



# **SIOV metal oxide varistors**

Taping, packaging and lead configuration

Date: April 2011

© EPCOS AG 2011. Reproduction, publication and dissemination of this publication, enclosures hereto and the information contained therein without EPCOS' prior express consent is prohibited.

## Taping, packaging and lead configuration

### 1 EPCOS ordering code system

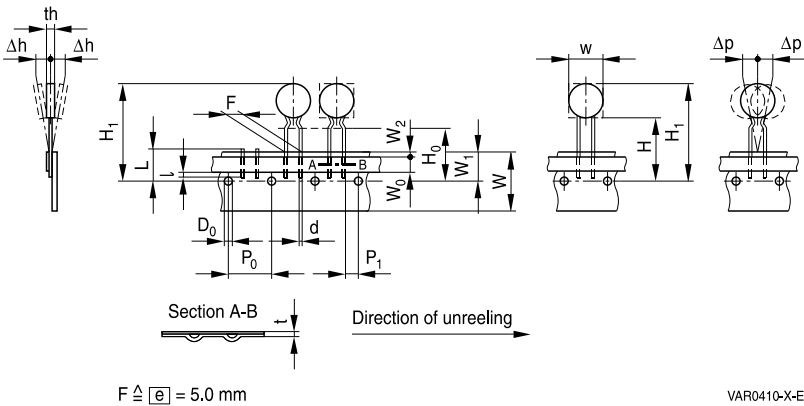
#### For leaded varistors

B722	10	S	2	271	K	1	0	1
Monolithic varistor								
Nominal disc diameter								
<b>Design:</b> S = Leaded varistor T = ThermoFuse F = Fail-safe varistor Q = EnergetiQ								
<b>Series:</b> 0 = Standard 1 = Automotive 2 = AdvanceD 3 = SuperioR 4 = SuperioR								
<b>Max. AC operating voltage:</b> $271 = 27 \cdot 10^1 = 275 \text{ VAC}$ $140 = 14 \cdot 10^0 = 14 \text{ VAC}$ $141 = 14 \cdot 10^1 = 140 \text{ VAC}$								
<b>Tolerance of varistor voltage:</b> K = $\pm 10\%$ J = $\pm 5\%$ S = Special tolerance								
<b>Lead configuration:</b> 1 = Straight leads 2 thru 5 = Kinked form								
<b>Packaging:</b> 0 = Bulk, 1 thru 7 = Taping style								
<b>Internal coding:</b> 1 = Standard								

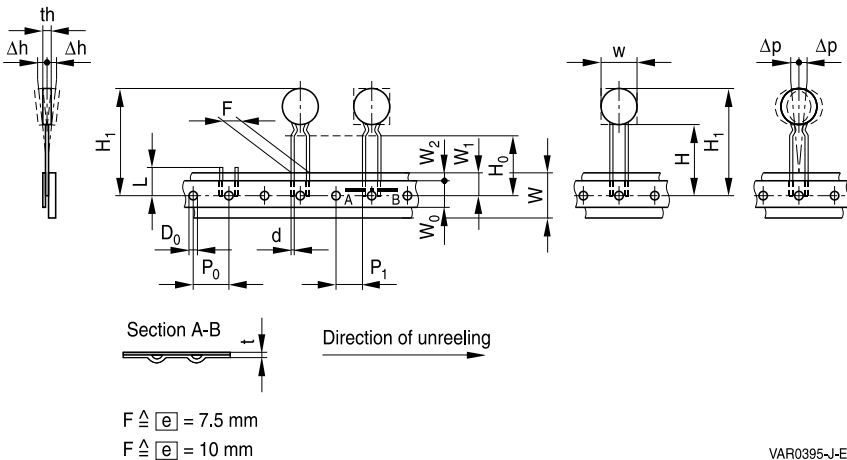
## 2 Taping and packaging of leaded varistors

Tape packaging for lead spacing  $\boxed{e} = 5$  fully conforms to IEC 60286-2, while for lead spacings  $\boxed{e} = 7.5$  and 10 the taping mode is based on this standard.

