



Non-Flammable varistor (AdvanceD series)

Date: 2014-10-17
Version: a

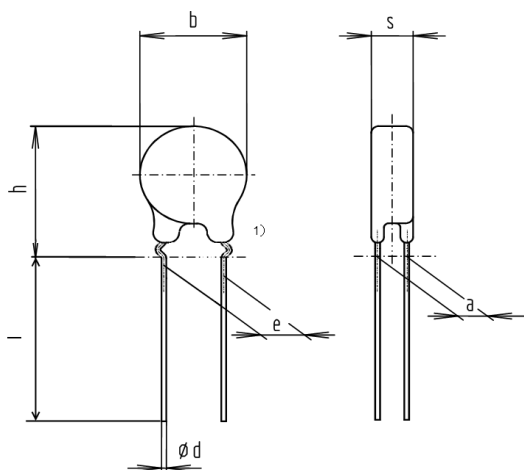


Overvoltage protection

- UL approval to UL1449 (file number E321126)
- Qualified according to AEC-Q200 REV D

SNF	=	Disk type, Non-Flammable
14	=	Rated disk diameter
K	=	Tolerance of V_V at 1mA : $\pm 10\%$
420	=	Max. AC voltage
E2	=	Advanced series
S5	=	Crimp style S5

Climatic category	to IEC 60068-1	40/125/56
Operating temperature		-40 +125 °C
Storage temperature		-40 +150 °C
Electric strength	to IEC 61051	2.5 kV _{RMS}
Insulation resistance	to IEC 61051	100 M Ω
Response time		<25 ns



b_{\max}	=	17.5
h_{\max}	=	23.5
s_{\max}	=	7.8
e	=	7.5 ± 1.0
a	=	3.6 ± 1.0
l_{\min}	=	25.0
$\varnothing d$	=	0.8 ± 0.05

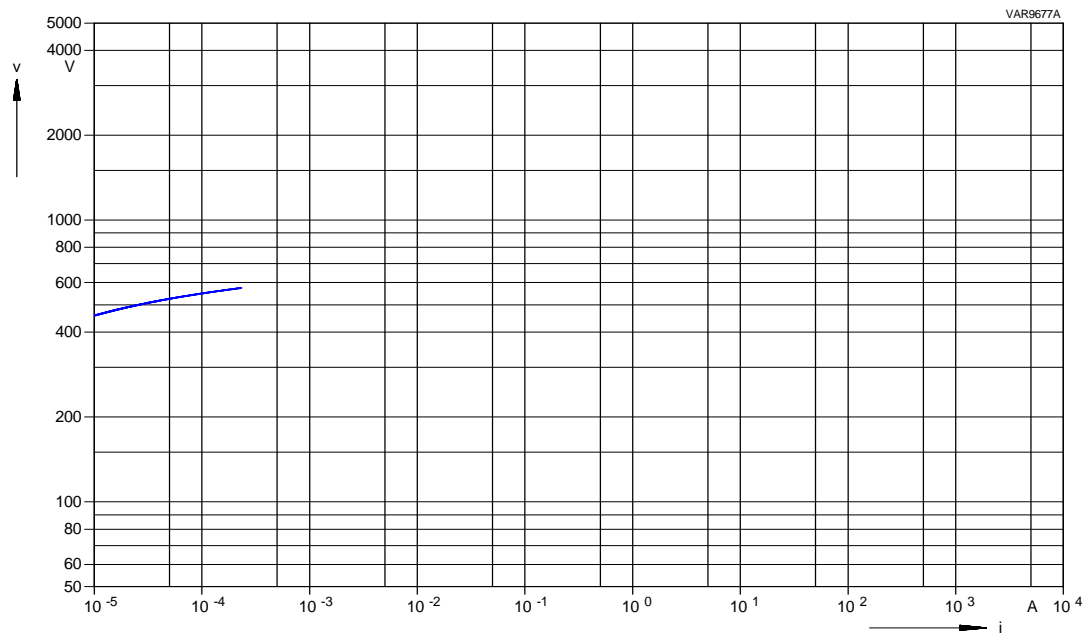
1) Seating plane in accordance with IEC 60717

