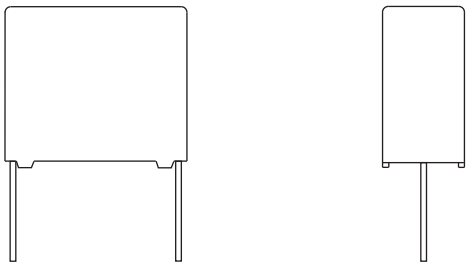
AC and Pulse Metallized Polypropylene Film Capacitors
MKP/MKP Radial Potted Type



FEATURES

- 15 mm to 27.5 mm pitch
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

APPLICATIONS

- Where steep pulses occur e.g. SMPS (switch mode power supplies)
- Motor control circuits

Pb-free
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

QUICK REFERENCE DATA	
Capacitance range (E24 series)	0.002 µF to 0.68 µF
Capacitance tolerance	± 5 %
Climatic testing class according to IEC 60068-1	55/085/56
Rated DC temperature	85 °C
Rated AC temperature	70 °C
Maximum application temperature	85 °C
Reference specifications	IEC 60384-17
Dielectric	Polypropylene film
Electrodes	Metallized film
Construction	Internal serial construction
Encapsulation	Flame retardant plastic case and epoxy resin (UL-class 94 V-0)
Leads	Tinned wire
Marking	C-value; tolerance; rated voltage; manufacturer's type designation; code for dielectric material; manufacturer's emblem; code for factory of origin; year and week of manufacture
Rated DC voltage	630 V_{DC}; 1000 V_{DC}; 1600 V_{DC}; 2000 V_{DC}
Rated AC voltage	300 V_{AC}; 400 V_{AC}; 500 V_{AC}; 600 V_{AC}
Rated peak-to-peak voltage	850 V; 1130 V; 1400 V; 1700 V
Performance grade	Grade 1 (long life)
Stability grade	Pitch 15 mm: grade 2 Pitch 22.5 mm and 27.5 mm: grade 1

Note

- For more detailed data and test requirements contact: dc-film@vishay.com

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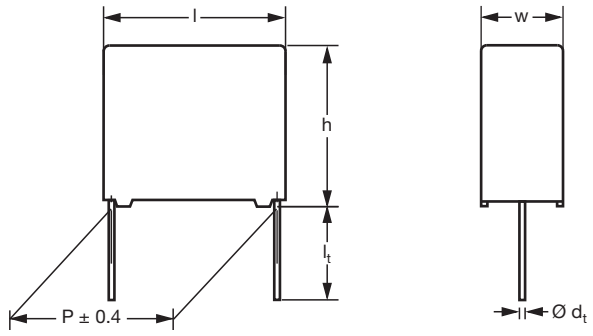
DIMENSIONS in millimeters



COMPOSITION OF CATALOG NUMBER

TYPE AND PITCHES	
378	15.0 mm
	22.5 mm
	27.5 mm

MULTIPLIER (nF)	
0.1	2
1	3
10	4

CAPACITANCE (numerically)

Example:
104 = 10 x 10 = 100 nF

BFC2	378	XX	XX	X
2222*	378	XX	XX	X

* Old ordering code

TYPE	PACKAGING	LEAD CONFIGURATION	PREFERRED TYPES				
			C-TOL.	630 V	1000 V	1600 V	2000 V
380	Loose in box	Lead length 3.5 mm ± 0.3 mm	± 5 %	64	74	84	94
TYPE	**PACKAGING**	**LEAD CONFIGURATION**	**ON REQUEST**				
378	Loose in box	Lead length 5.0 mm ± 1.0 mm	± 5 %	62	72	82	92
	Taped on reel	H = 18.5 mm; P_0 = 12.7 mm		65	75	85	95

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SPECIFIC REFERENCE DATA - 630 V_{DC}

