

Metallized Polypropylene Film Capacitors (MKP) in Plastic Case

B 32 652 ... B 32 656

MKP wound capacitors Very small dimensions

Construction

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

Features

- High pulse strength
- High contact reliability
- Very small dimensions

Typical applications

- TV S-correction
- TV flyback
- Electronic ballast circuits

Terminals

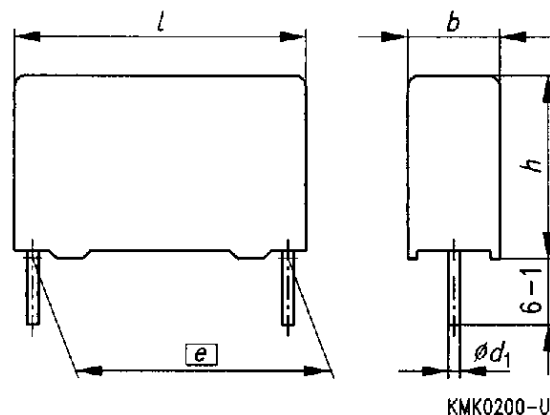
- Parallel wire leads, tinned
- Also available with $(3,2 \pm 0,3)$ mm lead length

Marking

Manufacturer's logo,
lot number for lead spacing $\leq 27,5$ mm
style (MKP),
rated capacitance (coded),
capacitance tolerance (code letter),
rated dc voltage,
date of manufacture (coded)

Delivery mode

Bulk
Taped (Ammo pack or reel)
For notes on taping refer to page 278.



Dimensions in mm

Lead spacing $e \pm 0,4$	Diameter d_1	Type
15,0	0,8	B 32 652
22,5	0,8	B 32 653
27,5	0,8	B 32 654
37,5	1,0	B 32 656

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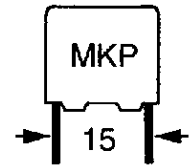


B 32 652 ... B 32 656

Overview of available types

Lead spacing	15 mm	22,5 mm	27,5 mm	37,5 mm
Type	B 32 652	B 32 653	B 32 654	B 32 656
Page	121	122	124	125
1,0 nF				
1,5 nF				
2,2 nF				
3,3 nF				
4,7 nF				
6,8 nF				
10 nF				
15 nF				
22 nF				
33 nF				
47 nF				
68 nF				
0,10 µF				
0,15 µF				
0,22 µF				
0,33 µF				
0,47 µF				
0,68 µF				
1,0 µF				
1,5 µF				
2,2 µF				
3,3 µF				
4,7 µF				

Capacitance	15 mm (B 32 652)	22,5 mm (B 32 653)	27,5 mm (B 32 654)	37,5 mm (B 32 656)
1,0 nF				
1,5 nF				
2,2 nF				
3,3 nF				
4,7 nF				
6,8 nF				
10 nF				
15 nF				
22 nF				
33 nF				
47 nF				
68 nF				
0,10 µF				
0,15 µF				
0,22 µF	250 V _{dc}	250 V _{dc}	250 V _{dc}	250 V _{dc}
0,33 µF	400 V _{dc}	400 V _{dc}	400 V _{dc}	400 V _{dc}
0,47 µF	630 V _{dc}	630 V _{dc}	630 V _{dc}	630 V _{dc}
0,68 µF	1000 V _{dc}	1000 V _{dc}	1000 V _{dc}	1000 V _{dc}
1,0 µF	1250 V _{dc}	1250 V _{dc}	1250 V _{dc}	1250 V _{dc}
1,5 µF	1600 V _{dc}	1600 V _{dc}	1600 V _{dc}	1600 V _{dc}
2,2 µF	2000 V _{dc}	2000 V _{dc}	2000 V _{dc}	2000 V _{dc}
3,3 µF				
4,7 µF				


