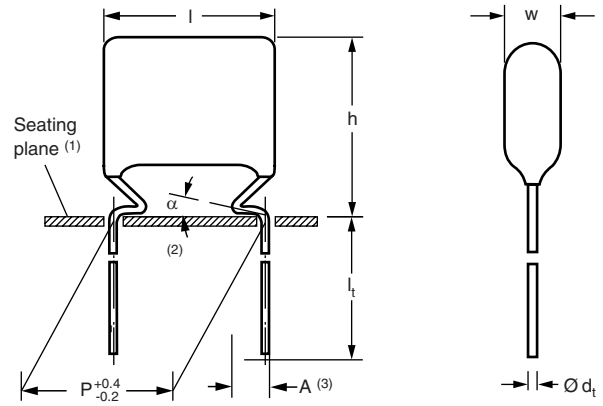
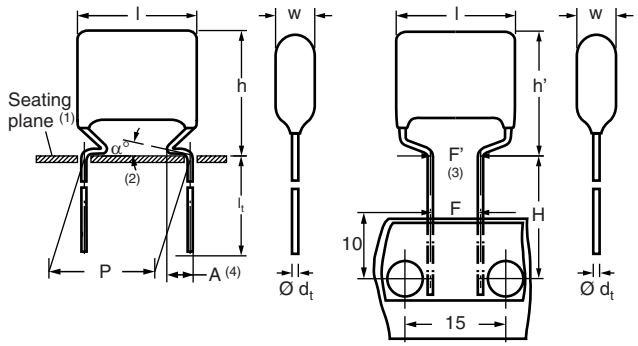
DC Film Capacitor
MKT Radial Lacquered Type

467



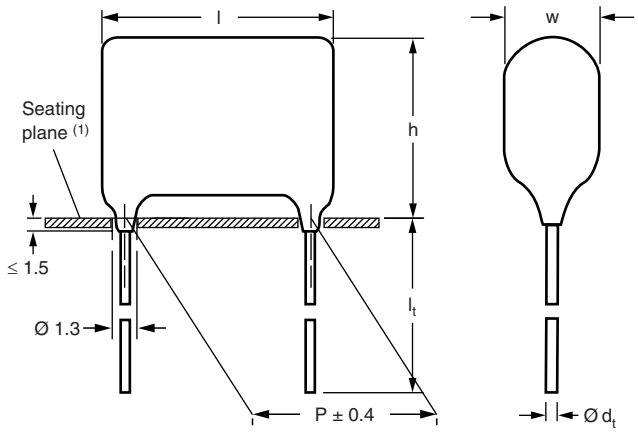
Notes
(1) Hole Ø 1.0 for d_t = 0.6 mm
(2) $0 \le \alpha < 50°$
(3) A = 2.0 ± 0.5 mm

468



Notes
(1) Hole Ø 1.0 for d_t = 0.8 mm
(2) $0 \le \alpha < 50°$
(3) |F - F'| < 0.3 mm
F = 7.5 + 0.6/- 0.1
(4) A = 2.5 + 1.4/- 0.5± 0.3 mm

469 Straight Leads



Note
(1) Hole Ø 1.0 for d_t = 0.6 mm

FEATURES
Available taped and loose in box
RoHs compliant

APPLICATIONS
Blocking and coupling, bypass and energy reservoir.

REFERENCE STANDARDS
IEC 60384-2

MARKING
C-value; tolerance; rated voltage; code for manufacturer; manufacturer's type; manufacturer's logo

DIELECTRIC
Polyester film

ELECTRODES
Metallized

CONSTRUCTION
Mono construction

RATED (DC) VOLTAGE
100 V, 250 V, 400 V, 630 V

RATED (AC) VOLTAGE
63 V, 160 V, 220 V, 250 V

ENCAPSULATION
Flame retardant epoxy material (UL-class 94 V-0)

CLIMATIC TESTING CLASS ACC. TO IEC 60068-1
55/105/56

RATED TEMPERATURE
85 °C

CAPACITANCE RANGE (E12 SERIES)
467: 0.001 µF to 1.0 µF
468: 0.001 µF to 10.0 µF
469: 0.001 µF to 1.0 µF

CAPACITANCE TOLERANCE
± 10 %, ± 5 %

LEADS
Tinned wire

MAXIMUM APPLICATION TEMPERATURE
105 °C

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

DC Film Capacitor
MKT Radial Lacquered Type

COMPOSITION OF CATALOG NUMBER: 467

TYPE AND PITCHES	
467	10.0 mm

CAPACITANCE (numerically)

MULTIPLIER (nF)	
0.1	2
1	3
10	4
100	5

Example:
104 = 10 x 10 = 100 nF

BFC2	**467**	**XX**	**YY**	**Y**
2222 (*)	**467**	**XX**	**YY**	**Y**

(*) Old ordering number

TYPE	PACKAGING	LEAD CONFIGURATION	PREFERRED TYPES				
			C-TOL.	100 V	250 V	400 V	630 V
MKT 467	Loose in box	Lead length 3.5 + 1.0/- 0.5 mm	± 10 %	04	16	28	40
			± 5 %	05	17	29	41
		Lead length 19.0 ± 4.0 mm	± 10 %	51	53	55	57
			± 5 %	52	54	56	58
	Taped on reel (1)	H = 16.0 mm; P_0 = 12.7 mm Reel diameter = 500 mm	± 10 %	06	18	30	42
			± 5 %	07	19	31	43

Notes
(1) For detailed tape specifications refer to packaging information: www.vishay.com/docs/28139/packinfo.pdf or end of catalogue
(2) SPQ = Standard Packaging Quantity

SPECIFIC REFERENCE DATA: 467

DESCRIPTION	VALUE			
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz	
C ≤ 0.1 µF	≤ 75 x 10^{-4}	≤ 120 x 10^{-4}	≤ 200 x 10^{-4}	
0.1 µF < C ≤ 0.47 µF	≤ 75 x 10^{-4}	≤ 120 x 10^{-4}	≤ 225 x 10^{-4}	
0.47 µF < C ≤ 1.0 µF	≤ 75 x 10^{-4}	≤ 120 x 10^{-4}	-	
Rated voltage pulse slope $(dU/dt)_R$ at $I_{max.}$ = 12.5 mm	100 Vdc	250 Vdc	400 Vdc	630 Vdc
	30 V/µs	120 V/µs	170 V/µs	120 V/µs
R between leads, for C ≤ 0.33 µF at 100 V; 1 min at 500 V; 1 min	> 15 000 MΩ	> 30 000 MΩ	> 30 000 MΩ	 > 30 000 MΩ
R between leads, for C >0.33 µF at 100 V; 1 min at 500 V; 1 min	> 5000 s	> 10 000 s	> 10 000 s	 > 10 000 s
R between interconnecting leads and casing, at 100 V; 1 min at 500 V; 1 min	> 30 000 MΩ			
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	160 V; 1 min	400 V; 1 min	640 V; 1 min	1008 V; 1 min
Withstanding (DC) voltage between leads and case	200 V; 1 min	500 V; 1 min	800 V; 1 min	1260 V; 1 min
Maximum application temperature	105 °C			

U_{Rdc} = 100 V; U_{Rac} = 63 V

C (µF)	DIMENSIONS $w_{max.}$ x $h_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 467..... AND PACKAGING						
			LOOSE IN BOX				REEL		C-VALUE
			l_t = 3.5 + 1.0/- 0.5 mm		l_t = 19.0 ± 4.0 mm		H = 16.0 mm; P_0 = 12.7 mm		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 10.0 ± 0.4 mm; d_t = 0.60 ± 0.06 mm									
0.056 0.068 0.082 0.1	4.0 x 14.0 x 12.5	0.37	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1500)	**07...** (1500)	**563** **683** **823** **104**
0.12	4.3 x 14.3 x 12.5	0.40	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1500)	**07...** (1500)	**124**
0.15	4.0 x 14.0 x 12.5	0.37	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1500)	**07...** (1500)	**154**
0.18	4.2 x 14.2 x 12.5	0.39	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1500)	**07...** (1500)	**184**
0.22	4.5 x 14.6 x 12.5	0.43	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1300)	**07...** (1300)	**224**
0.27	4.2 x 14.2 x 12.5	0.39	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1500)	**07...** (1500)	**274**
0.33	4.6 x 14.6 x 12.5	0.44	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1300)	**07...** (1300)	**334**
0.39	4.0 x 14.0 x 12.5	0.37	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1500)	**07...** (1500)	**394**
0.47	4.2 x 14.2 x 12.5	0.39	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1500)	**07...** (1500)	**474**
0.56	4.6 x 14.6 x 12.5	0.44	**04...** (2000)	**05...** (2000)	**51...** (1500)	**52...** (1500)	**06...** (1300)	**07...** (1300)	**564**
0.68	5.0 x 15.0 x 12.5	0.50	**04...** (1500)	**05...** (1500)	**51...** (1250)	**52...** (1250)	**06...** (1200)	**07...** (1200)	**684**
0.82	5.5 x 15.5 x 12.5	0.60	**04...** (1500)	**05...** (1500)	**51...** (1000)	**52...** (1000)	**06...** (1100)	**07...** (1100)	**824**
1.0	6.0 x 16.0 x 12.5	0.75	**04...** (1250)	**05...** (1250)	**51...** (1000)	**52...** (1000)	**06...** (1000)	**07...** (1000)	**105**

Note

(1) Net weight for short lead product only

U_{Rdc} = 250 V; U_{Rac} = 160 V

C (µF)	DIMENSIONS $w_{max.}$ x $h_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 467..... AND PACKAGING						
			LOOSE IN BOX				REEL		C-VALUE
			l_t = 3.5 + 1.0/- 0.5 mm		l_t = 19.0 ± 4.0 mm		H = 16.0 mm; P_0 = 12.7 mm		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 10.0 ± 0.4 mm; d_t = 0.60 ± 0.06 mm									
0.027	4.2 x 14.2 x 12.5	0.39	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1500)	**19...** (1500)	**273**
0.033	4.6 x 14.6 x 12.5	0.44	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1300)	**19...** (1300)	**333**
0.039	4.0 x 14.0 x 12.5	0.37	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1500)	**19...** (1500)	**393**
0.047	4.1 x 14.1 x 12.5	0.38	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1500)	**19...** (1500)	**473**
0.056	4.0 x 14.0 x 12.5	0.37	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1500)	**19...** (1500)	**563**
0.068	4.1 x 14.1 x 12.5	0.38	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1500)	**19...** (1500)	**683**
0.082	4.4 x 14.4 x 12.5	0.41	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1500)	**19...** (1500)	**823**
0.1	4.0 x 14.0 x 12.5	0.37	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1500)	**19...** (1500)	**104**
0.12	4.3 x 14.3 x 12.5	0.40	**16...** (2000)	**17...** (2000)	**53...** (1500)	**54...** (1500)	**18...** (1500)	**19...** (1500)	**124**
0.15	4.8 x 14.8 x 12.5	0.48	**16...** (2000)	**17...** (2000)	**53...** (1250)	**54...** (1250)	**18...** (1300)	**19...** (1300)	**154**
0.18	5.2 x 15.2 x 12.5	0.52	**16...** (1500)	**17...** (1500)	**53...** (1000)	**54...** (1000)	**18...** (1200)	**19...** (1200)	**184**
0.22	5.8 x 15.8 x 12.5	0.67	**16...** (1500)	**17...** (1500)	**53...** (1000)	**54...** (1000)	**18...** (1100)	**19...** (1100)	**224**

