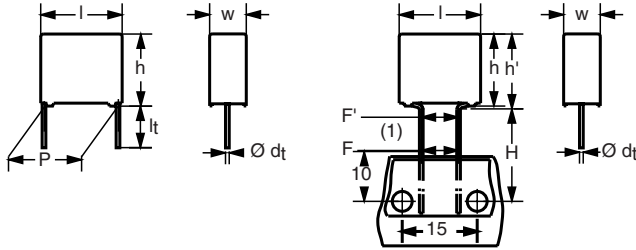


## Interference Suppression Film Capacitors MKP Radial Potted Type



Dimensions in mm

(1)  $|F - F'| < 0.3 \text{ mm}$   
 $F = 7.5 + 0.6 / -0.1 \text{ mm}$

### APPLICATIONS

X1 class

For X1 electromagnetic interference suppression in across the line applications (50/60 Hz) with a maximum mains voltage of 440 Vac.

These capacitors are not intended for continuous pulse applications. For these situations, capacitors of the AC and Pulse program must be used.

### REFERENCE STANDARDS

“IEC 60384-14 2<sup>nd</sup> edition and EN 132400” “IEC 60065, pass. flamm. class B”  
 250 V: UL1414  
 440 V: UL1283; ENEC

### MARKING

C-value; tolerance; rated voltage; sub-class; manufacturer's type designation; code for dielectric material; manufacturer location; manufacturer's emblem; year and week

### DIELECTRIC

Polypropylene film

### ELECTRODES

Metallized film

### CONSTRUCTION

Mono construction

### RATED VOLTAGE

AC 440 V; 50 to 60 Hz

### FEATURES

15 to 27.5 mm lead pitch and 15 mm bent back too 7.5 mm. Supplied loose in box, taped on ammpack or reel lead (Pb)-free product

RoHS-compliant product

### PERMISSIBLE DC VOLTAGE

DC 1000 V

### ENCAPSULATION

Plastic case, epoxy resin sealed, flame retardant UL-class 94 V-0

### CLIMATIC TESTING CLASS ACC. TO EN 60068-1

55/105/56/B

### CAPACITANCE RANGE (E12 SERIES)

E12 series 0.01 to 1  $\mu\text{F}$   
 Preferred values acc. to E6

### CAPACITANCE TOLERANCE

$\pm 20 \%$ ;  $\pm 10 \%$ ;  $\pm 5 \%$

### LEADS

Tinned wire

### MAXIMUM APPLICATION TEMPERATURE

105 °C

### RATED TEMPERATURE

105 °C

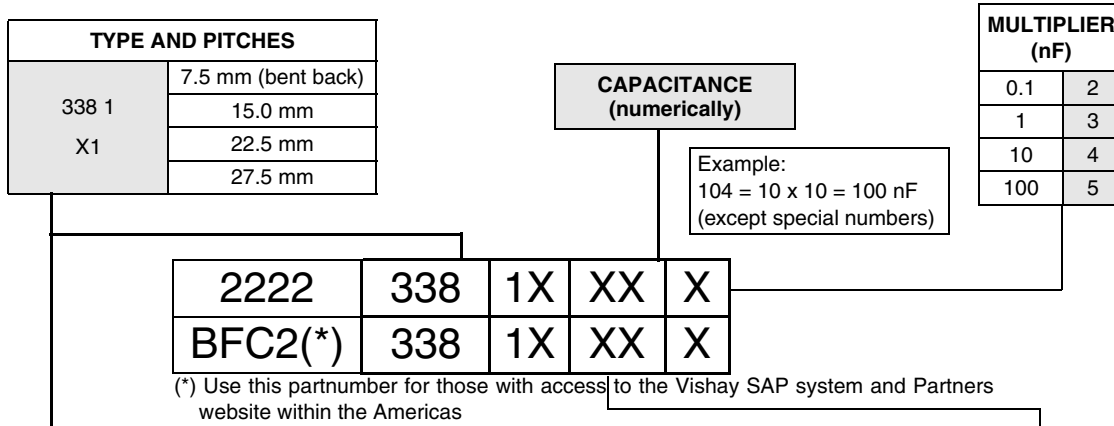
### DETAIL SPECIFICATION

For more detailed data and test requirements contact:  
[filmcaps.roeselare@vishay.com](mailto:filmcaps.roeselare@vishay.com)



