

## Molded Metal Film High Stability (< 0.25 % After 1000 h) High Temperature (up to 175 °C) Precision Resistors



The performance of the RCMT resistors exceed the requirements of NF C 83-230 standards. They are particularly relevant to the more stringent military and industrial applications especially when high ambient temperatures such as +175 °C are to be encountered.

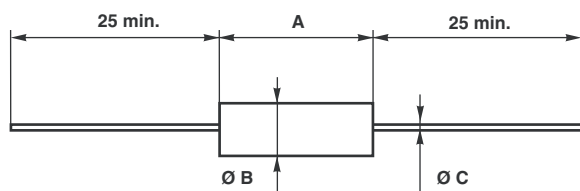
The RCMT resistors are manufactured according to the NF C UTE 83-230 standard styles RS56C, RS60E and C, RS65E and C, RS70E and C.

### FEATURES

- 0.1 W to 2 W at 125 °C
- EN140100
- According to CECC 40 101-044
- High climatic performance -65 °C / +175 °C / 56 days
- High long term stability drift < 0.25 % after 1000 h
- Tight temperature coefficient to ± 15 ppm/°C
- Temperature coefficient tracking 5 ppm/°C
- Wide ohmic range from 1 Ω to 5 MΩ
- Tight tolerances up to ± 0.1 %
- Matching tolerance to 0.05 %
- Termination: Pure matte tin
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)


**RoHS**  
COMPLIANT

### DIMENSIONS in millimeters



| SERIES | A max. | Ø B max. | Ø C | WEIGHT in g |
|--------|--------|----------|-----|-------------|
| RCMT01 | 4.32   | 2.03     | 0.4 | 0.11        |
| RCMT02 | 6.7    | 2.5      | 0.6 | 0.28        |
| RCMT05 | 10.4   | 3.66     | 0.6 | 0.46        |
| RCMT08 | 16.5   | 6.4      | 0.8 | 1.3         |
| RCMT1  | 19.3   | 6.4      | 0.8 | 1.5         |
| RCMT2  | 29     | 10.2     | 0.8 | 4.4         |
| RCMT4  | 54     | 10.2     | 0.8 | 13          |

### STANDARD ELECTRICAL SPECIFICATIONS

| MODEL  | RESISTANCE RANGE<br>Ω | RATED POWER<br>P <sub>70 °C</sub><br>W | LIMITING ELEMENT VOLTAGE<br>V | TOLERANCE<br>± % | TEMPERATURE COEFFICIENT<br>± ppm/°C |
|--------|-----------------------|----------------------------------------|-------------------------------|------------------|-------------------------------------|
| RCMT01 | 1 to 511K             | 0.063                                  | 200                           | 0.1, 0.2, 0.5, 1 | 15, 25, 50                          |
| RCMT02 | 1 to 322K             | 0.125                                  | 300                           | 0.1, 0.2, 0.5, 1 | 15, 25, 50                          |
| RCMT05 | 1 to 1M               | 0.250                                  | 350                           | 0.1, 0.2, 0.5, 1 | 15, 25, 50                          |
| RCMT08 | 1 to 1.5M             | 0.500                                  | 400                           | 0.1, 0.2, 0.5, 1 | 15, 25, 50                          |
| RCMT1  | 1 to 2M               | 1.0                                    | 500                           | 0.1, 0.2, 0.5, 1 | 15, 25, 50                          |
| RCMT2  | 1 to 2.5M             | 2.0                                    | 600                           | 0.1, 0.2, 0.5, 1 | 15, 25, 50                          |
| RCMT4  | 1 to 5M               | 4.0                                    | 800                           | 0.1, 0.2, 0.5, 1 | 15, 25, 50                          |

