



# PPB

- MKP with double side met. current carriers
- box with radial terminals • snubber
- high pulse applications • high current • high frequency



## Main applications

Snubber, SCR commutating circuits, electronic ballasts, protection circuits in SMPSs, defl ectors 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 (case)

-55°...+105°C

## Nominal Capacitance (Cn) $\mu$ F

0,001 $\mu$ F to 15 $\mu$ F, in compliance with IEC 60063, E6 series. Refer to article table

## Capacitance tolerance (at 1kHz)

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

## Capacitance temperature coefficient

Refer to General Technical Information

## Long term stability (at 1kHz)

Capacitance variation  $\leq \pm 0.5\%$  after a period of 2 years at standard environmental conditions

## Rated voltage (Ur) (Vdc) at 85°C

250, 400, 630, 1000, 1600, 2000 Vdc

## Permissible AC voltage at 60Hz (Vac)

160, 200, 400, 600, 650, 700 Vac

## Category voltage (Uc)

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

## Temperature de-rated 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

$\leq 1\text{nH/mm}$  of capacitor pitch

## Maximum pulse rise time V/ $\mu$ s

Refer to article table. The pulse characteristic  $K_o$  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.	$C_n \leq 0.1 \mu\text{F}$	$0.1 \mu\text{F} < C_n \leq 1 \mu\text{F}$	$C_n > 1 \mu\text{F}$
1kHz	5	4	5
10kHz	5	6	-
100kHz	16	-	-

## Insulation resistance ( $R_{INS}$ )

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

$C_n$	$R_{INS}$
$\leq 0.33 \mu\text{F}$	$\geq 100 \text{ G}\Omega$
$> 0.33 \mu\text{F}$	$\geq 30000 \text{ s}$

## 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  $\leq \pm 2\%$   
DF change  $\leq 0.0010$  at 10kHz for  $C_n \leq 1 \mu\text{F}$   
DF change  $\leq 0.0010$  at 1kHz for  $C_n > 1 \mu\text{F}$   
 $R_{INS} \geq 50\%$  of initial limit value

## Endurance test (DC)

### Test conditions:

Temperature =  $+85 \pm 2^\circ\text{C}$   
Test duration = 2000h  
Voltage applied =  $1,25xU_r(\text{DC})$

### Performance:

Capacitance change  $\leq \pm 1\%$   
DF change  $\leq 0.0010$  at 10kHz for  $C_n \leq 1 \mu\text{F}$   
DF change  $\leq 0.0010$  at 1kHz for  $C_n > 1 \mu\text{F}$   
 $R_{INS} \geq 50\%$  of initial limit value

## AC (50/60Hz) Endurance test (for $U_r > 400\text{Vdc}$ ratings only)

### Test conditions:

Temperature =  $+85 \pm 2^\circ\text{C}$   
Test duration = 2000h  
Voltage applied =  $1,25xU_r(\text{AC})$

### Performance:

Capacitance change  $\leq \pm 5\%$   
DF change  $\leq 0.0010$  at 10kHz for  $C_n \leq 1 \mu\text{F}$   
DF change  $\leq 0.0010$  at 1kHz for  $C_n > 1 \mu\text{F}$   
 $R_{INS} \geq 50\%$  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) =  $10 \pm 1\text{s}$

### Performance:

Capacitance change  $\leq \pm 1\%$   
DF change  $\leq 0.0010$  at 10kHz for  $C_n \leq 1 \mu\text{F}$   
DF change  $\leq 0.0010$  at 1kHz for  $C_n > 1 \mu\text{F}$   
 $R_{INS} \geq 50\%$  of initial limit value

## Reliability (MIL HDB 217)

### Application conditions:

Applied voltage =  $0,5 \times U_r(\text{DC})$   
Temperature =  $+40 \pm 2^\circ\text{C}$

**Failure rate:** (1FIT =  $1 \times 10^{-9}$  failures/components x hours)  
 $\leq 2\text{FIT}$  for  $U_r \leq 400\text{Vdc}$ ;  $1\text{FIT}$  for  $U_r > 400\text{Vdc}$

