



## Film Capacitors

### Metallized Polypropylene Film Capacitors (MKP)

**Series/Type:** B32651 ... B32656

**Date:** August 2004

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## High pulse (wound)

### Typical applications

- TV (S-correction/flyback)
- Electronic ballasts

### Climatic

- Max. operating temperature: 105 °C
- Climatic category (IEC 60068-1): 55/100/56

### Construction

- Dielectric: polypropylene (PP)
- Wound capacitor technology with internal series connection for  $V_R \geq 1250$  VDC
- Plastic case (UL 94 V-0)
- Epoxy resin sealing

### Features

- High pulse strength
- High contact reliability
- Small dimensions

### Terminals

- Parallel wire leads, lead-free tinned
- Special lead lengths available on request

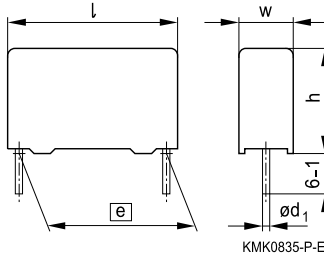
### Marking

Manufacturer's logo,  
lot number ( $\boxed{e} \leq 27.5$  mm), series number  
(e.g. 651),  
rated capacitance (coded), cap. tolerance (code letter),  
rated DC voltage  
(AC voltage for 1600 VDC/700 VAC and  
2000 VDC/1000 VAC),  
date of manufacture (coded)

### Delivery mode

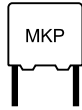
Bulk (untaped)  
Taped (Ammo pack or reel)  
For notes on taping, refer to chapter "Taping and packing".

### Dimensional drawing



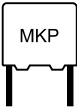
Dimensions in mm

| Lead spacing<br>$\boxed{e} \pm 0.4$ | Lead diameter<br>$d_1$ | Type   |
|-------------------------------------|------------------------|--------|
| 10                                  | 0.6                    | B32651 |
| 15                                  | 0.8                    | B32652 |
| 22.5                                | 0.8                    | B32653 |
| 27.5                                | 0.8                    | B32654 |
| 37.5                                | 1.0                    | B32656 |



### Overview of available types

| Lead spacing    | 10 mm  | 15 mm  |     |     |      |      |      |      |      |
|-----------------|--------|--------|-----|-----|------|------|------|------|------|
| Type            | B32651 | B32652 |     |     |      |      |      |      |      |
| Page            | 6      | 7      |     |     |      |      |      |      |      |
| $V_R$ (VDC)     | 1250   | 250    | 400 | 630 | 1000 | 1250 | 1600 | 1600 | 2000 |
| $V_{rms}$ (VAC) | 450    | 160    | 200 | 250 | 250  | 500  | 500  | 700  | 700  |
| $C_R$ (nF)      |        |        |     |     |      |      |      |      |      |
| 1.0             |        |        |     |     |      |      |      |      |      |
| 1.5             |        |        |     |     |      |      |      |      |      |
| 2.2             |        |        |     |     |      |      |      |      |      |
| 3.3             |        |        |     |     |      |      |      |      |      |
| 4.7             |        |        |     |     |      |      |      |      |      |
| 6.8             |        |        |     |     |      |      |      |      |      |
| 10              |        |        |     |     |      |      |      |      |      |
| 15              |        |        |     |     |      |      |      |      |      |
| 22              |        |        |     |     |      |      |      |      |      |
| 33              |        |        |     |     |      |      |      |      |      |
| 47              |        |        |     |     |      |      |      |      |      |
| 68              |        |        |     |     |      |      |      |      |      |
| 100             |        |        |     |     |      |      |      |      |      |
| 150             |        |        |     |     |      |      |      |      |      |
| 220             |        |        |     |     |      |      |      |      |      |
| 330             |        |        |     |     |      |      |      |      |      |
| 470             |        |        |     |     |      |      |      |      |      |
| 680             |        |        |     |     |      |      |      |      |      |

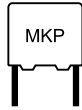


**B32651 ... B32656**

**High pulse (wound)**

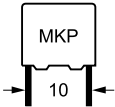
### Overview of available types

| Lead spacing    | 22.5 mm |     |     |      |      |      |      |      | 27.5 mm |     |     |      |      |      |      |  |
|-----------------|---------|-----|-----|------|------|------|------|------|---------|-----|-----|------|------|------|------|--|
| Type            | B32653  |     |     |      |      |      |      |      | B32654  |     |     |      |      |      |      |  |
| Page            | 9       |     |     |      |      |      |      |      | 11      |     |     |      |      |      |      |  |
| $V_R$ (VDC)     | 250     | 400 | 630 | 1000 | 1250 | 1600 | 2000 | 2000 | 250     | 400 | 630 | 1000 | 1250 | 1600 | 2000 |  |
| $V_{rms}$ (VAC) | 160     | 200 | 250 | 250  | 500  | 500  | 700  | 1000 | 160     | 200 | 250 | 250  | 500  | 500  | 700  |  |
| $C_R$ (nF)      |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 2.2             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 3.3             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 4.7             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 6.8             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 10              |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 15              |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 22              |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 33              |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 47              |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 68              |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 100             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 150             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 220             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 330             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 470             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 680             |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 1000            |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 1500            |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 2200            |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 3300            |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |
| 4700            |         |     |     |      |      |      |      |      |         |     |     |      |      |      |      |  |



# Overview of available types

|                 |         |      |      |      |      |
|-----------------|---------|------|------|------|------|
| Lead spacing    | 37.5 mm |      |      |      |      |
| Type            | B32656  |      |      |      |      |
| Page            | 12      |      |      |      |      |
| $V_R$ (VDC)     | 850     | 1000 | 1250 | 1600 | 2000 |
| $V_{rms}$ (VAC) | 450     | 500  | 500  | 600  | 700  |
| $C_R$ (nF)      |         |      |      |      |      |
| 100             |         |      |      |      |      |
| 150             |         |      |      |      |      |
| 220             |         |      |      |      |      |
| 330             |         |      |      |      |      |
| 470             |         |      |      |      |      |
| 680             |         |      |      |      |      |
| 1000            |         |      |      |      |      |


**B32651**
**High pulse (wound)**
**Ordering codes and packing units (lead spacing 10 mm)**

| $V_R$             | $V_{rms}$<br>$f \leq 1 \text{ kHz}$ | $C_R$ | Max. dimensions<br>$w \times h \times l$<br>mm | Ordering code<br>(composition see<br>below) | Ammo<br>pack<br>pcs./unit | Reel<br>pcs./unit | Untaped<br>pcs./unit |
|-------------------|-------------------------------------|-------|------------------------------------------------|---------------------------------------------|---------------------------|-------------------|----------------------|
| VDC <sup>1)</sup> | VAC                                 | nF    |                                                |                                             |                           |                   |                      |
| 1250              | 450                                 | 2.2   | $4.0 \times 9.0 \times 13.0$                   | B32651A7222+***                             | 1000                      | 1700              | 1000                 |
|                   |                                     | 3.3   | $5.0 \times 11.0 \times 13.0$                  | B32651A7332+***                             | 830                       | 1300              | 1000                 |
|                   |                                     | 4.7   | $5.0 \times 11.0 \times 13.0$                  | B32651A7472+***                             | 830                       | 1300              | 1000                 |
|                   |                                     | 6.8   | $6.0 \times 12.0 \times 13.0$                  | B32651A7682+***                             | 680                       | 1100              | 1000                 |

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

+ = Capacitance tolerance code:

K =  $\pm 10\%$

J =  $\pm 5\%$

on request =  $\pm 3.5\%$

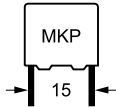
\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)

1) For pulse loads (pulse width  $\leq 1000 \mu s$ ), a peak voltage of  $1400 V_p$  can be permitted.



