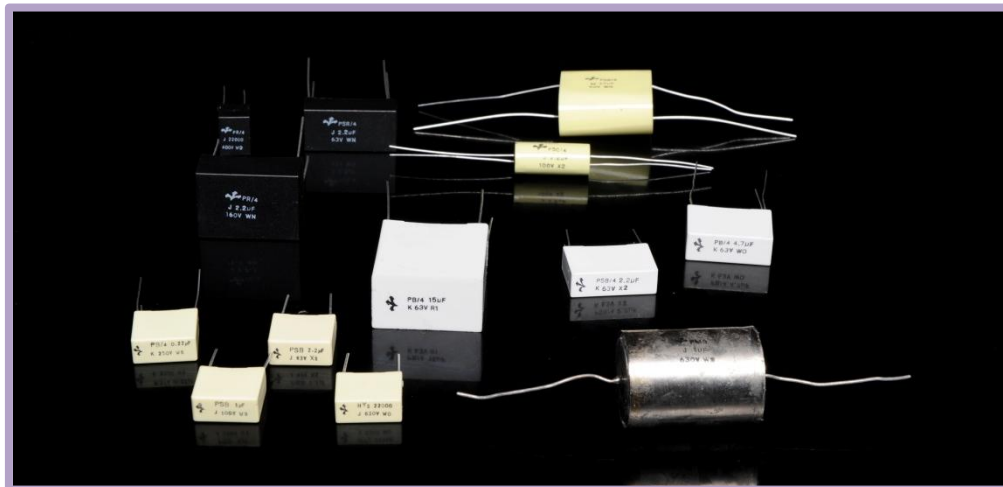


Polycarbonate capacitors

Polycarbonate capacitors

Polycarbonate capacitors

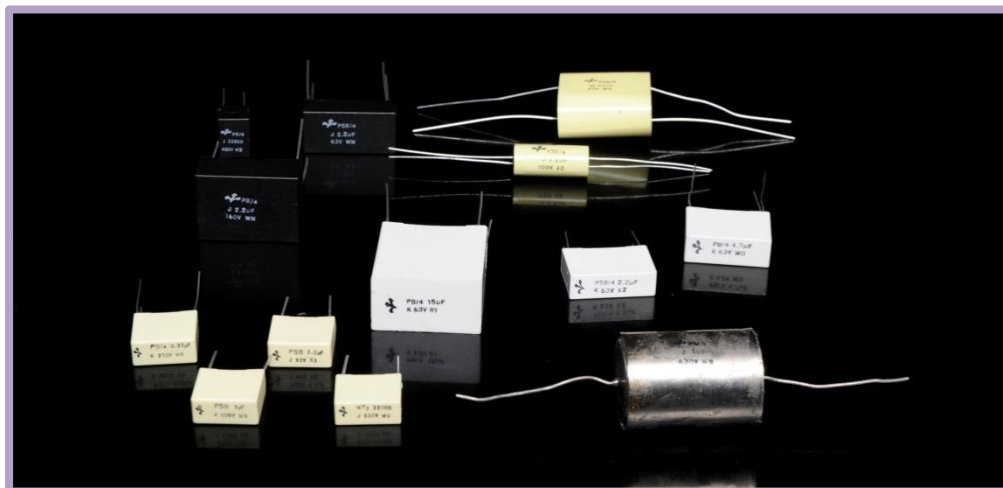


DIELECTRIC	METALLIZED POLYCARBONATE (MKC)					
Series	PB	PR/4 - PB/4	PB/5	PMR	PMA	PMA/4
Capacitance range (μF)	0.001 ÷ 22	0.001 ÷ 22	0.001 – 1	0.001 ÷ 22	0.001 ÷ 22	0.001 ÷ 22
Capacitance tolerance (+/- %)	1 ÷ 20	1 ÷ 20	1 ÷ 20	1 ÷ 20	1 ÷ 20	1 ÷ 20
Rated voltage						
▪ Vdc	63 ÷ 1000	63 ÷ 630	50 ÷ 100	63 ÷ 1000	63 ÷ 1000	63 ÷ 1000
▪ Vac	40 ÷ 250	40 ÷ 220	30 ÷ 63	40 ÷ 250	40 ÷ 250	40 ÷ 250
Pulse rise time (V/μs)	5 ÷ 60	5 ÷ 60	17 ÷ 24	5 ÷ 60	5 ÷ 60	5 ÷ 60
Lead spacing mm	7.5 ÷ 27.5	7.5 ÷ 27.5	5	7.5 ÷ 27.5	AXIAL	AXIAL
Encapsulation	Potted with epoxy resin	Potted with epoxy resin	Potted with epoxy resin	Plastic wrapped and epoxy resin filled	Plastic wrapped and epoxy resin filled	Plastic wrapped and epoxy resin filled
Climatic category acc.to IEC 60068	55/125/56	55/125/56	55/125/56	55/125/56	55/125/56	55/125/56
Packing	Bulk	Bulk	Bulk	Bulk	Bulk	Bulk
International standard	IEC 60384-6	IEC 60384-6	IEC 60384-6	IEC 60384-6	IEC 60384-6	IEC 60384-6

Due to material availability some types are not more available. These types are available in poliphenilesulfide, with the assurance of the same electrical and dimensional characteristics. For more information please contact us.

Polycarbonate capacitors

Polycarbonate capacitors

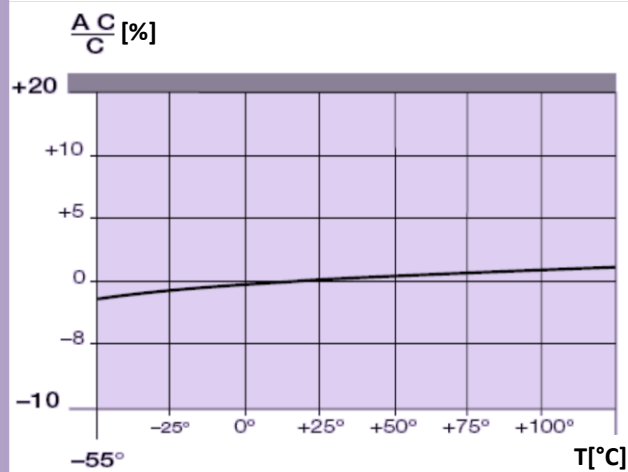


DIELECTRIC	METALLIZED POLYCARBONATE (MKC)			POLYCARBONATE FILM FOIL (KC)		
Series	PMC	PMC/4	PMC/M	PNC	NPB	NPB/4
Capacitance range (μF)	0.001 ÷ 33	0.001 ÷ 33	0.001 ÷ 22	0.0047 ÷ 1.5	0.0033 ÷ 1	0.0033 ÷ 1
Capacitance tolerance (+/- %)	1 ÷ 20	1 ÷ 20	1 ÷ 20	1 ÷ 20	1 ÷ 20	1 ÷ 20
Rated voltage						
▪ Vdc	63 ÷ 1000	63 ÷ 1000	63 ÷ 1000	160 ÷ 1000	160 ÷ 1000	160 ÷ 1000
▪ Vac	40 ÷ 250	40 ÷ 250	40 ÷ 250	63 ÷ 250	63 ÷ 250	63 ÷ 250
Pulse rise time (V/μs)	5 ÷ 60	5 ÷ 60	5 ÷ 60	200 ÷ 900	200 ÷ 900	200 ÷ 900
Lead spacing mm	AXIAL	AXIAL	AXIAL	AXIAL	15 ÷ 27.5	15 ÷ 27.5
Encapsulation	Plastic wrapped and epoxy resin filled	Plastic wrapped and epoxy resin filled	Hermetically sealed with a metal sleeve	Plastic wrapped and epoxy resin filled	Potted with epoxy resin	Potted with epoxy resin
Climatic category acc.to IEC 60068	55/125/56	55/125/56	55/125/56	55/125/56	55/125/56	55/125/56
Packing	Bulk, taped	Bulk	Bulk	Bulk, taped	Bulk	Bulk
International standard	IEC 60384-6	IEC 60384-6	IEC 60384-6	IEC 60384-13	IEC 60384-13	IEC 60384-13

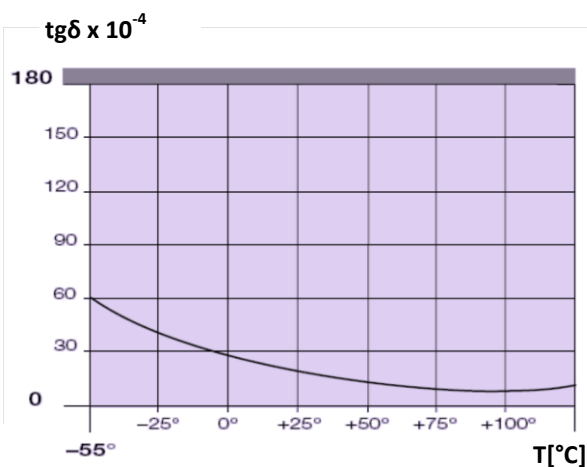
Due to material availability some types are not more available. These types are available in poliphenilesulphide, with the assurance of the same electrical and dimensional characteristics. For more information please contact us.

