



Metallized Polypropylene Film Capacitors MKP Radial Potted Type

APPLICATIONS

Low losses due to low contact resistance and low loss dielectric result in applications where high frequency occur or high stability is preferred. Their small dimensions make them suitable for circuits with high packaging density

MARKING

C-value; rated voltage; tolerance; code for manufacturer; year and week of manufacture; manufacturers type designation

DIELECTRIC

Polypropylene film

ELECTRODES

Vacuum deposited aluminium

ENCAPSULATION

Flame retardant plastic case and epoxy resin (UL-class 94 V-0)

CONSTRUCTION

Wound mono construction

LEADS

Tinned wire

CAPACITANCE RANGE (E24 SERIES)

0.001 to 1.2 μ F

CAPACITANCE TOLERANCE

\pm 5%; \pm 2%

RATED (DC) VOLTAGE

63 V; 160 V; 250 V; 400 V; 630 V

RATED (AC) VOLTAGE

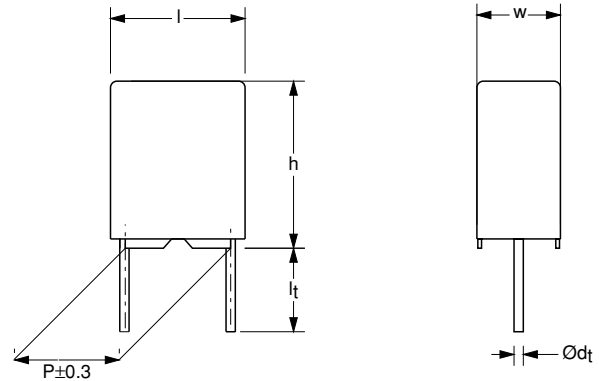
25 V; 63 V; 100 V; 125 V; 160 V

RATED PEAK-TO-PEAK VOLTAGE

70 V; 180 V; 280 V; 350 V; 450 V

CLIMATIC CATEGORY

55/085/56



Dimensions in mm

RATED TEMPERATURE (DC)

85 °C

RATED TEMPERATURE (AC)

85 °C

MAXIMUM APPLICATION TEMPERATURE

85 °C

REFERENCE SPECIFICATIONS

IEC 60384-16

PERFORMANCE GRADE

Grade 1 (long life)

STABILITY GRADE

Grade 1

FEATURES

5, 10 and 15 mm lead pitch. Supplied loose in box, in ammpack and taped on reel. Intermediate values are available of the E96 series

DETAIL SPECIFICATION

For more detailed data and test requirements see "Type detail specification HQN-384-16/101"

MKP 416 to 420

Vishay BCcomponents Metallized Polypropylene Film Capacitors
MKP Radial Potted Type



COMPOSITION OF CATALOG NUMBER

TYPE AND PITCHES	
416	5.0/10.0/15.0 mm
417	5.0/10.0/15.0 mm
418	5.0/10.0/15.0 mm
419	5.0/10.0/15.0 mm
420	5.0/10.0/15.0 mm

CAPACITANCE
(numerically)

MULTIPLIER (nF)	
0.01	2
0.1	3
1	4

Example:
1004 = 100 x 1 = 100 nF

2222 4.. X XXX X

TYPE	PACKAGING	PITCH (mm)	LEAD CONFIGURATION	PREFERRED TYPES						
				C-TOL	63 V	160 V	250 V	400 V	630 V	
416	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±2%	1					
	Loose in box	15	lead length 3.5 ±0.3 mm	±2%	7					
417	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±2%		1				
	Loose in box	15	lead length 3.5 ±0.3 mm	±2%		7				
418	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±2%			1			
	Loose in box	15	lead length 3.5 ±0.3 mm	±2%			7			
419	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±2%				1		
	Loose in box	15	lead length 3.5 ±0.3 mm	±2%				7		
420	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±2%						1
	Loose in box	15	lead length 3.5 ±0.3 mm	±2%						7
				ON REQUEST						
416	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±5%	0					
	Loose in box	5/10	lead length 4.0 +1.0/-0.5 mm	±5%	3					
		15	lead length 3.5 ±0.3 mm	±5%	4					
417	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±5%		0				
	Loose in box	5/10	lead length 4.0 +1.0/-0.5 mm	±5%		3				
		15	lead length 3.5 ±0.3 mm	±5%		4				
418	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±5%			0			
	Loose in box	5/10	lead length 4.0 +1.0/-0.5 mm	±5%			3			
		15	lead length 3.5 ±0.3 mm	±5%			4			
419	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±5%				0		
	Loose in box	5/10	lead length 4.0 +1.0/-0.5 mm	±5%				3		
		15	lead length 3.5 ±0.3 mm	±5%				4		
420	Taped; see note	5/10/15	H = 18.5 mm; P ₀ = 12.7 mm	±5%						0
	Loose in box	5/10	lead length 4.0 +1.0/-0.5 mm	±5%						3
		15	lead length 3.5 ±0.3 mm	±5%						4

