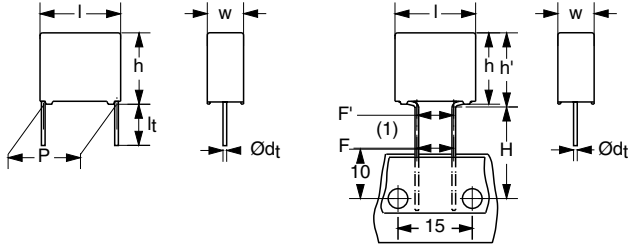


**Interference Suppression Film Capacitors  
MKP Radial Potted Type**



Dimensions in mm

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

**APPLICATIONS**

X2 class

For X2 electromagnetic interference suppression in across the line applications (50/60 Hz) with a maximum mains voltage of 275 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 2nd edition and EN 132400”

“IEC 60065, pass. flamm. class B”

250 V: CSA-C22.2 No 1; UL1414

275 V: CSA-C22.2 No 8; CQC

275 V: ENEC

305 V: UL1283

**MARKING**

C-value; tolerance; rated voltage; sub-class; manufacturer’s type designation; code for dielectric material, only for pitch  $\geq 15 \text{ mm}$ ; manufacturer location; manufacturer’s emblem; year and week

**DIELECTRIC**

Polypropylene film

**ELECTRODES**

Metallized film

**CONSTRUCTION**

Mono construction

**FEATURES**

7.5 to 27.5 mm lead pitch. Supplied loose in box, taped on ammpack or reel

Lead (Pb)-free product

RoHS-compliant product



**RoHS  
COMPLIANT**

**RATED VOLTAGE**

AC 275 V; 50 to 60 Hz

**PERMISSIBLE DC VOLTAGE**

DC 630 V

**ENCAPSULATION**

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

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

55/110/56/B

**CAPACITANCE RANGE (E12 SERIES)**

E12 series 0.001 to 4.7  $\mu\text{F}$

Preferred values acc. to E6

**CAPACITANCE TOLERANCE**

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

**LEADS**

Tinned wire (Lead (Pb)-free)