DESCRIPTION	VALUE	
Tangent of loss angle:	at 10 kHz	at 100 kHz
C ≤ 0.18 µF	≤ 10 x 10^{-4}	≤ 35 x 10^{-4}
0.2 µF ≤ C ≤ 0.3 µF	≤ 10 x 10^{-4}	≤ 45 x 10^{-4}
0.33 µF ≤ C ≤ 0.39 µF	≤ 10 x 10^{-4}	≤ 55 x 10^{-4}
0.43 µF ≤ C ≤ 0.51 µF	≤ 10 x 10^{-4}	≤ 65 x 10^{-4}
C > 0.51 µF	≤ 10 x 10^{-4}	≤ 75 x 10^{-4}
Rated voltage pulse slope $(dU/dt)_R$:		
P = 15 mm	500 V/µs	
P = 22.5 mm	370 V/µs	
P = 27.5 mm	230 V/µs (b < 15 mm)	
P = 27.5 mm	120 V/µs (b ≥ 15 mm)	
R between leads, for C ≤ 1 µF; 500 V; 1 min	> 100 000 MΩ	
R between leads and case; 500 V; 1 min	> 100 000 MΩ	
Ionization (AC) voltage (typical value) at 50 pC peak discharge	> 400 V	
Withstanding (DC) voltage (cut off current 10 mA) (1); rise time ≤ 1000 V/s	1008 V; 1 min	
Withstanding (DC) voltage between leads and case	2840 V; 1 min	

Note

(1) See “Voltage Proof Test for Metalized Film Capacitors” www.vishay.com/doc?28169

ELECTRICAL DATA AND ORDERING CODE

U_{RDC} (V)	CAP. (µF)	DIMENSIONS w x h x l (mm)	MASS (2) (g)	CATALOG NUMBER BFC2 378 ..... AND PACKAGING		
				LOOSE IN BOX		REEL (1)
				l_t = 3.5 mm ± 0.3 mm	ALL LEADS	H = 18.5 mm; P_0 = 12.7 mm
				C-TOL. = ± 5 %		
				LAST 5 DIGITS OF CATALOG NUMBER	SPQ	SPQ
630	PITCH = 15.0 mm ± 0.4 mm; d_t = 0.60 ± 0.06 mm; U_{RAC} = 300 V; U_{p-p} = 850 V					
	0.015	5.0 x 11.0 x 17.5	1.0	64153	1000	1100
	0.016			64163		
	0.018			64183		
	0.020			64203		
	0.022			64223		
	0.024		1.4	64243	1000	900
	0.027			64273		
	0.030			64303		
	0.033			64333		
	PITCH = 15.0 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 300 V; U_{p-p} = 850 V					
	0.036	6.0 x 12.0 x 17.5	1.8	64363	1000	800
	0.039			64393		
	0.043			64433		
	0.047		2.4	64473	1000	650
	0.051	7.0 x 13.0 x 17.5	2.4	64513		
	PITCH = 22.5 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 300 V; U_{p-p} = 850 V					
	0.056	6.0 x 15.5 x 26.0	2.4	64563	300	600
	0.062			64623		
	0.068		2.9	64683	200	550
	0.075			64753		
	0.082			64823		
	0.091			64913		
	0.10		3.8	64104	200	450
	0.11	7.0 x 16.5 x 26.0	3.8	64114	200	450
	0.12			64124		
	0.13			64134		
	0.15	8.5 x 18.0 x 26.0	6.8	64154	200	350
	0.16			64164		
	0.18			64184		

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ELECTRICAL DATA AND ORDERING CODE

U_{RDC} (V)	CAP. (µF)	DIMENSIONS w x h x l (mm)	MASS [2] (g)	CATALOG NUMBER BFC2 378 ..... AND PACKAGING		
				LOOSE IN BOX		REEL [1]
				l_t = 3.5 mm ± 0.3 mm	ALL LEADS	H = 18.5 mm; P_0 = 12.7 mm
				C-TOL. = ± 5 %		
				LAST 5 DIGITS OF CATALOG NUMBER	SPQ	SPQ
	PITCH = 27.5 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 300 V; U_{p-p} = 850 V					
630	0.20	9.0 x 19.0 x 31.5	7.4	64204	100	
	0.22			64224		
	0.24			64244		
	0.27			64274		
	0.30	11.0 x 21.0 x 31.0	9.2	64304	100	
	0.33			64334		
	0.36			64364		
	0.39			64394		
	0.43	13.0 x 23.0 x 31.0	12.3	64434	100	
	0.47			64474		
	0.51			64514		
	0.56	15.0 x 25.0 x 31.5	16.1	64564	100	
	0.62			64624		
	0.68			64684		