Note:
Pitch = 5 and 10 mm: taped on ammpack
Pitch = 15 mm: taped on reel with diameter = 356 mm.



SPECIFIC REFERENCE DATA

DESCRIPTION	VALUE				
	at 10 kHz		at 100 kHz		
Tangent of loss angle:					
C ≤ 0.0091 μF	≤ 5 × 10 ⁻⁴		≤ 10 × 10 ⁻⁴		
0.0091 μF < C ≤ 0.027 μF	≤ 5 × 10 ⁻⁴		≤ 15 × 10 ⁻⁴		
0.027 μF < C ≤ 0.075 μF	≤ 5 × 10 ⁻⁴		≤ 20 × 10 ⁻⁴		
0.075 μF < C ≤ 0.11 μF	≤ 5 × 10 ⁻⁴		≤ 25 × 10 ⁻⁴		
0.11 μF < C ≤ 0.18 μF	≤ 10 × 10 ⁻⁴		≤ 30 × 10 ⁻⁴		
0.18 μF < C ≤ 0.27 μF	≤ 10 × 10 ⁻⁴		≤ 35 × 10 ⁻⁴		
0.27 μF < C ≤ 0.39 μF	≤ 10 × 10 ⁻⁴		≤ 40 × 10 ⁻⁴		
0.39 μF < C ≤ 0.56 μF	≤ 10 × 10 ⁻⁴		≤ 45 × 10 ⁻⁴		
0.56 μF < C ≤ 0.75 μF	≤ 10 × 10 ⁻⁴		≤ 50 × 10 ⁻⁴		
0.75 μF < C ≤ 1.1 μF	≤ 10 × 10 ⁻⁴		≤ 60 × 10 ⁻⁴		
Rated voltage pulse slope (dU/dt) _R :	at 63 V (DC)	at 100 V (DC)	at 250 V (DC)	at 400 V (DC)	at 630 V (DC)
P = 5 mm	50 V/μs	50 V/μs	50 V/μs	50 V/μs	50 V/μs
P = 10 mm	20 V/μs	20 V/μs	20 V/μs	20 V/μs	50 V/μs
P = 15 mm	50 V/μs	50 V/μs	50 V/μs	50 V/μs	50 V/μs
R between leads, for C ≤ 0.33 μF:					
at 50 V; 1 minute	>100000 MΩ				
at 100 V; 1 minute		>100000 MΩ	>100000 MΩ	>100000 MΩ	>100000 MΩ
RC between leads, for C > 0.33 μF at 10 V; 1 minute	>30000 s	>30000 s	>30000 s	>30000 s	
R between interconnecting leads and casing; 50 V; 1 minute	>100000 MΩ	>100000 MΩ	>100000 MΩ	>100000 MΩ	>100000 MΩ
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	100 V; 1 minute	260 V; 1 minute	400 V; 1 minute	640 V; 1 minute	1000 V; 1 minute
Withstanding (DC) voltage between leads and case	2840 V; 1 minute	2840 V; 1 minute	2840 V; 1 minute	2840 V; 1 minute	1260 V; 1 minute

MKP 416 to 420

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$U_{Rdc} = 63\text{ V}$; $U_{Rac} = 25\text{ V}$; $U_{p-p} = 70\text{ V}$