Note
(1) Net weight for short lead product only

U_{Rdc} = 400 V; U_{Rac} = 220 V

C (µF)	DIMENSIONS $w_{max.}$ x $h_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 467..... AND PACKAGING						C-VALUE
			LOOSE IN BOX				REEL		
			l_t = 3.5 + 1.0/- 0.5 mm		l_t = 19.0 ± 4.0 mm		H = 16.0 mm; P_0 = 12.7 mm		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 10.0 ± 0.4 mm; d_t = 0.60 ± 0.06 mm									
0.001 0.0012 0.0015 0.0018	4.5 x 14.5 x 12.5	0.43	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1300)	**31...** (1300)	**102** **122** **152** **182**
0.0022	4.0 x 14.0 x 12.5	0.37	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**222**
0.0027	4.3 x 14.3 x 12.5	0.40	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**272**
0.0033	4.6 x 14.6 x 12.5	0.44	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1300)	**31...** (1300)	**332**
0.0039	4.0 x 14.0 x 12.5	0.37	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**393**
0.0047	4.1 x 14.2 x 12.5	0.38	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**472**
0.0056	4.6 x 14.6 x 12.5	0.44	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1300)	**31...** (1300)	**562**
0.0068	4.2 x 14.2 x 12.5	0.39	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**682**
0.0082	4.6 x 14.6 x 12.5	0.44	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1300)	**31...** (1300)	**822**
0.01	4.1 x 14.1 x 12.5	0.38	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**103**
0.012	4.5 x 14.5 x 12.5	0.43	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1300)	**31...** (1300)	**123**
0.015	4.1 x 14.1 x 12.5	0.38	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**153**
0.018	4.5 x 14.5 x 12.5	0.43	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1300)	**31...** (1300)	**183**
0.022	4.0 x 14.0 x 12.5	0.37	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**223**
0.027	4.2 x 14.2 x 12.5	0.39	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**273**
0.033	4.6 x 14.7 x 12.5	0.44	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1300)	**31...** (1300)	**333**
0.039	5.0 x 14.9 x 12.5	0.50	**28...** (1500)	**29...** (1500)	**55...** (1250)	**56...** (1250)	**30...** (1200)	**31...** (1200)	**393**
0.047	4.1 x 14.1 x 12.5	0.38	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**473**
0.056	4.4 x 14.4 x 12.5	0.41	**28...** (2000)	**29...** (2000)	**55...** (1500)	**56...** (1500)	**30...** (1500)	**31...** (1500)	**563**
0.068	4.8 x 14.8 x 12.5	0.48	**28...** (2000)	**29...** (2000)	**55...** (1250)	**56...** (1250)	**30...** (1300)	**31...** (1300)	**683**
0.082	5.4 x 15.3 x 12.5	0.57	**28...** (1500)	**29...** (1500)	**55...** (1000)	**56...** (1000)	**30...** (1200)	**31...** (1200)	**823**
0.1	5.7 x 15.7 x 12.5	0.64	**28...** (1500)	**29...** (1500)	**55...** (1000)	**56...** (1000)	**30...** (1100)	**31...** (1100)	**104**

Note

(1) Net weight for short lead product only

U_{Rdc} = 630 V; U_{Rac} = 250 V

C (µF)	DIMENSIONS $w_{max.}$ x $h_{max.}$ x $l_{max.}$ (mm)	MASS (g) [1]	CATALOG NUMBER BFC2 467..... AND PACKAGING						
			LOOSE IN BOX				REEL		C-VALUE
			l_t = 3.5 + 1.0/- 0.5 mm		l_t = 19.0 ± 4.0 mm		H = 16.0 mm; P_0 = 12.7 mm		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	**XX** (SPQ)	**XX** (SPQ)	**XX** (SPQ)	**XX** (SPQ)	**XX** (SPQ)	**..YYY**
Pitch = 10.0 ± 0.4 mm; d_t = 0.60 ± 0.06 mm									
0.01	4.1 x 14.1 x 12.5	0.38	**40...** (2000)	**41...** (2000)	**57...** (1500)	**58...** (1500)	**42...** (1500)	**43...** (1500)	**103**
0.012	4.5 x 14.5 x 12.5	0.43	**40...** (2000)	**41...** (2000)	**57...** (1500)	**58...** (1500)	**42...** (1300)	**43...** (1300)	**123**
0.015	4.9 x 14.9 x 12.5	0.49	**40...** (2000)	**41...** (2000)	**57...** (1250)	**58...** (1250)	**42...** (1200)	**43...** (1200)	**153**
0.018	5.4 x 15.4 x 12.5	0.57	**40...** (1500)	**41...** (1500)	**57...** (1000)	**58...** (1000)	**42...** (1100)	**43...** (1100)	**183**
0.022	4.8 x 14.8 x 12.5	0.48	**40...** (2000)	**41...** (2000)	**57...** (1250)	**58...** (1250)	**42...** (1300)	**43...** (1300)	**223**
0.027	5.3 x 15.3 x 12.5	0.55	**40...** (2000)	**41...** (2000)	**57...** (1000)	**58...** (1000)	**42...** (1200)	**43...** (1200)	**273**
0.033	5.9 x 15.9 x 12.5	0.70	**40...** (1500)	**41...** (1500)	**57...** (1000)	**58...** (1000)	**42...** (1100)	**43...** (1100)	**333**

Note
[1] Net weight for short lead product only

COMPOSITION OF CATALOG NUMBER: 468

TYPE AND PITCHES	
468	15.0/7.5 mm
	15.0 mm
	22.5 mm
	27.5 mm

CAPACITANCE (numerically)

Example:
104 = 10 x 10 = 100 nF

MULTIPLIER (nF)	
0.1	2
1	3
10	4
100	5

BFC2	**468**	**XX**	**YY**	**Y**
2222 (*)	**468**	**XX**	**YY**	**Y**

(*) Old ordering number

TYPE	PACKAGING	LEAD CONFIGURATION	PREFERRED TYPES				
			C-TOL.	100 V	250 V	400 V	630 V
MKT 468	Loose in box	Lead length 3.5 + 1.0/- 0.5 mm (Pitch 10 and 15 mm) Lead length 3.5 ± 0.5 mm (Pitch 22.5 and 27.5 mm)	± 10 %	04	16	28	40
			± 5 %	05	17	29	41
		Long leads: 19.0 ± 4.0 mm for lead pitch = 15.0 mm 25.0 ± 4.0 mm for lead pitch = 22.5 mm 24.0 ± 4.0 mm for lead pitch = 27.5 mm	± 10 %	51	53	55	57
			± 5 %	52	54	56	58
	Taped on reel (1) (bent back)	H = 16.0 mm; P_0 = 15.0 mm Reel diameter = 500 mm (2)	± 10 %	61	63	65	67
			± 5 %	62	64	66	68
			Dimensions of these code numbers stay between brackets				
	Taped on reel (1)	H = 16.0 mm; P_0 = 12.7 mm Reel diameter = 500 mm	± 10 %	06	18	30	42
			5 %	07	19	31	43

Notes

(1) For detailed tape specifications refer to packaging information: www.vishay.com/docs/28139/packinfo.pdf or end of catalogue

(2) Small reel diameter = 356 mm is available on request

SPECIFIC REFERENCE DATA: 468

DESCRIPTION	VALUE			
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz	
C ≤ 0.1 µF	≤ 75 x 10^{-4}	≤ 120 x 10^{-4}	≤ 200 x 10^{-4}	
0.1 µF < C ≤ 0.47 µF	≤ 75 x 10^{-4}	≤ 120 x 10^{-4}	≤ 225 x 10^{-4}	
0.47 µF < C ≤ 10 µF	≤ 75 x 10^{-4}	≤ 150 x 10^{-4}	-	
Rated voltage pulse slope $(dU/dt)_R$ at	100 Vdc	250 Vdc	400 Vdc	630 Vdc
$I_{max.}$ = 12.5 mm	30 V/µs	120 V/µs	170 V/µs	120 V/µs
$I_{max.}$ = 17.5 mm	20 V/µs	45 V/µs	65 V/µs	90 V/µs
$I_{max.}$ = 26.0 mm	10 V/µs	20 V/µs	30 V/µs	35 V/µs
$I_{max.}$ = 30.0 mm		15 V/µs	25 V/µs	30 V/µs
R between leads, for C ≤ 0.33 µF at 100 V; 1 min	> 15 000 MΩ	> 30 000 MΩ	> 30 000 MΩ	
at 500 V; 1 min				> 30 000 MΩ
R between leads, for C >0.33 µF at 100 V; 1 min	> 5000 s	> 10 000 s	> 10 000 s	
at 500 V; 1 min				> 10 000 s
R between interconnecting leads and casing, at 100 V; 1 min	> 30 000 MΩ	> 30 000 MΩ	> 30 000 MΩ	
at 500 V; 1 min				> 30 000 MΩ
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	160 V; 1 min	400 V; 1 min	640 V; 1 min	1008 V; 1 min
Withstanding (DC) voltage between leads and case	200 V; 1 min	500 V; 1 min	800 V; 1 min	1260 V; 1 min
Maximum application temperature	105 °C			

U_{Rdc} = 100 V; U_{Rac} = 63 V

C (µF)	DIMENSIONS $w_{max.}$ x h (h')$_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 467..... AND PACKAGING								
			LOOSE IN BOX				REEL H = 16.0 mm				C-VALUE
							Original pitch		Bent back pitch		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 15.0 ± 0.4 mm; d_t = 0.80 ± 0.08 mm											
			l_t = 3.5 + 1.0/- 0.5 mm		l_t = 19.0 ± 4.0 mm		P = 15 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
1.2	5.5 x 14.5 (16.0) x 17.5	0.90	04... (2000)	05... (2000)	51... (1250)	52... (1250)	06... (1100)	07... (1100)	61... (900)	62... (900)	125
1.5	6.0 x 15.0 (16.5) x 17.5	1.00	04... (2000)	05... (2000)	51... (1250)	52... (1250)	06... (1000)	07... (1000)	61... (800)	62... (800)	155
1.8	6.5 x 15.5 (17.0) x 17.5	1.15	04... (1500)	05... (1500)	51... (1000)	52... (1000)	06... (900)	07... (900)	61... (750)	62... (750)	185
2.2	7.0 x 16.0 (17.5) x 17.5	1.25	04... (1250)	05... (1250)	51... (1000)	52... (1000)	06... (800)	07... (800)	61... (700)	62... (700)	225
2.7	8.0 x 17.0 (18.5) x 17.5	1.50	04... (1000)	05... (1000)	51... (1000)	52... (1000)	06... (750)	07... (750)	61... (600)	62... (600)	275
3.3	8.5 x 17.5 (19.0) x 17.5	1.70	04... (1000)	05... (1000)	51... (1000)	52... (1000)	06... (700)	07... (700)	61... (550)	62... (550)	335
Pitch = 22.5 ± 0.4 mm; d_t = 0.80 ± 0.08 mm											
			l_t = 3.5 ± 0.5 mm		l_t = 25.0 ± 4.0 mm		P = 22.5 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
3.9	6.5 x 18.5 x 26.0	2.1	04... (1000)	05... (1000)	51... (750)	52... (750)	06... (650)	07... (650)			395
4.7	7.0 x 19.5 x 26.0	2.3	04... (900)	05... (900)	51... (700)	52... (700)	06... (550)	07... (550)			475
5.6	7.5 x 20.0 x 26.0	2.5	04... (750)	05... (750)	51... (600)	52... (600)	06... (500)	07... (500)			565
6.8	8.5 x 21.5 x 26.0	3.2	04... (750)	05... (750)	51... (500)	52... (500)	06... (450)	07... (450)	-		685
8.2	9.5 x 22.5 x 26.0	3.4	04... (700)	05... (700)	51... (500)	52... (500)	06... (400)	07... (400)			825
10.0	10.5 x 23.5 x 26.0	3.8	04... (500)	05... (500)	51... (400)	52... (400)	06... (350)	07... (350)			106