### Ordering codes and packing units (lead spacing 15 mm)

| $V_R$ | $V_{rms}$<br>$f \leq 1 \text{ kHz}$ | $C_R$ | Max. dimensions<br>$w \times h \times l$<br>mm | Ordering code<br>(composition see<br>below) | Ammo<br>pack<br>pcs./unit | Reel<br>pcs./unit | Untaped<br>pcs./unit |
|-------|-------------------------------------|-------|------------------------------------------------|---------------------------------------------|---------------------------|-------------------|----------------------|
| VDC   | VAC                                 | nF    |                                                |                                             |                           |                   |                      |
| 250   | 160                                 | 150   | $5.0 \times 10.5 \times 18.0$                  | B32652A3154+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 220   | $6.0 \times 11.0 \times 18.0$                  | B32652A3224+***                             | 960                       | 1100              | 1000                 |
|       |                                     | 330   | $7.0 \times 12.5 \times 18.0$                  | B32652A3334+***                             | 830                       | 900               | 1000                 |
|       |                                     | 470   | $8.5 \times 14.5 \times 18.0$                  | B32652A3474+***                             | 680                       | 700               | 500                  |
|       |                                     | 680   | $9.0 \times 17.5 \times 18.0$                  | B32652A3684+***                             | 640                       | 700               | 500                  |
| 400   | 200                                 | 68    | $5.0 \times 10.5 \times 18.0$                  | B32652A4683+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 100   | $5.0 \times 10.5 \times 18.0$                  | B32652A4104+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 150   | $6.0 \times 11.0 \times 18.0$                  | B32652A4154+***                             | 960                       | 1100              | 1000                 |
|       |                                     | 220   | $7.0 \times 12.5 \times 18.0$                  | B32652A4224+***                             | 830                       | 900               | 1000                 |
|       |                                     | 330   | $8.5 \times 14.5 \times 18.0$                  | B32652A4334+***                             | 680                       | 700               | 500                  |
| 630   | 250                                 | 470   | $9.0 \times 17.5 \times 18.0$                  | B32652A4474+***                             | 640                       | 700               | 500                  |
|       |                                     | 33    | $5.0 \times 10.5 \times 18.0$                  | B32652A6333+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 47    | $5.0 \times 10.5 \times 18.0$                  | B32652A6473+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 68    | $6.0 \times 11.0 \times 18.0$                  | B32652A6683+***                             | 960                       | 1100              | 1000                 |
|       |                                     | 100   | $7.0 \times 12.5 \times 18.0$                  | B32652A6104+***                             | 830                       | 900               | 1000                 |
| 1000  | 250                                 | 150   | $8.5 \times 14.5 \times 18.0$                  | B32652A6154+***                             | 680                       | 700               | 500                  |
|       |                                     | 220   | $9.0 \times 17.5 \times 18.0$                  | B32652A6224+***                             | 640                       | 700               | 500                  |
|       |                                     | 10    | $5.0 \times 10.5 \times 18.0$                  | B32652A0103+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 15    | $5.0 \times 10.5 \times 18.0$                  | B32652A0153+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 22    | $5.0 \times 10.5 \times 18.0$                  | B32652A0223+***                             | 1170                      | 1300              | 1000                 |
| 1250  | 500                                 | 33    | $6.0 \times 11.0 \times 18.0$                  | B32652A0333+***                             | 960                       | 1100              | 1000                 |
|       |                                     | 47    | $7.0 \times 12.5 \times 18.0$                  | B32652A0473+***                             | 830                       | 900               | 1000                 |
|       |                                     | 68    | $8.5 \times 14.5 \times 18.0$                  | B32652A0683+***                             | 680                       | 700               | 500                  |
|       |                                     | 100   | $9.0 \times 17.5 \times 18.0$                  | B32652A0104+***                             | 640                       | 700               | 500                  |
|       |                                     | 6.8   | $5.0 \times 10.5 \times 18.0$                  | B32652A7682+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 10    | $6.0 \times 11.0 \times 18.0$                  | B32652A7103+***                             | 960                       | 1100              | 1000                 |
|       |                                     | 15    | $7.0 \times 12.5 \times 18.0$                  | B32652A7153+***                             | 830                       | 900               | 1000                 |
|       |                                     | 22    | $8.5 \times 14.5 \times 18.0$                  | B32652A7223+***                             | 680                       | 700               | 500                  |
|       |                                     | 33    | $9.0 \times 17.5 \times 18.0$                  | B32652A7333+***                             | 640                       | 700               | 500                  |

Further E series and intermediate capacitance values on request.

### Composition of ordering code

+ = Capacitance tolerance code:

K =  $\pm 10\%$

J =  $\pm 5\%$

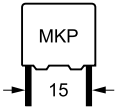
on request =  $\pm 3.5\%$

\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)


**B32652**
**High pulse (wound)**
**Ordering codes and packing units (lead spacing 15 mm)**

| $V_R$ | $V_{rms}$<br>$f \leq 1 \text{ kHz}$ | $C_R$ | Max. dimensions<br>$w \times h \times l$<br>mm | Ordering code<br>(composition see<br>below) | Ammo<br>pack<br>pcs./unit | Reel<br>pcs./unit | Untaped<br>pcs./unit |
|-------|-------------------------------------|-------|------------------------------------------------|---------------------------------------------|---------------------------|-------------------|----------------------|
| VDC   | VAC                                 | nF    |                                                |                                             |                           |                   |                      |
| 1600  | 500                                 | 3.3   | $5.0 \times 10.5 \times 18.0$                  | B32652A1332+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 4.7   | $6.0 \times 11.0 \times 18.0$                  | B32652A1472+***                             | 960                       | 1100              | 1000                 |
|       |                                     | 6.8   | $7.0 \times 12.5 \times 18.0$                  | B32652A1682+***                             | 830                       | 900               | 1000                 |
|       |                                     | 10    | $8.5 \times 14.5 \times 18.0$                  | B32652A1103+***                             | 680                       | 700               | 500                  |
|       |                                     | 15    | $9.0 \times 17.5 \times 18.0$                  | B32652A1153+***                             | 640                       | 700               | 500                  |
| 1600  | 700                                 | 2.2   | $5.0 \times 10.5 \times 18.0$                  | B32652J1222+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 3.3   | $6.0 \times 11.0 \times 18.0$                  | B32652J1332+***                             | 960                       | 1100              | 1000                 |
|       |                                     | 4.7   | $7.0 \times 12.5 \times 18.0$                  | B32652J1472+***                             | 830                       | 900               | 1000                 |
|       |                                     | 6.8   | $8.5 \times 14.5 \times 18.0$                  | B32652J1682+***                             | 680                       | 700               | 500                  |
|       |                                     | 10    | $9.0 \times 17.5 \times 18.0$                  | B32652J1103+***                             | 640                       | 700               | 500                  |
| 2000  | 700                                 | 1.0   | $5.0 \times 10.5 \times 18.0$                  | B32652A2102+***                             | 1170                      | 1300              | 1000                 |
|       |                                     | 1.5   | $6.0 \times 11.0 \times 18.0$                  | B32652A2152+***                             | 960                       | 1100              | 1000                 |
|       |                                     | 2.2   | $7.0 \times 12.5 \times 18.0$                  | B32652A2222+***                             | 830                       | 900               | 1000                 |
|       |                                     | 3.3   | $8.5 \times 14.5 \times 18.0$                  | B32652A2332+***                             | 680                       | 700               | 500                  |
|       |                                     | 4.7   | $9.0 \times 17.5 \times 18.0$                  | B32652A2472+***                             | 640                       | 700               | 500                  |

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

+ = Capacitance tolerance code:

K =  $\pm 10\%$

J =  $\pm 5\%$

on request =  $\pm 3.5\%$

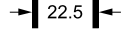
\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)