### 2.1 Taping in accordance with IEC 60286-2 for lead spacing 5.0 mm



### 2.2 Taping based on IEC 60286-2 for lead spacing 7.5 and 10 mm



## Taping, packaging and lead configuration

### 2.3 Tape dimensions (in mm)

Sym- bol	$\boxed{e} = 5.0$	Tolerance	$\boxed{e} = 7.5$	Tolerance	$\boxed{e} = 10.0$	Tolerance	Remarks
w		max.		max.		max.	see tables in each series under "Dimensions"
th		max.		max.		max.	
d	0.6	±0.05	0.8	±0.05	1.0	±0.05	
P <sub>0</sub>	12.7	±0.3	12.7 <sup>1)</sup>	±0.3	12.7	±0.3	±1 mm/20 sprocket holes
P <sub>1</sub>	3.85	±0.7	8.95	±0.8	7.7	±0.8	
F	5.0	+0.6/−0.1	7.5	±0.8	10.0	±0.8	measured at top of compo- nent body
Δh	0	±2.0	depends on s		depends on s		
Δp	0	±1.3	0	±2.0	0	±2.0	
W	18.0	±0.5	18.0	±0.5	18.0	±0.5	Peel-off force ≥ 5 N
W <sub>0</sub>	5.5	min.	11.0	min.	11.0	min.	
W <sub>1</sub>	9.0	±0.5	9.0	+0.75/−0.5	9.0	+0.75/−0.5	
W <sub>2</sub>	3.0	max.	3.0	max.	3.0	max.	
H	18.0	+2.0/−0	18.0	+2.0/−0	18.0	+2.0/−0	<sup>2)</sup> <sup>3)</sup>
H <sub>0</sub>	16.0 (18.0)	±0.5	16.0 (18.0)	±0.5	16.0	±0.5	
H <sub>1</sub>	32.2	max.	45.0	max.	45.0	max.	
D <sub>0</sub>	4.0	±0.2	4.0	±0.2	4.0	±0.2	without lead
t	0.9	max.	0.9	max.	0.9	max.	
L	11.0	max.	11.0	max.	11.0	max.	
l	4.0	max.					

1) Taping with P<sub>0</sub> = 15.0 mm upon request

2) Applies only to uncrimped types

3) Applies only to crimped types (H<sub>0</sub> = 18 upon request)

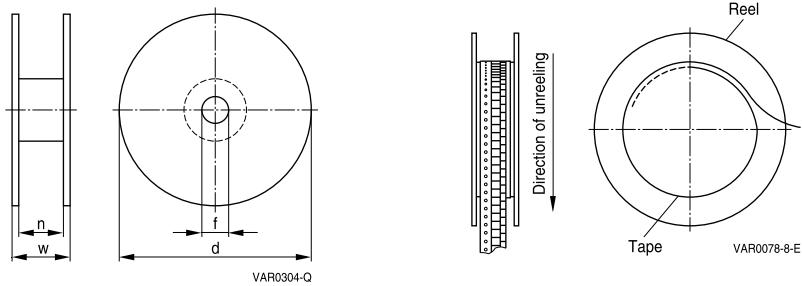
## Taping, packaging and lead configuration

### 2.4 Taping mode

Example: B72210S0271K1 5 1  
↑  
Digit 14

Digit 14	Taping mode	Reel type	Seating plane height $H_0$ for crimped types mm	Seating plane height $H$ for uncrimped types mm	Pitch distance $P_0$ mm
0	—	Bulk	—	—	—
1	G	I	16	18	12.7
2	G2	I	18	—	12.7
3	G3	II	16	18	12.7
4	G4	II	18	—	12.7
5	G5	III	16	18	12.7
6	GA	Ammo pack	16	18	12.7
7	G2A	Ammo pack	18	—	12.7
Internal coding for special taping					
	G6	III	18	—	12.7
	G10	II	16	18	15.0
	G11	II	18	—	15.0
	G10A	Ammo pack	16	18	15.0
	G11A	Ammo pack	18	—	15.0

## 2.5 Reel dimension

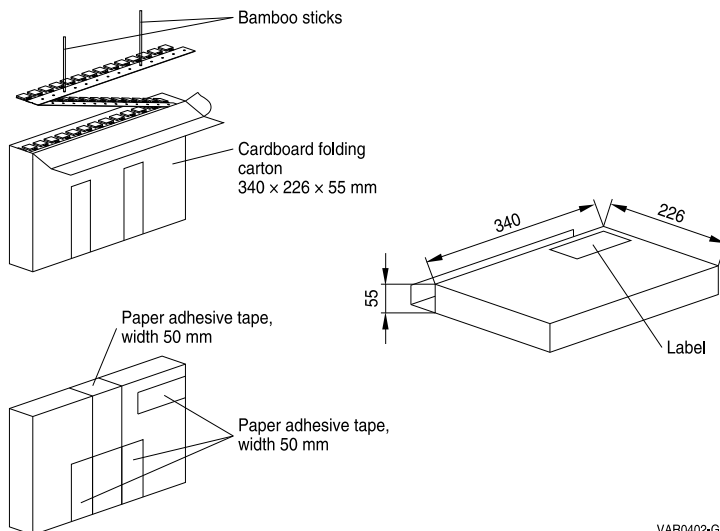


### Dimensions (in mm)

Reel type	d	f	n	w
I	360 max.	$31 \pm 1$	approx. 45	54 max.
II	360 max.	$31 \pm 1$	approx. 55	64 max.
III	500 max.	$23 \pm 1$	approx. 59	72 max.

