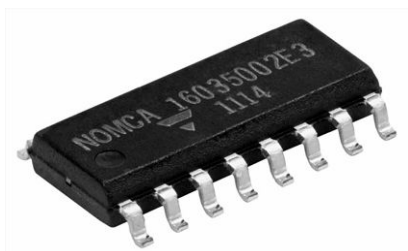


## Molded, 50 mil Pitch, Dual-In-Line Thin Film Resistor, Precision Automotive, AEC-Q200 Qualified, Networks



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 ( $< 10\text{ k}\Omega$ )
- AEC-Q200 ESD rated 2 kV ( $> 10\text{ k}\Omega$ )
- Compliant to RoHS Directive 2011/65/EU
- Halogen-free according to IEC 61249-2-21 definition



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

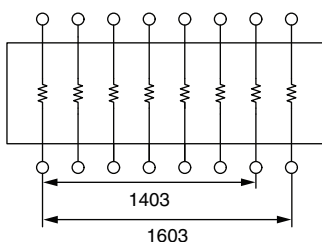
### Note

\* 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

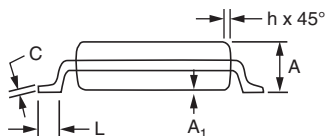
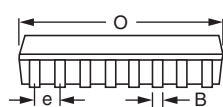
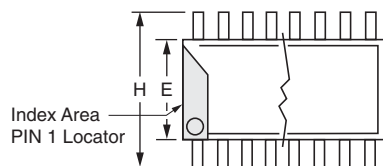
- Consult factory for additional values

**STANDARD ELECTRICAL SPECIFICATIONS**

| TEST                           | SPECIFICATIONS                               | CONDITIONS                              |
|--------------------------------|----------------------------------------------|-----------------------------------------|
| Material                       | Tantalum nitride (Ta <sub>2</sub> N)         | -                                       |
| Pin/Lead Number                | 14, 16                                       | -                                       |
| Resistance Range               | 1 k $\Omega$ to 50 k $\Omega$ each resistor  | -                                       |
| TCR: Absolute                  | $\pm 25$ ppm/ $^{\circ}$ C (standard)        | - 55 $^{\circ}$ C to + 125 $^{\circ}$ C |
| TCR: Tracking                  | $\pm 5$ ppm/ $^{\circ}$ C (typical)          | - 55 $^{\circ}$ C to + 125 $^{\circ}$ C |
| Tolerance: Absolute            | $\pm 0.10$ % to $\pm 1$ %                    | + 25 $^{\circ}$ C                       |
| Tolerance: Ratio               | $\pm 0.05$ % to $\pm 0.1$ %                  | + 25 $^{\circ}$ C                       |
| Power Rating: Resistor         | 100 mW (typical) (03) schematic              | Maximum at + 70 $^{\circ}$ C            |
| Power Rating: Package          | 400 mW/500 mW                                | Maximum at + 70 $^{\circ}$ C            |
| Stability: Absolute            | $\Delta R \pm 0.05$ %                        | 1000 h at + 125 $^{\circ}$ C            |
| Stability: Ratio               | $\Delta R \pm 0.015$ %                       | 1000 h at + 125 $^{\circ}$ 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 + 125 $^{\circ}$ C      | -                                       |
| Storage Temperature Range      | - 55 $^{\circ}$ C to + 150 $^{\circ}$ 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

| 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 <sup>1</sup> | 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 |

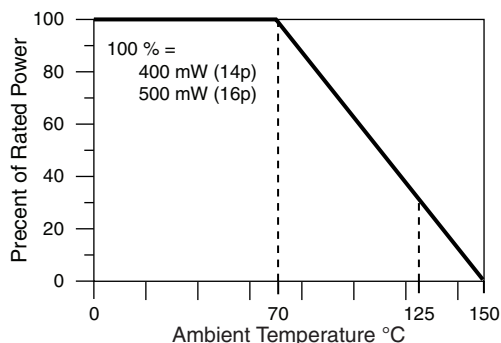
**ORDERING INFORMATION CHECK LIST (Customs)**

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

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

| ENVIRONMENTAL TEST                         |    | CONDITONS                                          | LIMITS PER AEC-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                  | ΔR | MIL-STD-202, 108, 1000 h at 125 °C                 | ± 0.20 %            | 0.005 %                          | 0.012 %                          |
| Temperature Cycling                        | ΔR | JESD22, A104, 1000 cycles, - 55 °C to + 125 °C     | ± 0.25 %            | 0.004 %                          | 0.004 %                          |
| 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 %            | 0.021 %                          | 0.033 %                          |
| Life                                       | ΔR | MIL-STD-202, 108, 1000 h at 125 °C                 | ± 0.10 %            | 0.012 %                          | 0.029 %                          |
| Mechanical Shock                           | ΔR | MIL-STD-202 method 213, condition C                | ± 0.25 %            | 0.001 %                          | 0.001 %                          |
| Vibration                                  | ΔR | MIL-STD-202 method 204, 10 Hz to 2 kHz             | ± 0.25 %            | 0.001 %                          | 0.001 %                          |
| Resistance to Soldering Heat               | ΔR | MIL-STD-202, 204, condition B                      | ± 0.10 %            | - 0.002 %                        | 0.001 %                          |
| Electrostatic Discharge                    | ΔR | 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                          | ΔR | 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: NOMCA14031002BUF

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

### Notes

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



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