



Metallized Polyester Film Capacitors (MKT)

B 32 591

Coated (Power Dipped)

... B 32 594

Standard applications

Crimped leads (standard)

Construction

- Dielectric: polyethylene terephthalate (polyester)
- Stacked-film technology for lead spacing 10 and 15 mm (100 ... 400 Vdc); Wound capacitor technology for lead spacing 10 and 15 mm (630 Vdc) as well as for lead spacing 22,5 and 27,5 mm
- Epoxy resin coating (UL 94 V-0)

Features

- High pulse strength
- High contact reliability

Terminals

- Crimped wire leads, tinned, lead length (6 – 1) mm or min. 20 mm
- Straight wire leads, tinned, lead length (17 ± 3) mm
- Different lead spacings (reduced and enlarged) available, lead length (6 – 1) mm

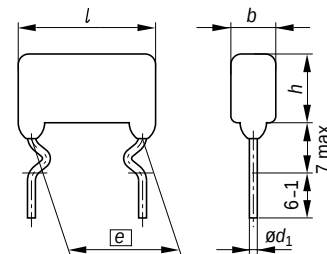
Marking

Manufacturer's logo,
rated capacitance (coded),
capacitance tolerance (code letter),
rated dc voltage,
style, type, date of manufacture (coded)
for lead spacing ≥ 15mm

Delivery mode

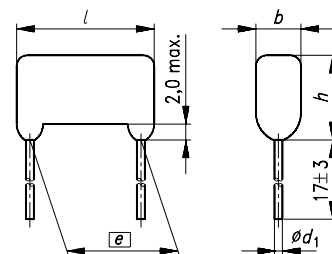
Bulk (untaped)
Taped (Ammo pack or reel)

For notes on taping,
refer to chapter "Taping and packing", page 161.



KMK0748-F

Straight leads (optional)



KMK0114-T

Dimensions in mm

Lead spacing $[e] \pm 0,8$	Diameter d_1	Type
10,0	0,5/0,6 ¹⁾	B 32 591
15,0	0,6	B 32 592
22,5	0,8	B 32 593
27,5	0,8	B 32 594

1) 0,6 mm for capacitor width $b > 5$ mm


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Overview of available types and lead configurations

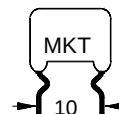
Lead spacing	10 mm	15 mm	22,5 mm	27,5 mm
Type	B 32 591	B 32 592	B 32 593	B 32 594
Page	45	46	47	48
10 nF				
15 nF				
22 nF				
33 nF				
47 nF				
68 nF				
0,10 µF				
0,15 µF				
0,22 µF				
0,33 µF				
0,47 µF				
0,68 µF				
1,0 µF				
1,5 µF				
2,2 µF				
3,3 µF				
4,7 µF				
6,8 µF				
10 µF				
Standard LS				
Reduced LS				
Enlarged LS				
Straight leads				

 Stacked-film technology

 Wound capacitor technology



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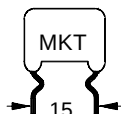
Ordering codes and packing units, lead spacing 10 mm

