

Product Brief 2011

# Strap Varistors

- SIOV Strap Metal Oxide varistors are mainly designed to be used in Surge Protection Devices (SPD's) for building entrance, photovoltaic and wind power protection. The extensive range is already recognized by UL as type 1 SPD components.
- There are square disk and round disk versions with epoxy coating available. For screw fixing or soldering the varistors are equipped with bent or straight strap terminals.
- Strap varistor features:
  - Size 40 and 50 mm
  - $V_{RMS}$  range from 130 V ... 750 V
  - Maximum surge currents:  $I_{max}$  (8/20  $\mu$ s) up to 75 kA,  $I_{imp}$  (10/350  $\mu$ s) up to 6.5 kA
  - Listed under UL 1449 3<sup>rd</sup> edition for type 1 applications
  - Designed in accordance with the requirements of IEC61643-1



# LS40

## Features

- $I_{max}$  8/20  $\mu$ s: 40 kA
- Operating voltage  $V_{RMS}$ : 130 V ... 750 V
- UL 1449, 3<sup>rd</sup> edition, type 1
- CSA approval

## Electrical specifications and ordering codes

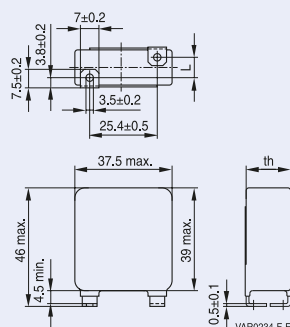
Ordering code	B72240L ...	0131K100	0141K100	0151K100	0231K100	0251K100	0271K100	0321K100
Type	SIOV-LS40K ...	130QP	140QP	150QP	230QP	250QP	275QP	320QP
Dimensions for bent strap terminals								
$th_{max}$	[mm]	8.1	8.2	8.3	9.0	9.2	9.4	9.9
$L \pm 1.0$	[mm]	-3.5	-3.3	-3.2	-2.0	-1.8	-1.6	-1.1
Ordering code	B72240L ...	0131K102	0141K102	0151K102	0231K102	0251K102	0271K102	0321K102
Type	SIOV-LS40K ...	130QPK2	140QPK2	150QPK2	230QPK2	250QPK2	275QPK2	320QPK2
Dimensions for straight strap terminals								
$th_{max}$	[mm]	8.1	8.2	8.3	9.0	9.2	9.4	9.9
$L \pm 1.0$	[mm]	4.4	4.5	4.6	5.4	5.6	5.8	6.3
Maximum ratings @ $T_A = 25^\circ C$								
$V_{RMS}$	[V]	130	140	150	230	250	275	320
$V_{DC}$	[V]	170	180	200	300	320	350	420
$I_{max}$ @ 8/20 $\mu$ s	[A]	40000	40000	40000	40000	40000	40000	40000
$W_{max}$ @ 2 ms	[J]	310	340	360	460	490	550	640
$P_{max}$	[W]	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Characteristics @ $T_A = 25^\circ C$								
$V_v$ @ 1 mA	[V]	205	220	240	360	390	430	510
$V_v$ @ 1 mA	[%]	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$
Maximum clamping voltage								
$v_c$ @ $i_c$	[V]	340	365	395	595	650	710	840
$i_c$	[A]	300	300	300	300	300	300	300
$C_{yp}$ @ 1 kHz	[pF]	7500	6800	6600	4200	3800	3500	3000
Ordering code	B72240L ...	0381K100	0421K100	0441K100	0461K100	0551K100	0681K100	0751K100
Type	SIOV-LS40K ...	385QP	420QP	440QP	460QP	550QP	680QP	750QP
Dimensions for bent strap terminals								
$th_{max}$	[mm]	10.6	10.9	11.1	11.4	12.3	13.5	14.1
$L \pm 1.0$	[mm]	-0.4	0.0	0.2	0.4	1.2	2.4	3.0
Ordering code	B72240L ...	0381K102	0421K102	0441K102	0461K102	0551K102	0681K102	0751K102
Type	SIOV-LS40K ...	385QPK2	420QPK2	440QPK2	460QPK2	550QPK2	680QPK2	750QPK2
Dimensions for straight strap terminals								
$th_{max}$	[mm]	10.6	10.9	11.1	11.4	12.3	13.5	14.1
$L \pm 1.0$	[mm]	6.9	7.3	7.6	7.8	8.8	9.9	10.5
Maximum ratings @ $T_A = 25^\circ C$								
$V_{RMS}$	[V]	385	420	440	460	550	680	750
$V_{DC}$	[V]	505	560	585	615	745	895	970
$I_{max}$ @ 8/20 $\mu$ s	[A]	40000	40000	40000	40000	40000	40000	40000
$W_{max}$ @ 2 ms	[J]	800	910	950	960	960	1100	1200
$P_{max}$	[W]	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Characteristics @ $T_A = 25^\circ C$								
$V_v$ @ 1 mA	[V]	620	680	715	750	910	1100	1200
$V_v$ @ 1 mA	[%]	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$
Maximum clamping voltage								
$v_c$ @ $i_c$	[V]	1025	1120	1180	1240	1500	1815	2000
$i_c$	[A]	300	300	300	300	300	300	300
$C_{yp}$ @ 1 kHz	[pF]	2700	2300	2100	2000	1700	1400	1300