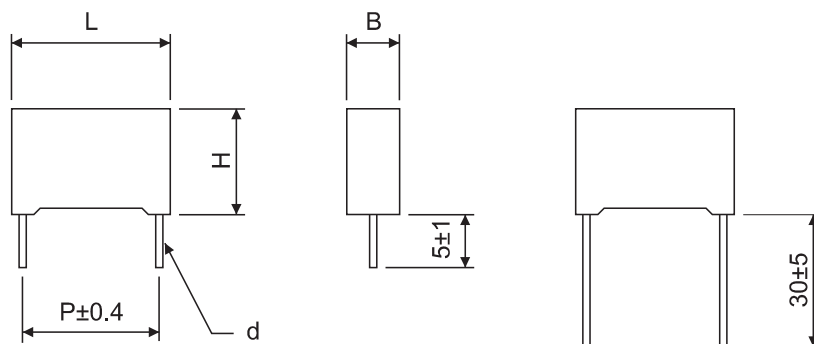
### Failure criteria (DIN44122):

Capacitance change  $> \pm 10\%$   
DF change  $> 2 \times$  initial value  
 $R_{INS} < 0,005 \times$  initial limit value  
Short or open circuit



# PPB

- MKP with double side met. current carriers
- box with radial terminals • snubber
- high pulse applications • high current • high frequency



PPB article table (different values available upon request)

Voltage at +85°C		Cn μF	Dimensions (mm)					du/dt <sup>(3)</sup> V/μs	K <sub>0</sub> V <sup>2</sup> /μs	ICEL CODE <sup>(1)</sup>
Ur (Vdc)	Urms (Vac)		B	H	L	P	d			
250	160	0,047	5	11	18	15	0,8	560	280000	PPB1252470*E#
250	160	0,068	6	12	18	15	0,8	560	280000	PPB1252680*E#
250	160	0,1	7,5	13,5	18	15	0,8	560	280000	PPB1253100*E#
250	160	0,15	8,5	14,5	18	15	0,8	560	280000	PPB1253150*E#
250	160	0,22	10	16	18	15	0,8	560	280000	PPB1253220*E#
250	160	0,22	6	15	26,5	22,5	0,8	320	160000	PPB1253220*G#
250	160	0,33	8,5	17	26,5	22,5	0,8	320	160000	PPB1253330*G#
250	160	0,47	10	18,5	26,5	22,5	0,8	320	160000	PPB1253470*G#
250	160	0,68	11	20	26,5	22,5	0,8	320	160000	PPB1253680*G#
250	160	0,68	11	20	32	27,5	0,8	240	120000	PPB1253680*H#
250	160	1	13	22	26,5	22,5	0,8	320	160000	PPB1254100*G#
250	160	1	11	20	32	27,5	0,8	240	120000	PPB1254100*H#
250	160	1,5	15	24,5	32	27,5	0,8	240	120000	PPB1254150*H#
250	160	2,2	14	28	32	27,5	0,8	240	120000	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#
250	160	10	30	45	42,5	37,5	1,2	170	85000	PPB1255100*J#
250	160	15	35	50	42	37,5	1,2	170	85000	PPB1255150*J#
400	250 <sup>(2)</sup>	0,033	5	11	18	15	0,8	910	728000	PPB1402330*E#
400	250 <sup>(2)</sup>	0,047	6	12	18	15	0,8	910	728000	PPB1402470*E#
400	250 <sup>(2)</sup>	0,068	7,5	13,5	18	15	0,8	910	728000	PPB1402680*E#
400	250 <sup>(2)</sup>	0,1	8,5	14,5	18	15	0,8	910	728000	PPB1403100*E#
400	250 <sup>(2)</sup>	0,15	10	16	18	15	0,8	910	728000	PPB1403150*E#
400	250 <sup>(2)</sup>	0,15	7	16	26,5	22,5	0,8	520	416000	PPB1403150*G#
400	250 <sup>(2)</sup>	0,22	10	18,5	26,5	22,5	0,8	520	416000	PPB1403220*G#
400	250 <sup>(2)</sup>	0,33	11	20	26,5	22,5	0,8	520	416000	PPB1403330*G#
400	250 <sup>(2)</sup>	0,33	9	17	32	27,5	0,8	400	320000	PPB1403330*H#
400	250 <sup>(2)</sup>	0,47	13	22	26,5	22,5	0,8	520	416000	PPB1403470*G#
400	250 <sup>(2)</sup>	0,47	13	22	32	27,5	0,8	400	320000	PPB1403470*H#
400	250 <sup>(2)</sup>	0,68	15	24,5	32	27,5	0,8	400	320000	PPB1403680*H#
400	250 <sup>(2)</sup>	1	18	33	32	27,5	1	400	320000	PPB1404100*H#
400	250 <sup>(2)</sup>	1	17	28	42,5	37,5	1	280	224000	PPB1404100*J#
400	250 <sup>(2)</sup>	1,5	17	28	42,5	37,5	1	280	224000	PPB1404150*J#
400	250 <sup>(2)</sup>	2,2	22	30	42,5	37,5	1	280	224000	PPB1404220*J#
400	250 <sup>(2)</sup>	3,3	28	37	42,5	37,5	1	280	224000	PPB1404330*J#

