

## Cement Resistors

# Axial Lead Type

Normal Style [ SQP Series ]

Non-Inductive Style [ NSP Series ]



### INTRODUCTION

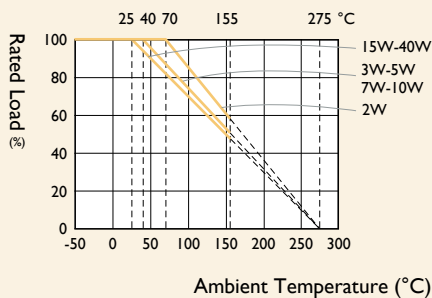
The materials used and the construction techniques ensure excellent flame resistance, arc resistance and moisture resistance as well as self-extinguishing capabilities. They will withstand the most rigorous loading test.

As resistors in radio and television receivers, hazardous conditions such as smoking and redheat can be completely prevented by the proper choice of power resistors.

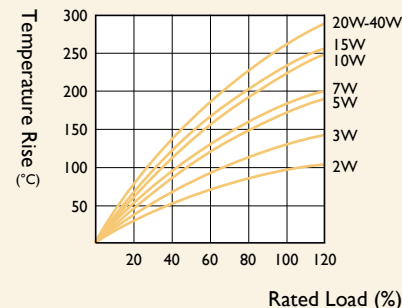
### FEATURES

|                      |                                              |
|----------------------|----------------------------------------------|
| Power Rating         | 2W, 3W, 5W, 7W, 10W, 15W, 20W, 25W, 30W, 40W |
| Resistance Tolerance | ±5%                                          |
| T.C.R.               | ±300ppm/°C                                   |

### DERATING CURVE

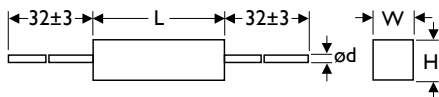


### TEMPERATURE RISE



### DIMENSIONS

Unit: mm



| STYLE  |               | DIMENSION |          |          |           |
|--------|---------------|-----------|----------|----------|-----------|
| Normal | Non-Inductive | L         | W        | H        | ød        |
| SQP200 | NSP200        | 18±1.0    | 7.0±1.0  | 7.0±1.0  | 0.65±0.05 |
| SQP300 | NSP300        | 22±1.5    | 8.0±1.0  | 8.0±1.0  | 0.8±0.05  |
| SQP500 | NSP500        | 22±1.5    | 9.5±1.0  | 9.0±1.0  | 0.8±0.05  |
| SQP700 | NSP700        | 35±1.5    | 9.5±1.0  | 9.0±1.0  | 0.8±0.05  |
| SQP10A | NSP10A        | 48±1.5    | 9.5±1.0  | 9.0±1.0  | 0.8±0.05  |
| SQP15A | NSP15A        | 48±1.5    | 12.5±1.0 | 12.5±1.0 | 0.8±0.05  |
| SQP20A | NSP20A        | 60±5.0    | 12.5±1.0 | 12.5±1.0 | 0.8±0.05  |
| SQP25A | NSP25A        | 60±5.0    | 14.0±1.5 | 13.0±1.5 | 0.8±0.05  |
| SQP30A | NSP30A        | 77±5.0    | 18.0±1.5 | 17.0±1.5 | 0.8±0.05  |
| SQP40A | NSP40A        | 90±5.0    | 19.0±1.5 | 18.0±1.5 | 0.8±0.05  |

## ELECTRICAL CHARACTERISTICS

## NORMAL STYLE

| STYLE                               | SQP200          | SQP300     | SQP500      | SQP700      | SQP10A      | SQP15A      | SQP20A      | SQP25A | SQP30A | SQP40A |
|-------------------------------------|-----------------|------------|-------------|-------------|-------------|-------------|-------------|--------|--------|--------|
| Power Rating at 25°C                |                 |            |             |             |             | 15W         | 20W         | 25W    | 30W    | 40W    |
| Power Rating at 40°C                |                 | 3W         | 5W          | 7W          | 10W         |             |             |        |        |        |
| Power Rating at 70°C                | 2W              |            |             |             |             |             |             |        |        |        |
| Maximum Working Voltage             | 250V            | 350V       |             | 500V        |             |             |             | 1,000V |        |        |
| Maximum Overload Voltage            | 500V            | 700V       |             | 1,000V      |             |             |             | 2,000V |        |        |
| Voltage Proof on Insulation         | 500V            | 700V       |             | 1,000V      |             |             |             | 2,000V |        |        |
| Resistance Range (Wirewound)        | 0.1Ω - 36Ω      | 0.1Ω - 68Ω | 0.1Ω - 130Ω | 0.1Ω - 330Ω | 0.1Ω - 510Ω | 0.1Ω - 680Ω | 0.15Ω - 1KΩ |        |        |        |
| Resistance Range (Metal Oxide Film) | 39Ω - 1MΩ       | 75Ω - 1MΩ  | 150Ω - 1MΩ  | 360Ω - 1MΩ  | 560Ω - 1MΩ  | 750Ω - 1MΩ  | 1.2KΩ - 1MΩ |        |        |        |
| Operating Temp. Range               | -55°C to +155°C |            |             |             |             |             |             |        |        |        |
| Temperature Coefficient             | ±300ppm/°C      |            |             |             |             |             |             |        |        |        |

