

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 (table 1)
- Digit 12 Identifies the dimensions and electrical characteristics.
- Digit 13 Internal use
- Digit 14 Capacitance tolerance:  
J=5%; K=10%; M=20%.

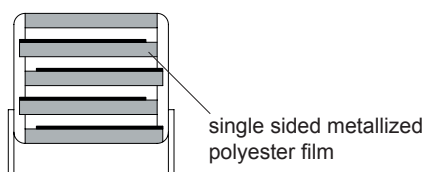
Table 1 (for more detailed information, please refer to page 14).

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

**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.
- Marking:** 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**



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Rated Cap.	50Vdc/30Vac Std dimensions				Max dv/dt (V/μs)	Max K <sub>0</sub> (V <sup>2</sup> /μs)	Part Number
	B	H	L	p			
2.2μF	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 <sub>0</sub> (V <sup>2</sup> /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 <sub>0</sub> (V <sup>2</sup> /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--

Rated Cap.	250Vdc/160Vac Std dimensions				Max dv/dt (V/μs)	Max K <sub>0</sub> (V <sup>2</sup> /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--

Mechanical version and packaging (Table1) \_\_\_\_\_  
Internal use \_\_\_\_\_  
Tolerance: J (±5%); K (±10%); M (±20%) \_\_\_\_\_

Rated Cap.	400Vdc/200Vac Std dimensions				Max dv/dt (V/μs)	Max K <sub>0</sub> (V <sup>2</sup> /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 <sub>0</sub> (V <sup>2</sup> /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 <sub>0</sub> (V <sup>2</sup> /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<sub>R</sub>), 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<sub>R</sub>/V.

The pulse characteristic K<sub>0</sub> 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 145).

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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<sup>-4</sup> 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

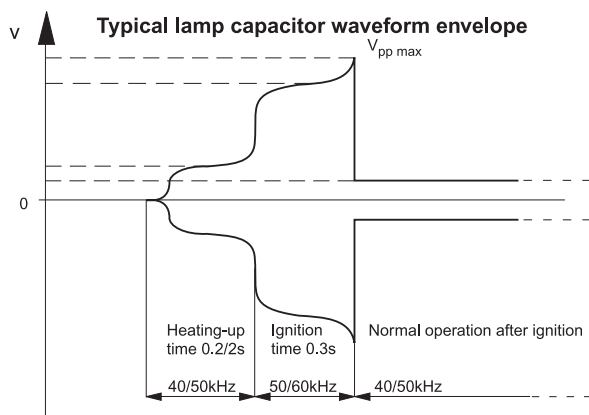
For  $V_R > 100$  Vdc

≥ 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 ( $\Delta tg\delta$ ): ≤ 50x10<sup>-4</sup> 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 ( $\Delta tg\delta$ ): ≤ 30x10<sup>-4</sup> at 10kHz for C ≤ 1µF  
≤ 20x10<sup>-4</sup> 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 ( $\Delta tg\delta$ ): ≤ 30x10<sup>-4</sup> at 10kHz for C ≤ 1µF  
≤ 20x10<sup>-4</sup> 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<sup>-9</sup> failures/components x h)

**Failure criteria:**

(according to DIN 44122)

