

SMD Varistors

MLV; Automotive Series



Construction

- Multilayer technology
- Termination: nickel barrier (CT series) or silver palladium (CN series)
- No plastic or epoxy encapsulation assures better than UL 94 V-0 flammability rating

Features

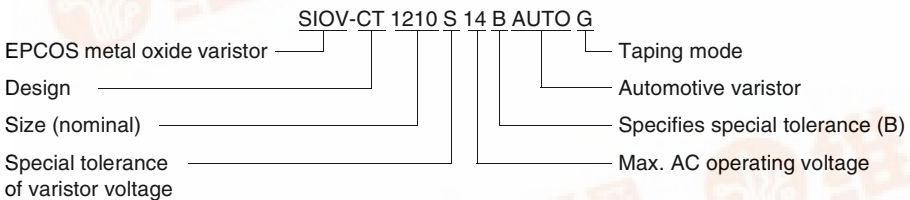
- Sizes 0603 ... 2220
- High energy absorption, particularly in case of load dump
- Stable protection level, low leakage current
- High resistance to cyclic temperature stress
- Wide range of operating temperature
- Low inductance (suitable for ESD protection)
- PSpice models
- Bidirectional clamping

Taping

- Supply on 8/12-mm tape, for tape dimensions see pages 154/155, for reel dimensions and packing units see page 157, chapter "SMD Varistors: Taping"

Type designation

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



General technical data

| | | |
|--|-------------------|-----------------------------------|
| Climatic category | 55/125/56 | in accordance with IEC 60068-1 |
| LCT | – 55 °C | |
| UCT | + 125 °C | |
| Damp heat, steady state (93 % r.h., 40 °C) | 56 days | in accordance with IEC 60068-2-3 |
| Operating temperature | – 55 ... + 125 °C | in accordance with CECC 42 000 |
| Storage temperature ¹⁾ | – 55 ... + 150 °C | |
| Response time | < 0,5 ns | |
| Solderability | 235 °C, 2 s | in accordance with IEC 60068-2-58 |
| Resistance to soldering heat | 260 °C, 10 s | in accordance with IEC 60068-2-58 |

1) For mounted parts (storage conditions for unused parts on reel see page 38, chapter "General Technical Information")





SMD Varistors

Automotive – Nickel Barrier Termination (available upon request)

Maximum ratings ($T_A = 125\text{ }^\circ\text{C}$)

| Type | Ordering code | V_{RMS} | V_{DC} | i_{max} 8/20 μs | W_{max} (2 ms) | P_{max} | W_{LD} (10x) |
|---------------------|-----------------|------------------|-----------------|--|----------------------------|------------------|--------------------------|
| SIOV- | | V | V | A | J | W | J |
| 12-V supply systems | | | | | | | |
| CT0603S14BAUTOG | B72500T1140S260 | 14 | 16 | 30 | 0,2 | 0,003 | — |
| CT0805S14BAUTOG | B72510T1140S262 | 14 | 16 | 120 | 0,3 | 0,008 | 1,0 |
| CT1206S14BAUTOG | B72520T1140S262 | 14 | 16 | 200 | 0,6 | 0,008 | 1,5 |
| CT1210S14BAUTOG | B72530T1140S262 | 14 | 16 | 400 | 1,6 | 0,010 | 3,0 |
| CT1812S14BAUTOG | B72580T1140S262 | 14 | 16 | 800 | 2,4 | 0,015 | 6,0 |
| CT2220S14BAUTOG | B72540T1140S262 | 14 | 16 | 1200 | 5,8 | 0,030 | 12,0 |
| CT2220S14BAUTOE2G2 | B72540T3140S272 | 14 | 16 | 1200 | 5,8 | 0,030 | 25,0 |
| 24-V supply systems | | | | | | | |
| CT2220K25AUTOE2G2 | B72540T3250K072 | 25 | 31 | 1200 | 9,6 | 0,030 | 25,0 |
| CT2220K30AUTOG | B72540T1300K062 | 30 | 34 | 1200 | 12,0 | 0,030 | 12,0 |
| CT2220K30AUTOE2G2 | B72540T3300K072 | 30 | 34 | 1200 | 12,0 | 0,030 | 25,0 |

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

| Type | V_{Jump} (5 min) | V_V (1 mA) | ΔV_V (1 mA) | Max. clamping voltage | | C_{typ} (1 kHz) | L_{typ} | Der. curve | V/I char. |
|---------------------|------------------------------|-----------------|------------------------|--------------------------|----------|-----------------------------|------------------|---------------|--------------|
| | | | | v V | i A | | | | |
| SIOV- | V | V | % | V | A | nF | nH | Page | Page |
| 12-V supply systems | | | | | | | | | |
| CT0603S14BAUTOG | 24,5 | 22 | +23/-0 | 42 | 1,0 | 0,12 | 1,0 | 238 | 272 |
| CT0805S14BAUTOG | 24,5 | 22 | +23/-0 | 42 | 1,0 | 0,4 | 1,5 | 239 | 272 |
| CT1206S14BAUTOG | 24,5 | 22 | +23/-0 | 40 | 1,0 | 0,8 | 1,8 | 240 | 272 |
| CT1210S14BAUTOG | 24,5 | 22 | +23/-0 | 40 | 2,5 | 1,7 | 1,8 | 242 | 272 |
| CT1812S14BAUTOG | 24,5 | 22 | +23/-0 | 40 | 5,0 | 5,6 | 2,5 | 244 | 272 |
| CT2220S14BAUTOG | 24,5 | 22 | +23/-0 | 40 | 10,0 | 9,5 | 3,0 | 245 | 272 |
| CT2220S14BAUTOE2G2 | 24,5 | 22 | +23/-0 | 40 | 10,0 | 15,0 | 3,0 | 245 | 272 |
| 24-V supply systems | | | | | | | | | |
| CT2220K25AUTOE2G2 | 40,0 | 39 | ± 10 | 65 | 10,0 | 10,0 | 3,0 | 245 | 271 |
| CT2220K30AUTOG | 45,0 | 47 | ± 10 | 77 | 10,0 | 4,0 | 3,0 | 245 | 271 |
| CT2220K30AUTOE2G2 | 45,0 | 47 | ± 10 | 77 | 10,0 | 10,0 | 3,0 | 245 | 271 |