C (E 24) (μF)	DIMENSIONS $w \times h \times l$ (mm)	MASS (g)	CATALOG NUMBER 2222 416 AND PACKAGING							
			AMMOPACK		LOOSE IN BOX		REEL		LOOSE IN BOX	
			H = 18.5 mm; P ₀ = 12.7 mm		$l_t =$ 4.0 +1.0/-0.5 mm		H = 18.5 mm; P ₀ = 12.7 mm		$l_t =$ 3.5 ±0.3 mm	
			C-tol = ±2%		C-tol = ±2%		C-tol = ±2%		C-tol = ±2%	
			last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ
Pitch = 5.0 ±0.3 mm; d_t = 0.50 ±0.05 mm										
0.036	4.5 × 9.0 × 7.2	0.45	13603	1000	13643	2000				
0.039			13903		13943					
0.043			14303		14343					
0.047			14703		14743					
0.051	6.0 × 11.0 × 7.2	0.60	15103	750	15143	1500				
0.056			15603		15643					
0.062			16203		16243					
0.068			16803		16843					
0.075			17503		17543					
0.082			18203		18243					
0.091			19103		19143					
0.1			11004		11044					
0.11			11104		11144					
0.12			11204		11244					
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm										
0.13	5.0 × 11.0 × 12.5	0.85	11304	600	11344	1000				
0.15			11504		11544					
0.16	6.0 × 12.0 × 12.5	1.10	11604	500	11644	750				
0.18			11804		11844					
0.20			12004		12044					
0.22			12204		12244					
0.24			12404		12444					
0.27			12704		12744					
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm										
0.3	6.0 × 12.0 × 17.5	1.4			13004	900	73004	1000		
0.33			13304		73304					
0.36			13604		73604					
0.39			13904		73904					
0.43	7.0 × 13.5 × 17.5	1.9			14304	800	74304	750		
0.47			14704		74704					
0.51			15104		75104					
0.56			15604		75604					
0.62	8.5 × 15.0 × 17.5	2.6			16204	650	76204	750		
0.68			16804		76804					
0.75			17504		77504					
0.82			18204		78204					
0.91	10.0 × 16.5 × 17.5	3.1			19104	600	79104	500		
1.0			11005		71005					
1.1			11105		71105					



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$U_{Rdc} = 160\text{ V}$; $U_{Rac} = 63\text{ V}$; $U_{p-p} = 180\text{ V}$

C (E 24) (μF)	DIMENSIONS $w \times h \times l$ (mm)	MASS (g)	CATALOG NUMBER 2222 417 AND PACKAGING							
			AMMOPACK		LOOSE IN BOX		REEL		LOOSE IN BOX	
			H = 18.5 mm; P ₀ = 12.7 mm		l _t = 4.0 +1.0/-0.5 mm		H = 18.5 mm; P ₀ = 12.7 mm		l _t = 3.5 ±0.3 mm	
			C-tol = ±2%	SPQ	C-tol = ±2%	SPQ	C-tol = ±2%	SPQ	C-tol = ±2%	SPQ
last 5 digits of catalog number	last 5 digits of catalog number	last 5 digits of catalog number	last 5 digits of catalog number							
Pitch = 5.0 ±0.3 mm; d_t = 0.50 ±0.05 mm										
0.024	4.5 × 9.0 × 7.2	0.45	12403	1000	12443	2000				
0.027			12703		12743					
0.03			13003		13043					
0.033			13303		13343					
0.036	6.0 × 11.0 × 7.2	0.60	13603	750	13643	1500				
0.039			13903		13943					
0.043			14303		14343					
0.047			14703		14743					
0.051			15103		15143					
0.056			15603		15643					
0.062			16203		16243					
0.068			16803		16843					
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm										
0.075	4.0 × 10.0 × 12.5	0.60	17503	750	17543	1000				
0.082			18203		18243					
0.091			19103		19143					
0.1			11004		11044					
0.11	5.0 × 11.0 × 12.5	0.85	11104	600	11144	1000				
0.12			11204		11244					
0.13			11304		11344					
0.15			11504		11544					
0.16	6.0 × 12.0 × 12.5	1.10	11604	500	11644	750				
0.18			11804		11844					
0.20			12004		12044					
0.22			12204		12244					
0.24			12404		12444					
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm										
0.27	5.0 × 11.0 × 17.5	1.2			12704	1100	72704	1250		
0.3	6.0 × 12.0 × 17.5	1.4			13004	900	73004	1000		
0.33			13304	73304						
0.36			13604	73604						
0.39			13904	73904						
0.43			14304	74304						
0.47	7.0 × 13.5 × 17.5	1.9			14704	800	74704	750		
0.51			15104	75104						
0.56			15604	75604						
0.62	8.5 × 15.0 × 17.5	2.6			16204	650	76204	750		
0.68			16804	76804						
0.75			17504	77504						
0.82			18204	78204						
0.91	10.0 × 16.5 × 17.5	3.1			19104	600	79104	500		
1.0			11005	71005						
1.1			11105	71105						

