

# POS Series Datasheet

Power Metal Oxide Resistors | Axial and SMD Version  
General propose | Flame retardant coating

## ORDERING CODE-Example

New SAP Part Nr.:

| POS    | 200          | J                             | T                                   | -               | 73-                                                                                                           | 150R    | AA            |
|--------|--------------|-------------------------------|-------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------------|---------|---------------|
| Series | Power rating | Tol.                          | Pack-Code                           | TCR             | Forming type                                                                                                  | R Value | Special       |
|        |              | F = ±1%<br>G = ±2%<br>J = ±5% | T = Tape on Box<br>R = Tape in Reel | - Base on spec. | 52- Inner Taping dimension or<br>73- Inner Taping dimension or<br>77- Inner Taping dimension<br>ZB- Z version |         | AA = Standard |

Historical VTM Part Nr.:

| PO593 - 0 | 5    | T         | 150R    |
|-----------|------|-----------|---------|
| Type      | Tol. | Pack-Code | R Value |

| RZP3 | 6720 | J    | K                     | -  | 13         | 150R    |
|------|------|------|-----------------------|----|------------|---------|
| Type | Size | Tol. | K = Blister tape reel | TC | Reel diam. | R Value |

## APPLICATIONS

- Automotive
- Charger
- Alternative Energy
- Power Supply
- Home Appliances
- Industrial

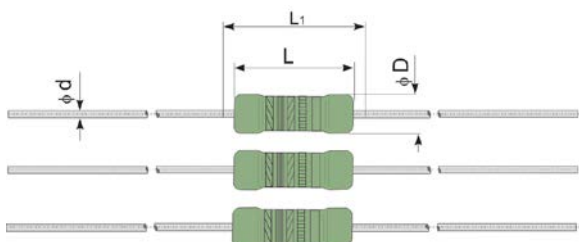
## FEATURES

High power dissipation 4[W]  
"Z" preforming ; Other preforming available  
RoHS & REACH Compliant

## ELECTRICAL SPECIFICATIONS

| Type                                                                         |                                        |      | POS-50                                                                    | POS100    | POS2WS    | POS200          | POS300       | POS400    |
|------------------------------------------------------------------------------|----------------------------------------|------|---------------------------------------------------------------------------|-----------|-----------|-----------------|--------------|-----------|
| Historical Part Number                                                       | AXIAL                                  |      | PO596 - 0                                                                 | PO595 - 0 | PO594 - 0 | PO593 - 0       | PO590 - 0    | PO591 - 0 |
|                                                                              | SMD                                    |      | -----                                                                     | RZP5      | RZP4      | RZP3            | RZP0         | -----     |
| Nominal Power Rating P <sub>70</sub>                                         | [W]                                    |      | 0,5                                                                       | 1,0       | 2WS       | 2,0             | 3,0          | 4,0       |
| Resistance Range<br>(Other values upon request)                              | [Ω]                                    | Min. | 1R                                                                        | R1        | R1        | R22             | R22          | R22       |
|                                                                              |                                        | Max. | 1M                                                                        | 10M       | 10M       | 10M             | 560K         | 100K      |
| E-Series                                                                     |                                        |      | E24 only (E96 1% + E48 2% contact factory)                                |           |           |                 |              |           |
| Tolerances                                                                   | ±[%]                                   |      | F = 1% ; J = 5%                                                           |           |           | G = 2% ; J = 5% |              |           |
| Temperature Coefficient                                                      | ±[10 <sup>-6</sup> * K <sup>-1</sup> ] |      | ±50 ; ±100 ; ±200<br>(Depends on the value, please check the table below) |           |           |                 |              |           |
| Working Temperature Range                                                    | [°C]                                   |      | -55 ... +200                                                              |           |           |                 | -55 ... +250 |           |
| Thermal Resistance                                                           | [KW <sup>-1</sup> ]                    |      | 260                                                                       | 130       | 83        | 83              | 93           | 70        |
| Max. Working Voltage                                                         | [V <sub>DC/AC</sub> ]                  |      | 200                                                                       | 500       |           |                 | 750          |           |
| Dielectric Withstanding Voltage<br>IEC115-1 clause 4.7 (1[ <sub>min</sub> ]) | [V] <sub>RMS</sub>                     |      | 300                                                                       | 500       |           |                 |              |           |

