



## Film Capacitors

### Metallized Polypropylene Film Capacitors (MKP)

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

**Date:** August 2004

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**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**

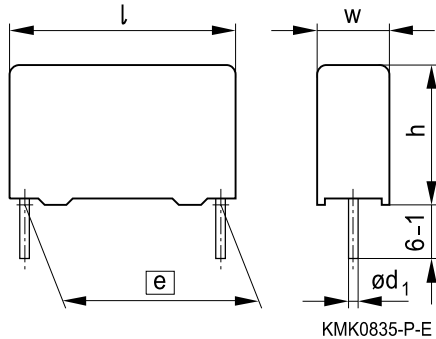
- Parallel wire leads, lead-free tinned
- Special lead lengths available on request

**Marking**

Manufacturer's logo,  
 lot number ( $\square \leq 27.5$  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)

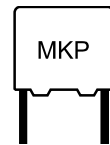
**Delivery mode**

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

**Dimensional drawing**


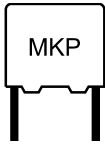
Dimensions in mm

| Lead spacing      | Lead diameter | Type   |
|-------------------|---------------|--------|
| $\square \pm 0.4$ | $d_1$         |        |
| 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             |        |        |     |     |      |      |      |      |      |

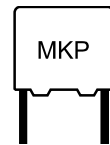


**B32651 ... B32656**

**High pulse (wound)**

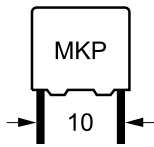
**Overview of available types**

| 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)**

| $V_R$<br>VDC <sup>1)</sup> | $V_{rms}$<br>f ≤ 1 kHz<br>VAC | $C_R$<br>nF | 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 |
|----------------------------|-------------------------------|-------------|------------------------------------|---|---------------------------|-------------------|----------------------|
| 1250                       | 450                           | 2.2         | 4.0 × 9.0 × 13.0                   | B32651A7222+***                             | 1000                      | 1700              | 1000                 |
|                            |                               | 3.3         | 5.0 × 11.0 × 13.0                  | B32651A7332+***                             | 830                       | 1300              | 1000                 |
|                            |                               | 4.7         | 5.0 × 11.0 × 13.0                  | B32651A7472+***                             | 830                       | 1300              | 1000                 |
|                            |                               | 6.8         | 6.0 × 12.0 × 13.0                  | B32651A7682+***                             | 680                       | 1100              | 1000                 |

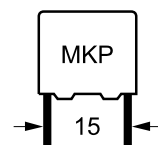
Further E series and intermediate capacitance values on request.

**Composition of ordering code**

+ = Capacitance tolerance code:  
 K = ±10%  
 J = ±5%  
 on request = ±3.5%

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

1) For pulse loads (pulse width ≤ 1000 μs), a peak voltage of 1400 V<sub>p</sub> can be permitted.


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

| $V_R$<br>VDC | $V_{rms}$<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                                | 150         | 5.0 × 10.5 × 18.0                              | B32652A3154+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 220         | 6.0 × 11.0 × 18.0                              | B32652A3224+***                             | 960                       | 1100              | 1000                 |
|              |                                    | 330         | 7.0 × 12.5 × 18.0                              | B32652A3334+***                             | 830                       | 900               | 1000                 |
|              |                                    | 470         | 8.5 × 14.5 × 18.0                              | B32652A3474+***                             | 680                       | 700               | 500                  |
|              |                                    | 680         | 9.0 × 17.5 × 18.0                              | B32652A3684+***                             | 640                       | 700               | 500                  |
| 400          | 200                                | 68          | 5.0 × 10.5 × 18.0                              | B32652A4683+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 100         | 5.0 × 10.5 × 18.0                              | B32652A4104+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 150         | 6.0 × 11.0 × 18.0                              | B32652A4154+***                             | 960                       | 1100              | 1000                 |
|              |                                    | 220         | 7.0 × 12.5 × 18.0                              | B32652A4224+***                             | 830                       | 900               | 1000                 |
|              |                                    | 330         | 8.5 × 14.5 × 18.0                              | B32652A4334+***                             | 680                       | 700               | 500                  |
|              |                                    | 470         | 9.0 × 17.5 × 18.0                              | B32652A4474+***                             | 640                       | 700               | 500                  |
| 630          | 250                                | 33          | 5.0 × 10.5 × 18.0                              | B32652A6333+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 47          | 5.0 × 10.5 × 18.0                              | B32652A6473+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 68          | 6.0 × 11.0 × 18.0                              | B32652A6683+***                             | 960                       | 1100              | 1000                 |
|              |                                    | 100         | 7.0 × 12.5 × 18.0                              | B32652A6104+***                             | 830                       | 900               | 1000                 |
|              |                                    | 150         | 8.5 × 14.5 × 18.0                              | B32652A6154+***                             | 680                       | 700               | 500                  |
|              |                                    | 220         | 9.0 × 17.5 × 18.0                              | B32652A6224+***                             | 640                       | 700               | 500                  |
| 1000         | 250                                | 10          | 5.0 × 10.5 × 18.0                              | B32652A0103+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 15          | 5.0 × 10.5 × 18.0                              | B32652A0153+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 22          | 5.0 × 10.5 × 18.0                              | B32652A0223+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 33          | 6.0 × 11.0 × 18.0                              | B32652A0333+***                             | 960                       | 1100              | 1000                 |
|              |                                    | 47          | 7.0 × 12.5 × 18.0                              | B32652A0473+***                             | 830                       | 900               | 1000                 |
|              |                                    | 68          | 8.5 × 14.5 × 18.0                              | B32652A0683+***                             | 680                       | 700               | 500                  |
|              |                                    | 100         | 9.0 × 17.5 × 18.0                              | B32652A0104+***                             | 640                       | 700               | 500                  |
| 1250         | 500                                | 6.8         | 5.0 × 10.5 × 18.0                              | B32652A7682+***                             | 1170                      | 1300              | 1000                 |
|              |                                    | 10          | 6.0 × 11.0 × 18.0                              | B32652A7103+***                             | 960                       | 1100              | 1000                 |
|              |                                    | 15          | 7.0 × 12.5 × 18.0                              | B32652A7153+***                             | 830                       | 900               | 1000                 |
|              |                                    | 22          | 8.5 × 14.5 × 18.0                              | B32652A7223+***                             | 680                       | 700               | 500                  |
|              |                                    | 33          | 9.0 × 17.5 × 18.0                              | B32652A7333+***                             | 640                       | 700               | 500                  |

Further E series and intermediate capacitance values on request.

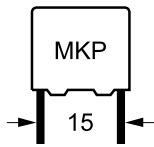
**Composition of ordering code**

+ = Capacitance tolerance code:

K = ±10%  
 J = ±5%  
 on request = ±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 =  $\pm 3.5\%$

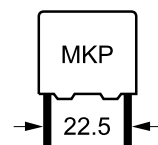
\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)




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

| $V_R$<br>VDC | $V_{rms}$<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                                | 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                  |
|              |                                    | 1000        | $11.0 \times 20.5 \times 26.5$                 | B32653A4105+***                             | 370                       | 350               | 510                  |
| 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                  |
|              |                                    | 220         | $11.0 \times 20.5 \times 26.5$                 | B32653A0224+***                             | 370                       | 350               | 510                  |
| 1250         | 500                                | 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                  |
|              |                                    | 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 =  $\pm 5\%$

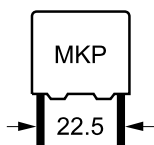
on request =  $\pm 3.5\%$

\*\*\* = 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>$f \leq 1$ 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                  |
| 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 =  $\pm 5\%$

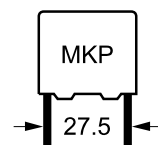
on request =  $\pm 3.5\%$

\*\*\* = Packaging code:

289 = Ammo pack

189 = Reel

000 = Untaped (lead length 6 – 1 mm)


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

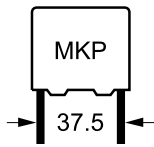
| $V_R$<br>VDC | $V_{rms}$<br>$f \leq 1$ kHz<br>VAC | $C_R$<br>nF | Max. dimensions<br>$w \times h \times l$<br>mm | Ordering code<br>(composition see<br>below) | Ammo<br>pack<br>pcs./unit | Reel<br>pcs./unit | Untaped<br>pcs./unit |
|--------------|------------------------------------|-------------|--|---|---------------------------|-------------------|--------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

