

All dimensions are in mm.

METALLIZED POLYESTER FILM CAPACITOR HIGH PERFORMANCES - HIGH TEMPERATURE D.C. AND PULSE APPLICATIONS

STACKED VERSION

Typical applications: blocking, coupling, decoupling for a signal from DC to high frequency; pulse, logic and timing circuit, lamp capacitor for electronic compact lamps, inverter for LCD monitors, automotive DC motor suppression.

PRODUCT CODE: **RSB**

p = 5mm

Pitch (mm)	Box thickness (B) (mm)	Maximum dimensions (mm)		
		B max	H max	L max
5.0	<4.5	B +0.1	H +0.1	L +0.2
5.0	≥4.5	B +0.1	H +0.1	L +0.3

PRODUCT CODE SYSTEM

The part number, comprising 14 digits, is formed as follows:

1	2	3	4	5	6	7	8	9	10	11	12	13	14
R	S	B		C								-	

Digit 1 to 3 Series code.

Digit 4 d.c. rated voltage:

C = 50V D = 63V E = 100V I = 250V

M = 400V W = 500V P = 630V

Digit 5 Pitch: C = 5 mm

Digit 6 to 9 Digits 7 - 8 - 9 indicate the first three digits of Capacitance value and the 6th digit indicates the number of zeros that must be added to obtain the Rated Capacitance in pF.

Digit 10 to 11 Mechanical version and/or packaging (table1)

Digit 12 Identifies the dimensions and electrical characteristics.

Digit 13 Internal use

Digit 14 Capacitance tolerance:
J=5%; K=10%; M=20%.

GENERAL TECHNICAL DATA

Dielectric: polyester film (polyethylene terephthalate).

Plates: aluminium layer deposited by evaporation under vacuum.

Winding: non-inductive type.

Leads: tinned wire.

Protection: plastic case, thermosetting resin filled.

Box material is solvent resistant and flame retardant according to UL94 V0.

Marking: Manufacturer's logo, series (RSB) capacitance, tolerance, D.C. rated voltage.

Climatic category: 55/125/56 IEC 60068-1

Operating temperature range: -55 to +125°C

Related documents: IEC 60384-2

Winding scheme

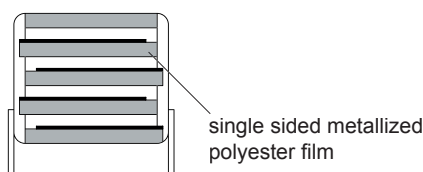


Table 1 (for more detailed information, please refer to page 14).

Standard packaging style	Lead length (mm)	Ordering code (Digit 10 to 11)
AMMO-PACK		DQ
Reel Ø 355 mm		CK
Loose, short leads	4 ^{+1.5}	AA
Loose, long leads	17 ^{+1/-2}	Z3

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Rated Cap.	50Vdc/30Vac Std dimensions				Max dv/dt (V/ μs)	Max K ₀ (V ² /μs)	Part Number
	B	H	L	p			
2.2 μF	6.0	11.0	7.2	5.0	200	20 E3	RSBCC4220--1--

Rated Cap.	63Vdc/40Vac Std dimensions				Max dv/dt (V/ μs)	Max K ₀ (V ² /μs)	Part Number
	B	H	L	p			
0.10 μF	2.5	6.5	7.2	5.0	250	31.5 E3	RSBDC3100--0--
0.15 μF	2.5	6.5	7.2	5.0	250	31.5 E3	RSBDC3150--0--
0.22 μF	2.5	6.5	7.2	5.0	250	31.5 E3	RSBDC3220--1--
0.33 μF	3.5	7.5	7.2	5.0	250	31.5 E3	RSBDC3330--0--
0.47 μF	3.5	7.5	7.2	5.0	250	31.5 E3	RSBDC3470--1--
0.68 μF	4.5	9.5	7.2	5.0	250	31.5 E3	RSBDC3680--1--
1.0 μF	5.0	10.0	7.2	5.0	250	31.5 E3	RSBDC4100--1--
1.5 μF	6.0	11.0	7.2	5.0	250	31.5 E3	RSBDC4150--1--