**RATED TEMPERATURE**

110 °C

**MAXIMUM APPLICATION TEMPERATURE**

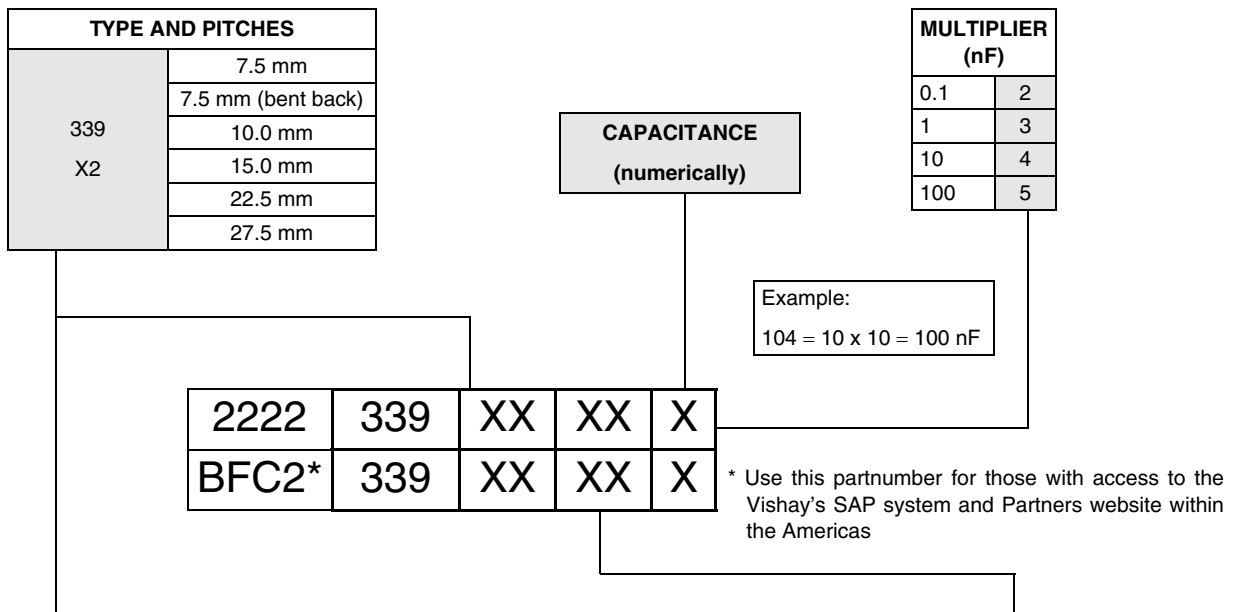
110 °C

**DETAIL SPECIFICATION**

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



**COMPOSITION OF CATALOG NUMBER**



TYPE	PACKAGING	STANDARD DIMENSIONS	C-TOL	CODE NUMBER	
339 X2	loose in box	lead length 3.5 + 1/- 0.5 mm or 3.5 ± 0.3 mm	± 20 %	2222 339 20...	
		lead length 5.0 ± 1.0 mm		2222 339 22...	
		lead length 25.0 ± 2.0 mm		2222 339 24...	
	taped	reel: H = 18.5 mm; P <sub>0</sub> = 12.7 mm and 15.0 mm		2222 339 26...	
		ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm		2222 339 28...	
		reel: pitch 7.5 mm (bent back), H = 16.0 mm; P <sub>0</sub> = 15.0 mm		2222 339 56...	
		ammopack: pitch 7.5 mm (bent back), H = 16.0 mm; P <sub>0</sub> = 15.0 mm		2222 339 58...	
	loose in box	lead length 3.5 + 1/- 0.5 mm or 3.5 ± 0.3 mm		± 10 %	2222 339 10...
		lead length 5.0 ± 1.0 mm			2222 339 12...
		lead length 25.0 ± 2.0 mm	2222 339 14...		
	taped	reel: H = 18.5 mm; P <sub>0</sub> = 12.7 mm and 15.0 mm	2222 339 16...		
		ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm	2222 339 18...		
		reel: pitch 7.5 mm (bent back), H = 16.0 mm; P <sub>0</sub> = 15.0 mm	2222 339 66...		
		ammopack: pitch 7.5 mm (bent back), H = 16.0 mm; P <sub>0</sub> = 15.0 mm	2222 339 68...		
	<b>PACKAGING</b>	<b>ALTERNATIVE LARGER PITCH SIZES</b>	<b>C-TOL</b>		<b>CODE NUMBER</b>
	loose in box	lead length 3.5 + 1/- 0.5 mm or 3.5 ± 0.3 mm	± 20 %		2222 339 21...
		lead length 5.0 ± 1.0 mm		2222 339 23...	
		lead length 25.0 ± 2.0 mm		2222 339 25...	
taped	reel or ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm	2222 339 27...			
loose in box	lead length 3.5 + 1/- 0.5 mm or 3.5 ± 0.3 mm	± 10 %	2222 339 11...		
	lead length 5.0 ± 1.0 mm		2222 339 13...		
	lead length 25.0 ± 2.0 mm		2222 339 15...		
taped	reel or ammopack: H = 18.5 mm; P <sub>0</sub> = 12.7 mm	2222 339 17...			



## SPECIFIC REFERENCE DATA MKP 339 X2 275 VAC

DESCRIPTION	VALUE		
	at 1 kHz	at 10 kHz	at 100 kHz
Tangent of loss angle:			
C < 470 nF	$\leq 10 \times 10^{-4}$	$\leq 20 \times 10^{-4}$	$\leq 100 \times 10^{-4}$
470 nF $\leq$ C $\leq$ 1 $\mu$ F	$\leq 20 \times 10^{-4}$	$\leq 70 \times 10^{-4}$	-
C > 1 $\mu$ F	$\leq 30 \times 10^{-4}$	-	-
Rated voltage pulse slope (dU/dt) <sub>R</sub> at 385 V (DC)	100 V/ $\mu$ s		
R between leads, for C $\leq$ 0.33 $\mu$ F at 100 V; 1 minute	> 15000 M $\Omega$		
RC between leads, for C > 0.33 $\mu$ F at 100 V; 1 minute	> 5000 s		
R between leads and case; 100 V; 1 minute	> 30000 M $\Omega$		
Withstanding (DC)voltage (cut off current 10 mA); rise time 100 V/s:			
C $\leq$ 1 $\mu$ F	2200 V; 1 minute		
C > 1 $\mu$ F	1800 V; 1 minute		
Withstanding (AC) voltage between leads and case	2050 V; 1 minute		

