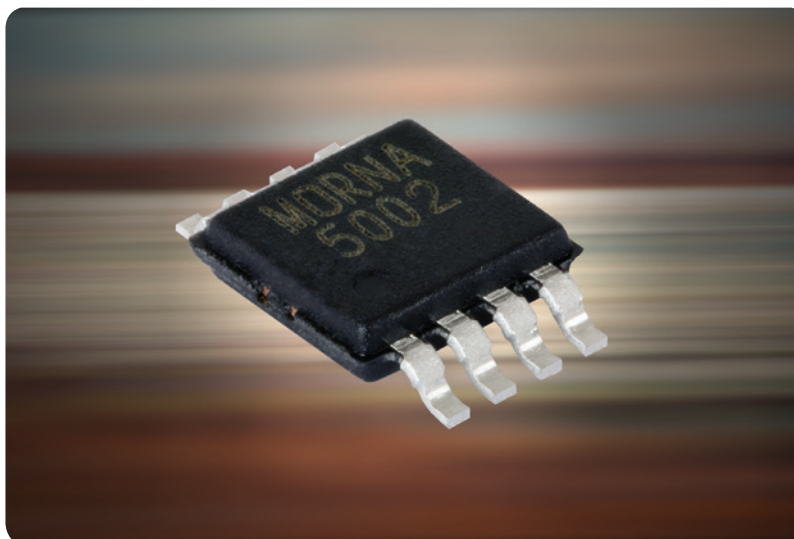




# THIN FILM RESISTOR NETWORKS

## MORN

### Molded, Compact, 0.65 mm Pitch, Dual-In-Line Thin Film Surface-Mount Resistor Network



#### KEY BENEFITS

- Low TCR tracking to  $\pm 1$  ppm/ $^{\circ}\text{C}$
- Tight ratio tolerances to  $\pm 0.01$  %
- Excellent long-term ratio stability of 0.015 %
- 400  $\Omega$  to 100 k $\Omega$  resistance range
- JEDEC MO-187 variation AA package (25 mil pitch, MSOP)
- Wide operating temperature range of  $-55$   $^{\circ}\text{C}$  to  $+155$   $^{\circ}\text{C}$

#### APPLICATIONS

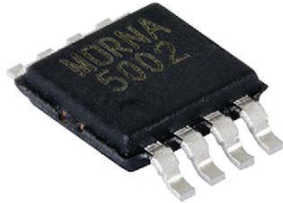
- Precision voltage dividers
- Operational amplifiers
- Telecommunications
- Industrial
- Process control
- Medical instrumentation

#### RESOURCES

- Datasheet: MORN - [www.vishay.com/doc?60129](http://www.vishay.com/doc?60129)
- For technical questions contact [thinfilm@vishay.com](mailto:thinfilm@vishay.com)

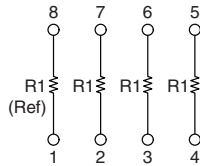
A **WORLD OF**  
**SOLUTIONS**

### Molded, Compact, 0.65 mm Pitch, Dual-In-Line Thin Film Surface-Mount Resistor Network



MORN series resistor networks feature four isolated resistors with standard 0.65 mm (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 offerings listed are available for immediate delivery.

#### SCHEMATICS



#### FEATURES

- Low TCR tracking of  $\pm 1$  ppm/ $^{\circ}\text{C}$  and ratio tolerance as low as  $\pm 0.01$  %
- 1.10 mm (0.043 mil) maximum seated height
- Excellent long-term ratio stability,  $\pm 0.015$  % over 2000 h at  $70^{\circ}\text{C}$
- JEDEC<sup>®</sup> MO-187 variation AA package (25 mil pitch, QSOP)
- 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 PERFORMANCE

	ABSOLUTE	TRACKING
TCR	25	1
	ABSOLUTE	RATIO
TOL.	0.1	0.01

#### STANDARD RESISTANCE OFFERING ( $R_1 =$ )

500 $\Omega$	10 k $\Omega$
1 k $\Omega$	20 k $\Omega$
2 k $\Omega$	25 k $\Omega$
4.99 k $\Omega$	50 k $\Omega$
5 k $\Omega$	100 k $\Omega$

#### Note

- Consult factory for additional values and schematics.

#### STANDARD ELECTRICAL SPECIFICATIONS

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

Revision 09-Nov-15