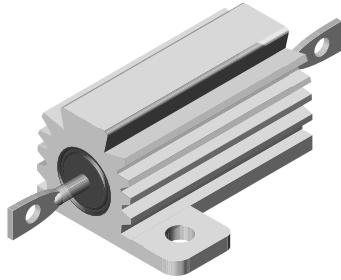


# Wirewound Resistors, Industrial Power, Aluminum Housed, Chassis Mount



## FEATURES

- Molded construction for total environmental protection
- Complete welded construction
- Available in non-inductive styles (NI special) with Ayrton-Perry winding for lowest reactive components
- Mounts on chassis to utilize heat-sink effect
- Excellent stability in operation (< 1 % change in resistance)
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**  
**GREEN**  
(5-2008)

| STANDARD ELECTRICAL SPECIFICATIONS |                  |   |                              |                      |                       |
|------------------------------------|------------------|---|------------------------------|----------------------|-----------------------|
| GLOBAL MODEL                       | HISTORICAL MODEL | POWER RATING<br>$P_{25\text{ }^\circ\text{C}}$<br>W | RESISTANCE RANGE<br>$\Omega$ | TOLERANCE<br>$\pm$ % | WEIGHT (typical)<br>g |
| TMC005                             | TMC-5            | 7.5   | 0.02 to 24.5K                | 1, 3, 5              | 3                     |
| TMC005...NI                        | TMC-5-...-NI     | 7.5   | 0.05 to 12.75K               | 1, 3, 5              | 3                     |
| TMC010                             | TMC-10           | 12.5  | 0.01 to 47.1K                | 1, 3, 5              | 5                     |
| TMC010...NI                        | TMC-10-...-NI    | 12.5  | 0.05 to 23.5K                | 1, 3, 5              | 5                     |
| TMC025                             | TMC-25           | 25  | 0.01 to 95.2K                | 1, 3, 5              | 12                    |
| TMC025...NI                        | TMC-25-...-NI    | 25  | 0.05 to 47.6K                | 1, 3, 5              | 12                    |
| TMC050                             | TMC-50           | 50  | 0.01 to 273K                 | 1, 3, 5              | 28                    |
| TMC050...NI                        | TMC-50-...-NI    | 50  | 0.05 to 136K                 | 1, 3, 5              | 28                    |
| TMC100                             | TMC-100          | 100   | 0.05 to 90K                  | 1, 3, 5              | 353                   |
| TMC100...NI                        | TMC-100-...-NI   | 100   | 0.05 to 37.5K                | 1, 3, 5              | 353                   |
| TMC250                             | TMC-250          | 250   | 0.05 to 116K                 | 1, 3, 5              | 637                   |
| TMC250...NI                        | TMC-250-...-NI   | 250   | 0.05 to 48.5K                | 1, 3, 5              | 637                   |

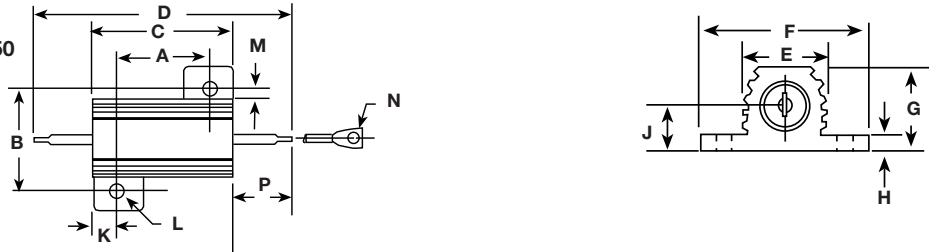
### Note

- The NI is for two digit "special" number to indicate a non-inductive part.