Rated Cap.	100Vdc/63Vac Std dimensions				Max dv/dt (V/ μs)	Max K ₀ (V ² / μs)	Part Number
	B	H	L	p			
4700 pF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC1470--0--
6800 pF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC1680--0--
0.010 μF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2100--0--
0.015 μF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2150--0--
0.022 μF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2220--0--
0.033 μF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2330--0--
0.047 μF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2470--0--
0.068 μF	2.5	6.5	7.2	5.0	300	60 E3	RSBEC2680--1--
0.10 μF	3.5	7.5	7.2	5.0	300	60 E3	RSBEC3100--0--
0.15 μF	4.5	9.5	7.2	5.0	300	60 E3	RSBEC3150--0--
0.22 μF	5.0	10.0	7.2	5.0	300	60 E3	RSBEC3220--0--
0.33 μF	6.0	11.0	7.2	5.0	300	60 E3	RSBEC3330--0--
0.47 μF	6.0	11.0	7.2	5.0	300	60 E3	RSBEC3470--1--

Mechanical version and packaging (Table1)

Internal use

Tolerance: J (±5%); K (±10%); M (±20%)

Rated Cap.	250Vdc/160Vac Std dimensions				Max dv/dt (V/ μs)	Max K ₀ (V ² / μs)	Part Number
	B	H	L	p			
1000 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1100--0--
1500 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1150--0--
2200 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1220--0--
3300 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1330--0--
4700 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1470--0--
6800 pF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC1680--0--
0.010 μF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC2100--0--
0.015 μF	2.5	6.5	7.2	5.0	400	20 E4	RSBIC2150--0--
0.022 μF	3.5	7.5	7.2	5.0	400	20 E4	RSBIC2220--0--
0.033 μF	3.5	7.5	7.2	5.0	400	20 E4	RSBIC2330--0--
0.047 μF	4.5	9.5	7.2	5.0	400	20 E4	RSBIC2470--0--
0.068 μF	4.5	9.5	7.2	5.0	400	20 E4	RSBIC2680--0--
0.10 μF	5.0	10.0	7.2	5.0	400	20 E4	RSBIC3100--0--
0.15 μF	6.0	11.0	7.2	5.0	400	20 E4	RSBIC3150--0--

Rated Cap.	400Vdc/200Vac Std dimensions				Max dv/dt (V/ μs)	Max K ₀ (V ² / μs)	Part Number
	B	H	L	p			
1000 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1100--0--
1500 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1150--0--
2200 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1220--0--
3300 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1330--0--
4700 pF	2.5	6.5	7.2	5.0	600	48 E4	RSBMC1470--0--
6800 pF	3.5	7.5	7.2	5.0	600	48 E4	RSBMC1680--0--
0.010 μF	3.5	7.5	7.2	5.0	600	48 E4	RSBMC2100--0--
0.015 μF	3.5	7.5	7.2	5.0	600	48 E4	RSBMC2150--0--
0.022 μF	4.5	9.5	7.2	5.0	600	48 E4	RSBMC2220--0--
0.033 μF	5.0	10.0	7.2	5.0	600	48 E4	RSBMC2330--0--
0.047 μF	6.0	11.0	7.2	5.0	600	48 E4	RSBMC2470--0--

Rated Cap.	500Vdc/220Vac* Std dimensions				Max dv/dt (V/ μs)	Max K ₀ (V ² / μs)	Part Number
	B	H	L	p			
1000 pF	2.5	6.5	7.2	5.0	700	70 E4	RSBWC1100--0--
1500 pF	2.5	6.5	7.2	5.0	700	70 E4	RSBWC1150--0--
2200 pF	3.5	7.5	7.2	5.0	700	70 E4	RSBWC1220--0--
3300 pF	3.5	7.5	7.2	5.0	700	70 E4	RSBWC1330--0--
4700 pF	3.5	7.5	7.2	5.0	700	70 E4	RSBWC1470--0--
6800 pF	4.5	9.5	7.2	5.0	700	70 E4	RSBWC1680--0--
0.010 μF	5.0	10.0	7.2	5.0	700	70 E4	RSBWC2100--0--
0.015 μF	6.0	11.0	7.2	5.0	700	70 E4	RSBWC2150--0--

