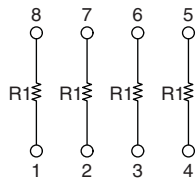
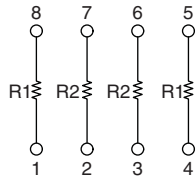


Molded, 50 mil Pitch, Dual-In-Line Thin Film Resistor, Precision Automotive, AEC-Q200 Qualified, Networks



The AORN series features a narrow body (0.150") small outline SMT package. The network is constructed with a tantalum nitride resistor film on a high purity alumina substrate for improved ESD and moisture protection.

SCHEMATICS



Note

- Consult Factory for additional divider ratios and resistance values.

FEATURES

- Moisture resistant tantalum nitride resistive film (MIL STD 202, method 106)
- Standard 8 pin count (0.150" narrow body) JEDEC MS-012
- Rugged molded case construction
- Excellent long term ratio stability ($\Delta R \pm 0.015\%$)
- Low TCR tracking ± 5 ppm/ $^{\circ}\text{C}$
- Passes Sulfur Resistance Test per ASTM B 809
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non-RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details.

TYPICAL APPLICATIONS

- Voltage divider circuits
- Engine control units
- Signal conditioning
- Feedback circuits

TYPICAL PERFORMANCE

| | ABSOLUTE | TRACKING |
|------|----------|----------|
| TCR | 25 | 5 |
| | ABSOLUTE | RATIO |
| TOL. | 0.10 | 0.05 |

STANDARD DIVIDER VALUES

| RATIO R_1/R_2 | R_1 | R_2 |
|-----------------|-----------------|--------------|
| 100:1 | 100 k Ω | 1 k Ω |
| 50:1 | 50 k Ω | 1 k Ω |
| 25:1 | 25 k Ω | 1 k Ω |
| 20:1 | 20 k Ω | 1 k Ω |
| 10:1 | 10 k Ω | 1 k Ω |
| 5:1 | 10 k Ω | 2 k Ω |
| 2:1 | 10 k Ω | 5 k Ω |
| 1:1 | 100 k Ω | |
| | 100 k Ω | |
| | 49.9 k Ω | |
| | 24.9 k Ω | |
| | 20.0 k Ω | |
| | 10.0 k Ω | |
| | 4.99 k Ω | |
| | 2.0 k Ω | |
| | 1.0 k Ω | |

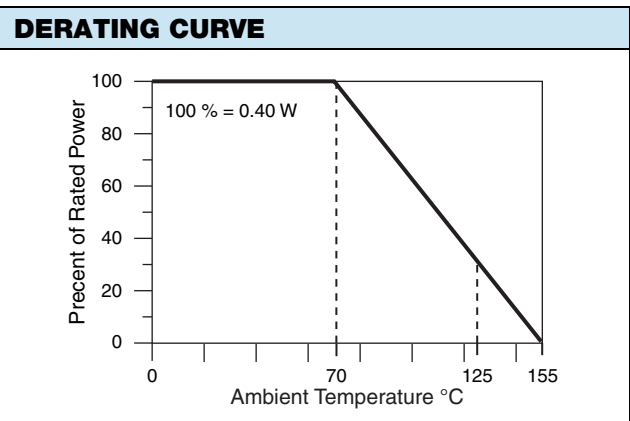
| STANDARD ELECTRICAL SPECIFICATIONS | | |
|------------------------------------|--|-----------------------|
| TEST | SPECIFICATIONS | CONDITIONS |
| Material | Tantalum nitride (Ta2N) | - |
| Pin/Lead Number | 8 | - |
| Resistance Range | 1 kΩ to 100 kΩ per resistor | - |
| TCR: Absolute | ± 25 ppm/°C (standard) | -55 °C to +155 °C |
| TCR: Tracking | ± 5 ppm/°C (typical) | -55 °C to +155 °C |
| Tolerance: Absolute | ± 0.10 % to ± 1 % | At +25 °C temperature |
| Tolerance: Ratio | ± 0.05 % to ± 0.1 % | At +25 °C temperature |
| Power Rating: Resistor | 100 mW | Maximum at +70 °C |
| Power Rating: Package | 400 mW | Maximum at +70 °C |
| Stability: Absolute | $\Delta R \pm 0.05 \%$ | 1000 h at +155 °C |
| Stability: Ratio | $\Delta R \pm 0.015 \%$ | 1000 h at +155 °C |
| Voltage Coefficient | < 0.1 ppm/V | - |
| Working Voltage | 100 V max. not to exceed $\sqrt{P \times R}$ | - |
| Operating Temperature Range | -55 °C to +155 °C | - |
| Storage Temperature Range | -55 °C to +155 °C | - |
| Noise | ≤ -30 dB | - |
| Thermal EMF | 0.08 μV/°C | - |
| Shelf Life Stability: Absolute | $\Delta R \pm 0.01 \%$ | 1 year at +25 °C |
| Shelf Life Stability: Ratio | $\Delta R \pm 0.002 \%$ | 1 year at +25 °C |