Note

(1) Net weight for short lead product only

U_{Rdc} = 250 V; U_{Rac} = 160 V

C (µF)	DIMENSIONS $w_{max.}$ x h $(h')_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 468..... AND PACKAGING								
			LOOSE IN BOX				REEL H = 16.0 mm				C-VALUE
							Original pitch		Bent back pitch		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 15.0 ± 0.4 mm; d_t = 0.80 ± 0.08 mm											
			l_t = 3.5 + 1.0/- 0.5 mm		l_t = 19.0 ± 4.0 mm		P = 15 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
0.27	5.0 x 14.0 (15.5) x 17.5	0.80	**16...** (2000)	**17...** (2000)	**53...** (1250)	**54...** (1250)	**18...** (1200)	**19...** (1200)	**63...** (1000)	**64...** (1000)	**274**
0.33	5.5 x 14.5 (16.0) x 17.5	0.90	**16...** (2000)	**17...** (2000)	**53...** (1250)	**54...** (1250)	**18...** (1100)	**19...** (1100)	**63...** (900)	**64...** (900)	**334**
0.39	6.0 x 15.0 (16.5) x 17.5	1.00	**16...** (2000)	**17...** (2000)	**53...** (1250)	**54...** (1250)	**18...** (1000)	**19...** (1000)	**63...** (800)	**64...** (800)	**394**
0.47	6.5 x 15.5 (17.0) x 17.5	1.15	**16...** (1500)	**17...** (1500)	**53...** (1000)	**54...** (1000)	**18...** (900)	**19...** (900)	**63...** (750)	**64...** (750)	**474**
0.56	7.5 x 16.5 (18.0) x 17.5	1.30	**16...** (1250)	**17...** (1250)	**53...** (1000)	**54...** (1000)	**18...** (800)	**19...** (800)	**63...** (650)	**64...** (650)	**564**
0.68	8.0 x 17.0 (18.5) x 17.5	1.50	**16...** (1000)	**17...** (1000)	**53...** (1000)	**54...** (1000)	**18...** (750)	**19...** (750)	**63...** (600)	**64...** (600)	**684**
0.82	8.5 x 17.5 (19.0) x 17.5	1.70	**16...** (1000)	**17...** (1000)	**53...** (1000)	**54...** (1000)	**18...** (700)	**19...** (700)	**63...** (550)	**64...** (550)	**824**
1.0	8.0 x 20.0 (21.5) x 17.5	2.10	**16...** (1000)	**17...** (1000)	**53...** (900)	**54...** (900)	**18...** (750)	**19...** (750)	**63...** (600)	**64...** (600)	**105**
Pitch = 22.5 ± 0.4 mm; d_t = 0.80 ± 0.08 mm											
			l_t = 3.5 ± 0.5 mm		l_t = 25.0 ± 4.0 mm		P = 22.5 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
1.2	7.0 x 19.0 x 26.0	2.3	**16...** (1000)	**17...** (1000)	**53...** (700)	**54...** (700)	**18...** (550)	**19...** (550)			**125**
1.5	8.0 x 21.0 x 26.0	2.8	**16...** (750)	**17...** (750)	**53...** (500)	**54...** (500)	**18...** (500)	**19...** (500)			**155**
1.8	9.0 x 22.0 x 26.0	3.3	**16...** (750)	**17...** (750)	**53...** (500)	**54...** (500)	**18...** (450)	**19...** (450)			**185**
2.2	9.8 x 23.0 x 26.0	3.4	**16...** (750)	**17...** (750)	**53...** (450)	**54...** (450)	**18...** (400)	**19...** (400)			**225**
2.7	11.0 x 24.0 x 26.0	4.0	**16...** (500)	**17...** (500)	**53...** (400)	**54...** (400)	**18...** (350)	**19...** (350)	-		**275**
3.3	12.5 x 25.5 x 26.0	4.5	**16...** (500)	**17...** (500)	**53...** (300)	**54...** (300)	**18...** (350)	**19...** (350)			**335**
3.9	13.5 x 26.5 x 26.0	5.5	**16...** (400)	**17...** (400)	**53...** (300)	**54...** (300)	**18...** (300)	**19...** (300)			**395**
4.7	14.9 x 28.0 x 26.0	6.3	**16...** (250)	**17...** (250)	**53...** (250)	**54...** (250)	**18...** (250)	**19...** (250)			**475**
Pitch = 27.5 ± 0.4 mm; d_t = 0.80 ± 0.08 mm; A = 2.5 + 1.4/- 0.5 mm											
			l_t = 3.5 ± 0.5 mm		l_t = 24.0 ± 4.0 mm		P = 27.5 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
5.6	15.0 x 28.0 x 30.0	7.5	**16...** (300)	**17...** (300)	**53...** (200)	**54...** (200)	-		-		**565**

Note

(1) Net weight for short lead product only

U_{Rdc} = 400 V; U_{Rac} = 220 V

C (µF)	DIMENSIONS $w_{max.}$ x h (h')$_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 468..... AND PACKAGING								
			LOOSE IN BOX				REEL H = 16.0 mm				C-VALUE
							Original pitch		Bent back pitch		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 15.0 ± 0.4 mm; d_t = 0.80 ± 0.08 mm											
			l_t = 3.5 + 1.0/- 0.5 mm		l_t = 19.0 ± 4.0 mm		P = 15 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
0.12	5.0 x 14.0 (15.5) x 17.5	0.80	**28...** (2000)	**29...** (2000)	**55...** (1250)	**56...** (1250)	**30...** (1200)	**31...** (1200)	**65...** (1000)	**66...** (1000)	**124**
0.15	5.8 x 15.0 (16.5) x 17.5	0.95	**28...** (1750)	**29...** (1750)	**55...** (1250)	**56...** (1250)	**30...** (1100)	**31...** (1100)	**65...** (850)	**66...** (850)	**154**
0.18	6.5 x 15.5 (17.0) x 17.5	1.15	**28...** (1500)	**29...** (1500)	**55...** (1000)	**56...** (1000)	**30...** (900)	**31...** (900)	**65...** (750)	**66...** (750)	**184**
0.22	7.0 x 16.0 (17.5) x 17.5	1.25	**28...** (1500)	**29...** (1500)	**55...** (1000)	**56...** (1000)	**30...** (800)	**31...** (800)	**65...** (700)	**66...** (700)	**224**
0.27	7.4 x 16.5 (18.0) x 17.5	1.28	**28...** (1250)	**29...** (1250)	**55...** (1250)	**56...** (1250)	**30...** (800)	**31...** (800)	**65...** (650)	**66...** (650)	**274**
0.33	8.5 x 17.5 (19.0) x 17.5	1.70	**28...** (1000)	**29...** (1000)	**55...** (1000)	**56...** (1000)	**30...** (700)	**31...** (700)	**65...** (550)	**66...** (550)	**334**
0.39	7.4 x 19.5 (21.0) x 17.5	2.00	**28...** (1000)	**29...** (1000)	**55...** (1000)	**56...** (1000)	**30...** (800)	**31...** (800)	**65...** (650)	**66...** (650)	**394**
0.47	8.4 x 20.5 (22.0) x 17.5	2.10	**28...** (750)	**29...** (750)	**55...** (850)	**56...** (850)	**30...** (700)	**31...** (700)	**65...** (550)	**66...** (550)	**474**
Pitch = 22.5 ± 0.4 mm; d_t = 0.80 ± 0.08 mm											
			l_t = 3.5 ± 0.5 mm		l_t = 25.0 ± 4.0 mm		P = 22.5 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
0.56	7.0 x 19.5 x 26.0	2.5	**28...** (1000)	**29...** (1000)	**55...** (650)	**56...** (650)	**30...** (550)	**28...** (550)			**564**
0.68	8.0 x 21.0 x 26.0	2.8	**28...** (750)	**29...** (750)	**55...** (500)	**56...** (500)	**30...** (500)	**28...** (500)			**684**
0.82	9.0 x 22.0 x 26.0	3.3	**28...** (750)	**29...** (750)	**55...** (500)	**56...** (500)	**30...** (450)	**28...** (450)	-		**824**
1.0	9.9 x 23.0 x 26.0	3.5	**28...** (750)	**29...** (750)	**55...** (450)	**56...** (450)	**30...** (400)	**28...** (400)			**105**
1.2	11.0 x 24.0 x 26.0	4.0	**28...** (500)	**29...** (500)	**55...** (400)	**56...** (400)	**30...** (350)	**28...** (350)			**125**
Pitch = 27.5 ± 0.4 mm; d_t = 0.80 ± 0.08 mm; A = 2.5 + 1.4/- 0.5 mm											
			l_t = 3.5 ± 0.5 mm		l_t = 24.0 ± 4.0 mm		P = 27.5 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
1.5	11.5 x 24.5 x 30.0	5.8	**28...** (450)	**29...** (450)	**55...** (300)	**56...** (300)					**155**
1.8	12.5 x 25.5 x 30.0	6.4	**28...** (350)	**29...** (350)	**55...** (250)	**56...** (250)	-		-		**185**
2.2	14.0 x 27.0 x 30.0	7.3	**28...** (300)	**29...** (300)	**55...** (200)	**56...** (200)					**225**