**TECHNICAL SPECIFICATIONS**

| VISHAY<br>SFERNICE<br>SERIES | NF C<br>83-230<br>CECC 40<br>101-044<br>(FOR<br>INFO.) | POWER<br>RATING<br>AT +70 °C | POWER<br>RATING<br>AT +125 °C | RESISTANCE VALUE RANGE IN RELATION TO<br>- TEMPERATURE COEFFICIENT<br>- TOLERANCE |                  |                    |                  |                    |                  | MAXIMUM<br>VOLTAGE | CRITICAL<br>RESISTANCE |
|------------------------------|--------------------------------------------------------|------------------------------|-------------------------------|-----------------------------------------------------------------------------------|------------------|--------------------|------------------|--------------------|------------------|--------------------|------------------------|
|                              |                                                        |                              |                               | K3                                                                                |                  | K4                 |                  | K5                 |                  |                    |                        |
|                              |                                                        |                              |                               | ± 0.2 %                                                                           | ± 0.5 %<br>± 1 % | ± 0.1 %<br>± 0.2 % | ± 0.5 %<br>± 1 % | ± 0.1 %<br>± 0.2 % | ± 0.5 %<br>± 1 % |                    |                        |
| RCMT01<br>K3                 | -                                                      | 0.063 W                      | 0.05 W                        | 10 Ω                                                                              | 1 Ω              | 49.9 Ω             | 49.9 Ω           | 100 Ω              | 100 Ω            | 200 V              | -                      |
| RCMT01<br>K4                 | -                                                      |                              |                               | 511 kΩ                                                                            | 511 kΩ           | 100 kΩ             | 511 kΩ           | 100 kΩ             | 100 kΩ           |                    |                        |
| RCMT02<br>K3                 | RS<br>56C                                              | 0.125 W                      | 0.1 W                         | 10 Ω                                                                              | 1 Ω              | 10 Ω               | 1 Ω              | 10 Ω               | 10 Ω             | 300 V              | -                      |
| RCMT02<br>K4                 | RS<br>56E                                              |                              |                               | 332 kΩ                                                                            | 332 kΩ           | 332 kΩ             | 332 kΩ           | 100 kΩ             | 332 kΩ           |                    |                        |
| RCMT05<br>K3                 | RS<br>60C                                              | 0.25 W                       | 0.125 W                       | 10 Ω                                                                              | 1 Ω              | 10 Ω               | 1 Ω              | 10 Ω               | 10Ω              | 350 V              | 980 kΩ                 |
| RCMT05<br>K4                 | RS<br>60E                                              |                              |                               | 332 kΩ                                                                            | 1 MΩ             | 332 kΩ             | 1 MΩ             | 332 kΩ             | 1 MΩ             |                    |                        |
| RCMT08<br>K3                 | RS<br>65C                                              | 0.5 W                        | 0.25 W                        | 10 Ω                                                                              | 1 Ω              | 10 Ω               | 1 Ω              | 10 Ω               | 10 Ω             | 400 V              | 640 kΩ                 |
| RCMT08<br>K4                 | RS<br>65E                                              |                              |                               | 1 MΩ                                                                              | 1.5 MΩ           | 1 MΩ               | 1.5 MΩ           | 750 kΩ             | 1.5 MΩ           |                    |                        |
| RCMT1<br>K3                  | RS<br>70C                                              | 1 W                          | 0.5 W                         | 10 Ω                                                                              | 1 Ω              | 10 Ω               | 1 Ω              | 10 Ω               | 10 Ω             | 500 V              | 500 kΩ                 |
| RCMT1<br>K4                  | RS<br>70E                                              |                              |                               | 1 MΩ                                                                              | 2 MΩ             | 1 MΩ               | 2 MΩ             | 750 kΩ             | 2 MΩ             |                    |                        |
| RCMT2<br>K3                  | -                                                      | 2 W                          | 1 W                           | 10 Ω                                                                              | 1Ω               | 10 Ω               | 1 Ω              | 10 Ω               | 10Ω              | 600 V              | 360 kΩ                 |
| RCMT2<br>K4                  | -                                                      |                              |                               | 1 MΩ                                                                              | 2.5 MΩ           | 1 MΩ               | 2.5 MΩ           | 100 kΩ             | 100 kΩ           |                    |                        |
| RCMT4<br>K3                  | -                                                      | 4 W                          | 2 W                           | 10 Ω                                                                              | 1 Ω              | 10 Ω               | 1 Ω              | 10 Ω               | 10 Ω             | 800 V              | 320 kΩ                 |
| RCMT4<br>K4                  | -                                                      |                              |                               | 2.5 MΩ                                                                            | 5 MΩ             | 2.5 MΩ             | 5 MΩ             | 100 kΩ             | 100 kΩ           |                    |                        |