V_R (V_{rms} , $f \leq 60$ Hz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code	Packing units (pcs)		
				Ammo pack	Reel	Untaped
100 Vdc (63 Vac)	47 nF	4,5 × 9,0 × 13,0	B32591-C1473-+***	1000	1700	1500
	68 nF	4,5 × 9,0 × 13,0	B32591-C1683-+***	1000	1700	1500
	0,10 µF	4,5 × 9,0 × 13,0	B32591-C1104-+***	1000	1700	1500
	0,15 µF	4,5 × 9,0 × 13,0	B32591-C1154-+***	1000	1700	1500
	0,22 µF	4,5 × 9,0 × 13,0	B32591-C1224-+***	1000	1700	1500
	0,33 µF	5,5 × 9,0 × 13,0	B32591-C1334-+***	1000	1700	1500
	0,47 µF	6,0 × 9,5 × 13,0	B32591-C1474-+***	1000	1700	1000
	0,68 µF	7,0 × 10,5 × 13,0	B32591-C1684-+***	830	1300	1000
	1,0 µF	8,0 × 15,0 × 13,0	B32591-C1105-+***	680	1100	500
250 Vdc (160 Vac)	10 nF	5,0 × 9,0 × 13,0	B32591-C3103-+***	1000	1700	1500
	15 nF	5,0 × 9,0 × 13,0	B32591-C3153-+***	1000	1700	1500
	22 nF	5,0 × 9,0 × 13,0	B32591-C3223-+***	1000	1700	1500
	33 nF	5,0 × 9,0 × 13,0	B32591-C3333-+***	1000	1700	1500
	47 nF	5,0 × 9,0 × 13,0	B32591-C3473-+***	1000	1700	1500
	68 nF	5,0 × 9,0 × 13,0	B32591-C3683-+***	1000	1700	1500
	0,10 µF	5,0 × 9,0 × 13,0	B32591-C3104-+***	1000	1700	1000
	0,15 µF	5,5 × 10,0 × 13,0	B32591-C3154-+***	1000	1700	1000
	0,22 µF	6,0 × 10,5 × 13,0	B32591-C3224-+***	830	1300	1000
	0,33 µF	6,5 × 11,0 × 13,0	B32591-C3334-+***	830	1300	1000
	0,47 µF	8,0 × 13,5 × 13,0	B32591-C3474-+***	680	1100	500
400 Vdc (200 Vac)	10 nF	5,0 × 9,0 × 13,0	B32591-C6103-+***	1000	1700	1500
	15 nF	5,0 × 9,0 × 13,0	B32591-C6153-+***	1000	1700	1500
	22 nF	5,0 × 9,0 × 13,0	B32591-C6223-+***	1000	1700	1500
	33 nF	5,0 × 9,0 × 13,0	B32591-C6333-+***	1000	1700	1500
	47 nF	5,0 × 10,5 × 13,0	B32591-C6473-+***	830	1300	1000
	68 nF	5,5 × 10,5 × 13,0	B32591-C6683-+***	830	1300	1000
	0,10 µF	6,0 × 11,5 × 13,0	B32591-C6104-+***	680	1100	1000
630 Vdc (200 Vac)	10 nF	6,0 × 10,0 × 13,0	B32591-C8103-+***	1000	1700	500
	15 nF	6,5 × 10,5 × 13,0	B32591-C8153-+***	830	1300	500
	22 nF	7,0 × 11,5 × 13,0	B32591-C8223-+***	830	1300	500
*** Code number for packing (taped version)				289	189	see table below
+ Code letter for capacitance tolerance						

Capacitance tolerance: $\pm 20\% \hat{=}$ M, $\pm 10\% \hat{=}$ K, $\pm 5\% \hat{=}$ J

*** Code number for untaped versions (for Ammo pack and reel see table above):

Untaped versions (bulk)	Lead spacing 10 mm
Crimped leads, length (6 – 1) mm	010
Crimped leads, length min. 20 mm	011
Straight leads (6 – 1) mm	008



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Ordering codes and packing units, lead spacing 15 mm

