

PPB

Metallized polypropylene film capacitor

MKP - High pulse - High performance



Main applications

Snubber, SCR commutating circuits, electronic ballasts, protection circuits in SMPSs, deflectors circuits in TV sets, high voltage, high current and high pulse operation up to very high operating frequencies

Dielectric

Polypropylene

Electrodes

Vacuum deposited metal layers

Coating

Solvent resistant plastic case with resin sealing (UL 94 V-0). Flame retardant execution

Construction

Extended double side metallized carrier film, internal series connection and metallized film for $U_r \geq 630$ VDC (refer to general technical information)

Terminals

Tinned copper wire (lead free)

Reference standard

IEC 60384/16, IEC 60384/17, IEC 60068, RoHS compliant

Climatic category

55/100/56 (IEC 60068/1), FMD (DIN40040)

Operating temperature range

-55°...+105°C

Rated capacitance (Cr)

0,001 μ F to 6,8 μ F, in compliance with IEC 60063, E6 series. Refer to article table

Capacitance tolerance (at 1kHz)

$\pm 10\%$ (code=K), $\pm 5\%$ (code=J), $\pm 20\%$ (code=M). Other tolerances upon request

Capacitance temperature coefficient

Refer to graphs in general technical information

Long term stability (at 1 kHz)

Capacitance variation $\leq \pm 0,5\%$ after a period of 2 years at standard environmental conditions

Rated voltage (Ur)

250, 400, 630, 1000, 1600, 2000 Vdc
(Permissible AC voltage at 60Hz: 160, 200, 400, 600, 650, 700 Vac)

Category voltage (Uc)

$U_c = U_r$ at +85°C; $U_c = 0,8 \times U_r$ (0,7xPermissible AC voltage) at +100°C

Temperature derated voltage

For $T > +85^\circ\text{C}$, U_r must be decreased 1,25% (permissible AC voltage must be decreased 2,25%) for every °C exceeding +85°C

Self inductance

≤ 1 nH/mm of capacitor pitch

Maximum pulse rise time

Refer to article table. The pulse characteristic K_0 depends on the voltage waveform. In any case the value given in the article table must not be exceeded

Dissipation factor (DF), max.

$\text{tg}\delta \times 10^{-4}$, measured at 25 $\pm 5^\circ\text{C}$

Freq.	$Cr \leq 0,1\mu\text{F}$	$0,1\mu\text{F} < Cr \leq 1\mu\text{F}$	$Cr > 1\mu\text{F}$
1kHz	5	4	5
10kHz	5	6	-
100kHz	16	-	-

Insulation resistance (IR)

Measured between terminals, at 25 $\pm 5^\circ\text{C}$, after 1 minute of electrification at 100Vdc

Cr	IR
$\leq 0,33\mu\text{F}$	$\geq 100\text{G}\Omega$
$> 0,33\mu\text{F}$	$\geq 30000\text{s}$

Test voltage between terminals (Ut)

1,6xUr (DC) or 1,5xUrac (AC) applied for 2s at 25 $\pm 5^\circ\text{C}$ (1 minute for type test)

Damp heat test (steady state)

Test conditions:

Temperature= +40 $\pm 2^\circ\text{C}$

Relative humidity=93 $\pm 2\%$

Test duration= 56 days

Performance:

Capacitance change $\leq \pm 1\%$

DF change ≤ 0.0010 at 10kHz for $Cr \leq 1\mu\text{F}$

DF change ≤ 0.0010 at 1kHz for $Cr > 1\mu\text{F}$

IR $\geq 50\%$ of initial limit value

Endurance test (DC)

Test conditions:

Temperature= +85 $\pm 2^\circ\text{C}$

Test duration= 2000h

Voltage applied=1,25xUr(DC)

Performance:

Capacitance change $\leq \pm 1\%$

DF change ≤ 0.0010 at 10kHz for $Cr \leq 1\mu\text{F}$

DF change ≤ 0.0010 at 1kHz for $Cr > 1\mu\text{F}$

IR $\geq 50\%$ of initial limit value

AC (50/60Hz) Endurance test (for Ur>400Vdc ratings only)

Test conditions:

Temperature= +85 $\pm 2^\circ\text{C}$

Test duration= 2000h

Voltage applied=1,25xUr(AC)

