



SIOV metal oxide varistors

Housed (Fail-safe) varistors

Series/Type: **SFS14**

Date: December 2007

Housed varistors
Fail-safe varistor, SFS14 series
Construction

- Plastic housing protected varistor
- Terminals: tinned copper wire
- Housing: heat-resistant and flame-retardant to UL 94 V-0

Features

- No flame or rupture under specified test conditions
(see "Reliability data", "Overvoltage test")
- No harm to other components nearby on printed circuit board (PCB)

Approvals

- UL
- CSA

Applications

- Consumer electronics
- Power supply

Delivery mode

- Bulk (standard)

General technical data

Climatic category	to IEC 60068-1	40/85/56	
Operating temperature	to CECC 42 000	-40 ... + 85	°C
Storage temperature		-40 ... +125	°C
Electric strength	to CECC 42 000	≥2.5	kV _{RMS}
Insulation resistance	to CECC 42 000	≥10	MΩ
Response time		<25	ns



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Maximum ratings ($T_A = 85\text{ °C}$)

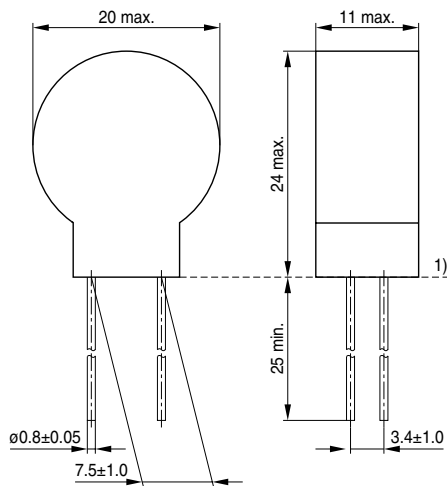
Ordering code	Type (untaped) SIOV-	V_{RMS} V	V_{DC} V	i_{max} (8/20 μ s) A	W_{max} (2 ms) J	P_{max} W
B72214F2381K101	SFS14K385E2	385	505	5000	136	0.6

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

Ordering code	Type (untaped) SIOV-	V_V (1 mA) V	ΔV_V (1 mA) %	$v_{c, max}$ (i_c) V	i_c A	C_{typ} (1 kHz) pF
B72214F2381K101	SFS14K385E2	620	± 10	1025	50	240

Other types are available on request.

Dimensional drawing



1) Seating plane in accordance with IEC 60717

VAR0593-F-E

Weight

Nominal diameter mm	V_{RMS} V	Weight g
14	385	5.5



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Reliability data

Test	Test methods/conditions	Requirement
Varistor voltage	The voltage between two terminals with the specified measuring current applied is called V_V (1 mA _{DC} @ 0.2 ... 2 s).	To meet the specified value.
Clamping voltage	The maximum voltage between two terminals with the specified standard impulse current (8/20 μ s) applied.	To meet the specified value.
Surge current derating, 8/20 μ s	CECC 42 000, test C 2.1 100 surge currents (8/20 μ s), unipolar, interval 30 s, amplitude corresponding to derating curve for 100 impulses at 20 μ s	$ \Delta V/V (1 \text{ mA}) \leq 10\%$ (measured in direction of surge current) No visible damage
Surge current derating, 2 ms	CECC 42 000, test C 2.1 100 surge currents (2 ms), unipolar, interval 120 s, amplitude corresponding to derating curve for 100 impulses at 2 ms	$ \Delta V/V (1 \text{ mA}) \leq 10\%$ (measured in direction of surge current) No visible damage
Overvoltage test	The varistor should be subjected to V_{RMS} test ($V_{RMS} = 0.85 V_V$ (1 mA)) until it failed, in series with 5 A fuse and 5 Ω resistor (based on S14 series).	No flame, no rupture