Typical curves

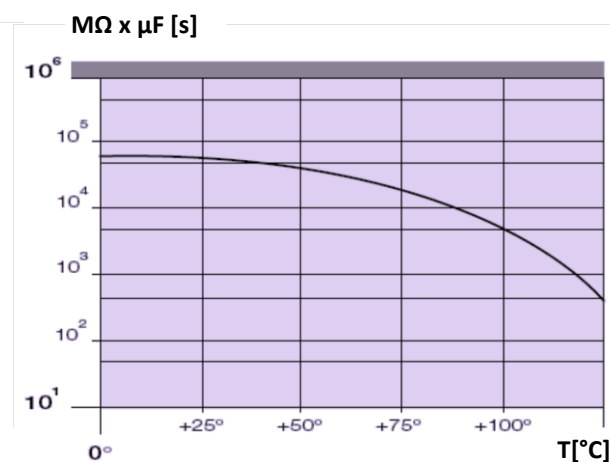
Polycarbonate capacitors



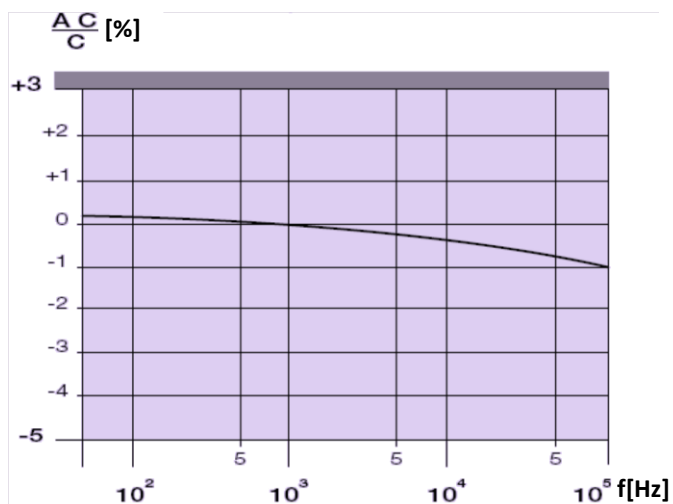
Capacitance variation as a function of temperature at 1 KHz



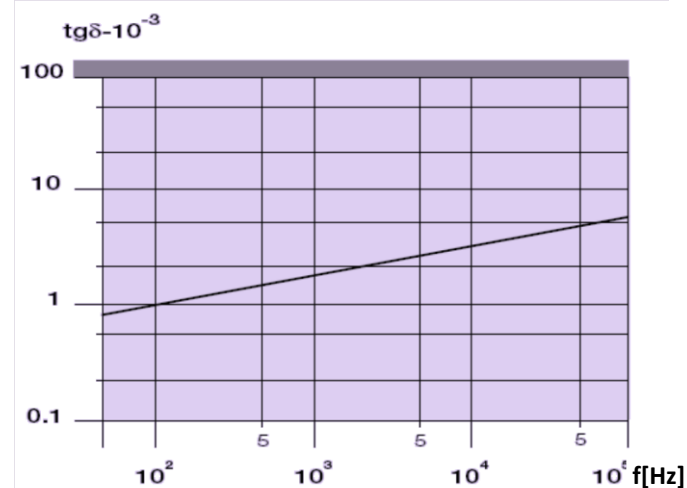
Dissipation factor variation as a function of temperature at 1 KHz



Time constant as a function of temperature



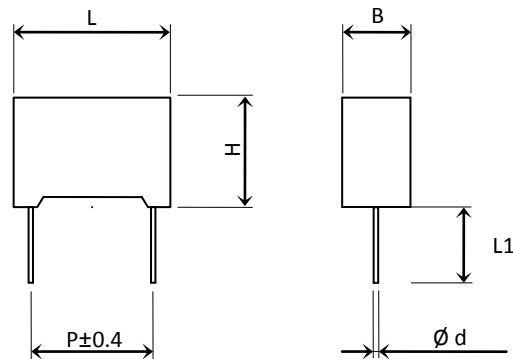
Capacitance resistance as a function of frequency (room temperature)



Dissipation factor variation as a function of frequency (room temperature)

Type PB

Polycarbonate capacitors



All dimensions are in mm

GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	aluminium layer deposited by evaporation under vacuum
Winding	non-inductive type
Leads	tinned copper wire
Construction	radial leads, box type
Protection	plastic case, made of solvent resistant material, sealed with epoxy resin
Marking	manufacturer's name or logo, type, capacitance, tolerance, D.C. rated voltage and manufacturing date code
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-6

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr)	63 Vdc - 100 Vdc - 250 Vdc - 400 Vdc - 630 Vdc - 1000 Vdc					
Category voltage (Vc)	up to 85 °C Vc = Vr					
<i>For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage (dc and ac) has to be applied</i>						
Capacitance values	normal values in compliance with IEC standard series E6 - E12 - E24 - E48 - E96 (IEC 60063 Norm) <i>Other values available upon request</i>					
Capacitance tolerances	±1% (F); ±1.25% (E); ±2% (G); ±2.5% (H); ±5% (J); ±10% (K); ±20% (M) <i>measured at 1 kHz</i>					
Total self-inductance (L)	Pitch (mm)	7.5	10	15	22.5	27.5
Lead length ~ 2mm	L (nH) ≈	8	9	10	18	18
Dissipation factor (tgδ) At +25°C ±5°C	≤30 x 10 ⁻⁴ at 1 kHz ≤50 x 10 ⁻⁴ at 10 kHz for C < 1 µF upon request					
Insulation resistance	for Vr > 100 V: ≥ 30000 MΩ for C ≤ 0.33 µF ≥ 10000 s for C > 0.33 µF for Vr ≤ 100 V: ≥ 10000 MΩ for C ≤ 0.1 µF ≥ 1000 s for C > 0.1 µF					
Test conditions	<i>Temperature: +25°C ±5°C Voltage charge time: 1 min Voltage charge: 50Vdc for Vr<100Vdc and 100Vdc for Vr≥100Vdc</i>					
Test voltage between terminals	1.6 x Vr applied for 2 s at 25 °C ±5 °C					

		Pitch (mm)			
Maximum pulse rise time (V/μs)	Vr	7.5-10	15	22.5	27.5
	63	15	10	5	5
	100	20	15	5	5
	250	30	20	10	10
	400	40	30	15	15
	630	50	40	20	15
	1000	60	50	30	25

If the working voltage (V) is lower than the rated voltage (Vr), the capacitor can work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value with the ratio Vr/V

Type PB

Polycarbonate capacitors

QUALITY TEST

Damp heat test at temperature + 40 °C ± 2°C, RH 93% ± 2% , test duration 56 days
capacitance change $|\Delta C/C| \leq 3\%$
dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz
insulation resistance $\geq 50\%$ of initial limit

Soldering test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen)
capacitance change $|\Delta C/C| \leq 1\%$
dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz
insulation resistance $\geq$ initial limit

Long term stability at standard environmental conditions after 2 years
capacitance change $|\Delta C/C| \leq 1\%$

Life test at temperature +85 °C ± 2° C , voltage applied 1.25 x Vr(d.c.), test duration 1000 h
capacitance change $|\Delta C/C| \leq 3\%$
dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz
insulation resistance $\geq 50\%$ of initial limit

