

EPCOS Product Brief 2018

SIOV Metal Oxide Varistors

SMD Varistors, CU Types for Surge Current Protection

SMD varistors, which are also known as CU varistors, are ceramic semiconductor components for surge current protection in consumer, industrial, automotive and telecom applications. SMD varistors are encapsulated components designed for SMD mounting and are electrically equivalent to the SIOV-S05 leaded disk varistors (disk diameter 5 mm) in case size 3225 and SIOV-S07 (disk diameter 7 mm) in case size 4032.

The varistors cover a voltage range from 14 to 385 V DC and are designed for surge currents of between 100 and 1200 A at a standard pulse of 8/20 μ s.

Depending on the type, a maximum energy of between 300 and 23000 mJ can be absorbed for 2 ms. The components have a maximum AC operating voltage of up to 300 V_{RMS} or respectively 385 V DC.

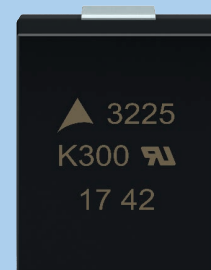
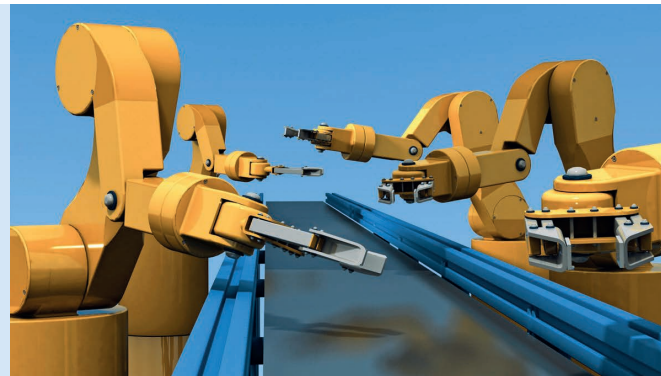
All CU varistors are RoHS-compatible. Types with ≥ 130 V_{RMS} are UL and CSA approved. They can be operated at temperatures of up to 85 °C without derating.

Features

- SMD mountable varistors, suitable for lead-free soldering
- Bidirectional protection in a single component
- High surge current capability to IEC 61000-4-5 for the telecom series
- Jump start and load dump protection to ISO 7637, pulse 5 for automotive series

Construction

Disk varistor element with thermo-plast encapsulation (flame-retardant to UL 94 V-0) in case sizes 3225 and 4032.



SMD Varistors (CU Types)



General technical data

Operating temperature: -40/+85 °C

Storage temperature: -40/+125 °C

Electrical specifications and ordering codes

Maximum ratings ($T_{op, max} = 85\text{ °C}$)								Characteristics ($T_A = 25\text{ °C}$)		
Ordering code	Case size	V_{RMS}	V_{DC}	i_{max} (8/20 μ s) 1 time	$I_n^{(1)}$ (8/20 μ s) 15 times	W_{max} (2 ms)	P_{max}	$V_V^{(2)}$ (1 mA)	$V_{c,max}$	I_c (8/20 μ s)
<u>SMD</u>		V	V	A	A	mJ	mW	V	V	A
B72650M0110K072	3225	11	14	100	50	300	10	18	36	1.0
B72660M0110K072	4032	11	14	250	100	800	20	18	36	2.5
B72650M0140K072	3225	14	18	100	50	400	10	22	43	1.0
B72660M0140K072	4032	14	18	250	100	900	20	22	43	2.5
B72650M0170K072	3225	17	22	100	50	500	10	27	53	1.0
B72660M0170K072	4032	17	22	250	100	1100	20	27	53	2.5
B72650M0200K072	3225	20	26	100	50	600	10	33	65	1.0
B72660M0200K072	4032	20	26	250	100	1300	20	33	65	2.5
B72650M0250K072	3225	25	31	100	50	700	10	39	77	1.0
B72660M0250K072	4032	25	31	250	100	1600	20	39	77	2.5
B72650M0300K072	3225	30	38	100	50	900	10	47	93	1.0
B72660M0300K072	4032	30	38	250	100	2000	20	47	93	2.5
B72650M0350K072	3225	35	45	100	50	1100	10	56	110	1.0
B72660M0350K072	4032	35	45	250	100	2500	20	56	110	2.5
B72650M0400K072	3225	40	56	100	50	1300	10	68	135	1.0
B72660M0400K072	4032	40	56	250	100	3000	20	68	135	2.5
B72650M0500K072	3225	50	65	400	150	1800	100	82	135	5.0
B72660M0500K072	4032	50	65	1200	500	4200	250	82	135	10.0
B72650M0600K072	3225	60	85	400	150	2200	100	100	165	5.0
B72660M0600K072	4032	60	85	1200	500	4800	250	100	165	10.0
B72650M0750K072	3225	75	100	400	150	2500	100	120	200	5.0
B72660M0750K072	4032	75	100	1200	500	5900	250	120	200	10.0

¹⁾ Nominal discharge current I_n according to UL 1449, 4th edition.