<sup>(1)</sup> 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

<sup>(2)</sup> Not suitable for across the line application

<sup>(3)</sup> Pulse endurance test not applicable



# PPB

- MKP with double side met. current carriers
- box with radial terminals • snubber
- high pulse applications • high current • high frequency



Voltage at +85°C		Cn μF	Dimensions (mm)					du/dt <sup>(3)</sup> V/μs	K <sub>0</sub> V <sup>2</sup> /μs	ICEL CODE <sup>(1)</sup> -
Ur (Vdc)	Urms (Vac)		B	H	L	P	d			
400	250 <sup>(2)</sup>	4,7	30	45	42,5	37,5	1,2	280	224000	PPB1404470*J#
400	250 <sup>(2)</sup>	6,8	35	50	42	37,5	1,2	280	224000	PPB1404680*J#
630	400 <sup>(2)</sup>	0,01	5	11	18	15	0,8	3300	4160000	PPB1632100*E#
630	400 <sup>(2)</sup>	0,015	5	11	18	15	0,8	3300	4160000	PPB1632150*E#
630	400 <sup>(2)</sup>	0,022	6	12	18	15	0,8	3300	4160000	PPB1632220*E#
630	400 <sup>(2)</sup>	0,033	7,5	13,5	18	15	0,8	3300	4160000	PPB1632330*E#
630	400 <sup>(2)</sup>	0,047	10	16	18	15	0,8	3300	4160000	PPB1632470*E#
630	400 <sup>(2)</sup>	0,047	6	15	26,5	22,5	0,8	2050	2580000	PPB1632470*G#
630	400 <sup>(2)</sup>	0,068	7	16	26,5	22,5	0,8	2050	2580000	PPB1632680*G#
630	400 <sup>(2)</sup>	0,1	8,5	17	26,5	22,5	0,8	2050	2580000	PPB1633100*G#
630	400 <sup>(2)</sup>	0,15	11	20	26,5	22,5	0,8	1500	1890000	PPB1633150*G#
630	400 <sup>(2)</sup>	0,15	11	20	32	27,5	0,8	1500	1890000	PPB1633150*H#
630	400 <sup>(2)</sup>	0,22	13	22	32	27,5	0,8	1500	1890000	PPB1633220*H#
630	400 <sup>(2)</sup>	0,33	15	24,5	32	27,5	0,8	1500	1890000	PPB1633330*H#
630	400 <sup>(2)</sup>	0,47	18	33	32	27,5	1	1500	1890000	PPB1633470*H#
630	400 <sup>(2)</sup>	0,47	17	28	42,5	37,5	1	950	1200000	PPB1633470*J#
630	400 <sup>(2)</sup>	0,68	17	28	42,5	37,5	1	950	1200000	PPB1633680*J#
630	400 <sup>(2)</sup>	1	22	30	42,5	37,5	1	950	1200000	PPB1634100*J#
630	400 <sup>(2)</sup>	1,5	28	37	42,5	37,5	1	950	1200000	PPB1634150*J#
630	400 <sup>(2)</sup>	2,2	30	45	42,5	37,5	1,2	950	1200000	PPB1634220*J#
630	400 <sup>(2)</sup>	3	35	50	42	37,5	1,2	950	1200000	PPB1634300*J#
1000	600 <sup>(2)</sup>	0,0033	5	11	18	15	0,8	5500	11000000	PPB2101330*E#
1000	600 <sup>(2)</sup>	0,0047	5	11	18	15	0,8	5500	11000000	PPB2101470*E#