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

+ = Capacitance tolerance code:  
 K = ±10%  
 J = ±5%  
 on request = ±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)**

| $V_R$<br>VDC | $V_{rms}$<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) | Untaped<br>pcs./unit |
|--------------|------------------------------------|-------------|--|---|----------------------|
| 850          | 450                                | 220         | 12.0 × 22.0 × 42.0                             | B32656A8224+000                             | 72                   |
|              |                                    | 330         | 12.0 × 22.0 × 42.0                             | B32656A8334+000                             | 72                   |
|              |                                    | 470         | 12.0 × 22.0 × 42.0                             | B32656A8474+000                             | 72                   |
|              |                                    | 680         | 16.0 × 28.5 × 42.0                             | B32656A8684+000                             | 48                   |
|              |                                    | 1000        | 18.0 × 32.5 × 42.0                             | B32656A8105+000                             | 32                   |
| 1000         | 500                                | 470         | 14.0 × 25.0 × 42.0                             | B32656A0474+000                             | 56                   |
|              |                                    | 680         | 16.0 × 28.5 × 42.0                             | B32656A0684+000                             | 48                   |
|              |                                    | 1000        | 20.0 × 39.5 × 42.0                             | B32656A0105+000                             | 32                   |
| 1250         | 500                                | 220         | 14.0 × 25.0 × 42.0                             | B32656A7224+000                             | 56                   |
|              |                                    | 330         | 16.0 × 28.5 × 42.0                             | B32656A7334+000                             | 48                   |
|              |                                    | 470         | 18.0 × 32.5 × 42.0                             | B32656A7474+000                             | 48                   |
|              |                                    | 680         | 20.0 × 39.5 × 42.0                             | B32656A7684+000                             | 32                   |
| 1600         | 600                                | 100         | 12.0 × 22.0 × 42.0                             | B32656J1104+000                             | 72                   |
|              |                                    | 150         | 14.0 × 25.0 × 42.0                             | B32656J1154+000                             | 56                   |
|              |                                    | 220         | 16.0 × 28.5 × 42.0                             | B32656J1224+000                             | 48                   |
| 2000         | 700                                | 100         | 14.0 × 25.0 × 42.0                             | B32656J2104+000                             | 56                   |
|              |                                    | 150         | 18.0 × 32.5 × 42.0                             | B32656J2154+000                             | 48                   |
|              |                                    | 220         | 20.0 × 39.5 × 42.0                             | B32656J2224+000                             | 32                   |

Further E series and intermediate capacitance values on request.

**Composition of ordering code**

+ = Capacitance tolerance code:

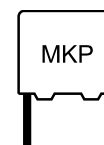
K = ±10%

J = ±5%

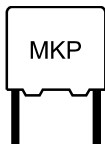
on request = ±3.5%

Packaging code:

000 = Untaped (lead length 6 – 1 mm)


**Technical data**

|  |   |  |   |  |             |
|--|---|--|---|--|-------------|
| Operating temperature range  | Max. operating temperature $T_{op,max}$   |  | +105 °C   |  |             |
|  | Upper category temperature $T_{max}$  |  | +100 °C   |  |             |
|  | Lower category temperature $T_{min}$  |  | -55 °C  |  |             |
|  | Rated temperature $T_R$   |  | +85 °C  |  |             |
| Dissipation factor $\tan \delta$ (in $10^{-3}$ )<br>at 20 °C<br>(upper limit values)   | at  | $\leq 27$ nF   | $27$ nF < $C_R \leq 0.1$ $\mu$ F  | $0.1$ $\mu$ F < $C_R \leq 1$ $\mu$ F   | > 1 $\mu$ F |
|  | 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 $R_{ins}$<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 G $\Omega$  |  | 30000 s   |  |             |
| DC test voltage  | $1.6 \cdot V_R$ , 2 s   |  |   |  |             |
| Category voltage $V_C$<br>(continuous operation with $V_{DC}$<br>or $V_{AC}$ at $f \leq 1$ kHz)  | $T_A$ (°C)  | DC voltage derating  |   | AC voltage derating  |             |
|  | $T_A \leq 85$<br>$85 < T_A \leq 100$  | $V_C = V_R$<br>$V_C = V_R \cdot (165 - T_A)/80$                          |   | $V_{C,rms} = V_{rms}$<br>$V_{C,rms} = V_{rms} \cdot (165 - T_A)/80$                |             |
| Operating voltage $V_{op}$ for<br>short operating periods<br>( $V_{DC}$ or $V_{AC}$ at $f \leq 1$ kHz)   | $T_A$ (°C)  | DC voltage (max. hours)  |   | AC voltage (max. hours)  |             |
|  | $T_A \leq 85$<br>$85 < T_A \leq 100$  | $V_{op} = 1.25 \cdot V_C$ (2000 h)<br>$V_{op} = 1.25 \cdot V_C$ (2000 h) |   | $V_{op} = 1.0 \cdot V_{C,rms}$ (2000 h)<br>$V_{op} = 1.0 \cdot V_{C,rms}$ (2000 h) |             |
| Damp heat test<br>Limit values after damp<br>heat test   | 56 days/40 °C/93% relative humidity   |  |   |  |             |
|  | Capacitance change $ \Delta C/C $   |  | $\leq 3\%$  |  |             |
|  | Dissipation factor change $\Delta \tan \delta$  |  | $\leq 0.5 \cdot 10^{-3}$ (at 1 kHz)<br>$\leq 1.0 \cdot 10^{-3}$ (at 10 kHz)     |  |             |
|  | Insulation resistance $R_{ins}$<br>or time constant $\tau = C_R \cdot R_{ins}$  |  | $\geq 50\%$ of minimum<br>as-delivered values                                   |  |             |
| Reliability:<br>Failure rate $\lambda$<br>Service life $t_{SL}$  | 1 fit ( $\leq 1 \cdot 10^{-9}/h$ ) at $0.5 \cdot V_R$ , 40 °C<br>200 000 h at $1.0 \cdot V_R$ , 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   |  |   |  |             |
|  | Capacitance change $ \Delta C/C $   |  | > 10%   |  |             |
|  | Dissipation factor $\tan \delta$  |  | > 4 · upper limit value   |  |             |
|  | Insulation resistance $R_{ins}$<br>or time constant $\tau = C_R \cdot R_{ins}$  |  | < 1500 M $\Omega$ ( $C_R \leq 0.33$ $\mu$ F)<br>< 500 s ( $C_R > 0.33$ $\mu$ F) |  |             |



**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.

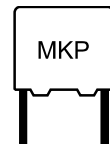
"k<sub>0</sub>" represents the maximum permissible pulse characteristic of the waveform applied to the capacitor, expressed in V<sup>2</sup>/μs.

*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

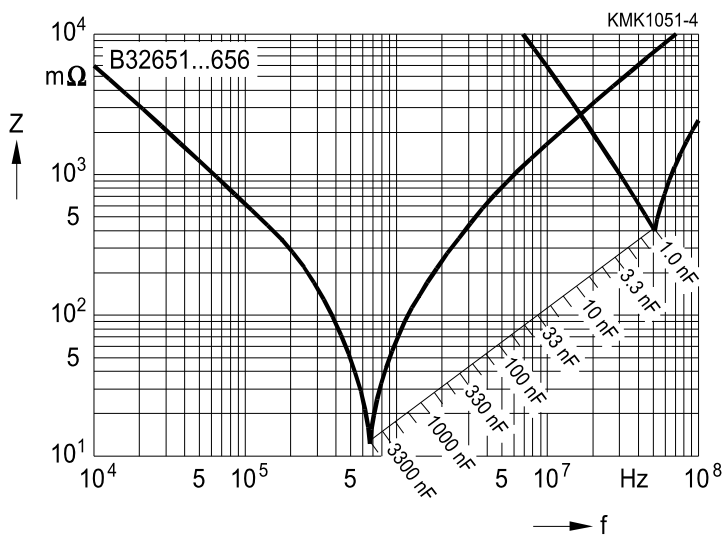
| Lead spacing          |                         | 10 mm         | 15 mm | 22.5 mm | 27.5 mm | 37.5 mm |
|-----------------------|-------------------------|---------------|-------|---------|---------|---------|
| V <sub>R</sub><br>VDC | V <sub>rms</sub><br>VAC | dV/dt in V/μs |       |         |         |         |
| 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    | –       | –       |