Rated Capacitance	63 Vdc - 40 Vac				100 Vdc - 63 Vac				250 Vdc - 160 Vac				400 Vdc - 200 Vac				630 Vdc - 220 Vac*				1000 Vdc - 250 Vac*			
	B	H	L	P	B	H	L	P	B	H	L	P	B	H	L	P	B	H	L	P	B	H	L	P
1000 pF									3.5	6.5	10.5	7.5	3.5	6.5	10.5	7.5	4	9	10.5	7.5	4	9	13	10
1500									3.5	6.5	10.5	7.5	3.5	6.5	10.5	7.5	4	9	10.5	7.5	4	9	13	10
2200									3.5	6.5	10.5	7.5	3.5	6.5	10.5	7.5	4	9	10.5	7.5	4	9	13	10
3300									3.5	6.5	10.5	7.5	3.5	6.5	10.5	7.5	4	9	10.5	7.5*	5	11	13	10
4700									3.5	6.5	10.5	7.5	3.5	6.5	10.5	7.5	4	9	10.5	7.5*	6	12	13	10
6800									3.5	6.5	10.5	7.5	4	9	10.5	7.5	4	9	13	10	5	11	18	15
0.010 µF									3.5	6.5	10.5	7.5	4	9	10.5	7.5	4	9	13	10	5	11	18	15
0.015									3.5	6.5	10.5	7.5*	4	9	13	10	5	11	13	10	6	12	18	15
0.022					3.5	6.5	10.5	7.5	4	9	10.5	7.5*	4	9	13	10	6	12	13	10	7.5	13.5	18	15
0.033					3.5	6.5	10.5	7.5*	4	9	13	10	5	11	13	10	6	12	18	15	7	16	27	22.5
0.047	3.5	6.5	10.5	7.5	4	9	10.5	7.5*	4	9	13	10	5	11	18	15	7.5	13.5	18	15	7	16	27	22.5
0.068	3.5	6.5	10.5	7.5	4	9	10.5	7.5*	4	9	13	10	5	11	18	15	8.5	14.5	18	15	10	18.5	27	22.5
0.10	3.5	6.5	10.5	7.5*	4	9	13	10	6	12	13	10	6	12	18	15	7	16	27	22.5	11	20.5	32	27.5
0.15	4	9	10.5	7.5*	4	9	13	10	5	11	18	15	7.5	13.5	18	15	8.5	17	27	22.5	13	22	32	27.5
0.22	4	9	13	10	5	11	13	10	6	12	18	15	7	16	27	22.5	10	18.5	27	22.5	13	22	32	27.5
0.33	4	9	13	10	5	11	18	15	7.5	13.5	18	15	8.5	17	27	22.5	11	20.5	32	27.5	14	28	32	27.5
0.47	5	11	13	10	6	12	18	15	8.5	14.5	18	15	10	18.5	27	22.5	13	22	32	27.5	18	33	32	27.5
0.68	6	12	18	15	7.5	13.5	18	15	7	16	27	22.5	11	20.5	32	27.5	14	28	32	27.5	22	37	32	27.5
1	6	12	18	15	8.5	14.5	18	15	8.5	17	27	22.5	13	22	32	27.5	18	33	32	27.5				
1.5	7.5	13.5	18	15	7	16	27	22.5	10	20.5	32	27.5	14	28	32	27.5	22	37	32	27.5				
2.2	8.5	14.5	18	15	8.5	17	27	22.5	11	20.5	32	27.5	18	33	32	27.5								
3.3	7	16	27	22.5	10	18.5	27	22.5	15	25	32	27.5	22	37	32	27.5								
4.7	8.5	17	27	22.5	11	20.5	32	27.5	14	28	32	27.5												
6.8	10	18.5	27	22.5	13	22	32	27.5	18	33	32	27.5												
10	11	20.5	32	27.5	14	28	32	27.5	22	37	32	27.5												
15	15	25	32	27.5	18	33	32	27.5																
22	14	28	32	27.5	22	37	32	27.5																

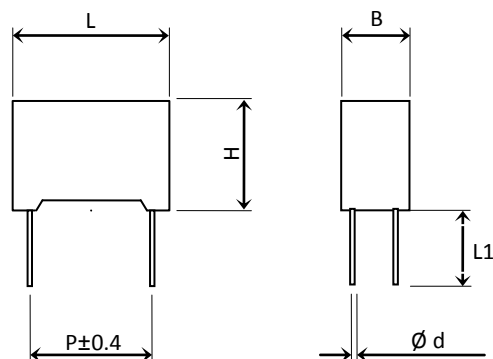
All dimensions are in mm

* Not suitable for across-the-line applications

(*) It is possible to supply values in P10 mm

Type PB/4

Polycarbonate capacitors



Pitch $\leq 10 = \varnothing d \ 0.6$
 Pitch $> 10 = \varnothing d \ 0.8$
 L1 standard = min. 6

All dimensions are in mm

GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	aluminium layer deposited by evaporation under vacuum
Winding	non-inductive type
Leads	tinned copper wire
Construction	radial leads, box type
Protection	plastic case, made of solvent resistant material, sealed with epoxy resin
Marking	manufacturer's name or logo, type, capacitance, tolerance, D.C. rated voltage and manufacturing date code
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-6

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr) 63 Vdc - 100 Vdc - 250 Vdc - 400 Vdc

Category voltage (Vc) up to 85 °C Vc = Vr

For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage (dc and ac) has to be applied

Capacitance values normal values in compliance with IEC standard series

E6 - E12 (IEC 60063 Norm)

Other values available upon request

Capacitance tolerances $\pm 1\%$ (F); $\pm 1.25\%$ (E); $\pm 2\%$ (G); $\pm 2.5\%$ (H); $\pm 5\%$ (J); $\pm 10\%$ (K); $\pm 20\%$ (M) measured at 1 kHz

Dissipation factor (tg δ) $\leq 30 \times 10^{-4}$ at 1 kHz

At +25°C $\pm 5^\circ\text{C}$

Insulation resistance
 for Vr > 100 V:
 $\geq 30000 \text{ M}\Omega$ for C $\leq 0.33 \mu\text{F}$
 $\geq 10000 \text{ s}$ for C > 0.33 μF
 for Vr $\leq 100 \text{ V}$:
 $\geq 10000 \text{ M}\Omega$ for C $\leq 0.1 \mu\text{F}$
 $\geq 1000 \text{ s}$ for C > 0.1 μF

Resistance between the two terminals on the same plate:
 C $\leq 0.1 \mu\text{F}$ R = from 0.025 to 0.5 ohm
 C > 0.1 μF R = from 0.006 to 0.3 ohm

Test conditions

Temperature: +25°C $\pm 5^\circ\text{C}$

Voltage charge time: 1 min

Voltage charge: 50Vdc for Vr<100Vdc and 100Vdc for Vr $\geq 100\text{Vdc}$

Test voltage between terminals

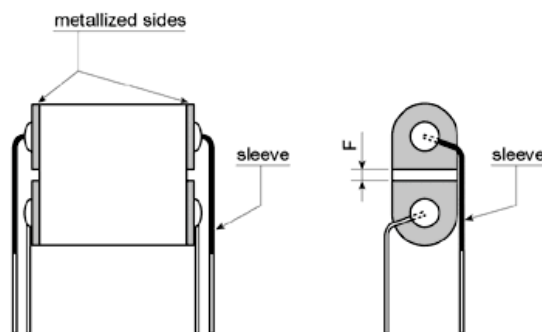
1.6 x Vr applied for 2 s at 25 °C $\pm 5^\circ\text{C}$

Type PB/4

Polycarbonate capacitors

QUALITY TEST			
Damp heat test	at temperature $+40\text{ }^{\circ}\text{C} \pm 2^{\circ}\text{C}$, RH 93% $\pm 2\%$, test duration 56 days capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit	Soldering	test IEC 60068-2-20 TB method 1A, solder bath at $260\text{ }^{\circ}\text{C} \pm 5^{\circ}\text{C}$ for $10\text{ s} \pm 1\text{ s}$ (with heat screen) capacitance change $ \Delta C/C \leq 1\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq$ initial limit
Long term stability	at standard environmental conditions after 2 years capacitance change $ \Delta C/C \leq 1\%$	Life test	at temperature $+85\text{ }^{\circ}\text{C} \pm 2^{\circ}\text{C}$, voltage applied $1.25 \times V_r$ (d.c.), test duration 1000 h capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit

OVAL CAPACITOR WITHOUT CASE



Particular F:

The metallization must be removed completely up to the level of the plate without rags.