Note

(1) Net weight for short lead product only

U_{Rdc} = 630 V; U_{Rac} = 250 V

C (µF)	DIMENSIONS $w_{max.}$ x h $(h')_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 468..... AND PACKAGING								C-VALUE
			LOOSE IN BOX				REEL H = 16.0 mm				
							Original pitch		Bent back pitch		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 15.0 ± 0.4 mm; d_t = 0.80 ± 0.08 mm											
			l_t = 3.5 + 1.0/- 0.5 mm		l_t = 19.0 ± 4.0 mm		P = 15 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
0.039	5.0 x 14.0 (15.5) x 17.5	0.80	**40...** (2000)	**41...** (2000)	**57...** (1250)	**58...** (1250)	**42...** (1200)	**43...** (1200)	**67...** (1000)	**68...** (1000)	**393**
0.047	5.5 x 14.5 (16.0) x 17.5	0.90	**40...** (2000)	**41...** (2000)	**57...** (1250)	**58...** (1250)	**42...** (1100)	**43...** (1100)	**67...** (900)	**68...** (900)	**473**
0.056	5.9 x 15.0 (16.5) x 17.5	0.95	**40...** (1750)	**41...** (1750)	**57...** (1250)	**58...** (1250)	**42...** (1000)	**43...** (1000)	**67...** (850)	**68...** (850)	**563**
0.068	6.5 x 16.0 (17.5) x 17.5	1.15	**40...** (1500)	**41...** (1500)	**57...** (1000)	**58...** (1000)	**42...** (800)	**43...** (800)	**67...** (750)	**68...** (750)	**683**
0.082	7.3 x 16.5 (18.0) x 17.5	1.27	**40...** (1500)	**41...** (1500)	**57...** (1000)	**58...** (1000)	**42...** (800)	**43...** (800)	**67...** (650)	**68...** (650)	**823**
0.1	7.9 x 17.0 (18.5) x 17.5	1.48	**40...** (1250)	**41...** (1250)	**57...** (1000)	**58...** (1000)	**42...** (750)	**43...** (750)	**67...** (600)	**68...** (600)	**104**
0.12	7.5 x 19.5 (21.0) x 17.5	2.00	**40...** (1250)	**41...** (1250)	**57...** (1000)	**58...** (1000)	**42...** (800)	**43...** (800)	**67...** (650)	**68...** (650)	**124**
0.15	8.5 x 20.5 (22.0) x 17.5	2.20	**40...** (1000)	**41...** (1000)	**57...** (850)	**58...** (850)	**42...** (700)	**43...** (700)	**67...** (550)	**68...** (550)	**154**
Pitch = 22.5 ± 0.4 mm; d_t = 0.80 ± 0.08 mm											
			l_t = 3.5 ± 0.5 mm		l_t = 25.0 ± 4.0 mm		P = 22.5 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
0.18	7.5 x 19.5 x 26.0	2.5	**40...** (1000)	**41...** (1000)	**57...** (650)	**58...** (650)	**42...** (550)	**43...** (550)			**184**
0.22	8.0 x 21.0 x 26.0	2.8	**40...** (750)	**41...** (750)	**57...** (500)	**58...** (500)	**42...** (500)	**43...** (500)			**224**
0.27	9.0 x 22.0 x 26.0	3.3	**40...** (750)	**41...** (750)	**57...** (500)	**58...** (500)	**42...** (450)	**43...** (450)			**274**
0.33	10.0 x 23.0 x 26.0	3.5	**40...** (700)	**41...** (700)	**57...** (450)	**58...** (450)	**42...** (400)	**43...** (400)			**334**
0.39	11.5 x 24.0 x 26.0	4.2	**40...** (600)	**41...** (600)	**57...** (400)	**58...** (400)	**42...** (350)	**43...** (350)	-		**394**
0.47	12.5 x 25.5 x 26.0	4.5	**40...** (500)	**41...** (500)	**57...** (300)	**58...** (300)	**42...** (350)	**43...** (350)			**474**
0.56	13.5 x 26.6 x 26.0	5.5	**40...** (450)	**41...** (450)	**57...** (300)	**58...** (300)	**42...** (300)	**43...** (300)			**564**
0.68	15.0 x 28.0 x 26.0	6.5	**40...** (400)	**41...** (400)	**57...** (250)	**58...** (250)	**42...** (250)	**43...** (250)			**684**
Pitch = 27.5 ± 0.4 mm; d_t = 0.80 ± 0.08 mm; A = 2.5 + 1.4/- 0.5 mm											
			l_t = 3.5 ± 0.5 mm		l_t = 24.0 ± 4.0 mm		P = 27.5 mm P_0 = 12.7 mm		P = 7.5 mm P_0 = 15.0 mm		
0.82	15.0 x 28.0 x 30.0	7.5	**40...** (300)	**41...** (300)	**57...** (200)	**58...** (200)	-		-		-

Note

(1) Net weight for short lead product only

DC Film Capacitor
MKT Radial Lacquered Type

COMPOSITION OF CATALOG NUMBER: 469

TYPE AND PITCHES	
469	10.0 mm

CAPACITANCE (numerically)

MULTIPLIER (nF)	
0.1	2
1	3
10	4
100	5

Example:
104 = 10 x 10 = 100 nF

BFC2	469	XX	YY	Y
2222 (*)	469	XX	YY	Y

(*) Old ordering number

TYPE	PACKAGING	LEAD CONFIGURATION	PREFERRED TYPES				
			C-TOL.	100 V	250 V	400 V	630 V
MKT 469	Loose in box	Lead length 4.0 + 1.0/- 0.5 mm	± 10 %	25	45	55	65
			± 5 %	26	46	56	66
		Lead length 22.0 ± 4.0 mm	± 10 %	21	41	51	61
			± 5 %	22	42	52	62
	Taped on reel (1)	H = 18.5 mm; P_0 = 12.7 mm Reel diameter = 500 mm	± 10 %	28	48	58	68
			± 5 %	29	49	59	69

Notes
(1) For detailed tape specifications refer to packaging information: www.vishay.com/docs/28139/packinfo.pdf or end of catalogue
(2) SPQ = Standard Packaging Quantity

SPECIFIC REFERENCE DATA: 469

DESCRIPTION	VALUE			
Tangent of loss angle:	at 1 kHz	at 10 kHz	at 100 kHz	
C ≤ 0.1 µF	≤ 75 x 10^{-4}	≤ 120 x 10^{-4}	≤ 200x 10^{-4}	
0.1 µF < C ≤ 0.47 µF	≤ 75 x 10^{-4}	≤ 120 x 10^{-4}	≤ 225 x 10^{-4}	
0.47 µF < C ≤ 1.0 µF	≤ 75 x 10^{-4}	≤ 120 x 10^{-4}	-	
Rated voltage pulse slope $(dU/dt)_R$ at $I_{max.}$ = 12.5 mm	100 Vdc	250 Vdc	400 Vdc	630 Vdc
	30 V/µs	120 V/µs	170 V/µs	120 V/µs
R between leads, for C ≤ 0.33 µF at 100 V; 1 min at 500 V; 1 min	> 15 000 MΩ	> 30 000 MΩ	> 30 000 MΩ	 > 30 000 MΩ
R between leads, for C >0.33 µF at 100 V; 1 min at 500 V; 1 min	> 5000 s	> 10 000 s	> 10 000 s	 > 10 000 s
R between interconnecting leads and casing, at 100 V; 1 min at 500 V; 1 min	> 30 000 MΩ	> 30 000 MΩ	> 30 000 MΩ	 > 30 000 MΩ
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	160 V; 1 min	400 V; 1 min	640 V; 1 min	1008 V; 1 min
Withstanding (DC) voltage between leads and case	200 V; 1 min	500 V; 1 min	840 V; 1 min	1260 V; 1 min
Maximum application temperature	105 °C			

U_{Rdc} = 100 V; U_{Rac} = 63 V

C (µF)	DIMENSIONS $w_{max.}$ x $h_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 469..... AND PACKAGING						
			LOOSE IN BOX				REEL		C-VALUE
			l_t = 4.0 + 1.0/- 0.5 mm		l_t = 22.0 ± 4.0 mm		H = 18.5 mm; P_0 = 12.7 mm		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 10.0 ± 0.4 mm; d_t = 0.60 ± 0.06 mm									
0.056 0.068 0.082 0.1	4.0 x 11.0 x 12.5	0.35	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1500)	**29...** (1500)	**563** **683** **823** **104**
0.12	4.3 x 11.3 x 12.5	0.38	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1500)	**29...** (1500)	**124**
0.15	3.9 x 10.9 x 12.5	0.34	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1500)	**29...** (1500)	**154**
0.18	4.2 x 11.2 x 12.5	0.37	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1500)	**29...** (1500)	**184**
0.22	4.5 x 11.5 x 12.5	0.40	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1300)	**29...** (1300)	**224**
0.27	4.2 x 11.2 x 12.5	0.37	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1500)	**29...** (1500)	**274**
0.33	4.6 x 11.6 x 12.5	0.41	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1300)	**29...** (1300)	**334**
0.39	4.0 x 11.0 x 12.5	0.35	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1500)	**29...** (1500)	**394**
0.47	4.2 x 11.2 x 12.5	0.37	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1500)	**29...** (1500)	**474**
0.56	4.6 x 11.6 x 12.5	0.41	**25...** (2000)	**26...** (2000)	**21...** (1500)	**22...** (1500)	**28...** (1300)	**29...** (1300)	**564**
0.68	5.0 x 12.0 x 12.5	0.44	**25...** (1500)	**26...** (1500)	**21...** (1250)	**22...** (1250)	**28...** (1200)	**29...** (1200)	**684**
0.82	5.5 x 12.5 x 12.5	0.47	**25...** (1500)	**26...** (1500)	**21...** (1000)	**22...** (1000)	**28...** (1100)	**29...** (1100)	**824**
1.0	6.0 x 13.0 x 12.5	0.55	**25...** (1250)	**26...** (1250)	**21...** (1000)	**22...** (1000)	**28...** (1000)	**29...** (1000)	**105**

Note

(1) Net weight for short lead product only

U_{Rdc} = 250 V; U_{Rac} = 160 V

C (µF)	DIMENSIONS $w_{max.}$ x $h_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 469..... AND PACKAGING						
			LOOSE IN BOX				REEL		C-VALUE
			l_t = 4.0 + 1.0/- 0.5 mm		l_t = 22.0 ± 4.0 mm		H = 18.5 mm; P_0 = 12.7 mm		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 10.0 ± 0.4 mm; d_t = 0.60 ± 0.06 mm									
0.027	4.2 x 11.2 x 12.5	0.37	**45...** (2000)	**46...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1500)	**49...** (1500)	**273**
0.033	4.6 x 11.6 x 12.5	0.41	**45...** (2000)	**467...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1300)	**49...** (1300)	**333**
0.039	4.0 x 11.0 x 12.5	0.35	**45...** (2000)	**46...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1500)	**49...** (1500)	**393**
0.047	4.1 x 11.1 x 12.5	0.36	**45...** (2000)	**46...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1500)	**49...** (1500)	**473**
0.056	4.0 x 11.0 x 12.5	0.35	**45...** (2000)	**46...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1500)	**49...** (1500)	**563**
0.068	4.1 x 11.1 x 12.5	0.36	**45...** (2000)	**46...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1500)	**49...** (1500)	**683**
0.082	4.4 x 11.4 x 12.5	0.39	**45...** (2000)	**46...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1500)	**49...** (1500)	**823**
0.1	4.0 x 11.0 x 12.5	0.35	**45...** (2000)	**46...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1500)	**49...** (1500)	**104**
0.12	4.3 x 11.3 x 12.5	0.38	**45...** (2000)	**46...** (2000)	**41...** (1500)	**42...** (1500)	**48...** (1500)	**49...** (1500)	**124**
0.15	4.8 x 11.8 x 12.5	0.42	**45...** (2000)	**46...** (2000)	**41...** (1250)	**42...** (1250)	**48...** (1300)	**49...** (1300)	**154**
0.18	5.2 x 12.2 x 12.5	0.45	**45...** (1500)	**46...** (1500)	**41...** (1000)	**42...** (1000)	**48...** (1200)	**49...** (1200)	**184**
0.22	5.8 x 12.8 x 12.5	0.50	**45...** (1500)	**46...** (1500)	**41...** (1000)	**42...** (1000)	**48...** (1100)	**49...** (1100)	**224**