Rated Cap.	630Vdc/220Vac* Std dimensions				Max dv/dt (V/ μs)	Max K ₀ (V ² / μs)	Part Number
	B	H	L	p			
1000 pF	2.5	6.5	7.2	5.0	800	100 E4	RSBPC1100--0--
1500 pF	3.5	7.5	7.2	5.0	800	100 E4	RSBPC1150--0--
2200 pF	3.5	7.5	7.2	5.0	800	100 E4	RSBPC1220--0--
3300 pF	4.5	9.5	7.2	5.0	800	100 E4	RSBPC1330--0--
4700 pF	4.5	9.5	7.2	5.0	800	100 E4	RSBPC1470--0--
6800 pF	5.0	10.0	7.2	5.0	800	100 E4	RSBPC1680--0--
0.010 μF	6.0	11.0	7.2	5.0	800	100 E4	RSBPC2100--0--

Mechanical version and packaging (Table1)

Internal use

Tolerance: J (±5%); K (±10%); M (±20%)

All dimensions are in mm.

Note 1: If the working voltage (V) is lower than the rated voltage (V_R), the capacitor may work at higher dv/dt. In this case the maximum value allowed is obtained multiplying the above value (see table dv/dt) with the ratio V_R/V.

The pulse characteristic K₀ depends on the voltage wave-form and in any case it cannot overcome the value given in the above table.

Note 2: The rated voltages from 250Vdc to 630Vdc are for pulse applications (i.e.: lamp capacitors).

*Not suitable for across-the-line applications. Please refer to Interference Suppression Capacitors (page 167).

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p = 5 mm

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ELECTRICAL CHARACTERISTICS
Rated voltage (V_R):

50 Vdc	63 Vdc	100 Vdc
250 Vdc	400 Vdc	500 Vdc
630 Vdc		

Rated temperature (T_R): +85°C

Temperature derated voltage:

for temperatures between +85°C and +125°C a decreasing factor of 1.25% per degree °C on the rated voltage V_R (d.c. and a.c.) has to be applied.

Capacitance range: 1000pF to 2.2μF

Capacitance values: E6 series (IEC 60063 Norm).

Capacitance tolerances (measured at 1 kHz):

±5% (J); ±10% (K); ±20% (M).

Total self-inductance (L): ≈7nH

max 1 nH per 1 mm lead and capacitor length.

Dissipation factor (DF):

tgδ 10⁻⁴ at +25°C ±5°C

kHz	C ≤ 0.1μF	C > 0.1μF
1	≤ 80	≤ 80
10	≤ 120	≤ 120
100	≤ 250	

Insulation resistance:
Test conditions

Temperature: +25°C±5°C

Voltage charge time: 1 min

Voltage charge:

50 Vdc for $V_R < 100$ Vdc
100 Vdc for $V_R ≥ 100$ Vdc

Performance

For $V_R ≤ 100$ Vdc

≥ 15000 MΩ for C ≤ 0.33μF

≥ 5000 s for C > 0.33μF and ≤ 1μF

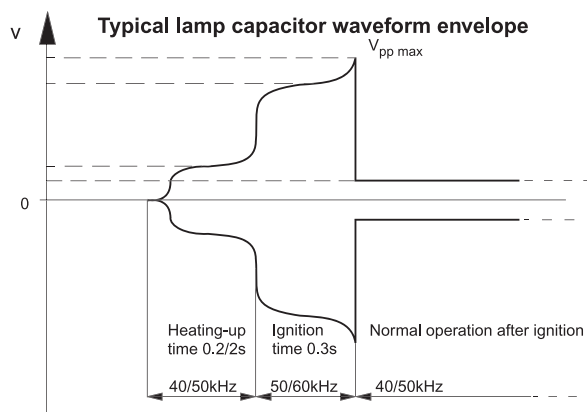
≥ 1000 s for C > 1μF

For $V_R > 100$ Vdc

≥ 30000 MΩ

Test voltage between terminations:

1.6x V_R applied for 2 s at +25°C±5°C.

Electrical characteristics for use as lamp capacitors in lighting applications.

