

DATA SHEET

MKT 467/468

MKT/MKT 468

Metallized polyester film capacitors

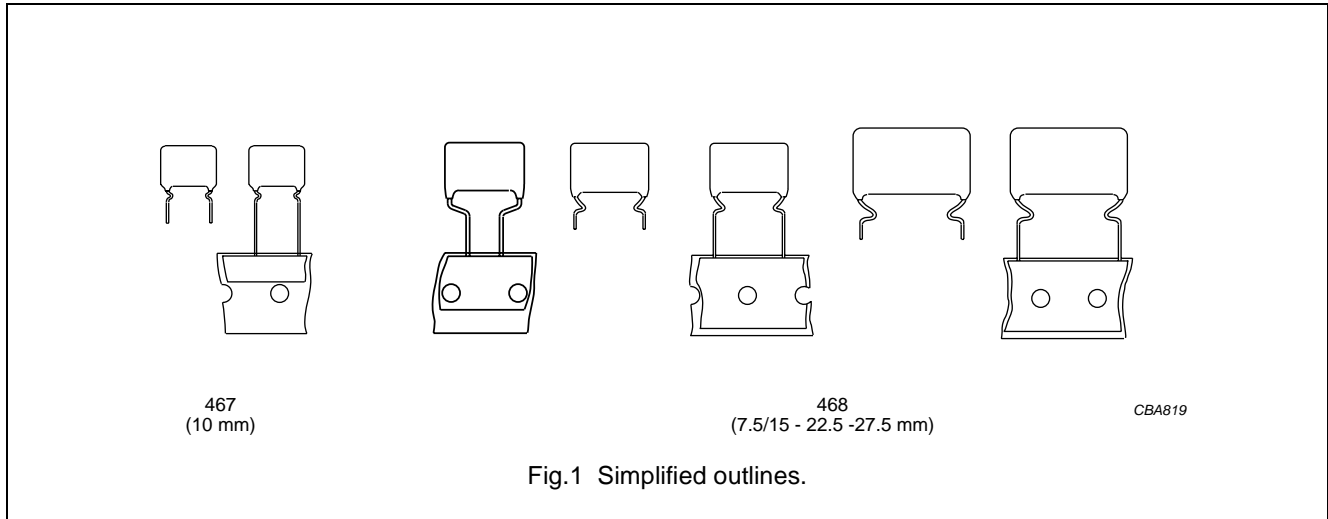
Product specification
Supersedes data of April 1999
File under BCcomponents, BC05

2000 Aug 30

Metallized polyester film capacitors

MKT 467/468 MKT/MKT 468

MKT RADIAL EPOXY LACQUERED TYPE

 PITCH 10/15/22.5/27.5 mm
 PITCH 7.5 (bent back leads)


APPLICATIONS

- Blocking and coupling
- Bypass and energy reservoir.

FEATURES

- Low-inductive wound cell of metallized (PETP) film
- Cell protected by epoxy lacquer
- Radial leads of solder-coated wire
- Withstands solvents and rinsing liquids

DETAIL SPECIFICATION

For more detailed data and test requirements see "Type detail specification HQN-384-02/102".

QUICK REFERENCE DATA

DESCRIPTION	VALUE
Capacitance range (E12 series)	0.01 to 10 μ F
Capacitance tolerance	\pm 10%; \pm 5%
Rated (DC) voltage	100 V; 250 V; 400 V; 630 V; 1000 V
Rated (AC) voltage	63 V; 160 V; 200 V; 250 V; 400 V
Climatic category	55/100/56
Rated temperature	85 °C
Maximum application temperature	100 °C
Tangent of loss angle at 10 kHz	100×10^{-4}
Reference specifications	IEC 60384-2
Performance grade	grade 1 (long life)

Metallized polyester film capacitors

MKT 467

COMPOSITION OF CATALOGUE NUMBER

TYPE AND PITCHES	
467	10.0 mm

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

CAPACITANCE (numerically)

Example:
104 = 10 x 10 = 100 nF

2222 467 XX XX X

TYPE	PACKAGING	LEAD CONFIGURATION	C-TOL	100 V	250 V	400 V	630 V
467	loose in box	lead length 3.5 mm	±10%	04	16	28	40
			±5%	05	17	29	41
		lead length 19.0 mm	±10%	51	53	55	57
			±5%	52	54	56	58
	taped on reel	H = 16.0 mm; P ₀ = 12.7 mm	±10%	06	18	30	42
			±5%	07	19	31	43

