



## **SIOV metal oxide varistors**

Housed (ThermoFuse) varistors, AdvanceD series

**Series/Type:**            **ETFV14**  
**Date:**                     December 2007

## Housed varistors

### ThermoFuse varistors, ETFV14 series

#### Construction

- Round varistor element, leaded
- Coating: epoxy resin, flame-retardant to UL 94 V-0
- Terminals: tinned copper wire, metal compound wire
- Housing: thermoplastic, flame-retardant to UL 94 V-0

#### Features

- Wide operating voltage range 130 ... 420 V<sub>RMS</sub>
- Self-protected under abnormal overvoltage conditions
- High-energy Advanced series E2

#### Approvals

- UL

#### Applications

- Air conditioner, refrigerator, TV, etc.
- Power meter, inverter, telecom equipment, etc.
- Transient voltage surge suppressors (TVSS)

#### Delivery mode

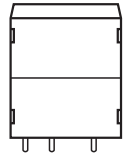
- Bulk (standard)

#### Typical applications



#### 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 <sub>RMS</sub>
Response time		<25	ns


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

Ordering code	Type (untaped) SIOV-	$V_{RMS}$ V	$V_{DC}$ V	$i_{max}$ (8/20 $\mu$ s) A	$W_{max}$ (2 ms) J	$P_{max}$ W
B72214T2131K101	ETFV14K130E2	130	170	6000	50	0.6
B72214T2141K101	ETFV14K140E2	140	180	6000	55	0.6
B72214T2151K101	ETFV14K150E2	150	200	6000	60	0.6
B72214T2171K101	ETFV14K175E2	175	225	6000	70	0.6
B72214T2211K101	ETFV14K210E2	210	270	6000	80	0.6
B72214T2231K101	ETFV14K230E2	230	300	6000	90	0.6
B72214T2251K101	ETFV14K250E2	250	320	6000	100	0.6
B72214T2271K101	ETFV14K275E2	275	350	6000	110	0.6
B72214T2301K101	ETFV14K300E2	300	385	6000	125	0.6
B72214T2321K101	ETFV14K320E2	320	420	6000	136	0.6
B72214T2351K101	ETFV14K350E2	350	460	6000	136	0.6
B72214T2381K101	ETFV14K385E2	385	505	6000	136	0.6
B72214T2421K101	ETFV14K420E2	420	560	6000	136	0.6

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

Ordering code	Type (untaped) SIOV-	$V_V$ (1 mA) V	$\Delta V_V$ (1 mA) %	$V_{c, max}$ ( $i_c$ ) V	$i_c$ A	$C_{typ}$ (1 kHz) pF
B72214T2131K101	ETFV14K130E2	205	$\pm 10$	340	50	650
B72214T2141K101	ETFV14K140E2	220	$\pm 10$	360	50	610
B72214T2151K101	ETFV14K150E2	240	$\pm 10$	395	50	570
B72214T2171K101	ETFV14K175E2	270	$\pm 10$	455	50	490
B72214T2211K101	ETFV14K210E2	330	$\pm 10$	545	50	410
B72214T2231K101	ETFV14K230E2	360	$\pm 10$	595	50	380
B72214T2251K101	ETFV14K250E2	390	$\pm 10$	650	50	350
B72214T2271K101	ETFV14K275E2	430	$\pm 10$	710	50	320
B72214T2301K101	ETFV14K300E2	470	$\pm 10$	775	50	300
B72214T2321K101	ETFV14K320E2	510	$\pm 10$	840	50	280
B72214T2351K101	ETFV14K350E2	560	$\pm 10$	910	50	260
B72214T2381K101	ETFV14K385E2	620	$\pm 10$	1025	50	240
B72214T2421K101	ETFV14K420E2	680	$\pm 10$	1120	50	220



