# A200RHI Series

# Very High Isolation, 2W Single & Dual Output DC/DC Converters


## Key Features:

- 2W Output Power
- 8,000 VDC Isolation
- 2 µA Leakage Current Max
- Compact DIP Case
- Single & Dual Outputs
- Meets EN55022 Class A
- 600 kH MTBF
- Industry Standard Pin-Out

**RoHS Compliant**

## Electrical Specifications

Specifications typical @ +25°C, nominal input voltage & rated output current, unless otherwise noted. Specifications subject to change without notice.

### Input

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Input Voltage Range | 5 VDC Input | 4.5 | 5.0 | 5.5 | VDC |
| | 12 VDC Input | 10.8 | 12.0 | 13.2 | |
| | 24 VDC Input | 21.6 | 24.0 | 26.4 | |
| Input Filter | π (Pi) Filter (Complies with EN55022 Class A) | | | | |
| Reverse Polarity Input Current | | | | 0.5 | A |
| Short Circuit Input Power | | | | 2,000 | mW |

### Output

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Output Voltage Accuracy | | | ±2.0 | ±4.0 | % |
| Output Voltage Balance | Dual Output , Balanced Loads | | ±2.0 | ±4.0 | % |
| Line Regulation | Vin = Min to Max | | ±0.3 | ±0.5 | % |
| Load Regulation | Iout = 10% to 100% | | ±0.5 | ±1.0 | % |
| Ripple & Noise (20 MHz) (Note 1) | | | 30 | 50 | mV P - P |
| Ripple & Noise (20 MHz) | Over Line, Load & Temp. | | | 100 | mV P - P |
| Ripple & Noise (20 MHz) | | | | 5 | mV rms |
| Output Power Protection | | 120 | | | % |
| Transient Recovery Time (Note 2) | 50% Load Step Change | | | 50 | µSec |
| Transient Response Deviation | | | | ±6.0 | % |
| Temperature Coefficient | | | ±0.01 | ±0.02 | %/°C |
| Output Short Circuit | Continuous | | | | |

### General

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Isolation Voltage, Rated | | 5,600 | | | VDC |
| Isolation Test Voltage | 60 Seconds | 6,000 | | | VDC |
| Isolation Test Voltage | Flash Tested For 1 Second | 8,000 | | | VDC |
| Leakage Current | 240 VAC, 60 Hz | | | 2 | µA |
| Isolation Resistance | 500 VDC | 10 | | | GΩ |
| Isolation Capacitance | 100 kHz, 1V | | 20 | 30 | pF |
| Switching Frequency | | 25 | | 80 | kHz |

### Environmental

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Operating Temperature Range | | -25 | | +60 | °C |
| Operating Temperature Range | | -25 | | +90 | °C |
| Storage Temperature Range | | -40 | | +125 | °C |
| Cooling | Free Air Convection | | | | |
| Humidity | RH, Non-condensing | | | 95 | % |

### Physical

| | |
|---|---|
| Case Size | 1.25 x 0.80 x 0.40 Inches (31.8 x 20.3 x 10.2 mm) |
| Case Material | Non-Conductive Black Plastic (UL94-V0) |
| Weight | 0.42 Oz (12g) |

### Reliability Specifications

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| MTBF | MIL HDBK 217F, 25°C, Gnd Benign | 600 | | | kHours |

### Absolute Maximum Ratings

| Parameter | Conditions | Min. | Typ. | Max. | Units |
|---|---|---|---|---|---|
| Input Voltage Surge (1 Sec) | 5 VDC Input | -0.7 | | 7.5 | VDC |
| | 12 VDC Input | -0.7 | | 15.0 | |
| | 24 VDC Input | -0.7 | | 30.0 | |
| Lead Temperature | 1.5 mm From Case For 10 Sec | | | 260 | °C |
| Internal Power Dissipation | All Models | | | 2,000 | mW |

**Caution:** Exceeding Absolute Maximum Ratings may damage the module. These are not continuous operating ratings.


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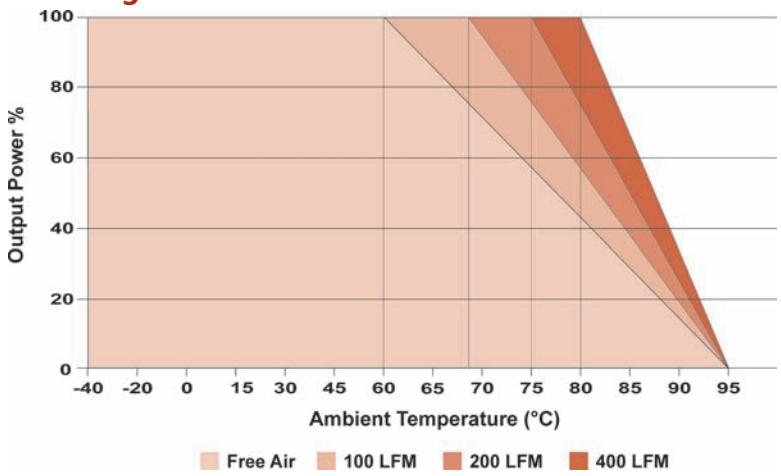
## Model Selection Guide

