

## Leaded Varistors

### Automotive Series

#### Construction

- Round varistor element, leaded
- Coating: epoxy resin (D1: phenolic resin), flame-retardant to UL 94 V-0
- Terminals: tinned copper wire

#### Features

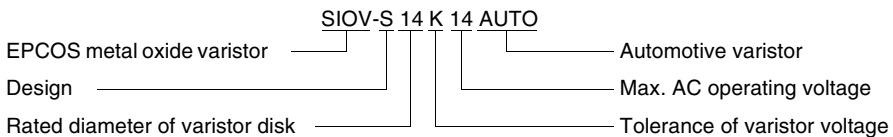
- High energy absorption, particularly in case of load dump
- Jump-start strength
- Stable protection level, minimum leakage current
- High resistance to cyclic temperature stress
- PSpice models
- Types for  $T_A = 125\text{ °C}$

#### Taping

- All types available on tape upon request

#### Type designation

Detailed description of coding system on page 39, chapter “General Technical Information”



#### General technical data

|                                               |                                         |                                  |
|-----------------------------------------------|-----------------------------------------|----------------------------------|
| Climatic category                             | 40/85/56 (D1: 40/125/56)                | in accordance with IEC 60068-1   |
| LCT                                           | – 40 °C                                 |                                  |
| UCT                                           | + 85 °C (D1: + 125 °C)                  |                                  |
| Damp heat, steady state<br>(93 % r.h., 40 °C) | 56 days                                 | in accordance with IEC 60068-2-3 |
| Operating temperature                         | – 40 ... + 85 °C<br>(D1: ... + 125 °C)  | in accordance with CECC 42 000   |
| Storage temperature                           | – 40 ... + 125 °C<br>(D1: ... + 150 °C) |                                  |
| Electric strength                             | ≥ 2,5 kV <sub>RMS</sub> (not D1)        | in accordance with CECC 42 000   |
| Insulation resistance                         | ≥ 10 MΩ (not D1)                        | in accordance with CECC 42 000   |
| Response time                                 | < 25 ns                                 |                                  |

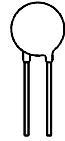


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**Maximum ratings** ( $T_A = 85\text{ °C}$ ,  $T_A = 125\text{ °C}$  for S...D1)

| Type<br>(untaped)<br>SIOV- | Ordering code   | $V_{RMS}$<br>V | $V_{DC}$<br>V | $i_{max}$<br>8/20 $\mu$ s<br>A | $W_{max}$<br>(2 ms)<br>J | $P_{max}$<br>W | $W_{LD}$<br>(10x)<br>J |
|----------------------------|-----------------|----------------|---------------|--------------------------------|--------------------------|----------------|------------------------|
| 12-V supply systems        |                 |                |               |                                |                          |                |                        |
| S07K14AUTOS2D1             | B72207S1140K201 | 14             | 16            | 250                            | 0,9                      | 0,02           | 12                     |
| S10K14AUTO                 | B72210S1140K102 | 14             | 16            | 500                            | 2,0                      | 0,05           | 25                     |
| S10K14AUTOS5D1             | B72210S1140K501 | 14             | 16            | 500                            | 2,0                      | 0,05           | 25                     |
| S14K14AUTO                 | B72214S1140K102 | 14             | 16            | 1000                           | 4,0                      | 0,10           | 50                     |
| S14K14AUTOS5D1             | B72214S1140K501 | 14             | 16            | 1000                           | 4,0                      | 0,10           | 50                     |
| S20K14AUTO                 | B72220S1140K102 | 14             | 16            | 2000                           | 12,0                     | 0,20           | 100                    |
| S10K17AUTO                 | B72210S1170K102 | 17             | 20            | 500                            | 2,5                      | 0,05           | 25                     |
| S14K17AUTO                 | B72214S1170K102 | 17             | 20            | 1000                           | 5,0                      | 0,10           | 50                     |
| S20K17AUTO                 | B72220S1170K102 | 17             | 20            | 2000                           | 14,0                     | 0,20           | 100                    |
| 24-V supply systems        |                 |                |               |                                |                          |                |                        |
| S20K25AUTO                 | B72220S1250K102 | 25             | 28            | 2000                           | 22,0                     | 0,20           | 100                    |
| S14K30AUTO                 | B72214S1300K102 | 30             | 34            | 1000                           | 9,0                      | 0,10           | 50                     |
| S20K30AUTO                 | B72220S1300K102 | 30             | 34            | 2000                           | 26,0                     | 0,20           | 100                    |