**RoHS**  
COMPLIANT

## COMPOSITION OF CATALOG NUMBER



TYPE	PACKAGING	LEAD CONFIGURATION	C-TOL	PREFERRED TYPES
338 1 X1	loose in box	lead length 3.5 ± 0.3 mm	± 20 %	10 ...
		lead length 5.0 ± 1.0 mm		12 ...
		lead length 25.0 ± 2.0 mm		14 ...
	taped on reel	bent back to 7.5 mm; H = 16.0 mm; P <sub>0</sub> = 15.0 mm; reel diameter = 500 mm		16 ...
		<b>ALTERNATIVE TAPED VERSIONS</b>		<b>ON REQUEST</b>
338 1 X1	taped on reel	H = 18.5 mm; for P <sub>0</sub> = 12.7 mm; reel diameter = 500 mm	± 20 %	17 ...
		<b>ALTERNATIVE C-TOL</b>		<b>ON REQUEST</b>
338 1 X1	loose in box	lead length 3.5 ± 0.3 mm	± 10 %	See tables for detail
			± 5 %	
		lead length 5.0 ± 1.0 mm	± 10 %	
		± 5 %		
	lead length 25.0 ± 2.0 mm	± 10 %		
		± 5 %		
taped on reel	Bent back to 7.5 mm; H = 16.0 mm; P <sub>0</sub> = 15.0 mm; reel diameter = 500 mm	± 10 %		
	H = 18.5 mm; P <sub>0</sub> = 12.7 mm; reel diameter = 500 mm	± 5 %		

### Note

1. For detailed tape specifications refer to Packaging information" [www.vishay.com/docs/28139/packinfo.pdf](http://www.vishay.com/docs/28139/packinfo.pdf)"

## SPECIFIC REFERENCE DATA MKP 338 1 440 VAC (X1)

DESCRIPTION	VALUE	
Tangent of loss angle: C ≤ 470 nF C > 470 nF	at 1 kHz	
	≤ 10 × 10 <sup>-4</sup>	at 10 kHz
	≤ 20 × 10 <sup>-4</sup>	≤ 20 × 10 <sup>-4</sup>
Rated voltage pulse slope (dU/dt) <sub>R</sub> at 615 V: Pitch = 15 mm and 7.5 mm (bent back) Pitch = 22.5 mm Pitch = 27.5 mm	250 V/μs	
	150 V/μs	
	100 V/μs	
R between leads, for C ≤ 0.33 μF at 100 V; 1 minute	> 15 000 MΩ	
R between leads, for C > 0.33 μF at 100 V; 1 minute	> 5000 s	
R between leads and case; 100 V; 1 minute	> 30 000 MΩ	
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	3400 V; 1 minute	
Withstanding (AC) voltage between leads and case	2380 V; 1 minute	



Interference Suppression Film Capacitors Vishay BCcomponents  
MKP Radial Potted Type

MKP 338 1 GENERAL DATA

URac = 440 V; C - tol = 20 % (URdc = 1000 V)

C (µF)	DIMENSIONS w × h × L (mm)	MASS (g) <sup>1)</sup>	CATALOG NUMBER 2222 338 ..... AND PACKAGING						
			LOOSE IN BOX					TAPED reel diameter = 500 mm H = 18.5 mm; P <sub>0</sub> = 12.7 mm	
			Short leads			Long leads		LAST 5 DIGITS	SPQ
			L <sub>t</sub> = 3.5 ± 0.3 mm LAST 5 DIGITS	L <sub>t</sub> = 5.0 ± 1.0 mm LAST 5 DIGITS	SPQ	L <sub>t</sub> = 25.0 ± 2.0 mm LAST 5 DIGITS	SPQ		
<b>Pitch = 15.0 ± 0.4 mm; d<sub>t</sub> = 0.60 ± 0.06 mm</b>									
0.010	5.0 × 11.0 × 17.5	1.0	10103	12103	1000	14103	1000	17103	1100
0.012			10123	12123		14123		17123	
0.015			10153	15153		14153		17153	
0.018			10183	18183		14183		17183	
0.022			10223	22223		14223		17223	
0.027	6.0 × 12.0 × 17.5	1.4	10273	12273	1000	14273	1000	17273	900
0.033			10333	12333		14333		17333	
<b>Pitch = 15.0 ± 0.4 mm; d<sub>t</sub> = 0.80 ± 0.08 mm</b>									
0.039	7.0 × 13.5 × 17.5	1.8	10393	12393	750	14393	500	17393	800
0.047			10473	12473		14473		17473	
0.056	8.5 × 15.0 × 17.5	2.4	10563	12563	750	14563	500	17563	650
0.068			10683	12683		14683		17683	
0.082	10.0 × 16.5 × 17.5	3.0	10823	12823	500	14823	450	17823	600
0.100			10104	12104		14104		17104	
<b>Pitch = 22.5 ± 0.4 mm; d<sub>t</sub> = 0.80 ± 0.08 mm</b>									
0.012	8.5 × 18.0 × 26.0	3.8	10124	12124	200	14124	250	17124	450
0.015			10154	12154		14154		17154	
0.018	10.0 × 19.5 × 26.0	6.8	10184	12184	200	14184	200	17184	350
0.022			10224	12224		14224		17224	
<b>Pitch = 27.5 ± 0.4 mm; d<sub>t</sub> = 0.80 ± 0.08 mm</b>									
0.027	11.0 × 21.0 × 31.0	7.4	10274	12274	100	14274	125		
0.033	13.0 × 23.0 × 31.0	9.2	10334	12334	100	14334	125		
0.039	15.0 × 25.0 × 31.0	12.3	10394	12394	100	14394	125		
0.047			10474	12474		14474	17474		
0.056	18.0 × 28.0 × 31.0	16.1	10564	12564	100	14564	100		
0.068			10684	12684		14684	17684		
0.082	21.0 × 31.0 × 31.0	20.3	10824	12824	50	14824	75		
0.100			10105	12105		14105		17105	

