

## EPCOS Product Brief 2018

# SIOV Metal Oxide Varistors

## Strap Varistors

SIOV® strap metal oxide varistors are designed to be used in surge protection devices (SPDs) that protect electrical networks in buildings, photovoltaic systems and wind turbines. The extensive range of products is certified and classified by UL.

Strap varistors are available as square and round disks with epoxy or silicate coating. For screw fixing or soldering the varistors are soldered with bent or straight strap terminals.

### Features

- Wide operating voltage range from 75 V<sub>RMS</sub> up to 750 V<sub>RMS</sub>
- Maximum surge currents I<sub>max</sub> (8/20 μs) up to 75 kA

- Listed under UL 1449, 4<sup>th</sup> edition
- Designed in accordance with the requirements of IEC 61643-11
- PSpice models for component selection and circuit simulation available
- High resistance to humidity

### Applications

- Photovoltaic inverters
- AC/DC power supply
- Variable frequency motor drives
- High voltage DC bus for servers
- DIN rail SPD modules
- AC line surge protection
- LED lighting protection



# LS40

## Features

- $I_{max}$  8/20  $\mu$ s: 40 kA
- Operating voltage  $V_{RMS}$ : 75 V ... 750 V
- UL 1449, 4<sup>th</sup> edition

- Designed in accordance with the requirements of IEC 61643-11, class II
- IEC 61051
- CSA approval



Electrical specifications and ordering codes									
<b>Ordering code</b>	<b>B72240L ...</b>	<b>0750K100</b>	<b>0131K100</b>	<b>0141K100</b>	<b>0151K100</b>	<b>0231K100</b>	<b>0251K100</b>	<b>0271K100</b>	<b>0321K100</b>
<b>Type</b>	<b>SIOV-LS40K ...</b>	<b>75QP</b>	<b>130QP</b>	<b>140QP</b>	<b>150QP</b>	<b>230QP</b>	<b>250QP</b>	<b>275QP</b>	<b>320QP</b>
Dimensions for bent strap terminals									
$th_{max}$	mm	8.0	8.1	8.2	8.3	9.0	9.2	9.4	9.9
$L \pm 1.0$	mm	-3.7	-3.5	-3.3	-3.2	-2.0	-1.8	-1.6	-1.1
<b>Ordering code</b>	<b>B72240L ...</b>	<b>0750K102</b>	<b>0131K102</b>	<b>0141K102</b>	<b>0151K102</b>	<b>0231K102</b>	<b>0251K102</b>	<b>0271K102</b>	<b>0321K102</b>
<b>Type</b>	<b>SIOV-LS40K ...</b>	<b>75QPK2</b>	<b>130QPK2</b>	<b>140QPK2</b>	<b>150QPK2</b>	<b>230QPK2</b>	<b>250QPK2</b>	<b>275QPK2</b>	<b>320QPK2</b>
Dimensions for straight strap terminals									
$th_{max}$	mm	8.0	8.1	8.2	8.3	9.0	9.2	9.4	9.9
$L \pm 1.0$	mm	4.2	4.4	4.5	4.6	5.4	5.6	5.8	6.3
Maximum ratings @ $T_A = 85^\circ C$									
$V_{RMS}$	V	75	130	140	150	230	250	275	320
$V_{DC}$	V	100	170	180	200	300	320	350	420
$I_{max}^{1)}$ @ 8/20 $\mu$ s	A	40000	40000	40000	40000	40000	40000	40000	40000
$I_n^{2)}$ @ 8/20 $\mu$ s	A	20000	20000	20000	20000	20000	20000	20000	20000
$W_{max}$ @ 2 ms	J	190	310	340	360	460	490	550	640
$P_{max}$	W	1.4	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	120	205	220	240	360	390	430	510
$\Delta V_v$ @ 1 mA	%	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$
Maximum clamping voltage									
$v_c$ @ $i_c$	V	220	340	365	395	595	650	710	840
$i_c$	A	300	300	300	300	300	300	300	300
$C_{typ}$ @ 1 kHz	pF	11000	5600	5200	4800	3200	2900	2700	2300
<b>Ordering code</b>	<b>B72240L ...</b>	<b>0381K100</b>	<b>0421K100</b>	<b>0441K100</b>	<b>0461K100</b>	<b>0511K100</b>	<b>0551K100</b>	<b>0681K100</b>	<b>0751K100</b>
<b>Type</b>	<b>SIOV-LS40K ...</b>	<b>385QP</b>	<b>420QP</b>	<b>440QP</b>	<b>460QP</b>	<b>510QP</b>	<b>550QP</b>	<b>680QP</b>	<b>750QP</b>
Dimensions for bent strap terminals									
$th_{max}$	mm	10.6	10.9	11.1	11.4	12.3	12.3	13.5	14.1
$L \pm 1.0$	mm	-0.4	0.0	0.2	0.4	0.9	1.2	2.4	3
<b>Ordering code</b>	<b>B72240L ...</b>	<b>0381K102</b>	<b>0421K102</b>	<b>0441K102</b>	<b>0461K102</b>	<b>0511K102</b>	<b>0551K102</b>	<b>0681K102</b>	<b>0751K102</b>
<b>Type</b>	<b>SIOV-LS40K ...</b>	<b>385QPK2</b>	<b>420QPK2</b>	<b>440QPK2</b>	<b>460QPK2</b>	<b>510QPK2</b>	<b>550QPK2</b>	<b>680QPK2</b>	<b>750QPK2</b>
Dimensions for straight strap terminals									
$th_{max}$	mm	10.6	10.9	11.1	11.4	12.3	12.3	13.5	14.1
$L \pm 1.0$	mm	6.9	7.3	7.6	7.8	8.7	8.8	9.9	10.5
Maximum ratings @ $T_A = 85^\circ C$									
$V_{RMS}$	V	385	420	440	460	510	550	680	750
$V_{DC}$	V	505	560	585	615	670	745	895	970
$I_{max}^{1)}$ @ 8/20 $\mu$ s	A	40000	40000	40000	40000	40000	40000	40000	40000
$I_n^{2)}$ @ 8/20 $\mu$ s	A	20000	20000	20000	20000	20000	20000	20000	20000
$W_{max}$ @ 2 ms	J	800	910	950	960	960	960	1100	1200
$P_{max}$	W	1.4	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	820	910	1100	1200
$\Delta V_v$ @ 1 mA	%	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$	$\pm 10$
Maximum clamping voltage									
$v_c$ @ $i_c$	V	1025	1120	1180	1240	1355	1500	1815	2000
$i_c$	A	300	300	300	300	300	300	300	300
$C_{typ}$ @ 1 kHz	pF	1900	1800	1700	1600	1640	1400	1100	1000