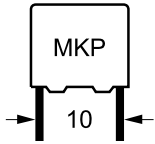


**$k_0$  values**

| 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**

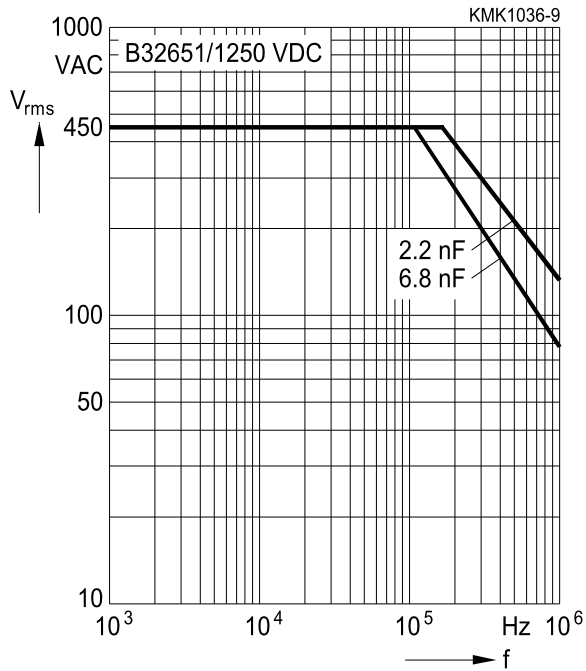
**High pulse (wound)**

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

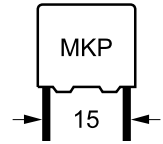
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 10 mm**

**1250 VDC/450 VAC**





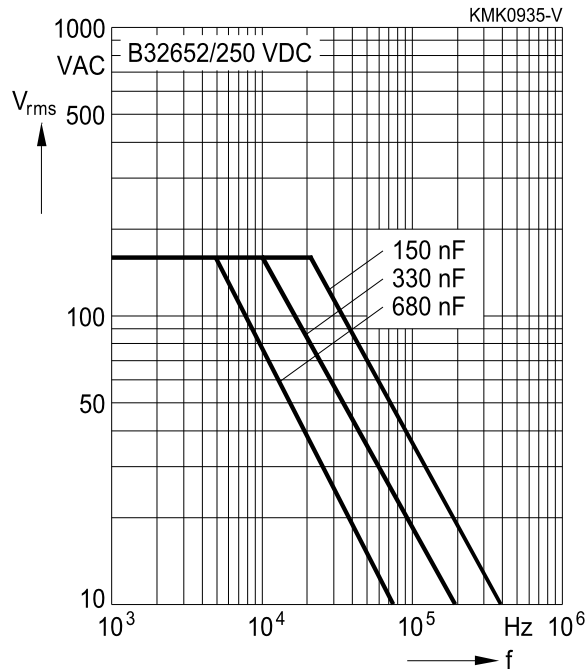


**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ\text{C}$ )**

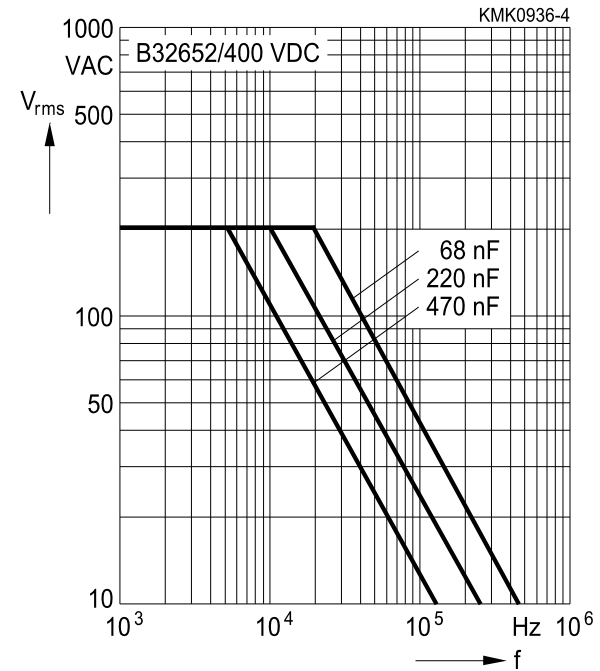
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 15 mm**

