



## Film Capacitors

### EMI Suppression Capacitors (MKP)

**Series/Type:** B81130  
**Date:** August 2004

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## EMI suppression capacitors (MKP)

B81130

### X2 / 275 VAC

Not for new design

#### Typical applications

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

#### Climatic

- Max. operating temperature: 100 °C
- Climatic category (IEC 60068-1): 40/100/21

#### Construction

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

#### Features

- 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.

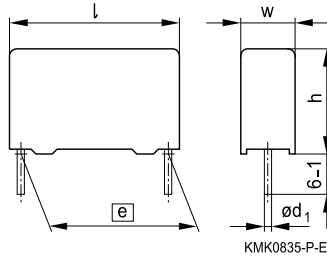
#### Delivery mode

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

#### Approvals

| Marks of conformity                                                                                                                                                                                                                                               | Standards                                                                               | Certificate                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|--------------------------------------------------------|
| <br><br> | EN 132400, IEC 60384-14<br>UL 1414 / UL 1283<br>CSA C22.2 No.1<br>CQC (GB/T 14472-1998) | 138554<br>E97863 / E157153<br>E97863<br>CQC02001001667 |

#### Dimensional drawing

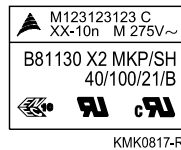


Dimensions in mm

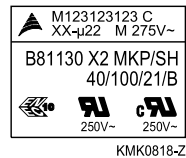
| Lead spacing   | Lead diameter d <sub>1</sub> |
|----------------|------------------------------|
| $e \pm 0.4$    |                              |
| 10 mm          | 0.6                          |
| 15 ... 27.5 mm | 0.8                          |

#### Marking examples

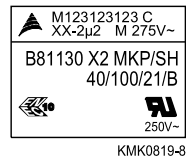
$e = 10$  mm

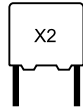


$e \geq 15$  mm/C<sub>R</sub> ≤ 1 µF



$e = 27.5$  mm/C<sub>R</sub> > 1 µF

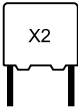




Not for new design

### Overview of available types

| Lead spacing | 10 mm | 15 mm | 22.5 mm | 27.5 mm |
|--------------|-------|-------|---------|---------|
| $C_R$ (μF)   |       |       |         |         |
| 0.010        |       |       |         |         |
| 0.015        |       |       |         |         |
| 0.022        |       |       |         |         |
| 0.033        |       |       |         |         |
| 0.047        |       |       |         |         |
| 0.056        |       |       |         |         |
| 0.068        |       |       |         |         |
| 0.10         |       |       |         |         |
| 0.15         |       |       |         |         |
| 0.22         |       |       |         |         |
| 0.33         |       |       |         |         |
| 0.47         |       |       |         |         |
| 0.68         |       |       |         |         |
| 1.0          |       |       |         |         |
| 1.5          |       |       |         |         |
| 2.2          |       |       |         |         |


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**Ordering codes and packing units**

| Lead spacing<br>mm | C <sub>R</sub><br>μF | Max. dimensions<br>w × h × l<br>mm | Ordering code<br>(composition see<br>below) | Ammo<br>pack<br>pcs./unit | Reel<br>pcs./unit | Untaped<br>pcs./unit |
|--------------------|----------------------|------------------------------------|---------------------------------------------|---------------------------|-------------------|----------------------|
| 10                 | 0.010                | 4.0 × 9.0 × 13.0                   | B81130C1103+***                             | 1000                      | 1700              | 1000                 |
|                    | 0.015                | 4.0 × 9.0 × 13.0                   | B81130C1153+***                             | 1000                      | 1700              | 1000                 |
|                    | 0.022                | 5.0 × 11.0 × 13.0                  | B81130C1223+***                             | 830                       | 1300              | 1000                 |
|                    | 0.033                | 5.0 × 11.0 × 13.0                  | B81130C1333M***                             | 830                       | 1300              | 1000                 |
|                    | 0.033                | 6.0 × 12.0 × 13.0                  | B81130A1333+***                             | 680                       | 1100              | 1000                 |
|                    | 0.047                | 6.0 × 12.0 × 13.0                  | B81130C1473+***                             | 680                       | 1100              | 1000                 |
| 15                 | 0.022                | 5.0 × 10.5 × 18.0                  | B81130B1223+***                             | 1170                      | 1300              | 1000                 |
|                    | 0.033                | 5.0 × 10.5 × 18.0                  | B81130B1333+***                             | 1170                      | 1300              | 1000                 |
|                    | 0.047                | 5.0 × 10.5 × 18.0                  | B81130B1473+***                             | 1170                      | 1300              | 1000                 |
|                    | 0.056                | 5.0 × 10.5 × 18.0                  | B81130C1563M***                             | 1170                      | 1300              | 1000                 |
|                    | 0.068                | 6.0 × 11.0 × 18.0                  | B81130C1683+***                             | 960                       | 1100              | 1000                 |
|                    | 0.10                 | 6.0 × 12.0 × 18.0                  | B81130C1104M***                             | 960                       | 1100              | 1000                 |
|                    | 0.10                 | 7.0 × 12.5 × 18.0                  | B81130A1104+***                             | 830                       | 900               | 1000                 |
|                    | 0.15                 | 8.5 × 14.5 × 18.0                  | B81130C1154+***                             | 680                       | 700               | 500                  |
| 22.5               | 0.22                 | 9.0 × 17.5 × 18.0                  | B81130C1224+***                             | 640                       | 700               | 500                  |
|                    | 0.15                 | 6.0 × 15.0 × 26.5                  | B81130B1154+***                             | 680                       | 700               | 720                  |
|                    | 0.22                 | 7.0 × 16.0 × 26.5                  | B81130B1224+***                             | 580                       | 600               | 630                  |
|                    | 0.33                 | 8.5 × 16.5 × 26.5                  | B81130C1334+***                             | 480                       | 500               | 510                  |
|                    | 0.47                 | 10.5 × 16.5 × 26.5                 | B81130C1474M***                             | 390                       | 400               | 540                  |
|                    | 0.47                 | 10.5 × 18.5 × 26.5                 | B81130A1474+***                             | 390                       | 400               | 540                  |
| 27.5               | 0.68                 | 11.0 × 20.5 × 26.5                 | B81130C1684+***                             | 370                       | 350               | 510                  |
|                    | 0.47                 | 11.0 × 21.0 × 31.5                 | B81130B1474+***                             | —                         | 350               | 320                  |
|                    | 0.68                 | 11.0 × 21.0 × 31.5                 | B81130B1684+***                             | —                         | 350               | 320                  |
|                    | 1.0                  | 12.5 × 21.5 × 31.5                 | B81130C1105M***                             | —                         | 300               | 280                  |
|                    | 1.0                  | 13.5 × 23.0 × 31.5                 | B81130A1105+***                             | —                         | 250               | 260                  |
|                    | 1.5                  | 15.0 × 24.5 × 31.5                 | B81130C1155M***                             | —                         | —                 | 240                  |
|                    | 1.5                  | 18.0 × 27.5 × 31.5                 | B81130A1155+***                             | —                         | —                 | 200                  |
|                    | 2.2                  | 18.0 × 27.5 × 31.5                 | B81130C1225M***                             | —                         | —                 | 200                  |
|                    | 2.2                  | 19.0 × 30.0 × 31.5                 | B81130A1225+***                             | —                         | —                 | 180                  |