Performance:

Capacitance change $\leq \pm 5\%$

DF change ≤ 0.0010 at 10kHz for $Cr \leq 1\mu\text{F}$

DF change ≤ 0.0010 at 1kHz for $Cr > 1\mu\text{F}$

IR $\geq 50\%$ of initial limit value

Resistance to soldering heat test

Test conditions:

Solder bath temperature= +260 $\pm 5^\circ\text{C}$

Dipping time (with heat screen)= 10 ± 1 s

Performance:

Capacitance change $\leq \pm 1\%$

DF change ≤ 0.0010 at 10kHz for $Cr \leq 1\mu\text{F}$

DF change ≤ 0.0010 at 1kHz for $Cr > 1\mu\text{F}$

IR $\geq 50\%$ of initial limit value

Reliability (MIL HDB 217)

Application conditions:

Applied voltage= 0,5 x Ur(DC)

Temperature= +40 $\pm 2^\circ\text{C}$

Failure rate: (FIT=1x10⁻⁹ failures/components x hours)

≤ 2 FIT for $U_r \leq 400$ Vdc ≤ 1 FIT for $U_r > 400$ Vdc

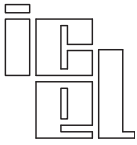
Failure criteria (DIN44122):

Capacitance change $> \pm 10\%$

DF change > 2 x initial value

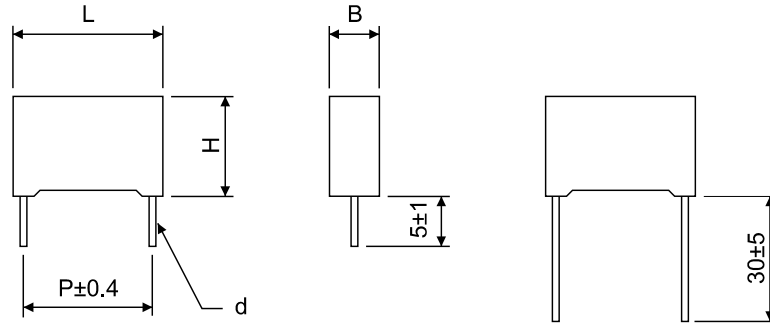
IR $< 0,005$ x initial limit value

Short or open circuit



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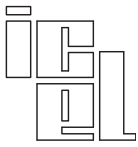
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PPB article table (different values available upon request)