| TECHNICAL SPECIFICATIONS    |          |   |
|-----------------------------|----------|---|
| PARAMETER                   | UNIT     | TMC RESISTOR CHARACTERISTICS  |
| Temperature Coefficient     | ppm/°C   | $\pm 20$ for 10 $\Omega$ and above; $\pm 50$ for 1 $\Omega$ to 9.9 $\Omega$ , $\pm 100$ for 0.5 $\Omega$ to 0.99 $\Omega$ |
| Maximum Working Voltage     | V        | $(P \times R)^{1/2}$  |
| Insulation Resistance       | $\Omega$ | 10 000 M $\Omega$ minimum dry, 1000 M $\Omega$ minimum after moisture test  |
| Solderability               | -        | Meets requirements of ANSI J-STD-002  |
| Operating Temperature Range | °C       | -55 to +250   |

| GLOBAL PART NUMBER INFORMATION   |   |   |   |   |   |                               |   |   |         |   |   |   |   |   |   |   |
|--|---|---|---|---|---|-------------------------------|---|---|---------|---|---|---|---|---|---|---|
| Global Part Numbering example: TMC0054R125FE02NI (visit <a href="http://www.vishay.net">www.vishay.net</a> Vishay Dale parts numbering manual for all options) |   |   |   |   |   |                               |   |   |         |   |   |   |   |   |   |   |
| T  | M | C | 0   | 0 | 5 | 4                             | R   | 1 | 2       | 5   | F | E | 0 | 2 | N | I |
| GLOBAL MODEL<br>(6 digits)   |   |   | VALUE<br>(5 digits)   |   |   | TOLERANCE<br>(1 digit)        | PACKAGING CODE<br>(3 digits)  |   |         | SPECIAL<br>(up to 2 digits)                                 |   |   |   |   |   |   |
| (See Standard Electrical Specifications Global Model column for options)   |   |   | R = decimal<br>K = thousand<br>15R00 = 15 $\Omega$<br>10K00 = 10 k $\Omega$ |   |   | F = 1 %<br>H = 3 %<br>J = 5 % | E02 = lead (Pb)-free, card pack (TMC005 to TMC050)<br>E01 = lead (Pb)-free, skin pack (TMC100 and TMC250) |   |         | NI = non-inductive (dash number) from 1 to 99 as applicable |   |   |   |   |   |   |
| Historical Part Number example: TMC-5-4.125-1%-NI  |   |   |   |   |   |                               |   |   |         |   |   |   |   |   |   |   |
| TMC-5  |   |   | 4.125 $\Omega$  |   |   | 1 %                           |   |   | NI      |   |   |   |   |   |   |   |
| HISTORICAL MODEL   |   |   | RESISTANCE VALUE  |   |   | TOLERANCE                     |   |   | SPECIAL |   |   |   |   |   |   |   |

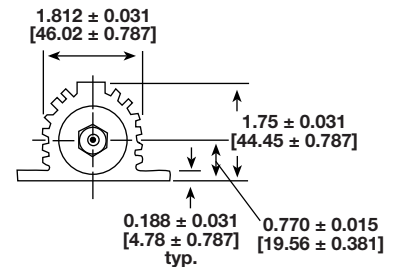
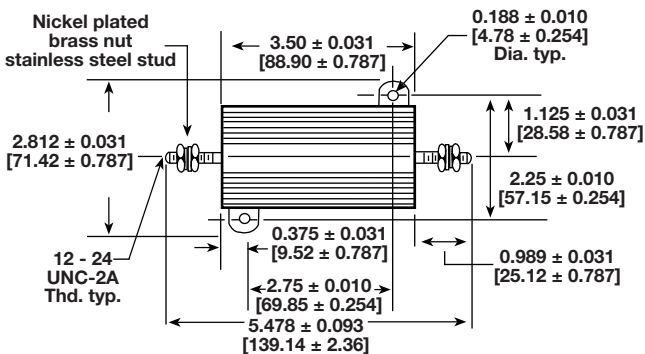
**DIMENSIONS** in inches [millimeters]

