



# Cement Power Resistors (RoHS Compliant)

# PRM-RC Series

## FEATURES

- 5% tolerance
- Exceptionally small, sturdy, and reliable
- Sealed with a special cement
- Excellent moisture resistance
- High temperature stability
- Ceramic flame retardant package
- Recommended wash method is alcohol

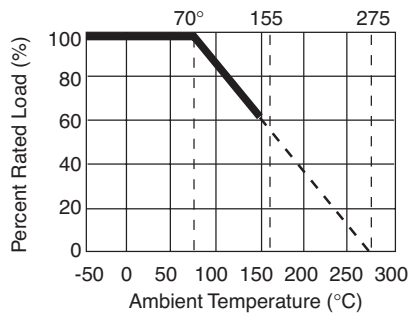


LEAD-FREE

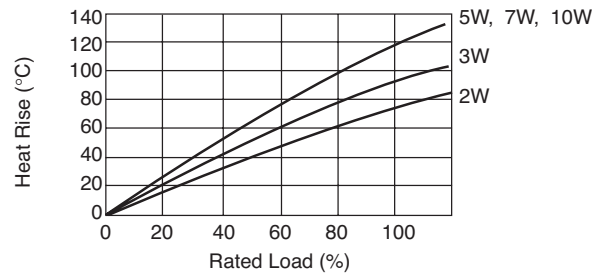


RoHS Compliant

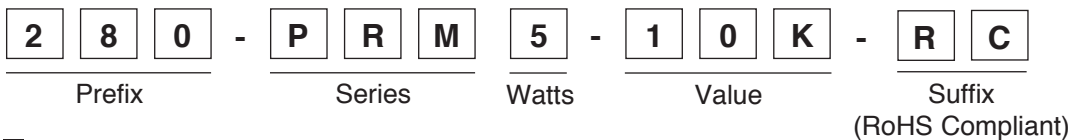
## DERATING CHART



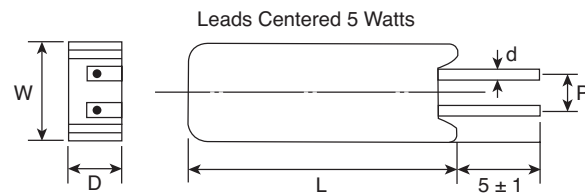
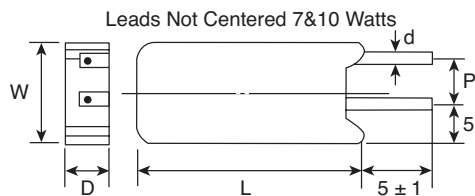
## HEAT RISE CHART



## PART NUMBERING SYSTEM



## SERIES, WATTAGE, VALUE RANGE, AND DIMENSIONS



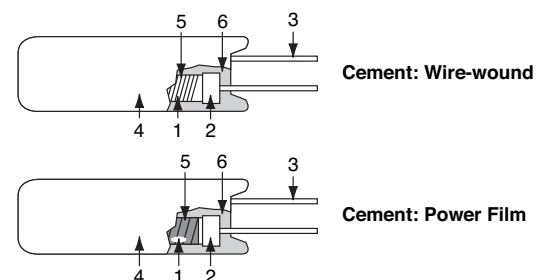
| Series | Watts (W) | Leads        | Value Ranges (Ω) |            | Dimensions (mm) |      |      |          |      |
|--------|-----------|--------------|------------------|------------|-----------------|------|------|----------|------|
|        |           |              | Wirewound        | Power Film | W ±1            | D ±1 | L ±1 | ød ±0.05 | P ±1 |
| PRM    | 5         | Centered     | 0.1 ~ 47         | 48 ~ 100K  | 12.5            | 9    | 25   | 0.75     | 5    |
| PRM    | 7         | Not Centered | 0.1 ~ 680        | 681 ~ 200K | 12.5            | 9    | 38   | 0.75     | 5    |
| PRM    | 10        | Not Centered | 0.1 ~ 910        | 911 ~ 200K | 12.5            | 9    | 50   | 0.75     | 5    |

## STANDARD STOCKED VALUES (Ω) All standard E-24 values not listed are available special order.

|      |      |      |     |     |     |    |    |    |    |    |     |     |     |     |     |     |     |    |    |      |     |
|------|------|------|-----|-----|-----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|----|----|------|-----|
| 0.1  | 0.3  | 0.51 | 1.0 | 3.0 | 6.8 | 15 | 33 | 56 | 68 | 75 | 100 | 150 | 200 | 300 | 330 | 470 | 680 | 1K | 2K | 4.7K | 10K |
| 0.22 | 0.47 | 0.68 | 2.2 | 4.7 | 10  | 20 | 47 |    |    |    |     |     |     |     |     |     |     |    |    |      |     |

