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DC–DC

# 4/6 Watts
# JTC Series

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- 4:1 Input Range
- DIP–24 Metal Package
- Operating Temperature –40 °C to +100 °C
- Single & Dual Outputs
- Continuous Short Circuit Protection
- 1500 VDC Isolation, 3500 VDC Option
- 3 Year Warranty

## Specification

### Input

| | |
|---|---|
| Input Voltage Range | • 24 V (9-36 VDC)<br>48 V (18-72 VDC) |
| Input Current | • See table |
| Input Filter | • Pi network |
| Input Reflected Ripple | • 35 mA pk-pk through 12 µH inductor |
| Input Surge | • 24 V models 40 VDC for 100 ms<br>48 V models 80 VDC for 100 ms |
| Undervoltage Lockout | • None |
| Input Reverse Voltage Protection | • None |

### Output

| | |
|---|---|
| Output Voltage | • See table |
| Output Voltage Balance | • ±1% max, dual output models |
| Minimum Load | • No minimum load required |
| Initial Set Accuracy | • ±1% max |
| Start Up Delay | • <800 ms |
| Start Up Rise Time | • <10 ms |
| Line Regulation | • ±0.5% max |
| Load Regulation | • ±0.5% max, ±1.5% max for 3.3 V and ±3.3 V models |
| Cross Regulation | • ±5% on dual output models (see note 4) |
| Transient Response | • <1.5% max deviation, recovery to within 1% in 200 µs for a 50% load change |
| Ripple & Noise | • 60 mV pk-pk for 3.3 V to 15 V models,<br>100 mV pk-pk for 18 V models,<br>150 mV pk-pk for 24 V models,<br>20 MHz bandwidth |
| Short Circuit Protection | • Trip & restart (Hiccup mode), auto recovery |
| Maximum Capacitive Load | • See tables |
| Temperature Coefficient | • ±0.02/°C max |

### General

| | |
|---|---|
| Efficiency | • See tables |
| Isolation Voltage | • 1500 VDC Input to Output, for optional high isolation version 3500 VDC input to output add suffix '-H' to model number<br>1000 VDC Input to Case<br>1000 VDC Output to Case |
| Isolation Resistance | • $10^9\Omega$ |
| Switching Frequency | • 266 kHz typical |
| Power Density | • JTC04: 10 W/in$^3$, JTC06: 15 W/in$^3$ |
| MTBF | • >1.0 MHrs to MIL-HDBK-217F at 25 °C, GB |

### Environmental

| | |
|---|---|
| Operating Temperature | • -40 °C to +100 °C, derate from 100% load at +85 °C to no load at +100 °C |
| Case Temperature | • +100 °C max |
| Storage Temperature | • -40 °C to +125 °C |
| Humidity | • Up to 95%, non-condensing |
| Cooling | • Natural convection |

### EMC

| | |
|---|---|
| Emissions | • EN55022 class A conducted with external components - see application note |
| ESD Immunity | • EN61000-4-2,<br>8 kV air discharge Perf Criteria A,<br>4 kV contact discharge Perf Criteria A |
| EFT/Burst | • EN61000-4-4, level 1, Perf Criteria A |
| Conducted Immunity | • EN61000-4-6, 3 Vrms, Perf Criteria A |
| Magnetic Fields | • EN61000-4-8, 1 A/m, Perf Criteria A |

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## Models and Ratings

# JTC04/06

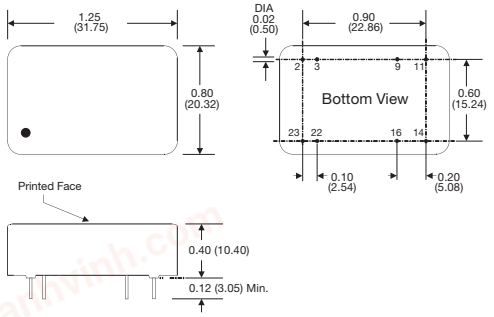
| Input Voltage | Output Voltage | Output Current | Input Current[2] | | Maximum Capacitive Load[3] | Efficiency | Model Number[1] |
|---|---|---|---|---|---|---|---|
| | | | No Load | Full Load | | | |
| 9-36 V | 3.3 V | 1200 mA | 12 mA | 220 mA | 1000 µF | 75% | JTC0424S3V3 |
| | 5.0 V | 800 mA | 15 mA | 211 mA | 1000 µF | 79% | JTC0424S05 |
| | 9.0 V | 445 mA | 12 mA | 201 mA | 220 µF | 83% | JTC0424S09 |
| | 12.0 V | 333 mA | 15 mA | 203 mA | 100 µF | 82% | JTC0424S12 |
| | 15.0 V | 267 mA | 15 mA | 203 mA | 220 µF | 82% | JTC0424S15 |
| | 18.0 V | 223 mA | 15 mA | 203 mA | 10 µF | 82% | JTC0424S18 |
| | 24.0 V | 167 mA | 18 mA | 203 mA | 220 µF | 82% | JTC0424S24 |
| | ±3.3 V | ±606 mA | 12 mA | 222 mA | ±470 µF | 75% | JTC0424D03 |
| | ±5.0 V | ±400 mA | 15 mA | 211 mA | ±100 µF | 79% | JTC0424D05 |
| | ±9.0 V | ±222 mA | 18 mA | 208 mA | ±47 µF | 80% | JTC0424D09 |
| | ±12.0 V | ±167 mA | 15 mA | 203 mA | ±47 µF | 82% | JTC0424D12 |
| | ±15.0 V | ±134 mA | 20 mA | 208 mA | ±10 µF | 80% | JTC0424D15 |
| | ±24.0 V | ±84 mA | 18 mA | 208 mA | ±22 µF | 80% | JTC0424D24 |
| 18-72 V | 3.3 V | 1200 mA | 10 mA | 110 mA | 1000 µF | 76% | JTC0448S3V3 |
| | 5.0 V | 800 mA | 8 mA | 106 mA | 470 µF | 79% | JTC0448S05 |
| | 9.0 V | 445 mA | 10 mA | 100 mA | 330 µF | 83% | JTC0448S09 |
| | 12.0 V | 333 mA | 12 mA | 104 mA | 1000 µF | 80% | JTC0448S12 |
| | 15.0 V | 267 mA | 10 mA | 99 mA | 47 µF | 84% | JTC0448S15 |
| | 18.0 V | 223 mA | 10 mA | 99 mA | 10 µF | 84% | JTC0448S18 |
| | 24.0 V | 167 mA | 15 mA | 102 mA | 22 µF | 82% | JTC0448S24 |
| | ±3.3 V | ±606 mA | 10 mA | 107 mA | ±680 µF | 78% | JTC0448D03 |
| | ±5.0 V | ±400 mA | 15 mA | 106 mA | ±330 µF | 79% | JTC0448D05 |
| | ±9.0 V | ±222 mA | 15 mA | 104 mA | ±47 µF | 80% | JTC0448D09 |
| | ±12.0 V | ±167 mA | 12 mA | 102 mA | ±100 µF | 82% | JTC0448D12 |
| | ±15.0 V | ±134 mA | 15 mA | 104 mA | ±100 µF | 80% | JTC0448D15 |
| | ±24.0 V | ±84 mA | 15 mA | 104 mA | ±10 µF | 80% | JTC0448D24 |