Notes

[1] H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to packaging information

[2] Weight for short lead product only

- SPQ = Standard Packing Quantity

SPECIFIC REFERENCE DATA - 1000 V_{DC}

DESCRIPTION	VALUE	
Tangent of loss angle:	at 10 kHz	at 100 kHz
C ≤ 0.051 µF	≤ 10 x 10^{-4}	≤ 20 x 10^{-4}
0.056 µF ≤ C ≤ 0.22 µF	≤ 10 x 10^{-4}	≤ 25 x 10^{-4}
Rated voltage pulse slope $(dU/dt)_R$:		
P = 15 mm	1300 V/µs	
P = 22.5 mm	1200 V/µs	
P = 27.5 mm	600 V/µs (b < 15 mm)	
P = 27.5 mm	300 V/µs (b ≥ 15 mm)	
R between leads, for C ≤ 1 µF; 500 V; 1 min	> 100 000 MΩ	
R between leads and case; 500 V; 1 min	> 100 000 MΩ	
Ionization (AC) voltage (typical value) at 50 pC peak discharge	> 500 V	
Withstanding (DC) voltage (cut off current 10 mA) [1]; rise time ≤ 1000 V/s	1600 V; 1 min	
Withstanding (DC) voltage between leads and case	2840 V; 1 min	

Note

[1] See “Voltage Proof Test for Metalized Film Capacitors” www.vishay.com/doc?28169

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ELECTRICAL DATA AND ORDERING CODE

U_{RDC} (V)	CAP. (µF)	DIMENSIONS w x h x l (mm)	MASS [2] (g)	CATALOG NUMBER BFC2 378 ..... AND PACKAGING		
				LOOSE IN BOX		REEL [1]
				l_t = 3.5 mm ± 0.3 mm	ALL LEADS	H = 18.5 mm; P_0 = 12.7 mm
				C-TOL. = ± 5 %		
				LAST 5 DIGITS OF CATALOG NUMBER	SPQ	SPQ
1000	PITCH = 15.0 mm ± 0.4 mm; d_t = 0.60 ± 0.06 mm; U_{RAC} = 300 V; U_{p-p} = 1130 V					
	0.0030	5.0 x 11.0 x 17.5	1.0	74302	1000	1100
	0.0033			74332		
	0.0036			74362		
	0.0039			74392		
	0.0043			74432		
	0.0047			74472		
	0.0051			74512		
	0.0056			74562		
	0.0062			74622		
	0.0068			74682		
	0.0075			74752		
	0.0082		1.4	74822	1000	900
	0.0091			74912		
	0.010	6.0 x 12.0 x 17.5		74103		
	0.011			74113		
	PITCH = 22.5 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 300 V; U_{p-p} = 1130 V					
	0.012	6.0 x 15.5 x 26.0	2.4	74123	300	600
	0.013			74133		
	0.015			74153		
	0.016			74163		
	0.018			74183		
	0.020		2.9	74203	200	550
	0.022			74223		
	0.024			74243		
	0.027		3.8	74273	200	450
	0.030			74303		
	0.033	7.0 x 16.5 x 26.0		74333		
	0.036			74363		
	0.039		6.8	74393	200	350
	0.043			74433		
	0.047	8.5 x 18.0 x 26.0		74473		
	0.051			74513		
	PITCH = 27.5 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 300 V; U_{p-p} = 1130 V					
	0.056	9.0 x 19.0 x 31.5	7.4	74563	100	
	0.062			74623		
	0.068			74683		
	0.075			74753		
	0.082	11.0 x 21.0 x 31.5		74823		
	0.091		9.2	74913	100	
	0.10			74104		
	0.11			74114		
	0.12	13.0 x 23.0 x 31.0	12.3	74124	100	
	0.13			74134		
	0.15			74154		
	0.16		16.1	74164	100	
	0.18	15.0 x 25.0 x 31.5		74184		
	0.20			74204		
	0.22	18.0 x 28.0 x 31.5		74224		