MKP 416 to 420

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$U_{Rdc} = 250\text{ V}$; $U_{Rac} = 25\text{ V}$; $U_{p-p} = 70\text{ V}$

C (E 24) (μF)	DIMENSIONS $w \times h \times l$ (mm)	MASS (g)	CATALOG NUMBER 2222 418 AND PACKAGING							
			AMMOPACK		LOOSE IN BOX		REEL		LOOSE IN BOX	
			H = 18.5 mm; P ₀ = 12.7 mm		l _t = 4.0 +1.0/-0.5 mm		H = 18.5 mm; P ₀ = 12.7 mm		l _t = 3.5 ±0.3 mm	
			C-tol = ±2%	SPQ	C-tol = ±2%	SPQ	C-tol = ±2%	SPQ	C-tol = ±2%	SPQ
last 5 digits of catalog number	last 5 digits of catalog number	last 5 digits of catalog number	last 5 digits of catalog number							
Pitch = 5.0 ±0.3 mm; d_t = 0.50 ±0.05 mm										
0.01	3.5 × 8.0 × 7.2	0.35	11003	1500	11043	3000				
0.011			11103		11143					
0.012			11203		11243					
0.013			11303		11343					
0.015			11503		11543					
0.016	4.5 × 9.0 × 7.2	0.45	11603	1000	11643	2000				
0.018			11803		11843					
0.02			12003		12043					
0.022			12203		12243					
0.024			12403		12443					
0.027	6.0 × 11.0 × 7.2	0.60	12703	750	12743	1500				
0.03			13003		13043					
0.033			13303		13343					
0.036			13603		13643					
0.039			13903		13943					
0.043			14303		14343					
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm										
0.047	4.0 × 10.0 × 12.5	0.60	14703	750	14743	1000				
0.051			15103		15143					
0.056			15603		15643					
0.062			16203		16243					
0.068			16803		16843					
0.075	5.0 × 11.0 × 12.5	0.85	17503	600	17543	1000				
0.082			18203		18243					
0.091			19103		19143					
0.1	6.0 × 12.0 × 12.5	1.10	11004	500	11044	750				
0.11			11104		11144					
0.12			11204		11244					
0.13			11304		11344					
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm										
0.15	5.0 × 11.0 × 17.5	1.2			11504	1100	71504	1250		
0.16					11604		71604			
0.18	6.0 × 12.0 × 17.5	1.4			11804	900	71804	1000		
0.2					12004		72004			
0.22					12204		72204			
0.24					12404		72404			
0.27	7.0 × 13.5 × 17.5	1.9			12704	800	72704	750		
0.3					13004		73004			
0.33					13304		73304			
0.36					13604		73604			
0.39	8.5 × 15.0 × 17.5	2.6			13904	650	73904	750		
0.43					14304		74304			
0.47					14704		74704			
0.51					15104		75104			
0.56	10.0 × 16.5 × 17.5	3.1			15604	600	75604	500		
0.62					16204		76204			
0.68					16804		76804			



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$U_{Rdc} = 400\text{ V}$; $U_{Rac} = 125\text{ V}$; $U_{p-p} = 350\text{ V}$