## Bent strap terminals

### Example

Ordering code: B72240L0131K100

Type: SIOV-LS40K130QP

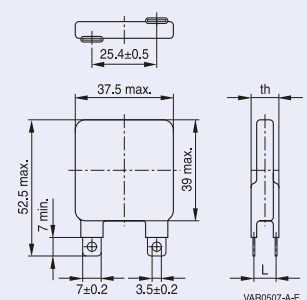


## Straight strap terminals

### Example

Ordering code: B72240L0131K102

Type: SIOV-LS40K130QPK2



# LS41

## Features

- $I_{max}$  8/20  $\mu$ s: 50 kA
- Operating voltage  $V_{RMS}$ : 130 V ... 460 V
- UL 1449, 3<sup>rd</sup> edition, type 1
- Designed in accordance with the requirements of IEC 61643-1, class II
- CSA approval

## Electrical specifications and ordering codes

Ordering code	B72241L ...	0131K100	0141K100	0151K100	0231K100	0251K100	0271K100	0321K100	0381K100	0421K100	0441K100	0461K100
Type SIOV-LS41K ...	130QP	140QP	150QP	230QP	250QP	275QP	320QP	385QP	420QP	440QP	460QP	
Dimensions for bent strap terminals												
$th_{max}$ [mm]	8.1	8.2	8.3	9.0	9.2	9.4	9.9	10.6	10.9	11.1	11.4	
$L \pm 1.0$ [mm]	-3.5	-3.3	-3.2	-2.0	-1.8	-1.6	-1.1	-0.4	0.0	0.2	0.4	
Ordering code	B72241L ...	0131K102	0141K102	0151K102	0231K102	0251K102	0271K102	0321K102	0381K102	0421K102	0441K102	0461K102
Type SIOV-LS41K ...	130QPK2	140QPK2	150QPK2	230QPK2	250QPK2	275QPK2	320QPK2	385QPK2	420QPK2	440QPK2	460QPK2	
Dimensions for straight strap terminals												
$th_{max}$ [mm]	8.1	8.2	8.3	9.0	9.2	9.4	9.9	10.6	10.9	11.1	11.4	
$L \pm 1.0$ [mm]	4.4	4.5	4.6	5.4	5.6	5.8	6.3	6.9	7.3	7.6	7.8	
Maximum ratings @ $T_A = 25^\circ C$												
$V_{RMS}$ [V]	130	140	150	230	250	275	320	385	420	440	460	
$V_{DC}$ [V]	170	180	200	300	320	350	420	505	560	585	615	
$I_{max}$ @ 8/20 $\mu$ s [A]	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	
$I_{max}^{(1)}$ @ 8/20 $\mu$ s [A]	45000	45000	45000	45000	45000	45000	45000	45000	45000	45000	45000	
$I_{nom}^{(2)}$ @ 8/20 $\mu$ s [A]	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	
$W_{max}$ @ 2 ms [J]	310	340	360	460	490	550	640	800	910	950	960	
$P_{max}$ [W]	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
Characteristics @ $T_A = 25^\circ C$												
$V_r$ @ 1 mA [V]	205	220	240	360	390	430	510	620	680	715	750	
$V_r$ @ 1 mA [%]	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	
Maximum clamping voltage												
$v_c$ @ $i_c$ [V]	340	365	395	595	650	710	840	1025	1120	1180	1240	
$i_c$ [A]	300	300	300	300	300	300	300	300	300	300	300	
$C_{typ}$ @ 1 kHz [pF]	7500	7400	6900	4400	4000	3700	3100	2800	2400	2200	2100	