Notes

[1] H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to packaging information

[2] Weight for short lead product only

- SPQ = Standard Packing Quantity

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SPECIFIC REFERENCE DATA - 1600 V_{DC}

DESCRIPTION	VALUE	
Tangent of loss angle:	at 10 kHz	at 100 kHz
C ≤ 0.022 µF	≤ 10 x 10^{-4}	≤ 15 x 10^{-4}
0.024 µF ≤ C ≤ 0.1 µF	≤ 10 x 10^{-4}	≤ 20 x 10^{-4}
Rated voltage pulse slope $(dU/dt)_R$:		
P = 22.5 mm	1600 V/µs	
P = 27.5 mm	900 V/µs (b < 15 mm)	
P = 27.5 mm	450 V/µs (b ≥ 15 mm)	
R between leads, for C ≤ 1 µF; 500 V; 1 min	> 100 000 MΩ	
R between leads and case; 500 V; 1 min	> 100 000 MΩ	
Ionization (AC) voltage (typical value) at 20 pC peak discharge	> 600 V	
Withstanding (DC) voltage (cut off current 10 mA) (1); rise time ≤ 1000 V/s	2560 V; 1 min	
Withstanding (DC) voltage between leads and case	2840 V; 1 min	

Note

(1) See "Voltage Proof Test for Metalized Film Capacitors" www.vishay.com/doc?28169

ELECTRICAL DATA AND ORDERING CODE

U_{RDC} (V)	CAP. (µF)	DIMENSIONS w x h x l (mm)	MASS (2) (g)	CATALOG NUMBER BFC2 378 ..... AND PACKAGING		
				LOOSE IN BOX		REEL (1)
				l_t = 3.5 mm ± 0.3 mm	ALL LEADS	H = 18.5 mm; P_0 = 12.7 mm
				C-TOL. = ± 5 %		
				LAST 5 DIGITS OF CATALOG NUMBER	SPQ	SPQ
1600	PITCH = 22.5 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 500 V; U_{p-p} = 1400 V					
	0.0056	6.0 x 15.5 x 26.0	2.4	84562	300	600
	0.0062			84622		
	0.0068			84682		
	0.0075		2.9	84752	200	550
	0.0082			84822		
	0.0091			84912		
	0.010			84103		
	0.011		3.8	84113	200	450
	0.012			84123		
	0.013			84133		
	0.015			84153		
	0.016			84163		
	0.018		6.8	84183	200	350
	0.020			84203		
	0.022			84223		
	PITCH = 27.5 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 500 V; U_{p-p} = 1400 V					
	0.024	9.0 x 19.0 x 31.5	7.4	84243	100	
	0.027			84273		
	0.030			84303		
	0.033			84333		
	0.036			84363		
	0.039		9.2	84393	100	
	0.043			84433		
	0.047	11.0 x 21.0 x 31.0		84473		
	0.051			84513		
	0.056		12.3	84563	100	
	0.062			84623		
	0.068			84683		
	0.075	13.0 x 23.0 x 31.0	16.1	84753	100	
	0.082			84823		
	0.091			84913		
	0.10	15.0 x 25.0 x 31.5		84104		

Notes

(1) H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to packaging information

(2) Weight for short lead product only

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SPECIFIC REFERENCE DATA - 2000 V_{DC}

DESCRIPTION	VALUE	
Tangent of loss angle: C ≤ 0.051 µF	at 10 kHz ≤ 10 x 10^{-4}	at 100 kHz ≤ 15 x 10^{-4}
Rated voltage pulse slope $(dU/dt)_R$: P = 22.5 mm P = 27.5 mm P = 27.5 mm	2000 V/µs 1200 V/µs (b < 15 mm) 600 V/µs (b ≥ 15 mm)	
R between leads, for C ≤ 1 µF; 500 V; 1 min	> 100 000 MΩ	
R between leads and case; 500 V; 1 min	> 100 000 MΩ	
Ionization (AC) voltage (typical value) at 20 pC peak discharge	> 600 V	
Withstanding (DC) voltage (cut off current 10 mA) (1); rise time ≤ 1000 V/s	3200 V; 1 min	
Withstanding (DC) voltage between leads and case	2840 V; 1 min	