V_R (V_{rms} , $f \leq 60$ Hz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code	Packing units (pcs)		
				Ammo pack	Reel	Untaped
100 Vdc (63 Vac)	0,47 μF	5,0 $\times$ 9,5 $\times$ 18,0	B32592-C1474-+***	1170	1300	1000
	0,68 μF	5,5 $\times$ 10,5 $\times$ 18,0	B32592-C1684-+***	1170	1300	1000
	1,0 μF	6,5 $\times$ 10,5 $\times$ 18,0	B32592-C1105-+***	1170	1300	500
	1,5 μF	7,5 $\times$ 14,0 $\times$ 18,0	B32592-C1155-+***	1170	1300	500
	2,2 μF	9,0 $\times$ 14,0 $\times$ 18,0	B32592-C1225-+***	1170	1300	250
	3,3 μF	11,0 $\times$ 17,5 $\times$ 18,0	B32592-C1335-+***	960	1100	250
	4,7 μF	11,0 $\times$ 17,5 $\times$ 18,0	B32592-C1475-+***	830	900	250
250 Vdc (160 Vac)	0,22 μF	5,5 $\times$ 9,0 $\times$ 18,0	B32592-C3224-+***	1170	1300	1000
	0,33 μF	6,0 $\times$ 10,0 $\times$ 18,0	B32592-C3334-+***	1170	1300	500
	0,47 μF	7,0 $\times$ 11,0 $\times$ 18,0	B32592-C3474-+***	960	1100	500
	0,68 μF	8,0 $\times$ 11,5 $\times$ 18,0	B32592-C3684-+***	830	900	500
	1,0 μF	9,5 $\times$ 13,0 $\times$ 18,0	B32592-C3105-+***	680	700	500
	1,5 μF	10,0 $\times$ 16,0 $\times$ 18,0	B32592-C3155-+***	640	630	250
	47 nF	5,0 $\times$ 9,0 $\times$ 18,0	B32592-C6473-+***	1170	1300	1000
400 Vdc (200 Vac)	68 nF	5,0 $\times$ 9,0 $\times$ 18,0	B32592-C6683-+***	1170	1300	1000
	0,10 μF	5,0 $\times$ 10,0 $\times$ 18,0	B32592-C6104-+***	1170	1300	1000
	0,15 μF	6,0 $\times$ 10,5 $\times$ 18,0	B32592-C6154-+***	960	1100	1000
	0,22 μF	7,0 $\times$ 11,0 $\times$ 18,0	B32592-C6224-+***	830	900	500
	0,33 μF	8,0 $\times$ 12,0 $\times$ 18,0	B32592-C6334-+***	680	700	500
	0,47 μF	9,5 $\times$ 13,0 $\times$ 18,0	B32592-C6474-+***	680	700	250
	0,68 μF	10,0 $\times$ 16,0 $\times$ 18,0	B32592-C3684-+***	640	700	250
630 Vdc (200 Vac)	33 nF	6,5 $\times$ 10,5 $\times$ 18,0	B32592-C8333-+***	1170	1300	1000
	47 nF	7,0 $\times$ 12,0 $\times$ 18,0	B32592-C8473-+***	1170	1300	500
	68 nF	7,5 $\times$ 14,0 $\times$ 18,0	B32592-C8683-+***	960	1100	500
	0,10 μF	8,5 $\times$ 15,0 $\times$ 18,0	B32592-C8104-+***	830	900	500
*** Code number for packing (taped version)				289	189	see table below
+ Code letter for capacitance tolerance						

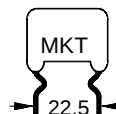
Capacitance tolerance: $\pm 20\% \hat{=} M, \pm 10\% \hat{=} K, \pm 5\% \hat{=} J$

*** Code number for untaped versions (for Ammo pack and reel see table above):

Untaped versions (bulk)	Reduced, standard or enlarged lead spacings				
	7,5 mm	10 mm	12,5 mm	15,0 mm	17,5 mm
Lead length (6 – 1) mm	030	040	050	010	060
Lead length min. 20 mm				011	
Straight leads, length (6 – 1) mm				008	



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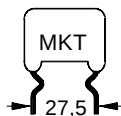
Ordering codes and packing units, lead spacing 22,5 mm

V_R (V_{rms} , $f \leq 60$ Hz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code	Packing units (pcs)		
				Ammo pack	Reel	Untaped
100 Vdc (63 Vac)	1,5 μF	7,0 $\times$ 14,0 $\times$ 26,5	B32593-C1155-+***	680	700	500
	2,2 μF	8,0 $\times$ 15,0 $\times$ 26,5	B32593-C1225-+***	680	700	500
	3,3 μF	10,0 $\times$ 16,5 $\times$ 26,5	B32593-C1335-+***	680	700	200
	4,7 μF	11,5 $\times$ 18,5 $\times$ 26,5	B32593-C1475-+***	480	500	200
	6,8 μF	13,0 $\times$ 21,5 $\times$ 26,5	B32593-C1685-+***	390	400	200
250 Vdc (160 Vac)	0,68 μF	7,0 $\times$ 13,0 $\times$ 26,5	B32593-C3684-+***	680	700	500
	1,0 μF	7,0 $\times$ 15,5 $\times$ 26,5	B32593-C3105-+***	680	700	500
	1,5 μF	8,5 $\times$ 17,0 $\times$ 26,5	B32593-C3155-+***	580	600	200
	2,2 μF	10,0 $\times$ 18,5 $\times$ 26,5	B32593-C3225-+***	390	400	200
400 Vdc (200 Vac)	0,22 μF	6,5 $\times$ 13,0 $\times$ 26,5	B32593-C6224-+***	680	700	500
	0,33 μF	6,0 $\times$ 14,0 $\times$ 26,5	B32593-C6334-+***	680	700	500
	0,47 μF	7,0 $\times$ 16,5 $\times$ 26,5	B32593-C6474-+***	580	600	500
630 Vdc (200 Vac)	0,10 μF	7,0 $\times$ 14,0 $\times$ 26,5	B32593-C8104-+***	680	700	500
	0,15 μF	7,5 $\times$ 16,0 $\times$ 26,5	B32593-C8154-+***	680	700	250
	0,22 μF	8,5 $\times$ 17,0 $\times$ 26,5	B32593-C8224-+***	580	600	250
*** Code number for packing (taped version)				289	189	see table
+ Code letter for capacitance tolerance						below