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

+ = Capacitance tolerance code:

M = ±20%

K = ±10%

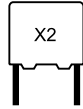
\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)

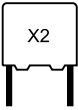
(Closer tolerances on request)



Not for new design

# Technical data

|                                                                                                                                                        |                                                                                         |                              |                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------|-------------------|
| Max. operating temperature $T_{op,max}$                                                                                                                | +100 °C                                                                                 |                              |                   |
| Dissipation factor $\tan \delta$ (in $10^{-3}$ )<br>at 20 °C (upper limit values)                                                                      |                                                                                         | $C_R \leq 0.1 \mu F$         | $C_R > 0.1 \mu F$ |
|                                                                                                                                                        | at 1 kHz<br>100 kHz                                                                     | 1.0<br>5.0                   | 1.0<br>—          |
| Insulation resistance $R_{ins}$<br>or time constant $\tau = C_R \cdot R_{ins}$<br>at 20 °C, rel. humidity $\leq 65\%$<br>(minimum as-delivered values) | $C_R \leq 0.33 \mu F$                                                                   | $C_R > 0.33 \mu F$           |                   |
|                                                                                                                                                        | 100 000 M $\Omega$                                                                      | 30 000 s                     |                   |
| DC test voltage                                                                                                                                        | 2121 V, 2 s                                                                             |                              |                   |
| Passive flammability category<br>to IEC 40 (CO) 752                                                                                                    | B                                                                                       |                              |                   |
| Maximum continuous AC voltage ( $V_{AC}$ )                                                                                                             | 310 V (50/60 Hz)                                                                        |                              |                   |
| Rated AC voltage (IEC 60384-14)                                                                                                                        | 275 V (50/60 Hz)                                                                        |                              |                   |
| Maximum continuous DC voltage ( $V_{DC}$ )                                                                                                             | 760 V                                                                                   |                              |                   |
| Operating AC voltage $V_{op}$ at high<br>temperature                                                                                                   | $T_A \leq 100 \text{ }^{\circ}\text{C}$                                                 | $V_{op} = V_{AC}$            | (continuously)    |
|                                                                                                                                                        | $T_A \leq 100 \text{ }^{\circ}\text{C}$                                                 | $V_{op} = 1.25 \cdot V_{AC}$ | (1000 h)          |
| Damp heat test                                                                                                                                         | 21 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<br>as-delivered values |                              |                   |



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### Pulse handling capability

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

"k<sub>0</sub>" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V<sup>2</sup>/ $\mu$ s.

*Note:*

*The values of dV/dt and k<sub>0</sub> provided below must not be exceeded in order to avoid damaging the capacitor.*

### dV/dt and k<sub>0</sub> values

| Lead spacing                               | 10 mm   | 15 mm   | 22.5 mm | 27.5 mm |
|--------------------------------------------|---------|---------|---------|---------|
| dV/dt in V/ $\mu$ s                        | 550     | 400     | 200     | 150     |
| k <sub>0</sub> in V <sup>2</sup> / $\mu$ s | 429 000 | 312 000 | 156 000 | 117 000 |

### Impedance Z versus frequency f

(typical values)