Note

(1) Net weight for short lead product only

U_{Rdc} = 400 V; U_{Rac} = 220 V

C (µF)	DIMENSIONS $w_{max.}$ x $h_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 469..... AND PACKAGING						C-VALUE
			LOOSE IN BOX				REEL		
			l_t = 4.0 + 1.0/- 0.5 mm		l_t = 22.0 ± 4.0 mm		H = 18.5 mm; P_0 = 12.7 mm		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 10.0 ± 0.4 mm; d_t = 0.60 ± 0.06 mm									
0.001 0.0012 0.0015 0.0018	4.5 x 11.5 x 12.5	0.40	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1300)	**59...** (1300)	**102** **122** **152** **182**
0.0022	4.0 x 11.0 x 12.5	0.35	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**222**
0.0027	4.3 x 11.3 x 12.5	0.38	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**272**
0.0033	4.6 x 11.6 x 12.5	0.41	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1300)	**59...** (1300)	**332**
0.0039	4.0 x 11.0 x 12.5	0.35	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**392**
0.0047	4.1 x 11.1 x 12.5	0.36	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**472**
0.0056	4.6 x 11.6 x 12.5	0.41	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1300)	**59...** (1300)	**562**
0.0068	4.2 x 11.2 x 12.5	0.37	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**682**
0.0082	4.6 x 11.6 x 12.5	0.41	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1300)	**59...** (1300)	**822**
0.01	4.1 x 11.1 x 12.5	0.36	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**103**
0.012	4.5 x 11.5 x 12.5	0.40	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1300)	**59...** (1300)	**123**
0.015	4.1 x 11.1 x 12.5	0.36	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**153**
0.018	4.5 x 11.5 x 12.5	0.40	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1300)	**59...** (1300)	**183**
0.022	4.0 x 11.0 x 12.5	0.35	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**223**
0.027	4.2 x 11.2 x 12.5	0.37	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**273**
0.033	4.6 x 11.6 x 12.5	0.41	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1300)	**59...** (1300)	**333**
0.039	5.0 x 12.0 x 12.5	0.44	**55...** (1500)	**56...** (1500)	**51...** (1250)	**52...** (1250)	**58...** (1200)	**59...** (1200)	**393**
0.047	4.1 x 11.1 x 12.5	0.36	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**473**
0.056	4.4 x 11.4 x 12.5	0.39	**55...** (2000)	**56...** (2000)	**51...** (1500)	**52...** (1500)	**58...** (1500)	**59...** (1500)	**563**
0.068	4.8 x 11.8 x 12.5	0.42	**55...** (2000)	**56...** (2000)	**51...** (1250)	**52...** (1250)	**58...** (1300)	**59...** (1300)	**683**
0.082	5.4 x 12.4 x 12.5	0.46	**55...** (1500)	**56...** (1500)	**51...** (1000)	**52...** (1000)	**58...** (1200)	**59...** (1200)	**823**
0.1	5.7 x 12.7 x 12.5	0.48	**55...** (1500)	**56...** (1500)	**51...** (1000)	**52...** (1000)	**58...** (1100)	**59...** (1100)	**104**

Note

(1) Net weight for short lead product only

U_{Rdc} = 630 V; U_{Rac} = 250 V

C (µF)	DIMENSIONS $w_{max.}$ x $h_{max.}$ x $l_{max.}$ (mm)	MASS (g) (1)	CATALOG NUMBER BFC2 469..... AND PACKAGING						
			LOOSE IN BOX				REEL		C-VALUE
			l_t = 4.0 + 1.0/- 0.5 mm		l_t = 22.0 ± 4.0 mm		H = 18.5 mm; P_0 = 12.7 mm		
			C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	C-tol. = ± 10 %	C-tol. = ± 5 %	
			XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	XX (SPQ)	..YYY
Pitch = 10.0 ± 0.4 mm; d_t = 0.60 ± 0.06 mm									
0.01	4.1 x 11.1 x 12.5	0.36	**65...** (2000)	**66...** (2000)	**61...** (1500)	**62...** (1500)	**68...** (1500)	**69...** (1500)	**103**
0.012	4.5 x 11.5 x 12.5	0.40	**65...** (2000)	**66...** (2000)	**61...** (1500)	**62...** (1500)	**68...** (1300)	**69...** (1300)	**123**
0.015	4.9 x 11.9 x 12.5	0.43	**65...** (2000)	**66...** (2000)	**61...** (1250)	**62...** (1250)	**68...** (1200)	**69...** (1200)	**153**
0.018	5.4 x 12.4 x 12.5	0.46	**65...** (1500)	**66...** (1500)	**61...** (1000)	**62...** (1000)	**68...** (1100)	**69...** (1100)	**183**
0.022	4.8 x 11.8 x 12.5	0.42	**65...** (2000)	**66...** (2000)	**61...** (1250)	**62...** (1250)	**68...** (1300)	**69...** (1300)	**223**
0.027	5.3 x 12.3 x 12.5	0.46	**65...** (2000)	**66...** (2000)	**61...** (1000)	**62...** (1000)	**68...** (1200)	**69...** (1200)	**273**
0.033	5.9 x 12.9 x 12.5	0.52	**65...** (1500)	**66...** (1500)	**61...** (1000)	**62...** (1000)	**68...** (1100)	**69...** (1100)	**333**

Note
(1) Net weight for short lead product only

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 packaging information: www.vishay.com/docs/28139/packinfo.pdf or end of catalogue.

Specific Method of Mounting to Withstand Vibration and Shock

In order to withstand vibration and shock tests, it must be ensured that the underside and the kinks are in good contact with the printed-circuit board.

- For pitches ≤ 15 mm capacitors shall be mechanically fixed by the leads
- For larger pitches the capacitors shall be mounted in the same way and the body clamped

Storage Temperature

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

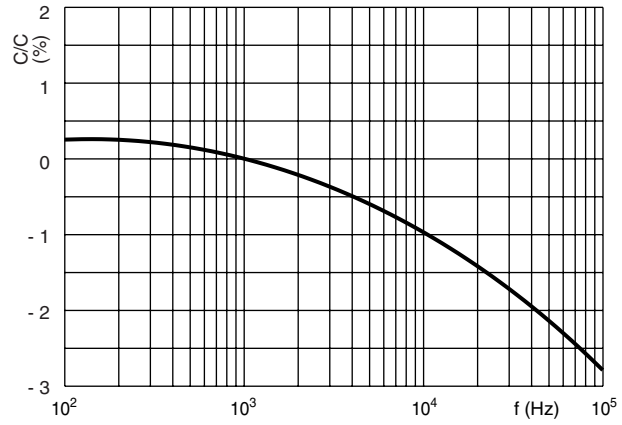
Ratings and Characteristics Reference Conditions

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

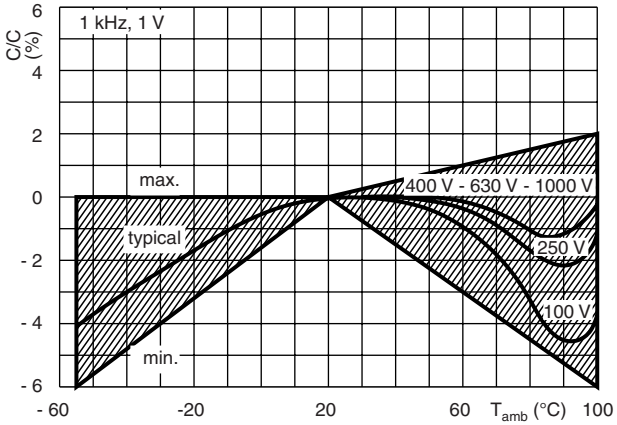
For reference testing, a conditioning period shall be applied over 96 ± 4 h by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20 %.

CHARACTERISTICS

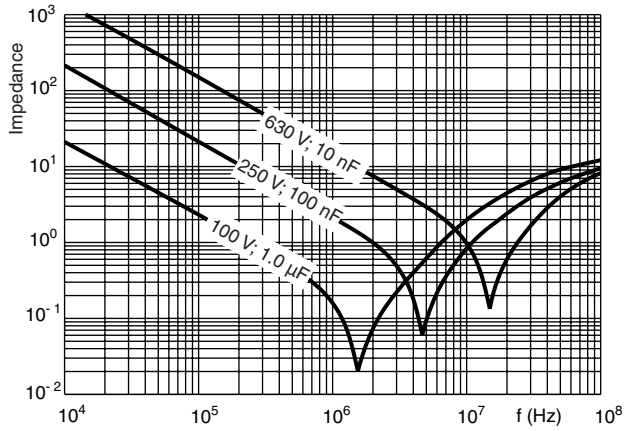
Capacitance as a function of frequency (typical curve)



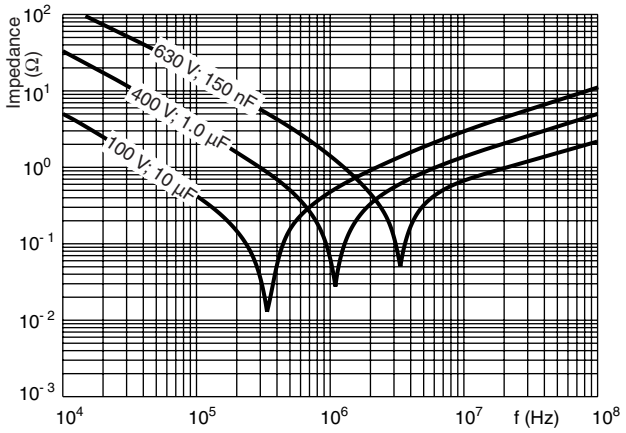
Capacitance as a function of ambient temperature (typical curve)



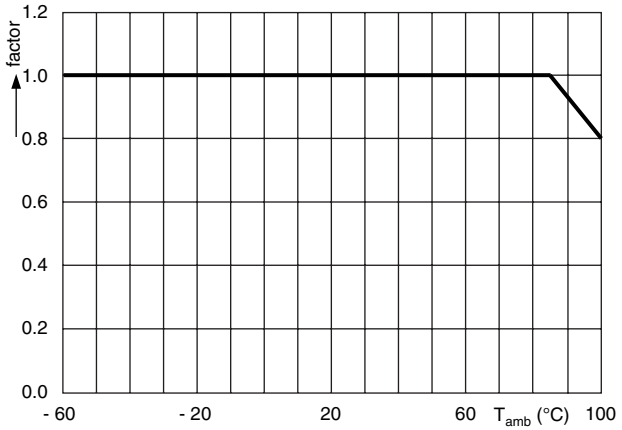
467, 469 - Impedance as a function of frequency (typical curve)



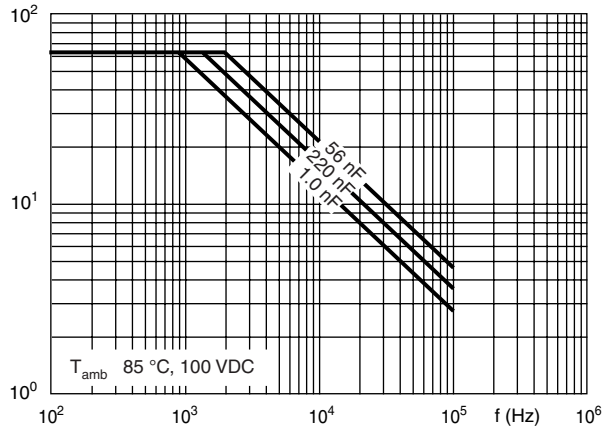
468 - Impedance as a function of frequency (typical curve)