Note

1. Weight for short lead products obly

BENT BACK PITCH 7.5 mm

C (µF)	DIMENSIONS w ≠ h ≠ L (mm)	MASS (g) <sup>2)</sup>	CATALOG NUMBER 2222 338 ..... AND PACKAGING						
			LOOSE IN BOX					TAPED reel diameter = 500 mm <sup>1)</sup> H = 16.0 mm; P <sub>0</sub> = 15.0 mm	
			Short leads			Long leads		LAST 5 DIGITS	SPQ
			L <sub>t</sub> = 3.5 ± 0.3 mm LAST 5 DIGITS	L <sub>t</sub> = 5.0 ± 1.0 mm LAST 5 DIGITS	SPQ	L <sub>t</sub> = 25.0 ± 2.0 mm LAST 5 DIGITS	SPQ		
<b>Original pitch = 15.0 mm; bent back pitch = 7.5 ± 0.4 mm; dt = 0.60 ± 0.06 mm</b>									
0.010	5.0 × 13.0 × 17.5	1.0						16103	950
0.012								16123	
0.015								16153	
0.018								16183	
0.022								16223	
0.027	6.0 × 14.0 × 17.5	1.4						16273	800
0.033								16333	

C ( $\mu$ F)	DIMENSIONS w $\times$ h $\times$ L (mm)	MASS (g) <sup>2</sup>	CATALOG NUMBER 2222 338 ..... AND PACKAGING					
			LOOSE IN BOX				TAPED reel diameter = 500 mm <sup>1</sup> H = 16.0 mm; P <sub>0</sub> = 15.0 mm	
			Short leads		Long leads		LAST 5 DIGITS	SPQ
			L <sub>t</sub> = 3.5 $\pm$ 0.3 mm LAST 5 DIGITS	L <sub>t</sub> = 5.0 $\pm$ 1.0 mm LAST 5 DIGITS	SPQ	L <sub>t</sub> = 25.0 $\pm$ 2.0 mm LAST 5 DIGITS		
<b>Original pitch = 15.0 mm; bent back pitch = 7.5 <math>\pm</math> 0.4 mm; dt = 0.80 <math>\pm</math> 0.08 mm</b>								
0.039 0.047	7.0 $\times$ 15.5 $\times$ 17.5	1.8					16393 16473	700
0.056 0.068	8.5 $\times$ 17.0 $\times$ 17.5	1.4					16563 16683	550
0.082 0.100	10.0 $\times$ 18.5 $\times$ 17.5	3.0					16823 16104	500

