



Film Capacitors

EMI Suppression Capacitors (MKP)

Series/Type: B32921 ... B32926

Date: May 2005

© EPCOS AG 2006. Reproduction, publication and dissemination of this data sheet, enclosures hereto and the information contained therein without EPCOS' prior express consent is prohibited.

Purchase orders are subject to the General Conditions for the Supply of Products and Services of the Electrical and Electronics Industry recommended by the ZVEI (German Electrical and Electronic Manufacturers' Association), unless otherwise agreed.

Please read "Important notes" on page 9.

Typical applications

- X2 class for interference suppression
- "Across the line" applications

Climatic

- Max. operating temperature: 125 °C
- Climatic category (IEC 60068-1): 40/105/56

Construction

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

Features

- Very small dimensions
- Self-healing properties

Terminals

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

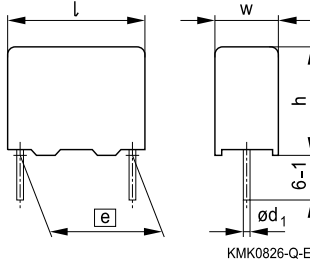
Marking

Manufacturer's logo, lot number, date code, rated capacitance (coded), cap. tolerance (code letter), rated AC voltage, series number, sub-class (X2), dielectric code (MKP), climatic category, passive flammability category, approvals.

Delivery mode

Bulk (untaped)
Taped (Ammo pack or reel)
For taping details, refer to chapter "Taping and packing".

Dimensional drawing

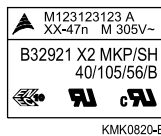


Dimensions in mm

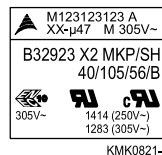
Lead spacing $e \pm 0.4$	Lead diameter d_1	Type
10	0.6	B32921
15	0.8	B32922
22.5	0.8	B32923
27.5	0.8	B32924
37.5	1.0	B32926

Marking examples

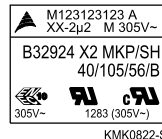
$e = 10 \text{ mm}$



$e \geq 15 \text{ mm} / C_R \leq 1 \mu\text{F}$

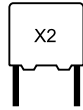


$e = 22.5, 27.5, 37.5 \text{ mm} / C_R > 1 \mu\text{F}$



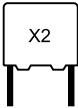
Approvals

Marks of conformity	Standards	Certificate
   	EN 132400, IEC 60384-14 UL 1414 / UL 1283 CSA C22.2 No. 1 / No. 8 CQC (GB/T 14472-1998)	40005536/40010694 E97863 / E157153 E97863 / E157153 (approved by UL) CQC001007-14859



Overview of available types

Lead spacing	10 mm	15 mm	22.5 mm	27.5 mm	37.5 mm
Type	B32921	B32922	B32923	B32924	B32926
C_R (μF)					
0.010					
0.022					
0.033					
0.047					
0.068					
0.10					
0.15					
0.22					
0.33					
0.47					
0.56					
0.68					
0.82					
1.0					
1.5					
2.2					
3.3					
4.7					
5.6					
6.8					
8.2					
10					



B32921 ... B32926

X2 / 305 VAC

Ordering codes and packing units

Lead spacing mm	C _R μF	Max. dimensions w × h × l mm	Ordering code (composition see below)	Ammo pack pcs./unit	Reel pcs./unit	Untaped pcs./unit
10	0.010	4.0 × 9.0 × 13.0	B32921C3103+***	1000	1700	1000
	0.022	4.0 × 9.0 × 13.0	B32921C3223+***	1000	1700	1000
	0.033	4.0 × 9.0 × 13.0	B32921C3333+***	1000	1700	1000
	0.047	5.0 × 11.0 × 13.0	B32921C3473+***	830	1300	1000
	0.047	6.0 × 12.0 × 13.0	B32921A2473+***	680	1100	1000
	0.068	6.0 × 12.0 × 13.0	B32921A2683M***	680	1100	1000
	0.068	6.0 × 12.0 × 13.0	B32921C3683+***	680	1100	1000
	0.10	6.0 × 12.0 × 13.0	B32921A2104M***	680	1100	1000
	0.10	6.0 × 12.0 × 13.0	B32921C3104M***	680	1100	1000
15	0.033	5.0 × 10.5 × 18.0	B32922C3333+***	1170	1300	1000
	0.047	5.0 × 10.5 × 18.0	B32922C3473+***	1170	1300	1000
	0.068	6.0 × 11.0 × 18.0	B32922A2683+***	960	1100	1000
	0.068	5.0 × 10.5 × 18.0	B32922C3683+***	1170	1300	1000
	0.10	6.0 × 11.0 × 18.0	B32922A2104+***	960	1100	1000
	0.10	5.0 × 10.5 × 18.0	B32922C3104+***	1170	1300	1000
	0.15	7.0 × 12.5 × 18.0	B32922A2154+***	830	900	1000
	0.15	6.0 × 12.0 × 18.0	B32922C3154+***	960	1100	1000
	0.22	8.5 × 14.5 × 18.0	B32922A2224+***	680	700	500
	0.22	8.0 × 14.0 × 18.0	B32922T2224+***	730	750	500
	0.22	7.0 × 12.5 × 18.0	B32922C3224+***	830	900	1000
	0.22	8.0 × 14.0 × 18.0	B32922T3224+***	730	750	500
	0.33	9.0 × 17.5 × 18.0	B32922A2334+***	640	700	500
	0.33	13.0 × 14.0 × 18.0	B32922T2334+***	—	500	300
	0.33	8.0 × 14.0 × 18.0	B32922C3334M***	730	750	500
	0.33	8.5 × 14.5 × 18.0	B32922D3334+***	680	700	500
	0.33	13.0 × 14.0 × 18.0	B32922T3334+***	—	500	300
	0.47	9.0 × 17.5 × 18.0	B32922C3474+***	640	700	500
	0.56	11.0 × 18.5 × 18.0	B32922C3564+***	—	550	250
	0.68	11.0 × 18.5 × 18.0	B32922C3684M***	—	550	250