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#### Characteristics ( $T_A = 25^\circ\text{C}$ )

| Type<br>(untaped)<br>SIOV- | $V_{\text{Jump}}$<br>(5 min)<br>V | $V_V$<br>(1 mA)<br>V | $\Delta V_V$<br>(1 mA)<br>% | Max. clamping voltage<br>$v$ $i$<br>V      A |  | $C_{\text{typ}}$<br>(1 kHz)<br>nF | Derating<br>curve<br>Page | V/I char-<br>acteristic<br>Page |
|----------------------------|-----------------------------------|----------------------|-----------------------------|----------------------------------------------|--|-----------------------------------|---------------------------|---------------------------------|
|----------------------------|-----------------------------------|----------------------|-----------------------------|----------------------------------------------|--|-----------------------------------|---------------------------|---------------------------------|

#### 12-V supply systems

|                |    |    |          |    |      |      |     |     |
|----------------|----|----|----------|----|------|------|-----|-----|
| S07K14AUTOS2D1 | 25 | 22 | $\pm 10$ | 43 | 2,5  | 2,3  | 246 | 275 |
| S10K14AUTO     | 25 | 22 | $\pm 10$ | 43 | 5,0  | 5,2  | 248 | 276 |
| S10K14AUTOS5D1 | 25 | 22 | $\pm 10$ | 43 | 5,0  | 5,2  | 248 | 276 |
| S14K14AUTO     | 25 | 22 | $\pm 10$ | 43 | 10,0 | 10,0 | 249 | 277 |
| S14K14AUTOS5D1 | 25 | 22 | $\pm 10$ | 43 | 10,0 | 10,0 | 249 | 277 |
| S20K14AUTO     | 25 | 22 | $\pm 10$ | 43 | 20,0 | 19,0 | 251 | 278 |
| S10K17AUTO     | 30 | 27 | $\pm 10$ | 53 | 5,0  | 4,4  | 248 | 276 |
| S14K17AUTO     | 30 | 27 | $\pm 10$ | 53 | 10,0 | 8,2  | 249 | 277 |
| S20K17AUTO     | 30 | 27 | $\pm 10$ | 53 | 20,0 | 15,6 | 251 | 278 |

#### 24-V supply systems

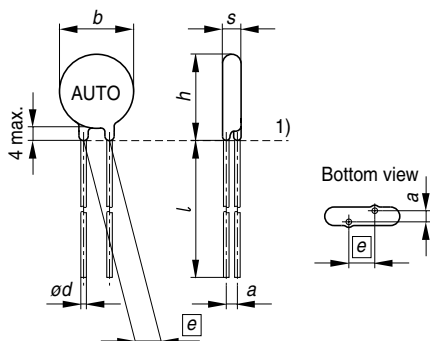
|            |    |    |          |    |      |      |     |     |
|------------|----|----|----------|----|------|------|-----|-----|
| S20K25AUTO | 40 | 39 | $\pm 10$ | 77 | 20,0 | 11,1 | 251 | 278 |
| S14K30AUTO | 45 | 47 | $\pm 10$ | 93 | 10,0 | 5,0  | 249 | 277 |
| S20K30AUTO | 45 | 47 | $\pm 10$ | 93 | 20,0 | 9,4  | 251 | 278 |