**Notes**

1. Reel diameter = 356 mm is available on request
2. Weight for short lead product only

**U<sub>Rac</sub> = 440 V; C-tol =  $\pm$  10 % (U<sub>Rdc</sub> = 1000 V)**

C ( $\mu$ F)	DIMENSIONS w $\times$ h $\times$ L (mm)	MASS (g) <sup>1</sup>	CATALOG NUMBER 2222 338 ..... AND PACKAGING						
			LOOSE IN BOX				TAPED reel diameter = 500 mm <sup>1</sup> H = 18.5 mm; P <sub>0</sub> = 12.7 mm		
			Short leads		Long leads		LAST 5 DIGITS	SPQ	
			L <sub>t</sub> = 3.5 $\pm$ 0.3 mm LAST 5 DIGITS	L <sub>t</sub> = 5.0 $\pm$ 1.0 mm LAST 5 DIGITS	SPQ	L <sub>t</sub> = 25.0 $\pm$ 2.0 mm LAST 5 DIGITS			
<b>Pitch = 15.0 <math>\pm</math> 0.4 mm; d<sub>t</sub> = 0.60 <math>\pm</math> 0.06 mm</b>									
0.010 0.012 0.015 0.018	5.0 $\times$ 11.0 $\times$ 17.5	1.0	18114 18115 18116 18117	18314 18315 18316 18317	1000	18514 18515 18516 18517	1000	18914 18915 18916 18917	1100
0.022 0.027	6.0 $\times$ 12.0 $\times$ 17.5	1.4	18118 18119	18318 18319	1000	18518 18519	1000	18918 18919	900
<b>Pitch = 15.0 <math>\pm</math> 0.4 mm; d<sub>t</sub> = 0.80 <math>\pm</math> 0.08 mm</b>									
0.033 0.039	7.0 $\times$ 13.5 $\times$ 17.5	1.8	18121 18122	18321 18322	750	18521 18522	500	18921 18922	800
0.047 0.056	8.5 $\times$ 15.0 $\times$ 17.5	2.4	18123 18124	18323 18324	750	18523 18524	500	18923 18924	650
0.068 0.082	10.0 $\times$ 16.5 $\times$ 17.5	3.0	18125 18126	18325 18326	500	18525 18526	450	18925 18926	600
<b>Pitch = 22.5 <math>\pm</math> 0.4 mm; d<sub>t</sub> = 0.80 <math>\pm</math> 0.08 mm</b>									
0.10 0.12 0.15 0.18	7.0 $\times$ 16.5 $\times$ 26.0 8.5 $\times$ 18.0 $\times$ 26.0 10.0 $\times$ 19.5 $\times$ 26.0	2.9 3.8 6.8	18127 18128 18129 18131	18327 18328 18329 18331	200 200 200	18527 18528 18529 18531	250 250 200	18927 18928 18929 18931	550 450 350
<b>Pitch = 27.5 <math>\pm</math> 0.4 mm; d<sub>t</sub> = 0.80 <math>\pm</math> 0.08 mm</b>									
0.22 0.27 0.33 0.39 0.47 0.56 0.68 0.82	11.0 $\times$ 21.0 $\times$ 31.0 13.0 $\times$ 23.0 $\times$ 31.0 15.0 $\times$ 25.0 $\times$ 31.0 18.0 $\times$ 28.0 $\times$ 31.0 21.0 $\times$ 31.0 $\times$ 31.0	7.4 9.2 12.3 16.1 20.3	18132 18133 18134 18135 18136 18137 18138 18139	18332 18333 18334 18335 18336 18337 18338 18339	100 100 100 100 50	18532 18533 18534 18535 18536 18537 18538 18539	125 125 125 100 75		

**Note**

1. Weight for short lead products only



Interference Suppression Film Capacitors Vishay BCcomponents  
MKP Radial Potted Type

BENT BACK PITCH 7.5 mm

C ( $\mu$ F)	DIMENSIONS w × h × L (mm)	MASS (g) <sup>2</sup>	CATALOG NUMBER 2222 338 ..... AND PACKAGING					
			LOOSE IN BOX				TAPED reel diameter = 500 mm H = 18.5 mm; P <sub>0</sub> = 12.7 mm	
			Short leads		Long leads		LAST 5 DIGITS	SPQ
			L <sub>t</sub> = 3.5 ± 0.3 mm LAST 5 DIGITS	L <sub>t</sub> = 5.0 ± 1.0 mm LAST 5 DIGITS	SPQ	L <sub>t</sub> = 25.0 ± 2.0 mm LAST 5 DIGITS		
<b>Original pitch = 15.0 mm; bent back pitch = 7.5 ± 0.4 mm; dt = 0.60 ± 0.06 mm</b>								
0.010 0.012 0.015 0.018	5.0 x 13.0 x 17.5	1.0					18714 18715 18716 18717	950
0.022 0.027	6.0 x 14.0 x 17.5	1.4					18718 18719	800
<b>Original pitch = 15.0 mm; bent back pitch = 7.5 ± 0.4 mm; dt = 0.80 ± 0.08 mm</b>								
0.033 0.039	7.0 x 15.5 x 17.5	1.8					18721 18722	700
0.047 0.056	8.5 x 17.0 x 17.5	2.4					18723 18724	550
0.068 0.082	10.0 x 18.5 x 17.5	3.0					18725 18726	500

Notes

1. Reel diameter = 356 mm is available on request
2. Weight for short lead products only

U<sub>Rac</sub> = 440 V; C-tol = ± 5 % (U<sub>Rdc</sub> = 1000 V)