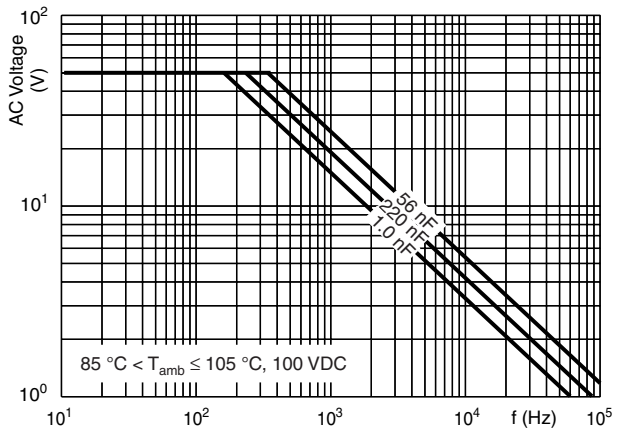
Max. DC and AC voltage as a function of temperature



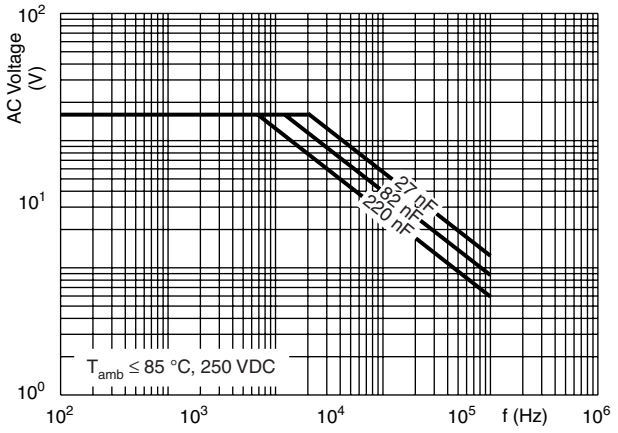
467, 469 - Max. RMS voltage as a function of frequency



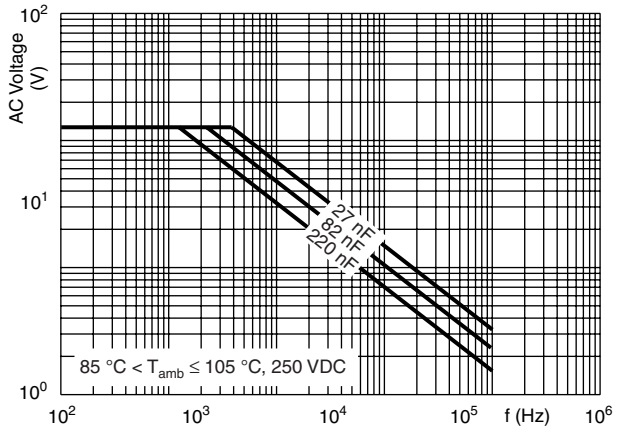
467, 469 - Max. RMS voltage as a function of frequency



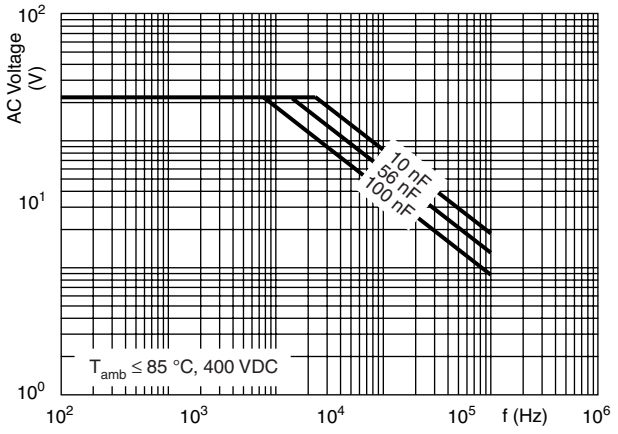
467, 469 - Max. RMS voltage as a function of frequency



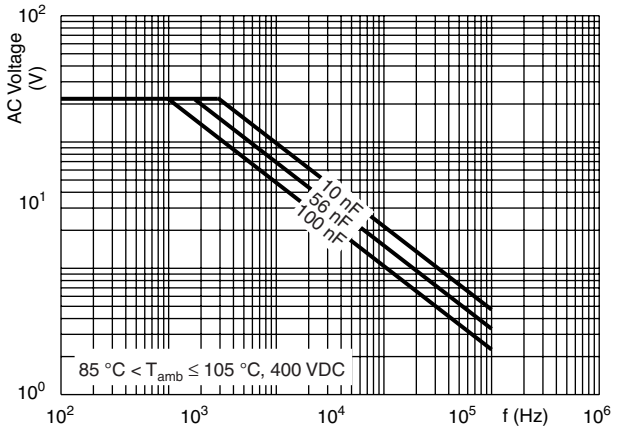
467, 469 - Max. RMS voltage as a function of frequency



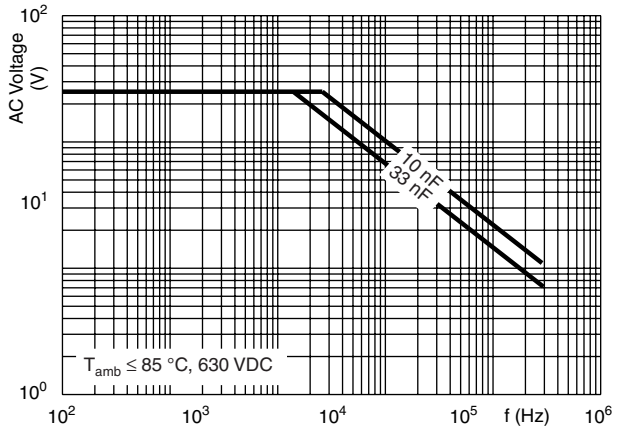
467, 469 - Max. RMS voltage as a function of frequency



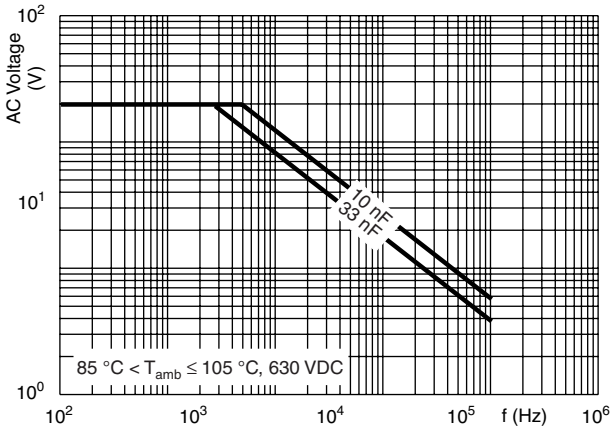
467, 469 - Max. RMS voltage as a function of frequency



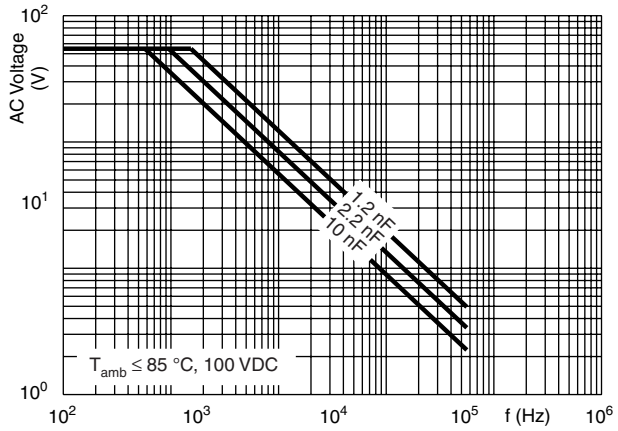
467, 469 - Max. RMS voltage as a function of frequency



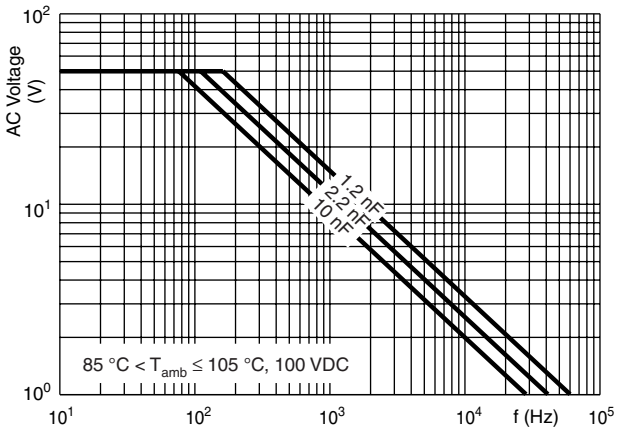
467, 469 - Max. RMS voltage as a function of frequency



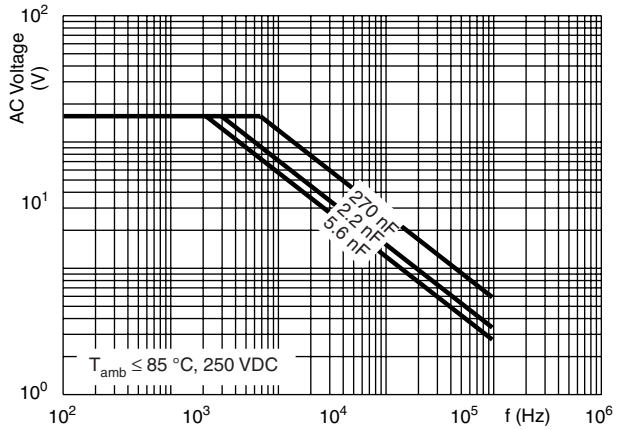
468 - Max. RMS voltage as a function of frequency



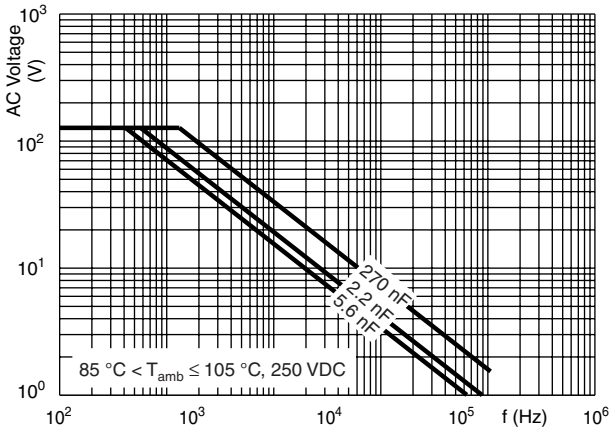
468 - Max. RMS voltage as a function of frequency



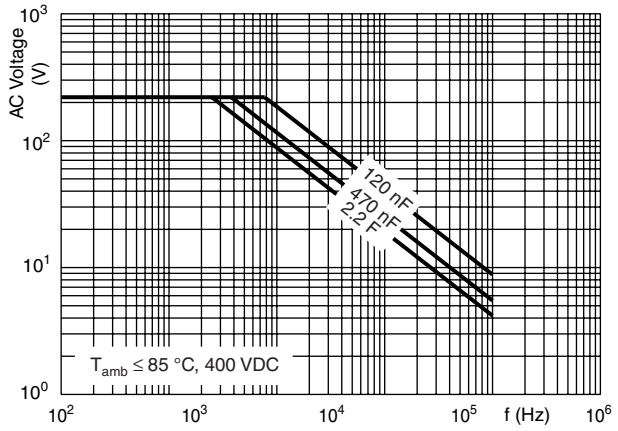
468 - Max. RMS voltage as a function of frequency



