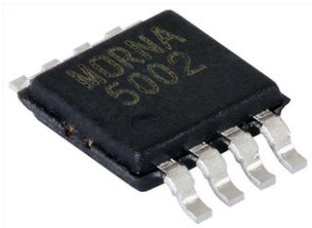
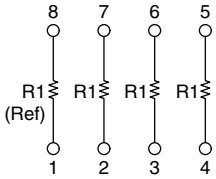
# Molded, Compact, 0.65 mm Pitch, Dual-In-Line Thin Film Resistor, Surface Mount Network
# 0.01 % Ratio Tolerance and 1 ppm/°C TCR Tracking




MORN series resistor networks feature four isolated resistors with standard 0.65mm (25.6 mil) pitch lead spacing. The networks feature close TCR tracking and tight ratio tolerance and are ideally suited for unity gain operational amplifier circuitry. The standard resistance offering listed are available for immediate delivery.

## SCHEMATICS




## FEATURES

- Low TCR tracking of ± 1 ppm/°C and ratio tolerance as low as ± 0.01 %
- 1.10 mm (0.043 mil) maximum seated height
- Excellent long term Ratio stability, ± 0.015 % over 2000 h at 70 °C
- JEDEC® MO-187 variation AA package (25 mil pitch, QSOP)
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* Available

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 PERFORMANCE

| | ABSOLUTE | TRACKING |
|---|---|---|
| TCR | 25 | 1 |
| | ABSOLUTE | RATIO |
| TOL. | 0.1 | 0.01 |

| STANDARD RESISTANCE OFFERING ($R_1$ =) | |
|---|---|
| 500 Ω | 10 kΩ |
| 1 kΩ | 20 kΩ |
| 2 kΩ | 25 kΩ |
| 4.99 kΩ | 50 kΩ |
| 5 kΩ | 100 kΩ |

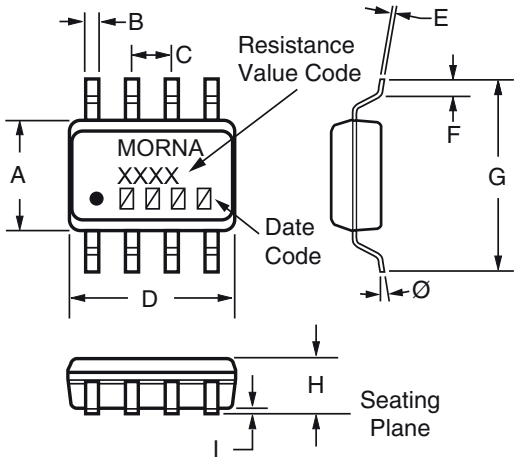
**Notes**

- Lead (Pb)-free containing terminations are not RoHS compliant, exemptions.
- Consult factory for additional values and schematics.

## STANDARD ELECTRICAL SPECIFICATIONS

| TEST | SPECIFICATIONS | CONDITIONS |
|---|---|---|
| **Material** | Passivated nichrome | - |
| **Pin/Lead Number** | 8 | - |
| **Resistance Range** | 400 Ω to 100 kΩ per resistor | - |
| **TCR: Absolute** | ± 25 ppm/°C | -55 °C to +125 °C |
| **TCR: Tracking** | ± 1 ppm/°C (typical) ; ± 2 ppm/°C (max.) | -55 °C to +125 °C |
| **Tolerance: Absolute** | ± 0.05 % to ± 1.0 % | +25 °C |
| **Tolerance: Ratio** | ± 0.01 % to ± 0.5 % | +25 °C |
| **Power Rating: Resistor** | 50 mW | Maximum at +70 °C |
| **Power Rating: Package** | 200 mW | Maximum at +70 °C |
| **Stability: Absolute** | $\Delta R$ ± 0.05 % | 2000 h at +70 °C |
| **Stability: Ratio** | $\Delta R$ ± 0.015 % | 2000 h at +70 °C |
| **Voltage Coefficient** | 0.1 ppm/V (typical) | - |
| **Working Voltage** | 50 V max. not to exceed $\sqrt{P \times R}$ | - |
| **Operating Temperature Range** | -55 °C to +125 °C | - |
| **Storage Temperature Range** | -55 °C to +155 °C | - |
| **Noise** | ≤ -30 dB | - |
| **Thermal EMF** | 0.08 µV/°C | - |
| **Shelf Life Stability: Absolute** | $\Delta R$ ± 0.01 % | 1 year at +25 °C |
| **Shelf Life Stability: Ratio** | $\Delta R$ ± 0.002 % | 1 year at +25 °C |

