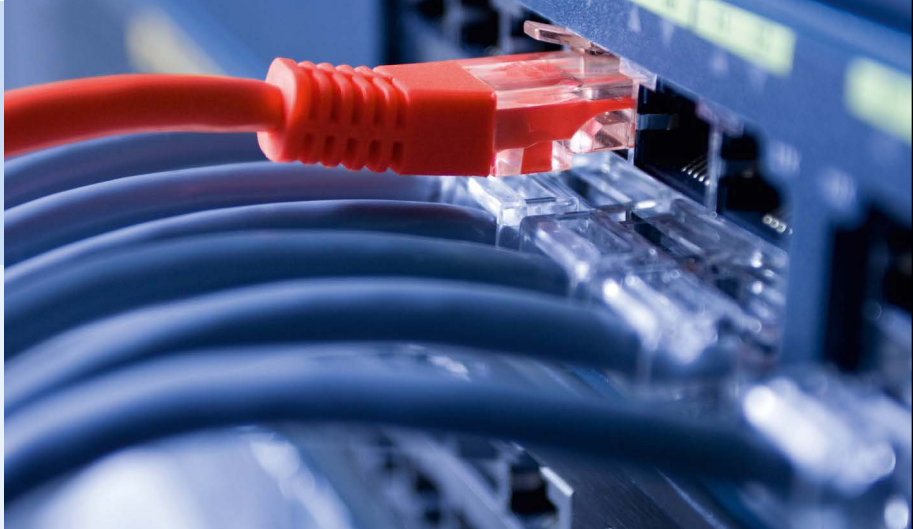
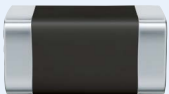
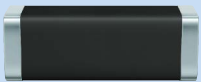


EPCOS Sample Kit 2015

# Ceramic Transient Voltage Suppressors

CTVS Multilayer Varistors and CeraDiodes for Industrial Use



# Protection against ESD and surge currents for industrial use

Industrial applications and automation equipment require both reliable ESD protection (e.g. on data line interfaces) as well as protection against severe surges or high-energy transients, such as caused by switching of large capacitive or inductive loads. EPCOS CTVS® (ceramic transient voltage suppressors) and CeraDiodes® are ceramic multilayer components for reliable protection against such electrical transients.

CeraDiodes® provide cost-efficient but reliable ESD protection up to 30 kV. The portfolio of EPCOS multilayer varistors provides additionally high surge protection capability and are qualified to protect industrial applications against high surge currents of up to 5 kA acc. to IEC 61000-4-5. CTVS® can replace semiconductor diodes in many applications.

## Features

### Cera Diodes® for ESD protection

- Bidirectional ESD protection up to 25 kV (ISO 10605)
- Bidirectional ESD protection min. 8 kV contact, 15 kV air (IEC 61000-4-2)
- High reliability, stable protection level, excellent long-term stability
- Multi-strike capability
- Low leakage current, low parasitic inductance
- No derating up to +85 °C/ +125 °C (depending on type)
- EMI/ RFI attenuation
- Short response time of < 0.5 ns

### Additional features for MLV types for surge protection

- High surge current protection up to 5.000 A
- Surge load capability up 4 kV for 8/20 µs acc. to IEC 61000-4-5
- Surge voltage capability up to 2 kV for 10/700 µs acc. to IEC 61000-4-5
- Continuous operation up to +125 °C without derating

## Applications

- Automation engineering
- Interfaces, data lines, push buttons, serial ports
- Industrial PCs and monitoring systems
- Power supplies
- PoE (power over ethernet)

**More details and applications under [www.epcos.com/ctvs\\_ie](http://www.epcos.com/ctvs_ie)**

**Important information:** Some parts of this publication contain statements about the suitability of our products for certain areas of application. These statements are based on our knowledge of typical requirements that are often placed on our products. We expressly point out that these statements cannot be regarded as binding statements about the suitability of our products for a particular customer application. It is incumbent on the customer to check and decide whether a product is suitable for use in a particular application. This publication is only a brief product survey which may be changed from time to time. Our products are described in detail in our data sheets. The *Important notes* ([www.epcos.com/ImportantNotes](http://www.epcos.com/ImportantNotes)) and the product-specific *Cautions and warnings* must be observed. All relevant information is available through our sales offices.

# Components

B72440 C0050A160	B72440 C0050H160	B72440 C0050H260	B72590 D0050H260	B72590 D0150H060	B72590 D0200H060	B72500 D005H160	B72500 D0150A060	B72500 D0200A060
---------------------	---------------------	---------------------	---------------------	---------------------	---------------------	--------------------	---------------------	---------------------

B72500 D0300H060	B72510 T0140K062	B72510 T0300K062	B72520 T0140K062	B72520 T0300K062	B72520 T0600K062	B72530 T0140K062	B72530 T0300K062	B72530 T0500K062
---------------------	---------------------	---------------------	---------------------	---------------------	---------------------	---------------------	---------------------	---------------------

B72580 T0300K062	B72580 T0500K062	B72580 T6750K072	B72580 T6111K072	B72540 T0300K062	B72540 T6300K062	B72540 T0400K062	B72540 T0500K062	B72540 T6500K062
---------------------	---------------------	---------------------	---------------------	---------------------	---------------------	---------------------	---------------------	---------------------