## PREFERRED TYPES: U<sub>Rac</sub> = 275 V; C-tol = $\pm$ 20 %

C ( $\mu$ F)	PITCH (mm)	DIMENSIONS <sup>1)</sup> w x h (h') x l (mm)	MASS (g)	CATALOG NUMBER 2222 339 ..... AND PACKAGING						
				LOOSE IN BOX					TAPED see table p.6	
				short leads <sup>2)</sup>			long leads			SPQ
				I <sub>t</sub> = 3.5 + 1/- 0.5 mm	I <sub>t</sub> = 5.0 $\pm$ 1.0 mm	SPQ	I <sub>t</sub> = 25.0 $\pm$ 2.0 mm	SPQ		
0.001	7.5	4.0 x 9.0 x 10.0	0.5	20102	22102	1500	24102	1000	28102	1250
0.001	10.0	4.0 x 10.0 x 12.5	0.6	21102	23102	1000	25102	1250	27102	950
0.0015	7.5	4.0 x 9.0 x 10.0	0.5	20152	22152	1500	24152	1000	28152	1250
0.0015	10.0	4.0 x 10.0 x 12.5	0.6	21152	23152	1000	25152	1250	27152	950
0.0022	7.5	4.0 x 9.0 x 10.0	0.5	20222	22222	1500	24222	1000	28222	1250
0.0022	10.0	4.0 x 10.0 x 12.5	0.6	21222	23222	1000	25222	1250	27222	950
0.0033	7.5	4.0 x 9.0 x 10.0	0.5	20332	22332	1500	24332	1000	28332	1250
0.0033	10.0	4.0 x 10.0 x 12.5	0.6	21332	23332	1000	25332	1250	27332	950
0.0047	7.5	4.0 x 9.0 x 10.0	0.5	20472	22472	1500	24472	1000	28472	1250
0.0047	10.0	4.0 x 10.0 x 12.5	0.6	21472	23472	1000	25472	1250	27472	950
0.0068	7.5	4.0 x 9.0 x 10.0	0.5	20682	22682	1500	24682	1000	28682	1250
0.0068	10.0	4.0 x 10.0 x 12.5	0.6	21682	23682	1000	25682	1250	27682	950
0.01	7.5	4.0 x 9.0 x 10.0	0.5	20103	22103	1500	24103	1000	28103	1250
0.01	10.0	4.0 x 10.0 x 12.5	0.6	21103	23103	1000	25103	1250	27103	950
0.015	7.5	4.0 x 9.0 x 10.0	0.5	20153	22153	1500	24153	1000	28153	1250
0.015	10.0	4.0 x 10.0 x 12.5	0.6	21153	23153	1000	25153	1250	27153	950
0.022	7.5	4.0 x 9.0 x 10.0	0.5	20223	22223	1500	24223	1000	28223	1250
0.022	10.0	4.0 x 10.0 x 12.5	0.6	21223	23223	1000	25223	1250	27223	950
0.033	7.5	4.0 x 9.0 x 10.0	0.5	20333	22333	1500	24333	1000	28333	1250
0.033	10.0	4.0 x 10.0 x 12.5	0.6	21333	23333	1000	25333	1250	27333	950
0.047	7.5	5.0 x 10.5 x 10.0	0.9	20473	22473	1000	24473	1250	28473	1000
0.047	10.0	4.0 x 10.0 x 12.5	0.6	21473	23473	1000	25473	1250	27473	950
0.068	7.5	6.0 x 11.5 x 10.0	1.0	20683	22683	750	24683	1000	28683	750
0.068	10.0	5.0 x 11.0 x 12.5	0.9	21683	23683	1000	25683	1000	27683	750
0.1	10.0	6.0 x 12.0 x 12.5	1.0	20104	22104	750	24104	750	28104	650
0.1	7.5 <sup>3)</sup>	6.0 x 12.0 (14.0)x 12.5	1.0						58104	1000
0.1	15.0	5.0 x 11.0 x 17.5	1.2	21104	23104	1250	25104	1000	27104	1100
0.15	15.0	6.0 x 12.0 x 17.5	1.4	20154	22154	1000	24154	1000	26154	900
0.15	7.5 <sup>3)</sup>	6.0 x 12.0 (14.0)x 17.5	1.4						56154	800
0.22	15.0	7.0 x 13.5 x 17.5	1.9	20224	22224	750	24224	500	26224	800
0.22	7.5 <sup>3)</sup>	7.0 x 13.5 (15.5)x 17.5	1.9						56224	700
0.33	15.0	8.5 x 15.0 x 17.5	2.6	20334	22334	750	24334	500	26334	650
0.33	7.5 <sup>3)</sup>	8.5 x 15.0 (17.0)x 17.5	2.6						56334	550
0.47	15.0	10.0 x 16.5 x 17.5	3.1	20474	22474	500	24474	450	26474	600
0.47	7.5 <sup>3)</sup>	10.0 x 16.5 (18.5)x 17.5	3.1						56474	500