C (E 24) (μF)	DIMENSIONS $w \times h \times l$ (mm)	MASS (g)	CATALOG NUMBER 2222 419 AND PACKAGING							
			AMMOPACK		LOOSE IN BOX		REEL		LOOSE IN BOX	
			H = 18.5 mm; P ₀ = 12.7 mm		l _t = 4.0 +1.0/-0.5 mm		H = 18.5 mm; P ₀ = 12.7 mm		l _t = 3.5 ±0.3 mm	
			C-tol = ±2%	SPQ	C-tol = ±2%	SPQ	C-tol = ±2%	SPQ	C-tol = ±2%	SPQ
last 5 digits of catalog number	last 5 digits of catalog number	last 5 digits of catalog number	last 5 digits of catalog number							
Pitch = 5.0 ±0.3 mm; d_t = 0.50 ±0.05 mm										
0.001	3.5 × 8.0 × 7.2	0.35	11002	1500	11042	3000				
0.0011			11102		11142					
0.0012			11202		11242					
0.0013			11302		11342					
0.0015			11502		11542					
0.0016			11602		11642					
0.0018			11802		11842					
0.002			12002		12042					
0.0022			12202		12242					
0.0024			12402		12442					
0.0027			12702		12742					
0.003			13002		13042					
0.0033			13302		13342					
0.0036			13602		13642					
0.0039			13902		13942					
0.0043	4.5 × 9.0 × 7.2	0.45	14302	1000	14342	2000				
0.0047			14702		14742					
0.0051			15102		15142					
0.0056			15602		15642					
0.0062			16202		16242					
0.0068			16802		16842					
0.0075			17502		17542					
0.0082			18202		18242					
0.0091			19102		19142					
0.01			11003		11043					
0.011	11103	11143								
0.012	11203	11243								
0.013	6.0 × 11.0 × 7.2	0.60	11303	750	11343	1500				
0.015			11503		11543					
0.016			11603		11643					
0.018			11803		11843					
0.02			12003		12043					
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm										
0.022	4.0 × 10.0 × 12.5	0.60	12203	750	12243	1000				
0.024			12403		12443					
0.027			12703		12743					
0.03			13003		13043					
0.033			13303		13343					
0.036	5.0 × 11.0 × 12.5	0.85	13603	600	13643	1000				
0.039			13903		13943					
0.043			14303		14343					

MKP 416 to 420

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C (E 24) (μ F)	DIMENSIONS w × h × l (mm)	MASS (g)	CATALOG NUMBER 2222 419 AND PACKAGING							
			AMMOPACK		LOOSE IN BOX		REEL		LOOSE IN BOX	
			H = 18.5 mm; P ₀ = 12.7 mm		l _t = 4.0 +1.0/-0.5 mm		H = 18.5 mm; P ₀ = 12.7 mm		l _t = 3.5 ±0.3 mm	
			C-tol = ±2%		C-tol = ±2%		C-tol = ±2%		C-tol = ±2%	
			last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ
0.047	6.0 × 12.0 × 12.5	1.10	14703	500	14743	750				
0.051			15103		15143					
0.056			15603		15643					
0.062			16203		16243					
0.068			16803		16843					
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm										
0.075	5.0 × 11.0 × 17.5	1.2			17503	1100		77503	1250	
0.082					18203			78203		
0.091	6.0 × 12.0 × 17.5	1.4			19103	900		79103	1000	
0.1					11004			71004		
0.11					11104			71104		
0.12					11204			71204		
0.13					11304			71304		
0.15	7.0 × 13.5 × 17.5	1.9			11504	800		71504	750	
0.16					11604			71604		
0.18					11804			71804		
0.2	8.5 × 15.0 × 17.5	2.6			12004	650		72004	750	
0.22					12204			72204		
0.24					12404			72404		
0.27					12704			72704		
0.3	10.0 × 16.5 × 17.5	3.1			13004	600		73004	500	
0.33					13304			73304		
0.36					13604			73604		