1000	600 <sup>(2)</sup>	0,0068	5	11	18	15	0,8	5500	11000000	PPB2101680*E#
1000	600 <sup>(2)</sup>	0,01	6	12	18	15	0,8	5500	11000000	PPB2102100*E#
1000	600 <sup>(2)</sup>	0,015	7,5	13,5	18	15	0,8	5500	11000000	PPB2102150*E#
1000	600 <sup>(2)</sup>	0,015	6	15	26,5	22,5	0,8	2600	5200000	PPB2102150*G#
1000	600 <sup>(2)</sup>	0,022	8,5	14,5	18	15	0,8	5500	11000000	PPB2102220*E#
1000	600 <sup>(2)</sup>	0,022	6	15	26,5	22,5	0,8	2600	5200000	PPB2102220*G#
1000	600 <sup>(2)</sup>	0,033	7	16	26,5	22,5	0,8	2600	5200000	PPB2102330*G#
1000	600 <sup>(2)</sup>	0,047	8,5	17	26,5	22,5	0,8	2600	5200000	PPB2102470*G#
1000	600 <sup>(2)</sup>	0,068	10	18,5	26,5	22,5	0,8	2600	5200000	PPB2102680*G#
1000	600 <sup>(2)</sup>	0,1	13	22	26,5	22,5	0,8	2600	5200000	PPB2103100*G#
1000	600 <sup>(2)</sup>	0,1	11	20	32	27,5	0,8	1850	3700000	PPB2103100*H#
1000	600 <sup>(2)</sup>	0,15	13	22	32	27,5	0,8	1850	3700000	PPB2103150*H#
1000	600 <sup>(2)</sup>	0,22	14	28	32	27,5	0,8	1850	3700000	PPB2103220*H#
1000	600 <sup>(2)</sup>	0,33	18	33	32	27,5	1	1850	3700000	PPB2103330*H#
1000	600 <sup>(2)</sup>	0,33	17	28	42,5	37,5	1	1200	2400000	PPB2103330*J#
1000	600 <sup>(2)</sup>	0,47	22	30	42,5	37,5	1	1200	2400000	PPB2103470*J#
1000	600 <sup>(2)</sup>	0,68	28	37	42,5	37,5	1	1200	2400000	PPB2103680*J#
1000	600 <sup>(2)</sup>	1	28	37	42,5	37,5	1	1200	2400000	PPB2104100*J#
1000	600 <sup>(2)</sup>	1,2	30	45	42,5	37,5	1,2	1200	2400000	PPB2104120*J#
1000	600 <sup>(2)</sup>	1,5	35	50	42	37,5	1,2	1200	2400000	PPB2104150*J#
1000	600 <sup>(2)</sup>	1,8	35	50	42	37,5	1,2	1200	2400000	PPB2104180*J#
1600	650 <sup>(2)</sup>	0,0022	5	11	18	15	0,8	7500	24000000	PPB2161220*E#
1600	650 <sup>(2)</sup>	0,0033	6	12	18	15	0,8	7500	24000000	PPB2161330*E#
1600	650 <sup>(2)</sup>	0,0047	7,5	13,5	18	15	0,8	7500	24000000	PPB2161470*E#
1600	650 <sup>(2)</sup>	0,0068	8,5	14,5	18	15	0,8	7500	24000000	PPB2161680*E#
1600	650 <sup>(2)</sup>	0,01	10	16	18	15	0,8	7500	24000000	PPB2162100*E#
1600	650 <sup>(2)</sup>	0,01	6	15	26,5	22,5	0,8	3800	12200000	PPB2162100*G#
1600	650 <sup>(2)</sup>	0,015	7	16	26,5	22,5	0,8	3800	12200000	PPB2162150*G#