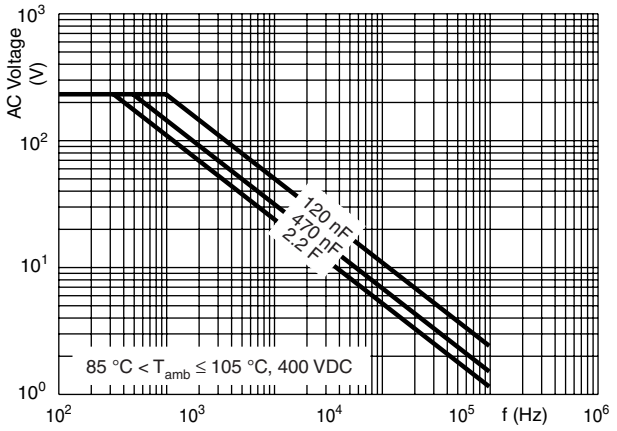
468 - Max. RMS voltage as a function of frequency



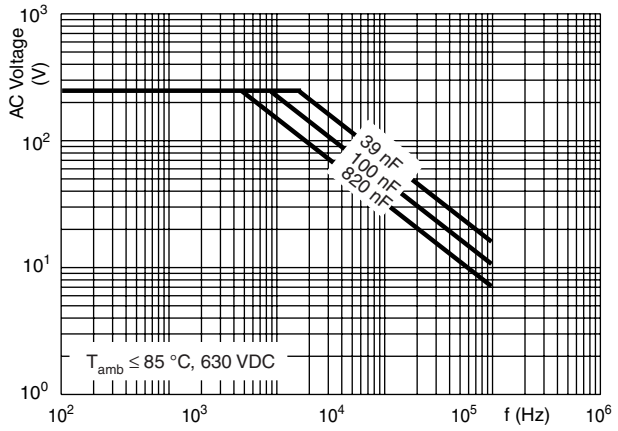
468 - Max. RMS voltage as a function of frequency



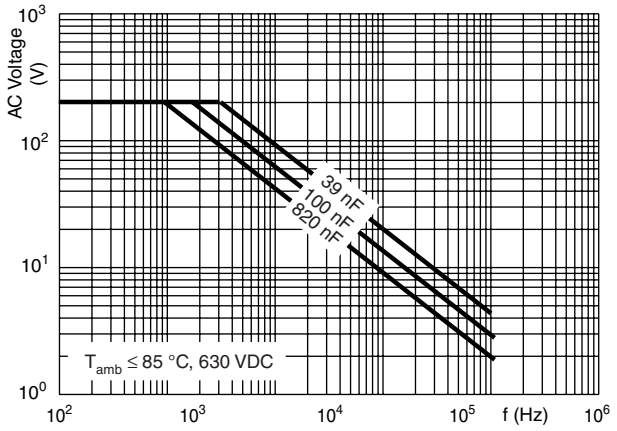
468 - Max. RMS voltage as a function of frequency



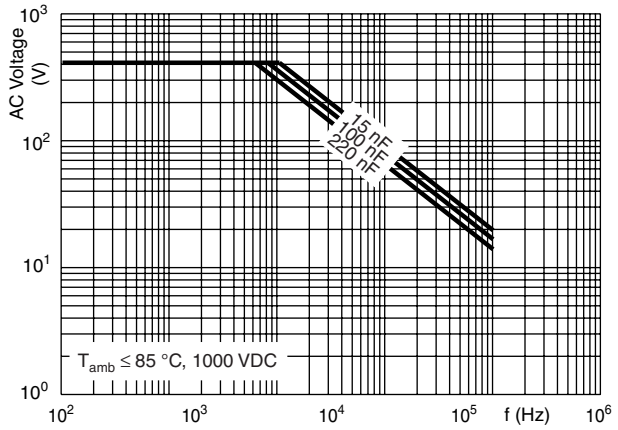
468 - Max. RMS voltage as a function of frequency



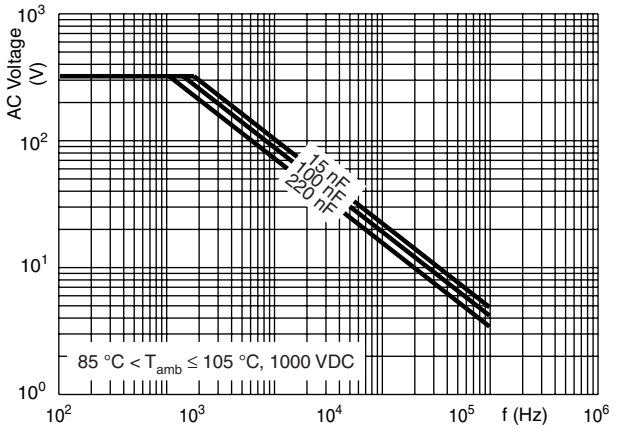
468 - Max. RMS voltage as a function of frequency



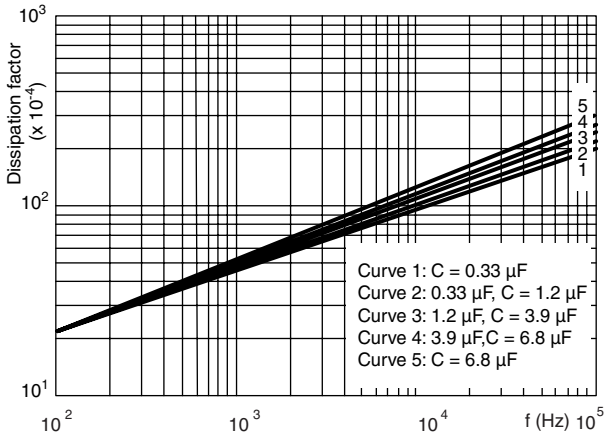
468 - Max. RMS voltage as a function of frequency



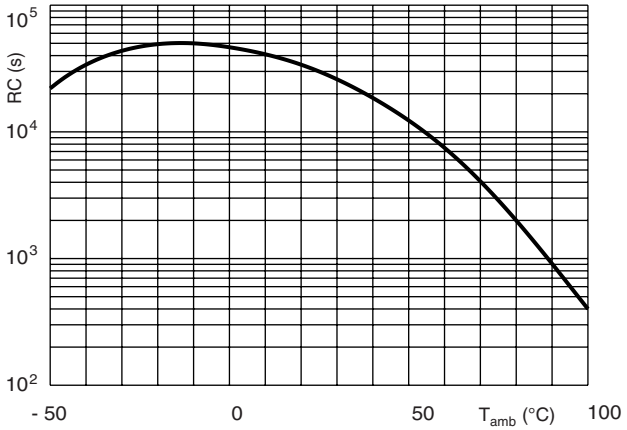
468 - Max. RMS voltage as a function of frequency



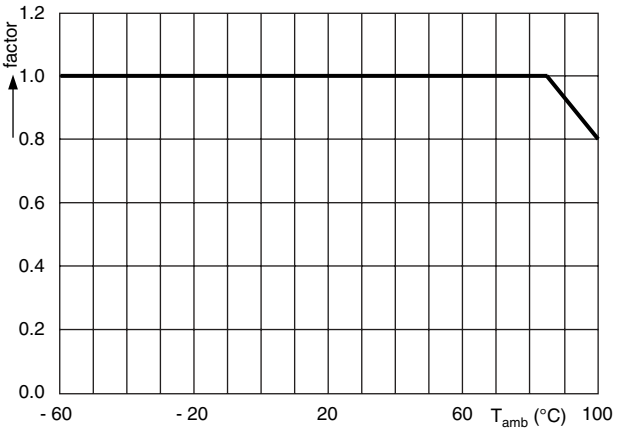
Tangent of loss angle as a function of frequency (typical curve)



Insulation resistance as a function of the ambient temperature (typical curve)



Maximum allowed component temperature rise (ΔT) as a function of the ambient temperature (T_{amb})



HEAT CONDUCTIVITY (G) AS A FUNCTION OF (ORIGINAL) PITCH AND CAPACITOR BODY THICKNESS IN mW/°C

$W_{max.}$ (mm)	HEAT CONDUCTIVITY (mW/°C)			
	PITCH 10 mm	PITCH 15.5 mm	PITCH 22.5 mm	PITCH 27.5 mm
4.0	4.0	5.0	-	-
4.5	4.5	6.0	-	-
5.0	5.0	6.0	12.0	13.0
5.5	6.0	6.5	13.0	15.0
6.0	6.0	6.5	13.0	15.0
6.5	6.5	8.0	15.0	17.0
7.0	-	8.0	15.0	17.0
7.5	-	9.0	17.0	18.0
8.0	-	9.0	17.0	20.0
8.5	-	11.0	18.0	20.0
9.0	-	11.0	18.0	22.0
9.5	-	12.0	20.0	22.0
10.0	-	12.0	20.0	23.0
10.5	-	-	22.0	25.0
11.0	-	-	-	25.0
11.5	-	-	-	27.0

$W_{max.}$ (mm)	HEAT CONDUCTIVITY (mW/°C)			
	PITCH 10 mm	PITCH 15.5 mm	PITCH 22.5 mm	PITCH 27.5 mm
12.0	-	-	-	27.0
12.5	-	-	-	30.0
13.0	-	-	-	30.0
13.5	-	-	-	30.0
14.0	-	-	-	30.0
14.5	-	-	-	33.0
15.0	-	-	-	33.0
15.5	-	-	-	37.0
16.0	-	-	-	37.0

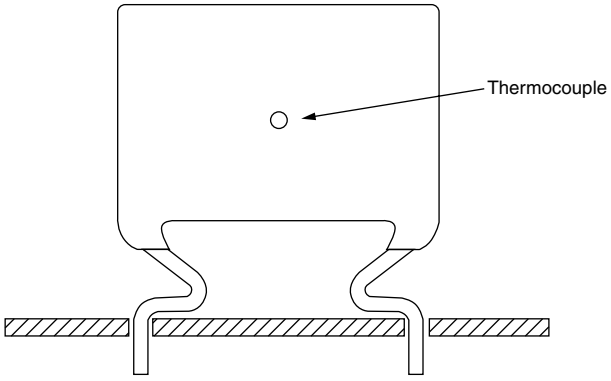
POWER DISSIPATION AND MAXIMUM COMPONENT TEMPERATURE RISE

The power dissipation must be limited in order not to exceed the maximum allowed component temperature rise as a function of the free ambient temperature.
The power dissipation can be calculated according type detail specification “HQN-384-01/101: Technical Information Film Capacitors”.
The component temperature rise (ΔT) can be measured (see section “Measuring the component temperature” for more details) or calculated by $\Delta T = P/G$:

- ΔT = Component temperature rise (°C)
- P = Power dissipation of the component (mW)
- G = Heat conductivity of the component (mW/°C)

MEASURING THE COMPONENT TEMPERATURE

A thermocouple must be attached to the capacitor body as in:



The temperature is measured in unloaded (T_{amb}) and maximum loaded condition (T_C).
The temperature rise is given by $\Delta T = T_C - T_{amb}$.
To avoid radiation or convection, the capacitor should be tested in a wind-free box.