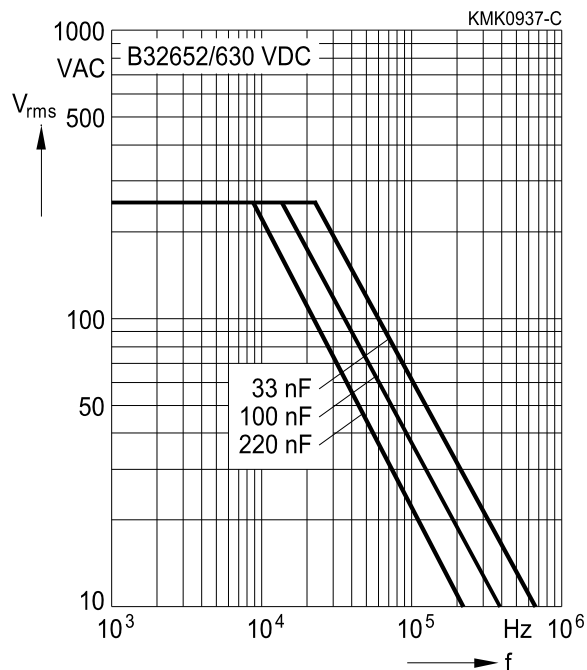
**250 VDC/160 VAC**



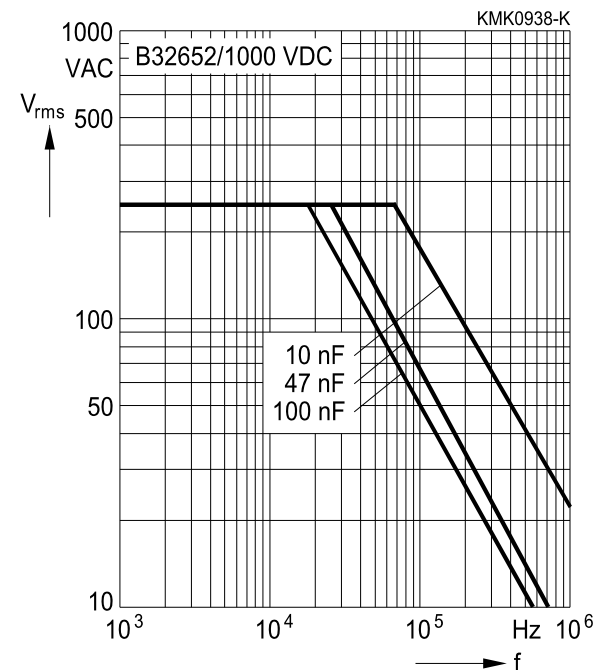
**400 VDC/200 VAC**

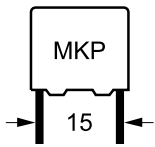


**630 VDC/250 VAC**



**1000 VDC/250 VAC**





**B32652**

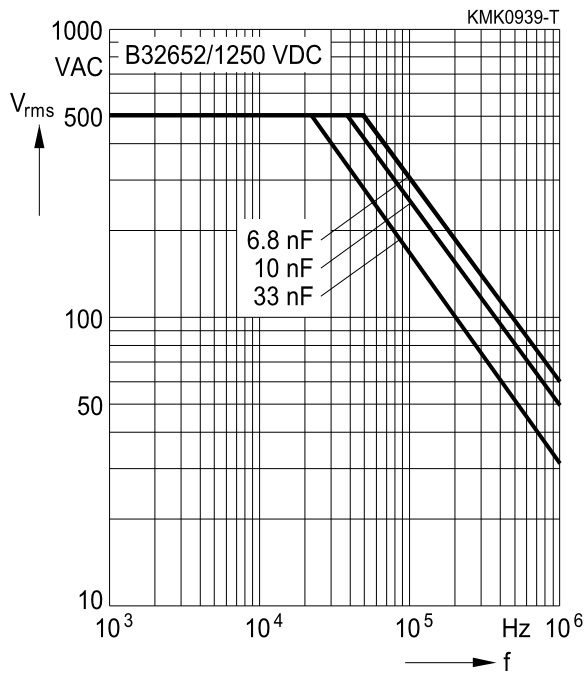
**High pulse (wound)**

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

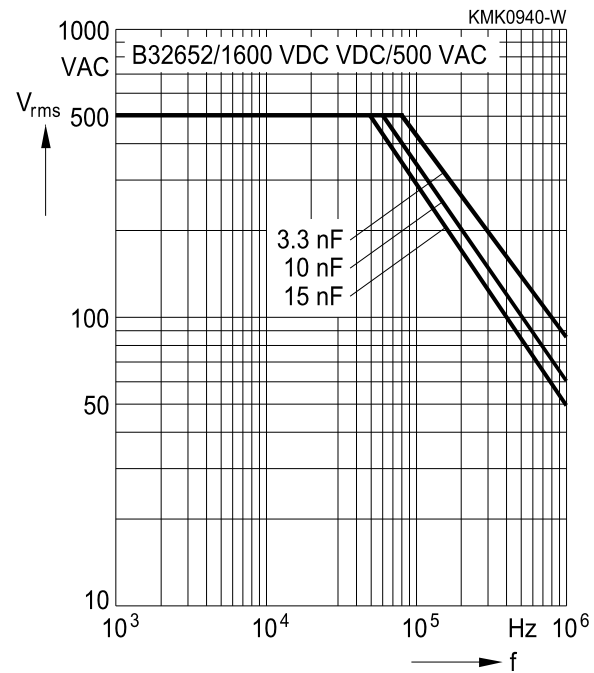
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 15 mm**

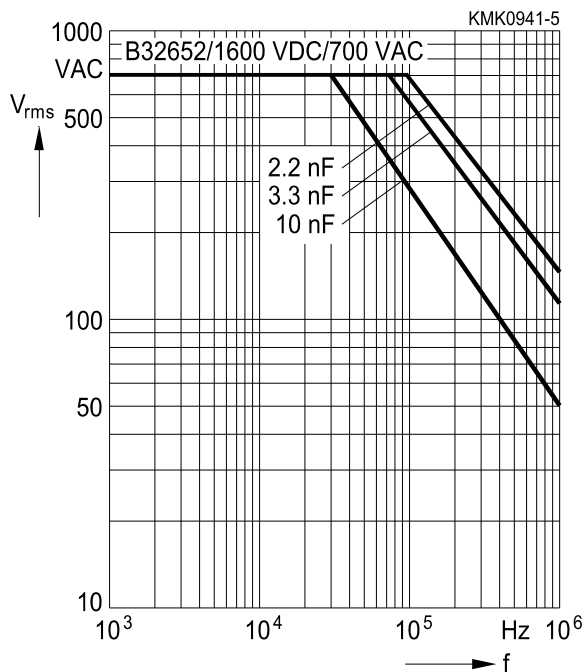
**1250 VDC/500 VAC**



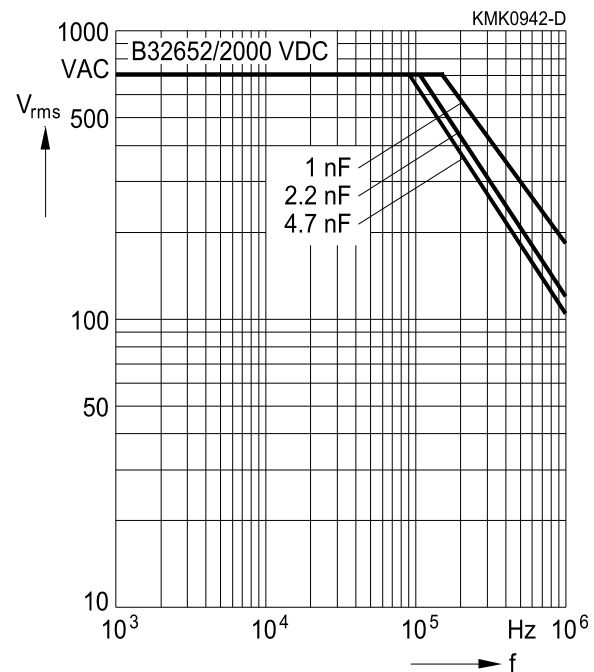
**1600 VDC/500 VAC**

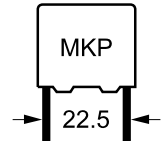


**1600 VDC/700 VAC**



**2000 VDC/700 VAC**



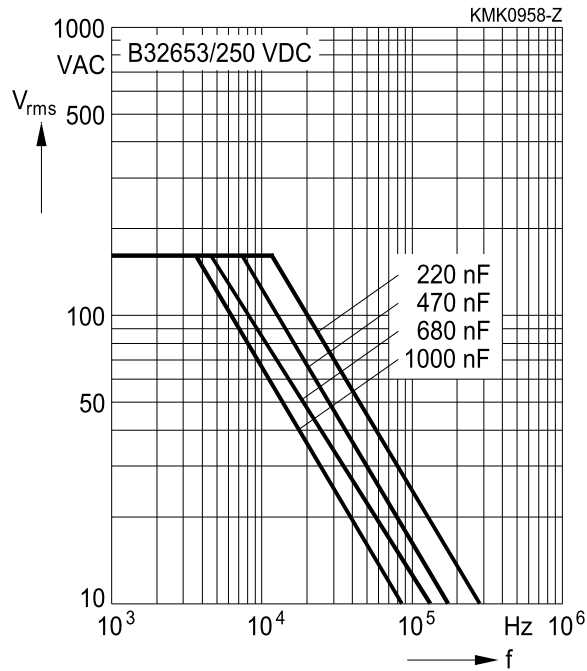


**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ C$ )**

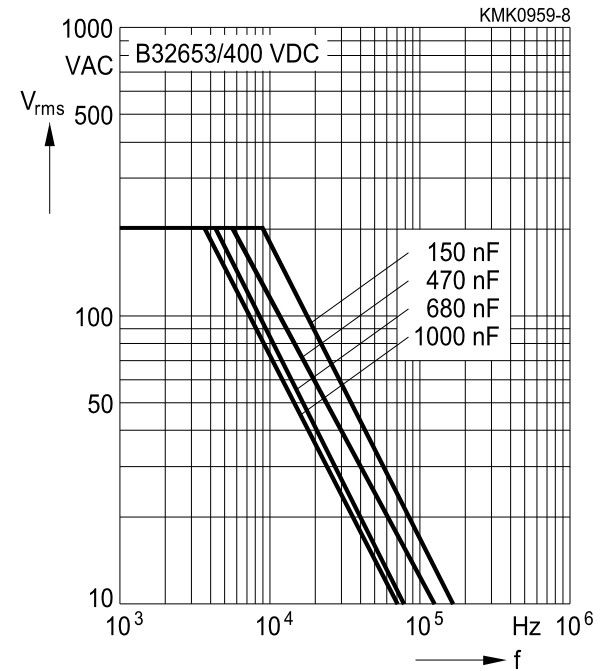
For  $T_A > 90^\circ C$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 22.5 mm**