#### Notes

- If the maximum loads specified for load dump and jump start are fully utilized, subsequent polarity reversal of the AUTO varistors is inadmissible.
- If the load remains under the maximum ratings, polarity reversal may be admissible.  
Contact EPCOS for consultancy on this kind of problem.
- Load dump or jump start can decrease the varistor voltage in load direction by max. 15 %.
- Load dump: min. time of energy input 40 ms, interval 60 s.

| Characteristics           | Test methods                                                                                                        | Specifications                                                      |
|---------------------------|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------|
| Fast temperature cycling  | IEC 60068-2-14, test Na,<br>UCT/LCT, dwell time 15 min<br>100 cycles: SIOV-S...AUTO<br>1000 cycles: SIOV-S...AUTOD1 | $ \Delta V/V (1 \text{ mA})  \leq 10 \%$<br>No visible damage       |
| Damp heat, steady state   | Based on IEC 60068-2-3,<br>85 °C, 85 % r.h., $V_{\text{DC}}$ , 1000 h                                               | $ \Delta V/V (1 \text{ mA}) ^{(1)} \leq 10 \%$<br>No visible damage |
| Max. DC operating voltage | MIL STD 202F, method 108A,<br>UCT, $V_{\text{DC}}$ , 1000 h                                                         | $ \Delta V/V (1 \text{ mA}) ^{(1)} \leq 10 \%$<br>No visible damage |

1) Measured in load direction



1) Seating plane in accordance with IEC 60717

VAR0401-Y

## Dimensions

| Type                | $e \pm 1$<br>mm | $a \pm 1$<br>mm | $b_{\text{max}}$<br>mm | $s_{\text{max}}$<br>mm | $h_{\text{max}}$<br>mm | $l_{\text{min}}$<br>mm | $d \pm 0,05$<br>mm |
|---------------------|-----------------|-----------------|------------------------|------------------------|------------------------|------------------------|--------------------|
| SIOV-S07K14AUTOS2D1 | 5,0             | 1,3             | 9,0                    | 3,5                    | 12,5                   | 30,0                   | 0,6                |
| SIOV-S10K14AUTO     | 7,5             | 1,5             | 13,0                   | 5,0                    | 16,5                   | 30,0                   | 0,8                |
| SIOV-S10K14AUTOS5D1 | 7,5             | 1,5             | 12,0                   | 4,0                    | 16,0                   | 30,0                   | 0,8                |
| SIOV-S14K14AUTO     | 7,5             | 1,5             | 17,0                   | 5,0                    | 20,5                   | 30,0                   | 0,8                |
| SIOV-S14K14AUTOS5D1 | 7,5             | 1,5             | 16,0                   | 4,0                    | 20,0                   | 30,0                   | 0,8                |
| SIOV-S20K14AUTO     | 10,0            | 1,6             | 23,0                   | 5,4                    | 27,5                   | 30,0                   | 1,0                |
| SIOV-S10K17AUTO     | 7,5             | 1,6             | 13,0                   | 5,1                    | 16,5                   | 30,0                   | 0,8                |
| SIOV-S14K17AUTO     | 7,5             | 1,7             | 17,0                   | 5,1                    | 20,5                   | 30,0                   | 0,8                |
| SIOV-S20K17AUTO     | 10,0            | 1,6             | 23,0                   | 5,6                    | 27,5                   | 30,0                   | 1,0                |
| SIOV-S20K25AUTO     | 10,0            | 2,9             | 23,0                   | 6,2                    | 27,5                   | 30,0                   | 1,0                |
| SIOV-S14K30AUTO     | 7,5             | 1,8             | 17,0                   | 5,3                    | 20,5                   | 30,0                   | 0,8                |
| SIOV-S20K30AUTO     | 10,0            | 3,2             | 23,0                   | 6,5                    | 27,5                   | 30,0                   | 1,0                |

For crimp styles S2 and S5 see page 212

## Weight

| Size | approx.       |
|------|---------------|
| S07  | 0,6 ... 0,8 g |
| S10  | 1,0 ... 2,0 g |
| S14  | 2,0 ... 4,0 g |
| S20  | 3,0 ... 6,0 g |

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