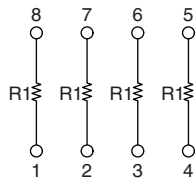
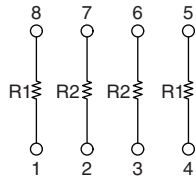


## Molded, 50 mil Pitch, Dual-In-Line Thin Film Resistor, Precision Automotive, AEC-Q200 Qualified, Networks



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/ $^{\circ}\text{C}$
- 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)



#### 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 $\Omega$	1 k $\Omega$
50:1	50 k $\Omega$	1 k $\Omega$
25:1	25 k $\Omega$	1 k $\Omega$
20:1	20 k $\Omega$	1 k $\Omega$
10:1	10 k $\Omega$	1 k $\Omega$
5:1	10 k $\Omega$	2 k $\Omega$
2:1	10 k $\Omega$	5 k $\Omega$
1:1	100 k $\Omega$	
	100 k $\Omega$	
	49.9 k $\Omega$	
	24.9 k $\Omega$	
	20.0 k $\Omega$	
	10.0 k $\Omega$	
	4.99 k $\Omega$	
	2.0 k $\Omega$	
	1.0 k $\Omega$	

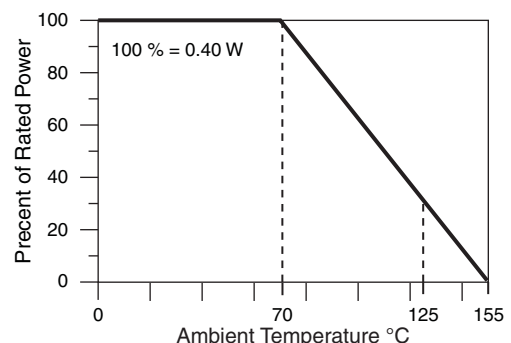
STANDARD ELECTRICAL SPECIFICATIONS		
TEST	SPECIFICATIONS	CONDITIONS
Material	Tantalum nitride (Ta2N)	-
Pin/Lead Number	8	-
Resistance Range	1 k $\Omega$ to 100 k $\Omega$ per resistor	-
TCR: Absolute	$\pm 25$ ppm/ $^{\circ}$ C (standard)	-55 $^{\circ}$ C to +155 $^{\circ}$ C
TCR: Tracking	$\pm 5$ ppm/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

DIMENSIONS AND IMPRINTING in inches and millimeters			
	<b>DIMENSION</b>	<b>INCHES</b>	<b>MILLIMETERS</b>
	A	0.157	3.99
	B	0.0165 $\pm$ 0.0025	0.4 $\pm$ 0.06
	C	0.050	1.27
	D	0.195 max.	4.93 max.
	E	0.008 $\pm$ 0.001	0.20 $\pm$ 0.03
	F	0.028 $\pm$ 0.001	0.71 $\pm$ 0.02
	G	0.239 $\pm$ 0.001	6.07 $\pm$ 0.13
	H	0.068 max.	1.73 max.
	I	0.008 $\pm$ 0.002	6.07 $\pm$ 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 <sup>(1)</sup>

**Note**

- Gold thickness less than 10  $\mu$ ".

**DERATING CURVE**




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><b>A</b></td> <td>= 0.1 / 0.05</td> </tr> <tr> <td><b>B</b></td> <td>= 0.1 / 0.1</td> </tr> <tr> <td><b>C</b></td> <td>= 0.25 / 0.1</td> </tr> <tr> <td><b>D</b></td> <td>= 0.5 / 0.1</td> </tr> <tr> <td><b>F</b></td> <td>= 1.0 / 0.5</td> </tr> </table>	<b>A</b>	= 0.1 / 0.05	<b>B</b>	= 0.1 / 0.1	<b>C</b>	= 0.25 / 0.1	<b>D</b>	= 0.5 / 0.1	<b>F</b>	= 1.0 / 0.5	<table border="0"> <tr> <td colspan="2" style="text-align: center;">TAPE AND REEL</td> </tr> <tr> <td><b>T0</b></td> <td>= 100 min., 100 mult</td> </tr> <tr> <td><b>T1</b></td> <td>= 1000 min., 1000 mult</td> </tr> <tr> <td><b>T3</b></td> <td>= 300 min., 300 mult</td> </tr> <tr> <td><b>T5</b></td> <td>= 500 min., 500 mult</td> </tr> <tr> <td><b>TF</b></td> <td>= Full reel 3000</td> </tr> <tr> <td><b>TS</b></td> <td>= 100 min., 1 mult</td> </tr> <tr> <td colspan="2" style="text-align: center;"><b>UF</b> = TUBED</td> </tr> </table>	TAPE AND REEL		<b>T0</b>	= 100 min., 100 mult	<b>T1</b>	= 1000 min., 1000 mult	<b>T3</b>	= 300 min., 300 mult	<b>T5</b>	= 500 min., 500 mult	<b>TF</b>	= Full reel 3000	<b>TS</b>	= 100 min., 1 mult	<b>UF</b> = TUBED	
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**Note**

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

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



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