DIMENSIONAL VALUES

Available upon request.

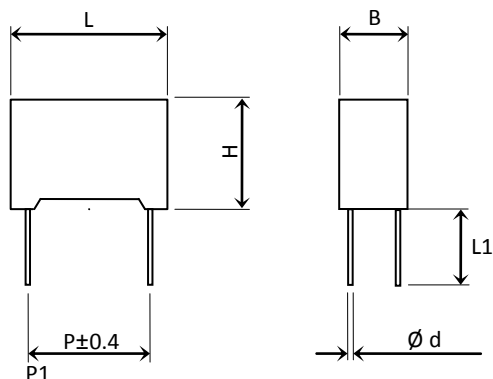
CONSTRUCTION CHARACTERISTICS

All the capacitors must be inserted in Makrolon or noryl case and sealed with transparent epoxy resin.

The terminal must be in tinned copper and the sleeve must consist of a class B, nylon textile, electric strength 1200 V.

Type PR/4

Polycarbonate capacitors



Pitch $\leq 10 = \varnothing d \ 0.6$
 Pitch $> 10 = \varnothing d \ 0.8$
 L1 standard = min. 6

All dimensions are in mm

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr) 63 Vdc - 100 Vdc - 250 Vdc - 400 Vdc - 630Vdc

Category voltage (Vc) up to 85 °C Vc = Vr

For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage (dc and ac) has to be applied

Capacitance values normal values in compliance with IEC standard series
 E6 - E12 (IEC 60063 Norm)
 Other values available upon request

Capacitance tolerances $\pm 1\%$ (F); $\pm 1.25\%$ (E); $\pm 2\%$ (G); $\pm 2.5\%$ (H); $\pm 5\%$ (J);
 $\pm 10\%$ (K); $\pm 20\%$ (M) measured at 1 kHz

Dissipation factor (tg δ) $\leq 30 \times 10^{-4}$ at 1 kHz
 At +25°C $\pm 5^\circ\text{C}$

Insulation resistance for Vr > 100 V:
 $\geq 30000 \text{ M}\Omega$ for C $\leq 0.33 \text{ }\mu\text{F}$
 $\geq 10000 \text{ s}$ for C > 0.33 μF
 for Vr $\leq 100 \text{ V}$:
 $\geq 10000 \text{ M}\Omega$ for C $\leq 0.1 \text{ }\mu\text{F}$
 $\geq 1000 \text{ s}$ for C > 0.1 μF

Resistance between the two terminals on the same plate: from 0.006 to 0.050 ohm

Test conditions Temperature: +25°C $\pm 5^\circ\text{C}$
 Voltage charge time: 1 min
 Voltage charge: 50Vdc for Vr < 100Vdc and 100Vdc for Vr $\geq 100\text{Vdc}$

Test voltage between terminals 1.6 x Vr applied for 2 s at 25 °C $\pm 5^\circ\text{C}$

GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	aluminium layer deposited by evaporation under vacuum
Winding	non-inductive type
Leads	tinned copper wire
Construction	radial leads, box type
Protection	plastic case, made of solvent resistant material, sealed with epoxy resin
Marking	manufacturer's name or logo, type, capacitance, tolerance, D.C. rated voltage and manufacturing date code
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-6

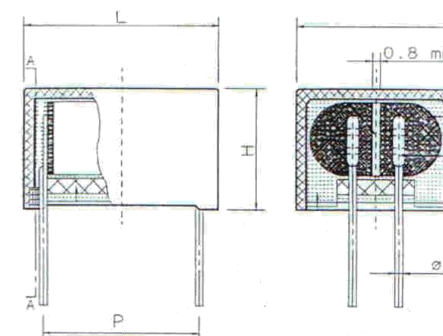
Type PR/4

Polycarbonate capacitors

QUALITY TEST			
Damp heat test	at temperature + 40 °C ± 2°C, RH 93% ± 2% , test duration 56 days capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit	Soldering	test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen) capacitance change $ \Delta C/C \leq 1\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq$ initial limit
Long term stability	at standard environmental conditions after 2 years capacitance change $ \Delta C/C \leq 1\%$	Life test	at temperature +85 °C ± 2° C , voltage applied 1.25 x Vr(d.c.), test duration 1000 h capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit

Rated Capacitor	40 Vdc			63 Vdc			160 Vdc			250 Vdc			400 Vdc			630 Vdc		
Tance (mF)	L	H	B	L	H	B	L	H	B	L	H	B	L	H	B	L	H	B
0.001 µF																11	10	15
0.0015																11	10	15
0.0022																11	10	15
0.0033																11	10	15
0.0047																11	10	15
0.0068																11	10	15
0.01																11	10	15
0.015																11	10	15
0.022													11	10	15	14	10	15
0.033										11	10	15	11	10	15	14	10	15
0.047										11	10	15	14	10	15	19	10	16
0.068							11	10	15	14	10	15	14	10	15	19	10	16
0.1							11	10	15	14	10	15	19	10	16	32	10	16
0.15							14	10	15	19	10	16	19	10	16	32	10	16
0.22				11	10	15	14	10	15	19	10	16	32	10	16	32	13	17
0.33				11	10	15	19	10	16	32	10	16	32	13	17	32	16	26
0.47	11	10	15	14	10	15	19	10	16	32	10	16	32	13	17	32	16	26
0.68	11	10	15	14	10	15	32	10	16	32	13	17	32	13	23			
1	14	10	15	19	10	16	32	13	17	32	13	23	32	16	26			
1.5	14	10	15	19	10	16	32	13	17	32	16	26						
2.2	19	10	16	32	10	16	32	13	23									
3.3	19	10	16	32	10	16	32	16	26									
4.7	32	10	16	32	13	17												
6.8	32	10	16	32	13	23												
10	32	13	17	32	13	26												
15	32	13	23															
22	32	16	26															

OVAL CAPACITOR WITHOUT CASE



The metallization must be removed completely up to the level of the plate without rags.

All the capacitors must be inserted in black thermoplastic polyester case and sealed with transparent epoxy resin. The terminal must be in tinned copper.

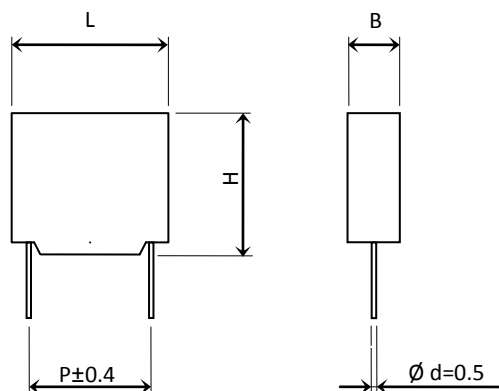
Dimensional values are available upon request

Box	PITCH						
	11x10x15	14x10x15	19x10x16	32x10x16	32x13x17	31x13x23	32x16x26
P1	5.08	5.08	5.08	5.08	5.08	10.16	10.16
P2	7.62	10.16	15.24	27.94	27.94	27.94	27.94
Leads Ø d	0.6	0.6	0.8	0.8	0.8	0.8	0.8

All dimension are in mm

Type PB/5

Polycarbonate capacitors



All dimensions are in mm

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr) 50 Vdc - 63 Vdc - 100 Vdc

Category voltage (Vc) up to 85 °C Vc = Vr

For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage has to be applied

Capacitance values normal values in compliance with IEC standard series E6 (IEC 60063 Norm)
Other values available upon request

Capacitance tolerances ±1% (F); ±1.25% (E); ±2% (G); ±2.5% (H); ±5% (J); ±10% (K); ±20% (M) *measured at 1 kHz*

Total self inductance (L) ≈ 6 nH per 2mm leads length

Dissipation factor (tgδ) ≤50 x 10⁻⁴ at 10 kHz
At +25°C ±5°C

Insulation resistance ≥ 10000 MΩ for C ≤ 0.1 µF
≥ 1000 s for C > 0.1 µF

Test conditions
Temperature: +25°C ±5°C
Voltage charge time: 1 min
Voltage charge: 50Vdc for Vr<100Vdc and 100Vdc for Vr≥100Vdc

Test voltage between terminals 1.6 x Vr applied for 2 sec. at 25 °C ±5 °C temp.