| DIMENSIONS AND IMPRINTING in inches and millimeters | | | |
|---|------------------|-----------------|--------------------|
| | DIMENSION | INCHES | MILLIMETERS |
| | A | 0.157 | 3.99 |
| | B | 0.0165 ± 0.0025 | 0.4 ± 0.06 |
| | C | 0.050 | 1.27 |
| | D | 0.195 max. | 4.93 max. |
| | E | 0.008 ± 0.001 | 0.20 ± 0.03 |
| | F | 0.028 ± 0.001 | 0.71 ± 0.02 |
| | G | 0.239 ± 0.001 | 6.07 ± 0.13 |
| | H | 0.068 max. | 1.73 max. |
| | I | 0.008 ± 0.002 | 6.07 ± 0.13 |

| MECHANICAL SPECIFICATIONS | |
|---------------------------|-------------------------------------|
| Resistive Element | Tantalum nitride (Ta2N) |
| Substrate Material | Ceramic |
| Body | Molded epoxy |
| Terminals | Copper alloy |
| Lead Frame Finish | Ni/Pd/Au solder free ⁽¹⁾ |

Note

- Gold thickness less than 10 μ".





| ENVIRONMENTAL TESTS | | | | | |
|--|------------|--|--------------------------|----------------------------------|----------------------------------|
| ENVIRONMENTAL TEST | | CONDITONS | SUGGESTED PRODUCT LIMITS | TYPICAL VISHAY PERFORMANCE < 10K | TYPICAL VISHAY PERFORMANCE > 10K |
| Max. Ambient Temperature at Rated Wattage | | | +70 °C | +70 °C | +70 °C |
| Max. Ambient Temperature at Power Derating | | | +155 °C | +155 °C | +155 °C |
| High Temperature Exposure | ΔR | MIL-STD-202, 108, 1000 h at 155 °C | $\pm 0.20 \%$ | 0.08 % | 0.045 % |
| Temperature Cycling | ΔR | JESD22, A104, 1000 cycles, -55 °C to +155 °C | $\pm 0.25 \%$ | 0.012 % | 0.010 % |
| Moisture Resistance | ΔR | MIL-STD-202 method 106 | $\pm 0.20 \%$ | 0.007 % | 0.007 % |
| Biased Humidity | ΔR | MIL-STD-202, 103, 1000 h at 85 °C, 85 % RH, 10 % P | $\pm 0.25 \%$ | 0.075 % | 0.075 % |
| Life | ΔR | MIL-STD-202, 108, 1000 h at 155 °C | $\pm 0.50 \%$ | 0.199 % | 0.221 % |
| Mechanical Shock | ΔR | MIL-STD-202 method 213, condition C | $\pm 0.25 \%$ | 0.004 % | 0.002 % |
| Vibration | ΔR | MIL-STD-202 method 204, 10 Hz to 2 kHz | $\pm 0.25 \%$ | 0.004 % | 0.002 % |
| Resistance to Soldering Heat | ΔR | MIL-STD-202, 204, condition B | $\pm 0.10 \%$ | -0.008 % | 0.016 % |
| Electrostatic Discharg | ΔR | AEC-Q200-002 at 1 kV, human body | $\pm 0.50 \%$ | -0.028 % | |
| | | AEC-Q200-002 at 2 kV, human body | $\pm 0.50 \%$ | | 0.108 % |
| Solderability | | J-STD-002 method B and B1 | 95 % | Acceptable | Acceptable |
| Terminal Strenght | ΔR | AEC-Q200-006 at 1 kg for 60 s | | Acceptable | Acceptable |
| Flame Retardance | | AEC-Q200-001 Para 4.0 | | Acceptable | Acceptable |