<sup>1)</sup>  $I_{max}$  = maximum discharge current to IEC 61643-11, class II

<sup>2)</sup>  $I_n$  = nominal discharge current to IEC 61643-11, class II

# LS41

## Features

- $I_{\max}$  8/20  $\mu$ s: 50 kA
- Operating voltage  $V_{\text{RMS}}$ : 130 V ... 460 V
- UL 1449, 4<sup>th</sup> edition

- Designed in accordance with the requirements of IEC 61643-11, class II
- IEC 61051
- CSA approval



## Electrical specifications and ordering codes

Ordering code		0131K100	0141K100	0151K100	0231K100	0251K100	0271K100	0321K100	0381K100	0421K100	0441K100	0461K100
B72241L ...												
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		0131K102	0141K102	0151K102	0231K102	0251K102	0271K102	0321K102	0381K102	0421K102	0441K102	0461K102
B72241L ...												
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 @ $T_A = 85^\circ\text{C}$												
$V_{\text{RMS}}$	V	130	140	150	230	250	275	320	385	420	440	460
$V_{\text{DC}}$	V	170	180	200	300	320	350	420	505	560	585	615
$I_{\max}^{1)}$ @ 8/20 $\mu$ s	A	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000	50000
$I_n^{2)}$ @ 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 @ $T_A = 25^\circ\text{C}$												
$V_v$ @ 1 mA	V	205	220	240	360	390	430	510	620	680	715	750
$\Delta V_v$ @ 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	365	395	595	650	710	840	1025	1120	1180	1240
$i_c$	A	300	300	300	300	300	300	300	300	300	300	300
$C_{\text{typ}}$ @ 1 kHz	pF	5600	5200	4800	3200	2900	2700	2300	1900	1800	1700	1600

