

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



The NOMCA series features a standard 14 pin or 16 pin narrow body (0.150") small outline SMT package. The network is constructed with tantalum nitride resistor film on high purity alumina substrate for improved ESD and moisture protection. Custom schematics are available consult factory.

### FEATURES

- Standard 14 pins and 16 pins counts (0.150" narrow body) JEDEC MS-012 variation AB and AC
- Rugged molded case construction
- Excellent long term ratio stability ( $\Delta R \pm 0.015\%$ )
- Low TCR tracking  $\pm 5$  ppm/ $^{\circ}\text{C}$
- AEC-Q200 ESD rated 1 kV ( $< 10$  k $\Omega$ )
- AEC-Q200 ESD rated 2 kV ( $> 10$  k $\Omega$ )
- Compliant to RoHS Directive 2011/65/EU
- Halogen-free according to IEC 61249-2-21 definition



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

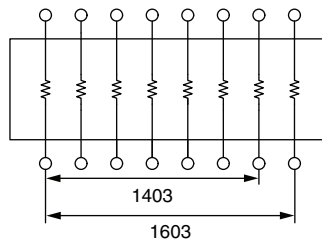
### Note

\* Pb containing terminations are not RoHS compliant, exemptions may apply

### TYPICAL PERFORMANCE

	ABSOLUTE	TRACKING
TCR	25	5
	ABSOLUTE	RATIO
TOL.	0.10	0.05

### SCHEMATICS



The 03 circuit provides a choice of 7 or 8 equal value resistors each connected between a common lead (14 or 16). Custom schematics available.

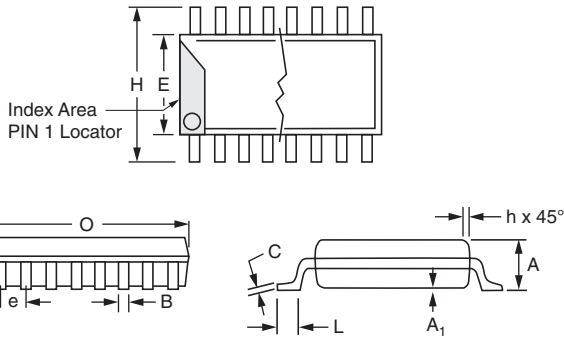
STANDARD RESISTANCE OFFERING (Equal Value Resistors)	
ISOLATED (03) SCHEMATIC	
	1 k $\Omega$
	2 k $\Omega$
	5 k $\Omega$
	10 k $\Omega$
	20 k $\Omega$
	50 k $\Omega$

### Note

- Consult factory for additional values

STANDARD ELECTRICAL SPECIFICATIONS		
TEST	SPECIFICATIONS	CONDITIONS
Material	Tantalum nitride (Ta <sub>2</sub> N)	-
Pin/Lead Number	14, 16	-
Resistance Range	1 kΩ to 50 kΩ each resistor	-
TCR: Absolute	± 25 ppm/°C (standard)	- 55 °C to + 125 °C
TCR: Tracking	± 5 ppm/°C (typical)	- 55 °C to + 125 °C
Tolerance: Absolute	± 0.10 % to ± 1 %	+ 25 °C
Tolerance: Ratio	± 0.05 % to ± 0.1 %	+ 25 °C
Power Rating: Resistor	100 mW (typical) (03) schematic	Maximum at + 70 °C
Power Rating: Package	400 mW/500 mW	Maximum at + 70 °C
Stability: Absolute	ΔR ± 0.05 %	1000 h at + 125 °C
Stability: Ratio	ΔR ± 0.015 %	1000 h at + 125 °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 + 125 °C	-
Storage Temperature Range	- 55 °C to + 150 °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	14		16	
	INCHES	MILLIMETERS	INCHES	MILLIMETERS
H	0.235	5.969	0.235	5.969
E	0.154	3.911	0.154	3.910
O	0.340	8.363	0.390	9.906
A	0.063	1.600	0.063	1.600
e	0.050	1.270	0.050	1.270
B	0.015	0.381	0.015	0.381
C	0.008	0.203	0.008	0.203
L	0.025	0.635	0.025	0.635
A <sub>1</sub>	0.006	0.152	0.006	0.152
h	0.015	0.381	0.015	0.381



MECHANICAL SPECIFICATIONS	
Resistive Element	Tantalum nitride (Ta <sub>2</sub> N)
Substrate Material	Ceramic
Body	Molded epoxy
Terminals	Copper alloy
Lead (Pb)-free Option	100 % matte tin plate or Ni/Pd/Au solder free option



