

Leaded Varistors

AdvanceD series

Series/Type: \$14K350E2S5M3,5K5T5 Ordering code: B72214S2351K505

Date: 2015-05-06

Version: a

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Applications

Overvoltage protection

Features

UL approval to UL1449 (file number E321126), for use in Type 3 SPD's (for inside varistor)

SIOV nomenclature

S = Disk type

14 = Rated disk diameter

K = Tolerance of V_V at 1mA: 10%

350 = Max. AC voltage E2 = AdvanceD Series S5 = Crimp style S5

M3,5 = Customized lead length K5 = Customized surge current

T5 = Encapsulated with shrinking tube

General technical data

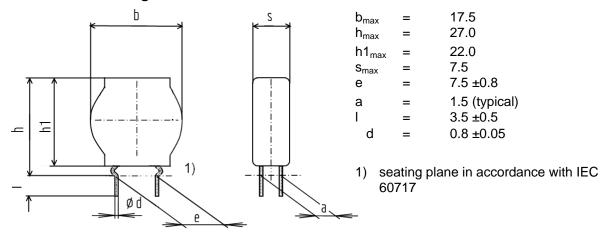
Climatic category	to IEC 60068-1	40/85/56
Operating temperature	to IEC 61051	-40+85 °C
Storage temperature		-40+125 °C
Electric strength	to IEC 61051	≥2.5 kV _{RMS}
Insulation resistance	to IEC 61051	≥100 MΩ
Response time		<25 ns



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Dimensional drawings in mm



Electrical data

Maximum Ratings (85 °C):

Max. operating AC voltage		V_{RMS}	=	350 V
Max. operating DC voltage		V_{DC}	=	460 V
Surge current (8/20 s)	1 time	I_{max}	=	8000 A
Energy absorption (2 ms)	1 time	W_{max}	=	136.0 J
Average power dissipation		P_{max}	=	0.60 W

Characteristics (25 °C):

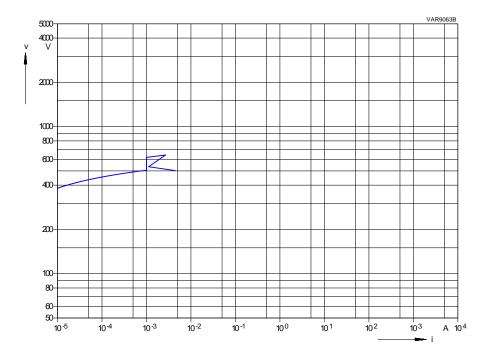
Varistor voltage at 1 mA	V_V	=	560V ±10%
Clamping voltage at 50 A (8/20 s)	$V_{C,max}$	=	910 V
Typ. capacitance at 1 kHz	С	=	400 pF



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V/I Characteristic



Derating



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Reliability Data Electrical

Characteristics	Test Methods/Description	Specifications
Varistor Voltage	The voltage between two terminals with the specified measuring current applied is called V_{ν} (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 (8/20µs) illustrated below applied.	To meet the specified value.
	Peak Ts Rise Time µs Decay time to half value µs Nominal start Peak value Trailing edge Trailing edge Trailing edge Trailing edge	
Surge current derating, 8/20 µs	10 surge currents (8/20 μs), unipolar, interval 30 s, amplitude corresponding to derating curve for 10 impulses at 20 μs	V/V (1 mA) 10% (measured in direction of surge current) No visible damage
Surge current derating, 2 ms	10 surge currents (2ms), unipolar, interval 120s, amplitude corresponding to derating curve for 10 impulses at 2 ms	V/V (1 mA) 10% (m easured in direction of surge current) N o visible damage



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Reliability Data Mechanical

Characteristics	Test Methods/Description	Specifications
Tensile strength	IEC 60068-2-21, test Ua1 After gradually applying the force specified below and keeping the unit fixed for 10 s, the terminal shall be visually examined for any damage. Force for wire diameter: 0.6 mm = 10 N 0.8 mm = 10 N 1.0 mm = 20 N	V/V (1 mA) 5% No break of solder joint, no wire break
Vibration	IEC 60068-2-6, test Fc, method B4 Frequency range: 10 55 Hz Amplitude: 0.75 mm or 98 m/s² Duration: 6 h (3 x 2 h) Pulse: sine wave After repeatedly applying a single harmonic vibration according to the table above, the change of V _v shall be measured and the part shall be visually examined.	V/V (1 mA) 5% No visible damage
Solderability	IEC 60068-2-20, test Ta, method 1 with modified conditions for lead-free solder alloys: 245°C, 3 s: After dipping the terminals to a depth of approximately 3 mm from the body in a soldering bath of 245 °C for 3 s, the terminals shall be visually examined.	The inspection shall be carried out under adequate light with normal eyesight or with the assistance of a magnifier capable of giving a magnification of 4 to 10 times. The dipped surface shall be covered with a smooth and bright solder coating with no more than small amounts of scattered imperfections such as pinholes or unwetted or de-wetted areas. These imperfections shall not be concentrated in one area.





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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. The 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 °C ... +45 °C Relative humidity: <75% annual average,

<95% on maximum 30 days a year.

Dew precipitation: Is to be avoided.

- 3. Avoid contamination of SIOVs surface during storage, handling and processing.
- 4. Avoid storage of SIOVs in harmful environments which can affect the function during long-term operation (examples given under operation precautions).
- 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.



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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.

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 the SIOVs should be physically shielded from adjacent components.

Operation

- 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 the 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.



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