<sup>1)</sup>  $I_{max}$  – Maximum discharge current to IEC 61643-1, class II

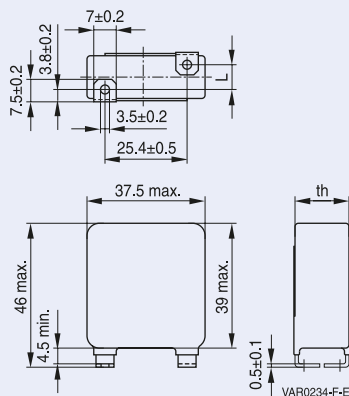
<sup>2)</sup>  $I_{nom}$  – Nominal discharge current to IEC 61643-1, class II

## Bent strap terminals

### Example

Ordering code: B72241L0131K100

Type: SIOV-LS41K130QP

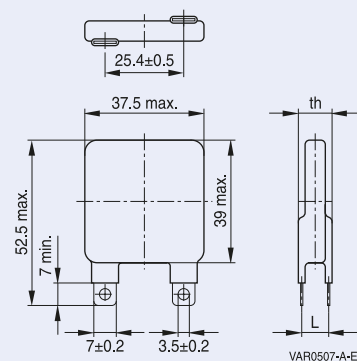


## Straight strap terminals

### Example

Ordering code: B72241L0131K102

Type: SIOV-LS41K130QPK2



# LS42

## Features

- $I_{max}$  8/20  $\mu$ s: 65 kA
- Operating voltage  $V_{RMS}$ : 250 V ... 460 V
- UL 1449, 3<sup>rd</sup> edition, type 1
- Designed in accordance with the requirements of IEC 61643-1, class II
- CSA approval

## Electrical specifications and ordering codes

Ordering code	B72242L ...	0251K100	0271K100	0321K100	0381K100	0421K100	0441K100	0461K100
Type	SIOV-LS42K ...	250QP	275QP	320QP	385QP	420QP	440QP	460QP
Dimensions for bent strap terminals								
$th_{max}$	[mm]	9.2	9.4	9.9	10.6	10.9	11.1	11.4
$L \pm 1.0$	[mm]	-2.1	-1.9	-1.5	-0.8	-0.5	-0.4	-0.2
Ordering code	B72242L ...	0251K102	0271K102	0321K102	0381K102	0421K102	0441K102	0461K102
Type	SIOV-LS42K ...	250QPK2	275QPK2	320QPK2	385QPK2	420QPK2	440QPK2	460QPK2
Dimensions for straight strap terminals								
$th_{max}$	[mm]	9.2	9.4	9.9	10.6	10.9	11.1	11.4
$L \pm 1.0$	[mm]	5.3	5.5	5.9	6.5	6.8	7.0	7.2
Maximum ratings @ $T_A = 25^\circ C$								
$V_{RMS}$	[V]	250	275	320	385	420	440	460
$V_{DC}$	[V]	320	350	420	505	560	585	615
$I_{max}$ @ 8/20 $\mu$ s	[A]	65000	65000	65000	65000	65000	65000	65000
$I_{max}^{1)}$ @ 8/20 $\mu$ s	[A]	65000	65000	65000	65000	65000	65000	65000
$I_{nom}^{2)}$ @ 8/20 $\mu$ s	[A]	20000	20000	20000	20000	20000	20000	20000
$W_{max}$ @ 2 ms	[J]	490	550	640	800	910	950	960
$P_{max}$	[W]	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Characteristics @ $T_A = 25^\circ C$								
$V_v$ @ 1 mA	[V]	390	430	510	620	680	715	750
$V_v$ @ 1 mA	[%]	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$
Maximum clamping voltage								
$V_c$ @ $i_c$	[V]	650	710	840	1025	1120	1180	1240
$i_c$	[A]	300	300	300	300	300	300	300
$C_{typ}$ @ 1 kHz	[pF]	2900	2700	2300	1900	1800	1700	1600

<sup>1)</sup>  $I_{max}$  – Maximum discharge current to IEC 61643-1, class II

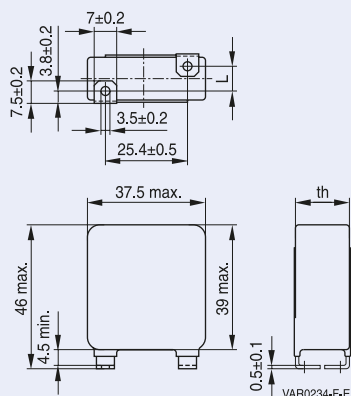
<sup>2)</sup>  $I_{nom}$  – Nominal discharge current to IEC 61643-1, class II

