EPCOS

EMI Suppression Capacitors (MKP)

B3291* Series

Series/Type: **B32911 … B32916**

Date: May 2007
Version: 1

Preliminary data

Recommended applications
- X1 class for interference suppression
- “Across the line” applications.
- For apparatus permanently connected to mains and isolated from direct contact with humidity

Climatic
- Maximum operating temperature 110 ºC
- Climatic category (IEC 60068-1): 40/110/56

Construction
- Dielectric: Polypropylene (MKP)
- Plastic case (UL 94 V-0)
- Epoxy resin sealing (UL 94 V-0)

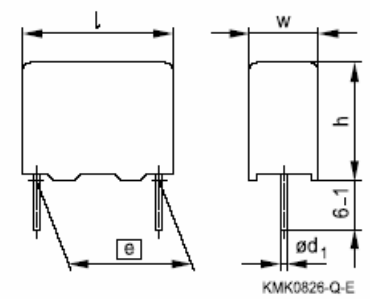
Features
- Very small dimensions
- Good self-healing properties
- High voltage capability

Terminals
- Parallel wire leads, lead-free tinned
- Standard lead lengths: 6 –1 mm
- Special lead lengths are available on request

Marking
- Manufacturer’s logo and lot number, date code, rated capacitance (coded), capacitance tolerance (code letter) and rated ac voltage (IEC)
- Series number, sub-class (X1), dielectric code (MKP), climatic category, passive flammability category, approvals.

Delivery mode
- Bulk (untaped)
- Taped (Ammo pack or Reel)

Dimensional drawing

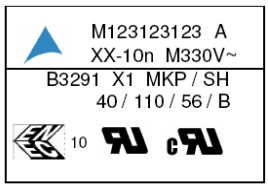


Dimensions in mm

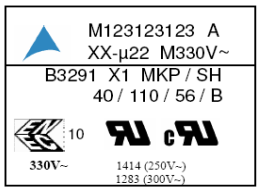
Lead spacing e ±0.4 (mm)	Lead diameter d_1 (mm)	Type
10	0.6	B32911
15 ... 27.5	0.8	B32912 ... 14
37.5	1.0	B32916

Marking examples:

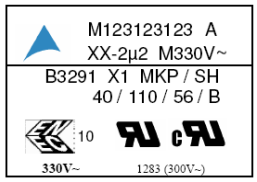
e = 10mm



15 ≤ e ≤ 27.5 mm
(C_R ≤ 1 µF)



22.5 ≤ e ≤ 37.5 mm
(C_R > 1 µF)



Technical data

Rated AC voltage (IEC 60384-14)	330 V (50/60 Hz)		
Maximum continuous DC voltage (V DC)	760 V		
Maximum operating temperature $T_{op,max}$	+110 ºC		
DC test voltage	2500 V, 2 s		
Dissipation factor tan δ (in 10^{-3}) at 20 °C, (upper limit values)		C ≤ 2.2 µF	C > 2.2 µF
	at 1 kHz	1	2
Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$ at 100 V DC, 20 °C, rel. humidity ≤ 65% and for 60 s (minimum “as delivered” values)	C_R ≤ 0.33 µF	C_R > 0.33 µF	
	100,000 MΩ	30,000 s	
Passive flammability category to IEC 40 (CO) 752	B		
Capacitance tolerances (measured at 1 kHz)	±10% (K), ±20% (M)		