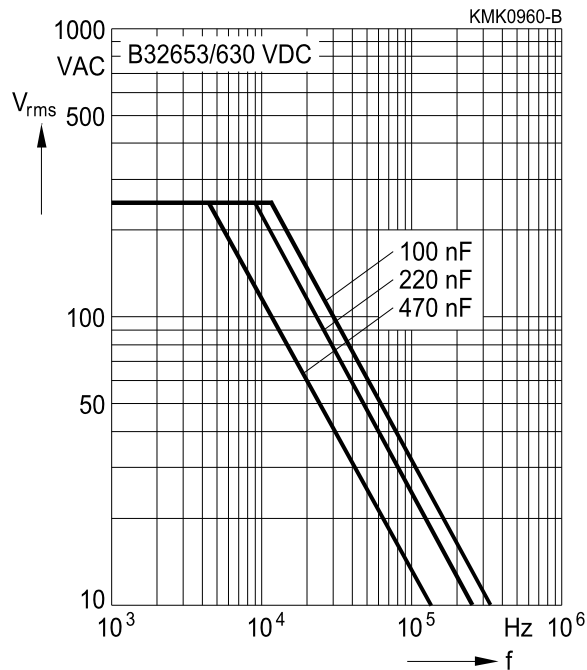
**250 VDC/160 VAC**



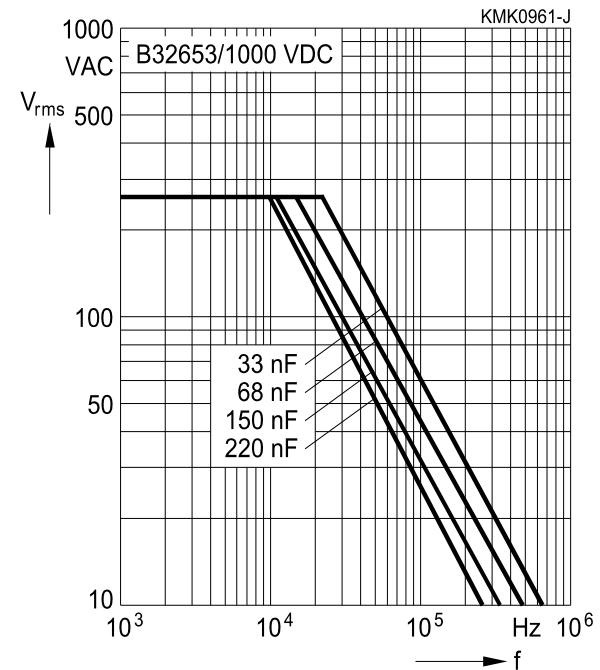
**400 VDC/200 VAC**

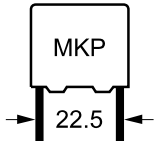


**630 VDC/250 VAC**



**1000 VDC/250 VAC**





**B32653**

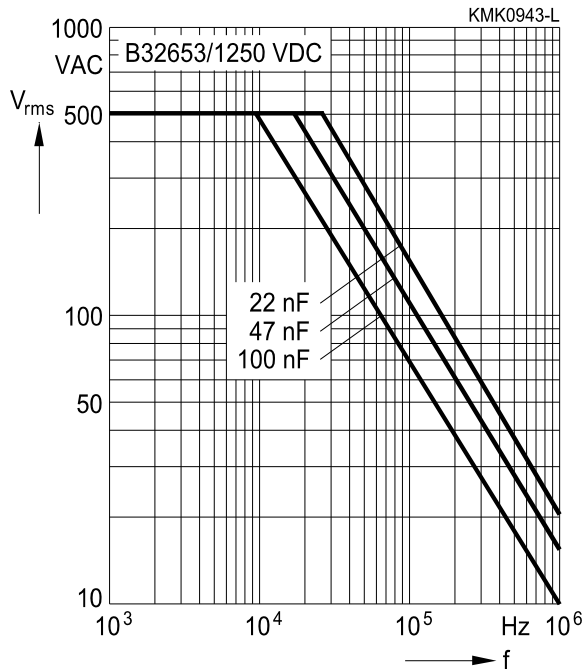
**High pulse (wound)**

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

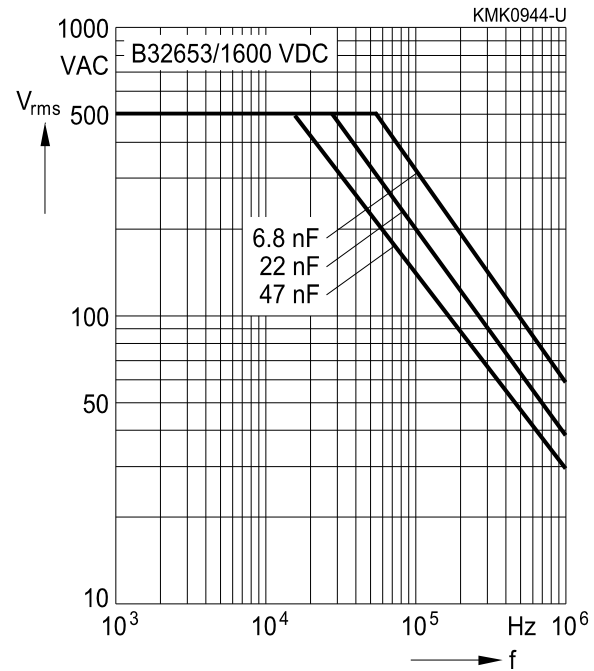
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 22.5 mm**

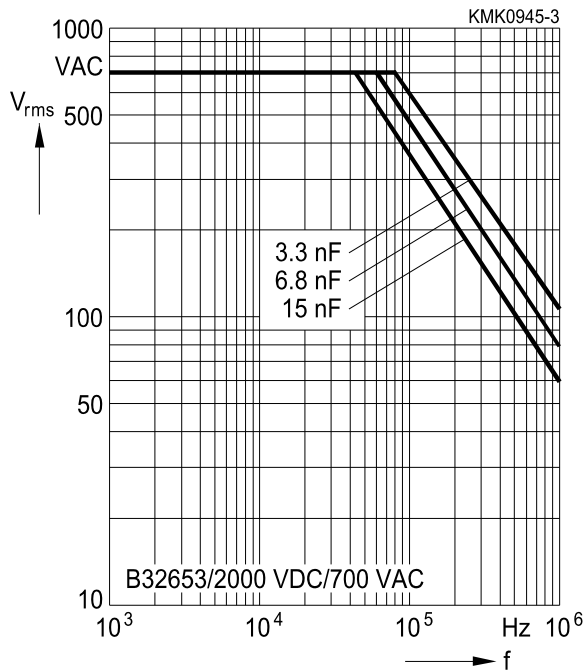
**1250 VDC/500 VAC**



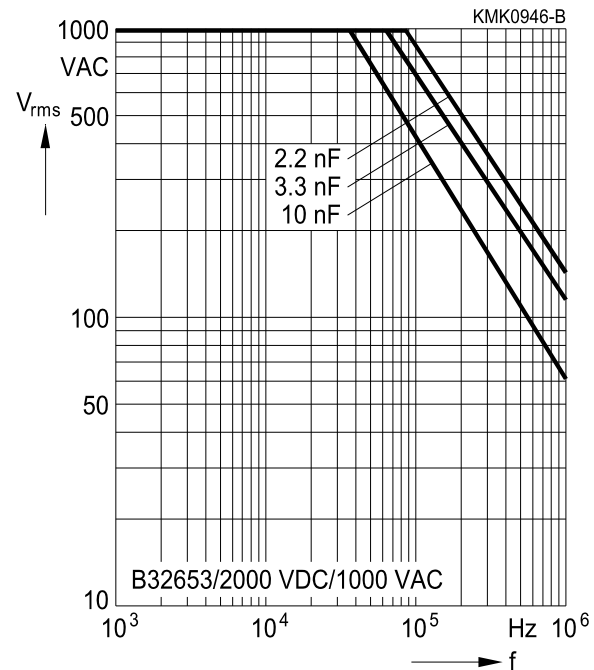
**1600 VDC/500 VAC**

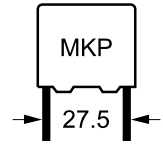


**2000 VDC/700 VAC**



**2000 VDC/1000 VAC**



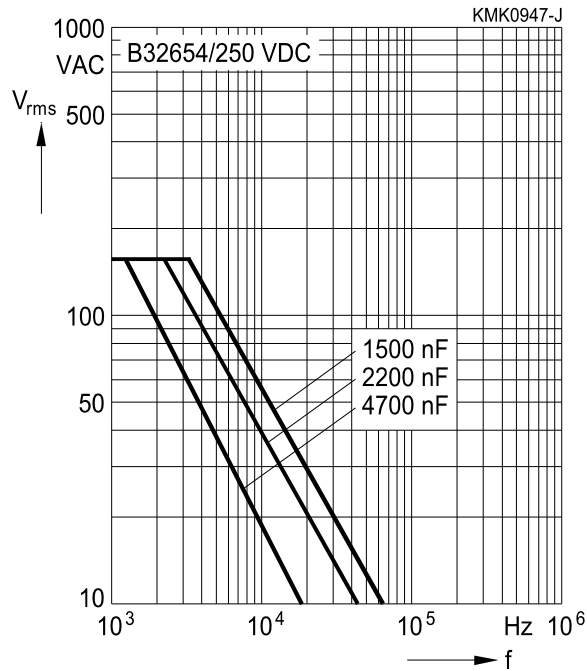


**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ C$ )**

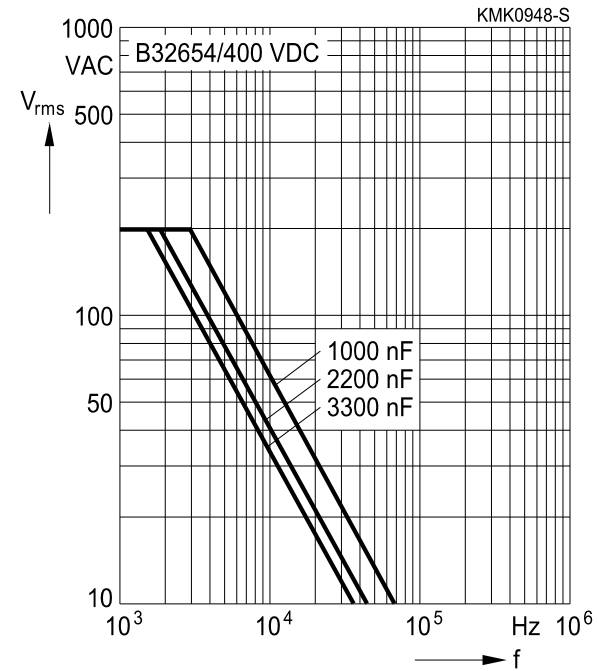
For  $T_A > 90^\circ C$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 27.5 mm**