C ( $\mu$ F)	DIMENSIONS w × h × L (mm)	MASS (g) <sup>1</sup>	CATALOG NUMBER 2222 338 ..... AND PACKAGING						
			LOOSE IN BOX				TAPED reel diameter = 500 mm <sup>1)</sup> H = 18.5 mm; P <sub>0</sub> = 12.7 mm		
			Short leads		Long leads		LAST 5 DIGITS	SPQ	
			L <sub>t</sub> = 3.5 ± 0.3 mm LAST 5 DIGITS	L <sub>t</sub> = 5.0 ± 1.0 mm LAST 5 DIGITS	SPQ	L <sub>t</sub> = 25.0 ± 2.0 mm LAST 5 DIGITS			
<b>Pitch = 15.0 ± 0.4 mm; d<sub>t</sub> = 0.60 ± 0.06 mm</b>									
0.010 0.012 0.015 0.018	5.0 × 11.0 × 17.5	1.0	18214 18215 18216 18217	18414 18415 18416 18417	1000	18614 18615 18616 18617	1000	18934 18935 18936 18937	1100
0.022 0.027	6.0 × 12.0 × 17.5	1.4	18218 18219	18418 18419	1000	18618 18619	1000	18938 18939	900
<b>Pitch = 15.0 ± 0.4 mm; d<sub>t</sub> = 0.80 ± 0.08 mm</b>									
0.033 0.039	7.0 × 13.5 × 17.5	1.8	18221 18222	18421 18422	750	18621 18622	500	18941 18942	800
0.047 0.056	8.5 × 15.0 × 17.5	2.4	18223 18224	18423 18424	750	18623 18624	500	18943 18944	650
0.068 0.082	10.0 × 16.5 × 17.5	3.0	18225 18226	18425 18426	500	18625 18626	450	18945 18946	600
<b>Pitch = 22.5 ± 0.4 mm; d<sub>t</sub> = 0.80 ± 0.08 mm</b>									
0.10 0.12	8.5 × 18.0 × 26.0	3.8	18227 18228	18427 18428	200	18627 18628	200	18947 18948	450
0.15 0.18	10.0 × 19.5 × 26.0	4.4	18229 18231	18429 18431	200	18629 18631	200	18949 18951	350

C ( $\mu$ F)	DIMENSIONS w × h × L (mm)	MASS (g) <sup>1)</sup>	CATALOG NUMBER 2222 338 ..... AND PACKAGING						
			LOOSE IN BOX				TAPED		
			Short leads			Long leads			reel diameter = 500 mm <sup>1)</sup> H = 18.5 mm; P <sub>0</sub> = 12.7 mm
			L <sub>t</sub> = 3.5 ± 0.3 mm	L <sub>t</sub> = 5.0 ± 1.0 mm	SPQ	L <sub>t</sub> = 25.0 ± 2.0 mm	SPQ	LAST 5 DIGITS	SPQ
LAST 5 DIGITS	LAST 5 DIGITS		LAST 5 DIGITS						
<b>Pitch = 27.5 ± 0.4 mm; d<sub>t</sub> = 0.80 ± 0.08 mm</b>									
0.22	11.0 × 21.0 × 31.0	7.4	18232	18432	100	18632	125		
0.27	13.0 × 23.0 × 31.0	9.2	18233	18433	100	18623	125		
0.33			18234	18434		18624			
0.39	15.0 × 25.0 × 31.0	12.3	18235	18435	100	18635	125		
0.47			18236	18436		18636			
0.56	18.0 × 28.0 31.0	16.1	18237	18437	100	18637	100		
0.68			18238	18438		18638			
0.82	21.0 × 31.0 × 31.0	20.3	18239	18349	50	18639	75		

**Note**

1. Weight for short lead product only

**BENT BACK PITCH 7.5 mm**

C ( $\mu$ F)	DIMENSIONS w × h × L (mm)	MASS (g) <sup>2)</sup>	CATALOG NUMBER 2222 338 ..... AND PACKAGING						
			LOOSE IN BOX				TAPED		
			Short leads			Long leads			reel diameter = 500 mm <sup>1)</sup> H = 16.0 mm; P <sub>0</sub> = 15.0 mm
			L <sub>t</sub> = 3.5 ± 0.3 mm	L <sub>t</sub> = 5.0 ± 1.0 mm	SPQ	L <sub>t</sub> = 25.0 ± 2.0 mm	SPQ	LAST 5 DIGITS	SPQ
LAST 5 DIGITS	LAST 5 DIGITS		LAST 5 DIGITS						
<b>Original pitch = 15.0 mm; bent back pitch = 7.5 ± 0.4 mm; dt = 0.60 ± 0.06 mm</b>									
0.010	5.0 × 13.0 × 17.5	1.0					18 814	950	
0.012							18 815		
0.015							18 816		
0.018							18 817		
0.022	6.0 × 14.0 × 17.5	1.4					18 818	800	
0.027							18 819		
<b>Original pitch = 15.0 mm; bent back pitch = 7.5 ± 0.4 mm; dt = 0.80 ± 0.08 mm</b>									
0.033	7.0 × 15.5 × 17.5	1.8					18 821	700	
0.039							18 822		
0.047	8.5 × 17.0 × 17.5	2.4					18 823	550	
0.056							18 824		
0.068	10.0 × 18.5 × 17.5	3.0					18 825	500	
0.082							18 826		

