

## Leaded Varistors

### HICAP; SHCV Series

#### Construction

- Combination of a multilayer ceramic capacitor and a multilayer varistor, leaded
- Coating: epoxy resin, flame-retardant to UL 94 V-0
- Terminals: tinned iron wire

#### Features

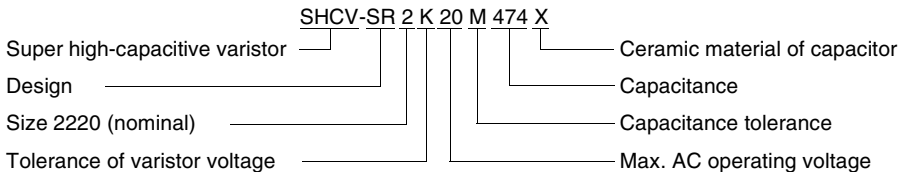
- High capacitance (up to 4,7  $\mu\text{F}$ )
- Overvoltage protection and RFI suppression provided by a single component
- Load-dump withstand capability
- Jump-start strength
- PSpice models

#### Taping

- Upon request

#### Type designation

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



#### General technical data

|                                               |                 |                                    |                                  |
|-----------------------------------------------|-----------------|------------------------------------|----------------------------------|
| Climatic category                             | X <sup>1)</sup> | 40/85/56                           | in accordance with IEC 60068-1   |
|                                               | Z <sup>2)</sup> | 25/85/56                           |                                  |
| LCT                                           | X               | – 40 °C                            |                                  |
|                                               | Z               | – 25 °C                            |                                  |
| UCT                                           | X               | + 85 °C                            | in accordance with IEC 60068-2-3 |
|                                               | Z               | + 85 °C                            |                                  |
| Damp heat, steady state<br>(93 % r.h., 40 °C) |                 | 56 days                            |                                  |
|                                               |                 |                                    |                                  |
| Operating temperature<br>(full load)          | X               | – 40 ... + 85 °C                   | in accordance with CECC 42 000   |
|                                               | Z               | – 25 ... + 85 °C                   |                                  |
| Storage temperature                           | X               | – 40 ... + 125 °C                  |                                  |
|                                               | Z               | – 25 ... + 85 °C                   |                                  |
| Electric strength                             |                 | $\geq 1,0 \text{ kV}_{\text{RMS}}$ | in accordance with CECC 42 000   |
| Insulation resistance                         |                 | $\geq 1,0 \text{ G}\Omega$         | in accordance with CECC 42 000   |
| Response time                                 |                 | < 25 ns                            |                                  |

1) Ceramic material: X = X7R

2) Ceramic material: Z = Z5U

**Leaded Varistors****HICAP; SHCV Series****Maximum ratings** ( $T_A = 85\text{ }^{\circ}\text{C}$ )

| Type<br>(untaped) | Ordering code   | $V_{\text{RMS}}$ | $V_{\text{DC}}$ | $i_{\text{max}}$<br>8/20 $\mu\text{s}$ | $W_{\text{max}}$<br>(2 ms) | $P_{\text{max}}$ | $W_{\text{LD}}$<br>(10x) |
|-------------------|-----------------|------------------|-----------------|----------------------------------------|----------------------------|------------------|--------------------------|
| SHCV-             |                 | V                | V               | A                                      | J                          | W                | J                        |
| SR1S14BM474X      | B72587E3140S200 | 14               | 16              | 800                                    | 2,4                        | 0,015            | 6                        |
| SR2S14BM474X      | B72547E3140S200 | 14               | 16              | 1200                                   | 5,8                        | 0,030            | 12                       |
| SR1S14BM105Z      | B72588G3140S200 | 14               | 16              | 800                                    | 2,4                        | 0,015            | 6                        |
| SR1S14BM155Z      | B72588H3140S200 | 14               | 16              | 800                                    | 2,4                        | 0,015            | 6                        |
| SR2S14BM105Z      | B72548G3140S200 | 14               | 16              | 1200                                   | 5,8                        | 0,030            | 12                       |
| SR2S14BM155Z      | B72548H3140S200 | 14               | 16              | 1200                                   | 5,8                        | 0,030            | 12                       |
| SR2S14BM475Z      | B72548L3140S200 | 14               | 16              | 1200                                   | 5,8                        | 0,030            | 12                       |
| SR1K20M474X       | B72587E3200K000 | 20               | 26              | 800                                    | 3,0                        | 0,015            | 6                        |
| SR2K20M474X       | B72547E3200K000 | 20               | 26              | 1200                                   | 7,8                        | 0,030            | 12                       |
| SR1K20M105Z       | B72588G3200K000 | 20               | 26              | 800                                    | 3,0                        | 0,015            | 6                        |
| SR1K20M155Z       | B72588H3200K000 | 20               | 26              | 800                                    | 3,0                        | 0,015            | 6                        |
| SR1K20M225Z       | B72588J3200K000 | 20               | 26              | 800                                    | 3,0                        | 0,015            | 6                        |
| SR2K20M105Z       | B72548G3200K000 | 20               | 26              | 1200                                   | 7,8                        | 0,030            | 12                       |
| SR2K20M155Z       | B72548H3200K000 | 20               | 26              | 1200                                   | 7,8                        | 0,030            | 12                       |