<sup>(1)</sup> 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

<sup>(2)</sup> Not suitable for across the line application

<sup>(3)</sup> Pulse endurance test not applicable



# PPB

- MKP with double side met. current carriers
- box with radial terminals • snubber
- high pulse applications • high current • high frequency



Voltage at +85°C		Cn μF	Dimensions (mm)					du/dt <sup>(3)</sup> V/μs	K <sub>0</sub> V <sup>2</sup> /μs	ICEL CODE <sup>(1)</sup> -
Ur (Vdc)	Urms (Vac)		B	H	L	P	d			
1600	650 <sup>(2)</sup>	0,022	8,5	17	26,5	22,5	0,8	3800	12200000	PPB2162220*G#
1600	650 <sup>(2)</sup>	0,033	10	18,5	26,5	22,5	0,8	3800	12200000	PPB2162330*G#
1600	650 <sup>(2)</sup>	0,047	13	22	26,5	22,5	0,8	3800	12200000	PPB2162470*G#
1600	650 <sup>(2)</sup>	0,047	11	20	32	27,5	0,8	2700	8640000	PPB2162470*H#
1600	650 <sup>(2)</sup>	0,068	13	22	32	27,5	0,8	2700	8640000	PPB2162680*H#
1600	650 <sup>(2)</sup>	0,1	14	28	32	27,5	0,8	2700	8640000	PPB2163100*H#
1600	650 <sup>(2)</sup>	0,15	18	33	32	27,5	1	2700	8640000	PPB2163150*H#
1600	650 <sup>(2)</sup>	0,15	17	28	42,5	37,5	1	1700	5440000	PPB2163150*J#
1600	650 <sup>(2)</sup>	0,22	17	28	42,5	37,5	1	1700	5440000	PPB2163220*J#
1600	650 <sup>(2)</sup>	0,33	22	30	42,5	37,5	1	1700	5440000	PPB2163330*J#
1600	650 <sup>(2)</sup>	0,47	28	37	42,5	37,5	1	1700	5440000	PPB2163470*J#
1600	650 <sup>(2)</sup>	0,56	30	45	42,5	37,5	1,2	1700	5440000	PPB2163560*J#
1600	650 <sup>(2)</sup>	0,68	35	50	42	37,5	1,2	1700	5440000	PPB2163680*J#
1600	650 <sup>(2)</sup>	0,82	35	50	42	37,5	1,2	1700	5440000	PPB2163820*J#
2000	700 <sup>(2)</sup>	0,001	5	11	18	15	0,8	9000	36000000	PPB2201100*E#
2000	700 <sup>(2)</sup>	0,0015	5	11	18	15	0,8	9000	36000000	PPB2201150*E#
2000	700 <sup>(2)</sup>	0,0022	6	12	18	15	0,8	9000	36000000	PPB2201220*E#
2000	700 <sup>(2)</sup>	0,0033	7,5	13,5	18	15	0,8	9000	36000000	PPB2201330*E#
2000	700 <sup>(2)</sup>	0,0047	8,5	14,5	18	15	0,8	9000	36000000	PPB2201470*E#
2000	700 <sup>(2)</sup>	0,0068	10	16	18	15	0,8	9000	24800000	PPB2201680*E#
2000	700 <sup>(2)</sup>	0,0068	6	15	26,5	22,5	0,8	6200	24800000	PPB2201680*G#
2000	700 <sup>(2)</sup>	0,01	8,5	17	26,5	22,5	0,8	6200	24800000	PPB2202100*G#
2000	700 <sup>(2)</sup>	0,015	10	18,5	26,5	22,5	0,8	6200	24800000	PPB2202150*G#
2000	700 <sup>(2)</sup>	0,022	13	22	26,5	22,5	0,8	6200	24800000	PPB2202220*G#
2000	700 <sup>(2)</sup>	0,022	11	20	32	27,5	0,8	4200	16800000	PPB2202220*H#
2000	700 <sup>(2)</sup>	0,033	13	22	32	27,5	0,8	4200	16800000	PPB2202330*H#
2000	700 <sup>(2)</sup>	0,047	15	24,5	32	27,5	0,8	4200	16800000	PPB2202470*H#
2000	700 <sup>(2)</sup>	0,068	14	28	32	27,5	0,8	4200	16800000	PPB2202680*H#
2000	700 <sup>(2)</sup>	0,1	18	33	32	27,5	1	4200	16800000	PPB2203100*H#
2000	700 <sup>(2)</sup>	0,1	17	28	42,5	37,5	1	2600	10400000	PPB2203100*J#
2000	700 <sup>(2)</sup>	0,15	22	30	42,5	37,5	1	2600	10400000	PPB2203150*J#
2000	700 <sup>(2)</sup>	0,22	28	37	42,5	37,5	1	2600	10400000	PPB2203220*J#
2000	700 <sup>(2)</sup>	0,33	35	50	42	37,5	1,2	2600	10400000	PPB2203330*J#
2000	700 <sup>(2)</sup>	0,47	35	50	42	37,5	1,2	2600	10400000	PPB2203470*J#

