

JAH Series



- Low Cost
- DIP-24 Package
- Operating Temperature $-40\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$
- Single & Dual Outputs
- Optional Metal Case
- Optional Isolation to 6000 VDC
- 3 Year Warranty

Specification

Input

| | |
|----------------------------------|---|
| Input Voltage Range | • Nominal $\pm 10\%$ |
| Input Current | • See table |
| Input Filter | • Pi network |
| Input Reverse Voltage Protection | • None |
| Undervoltage Lockout | • None |
| Input Reflected Ripple | • 35 mA pk-pk through 12 μH inductor, 5 Hz to 20 MHz |
| Input Surge | • 5 V models 7 VDC for 100 ms 12 V models 15 VDC for 100 ms 24 V models 28 VDC for 100 ms |

Output

| | |
|--------------------------|--|
| Output Voltage | • See table |
| Minimum Load | • No minimum load required |
| Initial Set Accuracy | • $\pm 2\%$ max |
| Start Up Delay | • 20 ms typical |
| Start Up Rise Time | • 20 ms typical |
| Line Regulation | • $\pm 0.5\%$ max |
| Load Regulation | • $\pm 0.5\%$ max single & dual models ($\pm 1.0\%$ max for 3V3 versions) (see note 6) |
| Cross Regulation | • $\pm 5\%$ on dual output models (see note 4) |
| Transient Response | • $\pm 3\%$ max deviation ($\pm 5\%$ for 3V3 output), recovery to within 1% in 2 ms for a 50% load change |
| Ripple & Noise | • 75 mV pk-pk measured with 20 MHz bandwidth |
| Short Circuit Protection | • Output shuts down with auto recovery |
| Maximum Capacitive Load | • See tables |
| Temperature Coefficient | • $\pm 0.02/^{\circ}\text{C}$ max |

General

| | |
|----------------------|---|
| Efficiency | • See tables |
| Isolation | • 1000 VDC input to output, for optional high isolation versions up to 6000 VDC input to output (see note 1) 60s test. 1000 VDC input to case 1000 VDC output to case |
| Isolation Resistance | • $10^9\Omega$ |
| Switching Frequency | • 40 kHz typical singles, 300 kHz typical duals |
| Power Density | • 5.21 W/in ³ |
| MTBF | • >3 Mhrs to MIL-HDBK-217F at 25 $^{\circ}\text{C}$, GB |

Environmental

| | |
|-----------------------|---|
| Operating Temperature | • $-40\text{ }^{\circ}\text{C}$ to $+100\text{ }^{\circ}\text{C}$, derate from 100% load at $+85\text{ }^{\circ}\text{C}$ to no load at $+100\text{ }^{\circ}\text{C}$ |
| Case Temperature | • $+100\text{ }^{\circ}\text{C}$ max |
| Storage Temperature | • $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ |
| Humidity | • Up to 90%, non-condensing |
| Cooling | • Natural convection |

EMC & Safety

| | |
|--------------------|--|
| Emissions | • EN55032 class A, conducted & radiated with external components (see Application Notes) |
| ESD Immunity | • EN61000-4-2, level 3, Perf Criteria A |
| EFT/Burst | • EN61000-4-4, level 3, Perf Criteria A (see note 5) |
| Surge | • EN61000-4-5, installation class 2, Perf Criteria A (see note 5) |
| Conducted Immunity | • EN61000-4-6, 10 Vrms, Perf Criteria A |
| Magnetic Fields | • EN61000-4-8, 1 A/m, Perf Criteria A |
| Safety Approvals | • CE (Meets all applicable directives), UKCA (Meets all applicable legislation) |