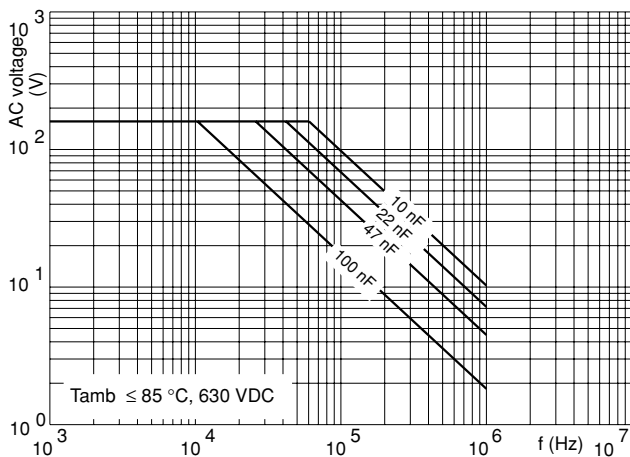
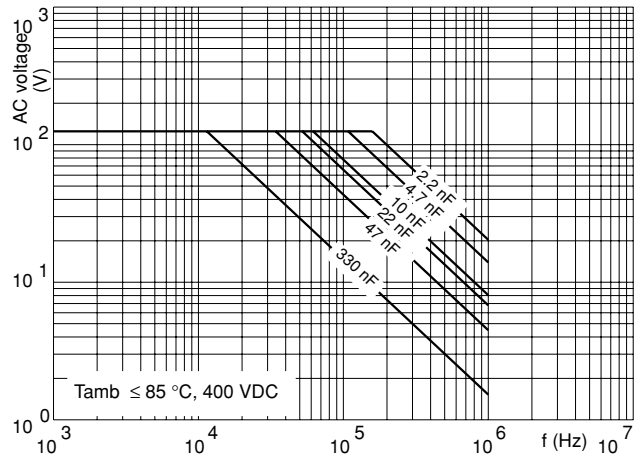
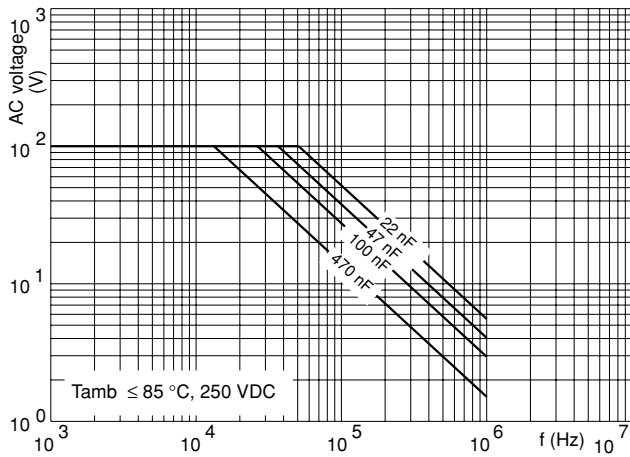
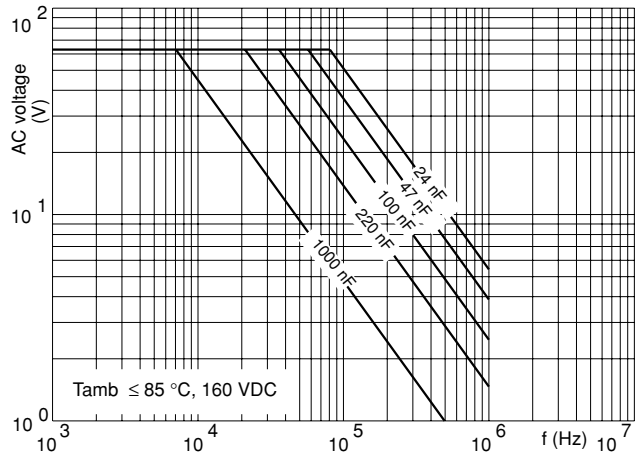
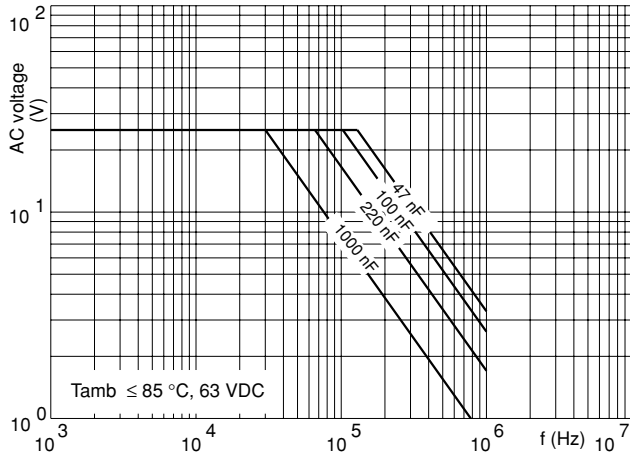