### Ordering codes and packing units (lead spacing 22.5 mm)

| $V_R$ | $V_{rms}$<br>$f \leq 1 \text{ kHz}$ | $C_R$ | Max. dimensions<br>$w \times h \times l$<br>mm | Ordering code<br>(composition see<br>below) | Ammo<br>pack<br>pcs./unit | Reel<br>pcs./unit | Untaped<br>pcs./unit |
|-------|-------------------------------------|-------|------------------------------------------------|---------------------------------------------|---------------------------|-------------------|----------------------|
| VDC   | VAC                                 | nF    |                                                |                                             |                           |                   |                      |
| 250   | 160                                 | 220   | $6.0 \times 15.0 \times 26.5$                  | B32653A3224+***                             | 680                       | 700               | 720                  |
|       |                                     | 330   | $6.0 \times 15.0 \times 26.5$                  | B32653A3334+***                             | 680                       | 700               | 720                  |
|       |                                     | 470   | $7.0 \times 16.0 \times 26.5$                  | B32653A3474+***                             | 580                       | 600               | 630                  |
|       |                                     | 680   | $8.5 \times 16.5 \times 26.5$                  | B32653A3684+***                             | 480                       | 500               | 510                  |
|       |                                     | 1000  | $10.5 \times 16.5 \times 26.5$                 | B32653A3105+***                             | 390                       | 400               | 540                  |
| 400   | 200                                 | 150   | $6.0 \times 15.0 \times 26.5$                  | B32653A4154+***                             | 680                       | 700               | 720                  |
|       |                                     | 220   | $6.0 \times 15.0 \times 26.5$                  | B32653A4224+***                             | 680                       | 700               | 720                  |
|       |                                     | 330   | $7.0 \times 16.0 \times 26.5$                  | B32653A4334+***                             | 580                       | 600               | 630                  |
|       |                                     | 470   | $8.5 \times 16.5 \times 26.5$                  | B32653A4474+***                             | 480                       | 500               | 510                  |
|       |                                     | 680   | $10.5 \times 16.5 \times 26.5$                 | B32653A4684+***                             | 390                       | 400               | 540                  |
| 630   | 250                                 | 100   | $6.0 \times 15.0 \times 26.5$                  | B32653A6104+***                             | 680                       | 700               | 720                  |
|       |                                     | 150   | $6.0 \times 15.0 \times 26.5$                  | B32653A6154+***                             | 680                       | 700               | 720                  |
|       |                                     | 220   | $8.5 \times 16.5 \times 26.5$                  | B32653A6224+***                             | 480                       | 500               | 510                  |
|       |                                     | 330   | $10.5 \times 16.5 \times 26.5$                 | B32653A6334+***                             | 390                       | 400               | 540                  |
|       |                                     | 470   | $11.0 \times 20.5 \times 26.5$                 | B32653A6474+***                             | 370                       | 350               | 510                  |
| 1000  | 250                                 | 33    | $6.0 \times 15.0 \times 26.5$                  | B32653A0333+***                             | 680                       | 700               | 720                  |
|       |                                     | 47    | $6.0 \times 15.0 \times 26.5$                  | B32653A0473+***                             | 680                       | 700               | 720                  |
|       |                                     | 68    | $6.0 \times 15.0 \times 26.5$                  | B32653A0683+***                             | 680                       | 700               | 720                  |
|       |                                     | 100   | $8.5 \times 16.5 \times 26.5$                  | B32653A0104+***                             | 480                       | 500               | 510                  |
|       |                                     | 150   | $10.5 \times 16.5 \times 26.5$                 | B32653A0154+***                             | 390                       | 400               | 540                  |
| 1250  | 500                                 | 220   | $11.0 \times 20.5 \times 26.5$                 | B32653A0224+***                             | 370                       | 350               | 510                  |
|       |                                     | 22    | $6.0 \times 15.0 \times 26.5$                  | B32653A7223+***                             | 680                       | 700               | 720                  |
|       |                                     | 33    | $6.0 \times 15.0 \times 26.5$                  | B32653A7333+***                             | 680                       | 700               | 720                  |
|       |                                     | 47    | $8.5 \times 16.5 \times 26.5$                  | B32653A7473+***                             | 480                       | 500               | 510                  |
|       |                                     | 68    | $10.5 \times 16.5 \times 26.5$                 | B32653A7683+***                             | 390                       | 400               | 540                  |
| 1250  | 500                                 | 100   | $11.0 \times 20.5 \times 26.5$                 | B32653A7104+***                             | 370                       | 350               | 510                  |

Further E series and intermediate capacitance values on request.

#### Composition of ordering code

+ = Capacitance tolerance code:

K =  $\pm 10\%$

J =  $\pm 5\%$

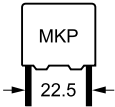
on request =  $\pm 3.5\%$

\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)


**B32653**
**High pulse (wound)**
**Ordering codes and packing units (lead spacing 22.5 mm)**

| $V_R$ | $V_{rms}$<br>$f \leq 1 \text{ kHz}$ | $C_R$ | Max. dimensions<br>$w \times h \times l$<br>mm | Ordering code<br>(composition see<br>below) | Ammo<br>pack<br>pcs./unit | Reel<br>pcs./unit | Untaped<br>pcs./unit |
|-------|-------------------------------------|-------|------------------------------------------------|---------------------------------------------|---------------------------|-------------------|----------------------|
| VDC   | VAC                                 | nF    |                                                |                                             |                           |                   |                      |
| 1600  | 500                                 | 6.8   | $6.0 \times 15.0 \times 26.5$                  | B32653A1682+***                             | 680                       | 700               | 720                  |
|       |                                     | 10    | $6.0 \times 15.0 \times 26.5$                  | B32653A1103+***                             | 680                       | 700               | 720                  |
|       |                                     | 15    | $7.0 \times 16.0 \times 26.5$                  | B32653A1153+***                             | 580                       | 600               | 630                  |
|       |                                     | 22    | $8.5 \times 16.5 \times 26.5$                  | B32653A1223+***                             | 480                       | 500               | 510                  |
|       |                                     | 33    | $10.5 \times 16.5 \times 26.5$                 | B32653A1333+***                             | 390                       | 400               | 540                  |
|       |                                     | 47    | $11.0 \times 20.5 \times 26.5$                 | B32653A1473+***                             | 370                       | 350               | 510                  |
| 2000  | 700                                 | 3.3   | $6.0 \times 15.0 \times 26.5$                  | B32653A2332+***                             | 680                       | 700               | 720                  |
|       |                                     | 4.7   | $6.0 \times 15.0 \times 26.5$                  | B32653A2472+***                             | 680                       | 700               | 720                  |
|       |                                     | 6.8   | $8.5 \times 16.5 \times 26.5$                  | B32653A2682+***                             | 480                       | 500               | 510                  |
|       |                                     | 10    | $10.5 \times 16.5 \times 26.5$                 | B32653A2103+***                             | 390                       | 400               | 540                  |
|       |                                     | 15    | $11.0 \times 20.5 \times 26.5$                 | B32653A2153+***                             | 370                       | 350               | 510                  |
| 2000  | 1000                                | 2.2   | $6.0 \times 15.0 \times 26.5$                  | B32653A8222+***                             | 680                       | 700               | 720                  |
|       |                                     | 3.3   | $6.0 \times 15.0 \times 26.5$                  | B32653A8332+***                             | 680                       | 700               | 720                  |
|       |                                     | 4.7   | $8.5 \times 16.5 \times 26.5$                  | B32653A8472+***                             | 480                       | 500               | 510                  |
|       |                                     | 6.8   | $10.5 \times 16.5 \times 26.5$                 | B32653A8682+***                             | 390                       | 400               | 540                  |
|       |                                     | 10    | $10.5 \times 20.5 \times 26.5$                 | B32653A8103+***                             | 390                       | 400               | 540                  |

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

+ = Capacitance tolerance code:

K =  $\pm 10\%$

J =  $\pm 5\%$

on request =  $\pm 3.5\%$

\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)

### Ordering codes and packing units (lead spacing 27.5 mm)

| $V_R$ | $V_{rms}$<br>$f \leq 1$ kHz<br>VAC | $C_R$<br>nF | Max. dimensions<br>$w \times h \times l$<br>mm | Ordering code<br>(composition see<br>below) | Ammo<br>pack<br>pcs./unit | Reel<br>pcs./unit | Untaped<br>pcs./unit |
|-------|------------------------------------|-------------|------------------------------------------------|---------------------------------------------|---------------------------|-------------------|----------------------|
| 250   | 160                                | 1500        | $11.0 \times 21.0 \times 31.5$                 | B32654A3155+***                             | —                         | 350               | 320                  |
|       |                                    | 2200        | $12.5 \times 21.5 \times 31.5$                 | B32654A3225+***                             | —                         | 300               | 280                  |
|       |                                    | 3300        | $15.0 \times 24.5 \times 31.5$                 | B32654A3335+000                             | —                         | —                 | 240                  |
|       |                                    | 4700        | $18.0 \times 27.5 \times 31.5$                 | B32654A3475+000                             | —                         | —                 | 200                  |
| 400   | 200                                | 1000        | $11.0 \times 21.0 \times 31.5$                 | B32654A4105+***                             | —                         | 350               | 320                  |
|       |                                    | 1500        | $12.5 \times 21.5 \times 31.5$                 | B32654A4155+***                             | —                         | 300               | 280                  |
|       |                                    | 2200        | $14.0 \times 24.5 \times 31.5$                 | B32654A4225+000                             | —                         | —                 | 260                  |
|       |                                    | 3300        | $19.0 \times 30.0 \times 31.5$                 | B32654A4335+000                             | —                         | —                 | 180                  |
| 630   | 250                                | 680         | $11.0 \times 21.0 \times 31.5$                 | B32654A6684+***                             | —                         | 350               | 320                  |
|       |                                    | 1000        | $13.5 \times 23.0 \times 31.5$                 | B32654A6105+***                             | —                         | 250               | 260                  |
|       |                                    | 1500        | $18.0 \times 27.5 \times 31.5$                 | B32654A6155+000                             | —                         | —                 | 200                  |
| 1000  | 250                                | 220         | $11.0 \times 21.0 \times 31.5$                 | B32654A0224+***                             | —                         | 350               | 320                  |
|       |                                    | 330         | $11.0 \times 21.0 \times 31.5$                 | B32654A0334+***                             | —                         | 350               | 320                  |
|       |                                    | 470         | $14.0 \times 24.5 \times 31.5$                 | B32654A0474+000                             | —                         | —                 | 260                  |
|       |                                    | 680         | $18.0 \times 27.5 \times 31.5$                 | B32654A0684+000                             | —                         | —                 | 200                  |
| 1250  | 500                                | 100         | $11.0 \times 21.0 \times 31.5$                 | B32654A7104+***                             | —                         | 350               | 320                  |
|       |                                    | 150         | $11.0 \times 21.0 \times 31.5$                 | B32654A7154+***                             | —                         | 350               | 320                  |
|       |                                    | 220         | $14.0 \times 24.5 \times 31.5$                 | B32654A7224+000                             | —                         | —                 | 260                  |
|       |                                    | 330         | $18.0 \times 27.5 \times 31.5$                 | B32654A7334+000                             | —                         | —                 | 200                  |
| 1600  | 500                                | 47          | $11.0 \times 21.0 \times 31.5$                 | B32654A1473+***                             | —                         | 350               | 320                  |
|       |                                    | 68          | $11.0 \times 21.0 \times 31.5$                 | B32654A1683+***                             | —                         | 350               | 320                  |
|       |                                    | 100         | $14.0 \times 24.5 \times 31.5$                 | B32654A1104+000                             | —                         | —                 | 260                  |
|       |                                    | 150         | $18.0 \times 27.5 \times 31.5$                 | B32654A1154+000                             | —                         | —                 | 200                  |
| 2000  | 700                                | 22          | $11.0 \times 21.0 \times 31.5$                 | B32654A2223+***                             | —                         | 350               | 320                  |
|       |                                    | 33          | $13.5 \times 23.0 \times 31.5$                 | B32654A2333+***                             | —                         | 250               | 260                  |
|       |                                    | 47          | $18.0 \times 27.5 \times 31.5$                 | B32654A2473+000                             | —                         | —                 | 200                  |
|       |                                    | 68          | $19.0 \times 30.0 \times 31.5$                 | B32654A2683+000                             | —                         | —                 | 180                  |