## Electrical specifications and ordering codes

### ESD protection (acc. to IEC 61000-4-2, level 4), CeraDiodes, single chips

EIA case size	Ordering code	$V_{DC, max}$ [V]	$V_v$ @ 1 mA [V]	$V_{clamp, max}$ 8/20 $\mu$ s [V]	$C_{typ}^{1)}$ 1 MHz, 1 V [pF]	$C_{max}^{1)}$ 1 MHz, 1 V [pF]
0201	B72440C0050A160	5.5	11	22	15	-
0201	B72440C0050H160	5.5	17	33	7	-
0201	B72440C0050H260	5.5	20	66	3	-
0402	B72590D0050H260	5.6	90	-	0.6	0.9
0402	B72590D0150H060	15	23	66	10	15
0402	B72590D0200H060	20	30	80	10	13
0603	B72500D0050H160	5.6	150	-	0.6	0.9
0603	B72500D0150A060	15	22	42	160	-
0603	B72500D0200A060	22	25	50	56	-
0603	B72500D0300H060	30	50	120	10	15

1) Measurement frequency:  
f = 1 MHz for C < 100 pF, f = 1 kHz for C  $\geq$  100 pF

### Surge protection (acc. to IEC 61000-4-5), MLV types, single chips

EIA case size	Ordering code	$V_{DC, max}$ [V]	$V_v$ @ 1 mA [V]	$V_{clamp, max}$ 8/20 $\mu$ s [V]	$I_{surge, max}$ 8/20 $\mu$ s [A]	$W_{max}$ 2 ms [mJ]
0805	B72510T0140K062	18	22	40	120	300
0805	B72510T0300K062	38	47	77	80	300
1206	B72520T0140K062	18	22	38	200	700
1206	B72520T0300K062	38	47	77	200	1.000
1206	B72520T0600K062	85	100	165	100	700
1210	B72530T0140K062	18	22	38	400	2.000
1210	B72530T0300K062	38	47	77	300	2.000
1210	B72530T0500K062	65	82	135	100	600
1812	B72580T0300K062	38	47	77	800	4.200
1812	B72580T0500K062	65	82	135	200	1.600
1812	B72580T6750K072	100	120	250	400 <sup>2)</sup>	2.500
1812	B72580T6111K072	150	180	360	250 <sup>2)</sup>	3.200
2220	B72540T0300K062	38	47	77	1.200	12.000
2220	B72540T6300K062	38	47	77	5.000	15.000
2220	B72540T0400K062	56	68	110	1.000	9.000
2220	B72540T0500K062	65	82	135	800	5.600
2220	B72540T6500K062	65	82	135	4.500	15.000

2)  $I_{surge, max}$  for 10/700  $\mu$ s = 45 A (acc. IEC 61000-4-5)

# Application matrix for ESD protection and surge current protection



EIA case size		Ordering code		Analog & digital ports, USB 2.0, Ethernet, memory cards	LIN, CAN, DIN measurement bus, BITBUS, LON, AS interface	HDMI 1.3 / display port	Analog audio, ISDN, key buttons, push buttons	CANopen, Bluetooth	Serial interfaces RS-232 / RS-485		
<b>ESD protection (acc. to IEC 61000-4-2, level 4), CeraDiodes, single chips</b>											
0201	B72440C0050A160			x			x	x	x		
0201	B72440C0050H160			x			x	x	x		
0201	B72440C0050H260			x			x	x	x		
0402	B72590D0050H260			x	x	x					
0402	B72590D0150H060			x	x		x	x	x		
0402	B72590D0200H060			x	x	x					
0603	B72500D0050H160			x	x	x					
0603	B72500D0150A060				x				x		
0603	B72500D0200A060				x				x		
0603	B72500D0300H060			x	x			x	x		
EIA case size		Ordering code		$V_{DC, max}$ [V]	$I_{surge, max}$ 8/20 $\mu$ s [A]	Power supply, SMPS	Base stations, Power over Ethernet (PoE)	Automated meter reading	Automation, servo amplifiers	Data capturing	Measurement and control
<b>Surge protection (acc. to IEC 61000-4-5), MLV types, single chips</b>											
0805	B72510T0140K062	18	120					x			x
0805	B72510T0300K062	38	80					x			x
1206	B72520T0140K062	18	200					x			
1206	B72520T0300K062	38	200			x		x	x		x
1206	B72520T0600K062	85	100						x		x
1210	B72530T0140K062	18	400					x			
1210	B72530T0300K062	38	300			x		x	x		x
1210	B72530T0500K062	65	100			x		x	x		x
1812	B72580T0300K062	38	800			x			x		x
1812	B72580T0500K062	65	200				x				x
1812	B72580T6750K072	100	400				x				
1812	B72580T6111K072	150	250				x				
2220	B72540T0300K062	38	1.200				x		x		x
2220	B72540T6300K062	38	5.000				x		x		
2220	B72540T0400K062	56	1.000			x	x		x		
2220	B72540T0500K062	65	800				x		x		
2220	B72540T6500K062	65	4.500				x		x		