**PERFORMANCE**

| TESTS                                        | CONDITIONS                                    | REQUIREMENTS                                              | TYPICAL VALUES<br>AND DRIFTS                                        |
|----------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------------------|
| Dielectric voltage                           | $2 U_n / 1 \text{ min}$                       | ± 0.25 %                                                  | < ± 0.05 % or 0.05 Ω                                                |
| Short time overload                          | $2.5 U_n / 5 \text{ s}$<br>Limited to $2 U_m$ | ± 0.25 %                                                  | ± 0.05 % or 0.05 Ω                                                  |
| Load life at maximum<br>category temperature | 1000 h at +155 °C<br>0 % of $P_r$             | ± 0.5 %                                                   | ± 0.25 % or 0.05 Ω                                                  |
| Damp heat humidity<br>(steady state)         | 56 days<br>with low load                      | ± 0.5 %                                                   | ± 0.2 % or 0.05 Ω<br>Insulation resistance > $10^6 \text{ M}\Omega$ |
| Rapid temperature change                     | -55 °C +175 °C                                | ± 0.1 %                                                   | ± 0.05 % or 0.05 Ω                                                  |
| Climatic sequence                            | -65 °C +175 °C<br>severity 1                  | ± 0.5 %<br>Insulation resistance > $10^3 \text{ M}\Omega$ | ± 0.2 % or 0.05 Ω<br>Insulation resistance > $10^6 \text{ M}\Omega$ |
| Terminal strength                            | Pull - twist - 2 bends                        | ± 0.1 %                                                   | ± 0.05 % or 0.05 Ω                                                  |
| Vibration                                    | Severity 55 B                                 | ± 0.1 %                                                   | ± 0.05 % or 0.05 Ω                                                  |
| Soldering (thermal shock)                    | +260 °C 10 s                                  | ± 0.1 %                                                   | ± 0.05 % or 0.05 Ω                                                  |
| Load life                                    | Cycle 90'/30'<br>70 °C ambient                | 1000 h at $P_n$                                           | ± 0.5 %                                                             |
|                                              |                                               | 10 000 h at $P_n$                                         | -                                                                   |
| Shelf life                                   | 1 year ambient temperature                    | -                                                         | < ± 0.05 %                                                          |

**TEMPERATURE COEFFICIENT**

| TCR CODE | TEMPERATURE RANGE | NOMINAL TEMPERATURE COEFFICIENT | TEMPERATURE RANGE | TYPICAL TEMPERATURE COEFFICIENT |
|----------|-------------------|---------------------------------|-------------------|---------------------------------|
| K5       | 0 °C to +155 °C   | ± 15 ppm/°C                     | 0 °C to +70 °C    | ± 10 ppm/°C                     |
| K4       | -55 °C to +175 °C | ± 25 ppm/°C                     | -10 °C to +70 °C  | ± 15 ppm/°C                     |
| K3       | -55 °C to +175 °C | ± 50 ppm/°C                     | -10 °C to +70 °C  | ± 30 ppm/°C                     |

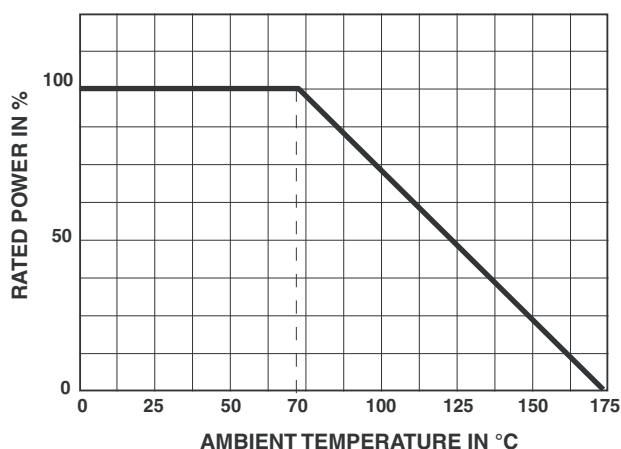
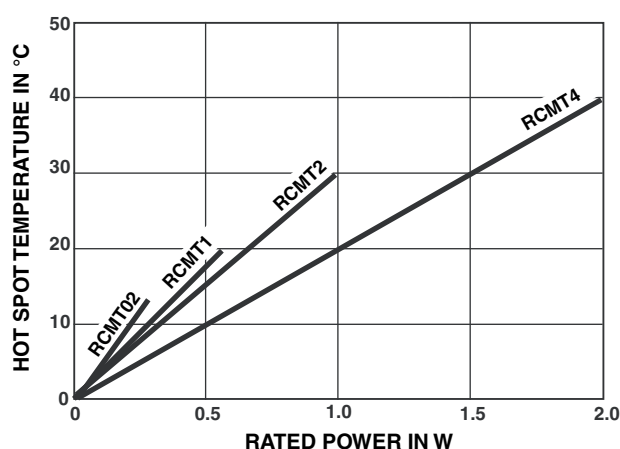
**ENVIRONMENTAL SPECIFICATIONS**