Capacitance tolerance: $\pm 20\% \hat{=} M, \pm 10\% \hat{=} K, \pm 5\% \hat{=} J$

*** Code number for untaped versions (for Ammo pack and reel see table above):

Untaped versions (bulk)	Reduced, standard or enlarged lead spacings			
	17,5 mm	20 mm	22,5 mm	25 mm
Lead length (6 – 1) mm	060	070	010	080
Lead length min. 20 mm			011	
Straight leads, length (6 – 1) mm			008	



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Ordering codes and packing units, lead spacing 27,5 mm

V_R (V_{rms} , $f \leq 60$ Hz)	C_R	Maximum dimensions $b \times h \times l$ (mm)	Ordering code	Packing unit (pcs) Untaped
100 Vdc (63 Vac)	4,7 μ F	10,5 $\times$ 18,0 $\times$ 31,5	B32594-C1475-+***	200
	6,8 μ F	12,5 $\times$ 20,0 $\times$ 31,5	B32594-C1685-+***	200
	10 μ F	15,0 $\times$ 21,0 $\times$ 31,5	B32594-C1106-+***	200
250 Vdc (160 Vac)	1,5 μ F	8,5 $\times$ 16,0 $\times$ 31,5	B32594-C3155-+***	500
	2,2 μ F	10,0 $\times$ 17,0 $\times$ 31,5	B32594-C3225-+***	500
	3,3 μ F	12,0 $\times$ 19,0 $\times$ 31,5	B32594-C3335-+***	200
	4,7 μ F	14,0 $\times$ 21,0 $\times$ 31,5	B32594-C3475-+***	200
400 Vdc (200 Vac)	0,68 μ F	8,0 $\times$ 16,0 $\times$ 31,5	B32594-C6684-+***	250
	1,0 μ F	9,5 $\times$ 18,0 $\times$ 31,5	B32594-C6105-+***	250
	1,5 μ F	11,5 $\times$ 19,0 $\times$ 31,5	B32594-C6155-+***	250
	2,2 μ F	13,5 $\times$ 21,0 $\times$ 31,5	B32594-C6225-+***	200
630 Vdc (220 Vac)	0,33 μ F	8,0 $\times$ 15,0 $\times$ 31,5	B32594-C8334-+***	250
	0,47 μ F	10,0 $\times$ 16,0 $\times$ 31,5	B32594-C8474-+***	200
	0,68 μ F	10,5 $\times$ 18,0 $\times$ 31,5	B32594-C8684-+***	200

Capacitance tolerance: $\pm 20\%$ $\hat{=}$ M, $\pm 10\%$ $\hat{=}$ K, $\pm 5\%$ $\hat{=}$ J

+ Code letter for capacitance tolerance

*** Code number for untaped versions:

Untaped versions (bulk)	Standard or reduced lead spacings	
	25 mm	27,5 mm
Lead length (6 – 1) mm	080	010
Lead length min. 20 mm		011
Straight leads, length (6 – 1) mm		008