Composition of ordering code

+ = Capacitance tolerance code:

M = ±20%

K = ±10%

*** = Packaging code:

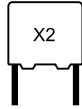
289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)

(Closer tolerances on request)

Preferred types



Ordering codes and packing units

Lead spacing	C _R	Max. dimensions w × h × l mm	Ordering code (composition see below)	Ammo pack pcs./unit	Reel pcs./unit	Untaped pcs./unit
mm	μF					
22.5	0.33	8.5 × 16.5 × 26.5	B32923A2334+***	480	500	510
	0.33	6.0 × 15.0 × 26.5	B32923C3334M***	680	700	720
	0.33	7.0 × 16.0 × 26.5	B32923D3334+***	580	600	630
	0.33	7.5 × 14.0 × 26.5	B32923T3334+***	550	500	570
	0.47	8.5 × 16.5 × 26.5	B32923A2474M***	480	500	510
	0.47	10.5 × 16.5 × 26.5	B32923B2474+***	390	400	540
	0.47	8.5 × 16.5 × 26.5	B32923C3474+***	480	500	510
	0.56	8.5 × 16.5 × 26.5	B32923C3564M***	480	500	510
	0.68	10.5 × 18.5 × 26.5	B32923A2684M***	390	400	540
	0.68	10.5 × 20.5 × 26.5	B32923B2684+***	390	400	540
	0.68	10.5 × 16.5 × 26.5	B32923C3684+***	390	400	540
	0.82	10.5 × 18.5 × 26.5	B32923C3824M***	390	400	540
	1.0	12.0 × 22.0 × 26.5	B32923A2105M***	—	—	450
	1.0	11.0 × 20.5 × 26.5	B32923C3105+***	370	350	510
	1.5	12.0 × 22.0 × 26.5	B32923C3155M***	—	—	450
	1.5	14.5 × 29.5 × 26.5	B32923D3155+***	—	—	260
	2.2	14.5 × 29.5 × 26.5	B32923C3225+***	—	—	260

Composition of ordering code

+ = Capacitance tolerance code:

M = ±20%

K = ±10%

*** = Packaging code:

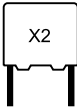
289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 –1 mm)

(Closer tolerances on request)

Preferred types



B32921 ... B32926

X2 / 305 VAC

Ordering codes and packing units

Lead spacing	C _R	Max. dimensions w × h × l mm	Ordering code (composition see below)	Ammo pack pcs./unit	Reel pcs./unit	Untaped pcs./unit
mm	μF					
27.5	0.68	11.0 × 19.0 × 31.5	B32924C3684+***	—	350	320
	0.82	11.0 × 19.0 × 31.5	B32924C3824+***	—	350	320
	1.0	11.0 × 21.0 × 31.5	B32924A2105+***	—	350	320
	1.0	11.0 × 19.0 × 31.5	B32924C3105+***	—	350	320
	1.5	13.5 × 23.0 × 31.5	B32924A2155M***	—	250	260
	1.5	14.0 × 24.5 × 31.5	B32924B2155+***	—	—	260
	1.5	12.5 × 21.5 × 31.5	B32924C3155+***	—	300	280
	2.2	18.0 × 27.5 × 31.5	B32924A2225+***	—	—	200
	2.2	14.0 × 24.5 × 31.5	B32924C3225+***	—	—	260
	3.3	21.0 × 31.0 × 31.5	B32924A2335M***	—	—	180
	3.3	18.0 × 27.5 × 31.5	B32924C3335M***	—	—	200
	3.3	16.0 × 32.0 × 31.5	B32924D3335+***	—	—	220
	4.7	22.0 × 36.5 × 31.5	B32924A2475M***	—	—	160
	4.7	18.0 × 33.0 × 31.5	B32924C3475M***	—	—	200
	4.7	21.0 × 31.0 × 31.5	B32924D3475M***	—	—	180
	5.6	22.0 × 36.5 × 31.5	B32924C3565+***	—	—	160
37.5	2.2	14.0 × 25.0 × 41.5	B32926C3225+***	—	—	115
	3.3	18.0 × 32.5 × 41.5	B32926A2335+***	—	—	90
	3.3	16.0 × 28.5 × 41.5	B32926C3335+***	—	—	100
	4.7	20.0 × 39.5 × 41.5	B32926A2475M***	—	—	75
	4.7	18.0 × 32.5 × 41.5	B32926C3475+***	—	—	90
	5.6	20.0 × 39.5 × 41.5	B32926A2565M***	—	—	75
	5.6	18.0 × 32.5 × 41.5	B32926C3565+***	—	—	90
	6.8	28.0 × 42.5 × 41.5	B32926A2685M***	—	—	55
	6.8	20.0 × 39.5 × 41.5	B32926C3685+***	—	—	75
	8.2	28.0 × 42.5 × 41.5	B32926A2825M***	—	—	55
	8.2	20.0 × 39.5 × 41.5	B32926C3825+***	—	—	55
	10.0	28.0 × 42.5 × 41.5	B32926C3106+***	—	—	55