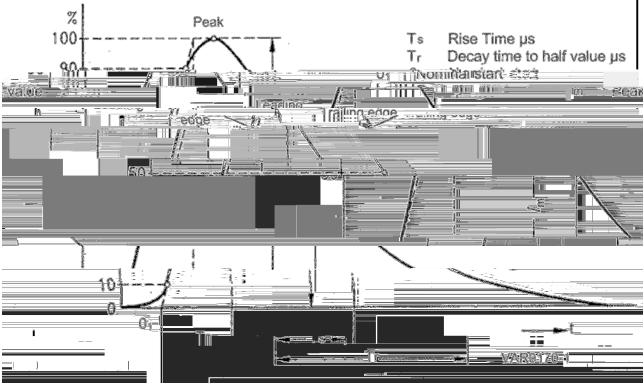
Maximum Ratings (125 °C)

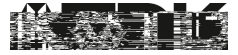
Max. AC operating voltage		V_{RMS}	=	420 V
Max. DC operating voltage		V_{DC}	=	560 V
Surge current (8/20 μs)	1 time	I_{max}	=	5000 A
Energy absorption (2 ms)	1 time	W_{max}	=	136.0 J
Average power dissipation		P_{max}	=	0.60 W

Characteristics (25 °C):

Varistor voltage at 1 mA		V_V	=	$680 \text{ V} \pm 10\%$
Clamping voltage at 50 A (8/20 μs)		$V_{\text{C,max}}$	=	1120 V
Typ. capacitance at 1 kHz		C	=	290 pF

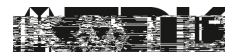


Varistor Voltage	The voltage between two terminals with the specified measuring current applied is called V_v (1 mA _{DC} @ 0.2 2 s).	To meet the specified value.
Clamping Voltage	The maximum voltage between two terminals with the specified standard impulse current (8/20µs) illustrated below applied. 	To meet the specified value.
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	$ \Delta V/V (1 \text{ mA}) \leq 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	$ \Delta V/V (1 \text{ mA}) \leq 10\%$ (measured in direction of surge current) No visible damage
Over voltage test	The varistor should be subjected to a U_{rms} test = 0.85 U_v (1 mA) until it fails.	The fire should be ≤ 20 mm and should be extinguished within 4 sec





Resistance to soldering heat	IEC 60068-2-20, test Tb, method 1A, 260 °C, 10 s: Each lead shall be dipped into a solder bath having a temperature of 260 ± 5 °C to a point 2.0 to 2.5 mm from the body of the unit, be held there for 10 ± 1 s and then be stored at room temperature and normal humidity for 1 to 2 hours. The change of V_v shall be measured and the part shall be visually examined.	$ \Delta V/V (1 \text{ mA}) \leq 5\%$ No visible damage
Bump	IEC 60068-2-29, test Eb Pulse duration: 6 ms Max. acceleration: 400 m/s^2 Number of bumps: 4000 Pulse: half sine	$ \Delta V/V (1 \text{ mA}) \leq 5\%$ No visible damage
Fire hazard	IEC 60695-11-5 (needle flame test) Severity: vertical 10 s	5 s max.
Electric strength	IEC 61051-1, test 4.9.2 Metal balls method, $2500 V_{\text{RMS}}$, 60 s The varistor is placed in a container holding 1.6 ± 0.2 mm diameter metal balls such that only the terminations of the varistor are protruding. The specified voltage shall be applied between both terminals of the specimen connected together and the electrode inserted between the metal balls.	No breakdown



Max. DC operating voltage	MIL STD 202F, method 108A, UCT, 0.85Uv (1 mA), 1000h	$ \Delta V/V (1 \text{ mA}) \leq 10\%$ No visible damage

Damp heat



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.

1. Store SIOVs only in original packaging. Do not open the package before storage.

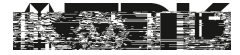
2. Storage conditions in original packaging:

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).
5. The SIOV type series should be soldered within the time specified.

SIOV-S, -Q, -LS	24 months.
ETFV and SFS types	12 months.

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.



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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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.
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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 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.



The following applies to all products named in this publication:

1. Some parts of this publication contain . 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 . 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 customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an 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 an electronic component.
- 3.
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