Short or open circuit

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

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

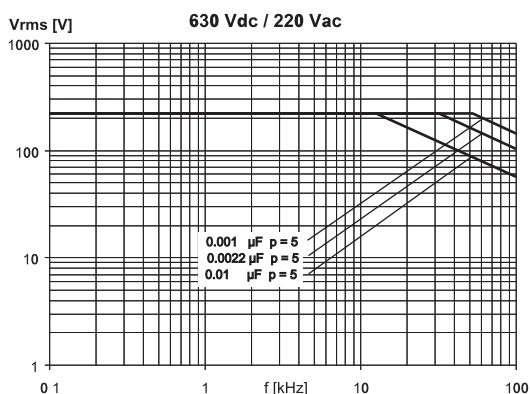
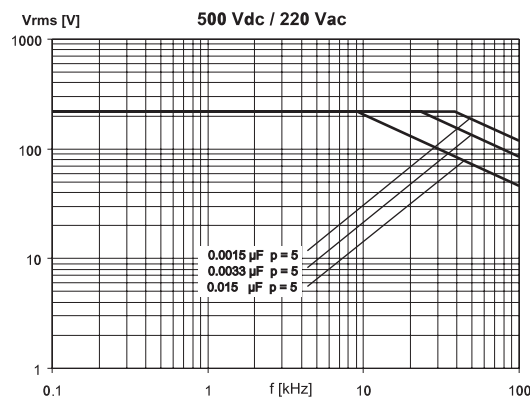
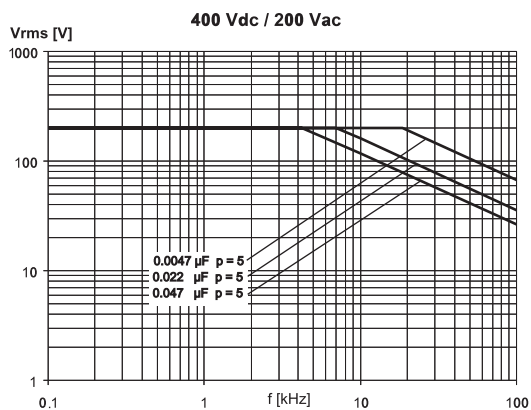
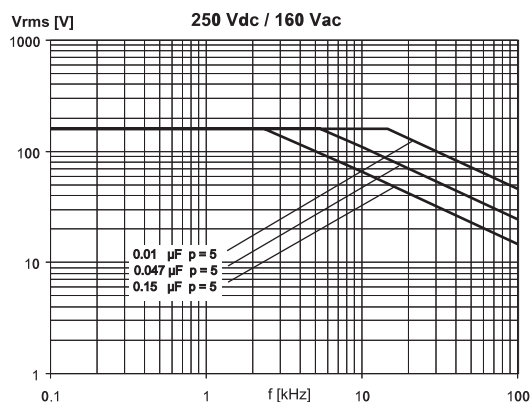
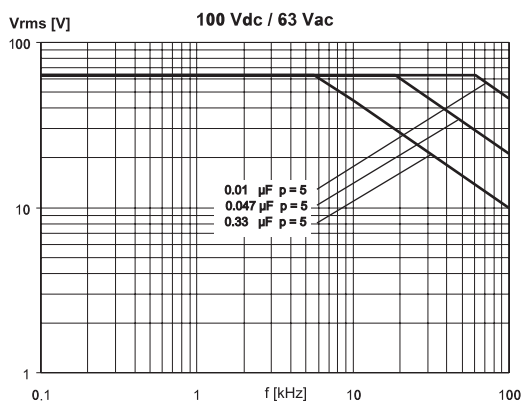
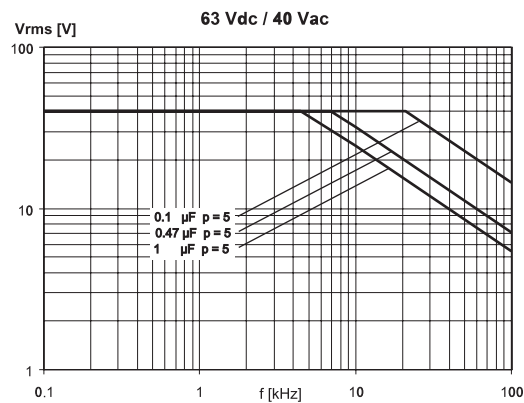
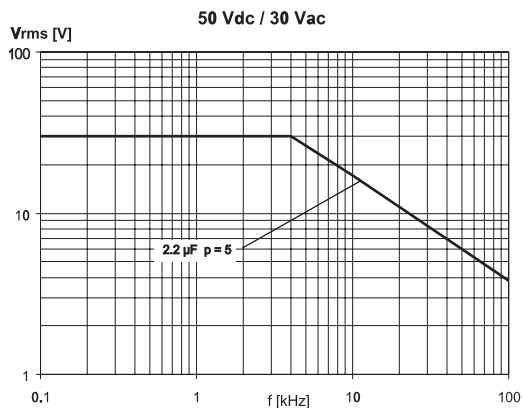
Insulation resistance: < 0.005 x initial limit.

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**MAX. VOLTAGE (Vr.m.s.) VERSUS FREQUENCY (sinusoidal wave-form / Th ≤ 85°C)**