Ordering codes and packing units, lead spacing 15 mm

V_R (V_{rms} $f \leq 1$ kHz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code ¹⁾	Packing units (pcs)		
				Ammo pack	Reel	Untaped
250 V_{dc} (160 V_{ac})	0,15 μF	5,0 × 10,5 × 18,0	B32652-A3154-+***	1180	1300	1000
	0,22 μF	6,0 × 11,0 × 18,0	B32652-A3224-+***	1000	1100	1000
	0,33 μF	7,0 × 12,5 × 18,0	B32652-A3334-+***	840	900	1000
	0,47 μF	8,5 × 14,5 × 18,0	B32652-A3474-+***	690	700	500
	0,68 μF	9,0 × 17,5 × 18,0	B32652-A3684-+***	660	700	500
400 V_{dc} (200 V_{ac})	68 nF	5,0 × 10,5 × 18,0	B32652-A4683-+***	1180	1300	1000
	0,10 μF	5,0 × 10,5 × 18,0	B32652-A4104-+***	1180	1300	1000
	0,15 μF	6,0 × 11,0 × 18,0	B32652-A4154-+***	1000	1100	1000
	0,22 μF	7,0 × 12,5 × 18,0	B32652-A4224-+***	840	900	1000
	0,33 μF	8,5 × 14,5 × 18,0	B32652-A4334-+***	690	700	500
	0,47 μF	9,0 × 17,5 × 18,0	B32652-A4474-+***	660	700	500
630 V_{dc} (250 V_{ac})	33 nF	5,0 × 10,5 × 18,0	B32652-A6333-+***	1180	1300	1000
	47 nF	5,0 × 10,5 × 18,0	B32652-A6473-+***	1180	1300	1000
	68 nF	6,0 × 11,0 × 18,0	B32652-A6683-+***	1000	1100	1000
	0,10 μF	7,0 × 12,5 × 18,0	B32652-A6104-+***	840	900	1000
	0,15 μF	8,5 × 14,5 × 18,0	B32652-A6154-+***	690	700	500
	0,22 μF	9,0 × 17,5 × 18,0	B32652-A6224-+***	660	700	500
1000 V_{dc} (250 V_{ac})	10 nF	5,0 × 10,5 × 18,0	B32652-A103-+***	1180	1300	1000
	15 nF	5,0 × 10,5 × 18,0	B32652-A153-+***	1180	1300	1000
	22 nF	5,0 × 10,5 × 18,0	B32652-A223-+***	1180	1300	1000
	33 nF	6,0 × 11,0 × 18,0	B32652-A333-+***	1000	1100	1000
	47 nF	7,0 × 12,5 × 18,0	B32652-A473-+***	840	900	1000
	68 nF	8,5 × 14,5 × 18,0	B32652-A683-+***	690	700	500
	0,10 μF	9,0 × 17,5 × 18,0	B32652-A104-+***	660	700	500
	1250 V_{dc} (500 V_{ac})	6,8 nF	5,0 × 10,5 × 18,0	B32652-A7682-+***	1180	1300
10 nF		6,0 × 11,0 × 18,0	B32652-A7103-+***	1000	1100	1000
15 nF		7,0 × 12,5 × 18,0	B32652-A7153-+***	840	900	1000
22 nF		8,5 × 14,5 × 18,0	B32652-A7223-+***	690	700	500
33 nF		9,0 × 17,5 × 18,0	B32652-A7333-+***	660	700	500
1600 V_{dc} (500 V_{ac})	3,3 nF	5,0 × 10,5 × 18,0	B32652-A1332-+***	1180	1300	1000
	4,7 nF	6,0 × 11,0 × 18,0	B32652-A1472-+***	1000	1100	1000
	6,8 nF	7,0 × 12,5 × 18,0	B32652-A1682-+***	840	900	1000
	10 nF	8,5 × 14,5 × 18,0	B32652-A1103-+***	690	700	500
	15 nF	9,0 × 17,5 × 18,0	B32652-A1153-+***	660	700	500

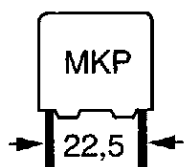
Capacitance tolerance: $\pm 10\% \hat{=} K, \pm 5\% \hat{=} J, (\pm 3,5\% \text{ upon request})$

1) Replace the + by the code letter for the required capacitance tolerance

Replace the *** by the code number for the required packing Ammo pack = 289, reel = 189 (taping cf p 278)

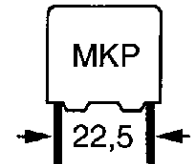
The ordering code for untaped components ends after the tolerance code letter.

For capacitors with 3,2 mm lead length, append code number "3" to the tolerance code, e.g. B32652-A4104-K3