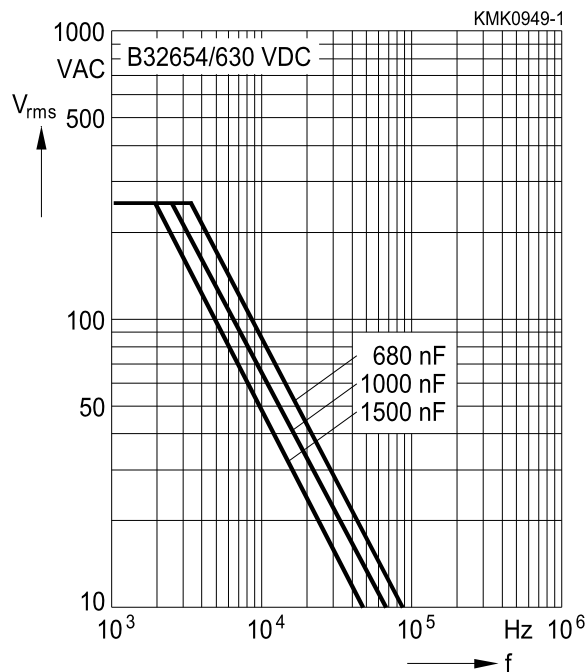
250 VDC/160 VAC



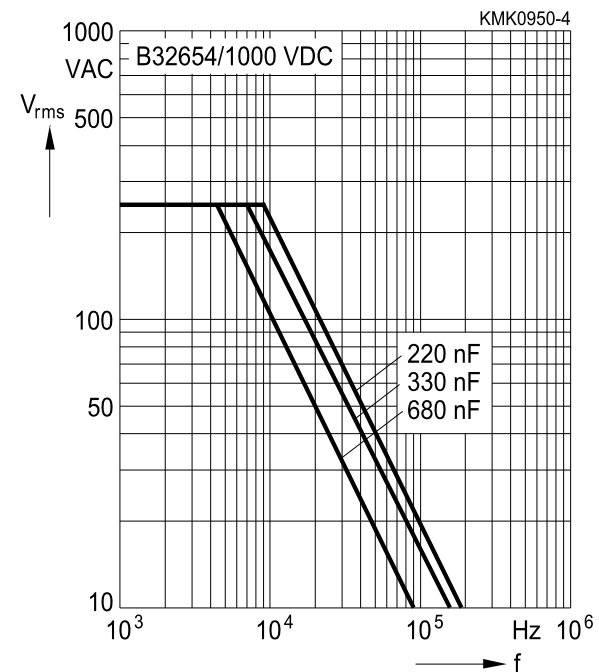
400 VDC/200 VAC

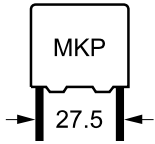


630 VDC/250 VAC



1000 VDC/250 VAC





**B32654**

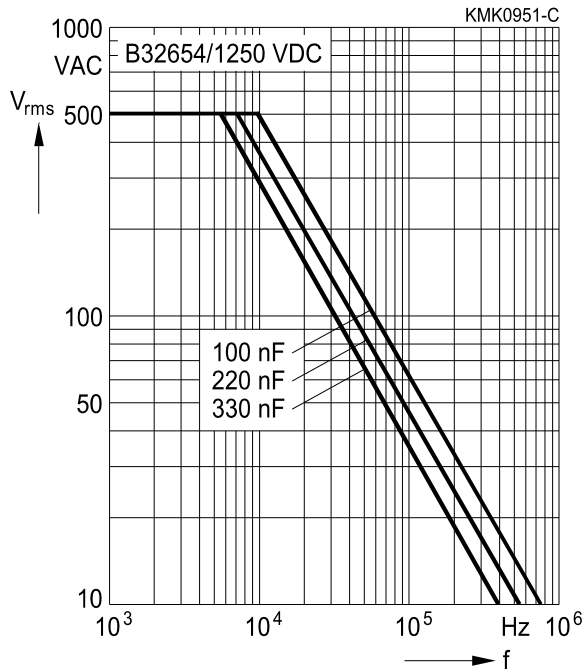
**High pulse (wound)**

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

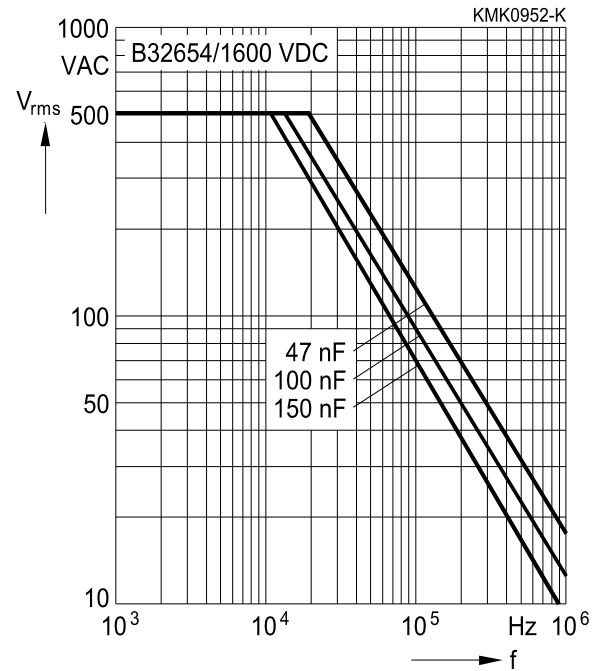
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 27.5 mm**