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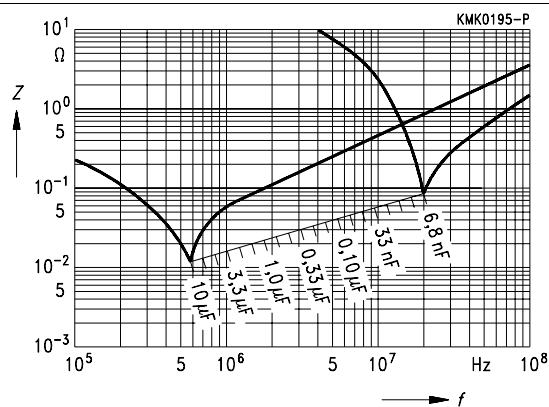
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Climatic category in accordance with IEC 60068-1 Lower category temperature $T_{\min}$ Upper category temperature $T_{\max}$ Damp heat test Limit values after damp heat test	55/100/56 – 55 °C + 100 °C (+ 125 °C for 1000 h and $V_C = 0,5 \cdot V_R$) 56 days/40 °C/93 % relative humidity Capacitance change $ \Delta C/C $ ≤ 5 % Dissipation factor change $\Delta \tan \delta$ ≤ $5 \cdot 10^{-3}$ (at 10 kHz) Insulation resistance R_{is} ≥ 50 % of minimum or time constant $\tau = C_R \cdot R_{is}$ as-delivered values			
Reliability: Reference conditions Failure rate Service life Failure criteria: Total failure Failure due to variation of parameters	0,5 · V_R ; 40 °C $2 \cdot 10^{-9}/h = 2$ fit 200 000 h Short circuit or open circuit Capacitance change $ \Delta C/C $ > 10 % Dissipation factor $\tan \delta$ > 2 · upper limit value Insulation resistance R_{is} < 150 MΩ ($C_R \leq 0,33 \mu F$) or time constant $\tau = C_R \cdot R_{is}$ < 50 s ($C_R > 0,33 \mu F$)			
DC test voltage	1,4 · V_R , 2 s			
Category voltage V_C Operation with dc voltage or ac voltage V_{rms} up to 60 Hz	$T \leq 85$ °C: $V_C = 1,0 \cdot V_R$ or $1,0 \cdot V_{rms}$ $T = 100$ °C: $V_C = 0,8 \cdot V_R$ or $0,8 \cdot V_{rms}$			
Category voltage for short operating periods	$T \leq 100$ °C: $V_C = 1,25 \cdot V_R$ or $1,0 \cdot V_{rms}$ for max. 2000 h $T = 125$ °C: $V_C = 0,5 \cdot V_R$ or $0,5 \cdot V_{rms}$ for max. 1000 h			
Dissipation factor $\tan \delta$ (in 10^{-3}) at 20 °C (upper limit values)		$C_R \leq 0,1 \mu F$	$0,1 \mu F < C_R \leq 1 \mu F$	$C_R > 1 \mu F$
	at 1 kHz	8	10	10
	10 kHz	15	20	–
	100 kHz	30	–	–
Insulation resistance R_{is} or time constant $\tau = C_R \cdot R_{is}$ at 20 °C, rel. humidity ≤ 65 % (minimum as-delivered values)	V_R	$C_R \leq 0,33 \mu F$	$C_R > 0,33 \mu F$	
	100 V_{dc}	3750 MΩ	1250 s	
	≥ 250 V_{dc}	7500 MΩ	2500 s	


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Impedance Z
versus
frequency f
(typical values)



Pulse handling capability

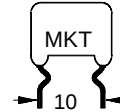
Maximum permissible voltage change per unit of time for non-sinusoidal voltages
(pulse, sawtooth)

V_R	Max. rate of voltage rise V_{pp}/τ in V/ μ s (for $V_{pp} = V_R$)			
	Lead spacing			
	10 mm	15 mm	22,5 mm	27,5 mm
100 Vdc	75	50	2,5 ¹⁾	2 ¹⁾
250 Vdc	150	100	4 ¹⁾	3 ¹⁾
400 Vdc	175	125	7 ¹⁾	5 ¹⁾
630 Vdc	20 ¹⁾	15 ¹⁾	10 ¹⁾	8 ¹⁾

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 in chapter "General technical information", page 169.

