## MORN



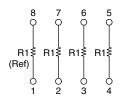
Vishay Dale Thin Film

## 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 0.65 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/°C and ratio tolerance as low as  $\pm$  0.01 %
- 1.10 mm (0.043 mil) maximum seated height
- Excellent long-term ratio stability, ± 0.015 % RoHS\* over 2000 h at 70 °C
- JEDEC<sup>®</sup> MO-187 variation AA package (25 mil pitch, QSOP)
- Material categorization: for definitions of compliance please see <u>www.vishay.com/doc?99912</u>

<sup>6</sup> 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**

$\bullet$	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	

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	± 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	$\Delta R \pm 0.05 \%$	2000 h at +70 °C	
Stability: Ratio	∆ <i>R</i> ± 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	$\Delta R \pm 0.01 \%$	1 year at +25 °C	
Shelf Life Stability: Ratio	$\Delta R \pm 0.002 \%$	1 year at +25 °C	

Document Number: 60129



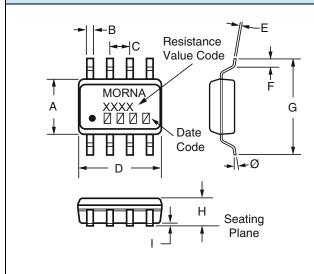
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Note



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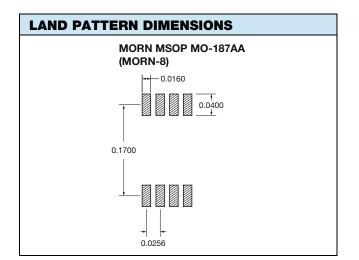


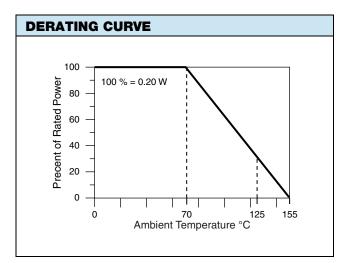
Imeters		
DIMENSION	INCHES	MILLIMETERS
А	0.118	3.00
В	0.0118 ± 0.0086	$0.3 \pm 0.08$
С	0.0256	0.65
D	0.118 max.	3.00
E	$0.006 \pm 0.003$	0.16 ± 0.08
F	$0.024 \pm 0.008$	0.60 ± 0.20
G	0.193	4.90
н	0.043 max.	1.10
I	0.006 max.	0.15 max.
Ø	0° to 8°	0° to 8°
	DIMENSION A B C C D E F G G H	DIMENSION INCHES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

#### Note

SHA

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



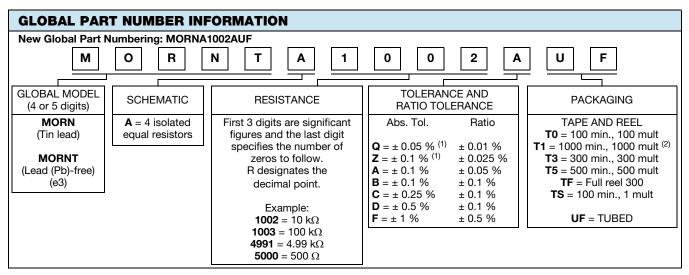


MECHANICAL SPECIFICATIONS		
Resistive Element	Passivated nichrome	
Substrate Material	Silicon	
Body	Molded epoxy	
Terminals	Copper alloy	
Lead (Pb)-free Option	100 % matte tin	
Tin Lead Option	Sn90	
Tin Lead and Lead (Pb)-free Finish	Plated	

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#### Notes

<sup>(1)</sup> Tolerance available 1K and up

<sup>(2)</sup> Preferred packaging code



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