**B 32 653****Ordering codes and packing units, lead spacing 22,5 mm**

V_R (V_{rms} $f \leq 1$ kHz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code ¹⁾	Packing units (pcs)		
				Ammo pack	Reel	Untaped
250 V_{dc} (160 V_{ac})	0,22 μF	6,0 × 15,0 × 26,5	B32653-A3224-+***	690	700	720
	0,33 μF	6,0 × 15,0 × 26,5	B32653-A3334-+***	690	700	720
	0,47 μF	7,0 × 16,0 × 26,5	B32653-A3474-+***	590	600	630
	0,68 μF	8,5 × 16,5 × 26,5	B32653-A3684-+***	500	500	510
	1,0 μF	10,5 × 16,5 × 26,5	B32653-A3105-+***	400	400	540
400 V_{dc} (200 V_{ac})	0,15 μF	6,0 × 15,0 × 26,5	B32653-A4154-+***	690	700	720
	0,22 μF	6,0 × 15,0 × 26,5	B32653-A4224-+***	690	700	720
	0,33 μF	7,0 × 16,0 × 26,5	B32653-A4334-+***	590	600	630
	0,47 μF	8,5 × 16,5 × 26,5	B32653-A4474-+***	500	500	510
	0,68 μF	10,5 × 16,5 × 26,5	B32653-A4684-+***	400	400	540
	1,0 μF	11,0 × 20,5 × 26,5	B32653-A4105-+***	380	350	510
630 V_{dc} (250 V_{ac})	0,10 μF	6,0 × 15,0 × 26,5	B32653-A6104-+***	690	700	720
	0,15 μF	6,0 × 15,0 × 26,5	B32653-A6154-+***	690	700	720
	0,22 μF	8,5 × 16,5 × 26,5	B32653-A6224-+***	500	500	510
	0,33 μF	10,5 × 16,5 × 26,5	B32653-A6334-+***	400	400	540
	0,47 μF	11,0 × 20,5 × 26,5	B32653-A6474-+***	380	350	510
1000 V_{dc} (250 V_{ac})	33 nF	6,0 × 15,0 × 26,5	B32653-A333-+***	690	700	720
	47 nF	6,0 × 15,0 × 26,5	B32653-A473-+***	690	700	720
	68 nF	6,0 × 15,0 × 26,5	B32653-A683-+***	690	700	720
	0,10 μF	8,5 × 16,5 × 26,5	B32653-A104-+***	500	500	510
	0,15 μF	10,5 × 16,5 × 26,5	B32653-A154-+***	400	400	540
	0,22 μF	11,0 × 20,5 × 26,5	B32653-A224-+***	380	350	510
1250 V_{dc} (500 V_{ac})	22 nF	6,0 × 15,0 × 26,5	B32653-A7223-+***	690	700	720
	33 nF	6,0 × 15,0 × 26,5	B32653-A7333-+***	690	700	720
	47 nF	8,5 × 16,5 × 26,5	B32653-A7473-+***	500	500	510
	68 nF	10,5 × 16,5 × 26,5	B32653-A7683-+***	400	400	540
	0,10 μF	11,0 × 20,5 × 26,5	B32653-A7104-+***	380	350	510

1) For instructions on how to determine the ordering code refer to page 123.



Ordering codes and packing units, lead spacing 22,5 mm

V_R (V_{rms} $f \leq 1$ kHz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code ¹⁾	Packing units (pcs)		
				Ammo pack	Reel	Untaped
1600 V_{dc} (500 V_{ac})	6,8 nF	6,0 × 15,0 × 26,5	B32653-A1682-+***	690	700	720
	10 nF	6,0 × 15,0 × 26,5	B32653-A1103-+***	690	700	720
	15 nF	7,0 × 16,0 × 26,5	B32653-A1153-+***	590	600	630
	22 nF	8,5 × 16,5 × 26,5	B32653-A1223-+***	500	500	510
	33 nF	10,5 × 16,5 × 26,5	B32653-A1333-+***	400	400	540
	47 nF	11,0 × 20,5 × 26,5	B32653-A1473-+***	380	350	510
2000 V_{dc} (700 V_{ac})	1,0 nF	6,0 × 15,0 × 26,5	B32653-A2102-+***	690	700	720
	1,5 nF	6,0 × 15,0 × 26,5	B32653-A2152-+***	690	700	720
	2,2 nF	6,0 × 15,0 × 26,5	B32653-A2222-+***	690	700	720
	3,3 nF	6,0 × 15,0 × 26,5	B32653-A2332-+***	690	700	720
	4,7 nF	6,0 × 15,0 × 26,5	B32653-A2472-+***	690	700	720
	6,8 nF	8,5 × 16,5 × 26,5	B32653-A2682-+***	500	500	510
	10 nF	10,5 × 16,5 × 26,5	B32653-A2103-+***	400	400	540
	15 nF	11,0 × 20,5 × 26,5	B32653-A2153-+***	380	350	510

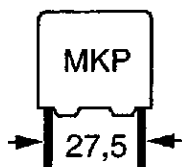
Capacitance tolerance: $\pm 10\% \hat{=}$ K, $\pm 5\% \hat{=}$ J, ($\pm 3,5\%$ upon request)

1) Replace the + by the code letter for the required capacitance tolerance

Replace the *** by the code number for the required packing: Ammo pack = 289, reel = 189 (taping cf. p. 278)

The ordering code for untaped components ends after the tolerance code letter.