²⁾ $\Delta V_V = \pm 10\%$

Dimensional drawing

Dimensions		Dimensions			
Chip size	V_{RMS} V	l mm	w mm	h mm	
3225	11 ... 175	8.0 ±0.3	6.3 ±0.3	3.2 ±0.3	
3225	230 ... 300	8.0 ±0.3	6.3 ±0.3	4.5 ±0.3	
4032	11 ... 175	10.2 ±0.3	8.0 ±0.3	3.2 ±0.3	
4032	230 ... 300	10.2 ±0.3	8.0 ±0.3	4.5 ±0.3	

SMD Varistors (CU Types)



General technical data

Operating temperature: -40/+85 °C

Storage temperature: -40/+125 °C

Electrical specifications and ordering codes

Maximum ratings ($T_{op, max} = 85\text{ °C}$)

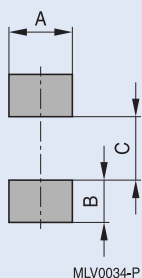
Characteristics ($T_A = 25\text{ °C}$)

Ordering code <u>SMD</u>	Case size	V_{RMS}	V_{DC}	i_{max} (8/20 μ s) 1 time	$I_n^{(1)}$ (8/20 μ s) 15 times	W_{max} (2 ms)	P_{max}	$V_V^{(2)}$ (1 mA)	$V_{c,max}$	I_c (8/20 μ s)
		V	V	A	A	mJ	mW	V	V	A
B72650M0950K072	3225	95	125	400	150	3400	100	150	250	5.0
B72660M0950K072	4032	95	125	1200	500	7600	250	150	250	10.0
B72650M0111K072	3225	115	150	400	150	3600	100	180	300	5.0
B72660M0111K072	4032	115	150	1200	500	8400	250	180	300	10.0
B72650M0131K072	3225	130	170	400	150	4200	100	205	340	5.0
B72660M0131K072	4032	130	170	1200	500	9500	250	205	340	10.0
B72650M0141K072	3225	140	180	400	150	4500	100	220	360	5.0
B72660M0141K072	4032	140	180	1200	500	10000	250	220	360	10.0
B72650M0151K072	3225	150	200	400	150	4900	100	240	395	5.0
B72660M0151K072	4032	150	200	1200	500	11000	250	240	395	10.0
B72650M0171K072	3225	175	225	400	150	5600	100	270	455	5.0
B72660M0171K072	4032	175	225	1200	500	13000	250	270	455	10.0
B72650M0231K072	3225	230	300	400	150	7200	100	360	595	5.0
B72660M0231K072	4032	230	300	1200	500	17000	250	360	595	10.0
B72650M0251K072	3225	250	320	400	150	8200	100	390	650	5.0
B72660M0251K072	4032	250	320	1200	500	19000	250	390	650	10.0
B72650M0271K072	3225	275	350	400	150	8600	100	430	710	5.0
B72660M0271K072	4032	275	350	1200	500	21000	250	430	710	10.0
B72650M0301K072	3225	300	385	400	150	9600	100	470	775	5.0
B72660M0301K072	4032	300	385	1200	500	23000	250	470	775	10.0

¹⁾ Nominal discharge current I_n , according to UL 1449, 4th edition.

²⁾ $\Delta V_V = \pm 10\%$

Recommended solder pad layout



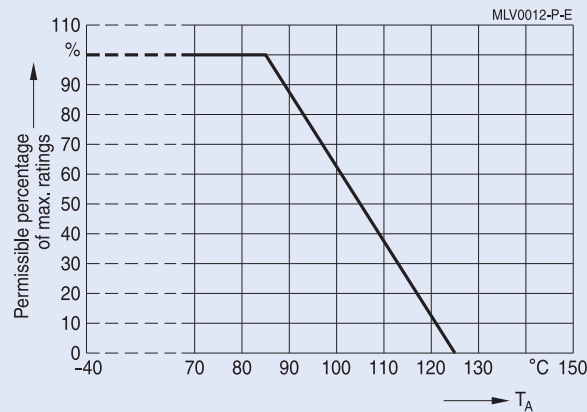
Dimensions

Chip size	A mm	B mm	C mm
3225	3.50	2.80	4.50
4032	3.50	2.80	6.50

SMD Varistors (CU Types)

Temperature derating

Climatic category $-40/+85\text{ }^{\circ}\text{C}$



Symbols and terms

Symbol	Term
I	Current
I_c	Clamping current
i_{max}	Maximum surge current (also termed peak current)
P_{max}	Maximum power dissipation
T_A	Ambient temperature
T_{op}	Operating temperature
V	Voltage
$V_{c,max}$	Maximum clamping voltage
V_{DC}	Maximum DC operating voltage (also termed working voltage)
V_{RMS}	Maximum AC operating voltage, root-mean-square value
V_V	Varistor voltage (also termed breakdown voltage)
ΔV_V	Tolerance of varistor voltage
W_{max}	Maximum energy absorption (also termed transient energy)

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.

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