Further E series and intermediate capacitance values on request.

#### Composition of ordering code

+ = Capacitance tolerance code:

K =  $\pm 10\%$

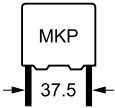
J =  $\pm 5\%$

on request =  $\pm 3.5\%$

\*\*\* = Packaging code:

189 = Reel

000 = Untaped (lead length 6 – 1 mm)


**B32656**
**High pulse (wound)**
**Ordering codes and packing units (lead spacing 37.5 mm)**

| $V_R$ | $V_{rms}$<br>$f \leq 1 \text{ kHz}$ | $C_R$ | Max. dimensions<br>$w \times h \times l$<br>mm | Ordering code<br>(composition see<br>below) | Untaped<br>pcs./unit |
|-------|-------------------------------------|-------|------------------------------------------------|---------------------------------------------|----------------------|
| VDC   | VAC                                 | nF    |                                                |                                             |                      |
| 850   | 450                                 | 220   | $12.0 \times 22.0 \times 42.0$                 | B32656A8224+000                             | 72                   |
|       |                                     | 330   | $12.0 \times 22.0 \times 42.0$                 | B32656A8334+000                             | 72                   |
|       |                                     | 470   | $12.0 \times 22.0 \times 42.0$                 | B32656A8474+000                             | 72                   |
|       |                                     | 680   | $16.0 \times 28.5 \times 42.0$                 | B32656A8684+000                             | 48                   |
|       |                                     | 1000  | $18.0 \times 32.5 \times 42.0$                 | B32656A8105+000                             | 32                   |
| 1000  | 500                                 | 470   | $14.0 \times 25.0 \times 42.0$                 | B32656A0474+000                             | 56                   |
|       |                                     | 680   | $16.0 \times 28.5 \times 42.0$                 | B32656A0684+000                             | 48                   |
|       |                                     | 1000  | $20.0 \times 39.5 \times 42.0$                 | B32656A0105+000                             | 32                   |
| 1250  | 500                                 | 220   | $14.0 \times 25.0 \times 42.0$                 | B32656A7224+000                             | 56                   |
|       |                                     | 330   | $16.0 \times 28.5 \times 42.0$                 | B32656A7334+000                             | 48                   |
|       |                                     | 470   | $18.0 \times 32.5 \times 42.0$                 | B32656A7474+000                             | 48                   |
|       |                                     | 680   | $20.0 \times 39.5 \times 42.0$                 | B32656A7684+000                             | 32                   |
| 1600  | 600                                 | 100   | $12.0 \times 22.0 \times 42.0$                 | B32656J1104+000                             | 72                   |
|       |                                     | 150   | $14.0 \times 25.0 \times 42.0$                 | B32656J1154+000                             | 56                   |
|       |                                     | 220   | $16.0 \times 28.5 \times 42.0$                 | B32656J1224+000                             | 48                   |
| 2000  | 700                                 | 100   | $14.0 \times 25.0 \times 42.0$                 | B32656J2104+000                             | 56                   |
|       |                                     | 150   | $18.0 \times 32.5 \times 42.0$                 | B32656J2154+000                             | 48                   |
|       |                                     | 220   | $20.0 \times 39.5 \times 42.0$                 | B32656J2224+000                             | 32                   |

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

+ = Capacitance tolerance code:

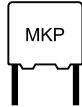
K =  $\pm 10\%$

J =  $\pm 5\%$

on request =  $\pm 3.5\%$

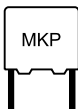
Packaging code:

000 = Untaped (lead length 6 – 1 mm)



## Technical data

|                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                     |                                                            |                              |                                                                 |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------|-----------------------------------------------------------------|-------|
| Operating temperature range                                                                                                                                        | Max. operating temperature T <sub>op,max</sub> +105 °C<br>Upper category temperature T <sub>max</sub> +100 °C<br>Lower category temperature T <sub>min</sub> −55 °C<br>Rated temperature T <sub>R</sub> +85 °C                                                                                                                      |                                                            |                              |                                                                 |       |
| Dissipation factor tan δ (in 10 <sup>−3</sup> )<br>at 20 °C<br>(upper limit values)                                                                                | at                                                                                                                                                                                                                                                                                                                                  | ≤27 nF                                                     | 27 nF<C <sub>R</sub> ≤0.1 μF | 0.1 μF<C <sub>R</sub> ≤1 μF                                     | >1 μF |
|                                                                                                                                                                    | 1 kHz                                                                                                                                                                                                                                                                                                                               | 0.8                                                        | 0.8                          | 0.8                                                             | 0.8   |
|                                                                                                                                                                    | 10 kHz                                                                                                                                                                                                                                                                                                                              | 1.0                                                        | 1.0                          | 1.0                                                             | —     |
|                                                                                                                                                                    | 100 kHz                                                                                                                                                                                                                                                                                                                             | 2.0                                                        | 3.0                          | —                                                               |       |
| Insulation resistance R <sub>ins</sub><br>or time constant τ = C <sub>R</sub> · R <sub>ins</sub><br>at 20 °C, rel. humidity ≤ 65%<br>(minimum as-delivered values) | C <sub>R</sub> ≤ 0.33 μF                                                                                                                                                                                                                                                                                                            |                                                            | C <sub>R</sub> > 0.33 μF     |                                                                 |       |
|                                                                                                                                                                    | 100 GΩ                                                                                                                                                                                                                                                                                                                              |                                                            | 30000 s                      |                                                                 |       |
| DC test voltage                                                                                                                                                    | 1.6 · V <sub>R</sub> , 2 s                                                                                                                                                                                                                                                                                                          |                                                            |                              |                                                                 |       |
| Category voltage V <sub>C</sub><br>(continuous operation with V <sub>DC</sub><br>or V <sub>AC</sub> at f ≤ 1 kHz)                                                  | T <sub>A</sub> (°C)                                                                                                                                                                                                                                                                                                                 | DC voltage derating                                        |                              | AC voltage derating                                             |       |
|                                                                                                                                                                    | T <sub>A</sub> ≤ 85                                                                                                                                                                                                                                                                                                                 | V <sub>C</sub> = V <sub>R</sub>                            |                              | V <sub>C,rms</sub> = V <sub>rms</sub>                           |       |
|                                                                                                                                                                    | 85<T <sub>A</sub> ≤100                                                                                                                                                                                                                                                                                                              | V <sub>C</sub> = V <sub>R</sub> · (165−T <sub>A</sub> )/80 |                              | V <sub>C,rms</sub> =V <sub>rms</sub> · (165−T <sub>A</sub> )/80 |       |
| Operating voltage V <sub>op</sub> for<br>short operating periods<br>(V <sub>DC</sub> or V <sub>AC</sub> at f ≤ 1 kHz)                                              | T <sub>A</sub> (°C)                                                                                                                                                                                                                                                                                                                 | DC voltage (max. hours)                                    |                              | AC voltage (max. hours)                                         |       |
|                                                                                                                                                                    | T <sub>A</sub> ≤ 85                                                                                                                                                                                                                                                                                                                 | V <sub>op</sub> = 1.25 · V <sub>C</sub> (2000 h)           |                              | V <sub>op</sub> = 1.0 · V <sub>C,rms</sub> (2000 h)             |       |
|                                                                                                                                                                    | 85<T <sub>A</sub> ≤100                                                                                                                                                                                                                                                                                                              | V <sub>op</sub> = 1.25 · V <sub>C</sub> (2000 h)           |                              | V <sub>op</sub> = 1.0 · V <sub>C,rms</sub> (2000 h)             |       |
| Damp heat test<br>Limit values after damp<br>heat test                                                                                                             | 56 days/40 °C/93% relative humidity<br>Capacitance change  ΔC/C  ≤ 3%<br>Dissipation factor change Δ tan δ ≤ 0.5 · 10 <sup>−3</sup> (at 1 kHz)<br>≤ 1.0 · 10 <sup>−3</sup> (at 10 kHz)<br><br>Insulation resistance R <sub>ins</sub> ≥ 50% of minimum<br>or time constant τ = C <sub>R</sub> · R <sub>ins</sub> as-delivered values |                                                            |                              |                                                                 |       |
| Reliability:<br>Failure rate λ<br>Service life t <sub>SL</sub>                                                                                                     | 1 fit (≤ 1 · 10 <sup>−9</sup> /h) at 0.5 · V <sub>R</sub> , 40 °C<br>200 000 h at 1.0 · V <sub>R</sub> , 40 °C<br>For conversion to other operating conditions and temperatures,<br>refer to chapter "Quality assurance", page .                                                                                                    |                                                            |                              |                                                                 |       |
| Failure criteria:<br>Total failure<br>Failure due to variation<br>of parameters                                                                                    | Short circuit or open circuit<br>Capacitance change  ΔC/C  > 10%<br>Dissipation factor tan δ > 4 · upper limit value<br>Insulation resistance R <sub>ins</sub> < 1500 MΩ (C <sub>R</sub> ≤0.33 μF)<br>or time constant τ = C <sub>R</sub> · R <sub>ins</sub> < 500 s (C <sub>R</sub> >0.33 μF)                                      |                                                            |                              |                                                                 |       |