## Housed varistors

### ThermoFuse varistors, ETFV14 series

#### Dimensional drawing



#### Weight

Nominal diameter mm	$V_{RMS}$ V	Weight g
14	130 ... 420	4.3 ... 5.3

#### Lead configuration



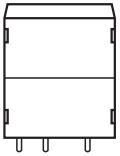


**Housed varistors**

**ThermoFuse varistors, ETFV14 series**

**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 <sub>DC</sub> @ 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 μs) applied.	To meet the specified value.
Surge current derating, 8/20 μs	CECC 42 000, test C 2.1 100 surge currents (8/20 μs), unipolar, interval 30 s, amplitude corresponding to derating curve for 100 impulses at 20 μs	$ \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
Abnormal overvoltage test	UL1449, limited current abnormal overvoltage test. Apply a high AC voltage to ThermoFuse varistor, the amplitude of overvoltage and current limit will be adopted from UL1449 general instruction in section 37. The specimen will be tested on a softwood surface covered with a double layer of white tissue paper. The specimen is to be loosely draped with a double layer of cheesecloth. The cheesecloth shall cover openings where flame, molten or other particles may be expelled as a result of the test. The test result will be visually inspected.	Any of these phenomena shall not be observed, or this specimen will be judged as failed part. <ul style="list-style-type: none"> <li>1. Emission of flame, molten metal, glowing or flaming particles through any openings (pre-existed or created as a result of the test) in the product.</li> <li>2. Charring, glowing, or flaming of the supporting surface, tissue paper, or cheesecloth.</li> <li>3. Ignition of the enclosure.</li> <li>4. Creation of any openings in the enclosure that result in accessibility of live parts, when judged in accordance with accessibility of live parts, UL1449 section 13.</li> </ul>