Maximum pulse rise time 50 Vdc - 63 Vdc = 17 V/µs
100 Vdc = 24 V/µs

If the working voltage (V) is lower than the rated voltage (Vr), the capacitor can work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value with the ratio Vr/V

GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	aluminium layer deposited by evaporation under vacuum
Winding	non-inductive type
Leads	tinned copper wire
Construction	radial leads, box type
Protection	plastic case, made of solvent resistant material, sealed with epoxy resin
Marking	capacitance, tolerance, D.C. rated voltage
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-6

Type PB/5

Polycarbonate capacitors

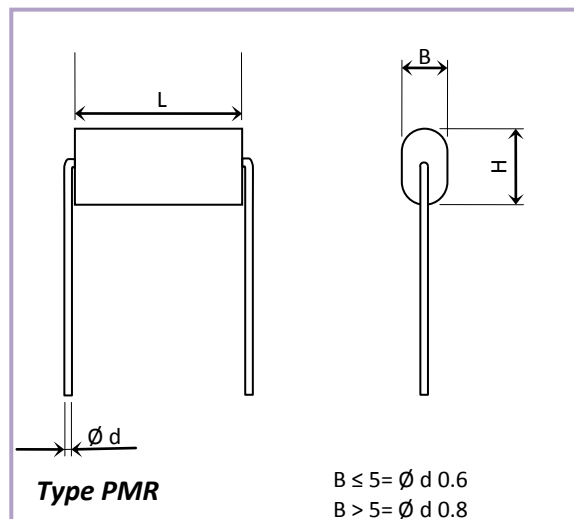
QUALITY TEST			
Damp heat test	at temperature + 40 °C ± 2°C, RH 93% ± 2% , test duration 56 days capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit	Soldering	test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen) capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq$ initial limit
Long term stability	at standard environmental conditions after 2 years capacitance change $ \Delta C/C \leq 1\%$	Life test	at temperature +85 °C ± 2° C , voltage applied 1.25 x Vr(d.c.), test duration 1000 h capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit

Rated	50 Vdc - 30 Vac				63 Vdc - 40 Vac				100 Vdc - 63 Vac			
Capacitance	B	H	L	P	B	H	L	P	B	H	L	P
1000 pF									3	6.5	7.2	5
1500									3	6.5	7.2	5
2200									3	6.5	7.2	5
3300									3	6.5	7.2	5
4700									3	6.5	7.2	5
6800									3	6.5	7.2	5
0.010									3	6.5	7.2	5
0.015									3	6.5	7.2	5
0.022									3	6.5	7.2	5
0.033					3	6.5	7.2	5				
0.047					3	6.5	7.2	5				
0.068					3	6.5	7.2	5				
0.10 µF	3	6.5	7.2	5	3	6.5	7.2	5				
0.15	3	6.5	7.2	5	3.5	7.5	7.2	5				
0.22	3.5	7.5	7.2	5	3.5	8.5	7.2	5				
0.33	3.5	8.5	7.2	5	4.5	9.5	7.2	5				
0.47	4.5	9.5	7.2	5	5	10	7.2	5				
0.68	5	10	7.2	5								
1	6	11	7.2	5								

All dimensions are in mm

Type PMA/PMR

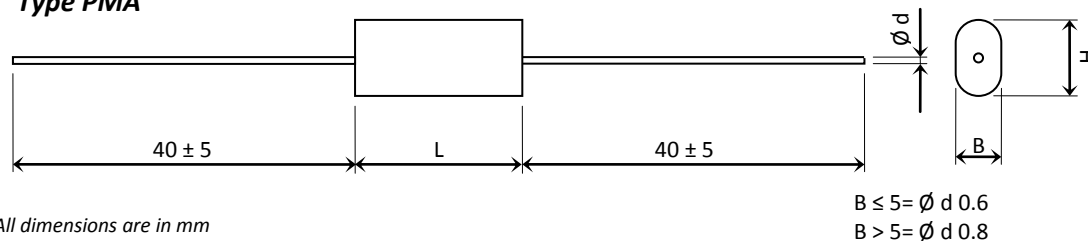
Polycarbonate capacitors



GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	aluminium layer deposited by evaporation under vacuum
Winding	non-inductive type
Leads	tinned copper wire
Construction	axial leads, flat type for PMA ; radial leads, flat type for PMR
Protection	polyester wrapping sealed with epoxy resin
Marking	manufacturer's name or logo, type, capacitance, tolerance, D.C. rated voltage and manufacturing date code
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-6

Type PMA



All dimensions are in mm

ELECTRICAL CHARACTERISTICS

Rated voltage (V_r) 63 Vdc - 100 Vdc - 250 Vdc - 400 Vdc - 630 Vdc - 1000 Vdc

Category voltage (V_c) up to 85 °C $V_c = V_r$

For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage has to be applied

Capacitance values normal values in compliance with IEC standard series E6 - E12 - E24 - E48 - E96 (IEC 60063 Norm)
 Other values available upon request

Capacitance tolerances $\pm 1\%$ (F); $\pm 1.25\%$ (E); $\pm 2\%$ (G); $\pm 2.5\%$ (H); $\pm 5\%$ (J); $\pm 10\%$ (K); $\pm 20\%$ (M) measured at 1 kHz

Total self inductance (L) max 1nH per 1 mm lead and capacitor length

Dissipation factor ($\tan \delta$) $\leq 30 \times 10^{-4}$ at 1 kHz
 At +25°C $\pm 5^\circ\text{C}$ $\leq 50 \times 10^{-4}$ at 10 kHz for $C < 1 \mu\text{F}$ upon request

Insulation resistance for $V_r > 100 \text{ V}$: $\geq 30000 \text{ M}\Omega$ for $C \leq 0.33 \mu\text{F}$
 for $V_r \leq 100 \text{ V}$: $\geq 10000 \text{ M}\Omega$ for $C \leq 0.1 \mu\text{F}$
 $\geq 10000 \text{ s}$ for $C > 0.33 \mu\text{F}$ $\geq 1000 \text{ s}$ for $C > 0.1 \mu\text{F}$

Test conditions Temperature: +25°C $\pm 5^\circ\text{C}$
 Voltage charge time: 1 min
 Voltage charge: 50Vdc for $V_r < 100 \text{ Vdc}$ and 100Vdc for $V_r \geq 100 \text{ Vdc}$

Test voltage between terminals 1.6 x V_r applied for 2 s at 25 °C $\pm 5^\circ\text{C}$

		L max (mm)			
Maximum pulse rise time (V/μs)	Vr	≤14	17-19	25-27	32
	63	15	10	5	5
	100	20	15	5	5
	250	30	20	10	10
	400	40	30	15	15
	630	50	40	20	15
	1000	60	50	30	25

If the working voltage (V) is lower than the nominal voltage (V_r), the capacitor can work at higher dv/dt . In this case the maximum value allowed is obtained multiplying the above value with the ratio V_r/V

Type PMA/PMR

Polycarbonate capacitors

QUALITY TEST			
Damp heat test	at temperature + 40 °C ± 2°C, RH 93% ± 2%, test duration 56 days capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit	Soldering	test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen) capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq$ initial limit
Long term stability	at standard environmental conditions after 2 years capacitance change $ \Delta C/C \leq 1\%$	Life test	at temperature +85 °C ± 2° C , voltage applied 1.25 x Vr(d.c.), test duration 1000 h capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit