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$U_{Rdc} = 630\text{ V}$; $U_{Rac} = 160\text{ V}$; $U_{p-p} = 450\text{ V}$

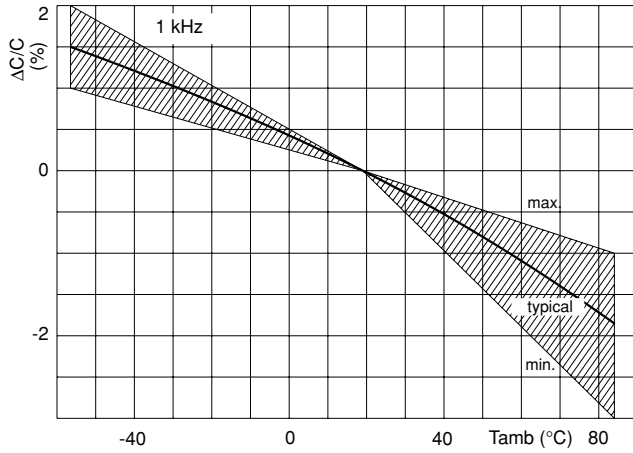
C (E 24) (μF)	DIMENSIONS $w \times h \times l$ (mm)	MASS (g)	CATALOG NUMBER 2222 420 AND PACKAGING							
			AMMOPACK		LOOSE IN BOX		REEL		LOOSE IN BOX	
			H = 18.5 mm; P ₀ = 12.7 mm		l _t = 4.0 +1.0/-0.5 mm		H = 18.5 mm; P ₀ = 12.7 mm		l _t = 3.5 ±0.3 mm	
			C-tol = ±2%		C-tol = ±2%		C-tol = ±2%		C-tol = ±2%	
			last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ	last 5 digits of catalog number	SPQ
Pitch = 5.0 ±0.3 mm; d_t = 0.50 ±0.05 mm										
0.0015	3.5 × 8.0 × 7.2	0.35	11502	1500	11542	3000				
0.0016			11602		11642					
0.0018			11802		11842					
0.002			12002		12042					
0.0022			12202		12242					
0.0024			12402		12442					
0.0027			12702		12742					
0.003	4.5 × 9.0 × 7.2	0.45	13002	1000	13042	2000				
0.0033			13302		13342					
0.0036			13602		13642					
0.0039			13902		13942					
0.0043	6.0 × 11.0 × 7.2	0.60	14302	750	14342	1500				
0.0047			14702		14742					
0.0051			15102		15142					
0.0056			15602		15642					
0.0062			16202		16242					
0.0068			16802		16842					
Pitch = 10.0 ±0.4 mm; d_t = 0.60 ±0.06 mm										
0.01	4.0 × 10.0 × 12.5	0.60	11003	750	11043	1000				
0.011			11103		11143					
0.012			11203		11243					
0.013			11303		11343					
0.015			11503		11543					
0.016			11603		11643					
0.018	5.0 × 11.0 × 12.5	0.85	11803	600	11843	1000				
0.02			12003		12043					
0.022			12203		12243					
0.024			12403		12443					
0.027	6.0 × 12.0 × 12.5	1.10	12703	500	12743	750				
0.03			13003		13043					
0.033			13303		13343					
0.036			13603		13643					
0.039			13903		13943					
0.043			14303		14343					
0.047			14703		14743					
Pitch = 15.0 ±0.4 mm; d_t = 0.80 ±0.08 mm										
0.051	6.0 × 12.0 × 17.5	1.4			15103	900	75103	1000		
0.056					15603		75603			
0.062	7.0 × 13.5 × 17.5	1.9			16203	800	76203	750		
0.068					16803		76803			
0.075					17503		77503			
0.082					18203		78203			
0.091	8.5 × 15.0 × 17.5	2.6			19103	650	79103	750		
0.1					11004		71004			
0.11					11104		71104			
0.12					11204		71204			
0.13	10.0 × 16.5 × 17.5	3.1			11304	600	71304	500		
0.15					11504		71504			
0.16					11604		71604			

MAXIMUM RMS VOLTAGE (SINEWAVE) AS A FUNCTION OF FREQUENCY





CAPACITANCE



IMPEDANCE