## Bent strap terminals

### Example

Ordering code: B72242L0251K100

Type: SIOV-LS42K250QP

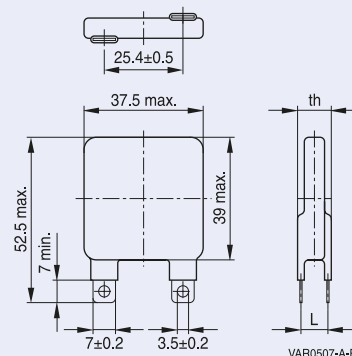


## Straight strap terminals

### Example

Ordering code: B72242L0251K102

Type: SIOV-LS42K250QPK2



# LS50

## Features

- $I_{max}$  8/20  $\mu$ s: 75 kA
- Operating voltage  $V_{RMS}$ : 130 V ... 550 V
- UL 1449, 3<sup>rd</sup> edition, type 1
- CSA approval

## Electrical specifications and ordering codes

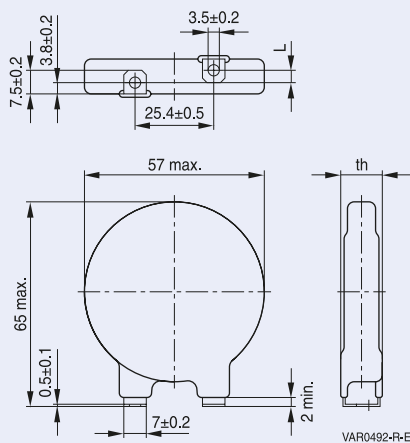
Ordering code B72250L ...	0131K100	0151K100	0231K100	0251K100	0271K100	0321K100	0381K100	0421K100	0441K100	0461K100	0551K100
Type SIOV-LS50K ...	130P	150P	230P	250P	275P	320P	385P	420P	440P	460P	550P
Dimensions for bent strap terminals											
$th_{max}$ [mm]	8.1	8.3	9.0	9.2	9.4	9.9	10.6	10.9	11.1	11.4	12.3
$L \pm 1.0$ [mm]	-3.5	-3.2	-2.0	-1.8	-1.6	-1.1	-0.4	0.0	0.2	0.4	1.2
Ordering code B72250L ...	0131K102	0151K102	0231K102	0251K102	0271K102	0321K102	0381K102	0421K102	0441K102	0461K102	0551K102
Type SIOV-LS50K ...	130PK2	150PK2	230PK2	250PK2	275PK2	320PK2	385PK2	420PK2	440PK2	460PK2	550PK2
Dimensions for straight strap terminals											
$th_{max}$ [mm]	8.1	8.3	9.0	9.2	9.4	9.9	10.6	10.9	11.1	11.4	12.3
$L \pm 1.0$ [mm]	4.4	4.6	5.3	5.5	5.8	6.3	6.9	7.3	7.5	7.8	8.7
Maximum ratings @ $T_A = 25^\circ C$											
$V_{RMS}$ [V]	130	150	230	250	275	320	385	420	440	460	550
$V_{DC}$ [V]	170	200	300	320	350	420	505	560	585	615	745
$I_{max}$ @ 8/20 $\mu$ s [A]	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000	75000
$W_{max}$ @ 2 ms [J]	490	570	730	800	860	1000	1200	1500	1580	1650	1820
$P_{max}$ [W]	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Characteristics @ $T_A = 25^\circ C$											
$V_v$ @ 1 mA [V]	205	240	360	390	430	510	620	680	715	750	910
$V_v$ @ 1 mA [%]	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$
Maximum clamping voltage											
$v_c$ @ $i_c$ [V]	340	395	595	650	710	840	1025	1120	1180	1240	1500
$i_c$ [A]	500	500	500	500	500	500	500	500	500	500	500
$C_{typ}$ @ 1 kHz [pF]	13700	12400	7800	7300	7100	5600	4600	4300	3900	3600	3000

## Bent strap terminals

### Example

Ordering code: B72250L0131K100

Type: SIOV-LS50K130P

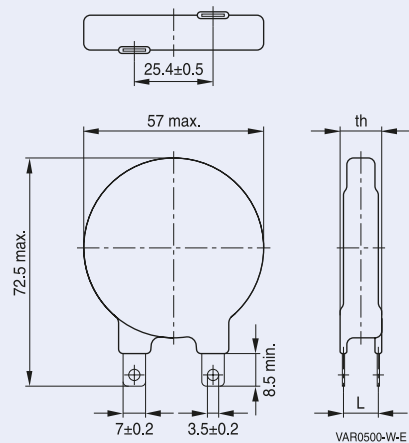


## Straight strap terminals

### Example

Ordering code: B72250L0131K102

Type: SIOV-LS50K130PK2



# LS40-E7

## Features

- Class I:  $I_{imp}$  10/350  $\mu$ s: 6.5 kA,  $I_{nom}$  20 kA
- Class II:  $I_{max}$  8/20  $\mu$ s: 40 kA,  $I_{nom}$  20 kA
- Max. operating voltage  $V_{RMS}$ : 130 V ... 460 V
- Max. operation DC voltage: 170 V ... 615 V
- Designed in accordance with the requirements of IEC 61643-1