TEST METHOD AND PERFORMANCE
Damp heat, steady state:
Test conditions

Temperature: +40°C±2°C

Relative humidity (RH): 93% ±2%

Test duration: 56 days

Performance

Capacitance change $|\Delta C/C|$: ≤ 5%

DF change ($\Delta \text{tg}\delta$): ≤ 50x10⁻⁴ at 1kHz

Insulation resistance: ≥ 50% of initial limit.

Endurance:
Test conditions

Temperature: +125°C ±2°C

Test duration: 2000 h

Voltage applied: 1.25x V_C

Performance

Capacitance change $|\Delta C/C|$: ≤ 5%

DF change ($\Delta \text{tg}\delta$): ≤ 30x10⁻⁴ at 10kHz for C ≤ 1μF
≤ 20x10⁻⁴ at 1kHz for C > 1μF

Insulation resistance: ≥ 50% of initial limit.

Resistance to soldering heat:
Test conditions

Solder bath temperature: +260°C±5°C

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

Performance

Capacitance change $|\Delta C/C|$: ≤ 2%

DF change ($\Delta \text{tg}\delta$): ≤ 30x10⁻⁴ at 10kHz for C ≤ 1μF
≤ 20x10⁻⁴ at 1kHz for C > 1μF

Insulation resistance: ≥ initial limit.

Long term stability (after two years):

Storage: standard environmental conditions (see page 12).

Performance

Capacitance change $|\Delta C/C|$: ≤ 3% for C ≤ 0.1μF

≤ 2% for C > 0.1μF

RELIABILITY:

Reference MIL HDB 217

Application conditions:

Temperature: +40°C ±2°C

Voltage: 0.5x V_R

Failure rate: ≤ 1 FIT

(1 FIT = 1x10⁻⁹ failures/components x h)

Failure criteria:

(according to DIN 44122)

Short or open circuit

Capacitance change $|\Delta C/C|$: > 10%

DF change ($\Delta \text{tg}\delta$): > 2 x initial limit.

Insulation resistance: < 0.005 x initial limit.