Rated voltage		Cap. value (µF)	Dimension in mm					du/dt V/µs ⁽³⁾	Ko V ² /µs	ICEL ordering code ⁽¹⁾
Vdc	Vac		B	H	L	P	d			
250	160	0,047	5	11	18	15	0,8	560	280E03	PPB1252470*E#
250	160	0,068	6	12	18	15	0,8	560	280E03	PPB1252680*E#
250	160	0,1	7,5	13,5	18	15	0,8	560	280E03	PPB1253100*E#
250	160	0,15	8,5	14,5	18	15	0,8	560	280E03	PPB1253150*E#
250	160	0,22	10	16	18	15	0,8	560	280E03	PPB1253220*E#
250	160	0,22	6	15	26,5	22,5	0,8	320	160E03	PPB1253220*G#
250	160	0,33	8,5	17	26,5	22,5	0,8	320	160E03	PPB1253330*G#
250	160	0,47	10	18,5	26,5	22,5	0,8	320	160E03	PPB1253470*G#
250	160	0,68	11	20	26,5	22,5	0,8	320	160E03	PPB1253680*G#
250	160	0,68	11	20	32	27,5	0,8	240	120E03	PPB1253680*H#
250	160	1	13	22	26,5	22,5	0,8	320	160E03	PPB1254100*G#
250	160	1	11	20	32	27,5	0,8	240	120E03	PPB1254100*H#
250	160	1,5	15	24,5	32	27,5	0,8	240	120E03	PPB1254150*H#
250	160	2,2	14	28	32	27,5	0,8	240	120E03	PPB1254220*H#
250	160	2,2	17	28	42,5	37,5	1	170	85000	PPB1254220*J#
250	160	3,3	22	30	42,5	37,5	1	170	85000	PPB1254330*J#
250	160	4,7	22	30	42,5	37,5	1	170	85000	PPB1254470*J#
250	160	6,8	28	37	42,5	37,5	1	170	85000	PPB1254680*J#
400	250 ⁽²⁾	0,033	5	11	18	15	0,8	910	728E03	PPB1402330*E#
400	250 ⁽²⁾	0,047	6	12	18	15	0,8	910	728E03	PPB1402470*E#
400	250 ⁽²⁾	0,068	7,5	13,5	18	15	0,8	910	728E03	PPB1402680*E#
400	250 ⁽²⁾	0,1	8,5	14,5	18	15	0,8	910	728E03	PPB1403100*E#
400	250 ⁽²⁾	0,15	10	16	18	15	0,8	910	728E03	PPB1403150*E#
400	250 ⁽²⁾	0,15	7	16	26,5	22,5	0,8	520	416E03	PPB1403150*G#
400	250 ⁽²⁾	0,22	10	18,5	26,5	22,5	0,8	520	416E03	PPB1403220*G#
400	250 ⁽²⁾	0,33	11	20	26,5	22,5	0,8	520	416E03	PPB1403330*G#
400	250 ⁽²⁾	0,33	9	17	32	27,5	0,8	400	320E03	PPB1403330*H#
400	250 ⁽²⁾	0,47	13	22	26,5	22,5	0,8	520	416E03	PPB1403470*G#
400	250 ⁽²⁾	0,47	13	22	32	27,5	0,8	400	320E03	PPB1403470*H#
400	250 ⁽²⁾	0,68	15	24,5	32	27,5	0,8	400	320E03	PPB1403680*H#
400	250 ⁽²⁾	1	18	33	32	27,5	1	400	320E03	PPB1404100*H#
400	250 ⁽²⁾	1	17	28	42,5	37,5	1	280	224E03	PPB1404100*J#
400	250 ⁽²⁾	1,5	17	28	42,5	37,5	1	280	224E03	PPB1404150*J#
400	250 ⁽²⁾	2,2	22	30	42,5	37,5	1	280	224E03	PPB1404220*J#
400	250 ⁽²⁾	3,3	28	37	42,5	37,5	1	280	224E03	PPB1404330*J#
630	400 ⁽²⁾	0,01	5	11	18	15	0,8	3300	416E04	PPB1632100*E#
630	400 ⁽²⁾	0,015	5	11	18	15	0,8	3300	416E04	PPB1632150*E#
630	400 ⁽²⁾	0,022	6	12	18	15	0,8	3300	416E04	PPB1632220*E#
630	400 ⁽²⁾	0,033	7,5	13,5	18	15	0,8	3300	416E04	PPB1632330*E#
630	400 ⁽²⁾	0,047	10	16	18	15	0,8	3300	416E04	PPB1632470*E#
630	400 ⁽²⁾	0,047	6	15	26,5	22,5	0,8	2050	258E04	PPB1632470*G#
630	400 ⁽²⁾	0,068	7	16	26,5	22,5	0,8	2050	258E04	PPB1632680*G#
630	400 ⁽²⁾	0,1	8,5	17	26,5	22,5	0,8	2050	258E04	PPB1633100*G#
630	400 ⁽²⁾	0,15	11	20	26,5	22,5	0,8	1500	189E04	PPB1633150*G#
630	400 ⁽²⁾	0,15	11	20	32	27,5	0,8	1500	189E04	PPB1633150*H#
630	400 ⁽²⁾	0,22	13	22	32	27,5	0,8	1500	189E04	PPB1633220*H#
630	400 ⁽²⁾	0,33	15	24,5	32	27,5	0,8	1500	189E04	PPB1633330*H#
630	400 ⁽²⁾	0,47	18	33	32	27,5	1	1500	189E04	PPB1633470*H#
630	400 ⁽²⁾	0,47	17	28	42,5	37,5	1	950	120E04	PPB1633470*J#
630	400 ⁽²⁾	0,68	17	28	42,5	37,5	1	950	120E04	PPB1633680*J#
630	400 ⁽²⁾	1	22	30	42,5	37,5	1	950	120E04	PPB1634100*J#
630	400 ⁽²⁾	1,5	28	37	42,5	37,5	1	950	120E04	PPB1634150*J#