Rated	63 Vdc - 40 Vac			100 Vdc - 63 Vac			250 Vdc - 160 Vac			400 Vdc - 200 Vac			630 Vdc - 220 Vac*			1000 Vdc - 250 Vac*		
Capacitance	B	H	L	B	H	L	B	H	L	B	H	L	B	H	L	B	H	L
1000 pF													4	6.5	10	4	6.5	10
1500													4	6.5	10	4	6.5	10
2200													4	6.5	10	4	6.5	10
3300													4	6.5	10	4	8	13
4700													4	6.5	10	4	8	13
6800													4	6.5	10	4.5	8.5	13
0.01 µF										4	6.5	10	4	8	13	5.5	9.5	13
0.015										4	6.5	10	4	8	13	4.5	8.5	17
0.022							4	6.5	10	4	8	13	4	8	13	6	10	17
0.033							4	6.5	10	4	8	13	5.5	9.5	13	7.5	11.5	17
0.047							4	6.5	10	4	8	13	5	8.5	17	5	10.5	25
0.068				4	6.5	10	4	8	13	5	9	13	6	10	17	6.5	12	25
0.1				4	6.5	10	4	8	13	4.5	8.5	17	7.5	11.5	17	6.5	14	32
0.15	4	6.5	10	4	7.5	13	4.5	8.5	13	6	10	17	6	11.5	25	8.5	16	32
0.22	4	6.5	10	4	7.5	13	6	10	13	7.5	11.5	17	7.5	13.5	25	11	18.5	32
0.33	4	7.5	13	4.5	8.5	13	5.5	9.5	17	6	11.5	25	8	15.5	32	12	24.5	32
0.47	4	8	13	5.5	9.5	13	7	10.5	17	7.5	13	25	10.5	17.5	32	15.5	28	32
0.68	4	8	13	5	9	17	5	10.5	25	7.5	14.5	32	10.5	23.5	32			
1	5	9	13	6	10	17	6.5	12.5	25	10	17	32	13.5	26.5	32			
1.5	5	9	17	8	12	17	7	14	32	10.5	23	32	18	30.5	32			
2.2	6.5	10.5	17	6	11.5	25	9	16	32	13.5	26	32						
3.3	5.5	10.5	25	7.5	14.5	25	11.5	18.5	32	17.5	30.5	32						
4.7	6	13	25	8	15.5	25	12	24.5	32									
6.8	7.5	14.5	25	9.5	17.5	32	15.5	28	32									
10	8.5	15.5	32	10.5	23.5	32	18.5	34	32									
15	11.5	18.5	32	14.5	27	32												
22	12	24.5	32	18.5	31	32												

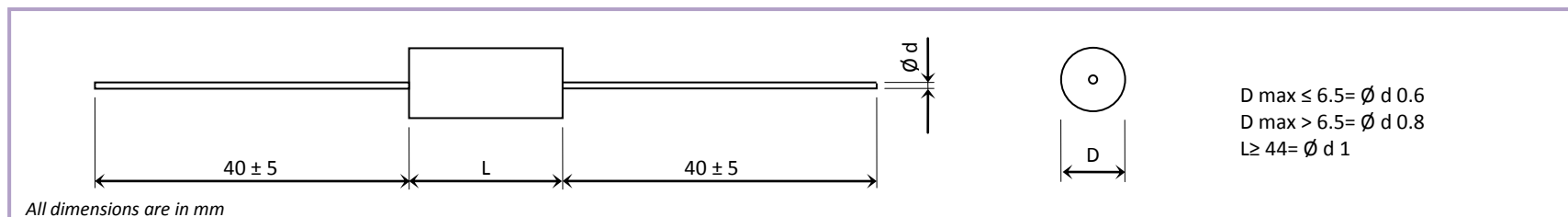
DIMENSION TOLERANCE (mm)					
L	L±	B	B±	H	H±
10	1	≤6	1	≤8	1
13	1.5	≤12	1.5	≤14	1.5
17	1.5				
25	2	≤20	2	≤35	2.5
32	2				

All dimension are in mm

- Not suitable for across-the-line applications

Type PMC

Polycarbonate capacitors



GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	aluminium layer deposited by evaporation under vacuum
Winding	non-inductive type
Leads	tinned copper wire
Construction	axial leads, cylindrical type
Protection	polyester wrapping sealed with epoxy resin
Marking	manufacturer's name or logo, type, capacitance, tolerance, D.C. rated voltage and manufacturing date code
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-6

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr) 63 Vdc - 100 Vdc - 250 Vdc - 400 Vdc - 630 Vdc - 1000 Vdc

Category voltage (Vc) up to 85 °C Vc = Vr

For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage has to be applied

Capacitance values normal values in compliance with IEC standard series E6 - E12 - E24 - E48 - E96 (IEC 60063 Norm)
Other values available upon request

Capacitance tolerances $\pm 1\%$ (F); $\pm 1.25\%$ (E); $\pm 2\%$ (G); $\pm 2.5\%$ (H); $\pm 5\%$ (J); $\pm 10\%$ (K); $\pm 20\%$ (M) measured at 1 kHz

Total self inductance (L) max 1nH per 1 mm lead and capacitor length

Dissipation factor (tg δ) $\leq 30 \times 10^{-4}$ at 1 kHz
At +25°C $\pm 5^\circ\text{C}$ $\leq 50 \times 10^{-4}$ at 10 kHz for C < 1 μF upon request

Insulation resistance for Vr > 100 V: $\geq 30000 \text{ M}\Omega$ for C $\leq 0.33 \mu\text{F}$
for Vr ≤ 100 V: $\geq 10000 \text{ M}\Omega$ for C $\leq 0.1 \mu\text{F}$
 $\geq 10000 \text{ s}$ for C > 0.33 μF $\geq 1000 \text{ s}$ for C > 0.1 μF

Test conditions Temperature: +25°C $\pm 5^\circ\text{C}$
Voltage charge time: 1 min
Voltage charge: 50Vdc for Vr < 100Vdc and 100Vdc for Vr ≥ 100 Vdc

Test voltage between terminals 1.6 x Vr applied for 2 s at 25 °C $\pm 5^\circ\text{C}$

		L max (mm)				
Maximum pulse rise time (V/μs)	Vr	≤14	17-19	25-27	32	44
	63	15	10	5	5	5
	100	20	15	5	5	5
	250	30	20	10	10	5
	400	40	30	15	15	10
	630	50	40	20	15	15
	1000	60	50	30	25	20

If the working voltage (V) is lower than the rated voltage (Vr), the capacitor can work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value with the ratio Vr/V

Type PMC

Polycarbonate capacitors

QUALITY TEST

Damp heat test at temperature + 40 °C ± 2°C, RH 93% ± 2% , test duration 56 days
capacitance change $|\Delta C/C| \leq 3\%$
dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz
insulation resistance $\geq 50\%$ of initial limit

Soldering test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen)
capacitance change $|\Delta C/C| \leq 1\%$
dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz
insulation resistance $\geq$ initial limit

Long term stability at standard environmental conditions after 2 years
capacitance change $|\Delta C/C| \leq 1\%$

Life test at temperature +85 °C ± 2° C , voltage applied 1.25 x Vr(d.c.), test duration 1000 h
capacitance change $|\Delta C/C| \leq 3\%$
dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz
insulation resistance $\geq 50\%$ of initial limit

Rated Capacitance	63 Vdc - 40 Vac		100 Vdc - 63 Vac		250 Vdc - 160 Vac		400 Vdc - 200 Vac		630 Vdc - 220 Vac*		1000 Vdc - 250 Vac*	
	D	L	D	L	D	L	D	L				
1000 pF									4.5	10	5	13
1500									4.5	10	5	13
2200									4.5	10	5.5	13
3300									4.5	10/13	5.5	13
4700									4.5	10/13	6	13
6800							4.5	10	5.5	13	6.5	13
0.010 µF							4.5	10	5.5	13	6	17
0.015					4.5	10	5	13	5.5	13	7	17
0.022					4.5	10	5	13	6.5	13	8.5	17
0.033			4.5	10	5	13	5.5	13	6.5	17	7.5	25
0.047			4.5	10	5	13	6.5	13	7.5	17	8.5	25
0.068			4.5	10	5	13	7.5	13	8.5	17	10	25
0.10	4.5	10	5	13	6	13	7.5	17	8	25	10.5	32
0.15	4.5	10	5	13	7	13	8.5	17	9.5	25	13	32
0.22	5	10/13	5.5	13	7	17	8	25	11	25	15	32
0.33	5	13	6.5	13	8	17	9.5	25	12	32	18.5	32
0.47	5.5	13	6	17	9.5	17	11	25	14	32	22	32
0.68	6	13	7	17	8.5	25	11.5	32	16.5	32	20.5	44
1	6	17	8.5	17	10	25	14	32	20.5	32	25	44
1.5	7	17	8	25	12	25	17	32	19.5	44		
2.2	8.5	17	9.5	25	13	32	20	32	23.5	44		
3.3	8.5	25	11.5	25	15.5	32	19.5	44				
4.7	9.5	25	12	32	18.5	32	23	44				
6.8	10.5	32	14	32	22	32	28	44				
10	12.5	32	17	32	21	44						
15	15	32	20.5	32	25.5	44						
22	18	32	22	32	31	44						
33	22	32	20	44								