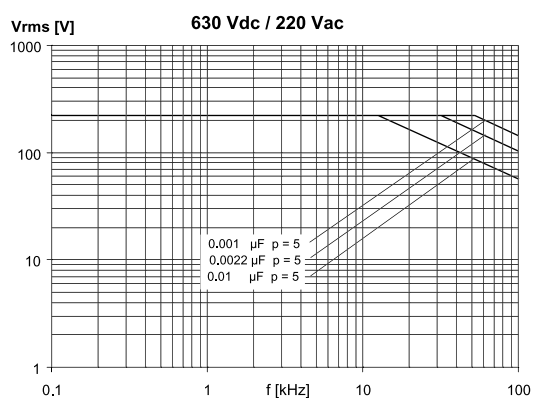
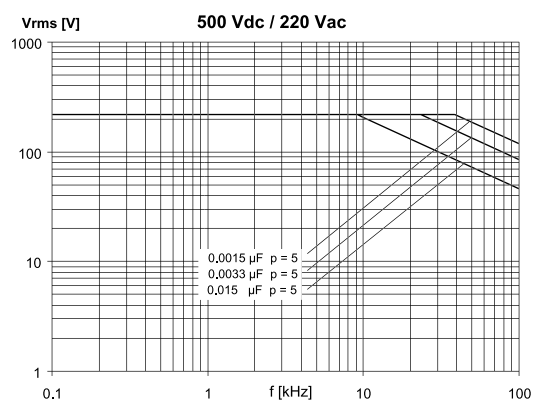
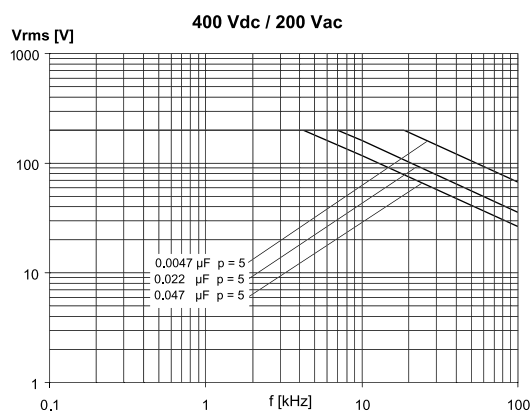
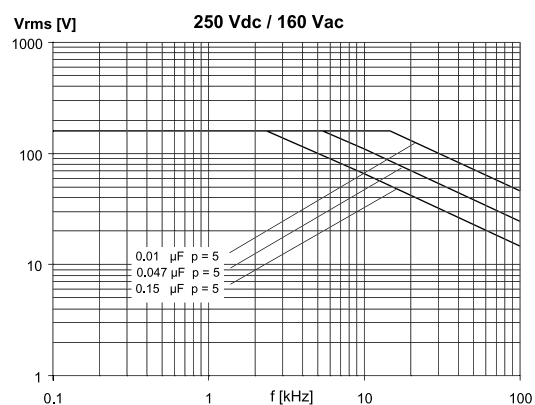
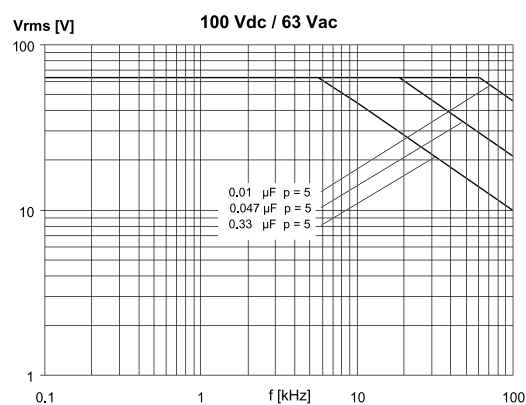
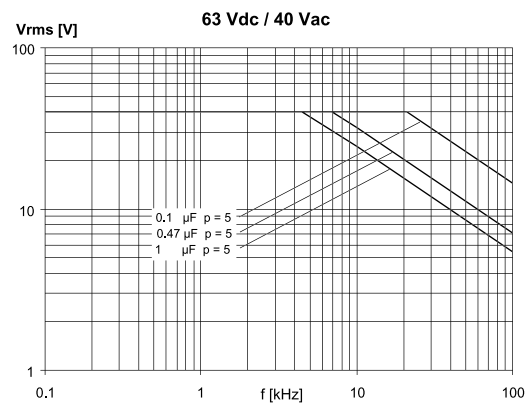
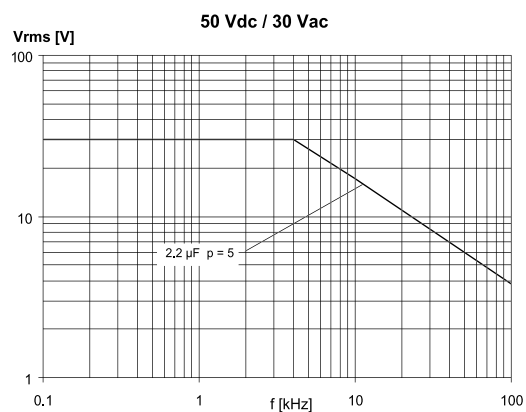
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p = 5 mm

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MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / $T_h \leq 85^\circ\text{C}$)



Note: p (pitch) in mm.

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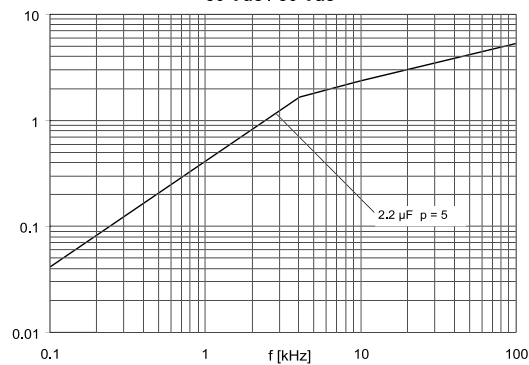
STACKED VERSION