**B32651 ... B32656**

**High pulse (wound)**

### Pulse handling capability

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

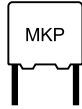
"k<sub>0</sub>" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V<sup>2</sup>/μs.

*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 values

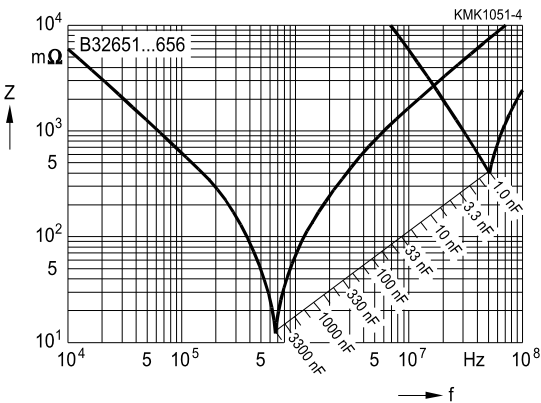
| Lead spacing          |                         | 10 mm         | 15 mm | 22.5 mm | 27.5 mm | 37.5 mm |
|-----------------------|-------------------------|---------------|-------|---------|---------|---------|
| V <sub>R</sub><br>VDC | V <sub>rms</sub><br>VAC | dV/dt in V/μs |       |         |         |         |
| 250                   | 160                     | —             | 200   | 120     | 50      | —       |
| 400                   | 200                     | —             | 300   | 180     | 100     | —       |
| 630                   | 250                     | —             | 400   | 300     | 150     | —       |
| 850                   | 450                     | —             | —     | —       | —       | 90      |
| 1000                  | 250                     | —             | 975   | 600     | 300     | —       |
|                       | 500                     | —             | —     | —       | —       | 100     |
| 1250                  | 450                     | 4000          | —     | —       | —       | —       |
|                       | 500                     | —             | 1850  | 1150    | 600     | 140     |
| 1600                  | 500                     | —             | 4500  | 2400    | 1000    | —       |
|                       | 600                     | —             | —     | —       | —       | 210     |
|                       | 700                     | —             | 5200  | —       | —       | —       |
| 2000                  | 700                     | —             | 8000  | 7000    | 2300    | 200     |
|                       | 1000                    | —             | —     | 7500    | —       | —       |

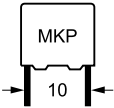


### $k_0$ values

| Lead spacing |                  | 10 mm                | 15 mm      | 22.5 mm    | 27.5 mm    | 37.5 mm |
|--------------|------------------|----------------------|------------|------------|------------|---------|
| $V_R$<br>VDC | $V_{rms}$<br>VAC | $k_0$ in $V^2/\mu s$ |            |            |            |         |
| 250          | 160              | —                    | 10 000     | 60 000     | 25 000     | —       |
| 400          | 200              | —                    | 250 000    | 200 000    | 110 000    | —       |
| 630          | 250              | —                    | 500 000    | 350 000    | 250 000    | —       |
| 850          | 450              | —                    | —          | —          | —          | 153 000 |
| 1000         | 250              | —                    | 3 000 000  | 1 500 000  | 1 000 000  | —       |
|              | 500              | —                    | —          | —          | —          | 180 000 |
| 1250         | 450              | 25 000 000           | —          | —          | —          | —       |
|              | 500              | —                    | 9 000 000  | 3 750 000  | 2 000 000  | 350 000 |
| 1600         | 500              | —                    | 20 000 000 | 10 000 000 | 4 000 000  | —       |
|              | 600              | —                    | —          | —          | —          | 672 000 |
|              | 700              | —                    | 28 000 000 | —          | —          | —       |
| 2000         | 700              | —                    | 60 000 000 | 40 000 000 | 15 000 000 | 800 000 |
|              | 1000             | —                    | —          | 50 000 000 | —          | —       |

### Impedance $Z$ versus frequency $f$ (typical values)





**B32651**

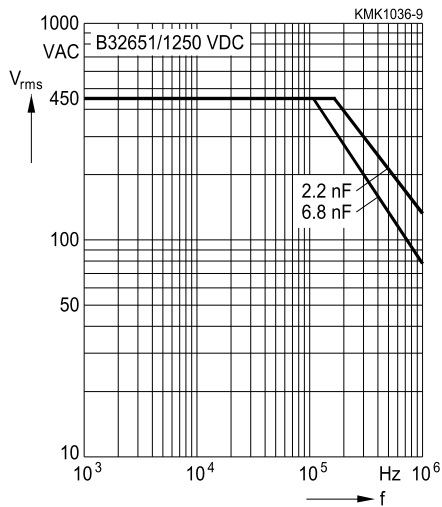
**High pulse (wound)**

**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )**

For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 10 mm**

**1250 VDC/450 VAC**



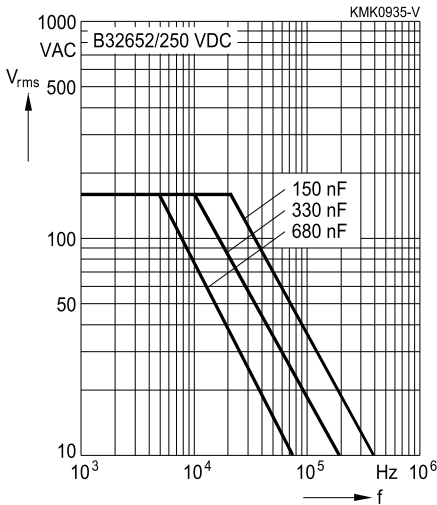


Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )

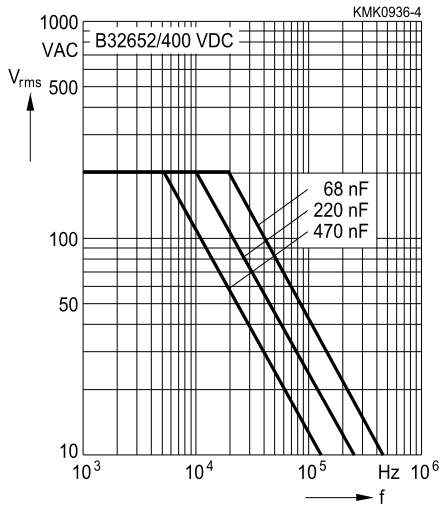
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