## DIMENSIONS [mm]



| Type   | Historical P/N: | L                    | L <sub>1 MAX</sub> | Ø D                 | Ø d                   |
|--------|-----------------|----------------------|--------------------|---------------------|-----------------------|
| POS-50 | PO596 - 0       | 3,4 <sup>±0,3</sup>  | 5,0                | 1,9 <sup>±0,2</sup> | 0,45 <sup>±0,05</sup> |
| POS100 | PO595 - 0       | 6,3 <sup>±0,5</sup>  | 8,0                | 2,4 <sup>±0,2</sup> | 0,60 <sup>±0,1</sup>  |
| POS2WS | PO594 - 0       | 9,0 <sup>±0,5</sup>  | 11,0               | 3,9 <sup>±0,3</sup> | 0,60 <sup>±0,1</sup>  |
| POS200 | PO593 - 0       | 11,5 <sup>±1,0</sup> | 14,0               | 4,5 <sup>±0,5</sup> | 0,80 <sup>±0,05</sup> |
| POS300 | PO590 - 0       | 16,5 <sup>-1,5</sup> | 20,0               | 6,0 <sup>-0,5</sup> | 0,80 <sup>±0,05</sup> |
| POS400 | PO591 - 0       | 20,0 <sup>-1,0</sup> | 24,0               | 9,0 <sup>-0,5</sup> | 0,80 <sup>±0,05</sup> |

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## PERFORMANCE DATE

| Type                                                                                                          |                                     | POS-50                               | POS100    | POS2WS    | POS200    | POS300           | POS400    |
|---------------------------------------------------------------------------------------------------------------|-------------------------------------|--------------------------------------|-----------|-----------|-----------|------------------|-----------|
| Historical Part Number                                                                                        | AXIAL                               | PO596 - 0                            | PO595 - 0 | PO594 - 0 | PO593 - 0 | PO590 - 0        | PO591 - 0 |
|                                                                                                               | SMD                                 | -----                                | RZP5      | RZP4      | RZP3      | RZP0             | -----     |
| Derating Linear                                                                                               | [°C]                                | 70...200 (0W)                        |           |           |           | 70...250 (0W)    |           |
| Climatic Category                                                                                             |                                     | 55/200/56                            |           |           |           |                  |           |
| Failure Rate<br><i>(Total, <math>\vartheta_o</math>, max, 60[%] cont. lev.)</i>                               | [10 <sup>-9</sup> h <sup>-1</sup> ] | < 10                                 |           |           |           |                  |           |
| Endurance<br><i>IEC60115-1 clause 4.25<br/>(<math>P_{Tb}</math>, @ 70[°C], 1000[h])</i>                       | ±[%]                                | 2,0                                  |           |           |           | 1,5              |           |
| Damp Heat, Steady State<br><i>IEC60115-1 clause 4.24<br/>(40[°C], 93[% r.h.], 56[d])</i>                      | ±[%]                                | 2,0                                  |           |           |           | 1,5              |           |
| Climatic Sequence<br><i>IEC60115-1 clause 4.23<br/>(260<sup>±5</sup>[°C], 10<sup>±1</sup>[s])</i>             | ±[%]                                | 1,0                                  |           |           |           |                  |           |
| Resistance to Soldering Heat<br><i>IEC60115-1 clause 4.18<br/>(260<sup>±5</sup>[°C], 3,5<sup>±1</sup>[s])</i> | ±[%]                                | 0,25                                 |           |           |           |                  |           |
| Surge Test<br><i>IEC61000-4-5</i>                                                                             | ±[%]                                | 2,0                                  |           |           |           |                  |           |
| Terminal Strength                                                                                             | ±[%]                                | 0,3                                  |           |           |           |                  |           |
| Terminal Tensile Strength                                                                                     | [N]                                 | 24,5                                 |           |           | 50        |                  |           |
| Solderability<br><i>IEC60068-2-20<br/>(260<sup>±5</sup>[°C] 3<sup>±0,5</sup>[s])</i>                          |                                     | Solder bath method (> 95% coverage)  |           |           |           |                  |           |
| Current Noise<br><i>IEC60195</i>                                                                              | [db]                                | R <15K: -15 R>: 15 +10 /decade       |           |           |           |                  |           |
| Nonlinearity<br><i>IEC60440</i>                                                                               | [db]                                | R <15K: 110 R> 15 K: 110 -20 /decade |           |           |           |                  |           |
| Marking<br><i>IEC60062</i>                                                                                    |                                     | Color code                           |           |           |           | Printed in clear |           |