For capacitors with 3,2 mm lead length, append code number "3" to the tolerance code, e.g. B32653-A1682-K3

**B 32 654****Ordering codes and packing units, lead spacing 27,5 mm**

V_R (V_{rms} $f \leq 1$ kHz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code ¹⁾	Packing units (pcs)		
				Ammo pack	Reel	Untaped
250 V _{dc} (160 V _{ac})	1,5 μ F	11,0 \times 21,0 \times 31,5	B32654-A3155-+***	—	350	320
	2,2 μ F	12,5 \times 21,5 \times 31,5	B32654-A3225-+***	—	300	280
	3,3 μ F	15,0 \times 24,5 \times 31,5	B32654-A3335-+***	—	—	240
	4,7 μ F	18,0 \times 27,5 \times 31,5	B32654-A3475-+***	—	—	200
400 V _{dc} (200 V _{ac})	1,0 μ F	11,0 \times 21,0 \times 31,5	B32654-A4105-+***	—	350	320
	1,5 μ F	12,5 \times 21,5 \times 31,5	B32654-A4155-+***	—	300	280
	2,2 μ F	14,0 \times 24,5 \times 31,5	B32654-A4225-+***	—	—	260
	3,3 μ F	19,0 \times 30,0 \times 31,5	B32654-A4335-+***	—	—	180
630 V _{dc} (250 V _{ac})	0,68 μ F	11,0 \times 21,0 \times 31,5	B32654-A6684-+***	—	350	320
	1,0 μ F	13,5 \times 23,0 \times 31,5	B32654-A6105-+***	—	250	260
	1,5 μ F	18,0 \times 27,5 \times 31,5	B32654-A6155-+***	—	—	200
1000 V _{dc} (250 V _{ac})	0,22 μ F	11,0 \times 21,0 \times 31,5	B32654-A224-+***	—	350	320
	0,33 μ F	11,0 \times 21,0 \times 31,5	B32654-A334-+***	—	350	320
	0,47 μ F	14,0 \times 24,5 \times 31,5	B32654-A474-+***	—	—	260
	0,68 μ F	18,0 \times 27,5 \times 31,5	B32654-A684-+***	—	—	200
1250 V _{dc} (500 V _{ac})	0,10 μ F	11,0 \times 21,0 \times 31,5	B32654-A7104-+***	—	350	320
	0,15 μ F	11,0 \times 21,0 \times 31,5	B32654-A7154-+***	—	350	320
	0,22 μ F	14,0 \times 24,5 \times 31,5	B32654-A7224-+***	—	—	260
	0,33 μ F	18,0 \times 27,5 \times 31,5	B32654-A7334-+***	—	—	200
1600 V _{dc} (500 V _{ac})	47 nF	11,0 \times 21,0 \times 31,5	B32654-A1473-+***	—	350	320
	68 nF	11,0 \times 21,0 \times 31,5	B32654-A1683-+***	—	350	320
	0,10 μ F	14,0 \times 24,5 \times 31,5	B32654-A1104-+***	—	—	260
	0,15 μ F	18,0 \times 27,5 \times 31,5	B32654-A1154-+***	—	—	200
2000 V _{dc} (700 V _{ac})	22 nF	11,0 \times 21,0 \times 31,5	B32654-A2223-+***	—	350	320
	33 nF	13,5 \times 23,0 \times 31,5	B32654-A2333-+***	—	250	260
	47 nF	18,0 \times 27,5 \times 31,5	B32654-A2473-+***	—	—	200
	68 nF	19,0 \times 30,0 \times 31,5	B32654-A2683-+***	—	—	180

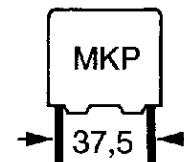
Capacitance tolerance: $\pm 10\% \hat{=} K, \pm 5\% \hat{=} J, (\pm 3,5\% \text{ upon request})$

1) Replace the + by the code letter for the required capacitance tolerance

Replace the *** by the code number for the required packing: reel = 189 (taping cf. p. 278)

The ordering code for untaped components ends after the tolerance code letter

For capacitors with 3,2 mm lead length, append code number "3" to the tolerance code, e.g. B32654-A4105-K3