### Lead spacing 15 mm

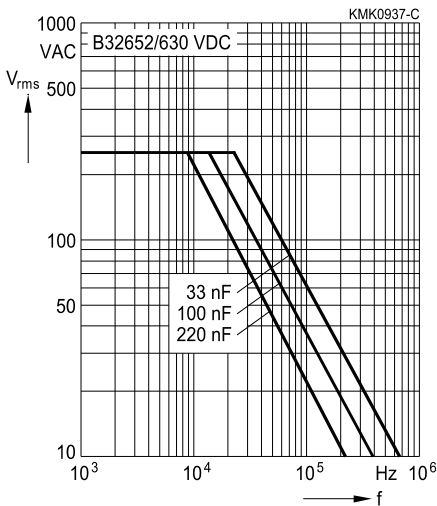
#### 250 VDC/160 VAC



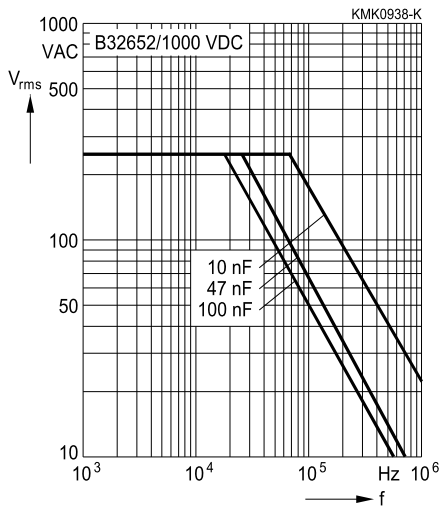
#### 400 VDC/200 VAC

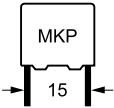


#### 630 VDC/250 VAC



#### 1000 VDC/250 VAC





**B32652**

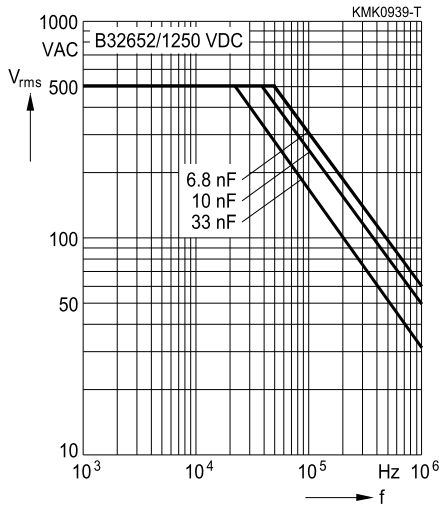
**High pulse (wound)**

**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ \text{C}$ )**

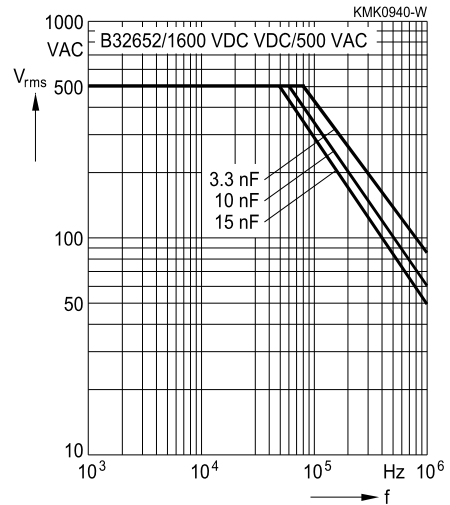
For  $T_A > 90^\circ \text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 15 mm**

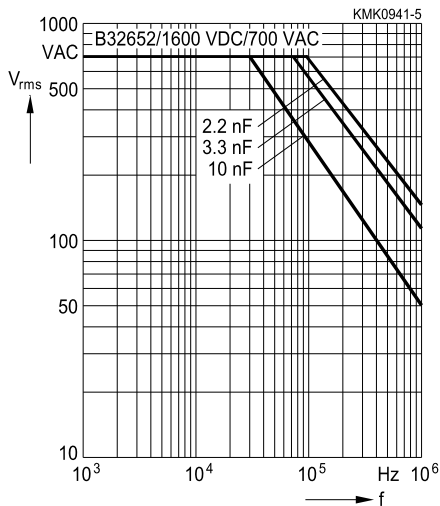
**1250 VDC/500 VAC**



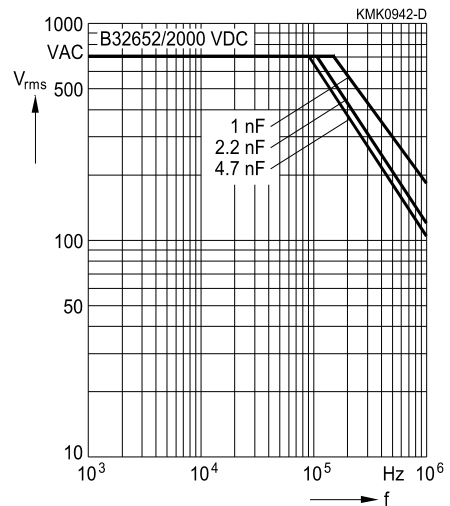
**1600 VDC/500 VAC**



**1600 VDC/700 VAC**



**2000 VDC/700 VAC**

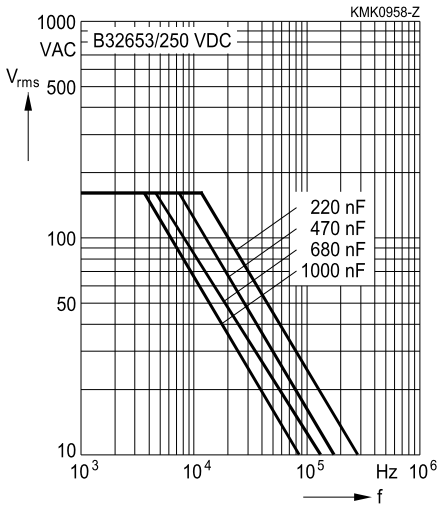


Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )

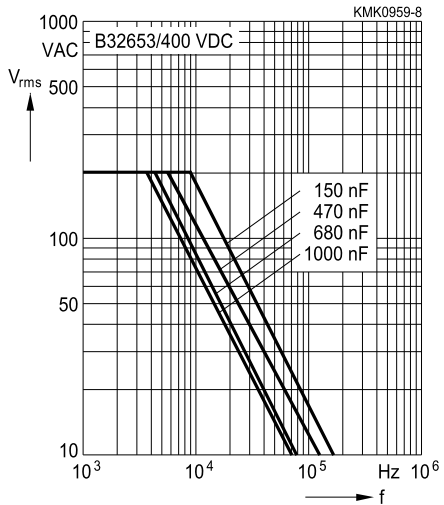
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

Lead spacing 22.5 mm

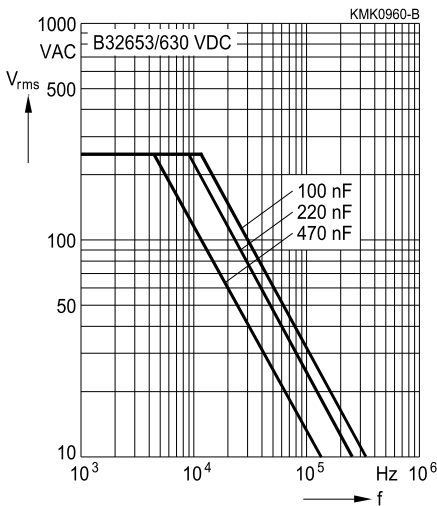
250 VDC/160 VAC



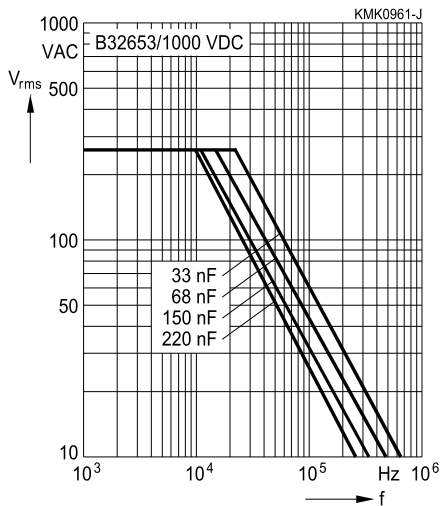
400 VDC/200 VAC

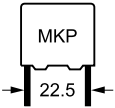


630 VDC/250 VAC



1000 VDC/250 VAC





**B32653**

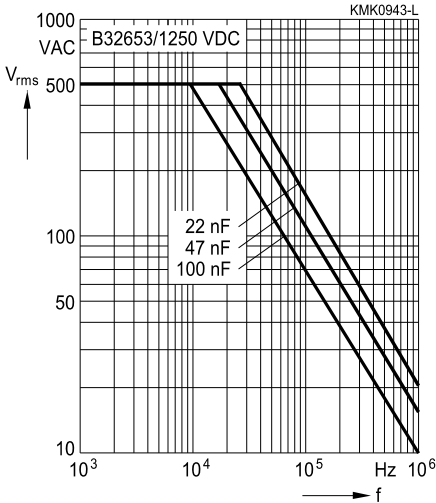
**High pulse (wound)**

**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )**

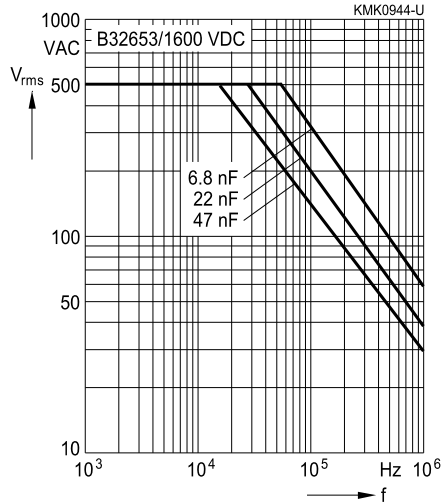
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 22.5 mm**