<sup>1)</sup>  $I_{\max}$  = maximum discharge current to IEC 61643-11, class II

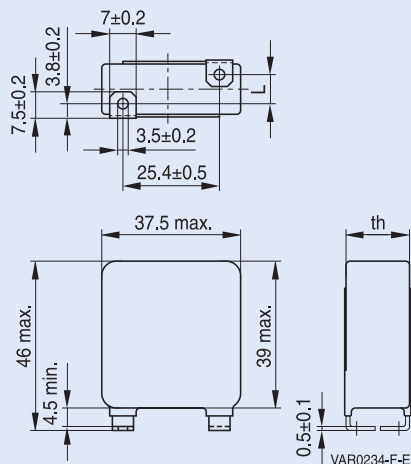
<sup>2)</sup>  $I_n$  = nominal discharge current to IEC 61643-11, class II

## Dimensional drawings for LS40 and LS41

### Bent strap terminals

#### Example

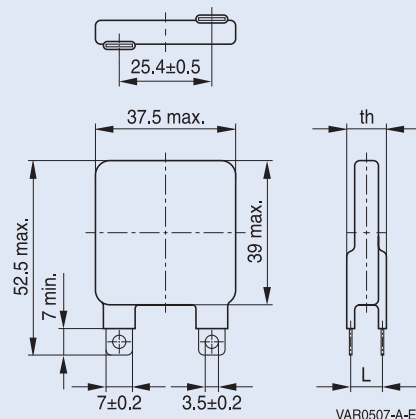
Ordering code: B72241L0131K100  
Type: SIOV-LS41K130QP



### Straight strap terminals

#### Example

Ordering code: B72241L0131K102  
Type: SIOV-LS41K130QPK2



# LS50

## Features

- $I_{max}$  8/20  $\mu$ s: 75 kA
- Operating voltage  $V_{RMS}$ : 130 V ... 550 V

- UL 1449, 4<sup>th</sup> edition
- CSA approval



## Electrical specifications and ordering codes

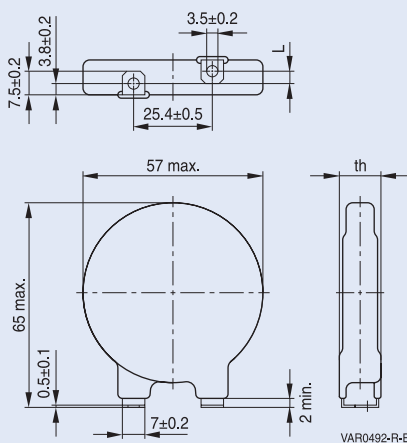
Ordering code	B72250L ...	0131K100	0151K100	0231K100	0251K100	0271K100	0321K100	0381K100	0421K100	0441K100	0461K100	0551K100
Type	SIOV-LS50K ...	130P	150P	230P	250P	275P	320P	385P	420P	440P	460P	550P
Dimensions for bent strap terminals												
$th_{max}$	mm	8.1	8.3	9.0	9.2	9.4	9.9	10.6	10.9	11.1	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 @ $T_A = 85^\circ C$												
$V_{RMS}$	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
$\Delta V_V$ @ 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	10500	9500	6000	5600	5500	4300	3500	3300	3000	2900	2400

## Dimensional drawings for LS50

### Bent strap terminals

#### Example

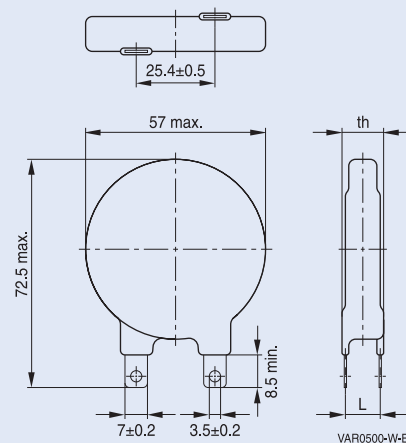
Ordering code: B72250L0131K100  
Type: SIOV-LS50K130P



### Straight strap terminals

#### Example

Ordering code: B72250L0131K102  
Type: SIOV-LS50K130PK2



**Structure of ordering codes:** The ordering code for one and the same product can be represented differently in data sheets, data books, other publications and the website of EPCOS, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.** Detailed information can be found on the Internet under [www.epcos.com/orderingcodes](http://www.epcos.com/orderingcodes).

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