| Model Number | Input | | | | | Output | | | Efficiency (%, Typ) | Fuse Rating Slow-Blow (mA) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Voltage (VDC) | | Current (mA) | | Reflected Ripple Current (mA, Typ) | Voltage (VDC) | Current (mA, Max) | Current (mA, Min) | | |
| | Nominal | Range | Full-Load | No-Load | | | | | | |
| A201RHI | 5 | 4.5 - 5.5 | 645 | 100 | 15 | 5.0 | 400 | 0.0 | 62 | 1,000 |
| A202RHI | 5 | 4.5 - 5.5 | 629 | 100 | 15 | 12.0 | 165 | 0.0 | 63 | 1,000 |
| A203RHI | 5 | 4.5 - 5.5 | 623 | 100 | 15 | 15.0 | 133 | 0.0 | 64 | 1,000 |
| A204RHI | 5 | 4.5 - 5.5 | 476 | 100 | 15 | ±5.0 | ±100 | ±0.0 | 42 | 1,000 |
| A205RHI | 5 | 4.5 - 5.5 | 699 | 100 | 15 | ±12.0 | ±83 | ±0.0 | 57 | 1,000 |
| A206RHI | 5 | 4.5 - 5.5 | 695 | 100 | 15 | ±15.0 | ±66 | ±0.0 | 57 | 1,000 |
| A211RHI | 12 | 10.8 - 13.2 | 269 | 50 | 8 | 5.0 | 400 | 0.0 | 62 | 500 |
| A212RHI | 12 | 10.8 - 13.2 | 262 | 50 | 8 | 12.0 | 165 | 0.0 | 63 | 500 |
| A213RHI | 12 | 10.8 - 13.2 | 260 | 50 | 8 | 15.0 | 133 | 0.0 | 64 | 500 |
| A214RHI | 12 | 10.8 - 13.2 | 185 | 50 | 8 | ±5.0 | ±100 | ±0.0 | 45 | 500 |
| A215RHI | 12 | 10.8 - 13.2 | 281 | 50 | 8 | ±12.0 | ±83 | ±0.0 | 59 | 500 |
| A216RHI | 12 | 10.8 - 13.2 | 280 | 50 | 8 | ±15.0 | ±66 | ±0.0 | 59 | 500 |
| A221RHI | 24 | 21.6 - 26.4 | 134 | 30 | 3 | 5.0 | 400 | 0.0 | 62 | 250 |
| A222RHI | 24 | 21.6 - 26.4 | 131 | 30 | 3 | 12.0 | 165 | 0.0 | 63 | 250 |
| A223RHI | 24 | 21.6 - 26.4 | 130 | 30 | 3 | 15.0 | 133 | 0.0 | 64 | 250 |
| A224RHI | 24 | 21.6 - 26.4 | 93 | 30 | 3 | ±5.0 | ±100 | ±0.0 | 45 | 250 |
| A225RHI | 24 | 21.6 - 26.4 | 143 | 30 | 3 | ±12.0 | ±83 | ±0.0 | 58 | 250 |
| A226RHI | 24 | 21.6 - 26.4 | 142 | 30 | 3 | ±15.0 | ±66 | ±0.0 | 58 | 250 |

**Notes:**

1. When measuring output ripple, it is recommended that an external 0.33 $\mu$F ceramic capacitor be placed from the +Vout pin to the -Vout pin for single output units and from each output to common for dual output units. For noise sensitive applications, the use of 1.5 $\mu$F capacitors will reduce the output ripple.
2. Transient recovery is measured to within a 1% error band for a load step change of 50% to 100%.
3. Dual output units may be connected to provide a 10 VDC, 24 VDC or 30 VDC output. To do this, connect the load across the positive (+Vout) and negative (-Vout) outputs and float the output common.
4. The converter should be connected to a low ac-impedance source. An input source with a highly inductive impedance may affect the stability of the converter. In applications where the converter output loading is high and input power is supplied over long lines, it may be necessary to use a capacitor on the input to insure start-up.
   In this case, it is recommended that a low ESR (ESR <1.0Ω at 100 kHz) capacitor be mounted close to the converter. For 5V input units a 4.7 $\mu$F is recommended, and for 12V & 24V units a 2.2 $\mu$F.
5. It is recommended that a fuse be used on the input of a power supply for protection. See the table above for the correct rating.

## Derating Curve




## Capacitive Load

| Single Output ($\mu$F Max) | Dual Output ($\mu$F Max) |
|---|---|
| 470 | ±220 |

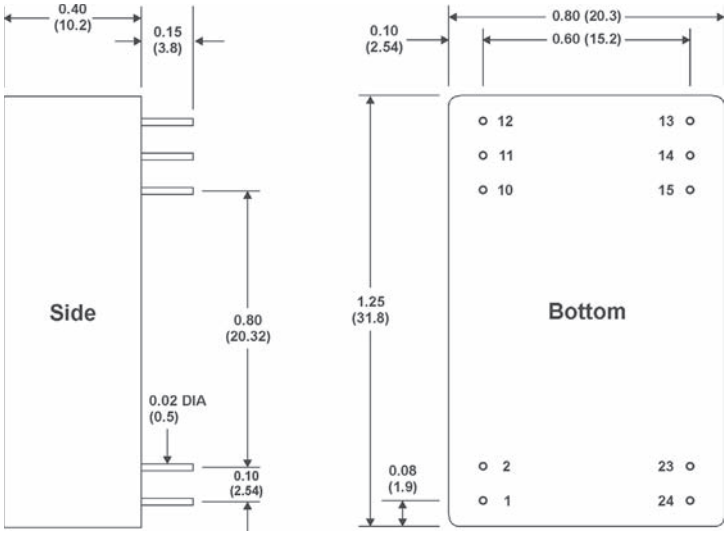
## Pin Connections

| Pin | Single | Dual |
|---|---|---|
| 1, 2 | +Vin | +Vin |
| 10, 11 | No Pin | Common |
| 12 | -Vout | No Pin |
| 13 | +Vout | -Vout |
| 15 | No Pin | +Vout |
| 23, 24 | -Vin | -Vin |

**Mechanical Notes:**

- All dimensions are typical in inches (mm)
- Tolerance x.xx = ±0.01 (±0.25)

## Mechanical Dimensions





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