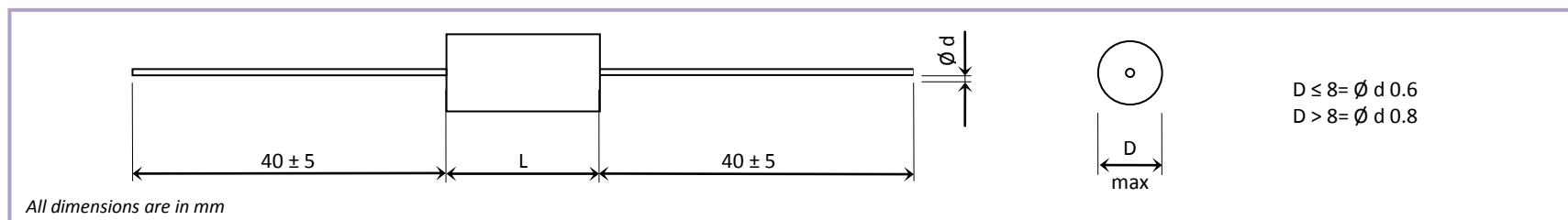
DIMENSION TOLERANCE (mm)		
L	L±	D±
10	1	1
13	1.5	1
17	1.5	1.5
25	2	1.5
32	2	2

All dimensions are in mm

* Not suitable for across-the-line applications

Type PMC/M

Polycarbonate capacitors



GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	aluminium layer deposited by evaporation under vacuum
Winding	non-inductive type
Leads	tinned copper wire
Construction	axial leads, cylindrical type
Protection	metal case sealed with epoxy resin insulated with a thermoshrunk sleeve
Marking	manufacturer's name or logo, type, capacitance, tolerance, D.C. rated voltage and manufacturing date code
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-6

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr)	63 Vdc - 100 Vdc - 250 Vdc - 400 Vdc - 630 Vdc - 1000 Vdc
Category voltage (Vc)	up to 85 °C Vc = Vr
<i>For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage has to be applied</i>	

Capacitance values	normal values in compliance with IEC standard series E6 - E12 - E24 - E48 - E96 (IEC 60063 Norm) <i>Other values available upon request</i>	
Capacitance tolerances	±1% (F); ±1.25% (E); ±2% (G); ±2.5% (H); ±5% (J); ±10% (K); ±20% (M) <i>measured at 1 kHz</i>	
Total self inductance (L)	max 1nH per 1 mm lead and capacitor length	
Dissipation factor (tgδ)	≤30 x 10 ⁻⁴ at 1 kHz At +25°C ±5°C ≤50 x 10 ⁻⁴ at 10 kHz for C < 1 µF upon request	
Insulation resistance	for Vr > 100 V: ≥ 30000 MΩ for C ≤ 0.33 µF ≥ 10000 s for C > 0.33 µF	for Vr ≤ 100 V: ≥ 10000 MΩ for C ≤ 0.1 µF ≥ 1000 s for C > 0.1 µF
Test conditions	Temperature: +25°C ±5°C Voltage charge time: 1 min Voltage charge: 50Vdc for Vr<100Vdc and 100Vdc for Vr≥100Vdc	

Test voltage between terminals	1.6 x Vr applied for 2 s at 25 °C ±5 °C
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		L max (mm)					
Maximum pulse rise time (V/µs)	Vn	≤16	22	32	36	50	
	63	15	10	5	5	5	
	100	20	15	5	5	5	
	250	30	20	10	10	5	
	400	40	30	15	15	10	
	630	50	40	20	15	15	
	1000	60	50	30	25	20	

If the working voltage (V) is lower than the rated voltage (Vr), the capacitor can work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value with the ratio Vr/V

Type PMC/M

Polycarbonate capacitors

QUALITY TEST			
Damp heat test	at temperature + 40 °C ± 2°C, RH 93% ± 2%, test duration 56 days capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit	Soldering	test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen) capacitance change $ \Delta C/C \leq 1\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq$ initial limit
Long term stability	at standard environmental conditions after 2 years capacitance change $ \Delta C/C \leq 1\%$	Life test	at temperature +85 °C ± 2° C , voltage applied 1.25 x Vr(d.c.), test duration 1000 h capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit

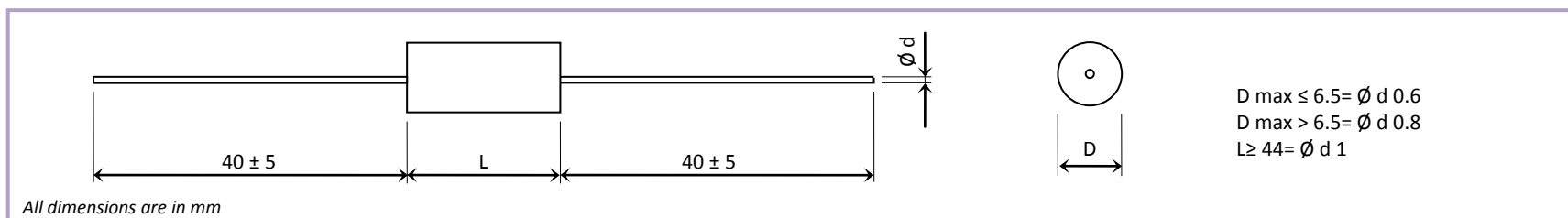
Rated Capacitance	63 Vdc - 40 Vac		100 Vdc - 63 Vac		250 Vdc - 160 Vac		400 Vdc - 200 Vac		630 Vdc - 220 Vac*		1000 Vdc - 250 Vac*	
	D	L	D	L	D	L	D	L	D	L	D	L
1000 pF									7	16	7	16
1500									7	16	7	16
2200	7	16	7	16	7	16	7	16	7	16	7	16
3300	7	16	7	16	7	16	7	16	7	16	7	16
4700	7	16	7	16	7	16	7	16	7	16	8	16
6800	7	16	7	16	7	16	7	16	7	16	8	22
0.010 µF	7	16	7	16	7	16	7	16	7	16	8	22
0.015	7	16	7	16	7	16	7	16	7	16	10	22
0.022	7	16	7	16	7	16	7	16	8	16	12	22
0.033	7	16	7	16	7	16	7	16	8	22	10	32
0.047	7	16	7	16	7	16	8	16	10	22	12	32
0.068	7	16	7	16	7	16	8	22	12	22	12	32
0.10	7	16	7	16	8	16	10	22	10	32	14	36
0.15	7	16	7	16	8	22	12	22	12	32	16	36
0.22	7	16	8	16	10	22	10	32	14	32	19	36
0.33	7	16	8	22	10	22	12	32	16	36	22	36
0.47	7	16	8	22	12	22	14	32	19	36	25	36
0.68	8	16	10	22	12	32	14	36	22	36	26	50
1	8	22	12	22	12	32	16	36	25	36		
1.5	10	22	10	32	14	32	22	36	26	50		
2.2	12	22	12	32	16	36	25	36				
3.3	12	32	14	32	19	36	26	50				
4.7	12	32	16	36	22	36						
6.8	14	36	19	36	22	50						
10	16	36	22	36	26	50						
15	19	36	25	36								
22	22	36	26	50								

DIMENSION TOLERANCE (mm)		
L	L±	D±
16	1	0.4
22	1	0.6
32	1.5	0.6
36	1.5	1
50	2	1

All dimensions are in mm * Not suitable for across-the-line applications

Type PNC

Polycarbonate capacitors



GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	tin-foil
Winding	non-inductive type
Leads	tinned copper wire
Construction	axial leads, cylindrical type
Protection	polyester wrapping sealed with epoxy resin
Marking	manufacturer's name or logo, type, capacitance, tolerance, D.C. rated voltage and manufacturing date code
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-13

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr)	160 Vdc - 250 Vdc - 400 Vdc - 630 Vdc (on request: 63 Vdc - 1000 Vdc)
Category voltage (Vc)	up to 85 °C Vc = Vr
<i>For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage has to be applied</i>	
Capacitance values	normal values in compliance with IEC standard series E6 - E12 - E24 - E48 - E96 (IEC 60063 Norm) <i>Other values available upon request</i>
Capacitance tolerances	±1% (F); ±1.25% (E); ±2% (G); ±2.5% (H); ±5% (J); ±10% (K); ±20% (M) <i>measured at 1 kHz</i>
Total self inductance (L)	max 1nH per 1 mm lead and capacitor length
Dissipation factor (tgδ) <i>At +25°C ±5°C</i>	≤20 x 10 ⁻⁴ at 1 kHz
Insulation resistance	≥ 30000 MΩ for C ≤ 0.47 µF ≥ 10000 s for C > 0.47 µF
<i>Test conditions</i>	<i>Temperature: +25°C ±5°C Voltage charge time: 1 min Voltage charge: 50Vdc for Vr<100Vdc and 100Vdc for Vr≥100Vdc</i>
Test voltage between terminals	2.5 x Vr applied for 2 sec. at 25 °C ±5 °C temp.