⁽¹⁾Change the * symbol with the needed Cap. tol. code: J=±5%, K=±10%, M=±20% and the # symbol with S for 5mm or L for 30 mm lead length - ⁽²⁾Not suitable for across the line application - ⁽³⁾Pulse endurance test not applicable - ⁽⁴⁾Not for new design



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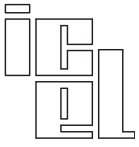
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Rated voltage		Cap. value (µF)	Dimension in mm				d	du/dt V/µs ⁽³⁾	Ko V ² /µs	ICEL ordering code ⁽¹⁾
Vdc	Vac		B	H	L	P				
1000	600 ⁽²⁾	0,0033	5	11	18	15	0,8	5500	110E05	PPB2101330*E#
1000	600 ⁽²⁾	0,0047	5	11	18	15	0,8	5500	110E05	PPB2101470*E#
1000	600 ⁽²⁾	0,0068	5	11	18	15	0,8	5500	110E05	PPB2101680*E#
1000	600 ⁽²⁾	0,01	6	12	18	15	0,8	5500	110E05	PPB2102100*E#
1000	600 ⁽²⁾	0,015	7,5	13,5	18	15	0,8	5500	110E05	PPB2102150*E#
1000	600 ⁽²⁾	0,015	6	15	26,5	22,5	0,8	2600	520E04	PPB2102150*G#
1000	600 ⁽²⁾	0,022	8,5	14,5	18	15	0,8	5500	110E05	PPB2102220*E#
1000	600 ⁽²⁾	0,022	6	15	26,5	22,5	0,8	2600	520E04	PPB2102220*G#
1000	600 ⁽²⁾	0,033	7	16	26,5	22,5	0,8	2600	520E04	PPB2102330*G#
1000	600 ⁽²⁾	0,047	8,5	17	26,5	22,5	0,8	2600	520E04	PPB2102470*G#
1000	600 ⁽²⁾	0,068	10	18,5	26,5	22,5	0,8	2600	520E04	PPB2102680*G#
1000	600 ⁽²⁾	0,1	13	22	26,5	22,5	0,8	2600	520E04	PPB2103100*G#
1000	600 ⁽²⁾	0,1	11	20	32	27,5	0,8	1850	370E04	PPB2103100*H#
1000	600 ⁽²⁾	0,15	13	22	32	27,5	0,8	1850	370E04	PPB2103150*H#
1000	600 ⁽²⁾	0,22	14	28	32	27,5	0,8	1850	370E04	PPB2103220*H#
1000	600 ⁽²⁾	0,33	18	33	32	27,5	1	1850	370E04	PPB2103330*H#
1000	600 ⁽²⁾	0,33	17	28	42,5	37,5	1	1200	240E04	PPB2103330*J#
1000	600 ⁽²⁾	0,47	22	30	42,5	37,5	1	1200	240E04	PPB2103470*J#
1000	600 ⁽²⁾	0,68	28	37	42,5	37,5	1	1200	240E04	PPB2103680*J#
1000	600 ⁽²⁾	1	28	37	42,5	37,5	1	1200	240E04	PPB2104100*J#
1600	650 ⁽²⁾	0,0022	5	11	18	15	0,8	7500	240E05	PPB2161220*E#
1600	650 ⁽²⁾	0,0033	6	12	18	15	0,8	7500	240E05	PPB2161330*E#
1600	650 ⁽²⁾	0,0047	7,5	13,5	18	15	0,8	7500	240E05	PPB2161470*E#
1600	650 ⁽²⁾	0,0068	8,5	14,5	18	15	0,8	7500	240E05	PPB2161680*E#
1600	650 ⁽²⁾	0,01	10	16	18	15	0,8	7500	240E05	PPB2162100*E#