Note

(1) See "Voltage Proof Test for Metalized Film Capacitors" www.vishay.com/doc?28169

ELECTRICAL DATA AND ORDERING CODE

U_{RDC} (V)	CAP. (µF)	DIMENSIONS w x h x l (mm)	MASS (2) (g)	CATALOG NUMBER BFC2 378 ..... AND PACKAGING		
				LOOSE IN BOX		REEL (1)
				l_t = 3.5 mm ± 0.3 mm	ALL LEADS	H = 18.5 mm; P_0 = 12.7 mm
				C-TOL. = ± 5 %		
				LAST 5 DIGITS OF CATALOG NUMBER	SPQ	SPQ
2000	PITCH = 22.5 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 600 V; U_{p-p} = 1700 V					
	0.0033 0.0036	6.0 x 12.0 x 26.0	2.4	94332 94362	300	600
	0.0039 0.0043 0.0047 0.0051		2.9	94392 94432 94472 94512	200	550
	0.0056		3.8	94562	200	450
	0.0062 0.0068 0.0075	7.0 x 16.5 x 26.0		94622 94682 94752		
	0.0082	8.5 x 18.0 x 26.0		94822		
	0.0091 0.010 0.011		6.8	94912 94103 94113	200	350
	0.012	10.0 x 19.5 x 26.0		94123		
	PITCH = 27.5 mm ± 0.4 mm; d_t = 0.80 ± 0.08 mm; U_{RAC} = 600 V; U_{p-p} = 1700 V					
	0.013 0.015 0.016	9.0 x 19.0 x 31.5	7.4	94133 94153 94163	100	
	0.018 0.020	11.0 x 21.0 x 31.0		94183 94203		
	0.022 0.024		9.2	94223 94243	100	
	0.027	13.0 x 23.0 x 31.0		94273		
	0.030 0.033 0.036		12.3	94303 94333 94363	100	
	0.039 0.043 0.047	15.0 x 25.0 x 31.5	16.1	94393 94433 94473	100	
	0.051	18.0 x 28.0 x 31.5		94513		

Notes

(1) H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to packaging information