**ORDERING INFORMATION CHECK LIST (Customs)**

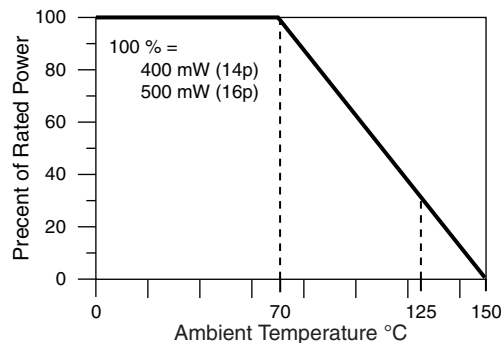
Special requirements should be identified in advance, but as a minimum, you should have the following information ready.

ELECTRICAL	MECHANICAL
1. Resistors, by value and tolerance 2. Reference resistor(s) and matching of which resistors to which reference resistors 3. Reference by ratio 4. Absolute temperature coefficient of resistivity 5. Temperature tracking of subordinate resistors to reference resistor(s) 6. Maximum operating voltage 7. Resistor power ratings 8. Operating temperature range	1. Maximum allowable seated height (from PC board to top of network) 2. Special marking concerns 3. Schematic pin out of package

**ENVIRONMENTAL TESTS (Vishay Performance vs. AEC-Q200 Requirements)**

ENVIRONMENTAL TEST	CONDITONS	LIMITS PER AQEC-Q200	TYPICAL VISHAY PERFORMANCE < 10K	TYPICAL VISHAY PERFORMANCE > 10K
Resistance Temperature Characteristic	- 55 °C to + 125 °C	± 25 ppm/°C	15 ppm/°C	15 ppm/°C
Max. Ambient Temperature at Rated Wattage		+ 70 °C	+ 70 °C	+ 70 °C
Max. Ambient Temperature at Power Derating		+ 150 °C	+ 150 °C	+ 150 °C
High Temperature Exposure $\Delta R$	MIL-STD-202, 108, 1000 h at 125 °C	± 0.20 %	0.005 %	0.012 %
Temperature Cycling $\Delta R$	JESD22, A104, 1000 cycles, - 55 °C to + 125 °C	± 0.25 %	0.004 %	0.004 %
Moisture Resistance $\Delta R$	MIL-STD-202 method 106	± 0.20 %	0.007 %	0.007 %
Biased Humidity $\Delta R$	MIL-STD-202, 103, 1000 h at 85 °C, 85 % RH, 10 % P	± 0.25 %	0.021 %	0.033 %
Life $\Delta R$	MIL-STD-202, 108, 1000 h at 125 °C	± 0.10 %	0.012 %	0.029 %
Mechanical Shock $\Delta R$	MIL-STD-202 method 213, condition C	± 0.25 %	0.001 %	0.001 %
Vibration $\Delta R$	MIL-STD-202 method 204, 10 Hz to 2 kHz	± 0.25 %	0.001 %	0.001 %
Resistance to Soldering Heat $\Delta R$	MIL-STD-202, 204, condition B	± 0.10 %	- 0.002 %	0.001 %
Electrostatic Discharg $\Delta R$	AEC-Q200-002 at 1 kV, human body	± 0.50 %	0.065 %	
	AEC-Q200-002 at 2 kV, human body	± 0.50 %		0.170 %
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

**DERATING CURVE**





GLOBAL PART NUMBER INFORMATION															
New Global Part Numbering: NOMCA14031002AT1															
N	O	M	C	A	1	4	0	3	1	0	0	2	A	T	1
GLOBAL MODEL (4 or 5 digits)		PINS		SCHEMATIC		RESISTANCE			TOLERANCE AND RATIO TOLERANCE			PACKAGING			
NOMCA (Lead (Pb)-free) (e3)		14 16		03 = 7 or 8 isolated equal value resistors		First 3 digits are significant figures and the last digit specifies the number of zeros to follow.  Example: 1002 = 10K			Abs. Tol.      Ratio  A = 0.1 % <sup>(1)</sup> 0.05 % B = 0.1 %        0.1 % C = 0.25 %       0.1 % D = 0.5 %        0.1 % F = 1 %            0.5 %			TAPE AND REEL T0 = 100 min., 100 mult T1 = 1000 min., 1000 mult <sup>(2)</sup> T3 = 300 min., 300 mult T5 = 500 min., 500 mult TF = Full reel 2500 TS = 100 min., 1 mult  UF = TUBED			

Notes

- <sup>(1)</sup> Tolerance available 1K and up
- <sup>(2)</sup> Preferred packaging code



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#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.