## Electrical specifications and ordering codes

Ordering code	B72240L ...	7131K100	7151K100	7171K100	7231K100	7251K100	7271K100	7321K100	7381K100	7441K100	7461K100
Type SIOV-LS40K ...	130QE7P	150QE7P	175QE7P	230QE7P	250QE7P	275QE7P	320QE7P	385QE7P	440QE7P	460QE7P	
Dimensions for bent strap terminals											
$th_{max}$ [mm]	9.2	9.5	9.9	10.8	11.2	11.6	12.5	13.7	14.7	15.2	
$L \pm 1.0$ [mm]	-2.3	-1.9	-1.6	-0.6	-0.2	0.2	1.1	2.3	3.4	3.8	
Ordering code	B72240L ...	7131K102	7151K102	7171K102	7231K102	7251K102	7271K102	7321K102	7381K102	7441K102	7461K102
Type SIOV-LS40K ...	130QE7PK2	150QE7PK2	175QE7PK2	230QE7PK2	250QE7PK2	275QE7PK2	320QE7PK2	385QE7PK2	440QE7PK2	460QE7PK2	
Dimensions for straight strap terminals											
$th_{max}$ [mm]	9.2	9.5	9.9	10.8	11.2	11.6	12.5	13.7	14.7	15.2	
$L \pm 1.0$ [mm]	4.8	5.2	5.5	6.5	6.9	7.3	8.2	9.4	10.5	10.9	
Maximum ratings @ $T_A = 25^\circ C$											
$V_{RMS}$ [V]	130	150	175	230	250	275	320	385	440	460	
$V_{DC}$ [V]	170	200	225	300	320	350	420	505	585	615	
$W_{max}$ @ 2 ms [J]	310	360	385	460	800	550	640	800	950	960	
$P_{max}$ [W]	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
$I_{max}^{1)}$ @ 8/20 $\mu$ s [A]	40000	40000	40000	40000	40000	40000	40000	40000	40000	40000	
$I_{nom}^{2)}$ @ 8/20 $\mu$ s [A]	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	
$I_{imp}^{3)}$ @ 10/350 $\mu$ s [A]	6500	6500	6500	6500	6500	6500	6500	6500	6500	6500	
$I_{nom}^{4)}$ @ 8/20 $\mu$ s [A]	20000	20000	20000	20000	20000	20000	20000	20000	20000	20000	
Characteristics @ $T_A = 25^\circ C$											
$V_v$ @ 1 mA [V]	205	240	270	360	390	430	510	620	715	750	
$V_v$ @ 1 mA [%]	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	
Maximum clamping voltage											
$v_c$ @ $i_c$ [V]	340	395	455	595	650	710	840	1025	1180	1240	
$i_c$ [A]	300	300	300	300	300	300	300	300	300	300	
$C_{typ}$ @ 1 kHz [pF]	9000	7600	6800	5000	4500	4000	3500	2900	2300	2200	

<sup>1)</sup>  $I_{max}$  – Maximum discharge current to IEC 61643-1, class II

<sup>2)</sup>  $I_{nom}$  – Nominal discharge current to IEC 61643-1, class II

<sup>3)</sup>  $I_{imp}$  – Impulse current to IEC 61643-1, class I

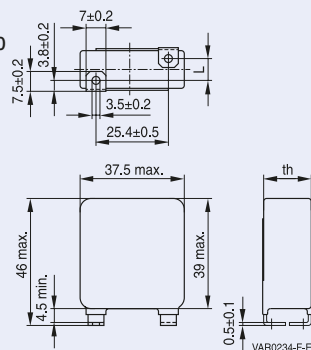
<sup>4)</sup>  $I_{nom}$  – Nominal discharge current to IEC 61643-1, class I

## Bent strap terminals

### Example

Ordering code: B72240L7131K100

Type: SIOV-LS40K130QE7P

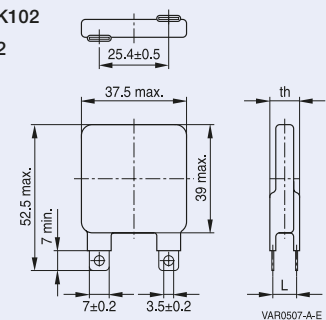


## Straight strap terminals

### Example

Ordering code: B72240L7131K102

Type: SIOV-LS40K130QE7PK2



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