



# Wirewound Resistors, Non-Magnetic, Non-Inductive, Axial Lead



#### **FEATURES**

- High temperature coating (> 350 °C)
- Non-magnetic and all welded constructions greatly enhance frequency response.
   Combined with non-inductive Ayrton-Perry winding the inductive reactance and signal loss are almost totally eliminated.





COMPLIANT

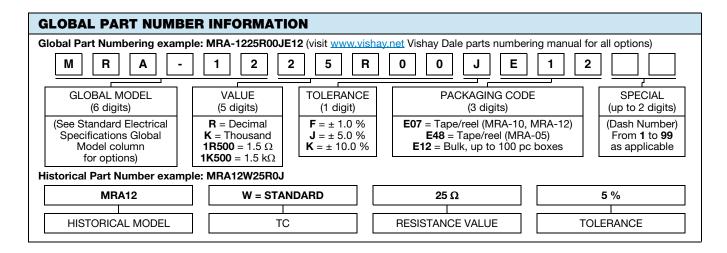
- Ideal for Audio Industry
- Material categorization: For definitions of compliance please see <a href="https://www.vishav.com/doc?99912">www.vishav.com/doc?99912</a>

| STANDARD ELECTRICAL SPECIFICATIONS |                     |  |                      |               |                          |                          |  |
|------------------------------------|---------------------|--|----------------------|---------------|--------------------------|--------------------------|--|
| GLOBAL<br>MODEL                    | HISTORICAL<br>MODEL | POWER RATING $^{(1)}$ $P_{25~{\rm ^{\circ}C}}$ W CHARACTERISTIC U + 250 $^{\circ}$ C | P <sub>25</sub> °C W | TOLERANCE (2) | RESISTANCE<br>RANGE<br>Ω | WEIGHT<br>(typical)<br>g |  |
| MRA-05                             | MRA05               | 4.0  | 5.0                  | 1, 5, 10      | 0.01 to 15.0K            | 1.00                     |  |
| MRA-10                             | MRA10               | 7.0  | 10.0                 | 1, 5, 10      | 0.05 to 35.0K            | 3.87                     |  |
| MRA-12                             | MRA12               | 10.0   | 12.0                 | 1 5 10        | 0.05 to 85.0K            | 5.02                     |  |

#### Notes

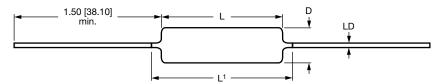
- (1) Vishay Mills MRA models have two power ratings depending on the operation temperature and stability requirements.
- (2) Other tolerances may be available, contact factory

| TECHNICAL SPECIFICATIONS        |                 |   |  |  |  |
|---------------------------------|-----------------|---|--|--|--|
| PARAMETER                       | UNIT            | MRA RESISTOR CHARACTERISTICS  |  |  |  |
| Temperature Coefficient         | ppm/°C          | $\pm$ 30 for 10 $\Omega$ and above; $\pm$ 50 for 1.0 $\Omega$ to 9.9 $\Omega;$ $\pm$ 90 for 0.5 $\Omega$ to 0.99 $\Omega$ |  |  |  |
| Terminal Strength               | lb              | 10 minimum  |  |  |  |
| Dielectric Withstanding Voltage | V <sub>AC</sub> | 500 for MRA-05 and 1000 for MRA-10 and MRA-12   |  |  |  |
| Operating Temperature Range     | °C              | Characteristic U = - 65 to + 250, Characteristic V = - 65 to + 350  |  |  |  |
| Maximum Working Voltage         | V               | $(P \times R)^{1/2}$  |  |  |  |