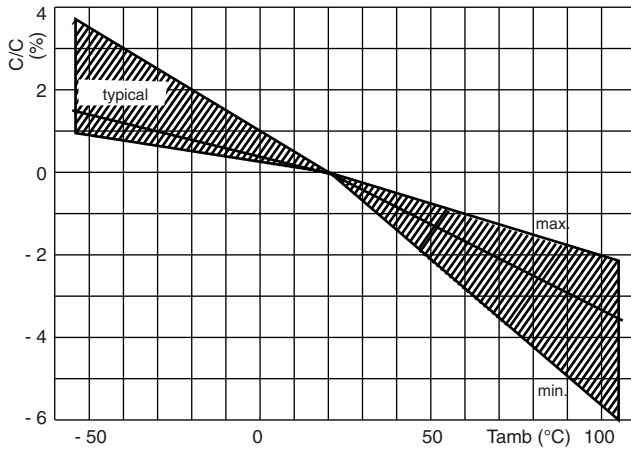
**Notes**

1. Reel diameter = 356 mm is available on request
2. Weight for short lead product only

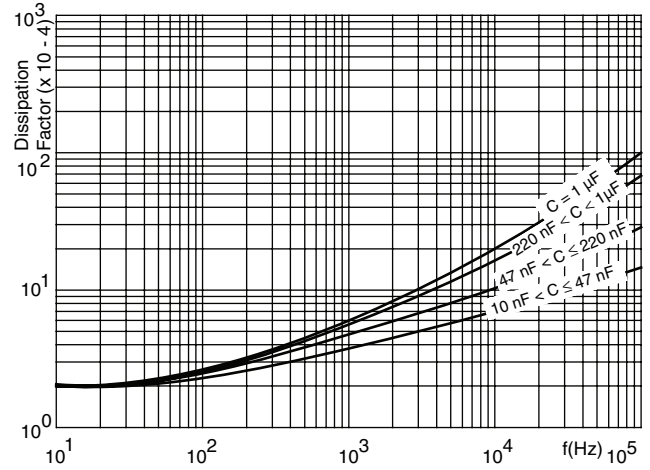


**CHARACTERISTICS**

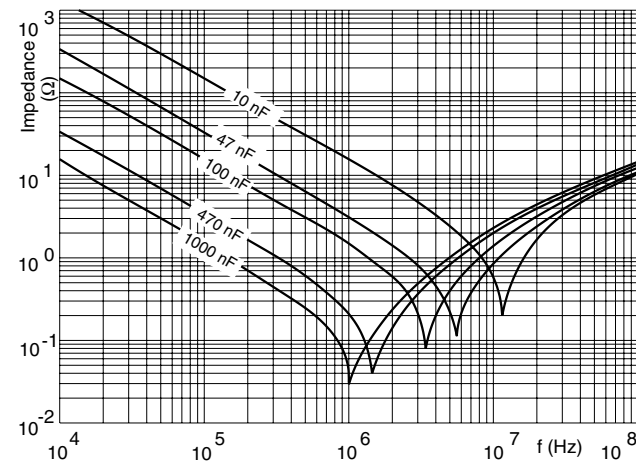
**Capacitance**



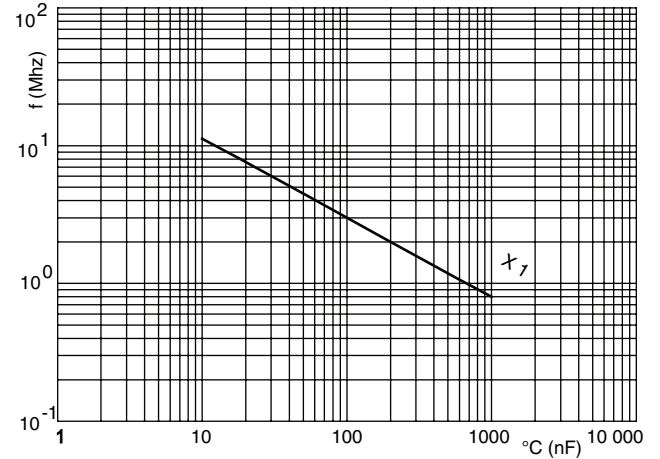
**Target of loss angle**



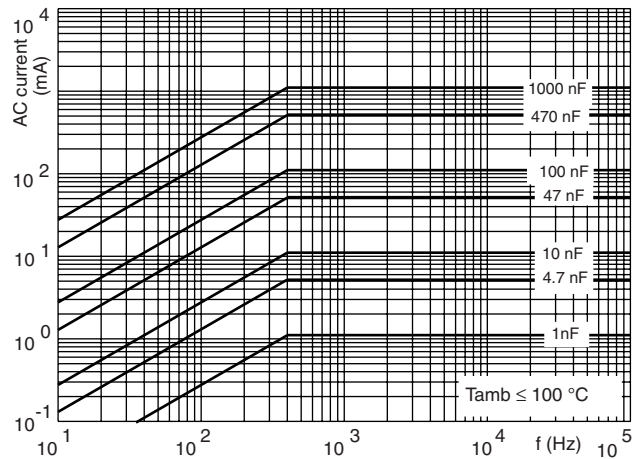
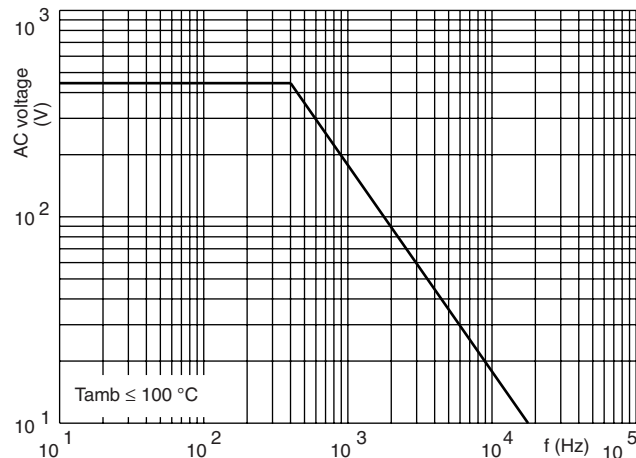
**Impedance**



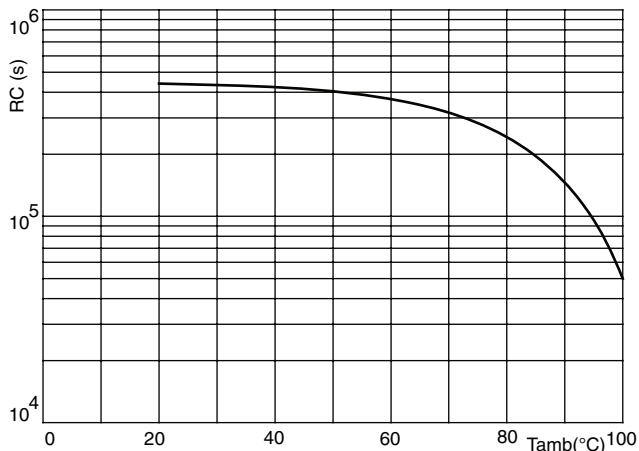
**Resonant frequency**



**Max REMS voltage and AC current (sinewave)**



## Insulation resistance



## APPLICATION NOTES

- For X1 electromagnetics interference suppression in across the line applications (50/60 Hz) with a maximum mains voltage of 440 V (AC)
- These capacitors are not intended for continuous pulse applications. For these situations, capacitors of the AC and pulse programs must be used
- The maximum ambient temperature must be not exceed 105 °C
- Rated voltage pulse slope:
  - If the pulse voltage is lower than the rated voltage, the values of the specific reference data can be multiplied by 615 V (DC) and divided by the applied voltage