## CONSTRUCTION

| No. | Subpart Name                       | Material                                                       | Material Generic Name                             |
|-----|------------------------------------|----------------------------------------------------------------|---------------------------------------------------|
| 1   | Body                               | Rod Type Ceramics                                              | Al <sub>2</sub> O <sub>3</sub> , SiO <sub>2</sub> |
| 2   | End Cap                            | Tin plated iron surface                                        | Tin : 5%, Iron : 95%                              |
| 3   | Lead                               | Annealed copper wire<br>(Electrosolder plated surface) Pb Free | Tin-Coated Copper wire                            |
| 4   | Ceramic Case                       | Ceramic                                                        | Al <sub>2</sub> O <sub>3</sub> , SiO <sub>2</sub> |
| 5   | Resistance wire<br>Resistance Film | Ni-Cr Alloy<br>Metal Oxide Film                                | Ni-Cr Alloy<br>Metal Oxide Film                   |
| 6   | Filling Materials                  | Quartz mixed sand                                              | SiO <sub>2</sub>                                  |





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# PRM-RC Series

## ■ CHARACTERISTICS

| Characteristics                 | Limits                                                                              |               | Test Methods ( JIS C 5201-1 )                                                                                                                                                                                                                                                                                                                                                                             |                |              |
|---------------------------------|-------------------------------------------------------------------------------------|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------------|
| Temperature coefficient         | ± 350 PPM / °C Max.<br><20Ω ± 400 PPM / °C                                          |               | 5.2 Natural resistance change per temp. degree centigrade.<br><div><div><div>R2-R1</div><div></div><div>x10<sup>6</sup></div></div><div>(PPM / °C)</div><div>R1(t2-t1)</div><div>R1: Resistance value at room temperature (t1)</div><div>R2: Resistance value at room temp. plus 100 °C (t2)</div></div>                                                                                                  |                |              |
| Dielectric withstanding voltage | No evidence of flashover, mechanical damage, arcing or insulation break down        |               | 5.7 Resistors shall be clamped in the trough of a 90° metallic V-block and shall be tested at AC potential respectively for 60 +10/- 0 secs.                                                                                                                                                                                                                                                              |                |              |
| Temperature cycling             | Resistance change rate is ± (2% + 0.05Ω) Max. with no evidence of mechanical damage |               | 7.4 Resistance change after continuous 5 cycles for duty shown below:                                                                                                                                                                                                                                                                                                                                     |                |              |
|                                 |                                                                                     |               | Step                                                                                                                                                                                                                                                                                                                                                                                                      | Temperature    | Time         |
|                                 |                                                                                     |               | 1                                                                                                                                                                                                                                                                                                                                                                                                         | -55 °C ± 3 °C  | 30 mins      |
|                                 |                                                                                     |               | 2                                                                                                                                                                                                                                                                                                                                                                                                         | Room temp.     | 10 ~ 15 mins |
|                                 |                                                                                     |               | 3                                                                                                                                                                                                                                                                                                                                                                                                         | +155 °C ± 2 °C | 30 mins      |
| 4                               | Room temp.                                                                          | 10 ~ 15 mins  |                                                                                                                                                                                                                                                                                                                                                                                                           |                |              |
| Short time overload             | Resistance change rate is ± (5% + 0.05Ω) Max. with no evidence of mechanical damage |               | 5.5 Permanent resistance change after the application of a potential of 2.5 times RCWV for 5 seconds                                                                                                                                                                                                                                                                                                      |                |              |
| Load life in humidity           | Resistance value                                                                    | Δ R/R         | 7.9 Resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") in a humidity test chamber controlled at 40 °C ± 2 °C and 90 to 95 % relative humidity                                                                                                                                                                                                      |                |              |
|                                 | Wire-wound                                                                          | ± 5%          |                                                                                                                                                                                                                                                                                                                                                                                                           |                |              |
|                                 | Power film: <100KΩ<br>>100KΩ                                                        | ± 5%<br>± 10% |                                                                                                                                                                                                                                                                                                                                                                                                           |                |              |
| Load life                       | Resistance value                                                                    | Δ R/R         | 7.10 Permanent resistance change after 1,000 hours operating at RCWV with duty cycle of (1.5 hours "on", 0.5 hour "off") at 70 °C ±2 °C                                                                                                                                                                                                                                                                   |                |              |
|                                 | Wire-wound                                                                          | ± 5%          |                                                                                                                                                                                                                                                                                                                                                                                                           |                |              |
|                                 | Power film: <100KΩ<br>>100KΩ                                                        | ± 5%<br>± 10% |                                                                                                                                                                                                                                                                                                                                                                                                           |                |              |
| Terminal strength               | No evidence of mechanical damage                                                    |               | 6.1 <b>Direct load :</b><br>Resistance to a 2.5 kgs direct load for 10 secs. in the direction of the longitudinal axis of the terminal leads<br><b>Twist test :</b><br>Terminal leads shall be bent through 90 ° at a point of about 6mm from the body of the resistor and shall be rotated through 360° about the original axis of the bent terminal in alternating direction for a total of 3 rotations |                |              |
| Resistance to soldering heat    | Resistance change rate is ± (1% + 0.05Ω) Max. with no evidence of mechanical damage |               | 6.4 Permanent resistance change when leads immersed to 3.2 to 4.8 mm from the body in 350 °C ± 10 °C solder for 3 ± 0.5 secs.                                                                                                                                                                                                                                                                             |                |              |
| Solderability                   | 95 % coverage Min.                                                                  |               | 6.5 The area covered with a new , smooth clean , shiny and continuous surface free from concentrated pinholes.<br>Test temp. of solder : 245 °C ± 3 °C<br>Dwell time in solder : 2 ~ 3 seconds                                                                                                                                                                                                            |                |              |