C ( $\mu$ F)	PITCH (mm)	DIMENSIONS <sup>1)</sup> w x h (h') x l (mm)	MASS (g)	CATALOG NUMBER 2222 339 ..... AND PACKAGING						
				LOOSE IN BOX					TAPED see table p.6	
				short leads <sup>2)</sup>			long leads			SPQ
				$l_t = 3.5$ + 1/- 0.5 mm	$l_t =$ 5.0 $\pm$ 1.0 mm	SPQ	$l_t =$ 25.0 $\pm$ 2.0 mm	SPQ		
0.68	22.5	8.5 x 18.0 x 26.0	4.4	20684	22684	200	24684	250	26684	450
1.0		10.0 x 19.5 x 26.0	5.5	20105	22105	200	24105	200	26105	350
1.5	27.5	13.0 x 23.0 x 31.0	10.4	20155	22155	100	24155	125		
2.2		15.0 x 25.0 x 31.0	12.8	20225	22225	100	24225	125		
3.3		18.0 x 28.0 x 31.0	17.2	20335	22335	100	24335	100		
4.7		21.0 x 31.0 x 31.0	20.4	20475	22475	50	24475	75		

**Note**

- h = height for straight leads and h' = height for bent back leads.
- $l_t = 3.5 + 1/- 0.5$  mm for pitch = 7.5 mm and 10 mm and  $l_t = 3.5 \pm 0.3$  mm for pitch = 15 mm; 22.5 mm and 27.5 mm.
- Bent back to pitch = 7.5 mm.

**ALTERNATIVE LARGER PITCH SIZE:  $U_{Rac} = 275$  V; C-tol =  $\pm 20$  %**

C ( $\mu$ F)	PITCH (mm)	DIMENSIONS w x h x l (mm)	MASS (g)	CATALOG NUMBER 2222 339 ..... AND PACKAGING						
				LOOSE IN BOX					TAPED see table p.6	
				short leads <sup>1)</sup>			long leads			SPQ
				$l_t = 3.5$ + 1/- 0.3 mm	$l_t =$ 5.0 $\pm$ 1.0 mm	SPQ	$l_t =$ 25.0 $\pm$ 2.0 mm	SPQ		
0.01	15.0	5.0 x 11.0 x 17.5	1.2	90001	90007	1250	90014	1000	90021	1100
0.015				90002	90008	1250	90015	1000	90022	1100
0.022				90003	90009	1250	90016	1000	90023	1100
0.033				90004	90011	1250	90017	1000	90024	1100
0.047				90005	90012	1250	90018	1000	90025	1100
0.068				90006	90013	1250	90019	1000	90026	1100
0.15	22.5	6.0 x 15.5 x 26.0	2.9	21154	23154	300	25154	250	27154	600
0.22				21224	23224	300	25224	250	27224	600
0.33				21334	23334	300	25334	250	27334	600
0.47		7.0 x 16.5 x 26.0	3.2	21474	23474	200	25474	250	27474	500
0.47	27.5	9.0 x 19.0 x 31.0	5.5	90076	90078	100	90081	150		
0.68				21684	23684	100	25684	150		
1.0				21105	23105	100	25105	125		

**Note**

- $l_t = 3.5 + 1/- 0.5$  mm for pitch = 7.5 mm and 10 mm and  $l_t = 3.5 \pm 0.3$  mm for pitch = 15 mm; 22.5 mm and 27.5 mm.