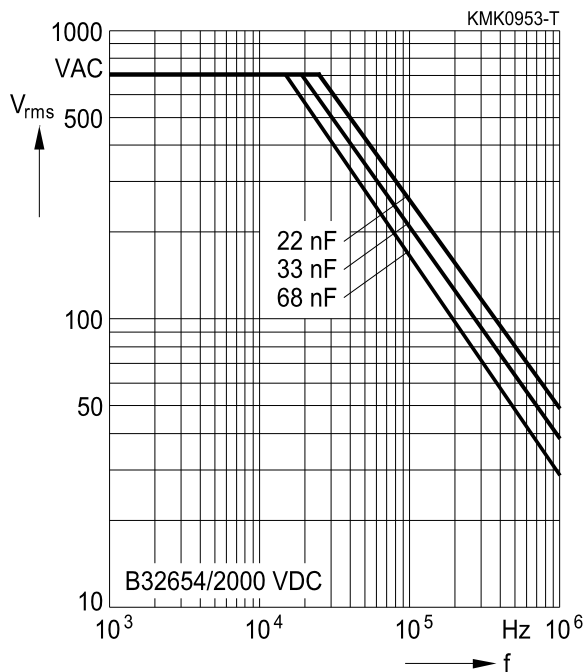
**1250 VDC/500 VAC**

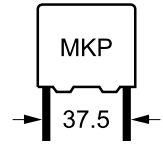


**1600 VDC/500 VAC**



**2000 VDC/700 VAC**



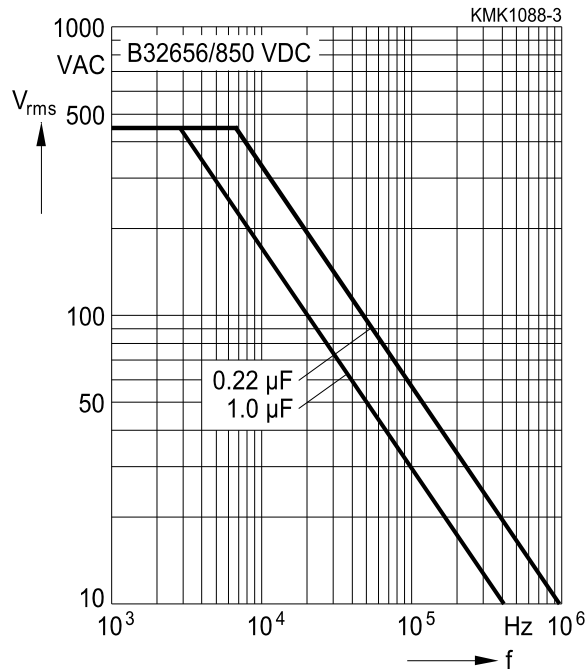


**Permissible AC voltage  $V_{rms}$  versus frequency  $f$  (for sinusoidal waveforms,  $T_A \leq 90^\circ C$ )**

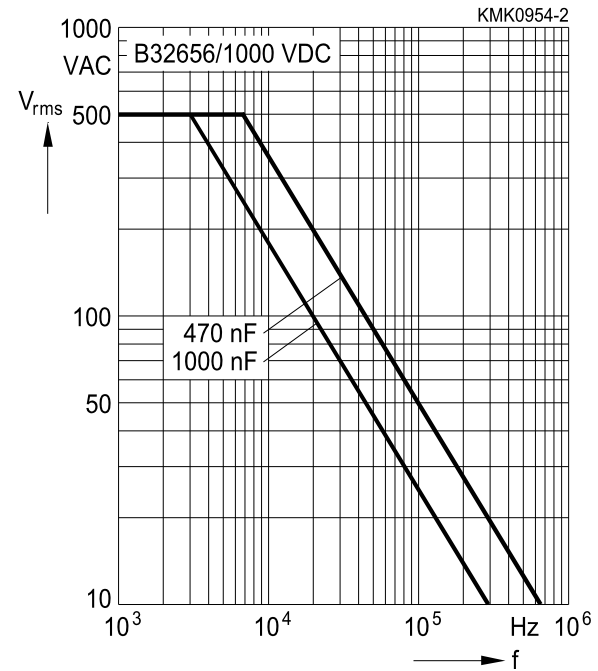
For  $T_A > 90^\circ C$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 37.5 mm**

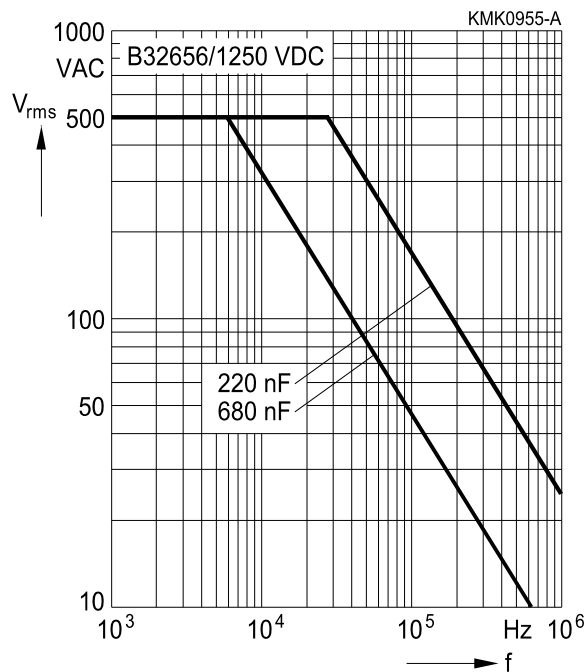
**850 VDC/450 VAC**



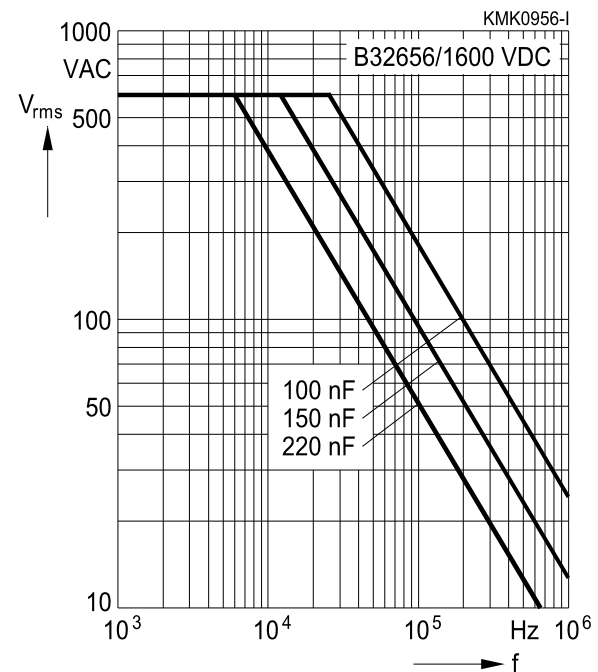
**1000 VDC/500 VAC**

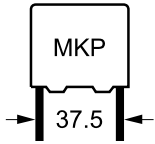


**1250 VDC/500 VAC**



**1600 VDC/600 VAC**





**B32656**

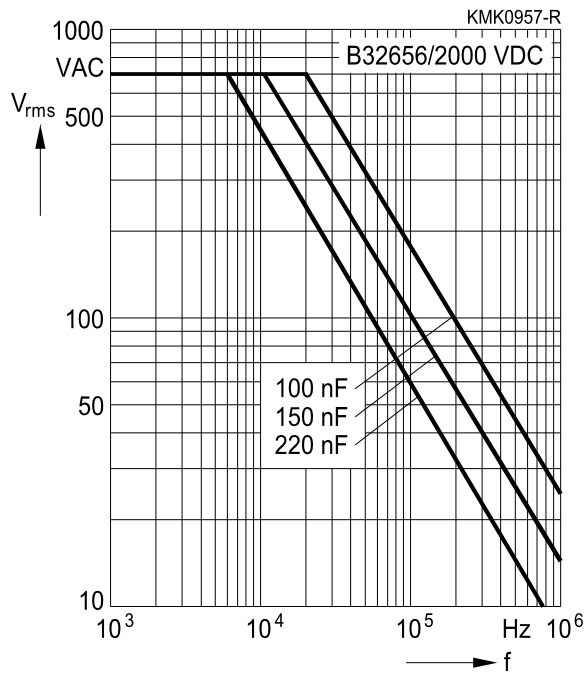
**High pulse (wound)**

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

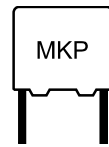
For  $T_A > 90^\circ\text{C}$ , please refer to "General technical information", section 3.2.3.

**Lead spacing 37.5 mm**

**2000 VDC/700 VAC**



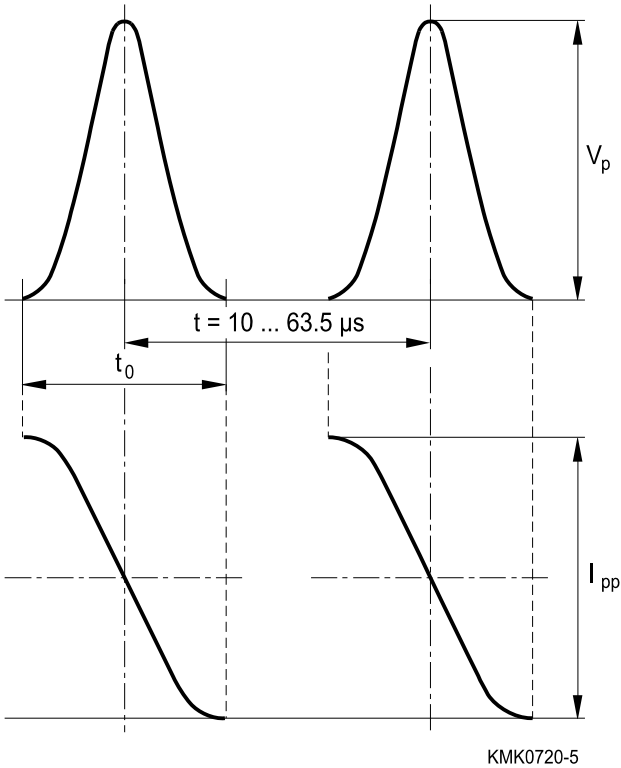




**Flyback application**

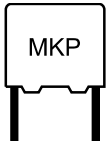
**Permissible voltage and current / waveform**