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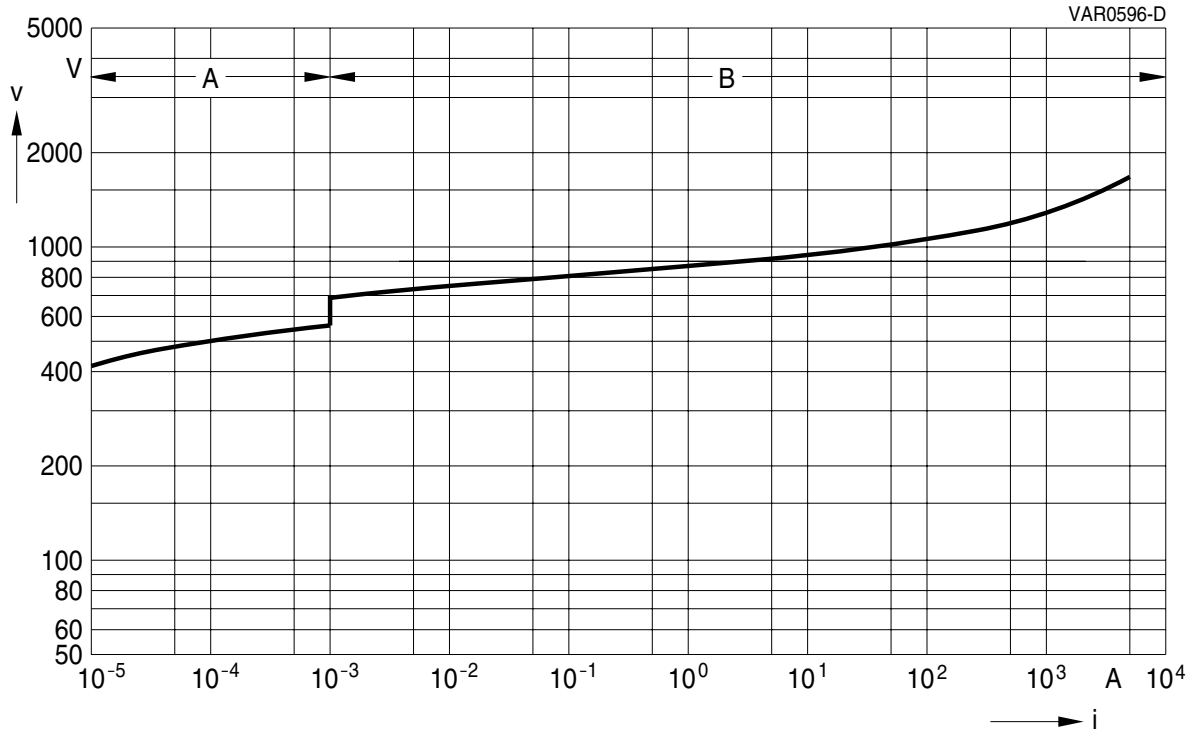
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v/i characteristics

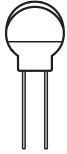
$v = f(i)$ – for explanation of the characteristics refer to “General technical information”, 1.6.3