**PREFERRED TYPES:  $U_{Rac} = 275 V$ ;  $C-tol = \pm 10 \%$**

C ( $\mu F$ )	PITCH (mm)	DIMENSIONS <sup>1)</sup> w x h (h') x l (mm)	MASS (g)	CATALOG NUMBER 2222 339 ..... AND PACKAGING						
				LOOSE IN BOX					TAPED see table p.6	
				short leads <sup>2)</sup>			long leads			SPQ
				$l_t = 3.5$ + 1/- 0.5 mm	$l_t =$ 5.0 $\pm$ 1.0 mm	SPQ	$l_t =$ 25.0 $\pm$ 2.0 mm	SPQ		
0.001	7.5	4.0 x 9.0 x 10.0	0.5	10102	12102	1500	14102	1000	18102	1250
0.001	10.0	4.0 x 10.0 x 12.5	0.6	11102	13102	1000	15102	1250	17102	950
0.0015	7.5	4.0 x 9.0 x 10.0	0.5	10152	12152	1500	14152	1000	18152	1250
0.0015	10.0	4.0 x 10.0 x 12.5	0.6	11152	13152	1000	15152	1250	17152	950
0.0022	7.5	4.0 x 9.0 x 10.0	0.5	10222	12222	1500	14222	1000	18222	1250
0.0022	10.0	4.0 x 10.0 x 12.5	0.6	11222	13222	1000	15222	1250	17222	950
0.0033	7.5	4.0 x 9.0 x 10.0	0.5	10332	12332	1500	14332	1000	18332	1250
0.0033	10.0	4.0 x 10.0 x 12.5	0.6	11332	13332	1000	15332	1250	17332	950
0.0047	7.5	4.0 x 9.0 x 10.0	0.5	10472	12472	1500	14472	1000	18472	1250
0.0047	10.0	4.0 x 10.0 x 12.5	0.6	11472	13472	1000	15472	1250	17472	950
0.0068	7.5	4.0 x 9.0 x 10.0	0.5	10682	12682	1500	14682	1000	18682	1250
0.0068	10.0	4.0 x 10.0 x 12.5	0.6	11682	13682	1000	15682	1250	17682	950
0.01	7.5	4.0 x 9.0 x 10.0	0.5	10103	12103	1500	14103	1000	18103	1250
0.01	10.0	4.0 x 10.0 x 12.5	0.6	11103	13103	1000	15103	1250	17103	950
0.015	7.5	4.0 x 9.0 x 10.0	0.5	10153	12153	1500	14153	1000	18153	1250
0.015	10.0	4.0 x 10.0 x 12.5	0.6	11153	13153	1000	15153	1250	17153	950
0.022	7.5	4.0 x 9.0 x 10.0	0.5	10223	12223	1500	14223	1000	18223	1250
0.022	10.0	4.0 x 10.0 x 12.5	0.6	11223	13223	1000	15223	1250	17223	950
0.033	7.5	5.0 x 10.5 x 10.0	0.9	10333	12333	1000	14333	1250	18333	1000
0.033	10.0	4.0 x 10.0 x 12.5	0.6	11333	13333	1000	15333	1250	17333	950
0.047	7.5	6.0 x 11.5 x 10.0	1.0	10473	12473	750	14473	1000	18473	750
0.047	10.0	4.0 x 10.0 x 12.5	0.6	11473	13473	1000	15473	1250	17473	950
0.068	10.0	5.0 x 11.0 x 12.5	0.9	10683	12683	1000	14683	1000	18683	750
0.068	7.5 <sup>3)</sup>	5.0 x 11.0 (13.0)x 12.5	0.9						68683	1300
0.1	10.0	6.0 x 12.0 x 12.5	1.0	10104	12104	750	14104	750	18104	650
0.1	7.5 <sup>3)</sup>	6.0 x 12.0 (14.0)x 12.5	1.0						68104	1000
0.1	15.0	5.0 x 11.0 x 17.5	1.2	11104	13104	1250	15104	1000	17104	1100
0.15	15.0	6.0 x 12.0 x 17.5	1.4	10154	12154	1000	14154	1000	16154	900
0.15	7.5 <sup>3)</sup>	6.0 x 12.0 (14.0)x 17.5	1.4						66154	800
0.22	15.0	7.0 x 13.5 x 17.5	1.9	10224	12224	750	14224	500	16224	800
0.22	7.5 <sup>3)</sup>	7.0 x 13.5 (15.5)x 17.5	1.9						66224	700
0.33	15.0	8.5 x 15.0 x 17.5	2.6	10334	12334	750	14334	500	16334	650
0.33	7.5 <sup>3)</sup>	8.5 x 15.0 (17.0)x 17.5	2.6						66334	550
0.47	15.0	10.0 x 16.5 x 17.5	3.1	10474	12474	500	14474	450	16474	600
0.47	7.5 <sup>3)</sup>	10.0 x 16.5 (18.5)x 17.5	3.1						66474	500
0.68	22.5	10.0 x 19.5 x 26.0	5.5	10684	12684	200	14684	200	16684	350
1.0		12.0 x 22.0 x 26.0	7.8	10105	12105	150	14105	200	16105	300
1.5	27.5	13.0 x 23.0 x 31.0	10.4	10155	12155	100	14155	125		
2.2		15.0 x 25.0 x 31.0	12.8	10225	12225	100	14225	125		
3.3		21.0 x 31.0 x 31.0	20.4	10335	12335	50	14335	75		