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



Approximation formular for duty cycle higher than 20%:

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



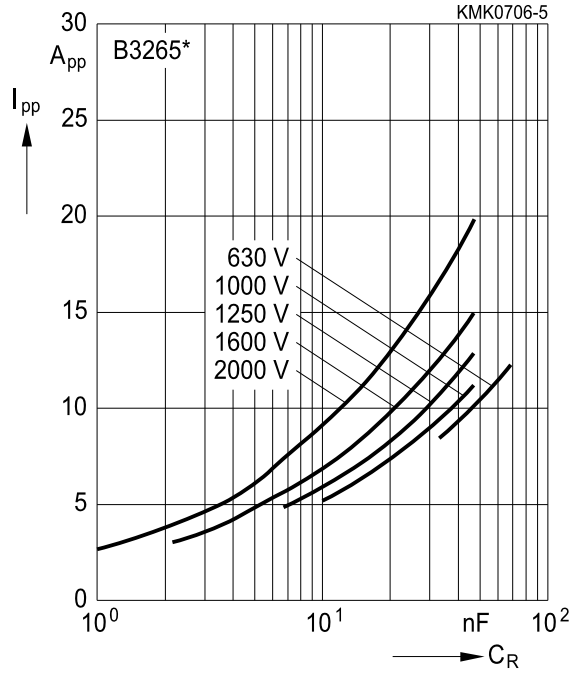
B32651 ... B32656

High pulse (wound)

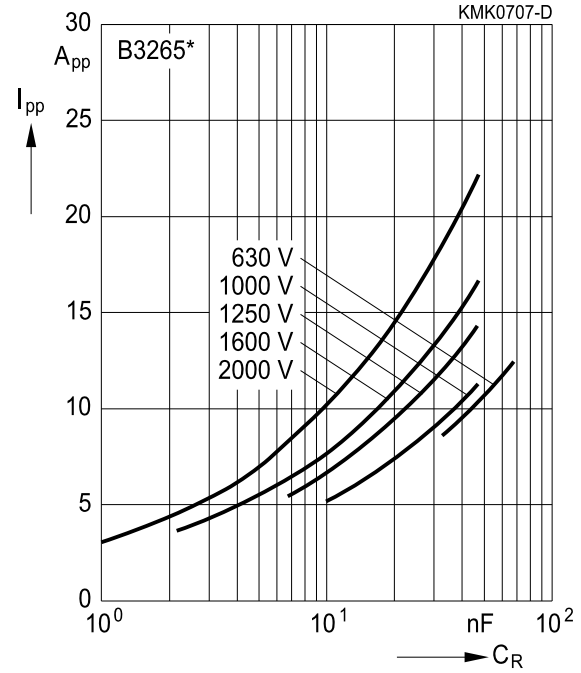
**Flyback application**

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

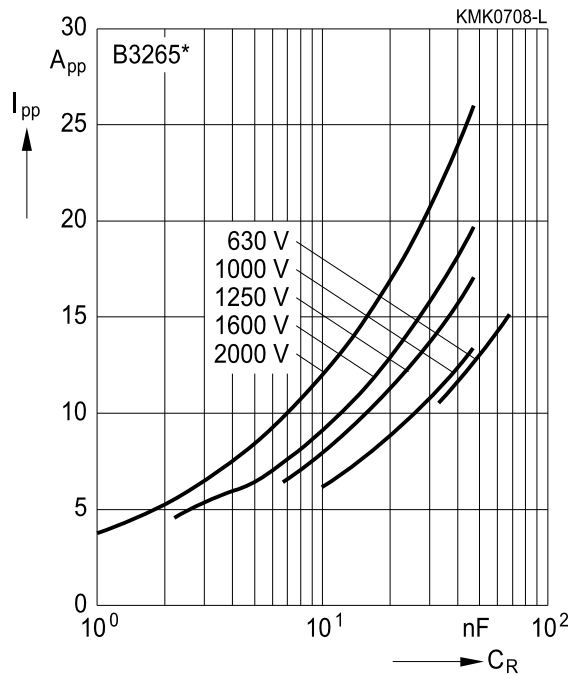
Frequency = 15.75 kHz

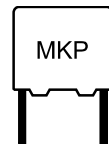


Frequency = 31.5 kHz

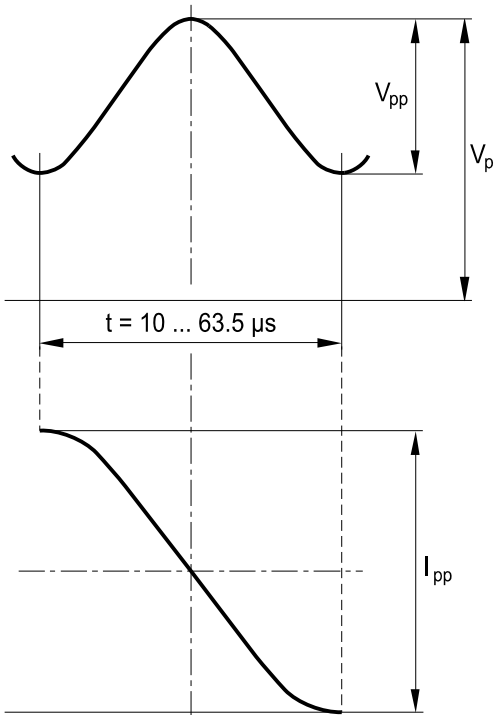


Frequency = 95 kHz

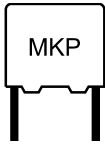




**S-correction application**  
**Permissible voltage and current / waveform**



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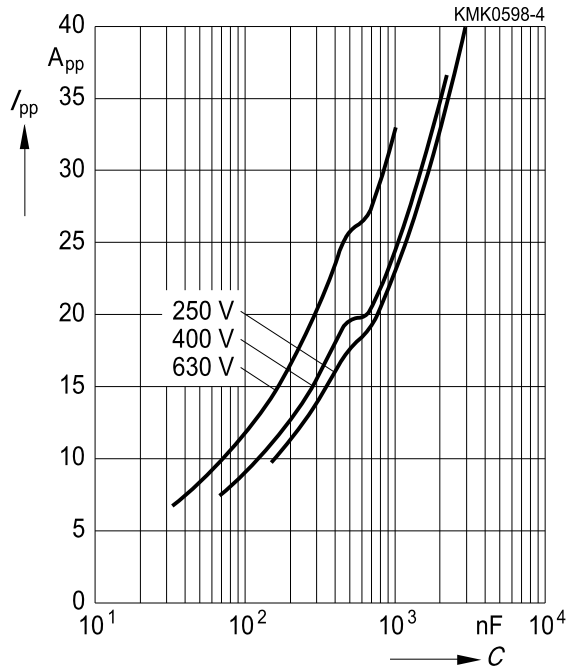
B32651 ... B32656

High pulse (wound)

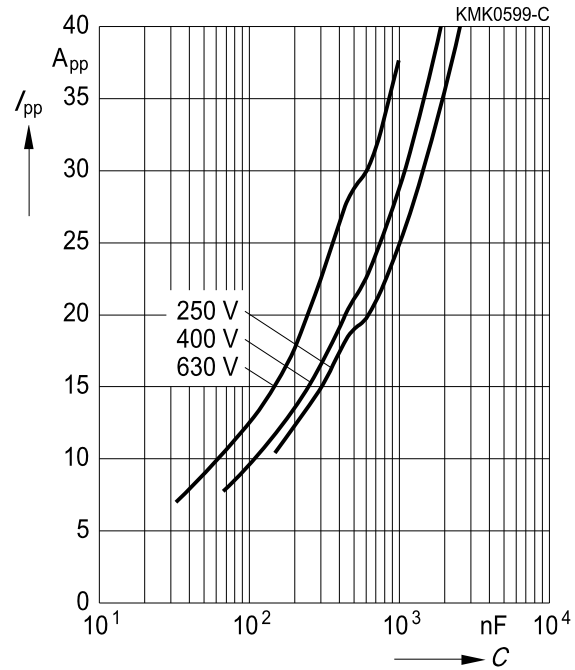
**S-correction application**

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

Frequency = 15.75 kHz



Frequency = 31.75 kHz



Frequency = 95 kHz