| GLOBAL PART NUMBER INFORMATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|-----------------------------------|-----------|-------|------|--------|------|--------|---------|--------|------|--------|------|---------|------|--|------|---|----------------|---------------|----------------|---------------|---------------|---|---------------|--------------------------------|----------------------------------|--------------------------------|--------------------------------|----------------------------|------------------------------|-------------------|
| New Global Part Numbering: AORN 5-1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | O | R | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | - | 1 | A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U | F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | O | R | N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 0 | 0 | 1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | U | F | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GLOBAL MODEL (4 digits) | DIVIDER ⁽¹⁾ or RESISTANCE (3, 4 or 5 digits) | TOLERANCE % (ABSOLUTE / RATIO) | PACKAGING | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AORN 8 pin SOIC, surface mount (e4) | <table border="0"> <tr> <td>2 - 1</td> <td>1001</td> </tr> <tr> <td>5 - 1</td> <td>2001</td> </tr> <tr> <td>10 - 1</td> <td>4991</td> </tr> <tr> <td>20 - 1</td> <td>or 1002</td> </tr> <tr> <td>25 - 1</td> <td>2002</td> </tr> <tr> <td>50 - 1</td> <td>2492</td> </tr> <tr> <td>100 - 1</td> <td>4992</td> </tr> <tr> <td></td> <td>1003</td> </tr> </table> | 2 - 1 | 1001 | 5 - 1 | 2001 | 10 - 1 | 4991 | 20 - 1 | or 1002 | 25 - 1 | 2002 | 50 - 1 | 2492 | 100 - 1 | 4992 | | 1003 | <table border="0"> <tr> <td>A = 0.1 / 0.05</td> </tr> <tr> <td>B = 0.1 / 0.1</td> </tr> <tr> <td>C = 0.25 / 0.1</td> </tr> <tr> <td>D = 0.5 / 0.1</td> </tr> <tr> <td>F = 1.0 / 0.5</td> </tr> </table> | A = 0.1 / 0.05 | B = 0.1 / 0.1 | C = 0.25 / 0.1 | D = 0.5 / 0.1 | F = 1.0 / 0.5 | <table border="0"> <tr> <td>TAPE AND REEL</td> </tr> <tr> <td>T0 = 100 min., 100 mult</td> </tr> <tr> <td>T1 = 1000 min., 1000 mult</td> </tr> <tr> <td>T3 = 300 min., 300 mult</td> </tr> <tr> <td>T5 = 500 min., 500 mult</td> </tr> <tr> <td>TF = Full reel 3000</td> </tr> <tr> <td>TS = 100 min., 1 mult</td> </tr> <tr> <td>UF = TUBED</td> </tr> </table> | TAPE AND REEL | T0 = 100 min., 100 mult | T1 = 1000 min., 1000 mult | T3 = 300 min., 300 mult | T5 = 500 min., 500 mult | TF = Full reel 3000 | TS = 100 min., 1 mult | UF = TUBED |
| 2 - 1 | 1001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 - 1 | 2001 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 - 1 | 4991 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 - 1 | or 1002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 - 1 | 2002 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 - 1 | 2492 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 - 1 | 4992 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 1003 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A = 0.1 / 0.05 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B = 0.1 / 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C = 0.25 / 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D = 0.5 / 0.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F = 1.0 / 0.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TAPE AND REEL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T0 = 100 min., 100 mult | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T1 = 1000 min., 1000 mult | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T3 = 300 min., 300 mult | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T5 = 500 min., 500 mult | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TF = Full reel 3000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| TS = 100 min., 1 mult | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| UF = TUBED | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Note

⁽¹⁾ Examples:

1. 2-1 = ratio between resistance values
2. 1001 = four 1K resistors



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- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



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