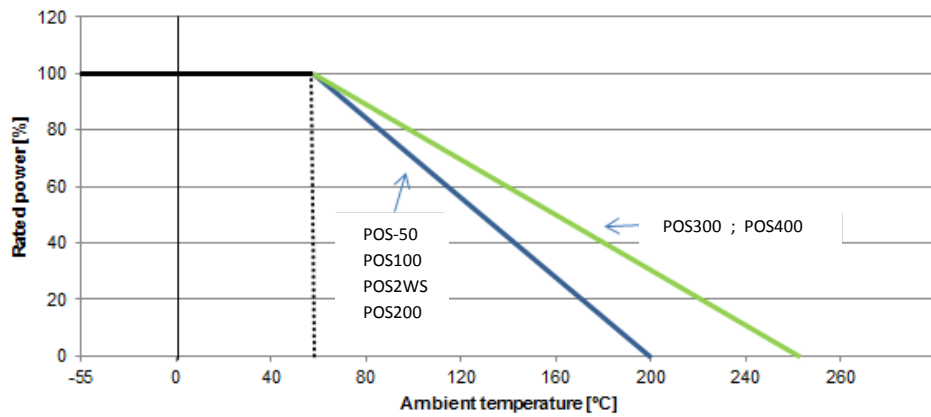
## TEMPERATURE COEFFICIENT

| New P/Nr. Type | Historical P/N: | TCR         | Tolerance | Resistance range |
|----------------|-----------------|-------------|-----------|------------------|
| POS-50         | PO596 - 0       | ± 100 ppm/K | ± 5%      | 1R ... 1M        |
|                |                 | ± 50 ppm/K  | ± 1%      |                  |
| POS100         | PO595 - 0       | ± 100 ppm/K | ± 5%      | 0R1 ... 10M      |
|                |                 | ± 50 ppm/K  | ± 1%      | 1R ... 1M        |
| POS2WS         | PO594 - 0       | ± 100 ppm/K | ± 5%      | 0R1 ... 10M      |
|                |                 | ± 50 ppm/K  | ± 1%      | 1R ... 1M        |
| POS200         | PO593 - 0       | ± 200 ppm/K | ± 5%      | 0R22 ... 10M     |
|                |                 |             | ± 2%      | 1R ... 1M        |
| POS300         | PO590 - 0       | ± 200 ppm/K | ± 5%      | 0R22 ... 560K    |
|                |                 |             | ± 2%      | 1R ... 100K      |
| POS400         | PO591 - 0       | ± 200 ppm/K | ± 5%      | 0R22 ... 100K    |
|                |                 |             | ± 2%      | 1R ... 68K       |