If reel type III is not compatible with insertion equipment because of its large diameter, nominal disk diameter 10 mm and 14 mm can be supplied on reel II upon request (taping mode G3).

## 2.6 Ammo pack dimensions



VAR0402-G

## 3 Lead configuration

Straight leads are standard for disk varistors. Other lead configurations as crimp style or customer-specific lead wire length according to 3.1, 3.2, 3.3 and 3.4 are optional. Crimped leads (non-standard) are differently crimped for technical reasons; the individual crimp styles are denoted by consecutive numbers (S, S2 through S5) as shown in the dimensional drawings below.

The crimp styles of the individual types can be seen from the type designation in the ordering tables.

### 3.1 Crimp style mode

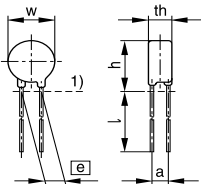
Example: B72210S0271K **5** 01

Digit 13

Digit 13 of ordering code	Crimp style	Figure
1	Standard, straight leads	1
2	S2	2
3	S3	3
4	S4	4
5	S5	5
Available upon request		
Internal coding	—	6

### 3.2 Standard leads and non-standard crimp styles

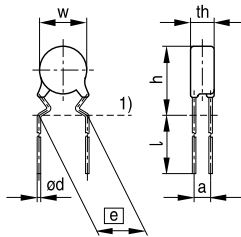
#### Standard, straight leads



1) Seating plane to IEC 717  
VAR0586-W-E

Figure 1

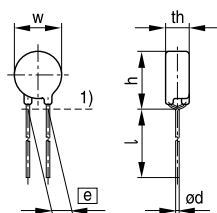
#### Non-standard, crimp style S2



1) Seating plane to IEC 60717  
VAR04111-F-E

Figure 2

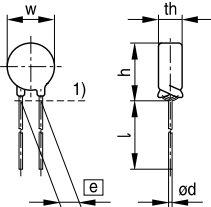
#### Non-standard, crimp style S3



1) Seating plane to IEC 60717  
VAR0396-R-E

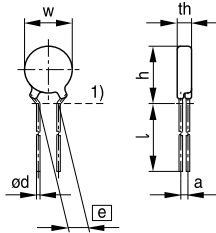
Figure 3

## Non-standard, crimp style S4



1) Seating plane to IEC 60717  
VAR0404-W-E

## Non-standard, crimp style S5



1) Seating plane to IEC 60717  
VAR0412-N-E

### Figure 4

### Figure 5

### 3.3 Component height ( $h_{\max}$ ) for crimped versions (non-standard)

Due to technical reasons the component height ( $h_{\max}$ ) increases if a crimp is added. The maximum height of the crimped component can be found in the table below.

Nominal diameter mm	$V_{\text{RMS}}$ V	Crimp style	$e$ mm	$h_{\max}$ mm
5	11 ... 175	S2	5.0	10.0
5	210 ... 460	S3	5.0	10.0
7	11 ... 175	S2	5.0	12.0
7	210 ... 460	S3	5.0	12.0
10	11 ... 300	S5	7.5	15.5
10	320 ... 460	S3/S5	7.5	16.5
10	510	S3/S5	7.5	17.5
10	Automotive	S5	7.5	17.0
10	Automotive (D1 types)	S5	7.5	16.0
10	11 ... 175	S4	5.0	16.5
10	210 ... 460	S3	5.0	16.5
14	11 ... 300	S5	7.5	20.0
14	320 ... 460	S3/S5	7.5	20.0
14	510	S3/S5	7.5	21.5
14	Automotive	S5	7.5	21.0
14	Automotive (D1 types)	S5	7.5	20.0
20	11 ... 320	S5	10.0	27.0
20	385 ... 510	S5	10.0	27.5

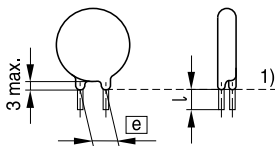


## 3.4 Trimmed leads (non-standard)

Varistors with cut leads available upon request.

Lead length tolerances:

Straight leads	$\pm 1.0$ mm
Crimped leads	$\pm 0.8$ mm
Minimum lead length	3.5 mm



1) Seating plane to IEC 60717

VAR0642-U-E

**Figure 6**