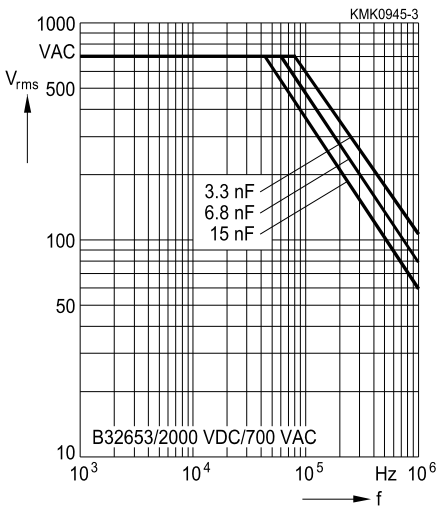
**1250 VDC/500 VAC**



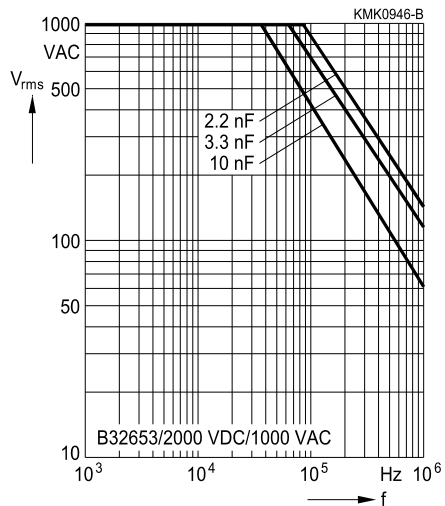
**1600 VDC/500 VAC**



**2000 VDC/700 VAC**



**2000 VDC/1000 VAC**

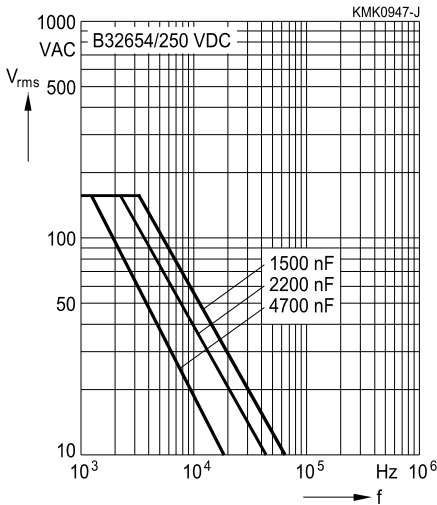


Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )

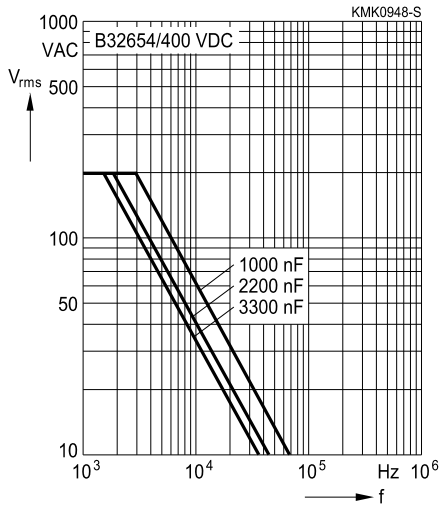
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

Lead spacing 27.5 mm

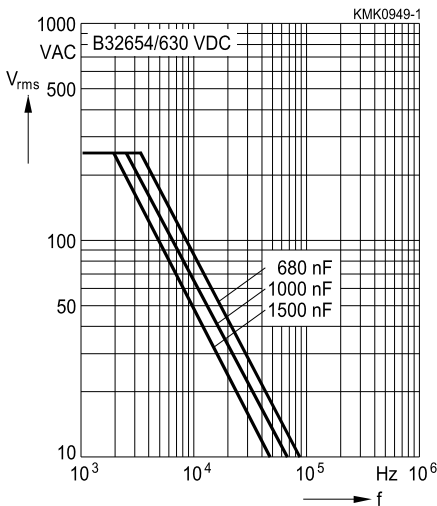
250 VDC/160 VAC



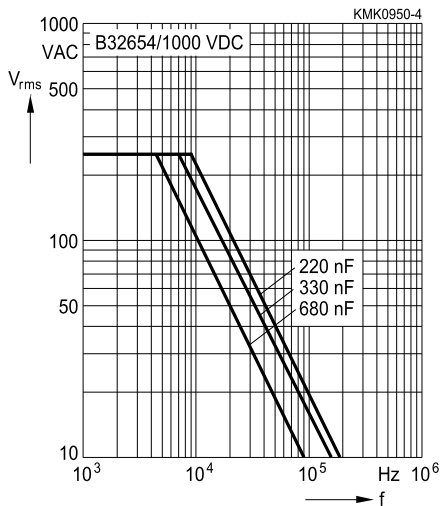
400 VDC/200 VAC

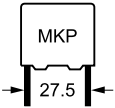


630 VDC/250 VAC



1000 VDC/250 VAC





**B32654**

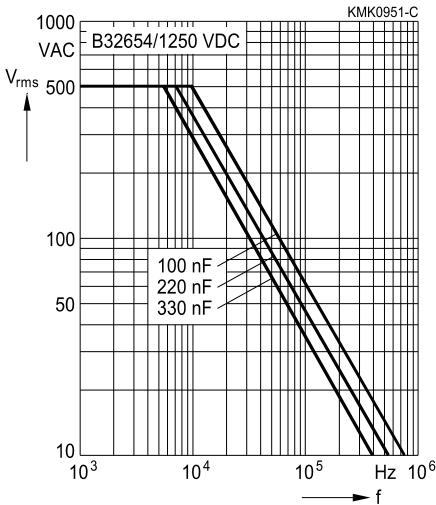
**High pulse (wound)**

**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )**

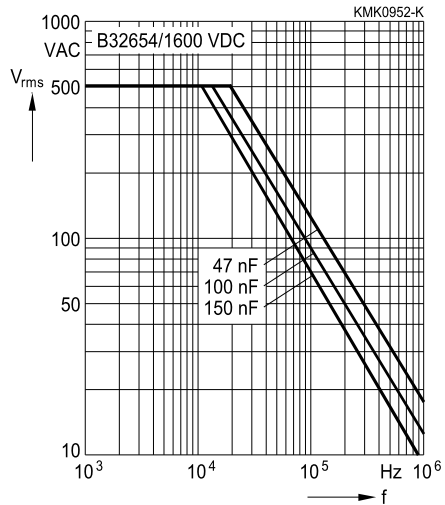
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 27.5 mm**

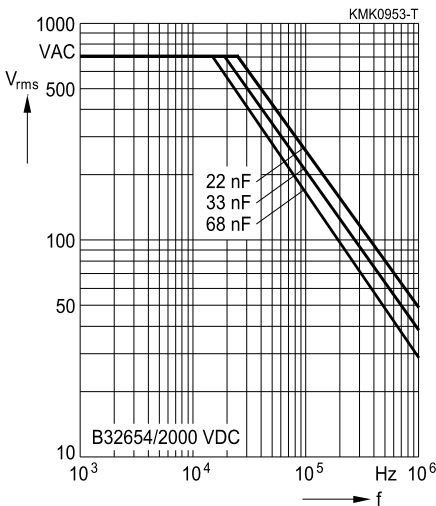
**1250 VDC/500 VAC**



**1600 VDC/500 VAC**



**2000 VDC/700 VAC**

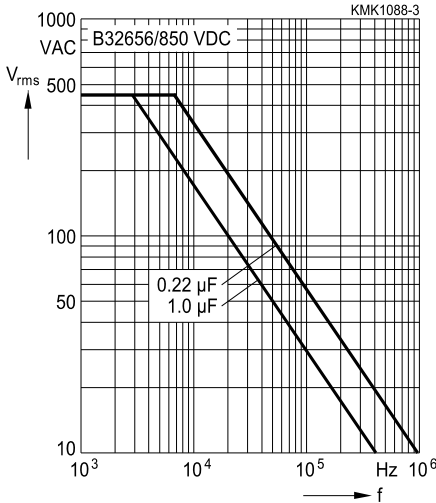


Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )

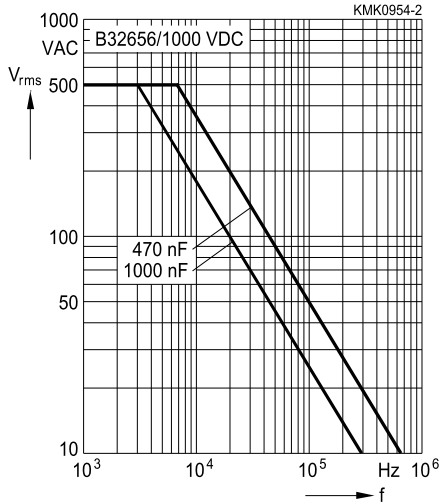
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