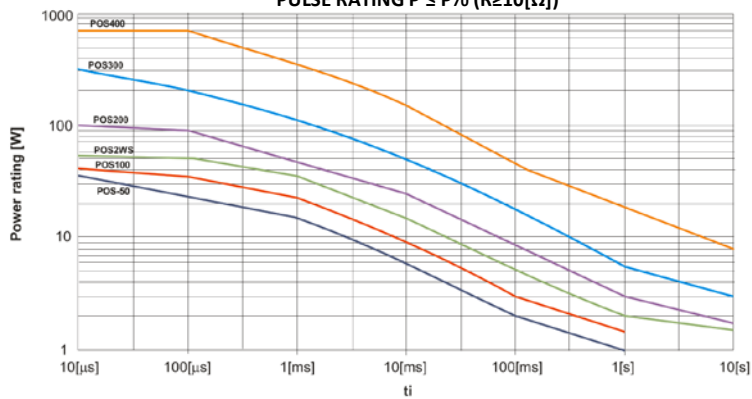
# POS Series Datasheet

## PERFORMANCE GRAPH'S

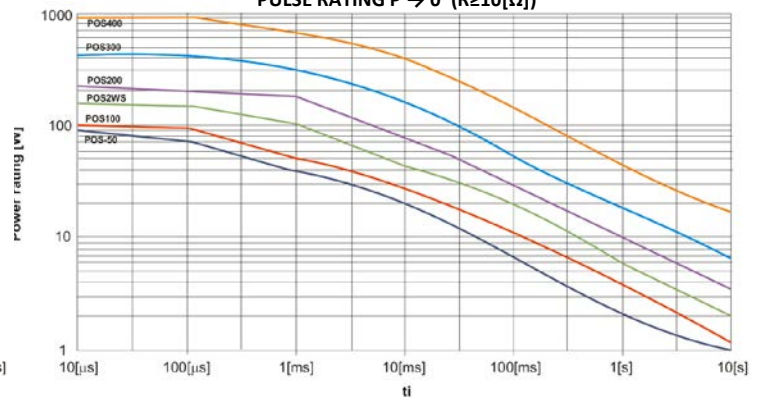
### DERATING



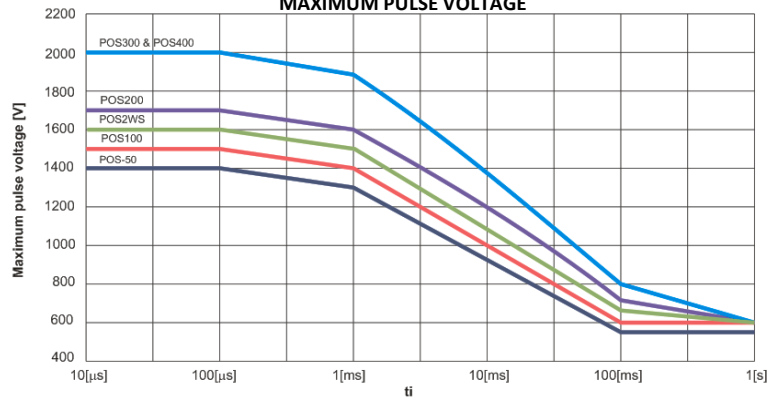
### PULSE RATING $P \leq P_{70}$ ( $R \geq 10[\Omega]$ )



### PULSE RATING $P \rightarrow 0$ ( $R \geq 10[\Omega]$ )



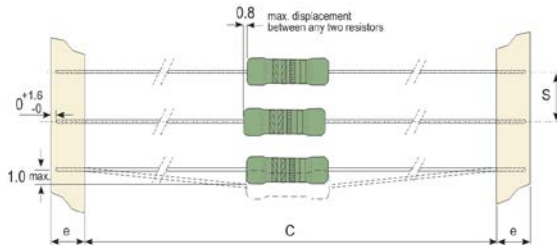
### MAXIMUM PULSE VOLTAGE



# POS Series Datasheet

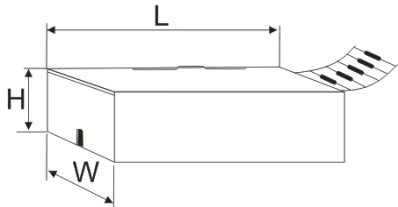
## PACKAGING

The standard packaging for POS in axial type is taped, dimensions below.