1600	650 ⁽²⁾	0,01	6	15	26,5	22,5	0,8	3800	122E05	PPB2162100*G#
1600	650 ⁽²⁾	0,015	7	16	26,5	22,5	0,8	3800	122E05	PPB2162150*G#
1600	650 ⁽²⁾	0,022	8,5	17	26,5	22,5	0,8	3800	122E05	PPB2162220*G#
1600	650 ⁽²⁾	0,033	10	18,5	26,5	22,5	0,8	3800	122E05	PPB2162330*G#
1600	650 ⁽²⁾	0,047	13	22	26,5	22,5	0,8	3800	122E04	PPB2162470*G#
1600	650 ⁽²⁾	0,047	11	20	32	27,5	0,8	2700	864E04	PPB2162470*H#
1600	650 ⁽²⁾	0,068	13	22	32	27,5	0,8	2700	864E04	PPB2162680*H#
1600	650 ⁽²⁾	0,1	14	28	32	27,5	0,8	2700	864E04	PPB2163100*H#
1600	650 ⁽²⁾	0,15	18	33	32	27,5	1	2700	864E04	PPB2163150*H#
1600	650 ⁽²⁾	0,15	17	28	42,5	37,5	1	1700	544E04	PPB2163150*J#
1600	650 ⁽²⁾	0,22	17	28	42,5	37,5	1	1700	544E04	PPB2163220*J#
1600	650 ⁽²⁾	0,33	22	30	42,5	37,5	1	1700	544E04	PPB2163330*J#
1600	650 ⁽²⁾	0,47	28	37	42,5	37,5	1	1700	544E04	PPB2163470*J#
2000	700 ⁽²⁾	0,001	5	11	18	15	0,8	9000	360E05	PPB2201100*E#
2000	700 ⁽²⁾	0,0015	5	11	18	15	0,8	9000	360E05	PPB2201150*E#
2000	700 ⁽²⁾	0,0022	6	12	18	15	0,8	9000	360E05	PPB2201220*E#
2000	700 ⁽²⁾	0,0033	7,5	13,5	18	15	0,8	9000	360E05	PPB2201330*E#
2000	700 ⁽²⁾	0,0033	6	15	26,5	22,5	0,8	6200	248E05	PPB2201330*G# ⁽⁴⁾
2000	700 ⁽²⁾	0,0047	8,5	14,5	18	15	0,8	9000	360E05	PPB2201470*E#
2000	700 ⁽²⁾	0,0047	6	15	26,5	22,5	0,8	6200	248E05	PPB2201470*G# ⁽⁴⁾
2000	700 ⁽²⁾	0,0068	10	16	18	15	0,8	9000	248E05	PPB2201680*E#
2000	700 ⁽²⁾	0,0068	6	15	26,5	22,5	0,8	6200	248E05	PPB2201680*G#
2000	700 ⁽²⁾	0,01	8,5	17	26,5	22,5	0,8	6200	248E05	PPB2202100*G#
2000	700 ⁽²⁾	0,015	10	18,5	26,5	22,5	0,8	6200	248E05	PPB2202150*G#
2000	700 ⁽²⁾	0,022	13	22	26,5	22,5	0,8	6200	248E05	PPB2202220*G#
2000	700 ⁽²⁾	0,022	11	20	32	27,5	0,8	4200	168E05	PPB2202220*H#
2000	700 ⁽²⁾	0,033	13	22	32	27,5	0,8	4200	168E05	PPB2202330*H#
2000	700 ⁽²⁾	0,047	15	24,5	32	27,5	0,8	4200	168E05	PPB2202470*H#
2000	700 ⁽²⁾	0,068	14	28	32	27,5	0,8	4200	168E05	PPB2202680*H#
2000	700 ⁽²⁾	0,1	18	33	32	27,5	1	4200	168E05	PPB2203100*H#
2000	700 ⁽²⁾	0,1	17	28	42,5	37,5	1	2600	104E05	PPB2203100*J#
2000	700 ⁽²⁾	0,15	22	30	42,5	37,5	1	2600	104E05	PPB2203150*J#
2000	700 ⁽²⁾	0,22	28	37	42,5	37,5	1	2600	104E05	PPB2203220*J#