**Insulation Resistance** > 10<sup>7</sup> MΩ  
**Voltage Coefficient** 10 ppm/V  
**Environmental Specifications** -65 °C / +175 °C / 56 days

**PRACTICAL OPERATING TOLERANCES**

After the 10 000 h load life test, at nominal power rating, 90'/30' cycles, +125 °C ambient temperature, the total actual drifts measured at +125 °C are the following:

|                                                                                      |          |          |
|--------------------------------------------------------------------------------------|----------|----------|
| Manufacturing tolerance                                                              | ± 0.1 %  | ± 1 %    |
| Drift due to TCR (K4) + life drift                                                   | ± 0.25 % | ± 0.35 % |
| Max. total deviation from nominal ohmic value, including the manufacturing tolerance | ± 0.35 % | ± 1.35 % |

**POWER RATING**

**TEMPERATURE RISE**

**NOISE LEVEL**

In a frequency decade, the average noise level is 0.1 µV/V for models RCMT08, RCMT1, RCMT2, and RCMT4 in all ohmic values. It progressively increases as a function of the ohmic value and can reach 0.2 µV/V for the highest values of models RCMT02 and RCMT05 (0.1 µV/V for R < 10 kΩ).

**SPECIAL APPLICATIONS**

Temperature coefficient tracking to 5 ppm.  
 Tolerance matching to 0.05 %.  
 Selection of positive or negative TCR in temperature range of -20 °C to +125 °C.  
 For these applications and other requirements consult Vishay Sfernice.

**RECOMMENDATION**

The lower the ohmic value, the more important the influence of lead resistance is on measurements. The nominal resistance value is therefore measured at a distance of 5 mm from resistor body.

**MARKING**

Printed: Series, style, ohmic value (in Ω), tolerance (in %), temperature coefficient, manufacturing date. Due to lack of space, RCMT02 is referenced as MT02.



| GLOBAL PART NUMBER INFORMATION |                                        |                               |                                                                                                                                                                                                                                                         |   |   |  |                                                |   |   |                                                          |   |   |                                                                                                       |   |     |
|--------------------------------|----------------------------------------|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|--|------------------------------------------------|---|---|----------------------------------------------------------|---|---|-------------------------------------------------------------------------------------------------------|---|-----|
| R                              | C                                      | M                             | T                                                                                                                                                                                                                                                       | 0 | 2 |  | 1                                              | 3 | 0 | 0                                                        | 1 | F | H                                                                                                     | S | 1 4 |
| GLOBAL<br>MODEL                | SIZE                                   | SPECIAL                       | OHMIC VALUE                                                                                                                                                                                                                                             |   |   |  | TOLERANCE                                      |   |   | TEMPERATURE<br>COEFFICIENT                               |   |   | PACKAGING                                                                                             |   |     |
| RCMT                           | 01<br>02<br>05<br>08<br>10<br>20<br>40 | As applicable.<br>Contact us. | The first four digits are<br>significant figures and the<br>last digit specifies the<br>number of zeros to follow.<br>R designates<br>decimal point.<br>13001 = 13 k $\Omega$<br>33001 = 33 k $\Omega$<br>220R0 = 220 $\Omega$<br>1R220 = 1.22 $\Omega$ |   |   |  | B = 0.1 %<br>A = 0.2 %<br>D = 0.5 %<br>F = 1 % |   |   | H = K3, 50 ppm/K<br>E = K4, 25 ppm/K<br>D = K5, 15 ppm/K |   |   | AM500 = A20<br>BAG100 = S14<br>BAG50 = S09<br>BAG10 = S03<br>BO50* = B25<br><br>*: possible<br>in N/A |   |     |



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