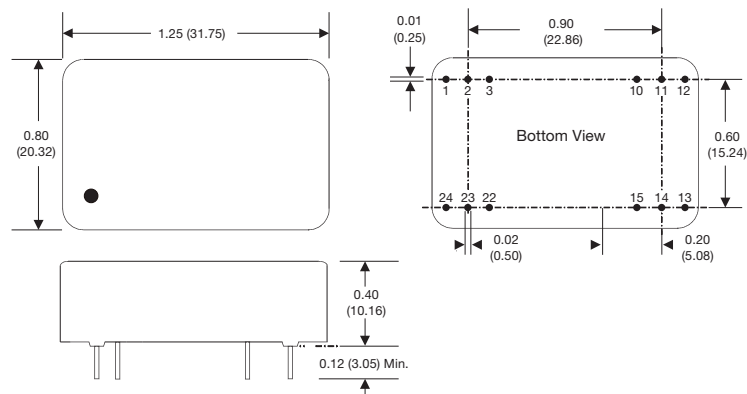
| Input Voltage | Output Voltage | Output Current | Input Current ⁽²⁾ | | Maximum Capacitive Load | Efficiency | Model Number ^(1,3) |
|---------------|----------------|----------------|------------------------------|-----------|-------------------------|------------|-------------------------------|
| | | | No Load | Full Load | | | |
| 5 V | 3.3 V | 500 mA | 75 mA | 622 mA | 330 µF | 53% | JAH0205S3V3 |
| | 5.0 V | 400 mA | 75 mA | 615 mA | 330 µF | 65% | JAH0205S05 |
| | 9.0 V | 222 mA | 75 mA | 597 mA | 330 µF | 67% | JAH0205S09 |
| | 12.0 V | 166 mA | 75 mA | 571 mA | 330 µF | 70% | JAH0205S12 |
| | 15.0 V | 133 mA | 75 mA | 588 mA | 330 µF | 68% | JAH0205S15 |
| | 24.0 V | 83 mA | 75 mA | 615 mA | 330 µF | 65% | JAH0205S24 |
| | ±3.3 V | ±300 mA | 30 mA | 638 mA | ±1000 µF | 62% | JAH0205D03 |
| | ±5.0 V | ±200 mA | 30 mA | 588 mA | ±1000 µF | 68% | JAH0205D05 |
| | ±9.0 V | ±111 mA | 40 mA | 571 mA | ±470 µF | 70% | JAH0205D09 |
| | ±12.0 V | ±83 mA | 40 mA | 571 mA | ±470 µF | 70% | JAH0205D12 |
| 12 V | 3.3 V | 500 mA | 70 mA | 245 mA | 330 µF | 56% | JAH0212S3V3 |
| | 5.0 V | 400 mA | 70 mA | 260 mA | 330 µF | 64% | JAH0212S05 |
| | 9.0 V | 222 mA | 70 mA | 245 mA | 330 µF | 68% | JAH0212S09 |
| | 12.0 V | 166 mA | 70 mA | 238 mA | 330 µF | 70% | JAH0212S12 |
| | 15.0 V | 133 mA | 70 mA | 252 mA | 330 µF | 66% | JAH0212S15 |
| | 24.0 V | 83 mA | 70 mA | 256 mA | 330 µF | 65% | JAH0212S24 |
| | ±3.3 V | ±300 mA | 20 mA | 250 mA | ±1000 µF | 66% | JAH0212D03 |
| | ±5.0 V | ±200 mA | 20 mA | 228 mA | ±1000 µF | 73% | JAH0212D05 |
| | ±9.0 V | ±111 mA | 20 mA | 222 mA | ±470 µF | 75% | JAH0212D09 |
| | ±12.0 V | ±83 mA | 20 mA | 213 mA | ±470 µF | 78% | JAH0212D12 |
| 24 V | 3.3 V | 500 mA | 25 mA | 120 mA | 330 µF | 57% | JAH0224S3V3 |
| | 5.0 V | 400 mA | 25 mA | 132 mA | 330 µF | 63% | JAH0224S05 |
| | 9.0 V | 222 mA | 25 mA | 132 mA | 330 µF | 63% | JAH0224S09 |
| | 12.0 V | 166 mA | 25 mA | 122 mA | 330 µF | 68% | JAH0224S12 |
| | 15.0 V | 133 mA | 25 mA | 122 mA | 330 µF | 68% | JAH0224S15 |
| | 24.0 V | 83 mA | 25 mA | 122 mA | 330 µF | 68% | JAH0224S24 |
| | ±3.3 V | ±300 mA | 15 mA | 121 mA | ±1000 µF | 68% | JAH0224D03 |
| | ±5.0 V | ±200 mA | 15 mA | 114 mA | ±1000 µF | 73% | JAH0224D05 |
| | ±9.0 V | ±111 mA | 15 mA | 111 mA | ±470 µF | 75% | JAH0224D09 |
| | ±12.0 V | ±83 mA | 15 mA | 104 mA | ±470 µF | 80% | JAH0224D12 |

Notes

- For optional 3000 VDC isolation add suffix '-H' to model number.
For optional 4000 VDC isolation add suffix '-H4' to model number.
For optional 5000 VDC isolation add suffix '-H5' to model number.
For optional 6000 VDC isolation add suffix '-H6' to model number.
- Input current measured at nominal input voltage.
- For optional metal case add suffix '-M'. Metal case is only an option up to 3000 VDC isolation versions eg. JAH0212S15-HM.
- Cross regulation is ±5% when one output is at 100% and the other is varied between 25% and 100%.
- A 220 µF/250 V capacitor across the input is required in order to meet EN61000-4-4 and EN61000-4-5.
- Dual output regulation is specified with a balanced load.

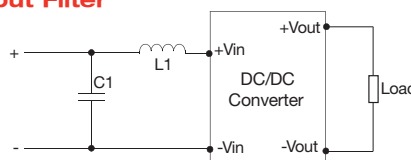
Mechanical Details

| PIN CONNECTIONS | | | | |
|-----------------|--------|--------|-----------|---------|
| Pin | Single | Dual | Single -H | Dual -H |
| 1 | +Vin | +Vin | +Vin | +Vin |
| 2 | N.C. | -Vout | +Vin | +Vin |
| 3 | N.C. | Common | N.P | N.P |
| 10 | -Vout | Common | N.P | Common |
| 11 | +Vout | +Vout | N.P | Common |
| 12 | -Vin | -Vin | -Vout | N.P |
| 13 | -Vin | -Vin | +Vout | -Vout |
| 14 | +Vout | +Vout | N.P | N.P |
| 15 | -Vout | Common | N.P | +Vout |
| 22 | N.C. | Common | N.P | N.P |
| 23 | N.C. | -Vout | -Vin | -Vin |
| 24 | +Vin | +Vin | -Vin | -Vin |



Application Notes

Input Filter



| Single Output Models | | Dual Output Models | |
|----------------------|-------|--------------------|-------|
| C1 | L1 | C1 | L1 |
| 220 µF/100V | 12 µH | 220 µF/100V | 22 µH |

Notes

- All dimensions are in inches (mm)
- Weight: Plastic Case: 0.028 lbs (12.5 g), Metal Case: 0.033 lbs (15.0 g)
- Pin diameter: 0.02±0.002 (0.5±0.05)
- Pin pitch tolerance: ±0.014 (±0.35)
- Case tolerance: ±0.02 (±0.5)