(2) Weight for short lead product only

- SPQ = Standard Packing Quantity

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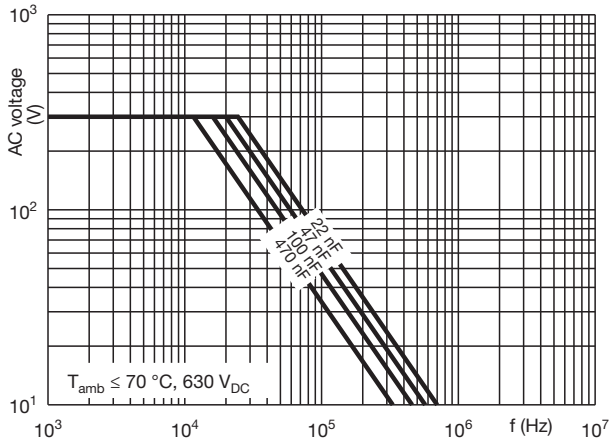
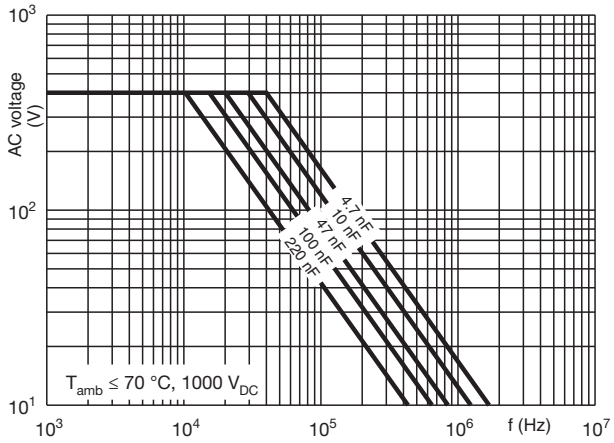
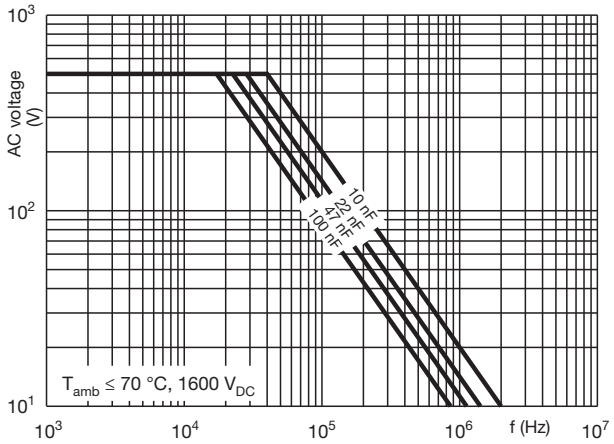
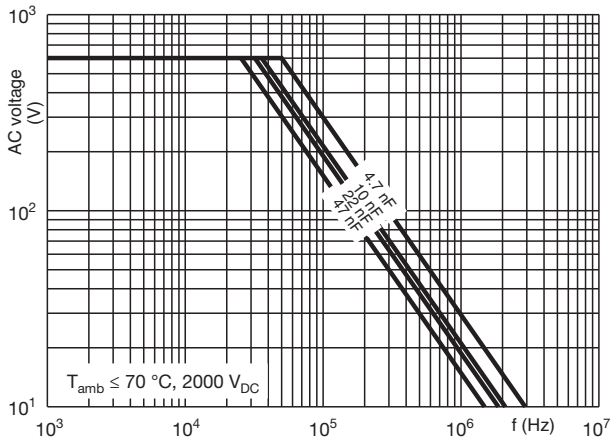
MAXIMUM RMS VOLTAGE (SINEWAVE) AS A FUNCTION OF FREQUENCY

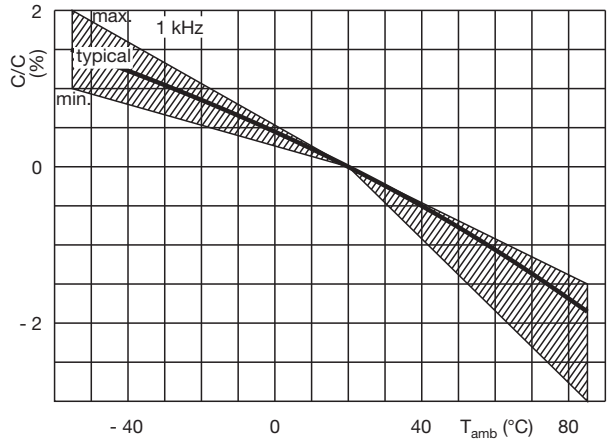




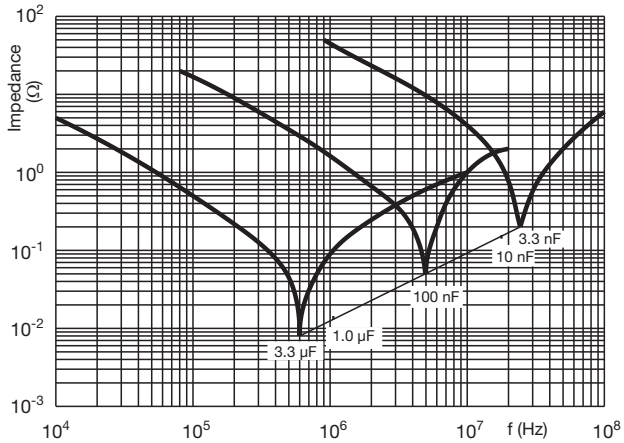




CAPACITANCE



IMPEDANCE



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