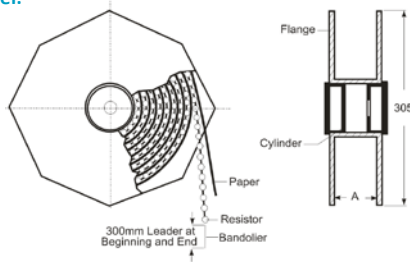
| Type   | Historical P/N: | Pack Code                                | Forming Type (Inner Taping dim.) | C  | S  | e |
|--------|-----------------|------------------------------------------|----------------------------------|----|----|---|
| POS-50 | PO596 - 0       | T = Taped Ammo pack or R = Taped in Reel | 52-                              | 52 | 5  | 6 |
| POS100 | PO595 - 0       |                                          |                                  | 52 | 5  | 6 |
| POS2WS | PO594 - 0       |                                          |                                  | 52 | 5  | 6 |
| POS200 | PO593 - 0       |                                          | 73-                              | 73 | 5  | 6 |
| POS300 | PO590 - 0       |                                          | 77-                              | 77 | 10 | 9 |
| POS400 | PO591 - 0       |                                          |                                  | 77 | 10 | 9 |

### Tape on Box:



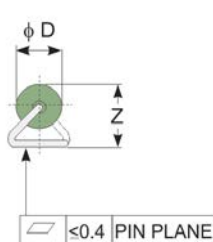
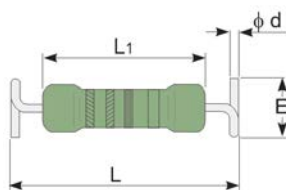
| Type   | Historical P/N: | Pack Code           | Pieces | Box dimensions |     |     |
|--------|-----------------|---------------------|--------|----------------|-----|-----|
|        |                 |                     |        | W              | H   | L   |
| POS-50 | PO596 - 0       | T = Taped Ammo pack | 5000   | 81             | 70  | 260 |
| POS100 | PO595 - 0       |                     | 5000   | 81             | 104 | 260 |
| POS2WS | PO594 - 0       |                     | 1000   | 73             | 45  | 258 |
| POS200 | PO593 - 0       |                     | 1000   | 103            | 78  | 260 |
| POS300 | PO590 - 0       |                     | 1000   | 115            | 93  | 405 |
| POS400 | PO591 - 0       |                     | 500    | 118            | 110 | 412 |

### Tape in Reel:

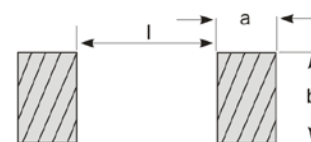


| Type   | Historical P/N: | Pack Code         | Pieces | Across Flange (A) |
|--------|-----------------|-------------------|--------|-------------------|
| POS-50 | PO596 - 0       | R = Taped in Reel | 5000   | 72                |
| POS100 | PO595 - 0       |                   | 5000   |                   |
| POS2WS | PO594 - 0       |                   | 2500   |                   |
| POS200 | PO593 - 0       |                   | 2000   | 95                |
| POS300 | PO590 - 0       |                   | 1500   | 105               |
| POS400 | PO591 - 0       |                   | 1000   |                   |