## Housed varistors

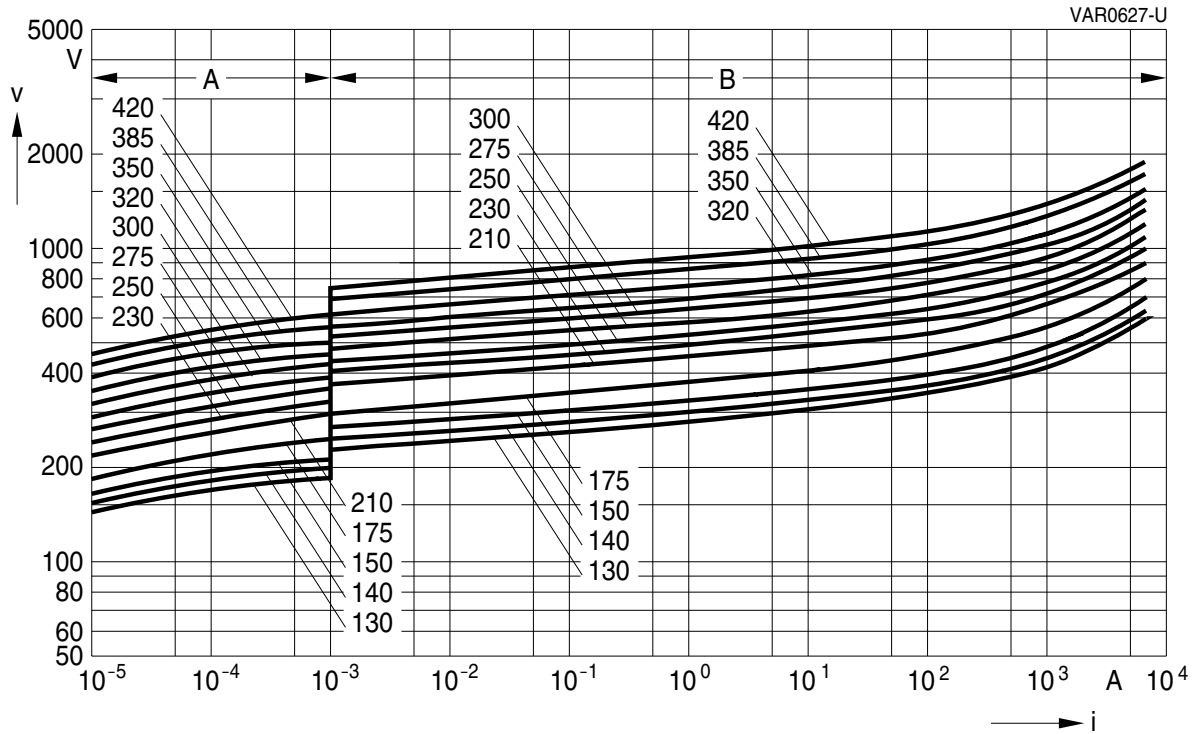
### ThermoFuse varistors, ETFV14 series

#### 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-ETFV14 ... E2



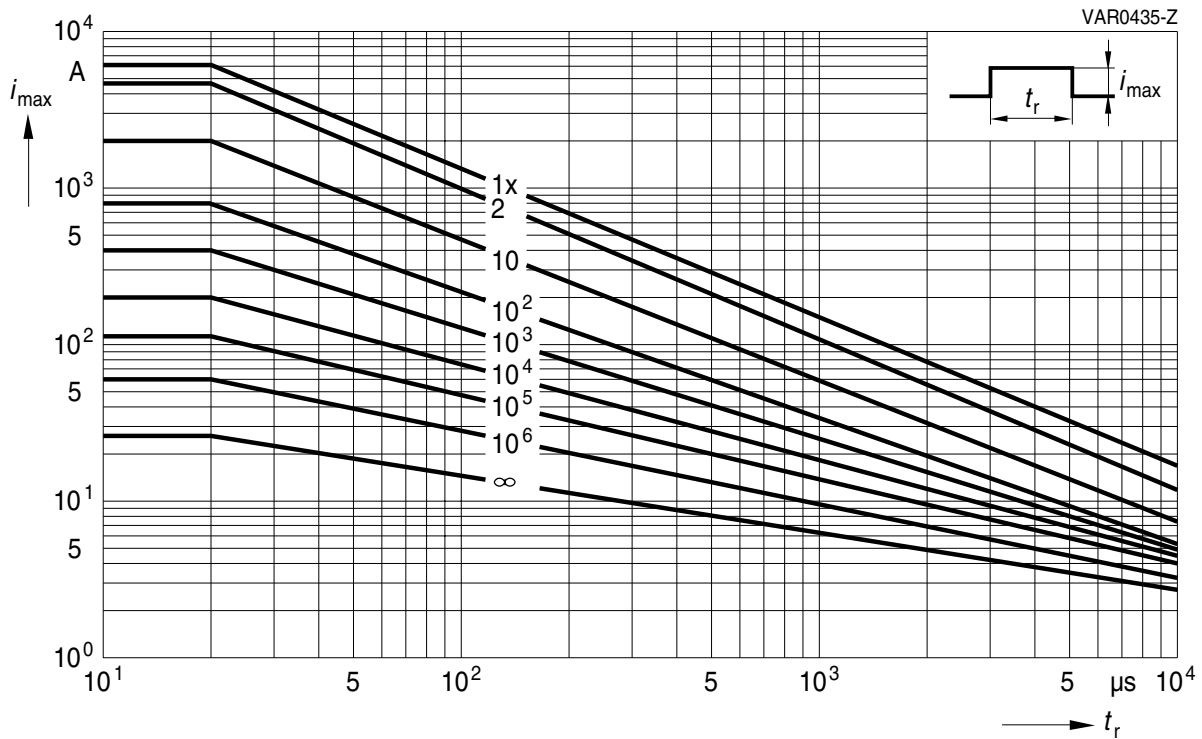
**Housed varistors**

**ThermoFuse varistors, ETFV14 series**

**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-ETFB14 ... E2**

## 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.



## Housed varistors

### ThermoFuse varistors, ETFV14 series

#### 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:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet ([www.epcos.com/material](http://www.epcos.com/material)). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order. We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.
6. Unless otherwise agreed in individual contracts, **all orders are subject to the current version of the “General Terms of Delivery for Products and Services in the Electrical Industry” published by the German Electrical and Electronics Industry Association (ZVEI)**.
7. The trade names EPCOS, BAOKE, Alu-X, CeraDiode, CSSP, DSSP, MiniBlue, MKK, MLSC, MotorCap, PCC, PhaseCap, PhaseMod, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SIMID, SineFormer, SIOV, SIP5D, SIP5K, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at [www.epcos.com/trademarks](http://www.epcos.com/trademarks).

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: [org@lifeelectronics.ru](mailto:org@lifeelectronics.ru)