B 32 656
Ordering codes and packing units, lead spacing 37,5 mm

V_R (V_{rms} $f \leq 1$ kHz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code ¹⁾	Packing units (pcs)		
				Ammo pack	Reel	Untaped
1000 V_{dc} (500 V_{ac})	0,47 μF	14,0 × 25,0 × 41,5	B32656-A474-+	—	—	40
	0,68 μF	16,0 × 28,5 × 41,5	B32656-A684-+	—	—	35
	1,0 μF	20,0 × 39,5 × 41,5	B32656-A105-+	—	—	30
1250 V_{dc} (500 V_{ac})	0,33 μF	16,0 × 28,5 × 41,5	B32656-A7334-+	—	—	35
	0,47 μF	18,0 × 32,5 × 41,5	B32656-A7474-+	—	—	30
	0,68 μF	20,0 × 39,5 × 41,5	B32656-A7684-+	—	—	30

 Capacitance tolerance: $\pm 10\% \hat{=}$ K, $\pm 5\% \hat{=}$ J, ($\pm 3,5\%$ upon request)

1) Replace the + by the code letter for the required capacitance tolerance

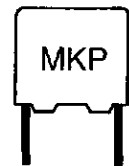
For capacitors with 3,2 mm wire leads, append code number "3" to the tolerance code, e.g · B32656-A474-K3



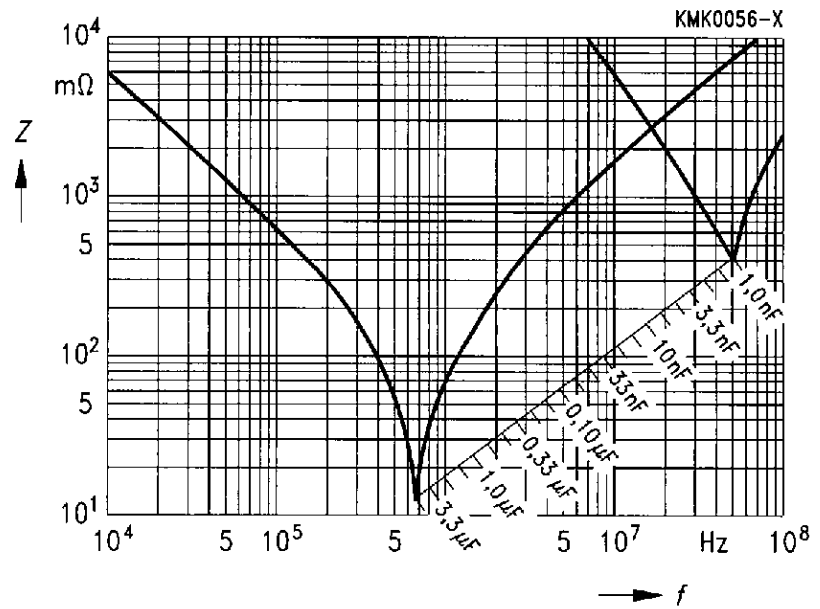
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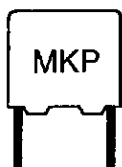
Technical data

Climatic category in accordance with IEC 68-1	55/100/56		
Lower category temperature T_{min}	- 55 °C		
Upper category temperature T_{max}	+ 100 °C		
Damp heat test	56 days/40 °C/93 % relative humidity		
Limit values after damp heat test	Capacitance change $\Delta C/C$	$\leq 3 \%$	
	Dissipation factor change $\Delta \tan \delta$	$\leq 0,5 \cdot 10^{-3}$ (at 1 kHz)	
		$\leq 1,0 \cdot 10^{-3}$ (at 10 kHz)	
	Insulation resistance R_{is} or time constant $\tau = C_R \cdot R_{is}$	$\geq 50 \%$ of minimum as-delivered values	
Reliability:			
Reference conditions	0,5 · V_R ; 40 °C		
Failure rate	$1 \cdot 10^{-9}/h = 1$ fit		
	For a conversion table for other operating conditions and temperatures refer to page 273.		
Service life	200 000 h		
Failure criteria:			
Total failure	Short circuit or open circuit		
Failure due to variation of parameters	Capacitance change $\Delta C/C$	$> 10 \%$	
	Dissipation factor $\tan \delta$	$> 4 \cdot$ upper limit values	
	Insulation resistance R_{is} or time constant $\tau = C_R \cdot R_{is}$	$< 1500 \text{ M}\Omega$ ($C_R \leq 0,33 \mu\text{F}$) $< 500 \text{ s}$ ($C_R > 0,33 \mu\text{F}$)	
DC test voltage	$1,6 \cdot V_R$, 2 s		
Category voltage V_C Operation with dc voltage or ac voltage V_{rms} up to 1 kHz	$T \leq 85 \text{ °C}$: $V_C = 1,0 \cdot V_R$ or $1,0 \cdot V_{rms}$ $T = 100 \text{ °C}$: $V_C = 0,7 \cdot V_R$ or $0,7 \cdot V_{rms}$		
Dissipation factor $\tan \delta$ (in 10^{-3}) at 20 °C (upper limit values)		$C_R \leq 0,1 \mu\text{F}$	$0,1 \mu\text{F} < C_R \leq 1 \mu\text{F}$
	at 1 kHz	–	0,5
	10 kHz	–	0,8
	100 kHz	5,0	–
Insulation resistance R_{is} or time constant $\tau = C_R \cdot R_{is}$ at 20 °C, rel. humidity $\leq 65 \%$ (minimum as-delivered values)	$C_R \leq 0,33 \mu\text{F}$	$C_R > 0,33 \mu\text{F}$	
	100 G Ω	30 000 s	