V_R	Pulse characteristic k_0 in V ² / μ s (for $V_{pp} \leq V_R$)			
	Lead spacing			
	10 mm	15 mm	22,5 mm	27,5 mm
100 Vdc	15 000	10 000	500 ¹⁾	400 ¹⁾
250 Vdc	75 000	50 000	2 000 ¹⁾	1 500 ¹⁾
400 Vdc	140 000	100 000	5 600 ¹⁾	4 000 ¹⁾
630 Vdc	25 000 ¹⁾	19 000 ¹⁾	12 600 ¹⁾	10 000 ¹⁾

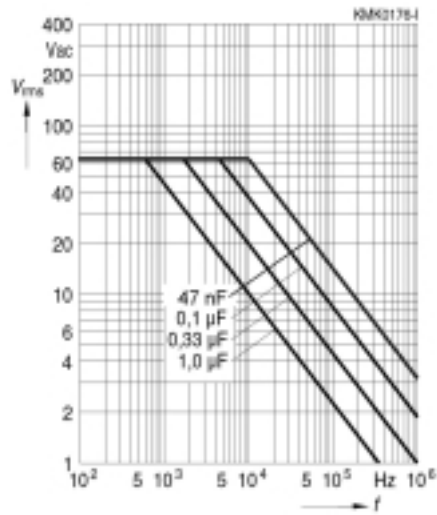
1) Wound capacitor technology



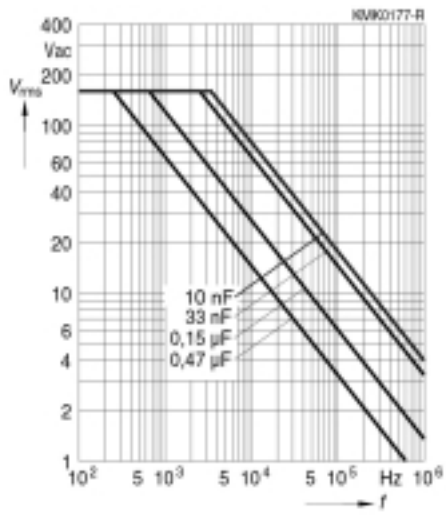
Permissible ac voltage V_{rms} versus frequency f