Composition of ordering code

+ = Capacitance tolerance code:

M = ±20%

K = ±10%

*** = Packaging code:

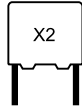
289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)

(Closer tolerances on request)

Preferred types

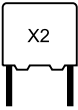


Technical data

Standard version (A/B/T): B3292*A.... / B3292*B.... / B3292*T....

Miniaturized version (C/D): B3292*C.... / B3292*D.... (preferred types)

Max. operating temperature T _{op,max}	+125 °C (for C _R ≤1 μF with A/B/T version) +110 °C (for C _R >1 μF or C/D version)			
Dissipation factor tan δ (in 10 ⁻³) at 20 °C (upper limit values)		C _R ≤0.1 μF	0.1μF<C _R ≤2.2 μF	C _R >2.2 μF
	at 1 kHz 100 kHz	1.0 5.0	1.0 —	2.0 —
Insulation resistance R _{ins} or time constant τ = C _R · R _{ins} at 20 °C, rel. humidity ≤ 65% (minimum as-delivered values)	C _R ≤0.33 μF	C _R >0.33 μF		
	100 000 MΩ	30 000 s		
DC test voltage	2121 V, 2 s			
Passive flammability category to IEC 40 (CO) 752	B			
Maximum continuous AC voltage V _{AC}	310 V (50/60 Hz)			
Rated AC voltage (IEC 60384-14)	305 V (50/60 Hz)			
Maximum continuous DC voltage V _{DC}	760 V (630 V for C/D version)			
Operating AC voltage V _{op} at high temperature	T _A ≤ 110 °C		V _{op} = V _{AC} (continuously)	
	T _A ≤ 110 °C		V _{op} = 1.25 · V _{AC} (1000 h)	
	110 °C <T _A ≤ 125 °C		V _{op} = V _{AC} (1000 h) (only for A/B/T version)	
Damp heat test	56 days / 40 °C / 93% relative humidity			
Limit values after damp heat test	Capacitance change ΔC/C ≤ 5%			
	Dissipation factor change Δ tan δ ≤ 0.5 · 10 ⁻³ (at 1 kHz)			
	Insulation resistance R _{ins} ≤ 1.0 · 10 ⁻³ (at 10 kHz)			
	or time constant τ = C _R · R _{ins} ≥ 50% of minimum as-delivered values			



B32921 ... B32926

X2 / 305 VAC

Pulse handling capability

"dV/dt" represents the maximum permissible voltage change per unit of time for non-sinusoidal voltages, expressed in V/μs.

"k₀" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V²/μs.

Note:

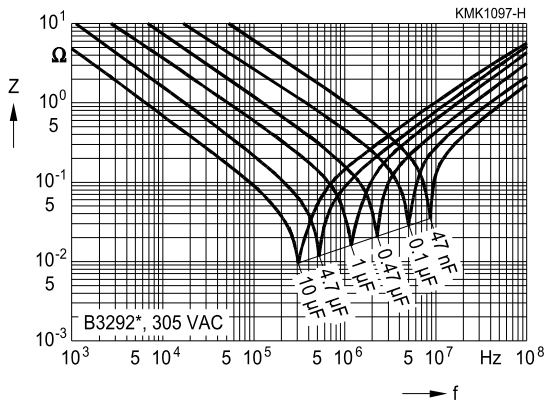
The values of dV/dt and k₀ provided below must not be exceeded in order to avoid damaging the capacitor.

dV/dt and k₀ values

Lead spacing	10 mm		15 mm		22.5 mm		27.5 mm		37.5 mm	
Version	A/B/T	C/D	A/B/T	C/D	A/B/T	C/D	A/B/T	C/D	A/B/T	C/D
dV/dt in V/μs	550	475	400	340	200	170	150	120	100	80
k ₀ in V ² /μs	473000	408500	344000	292400	172000	146200	129000	103200	86000	68800

Impedance Z versus frequency f

(typical values)



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, EPCOS-JONES, Baoke, CeraDiode, CSSP, MLSC, PhaseCap, PhaseMod, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMID, SIOV, SIP5D, SIP5K, UltraCap, 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.