⁽¹⁾Change the * symbol with the needed Cap. tol. code: J=±5%, K=±10%, M=±20% and the # symbol with S for 5mm or L for 30 mm lead length - ⁽²⁾Not suitable for across the line application - ⁽³⁾Pulse endurance test not applicable - ⁽⁴⁾Not for new design

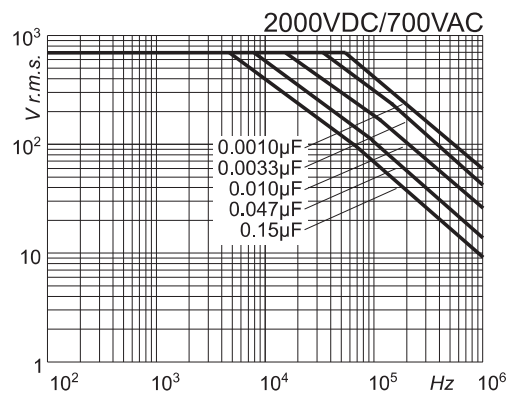
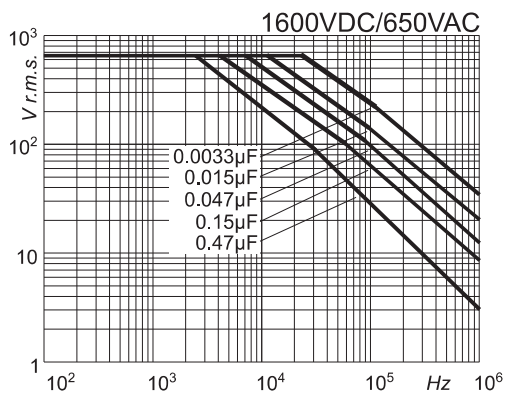
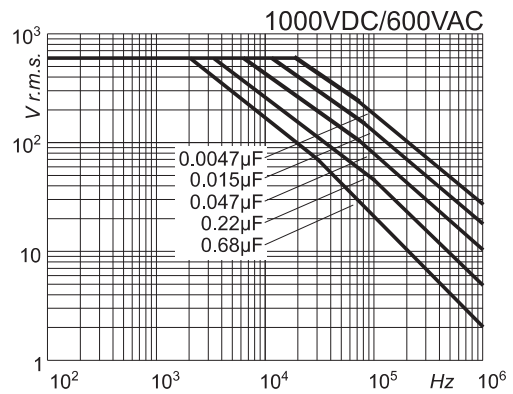
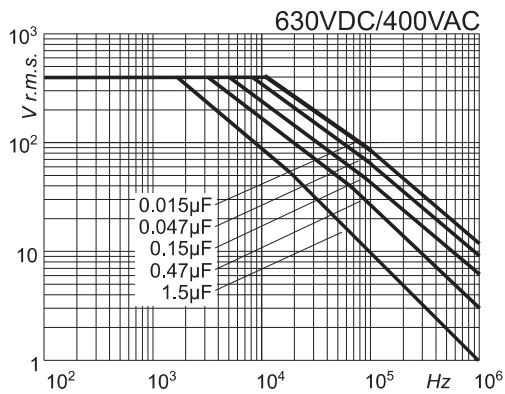
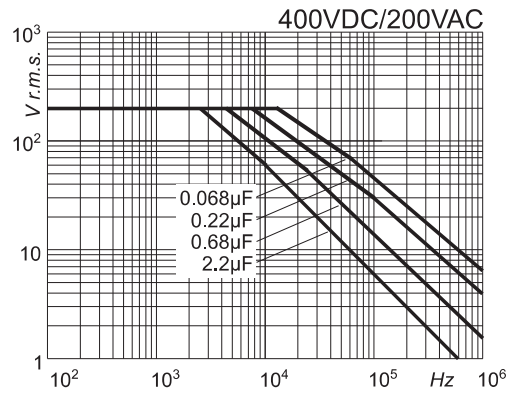
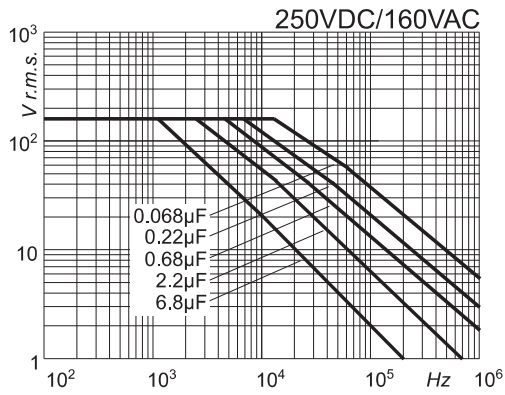


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Metallized polypropylene film capacitor MKP - High pulse - High performance



Permissible AC voltage versus frequency (sinusoidal waveform) for $\Delta T = +10^\circ\text{C}$
Referred to the largest pitch execution among available ones



**Warning: this specification must be completed with the data given in the
“General technical information” chapter**