**Notes**

- h = height for straight leads and h' = height for bent back leads.
- $l_t = 3.5 + 1/- 0.5$  mm for pitch = 7.5 mm and 10 mm and  $l_t = 3.5 \pm 0.3$  mm for pitch = 15 mm; 22.5 mm and 27.5 mm.
- Bent back to pitch = 7.5 mm.

**ALTERNATIVE LARGER DIMENSIONS:  $U_{Rac} = 275 V$ ;  $C-tol = \pm 10 \%$** 

C ( $\mu F$ )	PITCH (mm)	DIMENSIONS w x h x l (mm)	MASS (g)	CATALOG NUMBER 2222 339 ..... AND PACKAGING						
				LOOSE IN BOX					TAPED see table p.6	
				short leads <sup>1)</sup>			long leads			
				$l_t = 3.5$ + 1/- 0.5 mm	$l_t =$ 5.0 $\pm$ 1.0 mm	SPQ	$l_t =$ 25.0 $\pm$ 2.0 mm	SPQ		SPQ
0.01	15.0	5.0 x 11.0 x 17.5	1.2	90027	90039	1250	90052	1000	90064	1100
0.015				90029	90042	1250	90054	1000	90066	1100
0.022				90032	90044	1250	90056	1000	90068	1100
0.033				90034	90046	1250	90058	1000	90071	1100
0.047				90036	90048	1250	90061	1000	90073	1100
0.068				11683	13683	1250	15683	1000	17683	1100
0.15	22.5	6.0 x 15.5 x 26.0	2.9	11154	13154	300	15154	250	17154	600
0.22				11224	13224	300	15224	250	17224	600
0.33				11334	13334	300	15334	250	17334	600
0.47				7.0 x 16.5 x 26.0	3.2	11474	13474	200	15474	250
0.68	27.5	9.0 x 19.0 x 31.0	5.5	11684	13684	100	15684	150		
1.0		11.0 x 21.0 x 31.0	7.8	11105	13105	100	15105	125		

**Note**

1.  $l_t = 3.5 + 1/- 0.5$  mm for pitch = 7.5 mm and 10 mm and  $l_t = 3.5 \pm 0.3$  mm for pitch = 15 mm; 22.5 mm and 27.5 mm.

**TAPING INFORMATION AND LEAD DIAMETER**

PITCH (tolerance: $\pm 0.4$ mm)	TYPE	DIMENSIONS <sup>1)</sup>	LEAD DIAMETER
7.5 mm	ammopack	H = 18.5 mm, $P_o = 12.7$ mm	0.50 $\pm$ 0.05 mm
10.0 mm bent back to 7.5 mm	ammopack	H = 16 mm, $P_o = 15.0$ mm	0.60 $\pm$ 0.06 mm
15.0 mm bent back to 7.5 mm ( $w \leq 6$ mm)	reel	H = 16 mm, $P_o = 15.0$ mm	0.60 $\pm$ 0.06 mm
15.0 mm bent back to 7.5 mm ( $w > 6$ mm)	reel	H = 16 mm, $P_o = 15.0$ mm	0.80 $\pm$ 0.08 mm
10.0 mm	ammopack	H = 18.5 mm, $P_o = 12.7$ mm	0.60 $\pm$ 0.06 mm
15.0 mm ( $w \leq 6$ mm)	reel	H = 18.5 mm, $P_o = 12.7$ mm	0.60 $\pm$ 0.06 mm
15.0 mm ( $w > 6$ mm)	reel	H = 18.5 mm, $P_o = 12.7$ mm	0.80 $\pm$ 0.08 mm
22.5 mm	reel	H = 18.5 mm, $P_o = 12.7$ mm	0.80 $\pm$ 0.08 mm
27.5 mm	not available		0.80 $\pm$ 0.08 mm