<sup>(1)</sup> 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

<sup>(2)</sup> Not suitable for across the line application

<sup>(3)</sup> Pulse endurance test not applicable

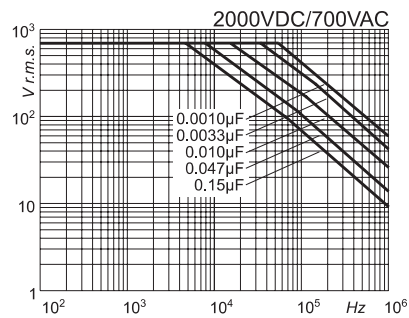
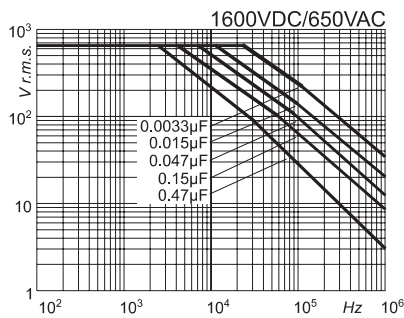
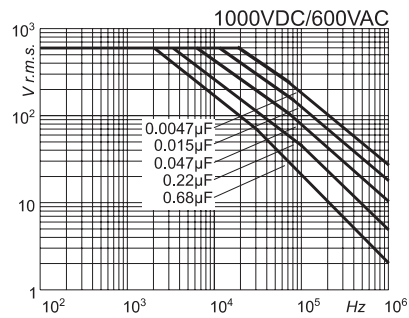
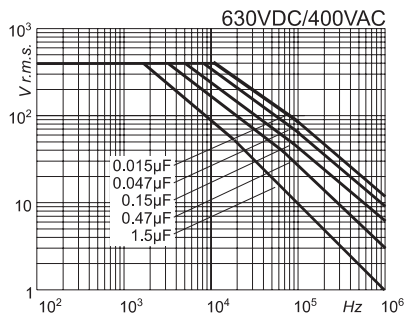
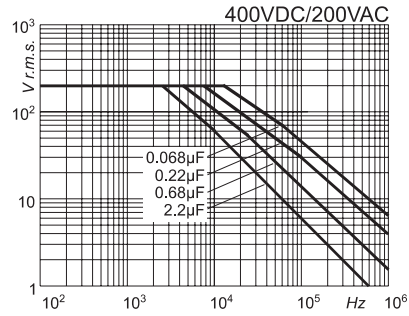
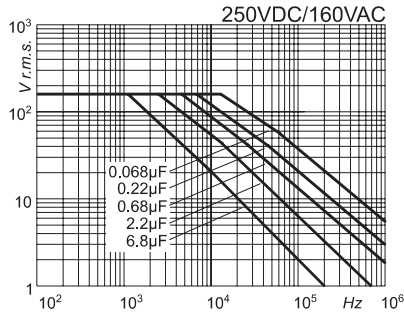


# PPB

- MKP with double side met. current carriers
- box with radial terminals • snubber
- high pulse applications • high current • high frequency



### 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**