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

| Type<br>(untaped) | $V_{\text{Jump}}$<br>(5 min) | $V_{\text{V}}$<br>(1 mA) | $\Delta V_{\text{V}}$<br>(1 mA) | Max. clamping<br>voltage |          | $C \pm 20\%$<br>(1 kHz) | Derating<br>curve | V/I char-<br>acteristic |
|-------------------|------------------------------|--------------------------|---------------------------------|--------------------------|----------|-------------------------|-------------------|-------------------------|
|                   |                              |                          |                                 | $v$<br>V                 | $i$<br>A |                         |                   |                         |
| SHCV-             | V                            | V                        | %                               | V                        | A        | $\mu\text{F}^1)$        | Page              | Page                    |
| SR1S14BM474X      | 24,5                         | 22                       | + 23/- 0                        | 40                       | 5,0      | 0,47                    | 244               | 272                     |
| SR2S14BM474X      | 24,5                         | 22                       | + 23/- 0                        | 40                       | 10,0     | 0,47                    | 245               | 272                     |
| SR1S14BM105Z      | 24,5                         | 22                       | + 23/- 0                        | 40                       | 5,0      | 1,00                    | 244               | 272                     |
| SR1S14BM155Z      | 24,5                         | 22                       | + 23/- 0                        | 40                       | 5,0      | 1,50                    | 244               | 272                     |
| SR2S14BM105Z      | 24,5                         | 22                       | + 23/- 0                        | 40                       | 10,0     | 1,00                    | 245               | 272                     |
| SR2S14BM155Z      | 24,5                         | 22                       | + 23/- 0                        | 40                       | 10,0     | 1,50                    | 245               | 272                     |
| SR2S14BM475Z      | 24,5                         | 22                       | + 23/- 0                        | 40                       | 10,0     | 4,70                    | 245               | 272                     |
| SR1K20M474X       | 26,0                         | 33                       | $\pm 10$                        | 58                       | 5,0      | 0,47                    | 244               | 270                     |
| SR2K20M474X       | 26,0                         | 33                       | $\pm 10$                        | 58                       | 10,0     | 0,47                    | 245               | 271                     |
| SR1K20M105Z       | 26,0                         | 33                       | $\pm 10$                        | 58                       | 5,0      | 1,00                    | 244               | 270                     |
| SR1K20M155Z       | 26,0                         | 33                       | $\pm 10$                        | 58                       | 5,0      | 1,50                    | 244               | 270                     |
| SR1K20M225Z       | 26,0                         | 33                       | $\pm 10$                        | 58                       | 5,0      | 2,20                    | 244               | 270                     |
| SR2K20M105Z       | 26,0                         | 33                       | $\pm 10$                        | 58                       | 10,0     | 1,00                    | 245               | 271                     |
| SR2K20M155Z       | 26,0                         | 33                       | $\pm 10$                        | 58                       | 10,0     | 1,50                    | 245               | 271                     |

1) at 0,5 V

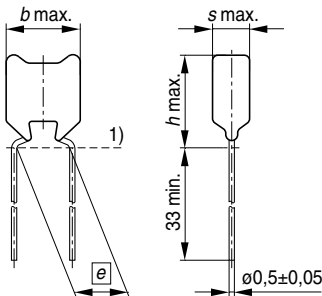


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#### Notes

- If the maximum loads specified for load dump and jump start are fully utilized, subsequent polarity reversal of the AUTO varistors are 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.



$e = 5,0 \pm 1$   
Offset =  $0,0 \pm 1$

1) Seating plane according to IEC 60717  
VAR0394B

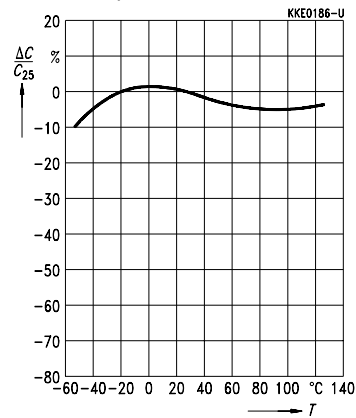
Weight:  
approx. 1 g

#### Dimensions

| Type              | $b_{\max}$<br>mm | $s_{\max}$<br>mm | $h_{\max}$<br>mm |
|-------------------|------------------|------------------|------------------|
| SHCV-SR1 ... 474X | 7,3              | 3,7              | 7,8              |
| SHCV-SR1 ... 105Z | 7,3              | 3,7              | 7,8              |
| SHCV-SR1 ... 155Z | 7,3              | 3,7              | 7,8              |
| SHCV-SR1 ... 225Z | 7,3              | 4,1              | 7,8              |
| SHCV-SR2 ... 474X | 7,8              | 3,6              | 9,0              |
| SHCV-SR2 ... 105Z | 7,8              | 4,1              | 9,0              |
| SHCV-SR2 ... 155Z | 7,8              | 4,1              | 9,0              |
| SHCV-SR2 ... 475Z | 7,8              | 4,1              | 9,0              |

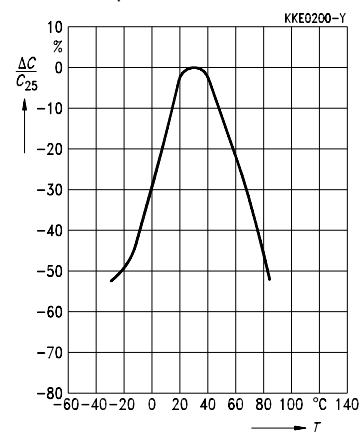
#### Typical characteristics of X7R-MLCC<sup>2)</sup>

Capacitance change  $\Delta C/C_{25}$   
versus temperature  $T$



#### Typical characteristics of Z5U-MLCC<sup>2)</sup>

Capacitance change  $\Delta C/C_{25}$   
versus temperature  $T$



2) MLCC: Multilayer chip capacitors

**Herausgegeben von EPCOS AG****Unternehmenskommunikation, Postfach 80 17 09, 81617 München, DEUTSCHLAND****☎ ++49 89 636 09, FAX (0 89) 636-2 26 89**

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