		L max (mm)		
Maximum pulse rise time (V/µs)	Vr	≤20.5	25-27	32
	160	450	300	200
	250	550	350	250
	400	700	400	300
	630	800	500	350

If the working voltage (V) is lower than the rated voltage (Vr), the capacitor can work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value with the ratio Vr/V

Type PNC

Polycarbonate capacitors

QUALITY TEST			
Damp heat test	at temperature + 40 °C ± 2°C, RH 93% ± 2% , test duration 56 days capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit	Soldering	test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen) capacitance change $ \Delta C/C \leq 1\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq$ initial limit
Long term stability	at standard environmental conditions after 2 years capacitance change $ \Delta C/C \leq 1\%$	Life test	at temperature +85 °C ± 2° C , voltage applied 1,5 x Vr(d.c.), test duration 1000 h capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit

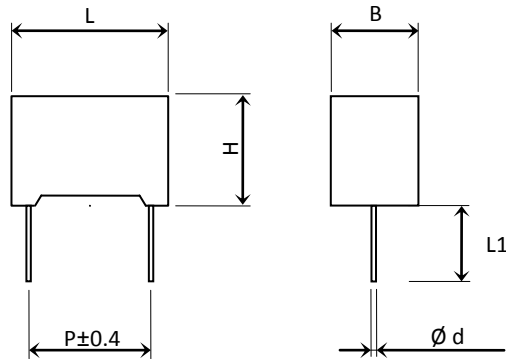
Rated Capacitance	160 Vdc - 63 Vac		250 Vdc - 160 Vac		400 Vdc - 200 Vac		630 Vdc - 220 Vac*	
	D	L	D	L	D	L	D	L
4700 pF	6	14.5	6	14.5	6	14.5	7	14.5
6800	6	14.5	6	14.5	7	14.5	7	20.5
0.010 µF	6	14.5	7	14.5	7	20.5	8	20.5
0.015	6.5	14.5	7	20.5	8	20.5	9	20.5
0.022	7	14.5	7.5	20.5	9	20.5	10.5	20.5
0.033	7.5	20.5	8.5	20.5	10.5	20.5	12.5	20.5
0.047	8.5	20.5	9.5	20.5	10	27	12	27
0.068	10	20.5	11	20.5	11.5	27	14	27
0.10	11	20.5	11	27	13.5	27	16.5	27
0.15	13	27	12.5	27	13.5	32	17	32
0.22	13	27	14.5	27	16	32	19.5	32
0.33	13	32	15	32	19	32	24	32
0.47	15	32	17.5	32	22	32		
0.68	17.5	32	20.5	32				
1	20.5	32	24	32				
1.5	25	32						

Max dimensions in mm.

* Not suitable for across-the-line applications

Type NPB

Polycarbonate capacitors



Pitch $\leq 10 = \varnothing d \cdot 0.6$
 Pitch $> 10 = \varnothing d \cdot 0.8$
 L1 standard = min. 6

All dimensions are in mm

GENERAL TECHNICAL DATA

Dielectric	polycarbonate film
Plates	tin-foil
Winding	non-inductive type
Leads	tinned copper wire
Construction	radial leads, box type
Protection	plastic case, made of solvent resistant material, sealed with epoxy resin
Marking	manufacturer's name or logo, type, capacitance, tolerance, DC rated voltage and manufacturing date code
Climatic category	55/125/56 IEC 60068-1
Standard references	IEC 60384-13

ELECTRICAL CHARACTERISTICS

Rated voltage (Vr)	160 Vdc - 250 Vdc - 400 Vdc - 630 Vdc - 1000 Vdc		
Category voltage (Vc)	up to 85 °C Vc = Vr		
<i>For temperature between +85 °C and +125 °C a decreasing factor of 1.25% per degree °C on the rated voltage (dc and ac) has to be applied</i>			
Capacitance values	normal values in compliance with IEC standard series E6 - E12 - E24 - E48 - E96 (IEC 60063 Norm) <i>Other values available upon request</i>		
Capacitance tolerances	±1% (F); ±1.25% (E); ±2% (G); ±2.5% (H); ±5% (J); ±10% (K); ±20% (M) <i>measured at 1 kHz</i>		
Total self-inductance (L)	Pitch (mm)	15	22.5
Lead length ~ 2mm	L (nH) ≈	10	18
Dissipation factor (tgδ) <i>At +25°C ±5°C</i>	≤20 x 10 ⁻⁴ at 1 kHz		
Insulation resistance	≥ 30000 MΩ for C ≤ 0.47 μF ≥ 10000 s for C > 0.47 μF		
<i>Test conditions</i>	<i>Temperature: +25°C ±5°C Voltage charge time: 1 min Voltage charge: 50Vdc for Vr<100Vdc and 100Vdc for Vr≥100Vdc</i>		
Test voltage between terminals	2.5 x Vr applied for 2 s at 25 °C ±5 °C		

		Pitch (mm)		
Maximum pulse rise time (V/ μs)	Vr	≤ 15	22.5	27.5
	100	450	300	200
	250	550	350	250
	400	700	400	300
	630	800	500	350
	1000	900	600	400

If the working voltage (V) is lower than the rated voltage (Vr), the capacitor can work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value with the ratio Vr/V

Type NPB

Polycarbonate capacitors

QUALITY TEST			
Damp heat test	at temperature + 40 °C ± 2°C, RH 93% ± 2% , test duration 56 days capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit	Soldering	test IEC 60068-2-20 TB method 1A, solder bath at 260 °C ± 5 °C for 10 s ± 1 s (with heat screen) capacitance change $ \Delta C/C \leq 1\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq$ initial limit
Long term stability	at standard environmental conditions after 2 years capacitance change $ \Delta C/C \leq 1\%$	Life test	at temperature +85 °C ± 2° C , voltage applied 1,5 x Vr(d.c.), test duration 1000 h capacitance change $ \Delta C/C \leq 3\%$ dissipation factor change $\Delta \text{tg}\delta \leq 30 \times 10^{-4}$ at 1 kHz insulation resistance $\geq 50\%$ of initial limit

Rated capacitance	160 Vdc - 63 Vac			250 Vdc - 160 Vac			400 Vdc - 200 Vac			630 Vdc - 220 Vac*			1000 Vdc - 250 Vac*			Lead spacing
	B	H	L	B	H	L	B	H	L	B	H	L	B	H	L	B
3300 pF													5	12	18	15
4700													6	12	18	
6800										5	12	18	7.5	13.5	18	
0.010							5	12	18	6	12	18	8.5	14.5	18	
0.015				5	12	18	6	12	18	7.5	13.5	18	6	15	27	22.5
0.022	5	12	18	6	12	18	7.5	13.5	18	8.5	14.5	18	7	16	27	
0.033	6	12	18	7.5	13.5	18	8.5	14.5	18	7	16	27	10	18.5	27	
0.047	7.5	13.5	18	8.5	14.5	18	7	16	27	8.5	17	27	11	20.5	32	
0.068	8.5	14.5	18	6	15	27	8.5	17	27	10	18.5	27	11	20.5	32	27.5
0.1 µF	6	15	27	7	16	27	10	18.5	27	11	20.5	32	13	22	32	
0.15	7	16	27	10	18.5	27	11	20.5	32	13	22	32	18	30	32	
0.22	10	18.5	27	11	20.5	32	13	22	32	18	30	32				
0.33	11	20.5	32	13	22	32	18	30	32							
0.47	13	22	32	15	25	32	18	37	32							
0.68	15	25	32	18	30	32										
1	18	30	32													

All dimension are in mm

* Not suitable for across-the-line applications