Lead spacing 10 mm

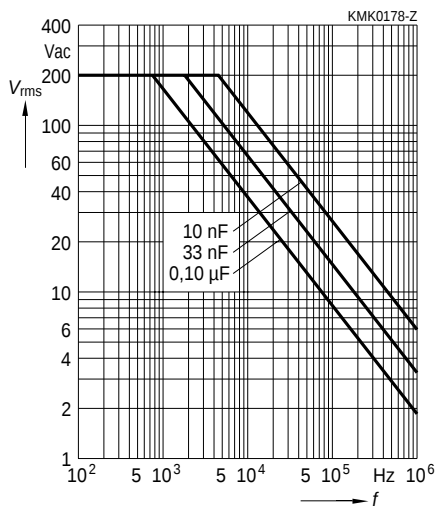
100 Vdc/63 Vac



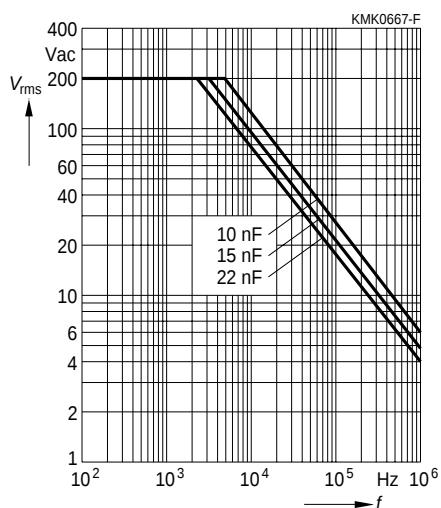
250 Vdc/160 Vac

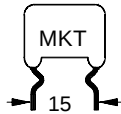


400 Vdc/200 Vac



630 Vdc/200 Vac



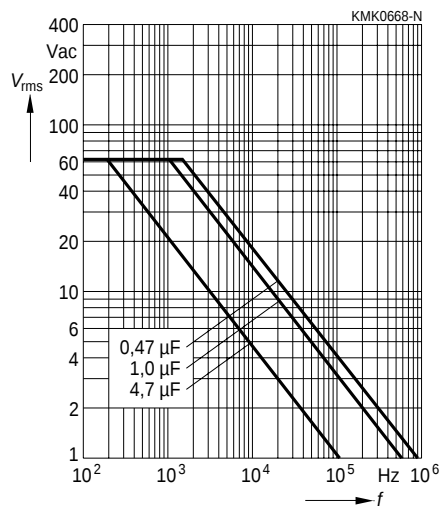


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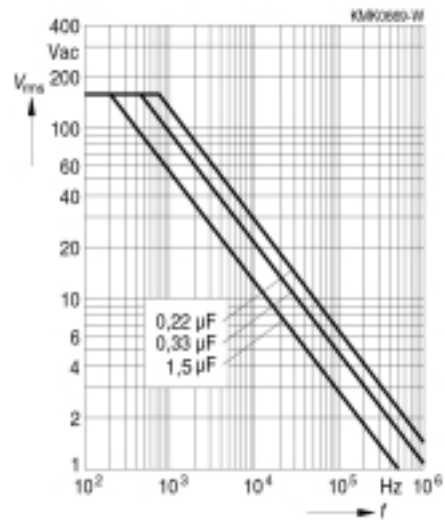
Permissible ac voltage V_{rms} versus frequency f

Lead spacing 15 mm

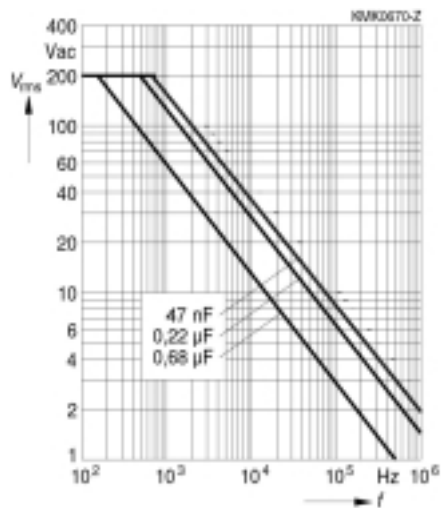
100 Vdc/63 Vac



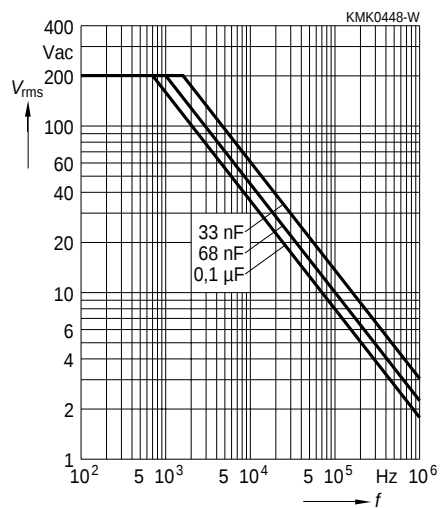
250 Vdc/160 Vac



400 Vdc/200 Vac



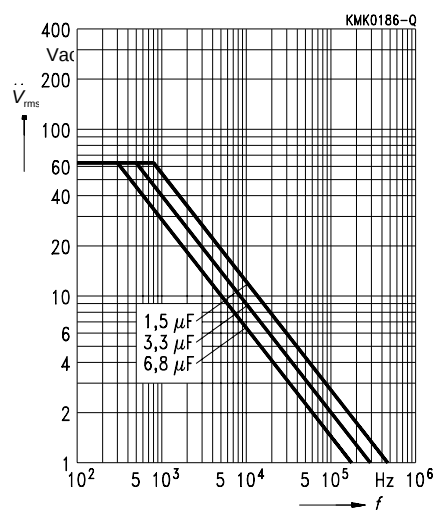
630 Vdc/200 Vac



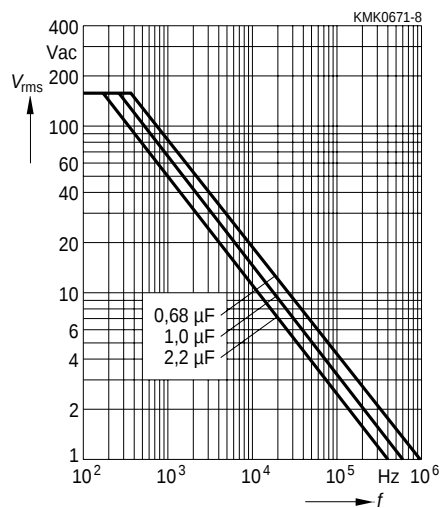
Permissible ac voltage V_{rms} versus frequency f