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.
(The load dump time constant t_d differs from the time constant of the energy input)


SMD Varistors
Automotive – Silver Palladium Termination

Maximum ratings ($T_A = 125\text{ }^\circ\text{C}$)

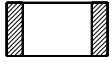
| Type | Ordering code | V_{RMS} | V_{DC} | i_{max} 8/20 μs | W_{max} (2 ms) | P_{max} | W_{LD} (10x) |
|----------------------------|-----------------|-----------|----------|---------------------------------|---------------------|-----------|-------------------|
| SIOV- | | V | V | A | J | W | J |
| 12-V supply systems | | | | | | | |
| CN0603S14BAUTOG | B72500V1140S260 | 14 | 16 | 30 | 0,2 | 0,003 | — |
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| 24-V supply systems | | | | | | | |
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| CN2220K30AUTOG | B72540V1300K062 | 30 | 34 | 1200 | 12,0 | 0,030 | 12,0 |
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Characteristics ($T_A = 25\text{ }^\circ\text{C}$)

| Type | V_{Jump} (5 min) | V_V (1 mA) | ΔV_V (1 mA) | Max. clamping voltage | | C_{typ} (1 kHz) | L_{typ} | Der. curve | V/I char. |
|----------------------------|-----------------------|-----------------|------------------------|--------------------------|------|----------------------|-----------|---------------|--------------|
| | | | | v | i | | | | |
| SIOV- | V | V | % | V | A | nF | nH | Page | Page |
| 12-V supply systems | | | | | | | | | |
| CN0603S14BAUTOG | 24,5 | 22 | +23/-0 | 42 | 1,0 | 0,12 | 1,0 | 238 | 272 |
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| CN1812S14BAUTOG | 24,5 | 22 | +23/-0 | 40 | 5,0 | 5,6 | 2,5 | 244 | 272 |
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| 24-V supply systems | | | | | | | | | |
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| CN2220K30AUTOG | 45,0 | 47 | ± 10 | 77 | 10,0 | 4,0 | 3,0 | 245 | 271 |
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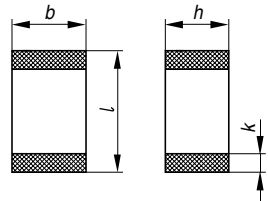
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(The load dump time constant t_d differs from the time constant of the energy input)



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Weight: < 0,2 g

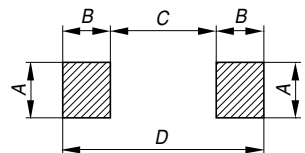
Termination acc. CECC 32101-801

VAR0406-M

Dimensions

| Type | l mm | b mm | h mm | k mm |
|----------------|------------|-------------|----------|---------------|
| SIOV-CT/CN0603 | 1,6 ± 0,15 | 0,80 ± 0,10 | 0,9 max. | 0,1 ... 0,4 |
| SIOV-CT/CN0805 | 2,0 ± 0,20 | 1,25 ± 0,15 | 1,4 max. | 0,13 ... 0,75 |
| SIOV-CT/CN1206 | 3,2 ± 0,30 | 1,60 ± 0,20 | 1,7 max. | 0,25 ... 0,75 |
| SIOV-CT/CN1210 | 3,2 ± 0,30 | 2,50 ± 0,25 | 1,7 max. | 0,25 ... 0,75 |
| SIOV-CT/CN1812 | 4,5 ± 0,40 | 3,20 ± 0,30 | 2,5 max. | 0,25 ... 1,0 |
| SIOV-CT/CN2220 | 5,7 ± 0,40 | 5,00 ± 0,40 | 2,5 max. | 0,25 ... 1,0 |

Termination: nickel barrier (CT) or silver palladium (CN)



VAR0391-D

Recommended solder pad layout

| Type | A mm | B mm | C mm | D mm |
|----------------|---------|---------|---------|---------|
| SIOV-CT/CN0603 | 1,0 | 1,0 | 1,0 | 3,0 |
| SIOV-CT/CN0805 | 1,4 | 1,2 | 1,0 | 3,4 |
| SIOV-CT/CN1206 | 1,8 | 1,2 | 2,1 | 4,5 |
| SIOV-CT/CN1210 | 2,8 | 1,2 | 2,1 | 4,5 |
| SIOV-CT/CN1812 | 3,6 | 1,5 | 3,0 | 6,0 |
| SIOV-CT/CN2220 | 5,5 | 1,5 | 4,2 | 7,2 |

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