Impedance Z
versus
frequency f
(typical values)





B 32 652 ... B 32 656

Pulse handling capability

Maximum permissible voltage change per unit of time for non-sinusoidal voltages
(pulse, sawtooth)

V_R	Max. rate of voltage rise V_{pp}/τ in V/ μ s (for $V_{pp} = V_R$)			
	Lead spacing			
	15 mm	22,5 mm	27,5 mm	37,5 mm
250 V _{dc}	140	80	50	–
400 V _{dc}	200	100	70	–
630 V _{dc}	270	140	100	–
1000 V _{dc}	400	230	150	90
1250 V _{dc}	800	500	400	140
1600 V _{dc}	1500	1000	700	–
2000 V _{dc}	–	1400	900	–

For $V_{pp} < V_R$, the permissible voltage rise rate value V_{pp}/τ may be multiplied by the factor V_R/V_{pp} .
Also refer to the calculation example on page 246.

V_R	Pulse characteristic k_0 in V ² / μ s (for $V_{pp} \leq V_R$)			
	Lead spacing			
	15 mm	22,5 mm	27,5 mm	37,5 mm
250 V _{dc}	70 000	40 000	25 000	–
400 V _{dc}	160 000	80 000	55 000	–
630 V _{dc}	340 000	170 000	120 000	–
1000 V _{dc}	800 000	450 000	300 000	180 000
1250 V _{dc}	2 000 000	1 250 000	1 000 000	350 000
1600 V _{dc}	4 800 000	3 200 000	2 200 000	–
2000 V _{dc}	–	5 600 000	3 600 000	–

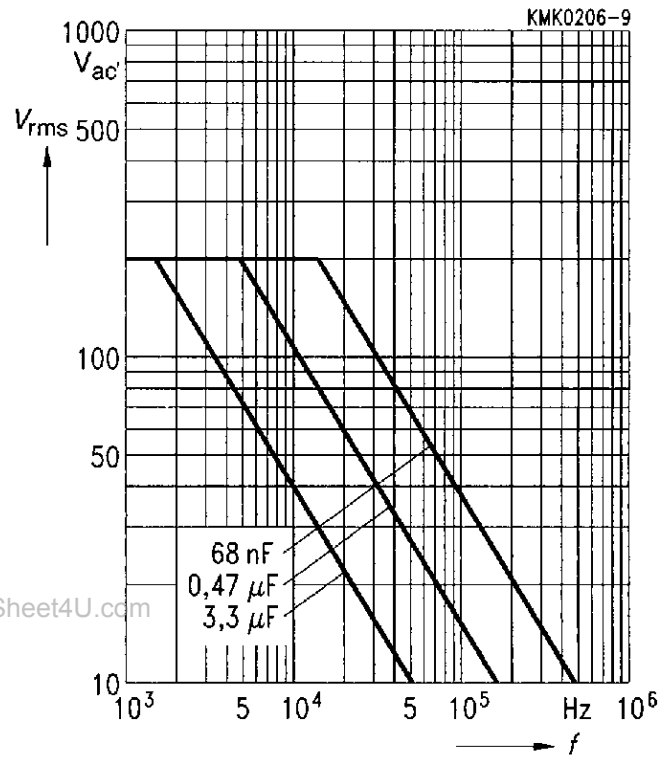
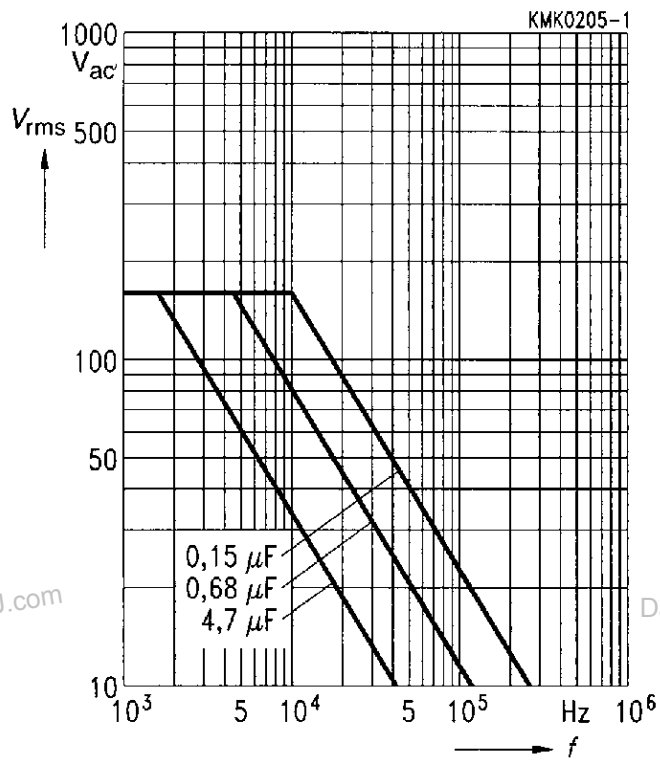


