



Film Capacitors

EMI Suppression Capacitors (MKP)

Series/Type: B32921 ... B32926

Date: May 2005

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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

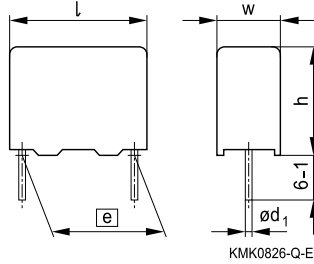
Marking

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

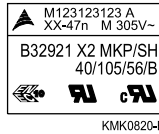


Dimensions in mm

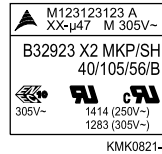
| Lead spacing e ±0.4 | Lead diameter d_1 | Type |
|--------------------------|------------------------|--------|
| 10 | 0.6 | B32921 |
| 15 | 0.8 | B32922 |
| 22.5 | 0.8 | B32923 |
| 27.5 | 0.8 | B32924 |
| 37.5 | 1.0 | B32926 |

Marking examples

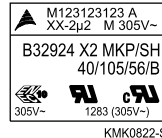
e = 10 mm







e ≥ 15 mm / C_R ≤ 1 μF

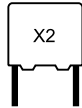


e = 22.5, 27.5, 37.5 mm / C_R > 1 μF



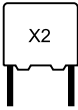
Approvals

| 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 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 | Ordering code (composition see below) | Ammo pack | Reel | Untaped |
|--------------|----------------|------------------------------|---|--------------|-----------|-----------|
| mm | μF | mm | | 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 |

Composition of ordering code

+ = Capacitance tolerance code:

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K = ±10%

*** = Packaging code:

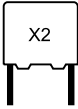
289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 –1 mm)

(Closer tolerances on request)

Preferred types



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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 |
|--------------------|----------------------|------------------------------------|---|---------------------------|-------------------|----------------------|
| 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)

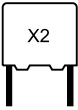
Preferred types

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 $C_R \leq 1 \mu F$ with A/B/T version) +110 °C (for $C_R > 1 \mu F$ or C/D version) | | | |
| Dissipation factor $\tan \delta$ (in 10^{-3}) at 20 °C (upper limit values) | | $C_R \leq 0.1 \mu F$ | $0.1 \mu F < C_R \leq 2.2 \mu F$ | $C_R > 2.2 \mu F$ |
| | at 1 kHz | 1.0 | 1.0 | 2.0 |
| | at 100 kHz | 5.0 | — | — |
| Insulation resistance R_{ins} or time constant $\tau = C_R \cdot R_{ins}$ at 20 °C, rel. humidity $\leq 65\%$ (minimum as-delivered values) | $C_R \leq 0.33 \mu F$ | $C_R > 0.33 \mu F$ | | |
| | 100 000 M Ω | 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 | $T_A \leq 110 \text{ }^\circ\text{C}$ | $V_{op} = V_{AC}$ (continuously) | | |
| | $T_A \leq 110 \text{ }^\circ\text{C}$ | $V_{op} = 1.25 \cdot V_{AC}$ (1000 h) | | |
| | $110 \text{ }^\circ\text{C} < T_A \leq 125 \text{ }^\circ\text{C}$ | $V_{op} = V_{AC}$ (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 $ \Delta C/C \leq 5\%$ Dissipation factor change $\Delta \tan \delta \leq 0.5 \cdot 10^{-3}$ (at 1 kHz) Insulation resistance $R_{ins} \leq 1.0 \cdot 10^{-3}$ (at 10 kHz) or time constant $\tau = C_R \cdot R_{ins} \geq 50\%$ of minimum as-delivered values | | | |



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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/ μ s.

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

Note:

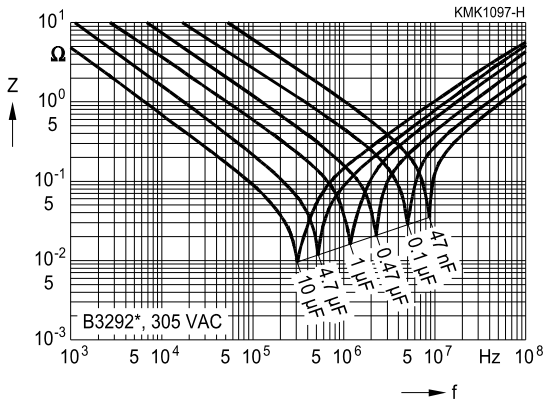
The values of dV/dt and k₀ provided below must not be exceeded in order to avoid damaging the capacitor.

dV/dt and k₀ values

| Lead spacing | 10 mm | | 15 mm | | 22.5 mm | | 27.5 mm | | 37.5 mm | |
|--|--------|--------|--------|--------|---------|--------|---------|--------|---------|-------|
| | 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/ μ s | 550 | 475 | 400 | 340 | 200 | 170 | 150 | 120 | 100 | 80 |
| k ₀ in V ² / μ s | 473000 | 408500 | 344000 | 292400 | 172000 | 146200 | 129000 | 103200 | 86000 | 68800 |

Impedance Z versus frequency f

(typical values)



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