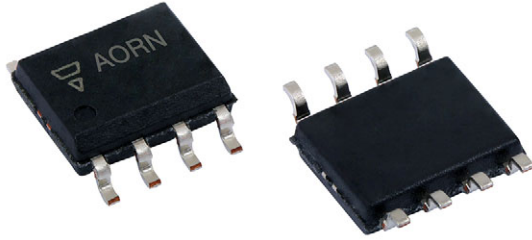


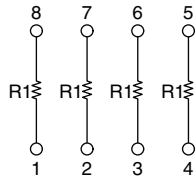
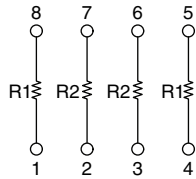


# Molded, 50 mil Pitch, Dual-In-Line Thin Film Resistor, Precision Automotive, AEC-Q200 Qualified, Networks



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  $\pm 5$  ppm/°C
- Passes sulfur resistance test per ASTM B 809
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS COMPLIANT**  
**HALOGEN FREE**

### 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 kΩ	1 kΩ
50:1	50 kΩ	1 kΩ
25:1	25 kΩ	1 kΩ
20:1	20 kΩ	1 kΩ
10:1	10 kΩ	1 kΩ
5:1	10 kΩ	2 kΩ
2:1	10 kΩ	5 kΩ
1:1	100 kΩ	
	100 kΩ	
	49.9 kΩ	
	24.9 kΩ	
	20.0 kΩ	
	10.0 kΩ	
	4.99 kΩ	
	2.0 kΩ	
	1.0 kΩ	

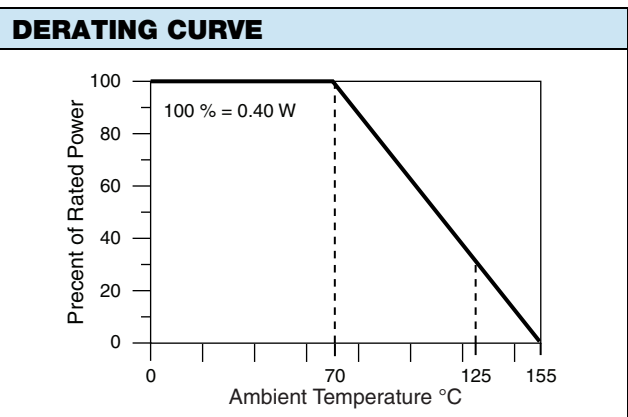
STANDARD ELECTRICAL SPECIFICATIONS		
TEST	SPECIFICATIONS	CONDITIONS
Material	Tantalum nitride (Ta <sub>2</sub> N)	-
Pin/Lead Number	8	-
Resistance Range	1 kΩ to 100 kΩ per resistor	-
TCR: Absolute	± 25 ppm/°C (standard)	-55 °C to +155 °C
TCR: Tracking	± 5 ppm/°C (typical)	-55 °C to +155 °C
Tolerance: Absolute	± 0.10 % to ± 1 %	At +25 °C temperature
Tolerance: Ratio	± 0.05 % to ± 0.5 %	At +25 °C temperature
Power Rating: Resistor	100 mW	Maximum at +70 °C
Power Rating: Package	400 mW	Maximum at +70 °C
Stability: Absolute	ΔR ± 0.05 %	1000 h at +155 °C
Stability: Ratio	ΔR ± 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	ΔR ± 0.01 %	1 year at +25 °C
Shelf Life Stability: Ratio	ΔR ± 0.002 %	1 year at +25 °C

DIMENSIONS AND IMPRINTING in inches and millimeters			
	<b>DIMENSION</b>	<b>INCHES</b>	<b>MILLIMETERS</b>
	A	0.154 ± 0.003	3.90 ± 0.09
	B	0.016 ± 0.002	0.4 ± 0.06
	C	0.050	1.27
	D	0.193 ± 0.004	4.90 ± 0.1
	E	0.008 ± 0.001	0.20 ± 0.03
	F	0.032 ± 0.016	0.81 ± 0.4
	G	0.236 ± 0.008	6.00 ± 0.2
	H	0.068 max.	1.73
	I	0.007 ± 0.003	0.18 ± 0.07
Ø	2° to 6°	2° to 6°	

MECHANICAL SPECIFICATIONS	
Resistive Element	Tantalum nitride (Ta <sub>2</sub> N)
Substrate Material	Ceramic
Body	Molded epoxy
Terminals	Copper alloy
Lead Frame Finish	Ni/Pd/Au solder free <sup>(1)</sup>

**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	$\Delta R$	MIL-STD-202, 108, 1000 h at 155 °C	$\pm 0.20 \%$	0.08 %	0.045 %
Temperature Cycling	$\Delta R$	JESD22, A104, 1000 cycles, -55 °C to +155 °C	$\pm 0.25 \%$	0.012 %	0.010 %
Moisture Resistance	$\Delta R$	MIL-STD-202 method 106	$\pm 0.20 \%$	0.007 %	0.007 %
Biased Humidity	$\Delta R$	MIL-STD-202, 103, 1000 h at 85 °C, 85 % RH, 10 % P	$\pm 0.25 \%$	0.075 %	0.075 %
Life	$\Delta R$	MIL-STD-202, 108, 1000 h at 155 °C	$\pm 0.50 \%$	0.199 %	0.221 %
Mechanical Shock	$\Delta R$	MIL-STD-202 method 213, condition C	$\pm 0.25 \%$	0.004 %	0.002 %
Vibration	$\Delta R$	MIL-STD-202 method 204, 10 Hz to 2 kHz	$\pm 0.25 \%$	0.004 %	0.002 %
Resistance to Soldering Heat	$\Delta R$	MIL-STD-202, 204, condition B	$\pm 0.10 \%$	-0.008 %	0.016 %
Electrostatic Discharg	$\Delta R$	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	$\Delta R$	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 <sup>(1)</sup> or RESISTANCE (3, 4 or 5 digits)	TOLERANCE % (ABSOLUTE / RATIO)	PACKAGING																					
<b>AORN</b> 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	<p>TAPE AND REEL</p> <p><b>T0</b> = 100 min., 100 mult.</p> <p><b>T1</b> = 1000 min., 1000 mult.</p> <p><b>T3</b> = 300 min., 300 mult.</p> <p><b>T5</b> = 500 min., 500 mult.</p> <p><b>TF</b> = full reel 3000</p> <p><b>TS</b> = 100 min., 1 mult.</p> <p><b>UF</b> = TUBED</p>
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																								

**Note**

<sup>(1)</sup> Examples:

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



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