Lead spacing 22,5 mm

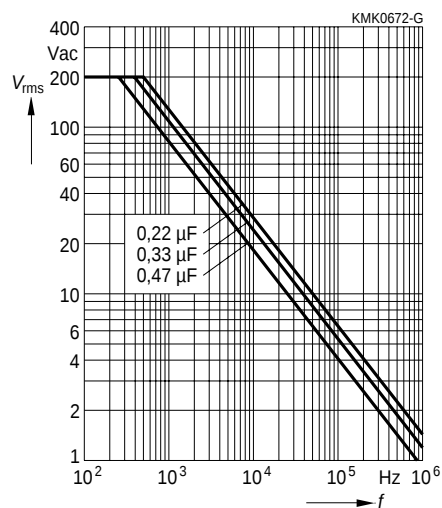
100 Vdc/63 Vac



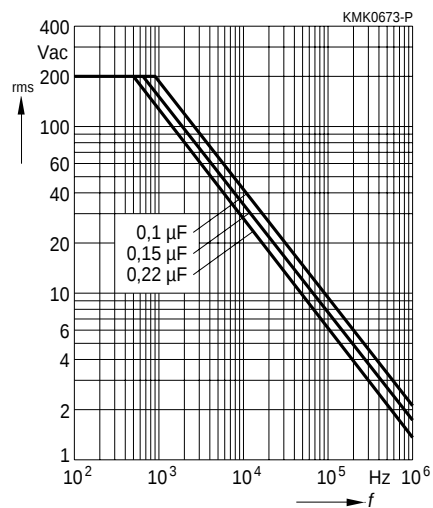
250 Vdc/160 Vac

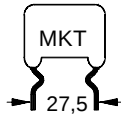


400 Vdc/200 Vac



630 Vdc/200 Vac



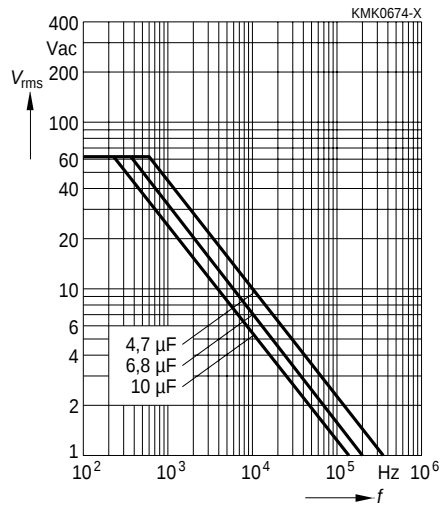


B 32 594

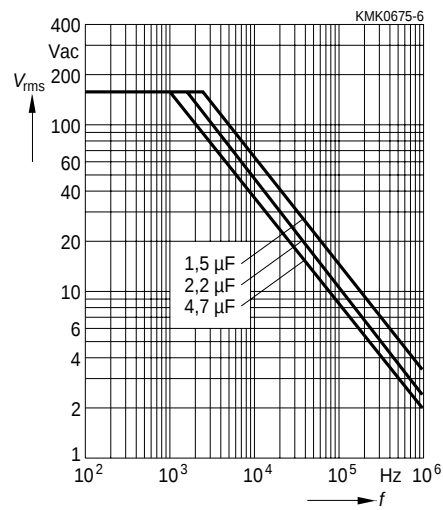
Permissible ac voltage V_{rms} versus frequency f

Lead spacing 27,5 mm

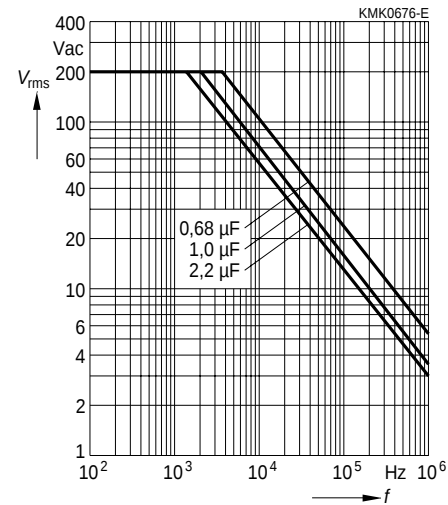
100 Vdc/63 Vac



250 Vdc/160 Vac



400 Vdc/200 Vac



630 Vdc/220 Vac