 TMC005, 010, 025, 050  
 TMC005...NI, 010, 025, 050


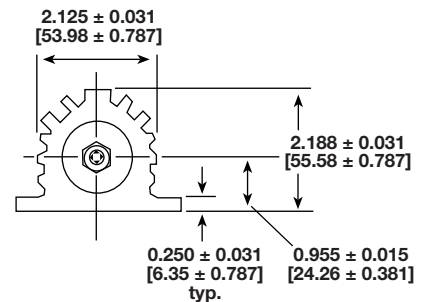
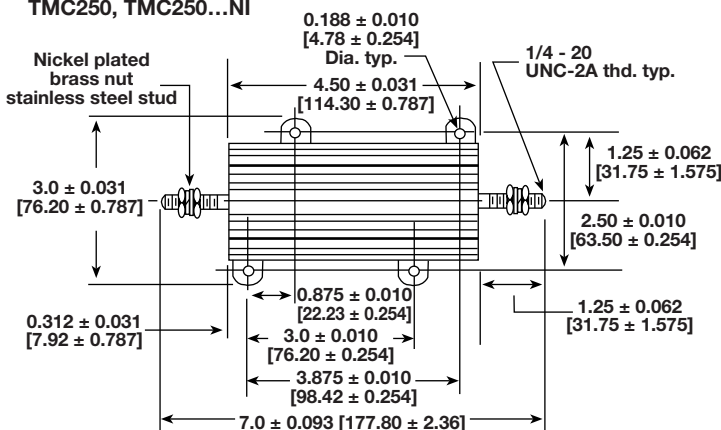
| GLOBAL MODEL                        | DIMENSIONS in inches [millimeters]     |  |  |                                       |  |  |  |                                       |                                       |                                       |                                       |                                       |                                       |                                       |
|-------------------------------------|--|--|--|---------------------------------------|--|--|--|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
|                                     | A                                      | B                                      | C                                      | D                                     | E                                      | F                                      | G                                      | H                                     | J                                     | K                                     | L                                     | M                                     | N                                     | P                                     |
| <b>TMC005</b><br><b>TMC005...NI</b> | 0.444<br>± 0.005<br>[11.28<br>± 0.127] | 0.490<br>± 0.005<br>[12.45<br>± 0.127] | 0.600<br>± 0.030<br>[15.24<br>± 0.787] | 1.125<br>± 0.062<br>[28.58<br>± 1.57] | 0.334<br>± 0.015<br>[8.48<br>± 0.381]  | 0.646<br>± 0.015<br>[16.41<br>± 0.381] | 0.320<br>± 0.015<br>[8.13<br>± 0.381]  | 0.065<br>± 0.010<br>[1.65<br>± 0.254] | 0.133<br>± 0.010<br>[3.38<br>± 0.254] | 0.078<br>± 0.010<br>[1.98<br>± 0.254] | 0.093<br>± 0.005<br>[2.36<br>± 0.127] | 0.078<br>± 0.015<br>[1.98<br>± 0.381] | 0.050<br>± 0.005<br>[1.27<br>± 0.127] | 0.266<br>± 0.062<br>[6.76<br>± 1.57]  |
| <b>TMC010</b><br><b>TMC010...NI</b> | 0.562<br>± 0.005<br>[14.27<br>± 0.127] | 0.625<br>± 0.005<br>[15.88<br>± 0.127] | 0.750<br>± 0.031<br>[19.05<br>± 0.787] | 1.375<br>± 0.062<br>[34.93<br>± 1.57] | 0.420<br>± 0.015<br>[10.67<br>± 0.381] | 0.800<br>± 0.015<br>[20.32<br>± 0.381] | 0.390<br>± 0.015<br>[9.91<br>± 0.381]  | 0.075<br>± 0.010<br>[1.91<br>± 0.254] | 0.165<br>± 0.010<br>[4.19<br>± 0.254] | 0.093<br>± 0.010<br>[2.36<br>± 0.254] | 0.094<br>± 0.005<br>[2.39<br>± 0.127] | 0.102<br>± 0.015<br>[2.59<br>± 0.381] | 0.085<br>± 0.005<br>[2.16<br>± 0.127] | 0.312<br>± 0.062<br>[7.92<br>± 1.57]  |
| <b>TMC025</b><br><b>TMC025...NI</b> | 0.719<br>± 0.005<br>[18.26<br>± 0.127] | 0.781<br>± 0.005<br>[19.84<br>± 0.127] | 1.062<br>± 0.031<br>[26.97<br>± 0.787] | 1.938<br>± 0.062<br>[49.23<br>± 1.57] | 0.550<br>± 0.015<br>[13.97<br>± 0.381] | 1.080<br>± 0.015<br>[27.43<br>± 0.381] | 0.546<br>± 0.015<br>[13.87<br>± 0.381] | 0.075<br>± 0.010<br>[1.91<br>± 0.254] | 0.231<br>± 0.010<br>[5.87<br>± 0.254] | 0.172<br>± 0.010<br>[4.37<br>± 0.254] | 0.125<br>± 0.005<br>[3.18<br>± 0.127] | 0.115<br>± 0.015<br>[2.92<br>± 0.381] | 0.085<br>± 0.005<br>[2.16<br>± 0.127] | 0.438<br>± 0.062<br>[11.13<br>± 1.57] |
| <b>TMC050</b><br><b>TMC050...NI</b> | 1.562<br>± 0.005<br>[39.67<br>± 0.127] | 0.844<br>± 0.005<br>[21.44<br>± 0.127] | 1.968<br>± 0.031<br>[49.99<br>± 0.787] | 2.781<br>± 0.062<br>[70.64<br>± 1.57] | 0.630<br>± 0.015<br>[16.00<br>± 0.381] | 1.140<br>± 0.015<br>[28.96<br>± 0.381] | 0.610<br>± 0.015<br>[15.49<br>± 0.381] | 0.088<br>± 0.010<br>[2.24<br>± 0.254] | 0.260<br>± 0.010<br>[6.60<br>± 0.254] | 0.196<br>± 0.010<br>[4.98<br>± 0.254] | 0.125<br>± 0.005<br>[3.18<br>± 0.127] | 0.107<br>± 0.015<br>[2.72<br>± 0.381] | 0.085<br>± 0.005<br>[2.16<br>± 0.127] | 0.438<br>± 0.062<br>[11.13<br>± 1.57] |