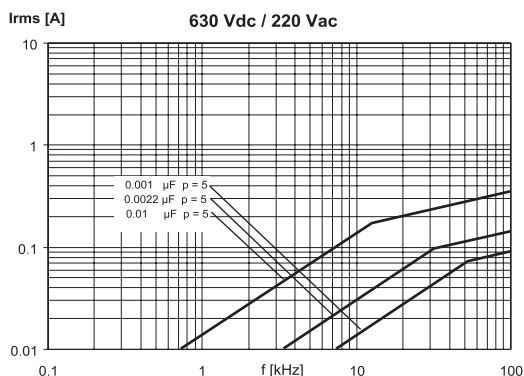
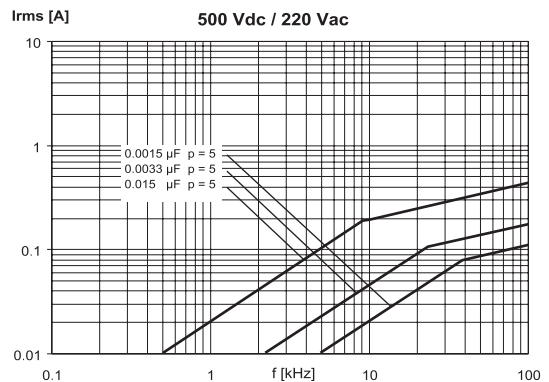
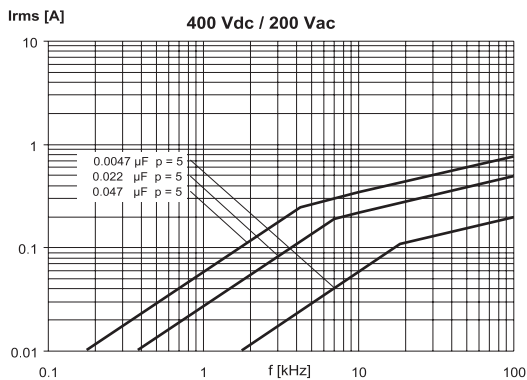
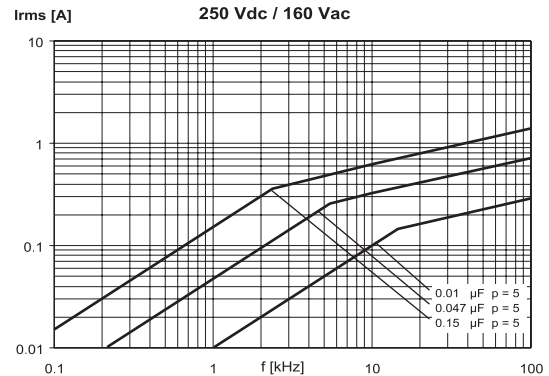
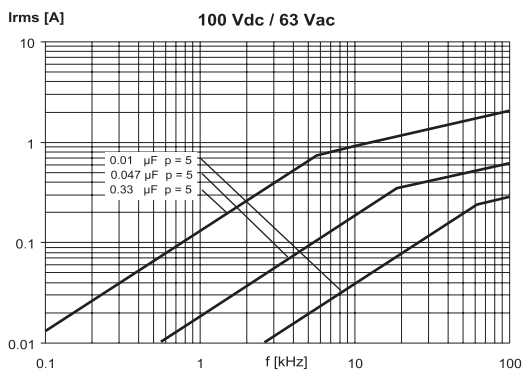
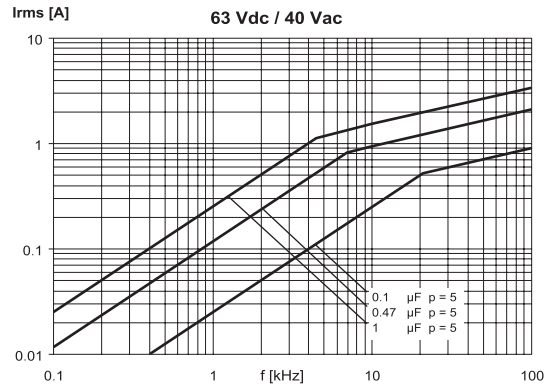
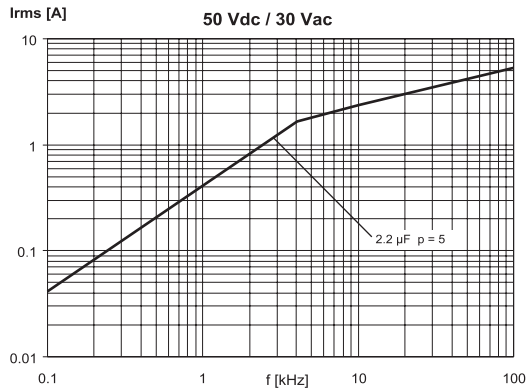
Note: p (pitch) in mm.

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**MAX. CURRENT (I<sub>r.m.s.</sub>) VERSUS FREQUENCY (sinusoidal wave-form / T<sub>h</sub> ≤ 85°C)**



Note: p (pitch) in mm.

Statements of suitability for certain applications are based on our knowledge of typical operating conditions for such applications, but are not intended to constitute – and we specifically disclaim – any warranty concerning suitability for a specific customer application or use. This Information is intended for use only by customers who have the requisite experience and capability to determine the correct products for their application. Any technical advice inferred from this Information or otherwise provided by us with reference to the use of our products is given gratis, and we assume no obligation or liability for the advice given or results obtained.