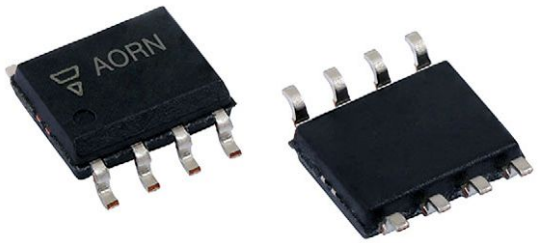
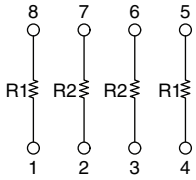
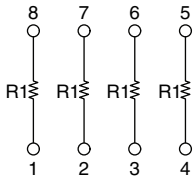
Molded, 50 mil Pitch, Dual-In-Line Thin Film Resistor, Precision Automotive, AEC-Q200 Qualified, Networks



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 (ΔR ± 0.015 %)
- Low TCR tracking ± 5 ppm/°C
- Passes sulfur resistance test per ASTM B 809
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
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

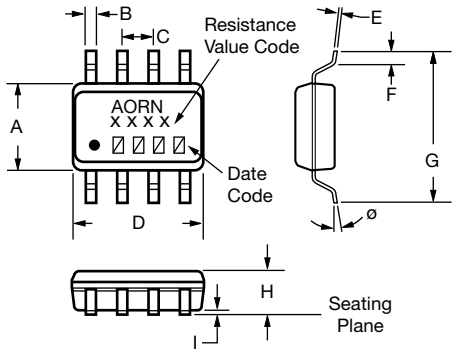
●	ABSOLUTE	TRACKING
TCR	25	5
	ABSOLUTE	RATIO
TOL.	0.10	0.05

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_2N)	-
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	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



DIMENSION	INCHES	MILLIMETERS
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°

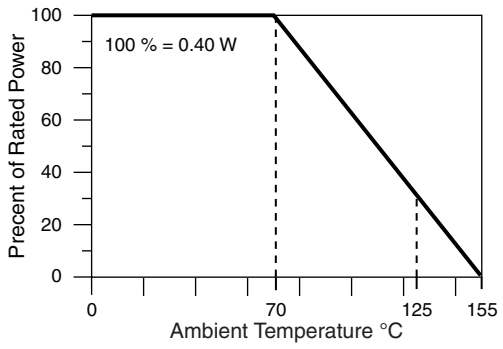
MECHANICAL SPECIFICATIONS

Resistive Element	Tantalum nitride (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"

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	**ΔR**	MIL-STD-202, 108, 1000 h at 155 °C	± 0.20 %	0.08 %	0.045 %
Temperature Cycling	**ΔR**	JESD22, A104, 1000 cycles, -55 °C to +155 °C	± 0.25 %	0.012 %	0.010 %
Moisture Resistance	**ΔR**	MIL-STD-202 method 106	± 0.20 %	0.007 %	0.007 %
Biased Humidity	**ΔR**	MIL-STD-202, 103, 1000 h at 85 °C, 85 % RH, 10 % P	± 0.25 %	0.075 %	0.075 %
Life	**ΔR**	MIL-STD-202, 108, 1000 h at 155 °C	± 0.50 %	0.199 %	0.221 %
Mechanical Shock	**ΔR**	MIL-STD-202 method 213, condition C	± 0.25 %	0.004 %	0.002 %
Vibration	**ΔR**	MIL-STD-202 method 204, 10 Hz to 2 kHz	± 0.25 %	0.004 %	0.002 %
Resistance to Soldering Heat	**ΔR**	MIL-STD-202, 204, condition B	± 0.10 %	-0.008 %	0.016 %
Electrostatic Discharg	**ΔR**	AEC-Q200-002 at 1 kV, human body	± 0.50 %	-0.028 %	
		AEC-Q200-002 at 2 kV, human body	± 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)	**2 - 1** **5 - 1** **10 - 1** **20 - 1** **25 - 1** **50 - 1** **100 - 1** or **1001** **2001** **4991** **1002** **2002** **2492** **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

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.