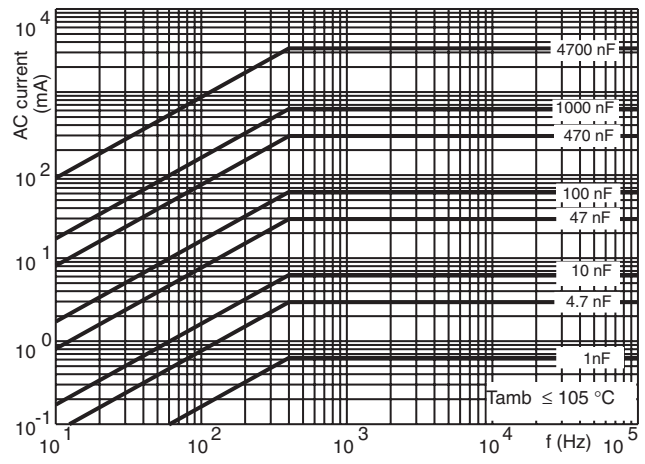
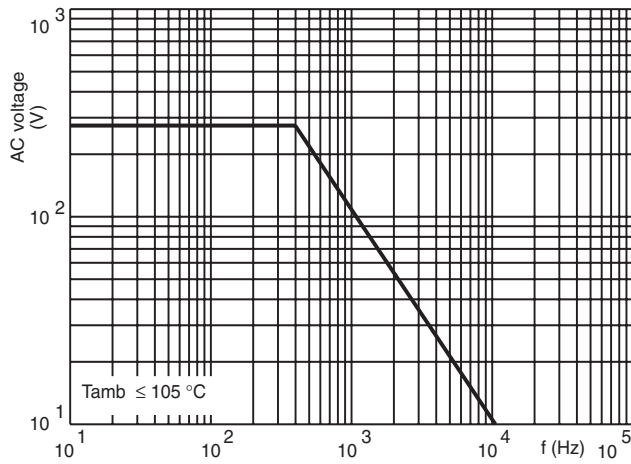
**Note**

1. Standard reel diameter = 500 mm, reel diameter = 356 mm is available on request.  
a) Other taping possibilities are available on request.

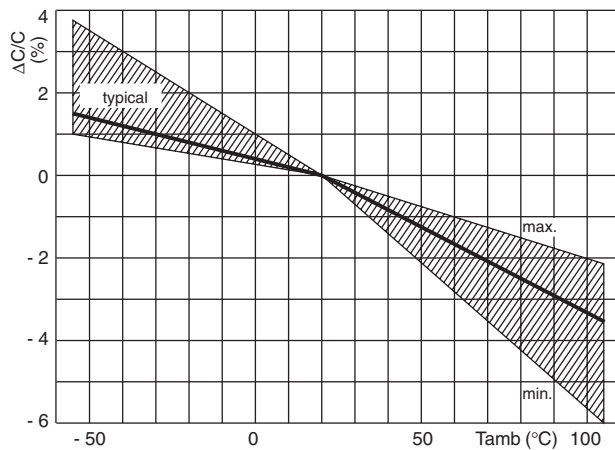
**APPROVALS**

COUNTRY	SPECIFICATION	ELECTRICAL VALUES	FILE NUMBERS	APPROVAL MARK
U.S.A. and Canada (for AC 250 V)	UL1414 and CSA-C22.2 No.1	1 nF to 1 $\mu F$	E112471	
U.S.A. (for AC 305 V)	UL1283	1 nF to 4.7 $\mu F$	E109565	
Canada (for AC 275 V)	CSA-C22.2 No.8	1 nF to 4.7 $\mu F$	1438188	
China	CQC	1 nF to 4.7 $\mu F$	CQC03001006961 (Roeselare) CQC03001006960 (Shanghai)	
CB TEST CERTIFICATE (for AC 275 V)		1 nF to 4.7 $\mu F$ : 55/105/56/B	BE-408	
Europe	EN132400 IEC 60384-14 2 <sup>nd</sup> edition	1 nF to 4.7 $\mu F$	14225	

## MAXIMUM RMS VOLTAGE AND AC CURRENT (SINEWAVE) AS A FUNCTION OF FREQUENCY



## CAPACITANCE



## IMPEDANCE