### **DIMENSIONS** in inches [millimeters]



|        | DIMENSIONS in inches [millimeters] |                     |                     |                       |  |
|--------|------------------------------------|---------------------|---------------------|-----------------------|--|
| MODEL  | L<br>± 0.062 [1.57]                | L <sup>1</sup> Max. | D<br>± 0.031 [0.79] | LD<br>± 0.002 [0.051] |  |
| MRA-05 | 0.562 [14.27]                      | 0.650 [16.51]       | 0.167 [4.24]        | 0.032 [0.813]         |  |
| MRA-10 | 0.875 [22.22]                      | 0.975 [24.76]       | 0.312 [7.92]        | 0.040 [1.016]         |  |
| MRA-12 | 1.188 [30.18]                      | 1.280 [32.51]       | 0.312 [7.92]        | 0.040 [1.016]         |  |

#### **MATERIAL SPECIFICATIONS**

Element: Copper-nickel alloy or nickel-chrome alloy,

depending on resistance value

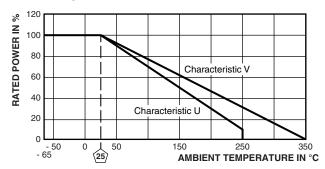
Core: Ceramic: Alumina

**Coating:** Special high temperature silicone **Standard Terminals:** Tinned copper

End Caps: Copper alloy

Part Marking: MILLS, model, value, tolerance, date code

#### **DERATING**



| PERFORMANCE                        |  |                           |   |  |  |
|------------------------------------|--|---------------------------|---|--|--|
| TECT                               | CONDITIONS OF TEST   | TEST LIMITS               |   |  |  |
| TEST                               | CONDITIONS OF TEST   | (CHARACTERISTIC U)        | (CHARACTERISTIC V)                        |  |  |
| Dielectric Withstanding<br>Voltage | 1000 V <sub>RMS</sub> , 1 min  | ± (0.1 % + 0.05 Ω) ΔR     | ± (0.1 % + 0.05 Ω) ΔR                     |  |  |
| High Frequency<br>Vibration        | Frequency varied 10 Hz to 2000 Hz, 20 g peak, 2 directions 6 h each                    | ± (0.1 % + 0.05 Ω) ΔR     | ± (0.2 % + 0.05 Ω) ΔR                     |  |  |
| High Temperature<br>Exposure       | 250 h at + 250 °C for U Characteristic,<br>+ 350 °C for V Characteristic               | ± (0.5 % + 0.05 Ω) ΔR     | ± (4.0 % + 0.05 Ω) ΔR                     |  |  |
| Load Life                          | 2000 h at rated power, + 25 °C, 1.5 h "ON", 0.5 h "OFF"                                | $\pm$ (0.5 % + 0.05 Ω) ΔR | $\pm$ (3.0 % + 0.05 $\Omega$ ) $\Delta R$ |  |  |
| Low Temperature<br>Storage         | - 65 °C for 24 h   | ± (0.2 % + 0.05 Ω) ΔR     | ± (2.0 % + 0.05 Ω) ΔR                     |  |  |
| Moisture Resistance                | MIL-STD 202 Method 106   | ± (0.2 % + 0.05 Ω) ΔR     | $\pm$ (2.0 % + 0.05 Ω) ΔR                 |  |  |
| Shock, Specified Pulse             | MIL-STD 202 Method 213, 100 g's for 6 ms, 10 shocks                                    | $\pm$ (0.1 % + 0.05 Ω) ΔR | $\pm$ (0.2 % + 0.05 Ω) ΔR                 |  |  |
| Thermal Shock                      | Rated power applied until thermally stable, then 15 min at - 55 °C                     | ± (0.2 % + 0.05 Ω) ΔR     | ± (2.0 % + 0.05 Ω) ΔR                     |  |  |
| Short Time Overload                | 5 x rated power (5 W smaller),<br>10 x rated power (7 W and larger) for 5 s            | ± (0.2 % + 0.05 Ω) ΔR     | ± (2.0 % + 0.05 Ω) ΔR                     |  |  |
| Terminal Strength                  | 5 s to 10 s 10 pound pull test;<br>torsion test - 3 alternating directions, 360 ° each | ± (0.1 % + 0.05 Ω) ΔR     | ± (1.0 % + 0.05 Ω) ΔR                     |  |  |



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Vishay

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