## DIMENSIONS AND IMPRINTING in inches and millimeters



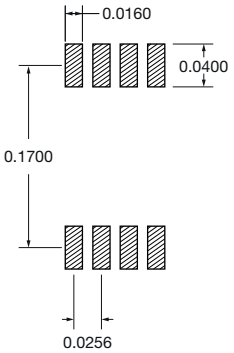

| DIMENSION | INCHES | MILLIMETERS |
|---|---|---|
| A | 0.118 | 3.00 |
| B | 0.0118 ± 0.0086 | 0.3 ± 0.08 |
| C | 0.0256 | 0.65 |
| D | 0.118 max. | 3.00 |
| E | 0.006 ± 0.003 | 0.16 ± 0.08 |
| F | 0.024 ± 0.008 | 0.60 ± 0.20 |
| G | 0.193 | 4.90 |
| H | 0.043 max. | 1.10 |
| I | 0.006 max. | 0.15 max. |
| Ø | 0° to 8° | 0° to 8° |

**Note**

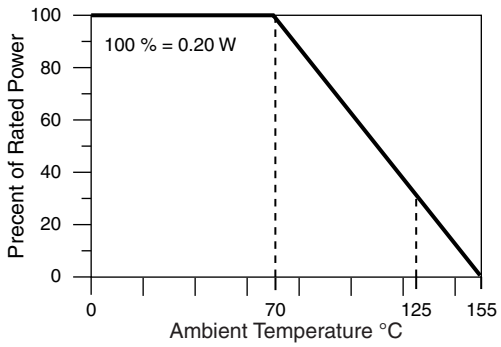
- Marking - Vishay symbol, part number from ordering information.

## LAND PATTERN DIMENSIONS

**MORN MSOP MO-187AA**
**(MORN-8)**




## DERATING CURVE




## MECHANICAL SPECIFICATIONS

| | |
|---|---|
| **Resistive Element** | Passivated nichrome |
| **Substrate Material** | Silicon |
| **Body** | Molded epoxy |
| **Terminals** | Copper alloy |
| **Lead (Pb)-free Option** | 100 % matte tin |
| **Tin Lead Option** | Sn90 |
| **Tin Lead and Lead (Pb)-free Finish** | Plated |

## GLOBAL PART NUMBER INFORMATION

**New Global Part Numbering: MORNA1002AUF**

| M | O | R | N | T | A | 1 | 0 | 0 | 2 | A | U | F |
|---|---|---|---|---|---|---|---|---|---|---|---|---|

### GLOBAL MODEL (4 or 5 digits)

**MORN**
(Tin Lead)

**MORNT**
(Lead (Pb)-free)
(e3)

### SCHEMATIC

**A** = 4 isolated equal resistors

### RESISTANCE

First 3 digits are significant figures and the last digit specifies the number of zeroes to follow.
R designates the decimal point.

Example:
**1002** = 10 kΩ
**1003** = 100 kΩ
**4991** = 4.99 kΩ
**5000** = 500 Ω

### TOLERANCE AND RATIO TOLERANCE

| Abs. Tol. | Ratio |
|---|---|
| **Q** = ± 0.05 % (1) | ± 0.01 % |
| **Z** = ± 0.1 % (1) | ± 0.025 % |
| **A** = ± 0.1 % | ± 0.05 % |
| **B** = ± 0.1 % | ± 0.1 % |
| **C** = ± 0.25 % | ± 0.1 % |
| **D** = ± 0.5 % | ± 0.1 % |
| **F** = ± 1 % | ± 0.5 % |

### PACKAGING

TAPE AND REEL
**T0** = 100 min., 100 mult
**T1** = 1000 min., 1000 mult (2)
**T3** = 300 min., 300 mult
**T5** = 500 min., 500 mult
**TF** = Full reel 300
**TS** = 100 min., 1 mult

**UF** = TUBED

**Notes**

(1) Tolerance available 1K and up

(2) Preferred packaging code

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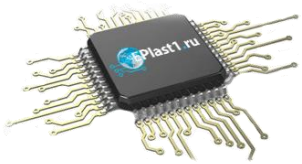
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.

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