## NON-INDUCTIVE STYLE

| STYLE                        | NSP200              | NSP300     | NSP500     | NSP700      | NSP10A       | NSP15A       | NSP20A       | NSP25A | NSP30A | NSP40A |
|------------------------------|---------------------|------------|------------|-------------|--------------|--------------|--------------|--------|--------|--------|
| Power Rating at 25°C         |                     |            |            |             |              | 15W          | 20W          | 25W    | 30W    | 40W    |
| Power Rating at 40°C         |                     | 3W         | 5W         | 7W          | 10W          |              |              |        |        |        |
| Power Rating at 70°C         | 2W                  |            |            |             |              |              |              |        |        |        |
| Maximum Working Voltage      | $\sqrt{P \times R}$ |            |            |             |              |              |              |        |        |        |
| Voltage Proof on Insulation  | 500V                | 700V       |            | 1,000V      |              |              |              | 2,000V |        |        |
| Resistance Range (Wirewound) | 0.08Ω - 10Ω         | 0.1Ω - 30Ω | 0.1Ω - 40Ω | 0.15Ω - 65Ω | 0.25Ω - 100Ω | 0.25Ω - 120Ω | 0.36Ω - 160Ω |        |        |        |
| Operating Temp. Range        | -55°C to +155°C     |            |            |             |              |              |              |        |        |        |
| Temperature Coefficient      | ±300ppm/°C          |            |            |             |              |              |              |        |        |        |

Note: Special value is available on request

## ENVIRONMENTAL CHARACTERISTICS

| PERFORMANCE TEST              | TEST METHOD      |                                                                  | APPRAISE                                  |
|-------------------------------|------------------|------------------------------------------------------------------|-------------------------------------------|
| Short Time Overload           | IEC 60115-1 4.13 | 2.5 times RCWV for 5 Sec.                                        | ±2.0%+0.05Ω                               |
| Voltage Proof on Insulation   | IEC 60115-1 4.7  | in V-block for 60 Sec., test voltage by type                     | By type                                   |
| Temperature Coefficient       | IEC 60115-1 4.8  | -55°C to +155°C                                                  | By type                                   |
| Insulation Resistance         | IEC 60115-1 4.6  | in V-block for 60 Sec.                                           | >1,000MΩ                                  |
| Solderability                 | IEC 60115-1 4.17 | 235±5°C for 3±0.5 Sec.                                           | 95% Min. coverage                         |
| Solvent Resistance of Marking | IEC 60115-1 4.30 | IPA for 5±0.5 Min. with ultrasonic                               | No deterioration of coatings and markings |
| Robustness of Terminations    | IEC 60115-1 4.16 | Direct load for 10 Sec. in the direction of the terminal leads   | ≥2.5kg (24.5N)                            |
| Periodic-pulse Overload       | IEC 60115-1 4.39 | 4 times RCWV 10,000 cycles (1 Sec. on, 25 Sec. off)              | ±2.0%+0.05Ω                               |
| Damp Heat Steady State        | IEC 60115-1 4.24 | 40±2°C, 90-95% RH for 56 days, loaded with 0.1 times RCWV        | ±5.0%+0.05Ω                               |
| Endurance at 70°C             | IEC 60115-1 4.25 | 70±2°C at RCWV for 1,000 Hr. (1.5 Hr. on, 0.5 Hr. off)           | ±5.0%+0.05Ω                               |
| Temperature Cycling           | IEC 60115-1 4.19 | -55°C ⇒ Room Temp. ⇒ +155°C ⇒ Room Temp. (5 cycles)              | ±2.0%+0.05Ω                               |
| Resistance to Soldering Heat  | IEC 60115-1 4.18 | 260±3°C for 10±1 Sec., immersed to a point 3±0.5mm from the body | ±1.0%+0.05Ω                               |

Note: Rated Continuous Working Voltage (RCWV) =  $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$  or Max. working voltage listed above, whichever less.