## SMD LEAD CONFIGURATIONS

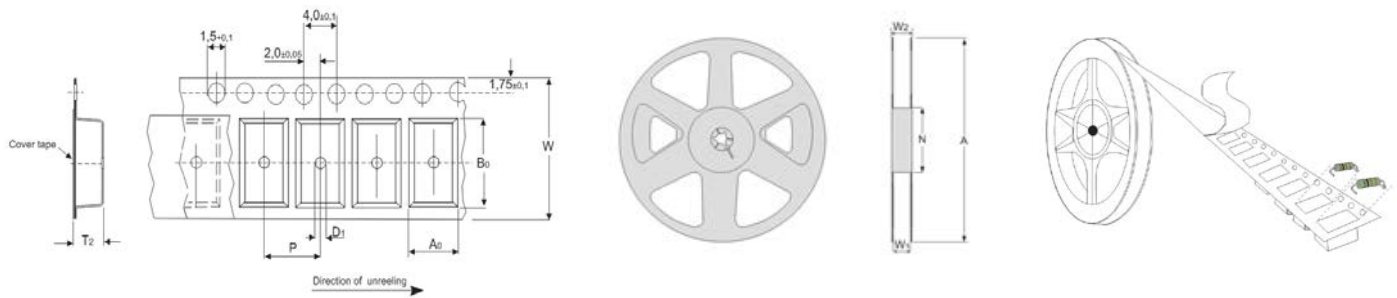


### SOLDER PAD



| Type   | Historical P/N | Size | L        | L <sub>1</sub>       | Ø D                 | Ø d  | E       | Z max | l  | a  | b  |
|--------|----------------|------|----------|----------------------|---------------------|------|---------|-------|----|----|----|
| POS100 | RZP5           | 5315 | 13,4±0,5 | 6,3 <sup>+0,5</sup>  | 2,4 <sup>+0,2</sup> | 0,60 | 5,0±0,5 | 7,0   | 10 | 10 | 10 |
| POS2WS | RZP4           | 5315 |          | 9,0 <sup>+0,5</sup>  | 3,9 <sup>+0,3</sup> | 0,60 |         | 7,5   | 14 |    |    |
| POS200 | RZP3           | 6720 | 17,0±1,0 | 11,5 <sup>+1,0</sup> | 4,5 <sup>+0,5</sup> | 0,80 |         | 8,0   | 16 |    |    |
| POS300 | RZP0           | 8424 | 20,9±1,0 | 16,5 <sup>-1,5</sup> | 6,0 <sup>-0,5</sup> | 0,80 |         |       |    |    |    |

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| Type   | A0  | B0   | W  | D1  | P  | T2  | Type   | W1   | W2   | N   | A   | Type   | Packaging                | Pieces |
|--------|-----|------|----|-----|----|-----|--------|------|------|-----|-----|--------|--------------------------|--------|
| POS100 | 5,0 | 13,7 | 24 | 2,0 | 8  | 7,2 | POS100 | 25,4 | 29,5 | 90  | 330 | POS100 | 13(inch)<br>Blister tape | 1000   |
| POS2WS |     |      |    |     |    |     | POS2WS |      |      |     |     | POS2WS |                          |        |
| POS200 | 5,7 | 16,7 | 24 | 2,0 | 8  | 7,6 | POS200 |      |      |     |     | POS200 |                          |        |
| POS300 | 6,0 | 21,4 | 32 | 2,0 | 12 | 8,1 | POS300 | 33,4 | 37,4 | 100 | 380 | POS300 | 15(inch)<br>Blister tape |        |

## Ordering Code for SMD :

| POS   | 200          | J       | K                     | -               | ZB-           | 150R    | AA            |
|-------|--------------|---------|-----------------------|-----------------|---------------|---------|---------------|
| Serie | Power rating | Tol.    | Pack-Code             | TCR             | Forming type  | R Value | Special       |
|       |              | J = ±5% | K = Blister Tape Reel | - Base on spec. | ZB- Z version |         | AA = Standard |

## ALTERNATIVE LEAD CONFIGURATIONS

This type POS is also available in a different pre-forming, as shown below, other's upon request.

### THOUGH HOLE VERSION

|                       |                            |              |                     |
|-----------------------|----------------------------|--------------|---------------------|
|                       |                            |              |                     |
| Axial Goal Post (AG-) | Axial Goal Post Kink (AK-) | Radial (RD-) | Radial 2 Kink (RK-) |