 V	4.000 A	10 mA	331 mA	1000 $\mu$ F	84%	JTK1548S3V3
	5.0 V	3.000 A	10 mA	368 mA	1000 $\mu$ F	86%	JTK1548S05
	12.0 V	1.300 A	10 mA	378 mA	330 $\mu$ F	87%	JTK1548S12
	15.0 V	1.000 A	10 mA	360 mA	220 $\mu$ F	88%	JTK1548S15
	$\pm 5.0$ V	$\pm 1.500$ A	10 mA	377 mA	$\pm 470$ $\mu$ F	84%	JTK1548D05
	$\pm 12.0$ V	$\pm 0.625$ A	10 mA	363 mA	$\pm 220$ $\mu$ F	87%	JTK1548D12
9-36 V	3.3 V	4.500 A	50 mA	720 mA	10000 $\mu$ F	86%	JTK2024S3V3
	5.0 V	4.000 A	50 mA	936 mA	5000 $\mu$ F	89%	JTK2024S05
	12.0 V	1.670 A	22 mA	936 mA	850 $\mu$ F	89%	JTK2024S12
	15.0 V	1.330 A	22 mA	936 mA	700 $\mu$ F	89%	JTK2024S15
	$\pm 12.0$ V	$\pm 0.833$ A	25 mA	936 mA	$\pm 470$ $\mu$ F	89%	JTK2024D12
	$\pm 15.0$ V	$\pm 0.667$ A	25 mA	936 mA	$\pm 330$ $\mu$ F	89%	JTK2024D15
18-75 V	3.3 V	4.500 A	30 mA	309 mA	10000 $\mu$ F	86%	JTK2048S3V3
	5.0 V	4.000 A	30 mA	468 mA	5000 $\mu$ F	89%	JTK2048S05
	12.0 V	1.670 A	15 mA	468 mA	850 $\mu$ F	89%	JTK2048S12
	15.0 V	1.330 A	15 mA	468 mA	700 $\mu$ F	90%	JTK2048S15
	$\pm 12.0$ V	$\pm 0.833$ A	15 mA	468 mA	$\pm 470$ $\mu$ F	89%	JTK2048D12
	$\pm 15.0$ V	$\pm 0.667$ A	15 mA	468 mA	$\pm 330$ $\mu$ F	89%	JTK2048D15

### Notes

1. Input current measured at nominal 24 V and 48 V input.
2. When one output is set to 100% load, and the other varies between 25% and 100% load.
3. Measured with 1  $\mu$ F ceramic capacitor and 10  $\mu$ F tantalum capacitor across output rails.

## Mechanical Details



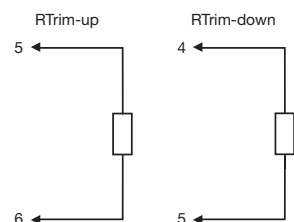
Pin	Pin Connections	
	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	Remote On/Off	Remote On/Off
4	+Vout	+Vout
5	Trim	Com
6	-Vout	-Vout

### Notes

1. All dimensions are in inches (mm)
2. Weight: 0.04 lbs (20 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

### Output Trim

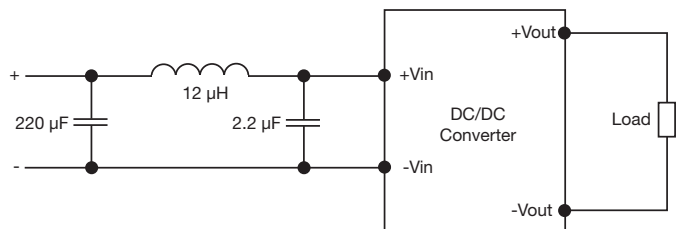


Model Number	Trim Resistor Values	
	Trim up 10%	Trim down 10%
JTK - S3V3	8 k	12 k
JTK - S05	10 k	5 k
JTK - S12	20 k	7 k
JTK - S15	20 k	6 k

Approximate values.



Output can be externally trimmed by using this method. (Single output models only). For variable trimming, use 100 k $\Omega$  potentiometer. Contact sales for details.

### Input Filter



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