**DIMENSIONS** in inches [millimeters]

TMC100, TMC100...NI



TMC250, TMC250...NI





**POWER RATING**

Vishay TMC resistor wattage ratings are based on mounting to the following heat sink:

- TMC005 and TMC010: 4" x 6" x 2" x 0.040" thick aluminum chassis (129 sq. in. surface area)
- TMC025: 5" x 7" x 2" x 0.040" thick aluminum chassis (167 sq. in. surface area)
- TMC050: 12" x 12" x 0.059" thick aluminum panel (291 sq. in. surface area)
- TMC100 and TMC250: 12" x 12" x 0.125" thick aluminum panel (294 sq. in. surface area)

| FREE AIR POWER RATING |                       |                       |                       |                       |                       |                       |
|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| GLOBAL MODEL          | TMC005<br>TMC005...NI | TMC010<br>TMC010...NI | TMC025<br>TMC025...NI | TMC050<br>TMC050...NI | TMC100<br>TMC100...NI | TMC250<br>TMC250...NI |
| W at 25 °C            | 4.5                   | 7.5                   | 12.5                  | 20                    | 40                    | 100                   |

**AMBIENT TEMPERATURE DERATING**

Derating is required for ambient temperatures above 25 °C, see the following graph.

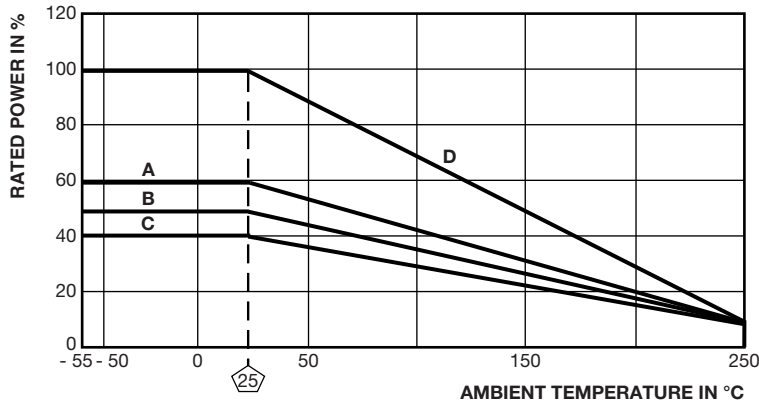
Curves **A**, **B**, **C** apply to operation of unmounted resistors. Curve **D** applies to all types when mounted to specified heat sink.