p = 5 mm

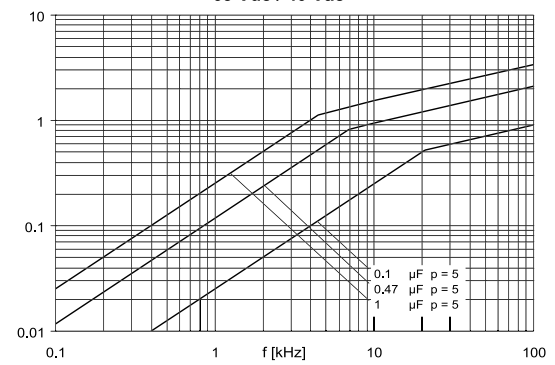
PRODUCT CODE: **RSB**

MAX. CURRENT ($I_{r.m.s.}$) VERSUS FREQUENCY (sinusoidal wave-form / $T_h \leq 85^\circ\text{C}$)

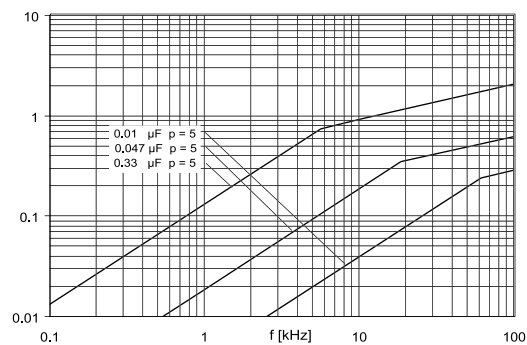
50 Vdc / 30 Vac



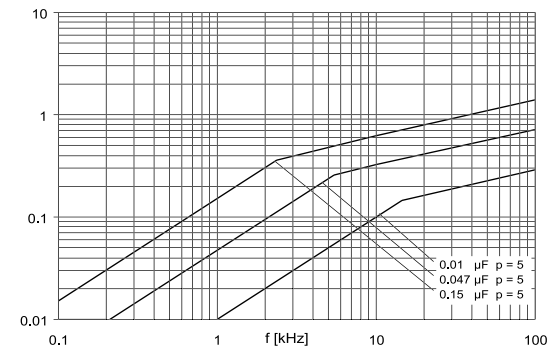
63 Vdc / 40 Vac



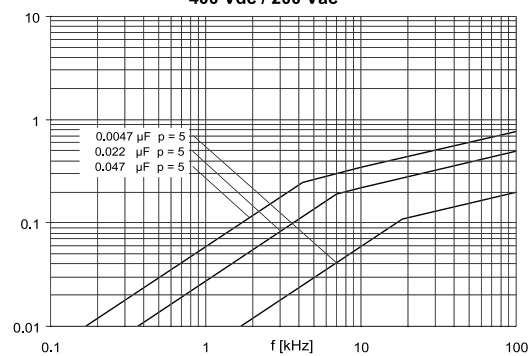
100 Vdc / 63 Vac



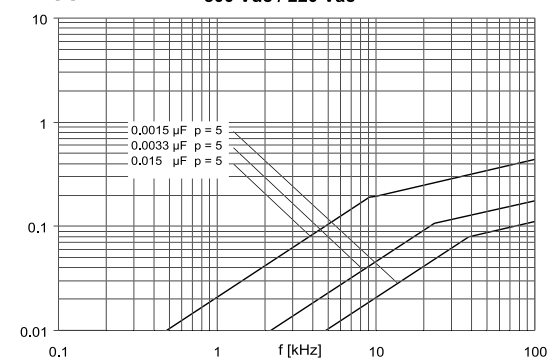
250 Vdc / 160 Vac



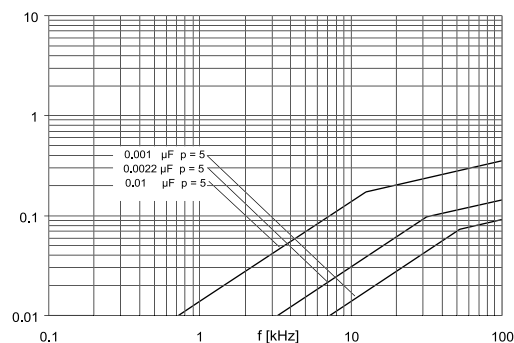
400 Vdc / 200 Vac



500 Vdc / 220 Vac



630 Vdc / 220 Vac



Note: p (pitch) in mm.