Film Capacitors

EMI Suppression Capacitors (MKP)

Series/Type: **B32921 ... B32926**
Date: May 2005

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

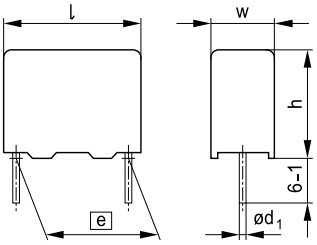
Marking

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



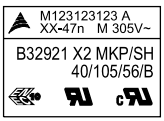
KMK0826-Q-E

Dimensions in mm

Lead spacing e ±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

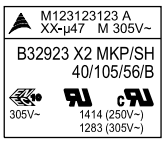
Marking examples

e = 10 mm



KMK0820-B

e ≥15 mm/C_R≤1 µF



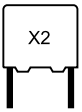
KMK0821-J

e = 22.5, 27.5,
37.5 mm/C_R>1 µF

KMK0822-S

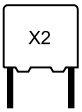
Approvals

Marks of conformity	Standards	Certificate
	EN 132400, IEC 60384-14	40005536/40010694
	UL 1414 / UL 1283	E97863 / E157153
	CSA C22.2 No.1 / No. 8	E97863 / E157153 (approved by UL)
	CQC (GB/T 14472-1998)	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	C_R	Max. dimensions w × h × l	Ordering code (composition see	Ammo pack	Reel	Untaped
mm	µF	mm	below)	pcs./unit	pcs./unit	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

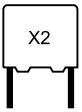
Composition of ordering code

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

(Closer tolerances on request)

*** = Packaging code:
289 = Ammo pack
189 = Reel
000 = Untaped (lead length 6 −1 mm)

Preferred types



Ordering codes and packing units

Lead spacing	C_R	Max. dimensions w × h × l	Ordering code (composition see	Ammo pack	Reel	Untaped
mm	µF	mm	below)	pcs./unit	pcs./unit	pcs./unit
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

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Preferred types

Ordering codes and packing units

Lead spacing	C_R	Max. dimensions w × h × l	Ordering code (composition see	Ammo pack	Reel	Untaped
mm	µF	mm	below)	pcs./unit	pcs./unit	pcs./unit
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

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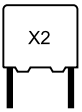
Preferred types



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 $C_R \leq 1$ 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)		$C_R \leq 0.1$ µF	0.1µF$< C_R \leq$2.2 µF	$C_R >$2.2 µF
	at 1 kHz	1.0	1.0	2.0
	100 kHz	5.0	–	–
Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$ at 20 °C, rel. humidity ≤ 65% (minimum as-delivered values)	$C_R \leq 0.33$ 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	$T_A \leq 110$ °C	$V_{op} = V_{AC}$	(continuously)	
	$T_A \leq 110$ °C	$V_{op} = 1.25 \cdot V_{AC}$	(1000 h)	
	110 °C $< T_A \leq 125$ °C	$V_{op} = V_{AC}$	(1000 h) (only for A/B/T version)	
Damp heat test Limit values after damp heat test	56 days / 40 °C / 93% relative humidity Capacitance change $\lvert\Delta C/C\rvert$ ≤ 5% Dissipation factor change Δ tan δ ≤ $0.5 \cdot 10^{-3}$ (at 1 kHz) Insulation resistance R_{ins} ≤ $1.0 \cdot 10^{-3}$ (at 10 kHz) or time constant $\tau = C_R \cdot R_{ins}$ ≥ 50% of minimum as-delivered values			

Pulse handling capability

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

"k_0" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in $V^2/\mu s$.

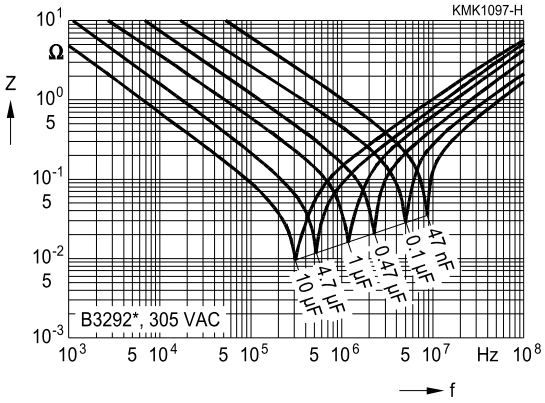
Note:
The values of dV/dt and k_0 provided below must not be exceeded in order to avoid damaging the capacitor.

dV/dt and k_0 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 $V^2/\mu s$	473000	408500	344000	292400	172000	146200	129000	103200	86000	68800

Impedance Z versus frequency f

(typical values)



product specification is suitable for use in a particular customer applicat

2. We also point out that **in individual cases, a malfunction of passiv or failure before the end of their usual service life cannot be co current state of the art, even if they are operated as specified.** requiring a very high level of operational safety and especially in custo the malfunction or failure of a passive electronic component could end (e.g. in accident prevention or life-saving systems), it must therefore suitable design of the customer application or other action taken by the of protective circuitry or redundancy) that no injury or damage is susta event of malfunction or failure of a passive electronic component.

3. **The warnings, cautions and product-specific notes must be observ**

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