Permissible ac voltage V_{rms} versus frequency f

Lead spacing 15 ... 37,5 mm

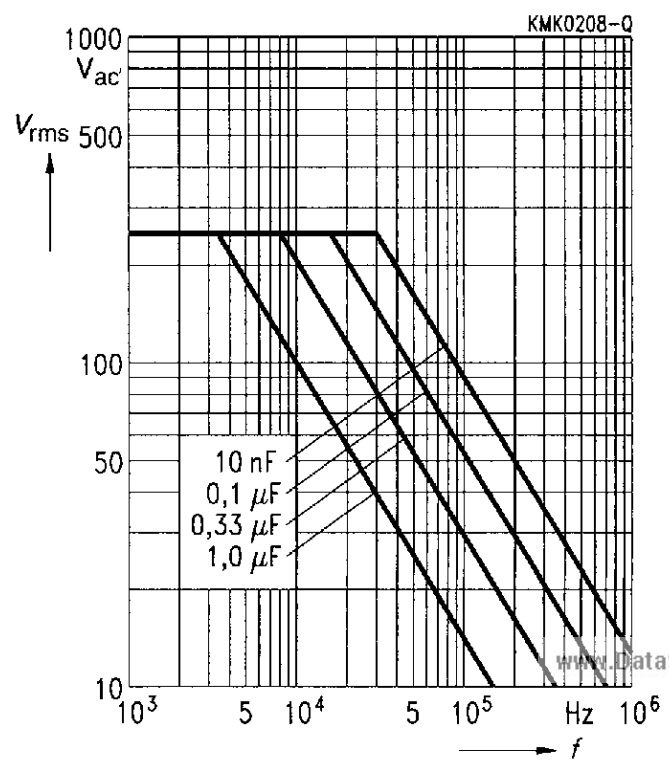
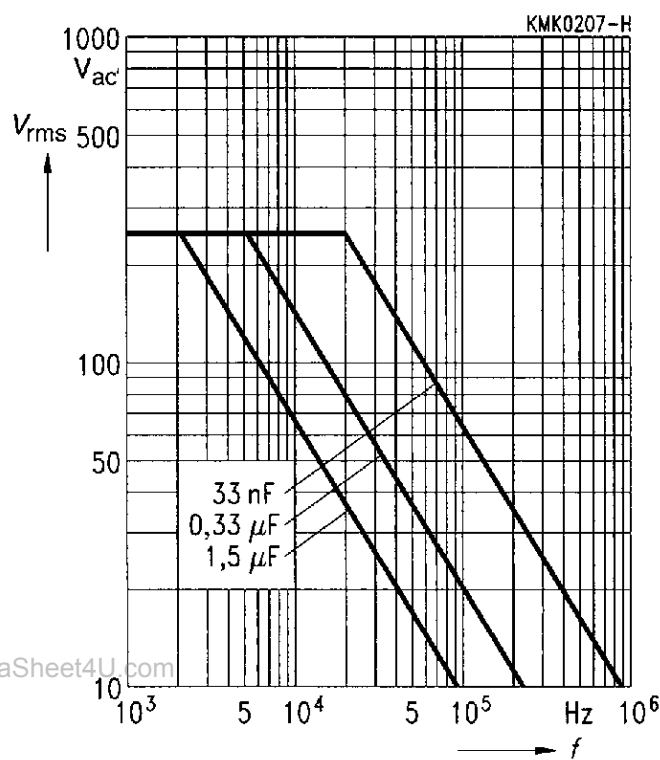
250 V_{dc} / 160 V_{ac}