A = Leakage current
 B = Protection level

{ for worst-case varistor tolerances



SIOV-SFS14K385E2

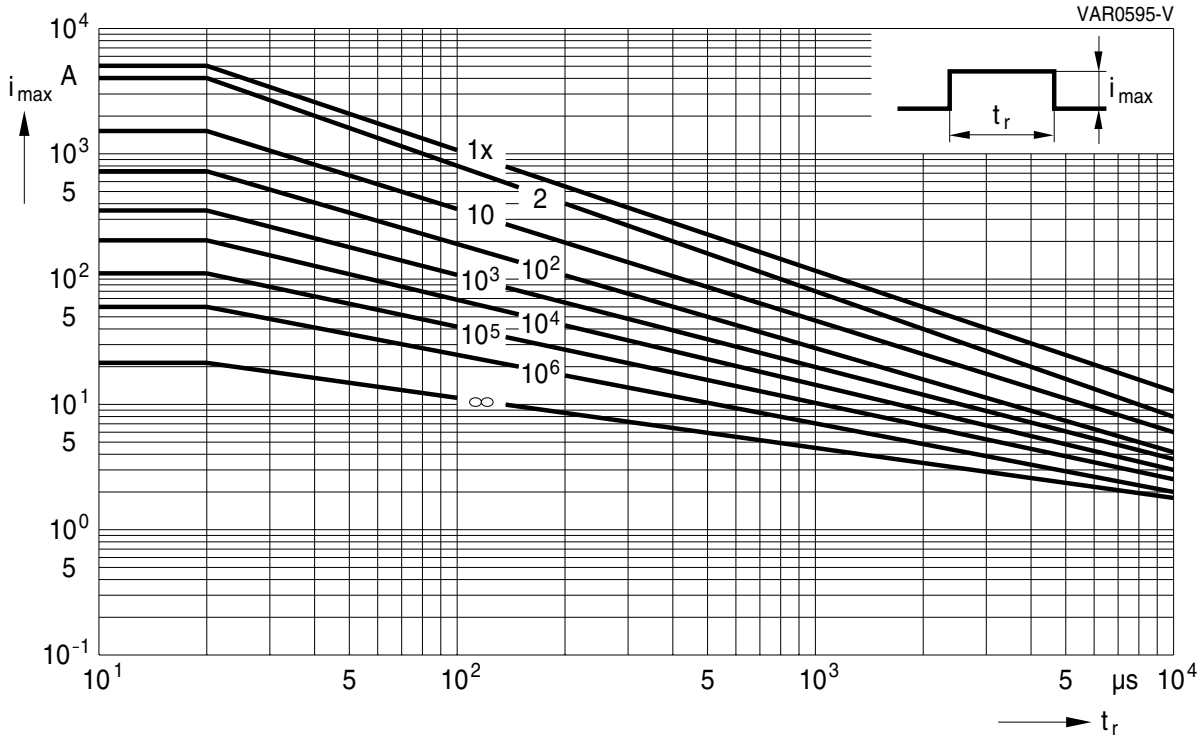


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Derating curves

Maximum surge current $i_{max} = f(t_r, \text{pulse train})$

For explanation of the derating curves refer to "General technical information", section 1.8.1



SIOV-SFS14K385E2

Cautions and warnings

General

1. EPCOS metal oxide varistors (SIOVs) are designed for specific applications and should not be used for purposes not identified in our specifications, application notes and data books unless otherwise agreed with EPCOS during the design-in-phase.
2. Ensure suitability of SIOVs through reliability testing during the design-in phase. SIOVs should be evaluated taking into consideration worst-case conditions.
3. For applications of SIOVs in line-to-ground circuits based on various international and local standards there are restrictions existing or additional safety measures required.

Storage

1. Store SIOVs only in original packaging. Do not open the package before storage.
2. Storage conditions in original packaging:
Storage temperature: $-25\text{ °C} \dots +45\text{ °C}$
Relative humidity: $<75\%$ annual average,
 $<95\%$ on maximum 30 days a year.
Dew precipitation: Is to be avoided.
3. Avoid contamination of an SIOV's surface during storage, handling and processing.
4. Avoid storage of SIOVs in harmful environments that can affect the function during long-term operation (examples given under operation precautions).
5. The SIOV type series should be soldered within the time specified:
SIOV-S, -Q, -LS 24 months
ETFV and SFS types 12 months.

Handling

1. SIOVs must not be dropped.
2. Components must not be touched with bare hands. Gloves are recommended.
3. Avoid contamination of the surface of SIOV electrodes during handling, be careful of the sharp edge of SIOV electrodes.

Soldering (where applicable)

1. Use rosin-type flux or non-activated flux.
2. Insufficient preheating may cause ceramic cracks.
3. Rapid cooling by dipping in solvent is not recommended.
4. Complete removal of flux is recommended.

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Mounting

1. Potting, sealing or adhesive compounds can produce chemical reactions in the SIOV ceramic that will degrade the component's electrical characteristics.
2. Overloading SIOVs may result in ruptured packages and expulsion of hot materials. For this reason SIOVs should be physically shielded from adjacent components.

Operation

1. Use SIOVs only within the specified temperature operating range.
2. Use SIOVs only within the specified voltage and current ranges.
3. Environmental conditions must not harm SIOVs. Use SIOVs only in normal atmospheric conditions. Avoid use in the presence of deoxidizing gases (chlorine gas, hydrogen sulfide gas, ammonia gas, sulfuric acid gas, etc), corrosive agents, humid or salty conditions. Avoid contact with any liquids and solvents.

Important notes

The following applies to all products named in this publication:

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