APPLICATION NOTE AND LIMITING CONDITIONS

These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection, as described hereunder. These mains applications are strictly regulated in safety standards and therefore electromagnetic interference suppression capacitors conforming the standards must be used.

To select the capacitor for a certain application, the following conditions must be checked:

1. The peak voltage (U_P) shall not be greater than the rated DC voltage (U_{Rdc})
2. The peak-to-peak voltage (U_{P-P}) shall not be greater than $2\sqrt{2} \times U_{Rac}$ to avoid the ionisation inception level

3. The voltage pulse slope (dU/dt) shall not exceed the rated voltage pulse slope in an RC-circuit at rated voltage and without ringing. If the pulse voltage is lower than the rated DC voltage, the rated voltage pulse slope may be multiplied by U_{Rdc} and divided by the applied voltage.

   For all other pulses following equation must be fulfilled:

$$2 \times \int_0^T \left(\frac{dU}{dt}\right)^2 \times dt < U_{Rdc} \times \left(\frac{dU}{dt}\right)_{rated}$$

   T is the pulse duration.
   The rated voltage pulse slope is valid for ambient temperatures up to 85 °C. For higher temperatures a derating factor of 3 % per K shall be applied.
4. The maximum component surface temperature rise must be lower than the limits (see graph max. allowed component temperature rise).
5. Since in circuits used at voltages over 280 V peak-to-peak the risk for an intrinsically active flammability after a capacitor breakdown (short circuit) increases, it is recommended that the power to the component is limited to 100 times the values mentioned in the table: “Heat conductivity”
6. When using these capacitors as across-the-line capacitor in the input filter for mains applications or as series connected with an impedance to the mains the applicant must guarantee that the following conditions are fulfilled in any case (spikes and surge voltages from the mains included).

Voltage Conditions for 6 Above

ALLOWED VOLTAGES	$T_{amb} \leq 85$ °C	85 °C < $T_{amb} \leq 105$ °C
Maximum continuous RMS voltage	U_{Rac}	0.8 x U_{Rac}
Maximum temperature RMS-overvoltage (< 24 h)	1.25 x U_{Rac}	U_{Rac}
Maximum peak voltage (V_{O-P}) (< 2 s)	1.6 x U_{Rdc}	1.3 x U_{Rdc}

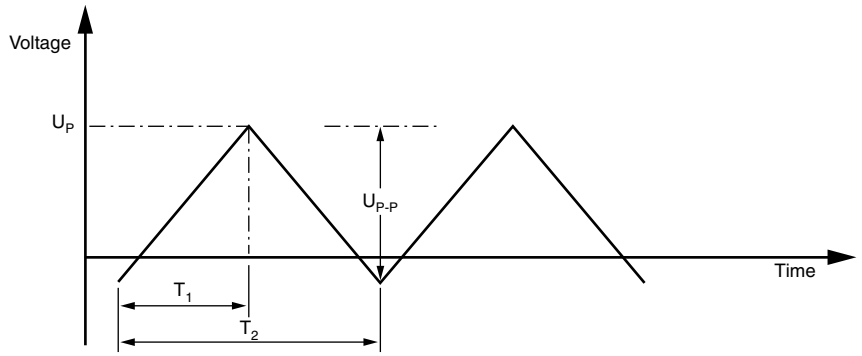
EXAMPLE

C = 330 nF - 100 V used for the voltage signal shown in next drawing.
U_{P-P} = 80 V; U_P = 70 V; T_1 = 0.5 ms; T_2 = 1 ms
The ambient temperature is 35 °C

Checking conditions:

1. The peak voltage U_P = 70 V is lower than 100 Vdc
2. The peak-to-peak voltage 80 V is lower than $2\sqrt{2}$ x 63 Vac = 178 U_{P-P}
3. The voltage pulse slope (dU/dt) = 80 V/500 µs = 0.16 V/µs
   This is lower than 20 V/µs (see specific reference data for each version)
4. The dissipated power is 60 mW as calculated with fourier terms
   The temperature rise for $W_{max.}$ = 8.5 mm and pitch = 15 mm will be 60mW/11 mW/°C = 5.5 °C
   This is lower than 15 °C temperature rise at 35 °C, according figure max. allowed component temperature rise
5. Not applicable
6. Not applicable

Voltage Signal



INSPECTION REQUIREMENTS

General Notes:
Sub-clause numbers of tests and performance requirements refer to the “Sectional Specification, Publication IEC 60384-2 and specific reference data”.

Group C Inspection Requirements

SUB-CLAUSE NUMBER AND TEST		CONDITIONS	PERFORMANCE REQUIREMENTS
SUB-GROUP C1A PART OF SAMPLE OF SUB-GROUP C1			
4.1	Dimensions (detail)		As specified in chapters “General Data” of this specification
4.3.1	Initial measurements	Capacitance Tangent of loss angle: For C ≤ 470 nF at 100 kHz or for C > 470 nF at 10 kHz	
4.3	Robustness of terminations	Tensile: Load 10 N; 10 s Bending: Load 5 N; 4 x 90°	No visible damage
4.4	Resistance to soldering heat	Method: 1A Solder bath: 280 °C ± 5 °C Duration: 10 s	
4.14	Component solvent resistance	Isopropylalcohol at room temperature Method: 2 Immersion time: 5 ± 0.5 min Recovery time: Min. 1 h, max. 2 h	
4.4.2	Final measurements	Visual examination	No visible damage Legible marking
		Capacitance	$\lvert\Delta C/C\rvert \leq 2$ % of the value measured initially
		Tangent of loss angle	Increase of tan δ ≤ 0.005 for: C ≤ 100 nF or ≤ 0.010 for: 100 nF < C ≤ 220 nF or ≤ 0.015 for: 220 nF < C ≤ 470 nF and ≤ 0.003 for: C > 470 nF Compared to values measured in 4.3.1

SUB-CLAUSE NUMBER AND TEST		CONDITIONS	PERFORMANCE REQUIREMENTS
SUB-GROUP C1B PART OF SAMPLE OF SUB-GROUP C1			
4.6.1	Initial measurements	Capacitance Tangent of loss angle: For C ≤ 470 nF at 100 kHz or for C > 470 nF at 10 kHz	No visible damage
4.6	Rapid change of temperature	θA = - 55 °C θB = + 100 °C 5 cycles Duration t = 30 min	
4.7	Vibration	Visual examination Mounting: See section “Mounting” of this specification Procedure B4 Frequency range: 10 Hz to 55 Hz Amplitude: 0.75 mm or Acceleration 98 m/s² (whichever is less severe) Total duration 6 h	No visible damage
4.7.2	Final inspection	Visual examination	No visible damage
4.9	Shock	Mounting: See section “Mounting” of this specification Pulse shape: Half sine Acceleration: 490 m/s² Duration of pulse: 11 ms	
4.9.3	Final measurements	Visual examination	No visible damage
		Capacitance	$\lvert\Delta C/C\rvert \leq 3$ % of the value measured in 4.6.1
		Tangent of loss angle	Increase of tan δ ≤ 0.005 for: C ≤ 100 nF or ≤ 0.010 for: 100 nF < C ≤ 220 nF or ≤ 0.015 for: 220 nF < C ≤ 470 nF and ≤ 0.003 for: C > 470 nF Compared to values measured in 4.6.1
		Insulation resistance	As specified in section “Insulation Resistance” of this specification
SUB-GROUP C1 COMBINED SAMPLE OF SPECIMENS OF SUB-GROUPS C1A AND C1B			
4.10	Climatic sequence		
4.10.2	Dry heat	Temperature: + 105 °C Duration: 16 h	
4.10.3	Damp heat cyclic Test Db, first cycle		
4.10.4	Cold	Temperature: - 55 °C Duration: 2 h	
4.10.6	Damp heat cyclic Test Db, remaining cycles		
4.10.6.2	Final measurements	Voltage proof = U_{Rdc} for 1 min within 15 min after removal from testchamber	No breakdown of flash-over
		Visual examination	No visible damage Legible marking
		Capacitance	$\lvert\Delta C/C\rvert \leq 5$ % of the value measured in 4.4.2 or 4.9.3
		Tangent of loss angle	Increase of tan δ ≤ 0.007 for: C ≤ 100 nF or ≤ 0.010 for: 100 nF < C ≤ 220 nF or ≤ 0.015 for: 220 nF < C ≤ 470 nF and ≤ 0.005 for: C > 470 nF Compared to values measured in 4.3.1 or 4.6.1
		Insulation resistance	≥ 50 % of values specified in section “Insulation Resistance” of this specification

SUB-CLAUSE NUMBER AND TEST	CONDITIONS	PERFORMANCE REQUIREMENTS
SUB-GROUP C2		
4.11 Damp heat steady state	56 days, 40 °C, 90 % to 95 % RH	
4.11.1 Initial measurements	Capacitance Tangent of loss angle at 1 kHz	
4.11.3 Final measurements	Voltage proof = U_{Rdc} for 1 min within 15 min after removal from testchamber	No breakdown of flash-over
	Visual examination	No visible damage Legible marking
	Capacitance	$\|\Delta C/C\| \leq 5$ % of the value measured in 4.11.1.
	Tangent of loss angle	Increase of tan $\delta \leq 0.005$ Compared to values measured in 4.11.1
	Insulation resistance	≥ 50 % of values specified in section "Insulation Resistance" of this specification
SUB-GROUP C3		
4.12 Endurance	Duration: 2000 h 1.25 x U_{Rdc} at 85 °C 1.0 x U_{Rdc} at 105 °C	
4.12.1 Initial measurements	Capacitance Tangent of loss angle: For C ≤ 470 nF at 100 kHz or for C > 470 nF at 10 kHz	
4.12.5 Final measurements	Visual examination	No visible damage Legible marking
	Capacitance	$\|\Delta C/C\| \leq 5$ % compared to values measured in 4.12.1
	Tangent of loss angle	Increase of tan δ ≤ 0.005 for: C ≤ 100 nF or ≤ 0.010 for: 100 nF < C ≤ 220 nF or ≤ 0.015 for: 220 nF < C ≤ 470 nF and ≤ 0.003 for: C > 470 nF Compared to values measured in 4.12.1
	Insulation resistance	≥ 50 % of values specified in section "Insulation Resistance" of this specification
SUB-GROUP C4		
4.13 Charge and discharge	10 000 cycles Charged to U_{Rdc} Discharge resistance: $R = \frac{U_R}{C \times 2.5 \times (dU/dt)_R}$	
4.13.1 Initial measurements	Capacitance Tangent of loss angle: For C ≤ 470 nF at 100 kHz or for C > 470 nF at 10 kHz	
4.13.3 Final measurements	Capacitance	$\|\Delta C/C\| \leq 3$ % compared to values measured in 4.13.1
	Tangent of loss angle	Increase of tan δ ≤ 0.005 for: C ≤ 100 nF or ≤ 0.010 for: 100 nF < C ≤ 220 nF or ≤ 0.015 for: 220 nF < C ≤ 470 nF and ≤ 0.003 for: C > 470 nF Compared to values measured in 4.13.1
	Insulation resistance	≥ 50 % of values specified in section "Insulation Resistance" of this specification

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