SAFETY APPROVALS X1	VOLTAGE	VALUE	FILE NUMBERS
EN132400	440 V (AC)	10 nF to 1 μF	14220
UL1414	250 V (AC)	10 nF to 1 μF	E112471
UL1283 and CSA 22.2.8	440 V (AC)	100 nF to 1 μF	E109565

The EneC-approval together with the CB-Certificate replace all national marks of the following countries (they have already signed the ENEC-Agreement): Austria; Belgium; Czech.Republic; Denmark; Finland; France; Germany; Greece; Hungary; Ireland; Italy; Luxembourg; Netherlands; Norway; Portugal; Slovenian; Spain; Switzerland and United Kingdom.

## MOUNTING

### Normal Use

The capacitors are designed for mounting on printed-circuit boards. The capacitors packed in bandoliers are designed for mounting in printed-circuit boards by means of automatic insertion machines.

For detailed tape specifications refer to Type detail specification “HQN-384-01/102, Packaging information”.

### Specific Method of Mounting to Withstand Vibration and Shock

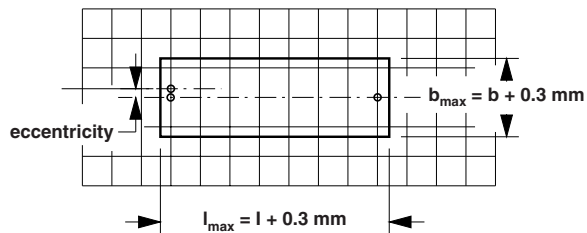
In order to withstand vibration and shock tests, it must be ensured that the stand-off pips are in good contact with the printed-circuit board:

- For pitches  $\leq 15$  mm capacitors shall be mechanically fixed by the leads
- For longer pitches the capacitors shall be mounted in the same way and the body clamped

### Space Requirements on printed Circuit Board

The maximum length and width of film capacitors is shown in Figure:

- Eccentricity as in figure. The maximum eccentricity is smaller than or equal to the lead diameter of the product concerned
- Product height with seating plane as given by “IEC 60717” as reference:  $h_{max} \leq h + 0.3$  mm



CBA116

### Storage Temperature

- Storage temperature:  $T_{stg} = 25$  to  $+ 40$  °C with RH maximum 80 % without condensation

### Ratings and Characteristics Reference Conditions

Unless otherwise specified, all electrical values apply to an ambient temperature of  $23 \pm 1$  °C, an atmospheric pressure of 86 to 106 kPa and a relative humidity of  $50 \pm 2$  %.

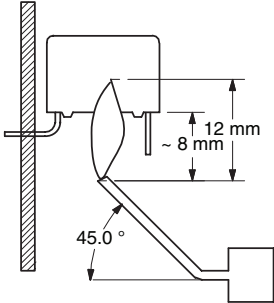
For reference testing, a conditioning period shall be applied over  $96 \pm 4$  hours by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20 %.



Vishay BCcomponents Interference Suppression Film Capacitors  
MKP Radial Potted Type

SUB - CLAUSE NUMBER AND TEST	D OR ND	CONDITIONS	PERFORMANCE REQUIREMENTS
4.7 Vibration (see note 3.1)  4.7.2 Final inspection 4.9 Shock (see note 3)  4.9.2 Final measurements		Visual examination Mounting: see Section "Mounting" of this specification Procedure B4 Frequency range: 10 to 55 Hz. Amplitude: 0.75 mm or Acceleration 98 m/s <sup>2</sup> (whichever is less severe) Total duration 6 hours.  Visual examination Mounting: see Section "Mounting" for more information Pulse shape: half sine Acceleration: 490 m/s <sup>2</sup> Duration of pulse: 11 ms.  Visual examination Capacitance  Tangent of loss angle  Insulation resistance	No visible damage  No visible damage  No visible damage $ \Delta C/C  \leq 5\%$ of the value measured initially Increase of tan $\delta$ : $\leq 0.008$ Compared to values measured initially As specified in Section "Insulation Resistance" of this specification
<b>SUB - GROUP C1 COMBINED SAMPLE OF SPECIMENS OF SUB - GROUPS C1A AND C1B</b>	D		
4.11 Climatic sequence 4.11.1 Initial measurements  4.11.2 Dry heat  4.11.3 Damp heat cyclic Test Db First cycle 4.11.4 Cold  4.11.5 Damp heat cyclic Test Db remaining cycles 4.11.6 Final measurements		Capacitance Measured in 4.4.2 and 4.9.2 Tangent of loss angle: Measured initially in C1A and C1B  Temperature: 105 °C Duration: 16 hours  Temperature: - 55 °C Duration: 2 hours  Visual examination  Capacitance  Tangent of loss angle  Voltage proof 1900 V (DC); 1 min between term. Insulation resistance	No visible damage Legible marking $ \Delta C/C  \leq 5\%$ of the value measured in 4.11.1. Increase of tan $\delta$ : $\leq 0.008$ Compared to values measured in 4.11.1. No permanent breakdown or flash-over $\geq 50\%$ of values specified in Section "Insulation resistance" of this specification
<b>SUB - GROUP C2</b>	D		
4.12 Damp heat steady state			



SUB - CLAUSE NUMBER AND TEST	D OR ND	CONDITIONS	PERFORMANCE REQUIREMENTS
		Tangent of loss angle  Insulation resistance	Increase of $\tan \delta$ : $\leq 0.008$ Compared to values measured in 4.15.1.  $\geq 50\%$ of values specified in Section "Insulation resistance" of this specification
<b>SUB - GROUP C5</b>	D		
4.16 Radio frequency characteristic		Resonance frequency	As specified in Section "Resonant frequency" of this specification. $\pm 10\%$
<b>SUB - GROUP C6</b>	D		
4.17 Passive flammability Class B		Bore of gas jet: $\varnothing 0.5$ mm Fuel: butane Test duration for actual volume V in mm <sup>3</sup> : $V \leq 250$ : 10 s $250 < V \leq 500$ : 20 s $500 < V \leq 1750$ : 30 s $V > 1750$ : 60 s One flame application  	After removing test flame from capacitor, the capacitor must not continue to burn for more than 10 s. No burning particle must drop from the sample.
<b>SUB - GROUP C7</b>	D		
4.18 Active flammability		20 x 4 kV discharges on the test capacitor connected to UR	The cheese cloth around the capacitors shall not burn with a flame. No electrical measurements are required.



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