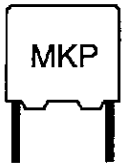
400 V_{dc} / 200 V_{ac}



630 V_{dc} / 250 V_{ac}

1000 V_{dc} / 250 V_{ac}





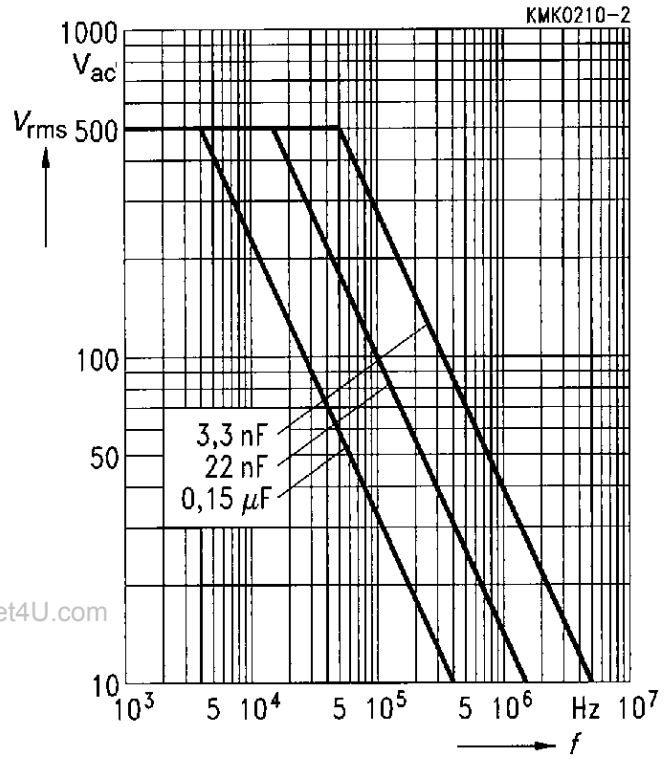
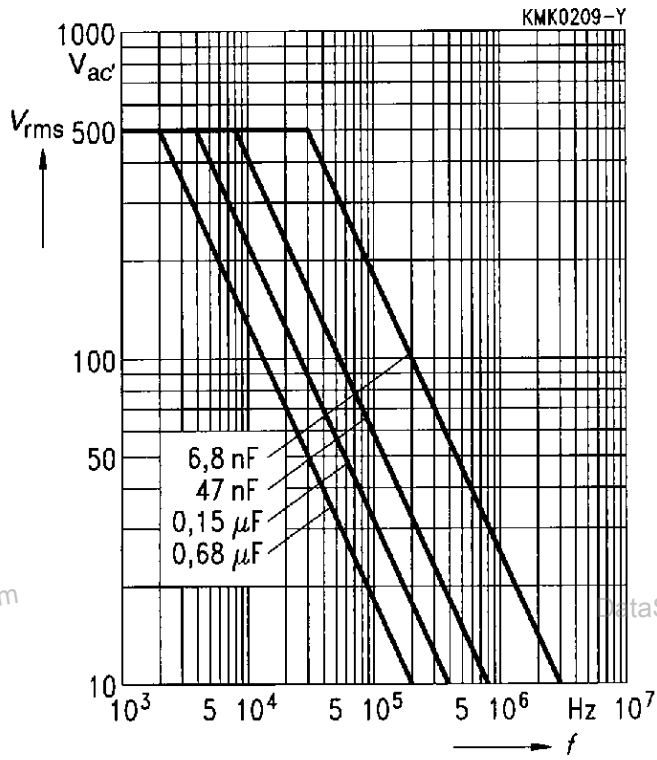
B 32 652 ... B 32 656

Permissible ac voltage V_{rms} versus frequency f

Lead spacing 15 ... 37,5 mm

1250 V_{dc} / 500 V_{ac}

1600 V_{dc} / 500 V_{ac}



2000 V_{dc} / 700 V_{ac}