Preliminary data

Ordering codes and packing units

ē ±0.4 (mm) mm	C_R	Max dimensions w × h × l mm	Ordering code	Ammo pack pcs/unit	Reel pcs/unit	Untaped pcs/unit
10	10 nF	4.0 × 9.0 × 13.0	B32911A3103+***	1000	1700	1000
	22 nF	5.0 × 11.0 × 13.0	B32911B3223+***	830	1300	1000
	33 nF	6.0 × 12.0 × 13.0	B32911A3333M***	680	1100	1000
15	22 nF	5.0 × 10.5 × 18.0	B32912A3223+***	1170	1300	1000
	33 nF	5.0 × 10.5 × 18.0	B32912A3333+***	1170	1300	1000
	47 nF	5.0 × 10.5 × 18.0	B32912A3473+***	1170	1300	1000
	68 nF	6.0 × 11.0 × 18.0	B32912A3683+***	960	1100	1000
	0.1 µF	7.0 × 12.5 × 18.0	B32912A3104+***	830	900	1000
	0.15 µF	7.0 × 12.5 × 18.0	B32912B3154M***	830	900	1000
	0.15 µF	8.5 × 14.5 × 18.0	B32912A3154+***	680	700	500
	0.22 µF	8.5 × 14.5 × 18.0	B32912B3224M***	680	700	500
	0.22 µF	9.0 × 17.5 × 18.0	B32912A3224+***	640	700	500
	0.33 µF	9.0 × 17.5 × 18.0	B32912B3334M***	640	700	500
22.5	0.15 µF	6.0 × 15.0 × 26.5	B32913A3154+***	680	700	720
	0.22 µF	7.0 × 16.0 × 26.5	B32913A3224+***	580	600	630
	0.33 µF	8.5 × 16.5 × 26.5	B32913A3334M***	480	500	510
	0.47 µF	10.5 × 18.5 × 26.5	B32913A3474M***	390	400	540
27.5	0.47 µF	11.0 × 21.0 × 31.5	B32914A3474+***	-	350	320
	0.68 µF	11.0 × 21.0 × 31.5	B32914B3684+***	-	350	320
	1.0 µF	13.5 × 23.0 × 31.5	B32914A3105+***	-	250	260
	1.5 µF	18.0 × 27.5 × 31.5	B32914A3155+***	-	-	200
	2.2 µF	19.0 × 30.0 × 31.5	B32914A3225M***	-	-	180
37.5	3.3 µF	18.0 × 32.5 × 41.5	B32916A3335+***	-	-	90
	4.7 µF	20.0 × 39.5 × 41.5	B32916A3475M***	-	-	75
	6.8 µF	28.0 × 42.5 × 41.5	B32916A3685M***	-	-	55

Further E series and intermediate capacitance values are available on request.

Composition of ordering code

+ = Capacitance tolerance code
  M = ±20%
  K = ±10%

*** = Packing code
  289 = ammo pack
  189 = reel pack
  000 = untaped (lead length 6 –1 mm)

Approvals

Standards	Certificate	Marks of Conformity
EN 132400 / IEC 60384-14 (330 V AC)	40018909 & 40010694	
UL1414 (250 V AC) UL1283 (330 V AC)	E97863 E157153	
CSA C22.2 No.1 (250 V AC) CSA C22.2 No.8 (330 V AC)	E97863 E157153	(1)

(1) approved by UL

dV/dt and K_0 values

ē ±0.4 (mm)	10	15	22.5	27.5	37.5
dV/dt (V/µs)	550	400	200	150	100
K_0 (V^2/µs)	473,000	344,000	172,000	129,000	86,000

Note: The maximum values of dV/dt and K_0 must not be exceeded in order to avoid overheating of the capacitor.

Important notes

The following applies to all products named in this publication:

1. 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 in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application.** As a rule, EPCOS is either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether an EPCOS product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of passive electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified.** In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of a passive electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of a passive electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as "hazardous")**. Useful information on this will be found in our Material Data Sheets on the Internet (www.epcos.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.

   We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available.
6. Unless otherwise agreed in individual contracts, **all orders are subject to the current version of the "General Terms of Delivery for Products and Services in the Electrical Industry" published by the German Electrical and Electronics Industry Association (ZVEI)**.
7. The trade names EPCOS, BAOKE, Alu-X, CeraDiode, CSSP, MiniBlue, MKK, MLSC, MotorCap, PCC, PhaseCap, PhaseMod, SIFI, SIKOREL, SilverCap, SIMDAD, SIMID, SineFormer, SIOV, SIP5D, SIP5K, ThermoFuse, WindCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.epcos.com/trademarks.