**A** = TMC005 and TMC010 size resistor, unmounted

**B** = TMC025 size resistor, unmounted

**C** = TMC050, TMC100 and TMC250 size resistor, unmounted

**D** = All types mounted to recommended aluminum heat sink



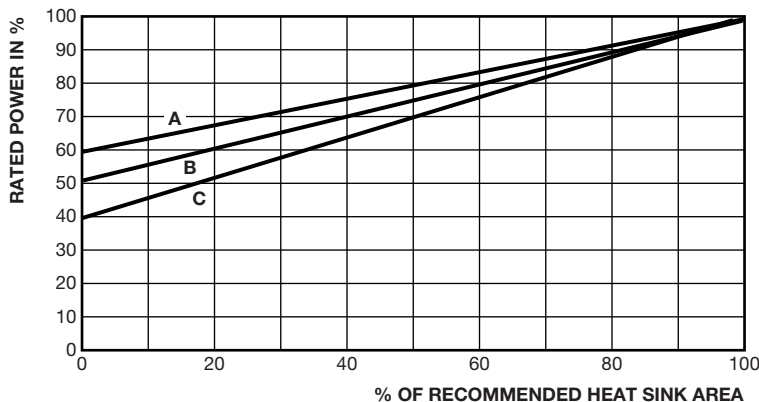
**REDUCED HEAT SINK DERATING**

Derating is also required when recommended heat sink area is reduced.

**A** = TMC005 and TMC010 size resistor

**B** = TMC025 size resistor

**C** = TMC050, TMC100 and TMC250 size resistor





**MATERIAL SPECIFICATIONS**

**Element:** copper-nickel alloy or nickel-chrome alloy, depending on resistance value

**Core:** ceramic, steatite or alumina, depending on physical size

**Encapsulant:** silicone molded construction

**Housing:** aluminum with hard anodic coating

**End Caps:** stainless steel

**Standard Terminals:** For TMC005 through TMC050 size terminal finish - Lead (Pb)-free is Ni/Pd/Au, finish is on copper clad steel core terminal. For TMC100 and TMC250 terminals are threaded stainless steel.

**Part Marking:** HEI, model, wattage, value, tolerance, date code

**TMC NON-INDUCTIVE**

Models of equivalent physical and electrical specifications are available with non-inductive (Ayrton-Perry) winding. They are identified by model number with special (TMC005...NI, for example).

**SPECIAL MODIFICATIONS**

A number of special modifications to the aluminum housed resistor style are available upon request. Special modifications include:

- Terminal configurations and materials
- Resistance values and tolerances
- Low resistance temperature coefficient (RTC)
- Housing configuration
- Threaded mounting holes
- Preconditioning and other additional testing

| PERFORMANCE                     |  |                       |
|---------------------------------|--|-----------------------|
| TEST                            | CONDITIONS OF TEST   | TEST LIMITS           |
| Thermal Shock                   | Rated power applied until thermally stable, then a minimum of 15 min at -55 °C   | ± (0.5 % + 0.05 Ω) ΔR |
| Short Time Overload             | 5x rated power for 5 s   | ± (0.5 % + 0.05 Ω) ΔR |
| Dielectric Withstanding Voltage | 1000 V <sub>RMS</sub> TMC005, TMC010 and TMC025; 2000 V <sub>RMS</sub> for TMC050; 4500 V <sub>RMS</sub> for TMC100 and TMC250; duration 1 min | ± (0.2 % + 0.05 Ω) ΔR |
| High Temperature Storage        | 250 °C for 2 h   | ± (0.5 % + 0.05 Ω) ΔR |
| Moisture Resistance             | MIL-STD-202 Method 106, 7b not applicable  | ± (1.0 % + 0.05 Ω) ΔR |
| Shock, Specified Pulse          | MIL-STD-202 Method 213, 100 g's for 6 ms, 10 shocks  | ± (0.2 % + 0.05 Ω) ΔR |
| Vibration, High Frequency       | Frequency varied 10 Hz to 2000 Hz, 20 g peak, 2 directions 6 h each  | ± (0.2 % + 0.05 Ω) ΔR |
| Load Life                       | 1000 h at rated power, +25 °C, 1.5 h "ON", 0.5 h "OFF"   | ± (1.0 % + 0.05 Ω) ΔR |
| Terminal Strength               | 30 s, 5 pound pull test for TMC005 and TMC010, 10 pound pull test for other sizes  | ± (0.2 % + 0.05 Ω) ΔR |



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