Revision: 201304



## EXPLANATIONS OF ORDERING CODE

| MFR                                           | -12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | F                                                                                                                                                                                                                      | T                                                                           | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 52-                                                                                                                                                                                                                                                                                                   | 100R                                                                                                   |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| Code 1 - 3<br><b>Series Name</b><br>See Index | Code 4 - 6<br><b>Power Rating</b><br>-05 = $\varnothing$ d0.5mm<br>-06 = $\varnothing$ d0.6mm<br>-07 = $\varnothing$ d0.7mm<br>-08 = $\varnothing$ d0.8mm<br>-10 = $\varnothing$ d1.0mm<br>-14 = $\varnothing$ d1.4mm<br>-12 = 1/6W<br>-25 = 1/4W<br>25S = 1/4WS<br>-50 = 1/2W<br>50S = 1/2WS<br>100 = 1W<br>1WS = 1WS<br>200 = 2W<br>2WS = 2WS<br>204 = 0.4W<br>207 = 0.6W<br>300 = 3W<br>3WS = 3WS<br>3WM = 3WM<br>400 = 4W<br>500 = 5W<br>5WS = 5WS<br>5SS = 5WSS<br>700 = 7W<br>7WS = 7WS<br>10A = 10W<br>20A = 20W<br>30A = 30W<br>40A = 40W<br>50A = 50W<br>10S = 10WS<br>15A = 15W<br>25A = 25W<br>10B = 100W<br>25B = 250W | Code 7<br><b>Tolerance</b><br>P = $\pm 0.02\%$<br>A = $\pm 0.05\%$<br>B = $\pm 0.1\%$<br>C = $\pm 0.25\%$<br>D = $\pm 0.5\%$<br>F = $\pm 1\%$<br>G = $\pm 2\%$<br>J = $\pm 5\%$<br>K = $\pm 10\%$<br>- = Base on Spec. | Code 8<br><b>Packing Style</b><br>T = Tape/Box<br>R = Tape/Reel<br>B = Bulk | Code 9<br><b>Temperature Coef-<br/>ficient of Resistance</b><br>- = Base on Spec.<br>A = $\pm 5$ ppm/ $^{\circ}$ C<br>B = $\pm 10$ ppm/ $^{\circ}$ C<br>C = $\pm 15$ ppm/ $^{\circ}$ C<br>S = $\pm 20$ ppm/ $^{\circ}$ C<br>D = $\pm 25$ ppm/ $^{\circ}$ C<br>E = $\pm 50$ ppm/ $^{\circ}$ C<br>F = $\pm 100$ ppm/ $^{\circ}$ C<br>G = $\pm 200$ ppm/ $^{\circ}$ C<br>H = $\pm 250$ ppm/ $^{\circ}$ C<br>I = $\pm 300$ ppm/ $^{\circ}$ C<br>J = $\pm 350$ ppm/ $^{\circ}$ C | Code 10 - 12<br><b>Forming Type</b><br>26- = 26mm<br>52- = 52.4mm<br>73- = 73mm<br>81- = 81mm<br>91- = 91mm<br>F = F Type<br>FK = FK Type<br>FKK = FKK Type<br>FFK = F-form Kink<br>M = M-Type Forming<br>MB = M-form W/flat<br>MT = MT Type Forming<br>MR = MR Type<br>AV = AVIsert<br>PN = PANAsert | Code 13 - 17<br><b>Resistance Value</b><br>0R1 = 0.1<br>100R = 100<br>10K = 10,000<br>10M = 10,000,000 |

### EXCEPTION:

#### • Cement series:

<Code 8>: Special packing style code

B: Bulk with wirewound or metal oxide sub-assembly for resistance value

W: Bulk with ceramic based wirewound sub-assembly for resistance value

M: Bulk with metal oxide sub-assembly for resistance value

F: Bulk with Fiberglass based wirewound sub-assembly for resistance value

<Code 10-12>: Without forming code

Example: **SQP500JB-10R**

#### • JPW series:

<Code 13-17>: without resistance value code

Example: **JPW-06-T-52-**