| Input Voltage | Output Voltage | Output Current | Input Current[2] | | Maximum Capacitive Load[3] | Efficiency | Model Number[1] |
|---|---|---|---|---|---|---|---|
| | | | No Load | Full Load | | | |
| 9-36 V | 3.3 V | 1400 mA | 12 mA | 253 mA | 1000 µF | 76% | JTC0624S3V3 |
| | 5.0 V | 1200 mA | 10 mA | 312 mA | 1000 µF | 80% | JTC0624S05 |
| | 9.0 V | 667 mA | 12 mA | 301 mA | 220 µF | 83% | JTC0624S09 |
| | 12.0 V | 500 mA | 15 mA | 301 mA | 1000 µF | 83% | JTC0624S12 |
| | 15.0 V | 400 mA | 18 mA | 301 mA | 470 µF | 83% | JTC0624S15 |
| | 18.0 V | 334 mA | 15 mA | 301 mA | 47 µF | 83% | JTC0624S18 |
| | 24.0 V | 250 mA | 18 mA | 305 mA | 47 µF | 82% | JTC0624S24 |
| | ±3.3 V | ±909 mA | 12 mA | 338 mA | ±470 µF | 74% | JTC0624D03 |
| | ±5.0 V | ±600 mA | 10 mA | 312 mA | ±680 µF | 80% | JTC0624D05 |
| | ±9.0 V | ±333 mA | 18 mA | 309 mA | ±100 µF | 81% | JTC0624D09 |
| | ±12.0 V | ±250 mA | 20 mA | 301 mA | ±330 µF | 83% | JTC0624D12 |
| | ±15.0 V | ±200 mA | 22 mA | 305 mA | ±100 µF | 82% | JTC0624D15 |
| | ±24.0 V | ±125 mA | 18 mA | 312 mA | ±22 µF | 80% | JTC0624D24 |
| 18-72 V | 3.3 V | 1400 mA | 15 mA | 126 mA | 1000 µF | 76% | JTC0648S3V3 |
| | 5.0 V | 1200 mA | 8 mA | 156 mA | 1000 µF | 80% | JTC0648S05 |
| | 9.0 V | 667 mA | 10 mA | 153 mA | 220 µF | 82% | JTC0648S09 |
| | 12.0 V | 500 mA | 10 mA | 151 mA | 1000 µF | 83% | JTC0648S12 |
| | 15.0 V | 400 mA | 10 mA | 149 mA | 100 µF | 84% | JTC0648S15 |
| | 18.0 V | 334 mA | 10 mA | 151 mA | 10 µF | 83% | JTC0648S18 |
| | 24.0 V | 250 mA | 12 mA | 151 mA | 22 µF | 83% | JTC0648S24 |
| | ±3.3 V | ±909 mA | 10 mA | 162 mA | ±330 µF | 77% | JTC0648D03 |
| | ±5.0 V | ±600 mA | 10 mA | 158 mA | ±470 µF | 79% | JTC0648D05 |
| | ±9.0 V | ±333 mA | 15 mA | 154 mA | ±100 µF | 81% | JTC0648D09 |
| | ±12.0 V | ±250 mA | 10 mA | 152 mA | ±100 µF | 82% | JTC0648D12 |
| | ±15.0 V | ±200 mA | 15 mA | 149 mA | ±47 µF | 84% | JTC0648D15 |
| | ±24.0 V | ±125 mA | 15 mA | 154 mA | ±22 µF | 81% | JTC0648D24 |

## Notes

1. *For optional 3500 VDC isolation add suffix '-H' to model number. For optional plastic case, add suffix'-P' to model number. For both options add suffix '-HP to model number.*
2. *Input current measured at nominal input voltage.*
3. *Maximum capacitive load is per output.*
4. *Cross regulation for duals is ±5% when one output is at 100% and the other is varied between 25% and 100%.*

## Mechanical Details and Application Note




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

1. All dimensions are in inches (mm)
2. Weight: 0.04 lbs (17 g) approx.
3. Pin diameter: 0.02 ±0.002 (0.5 ±0.005)
4. Pin pitch tolerance: ±0.014 (±0.35)
5. Case tolerance: ±0.02 (±0.5)

### Input Filter