Lead spacing 37.5 mm

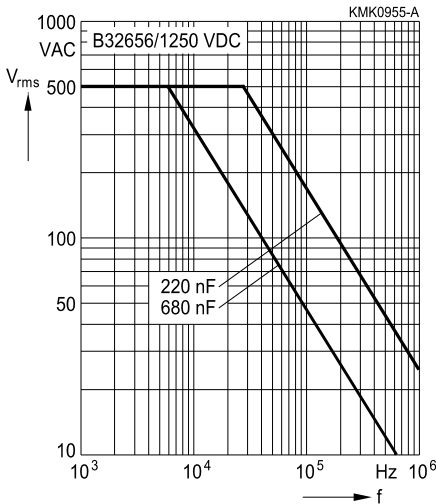
850 VDC/450 VAC



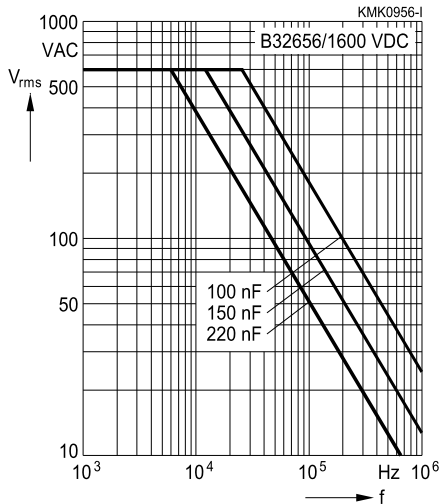
1000 VDC/500 VAC

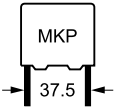


1250 VDC/500 VAC



1600 VDC/600 VAC





**B32656**

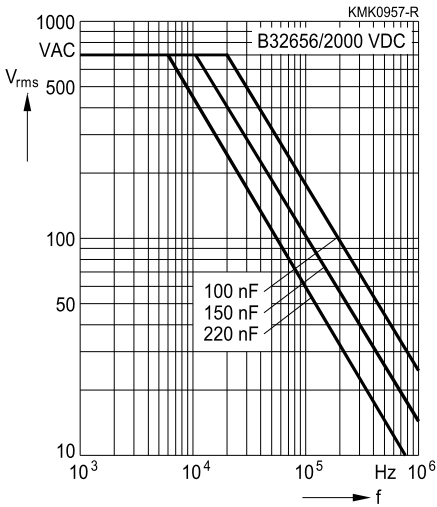
**High pulse (wound)**

**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )**

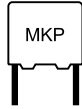
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 37.5 mm**

**2000 VDC/700 VAC**



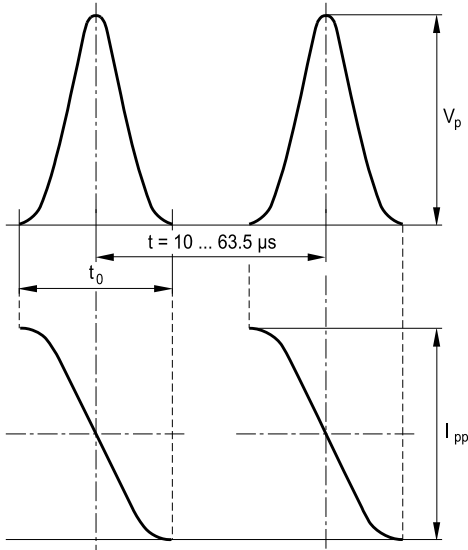




## Flyback application

### Permissible voltage and current / waveform

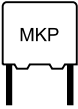
Permissible current  $I_{pp}$  versus frequency  $f$  for a duty cycle of 20% ( $t_0/t = 0.2$ ):



KMK0720-5

Approximation formular for duty cycle higher than 20%:

$$I'_{pp} = I_{pp} \cdot \sqrt{\frac{t_0^3}{t'^3}}$$



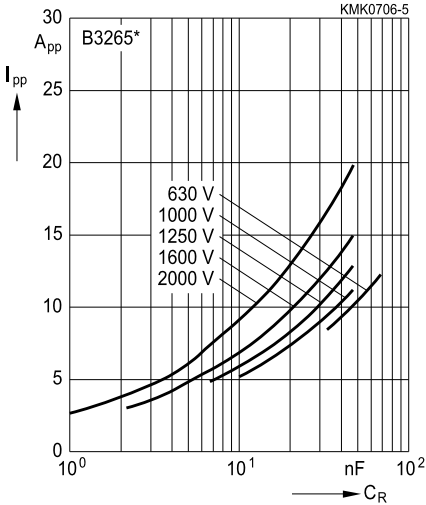
B32651 ... B32656

High pulse (wound)

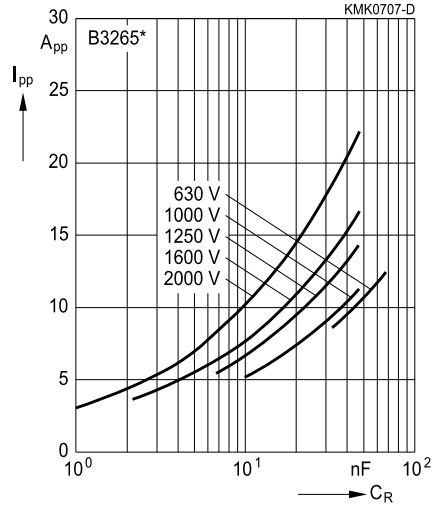
## Flyback application

Permissible current  $I_{pp}$  versus rated capacitance  $C_R$

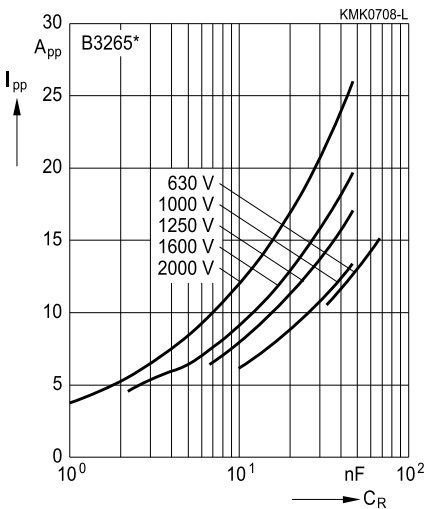
Frequency = 15.75 kHz

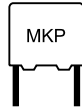


Frequency = 31.5 kHz



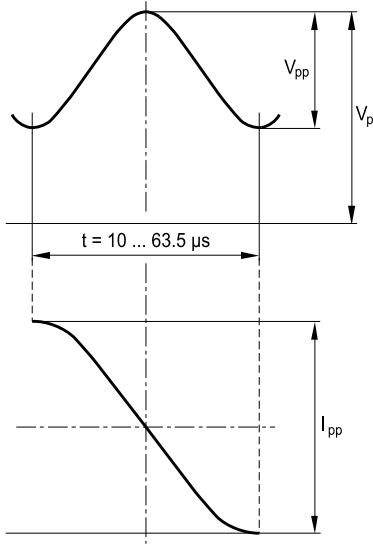
Frequency = 95 kHz



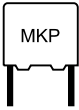


# S-correction application

## Permissible voltage and current / waveform



KMK0721-D



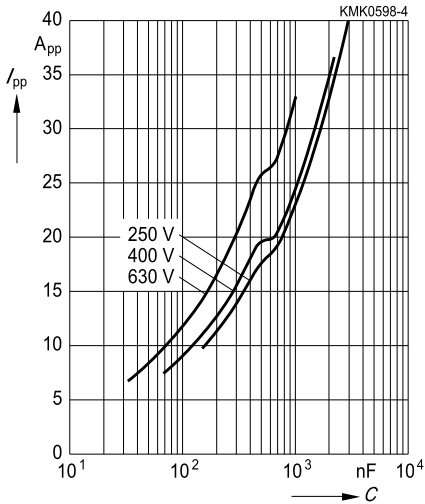
B32651 ... B32656

High pulse (wound)

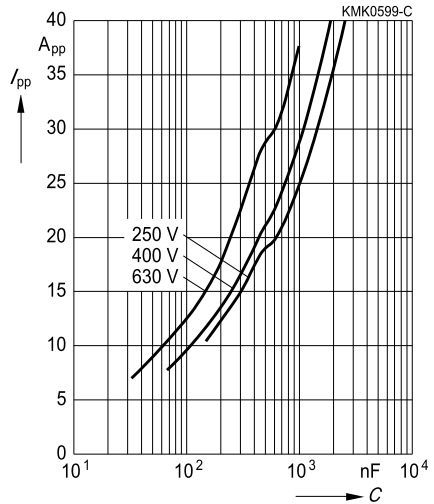
### S-correction application

Permissible current  $I_{pp}$  versus rated capacitance  $C_R$

Frequency = 15.75 kHz



Frequency = 31.75 kHz



Frequency = 95 kHz