Metallized polyester film capacitors

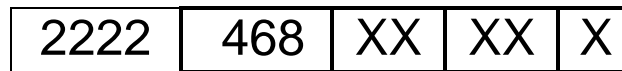
MKT 468

TYPE AND PITCHES	
MKT 468	15/7.5 mm
	15.0 mm
	22.5 mm
	27.5 mm
MKT/MKT 468	15.0 mm
	22.5 mm
	27.5 mm

CAPACITANCE
(numerically)

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

Example:
104 = 10 x 10 = 100 nF



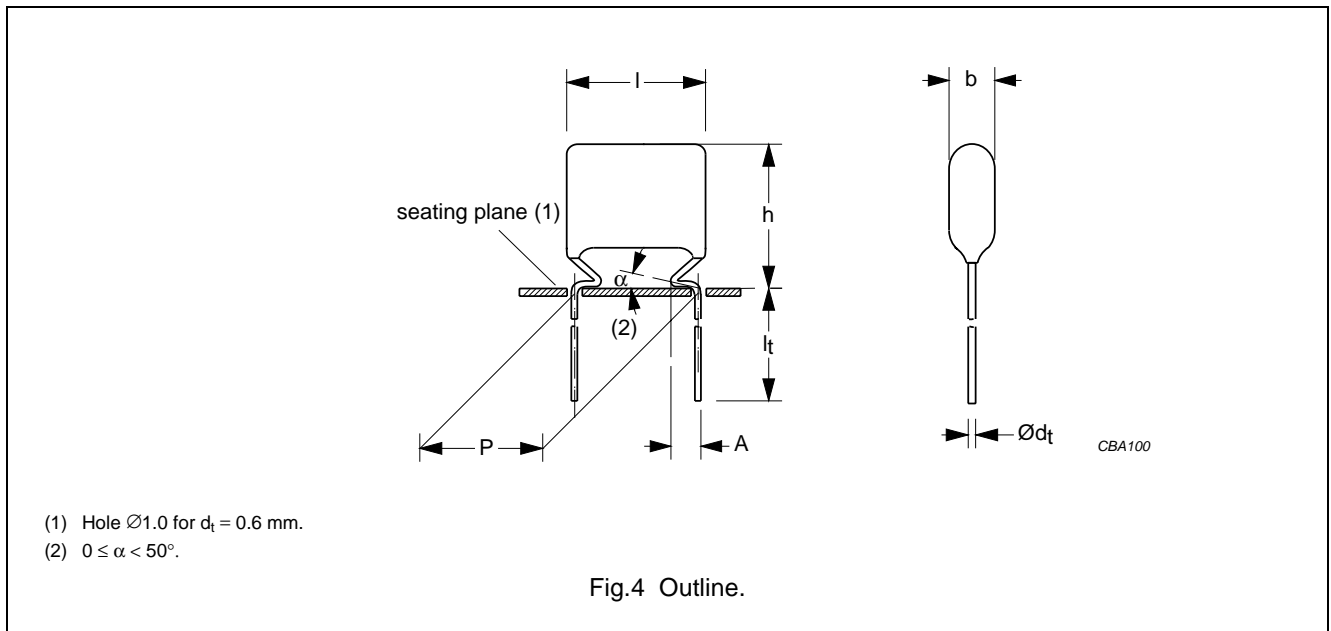
TYPE	PACKAGING	LEAD CONFIGURATION	C-TOL	100 V	250 V	400 V	630 V	1000 V
MKT 468	loose in box	lead length 3.5 mm	±10%	04	16	28	40	–
			±5%	05	17	29	41	–
	long leads	±10%	51	53	55	57	–	
		±5%	52	54	56	58	–	
	taped on reel	H = 16.0 mm; P ₀ = 12.7 mm	±10%	06	18	30	42	–
			±5%	07	19	31	43	–
taped on reel (bent back)	H = 16.0 mm; P ₀ = 15.0 mm	±10%	61	63	65	67	–	
		±5%	62	64	66	68	–	
MKT/MKT 468	loose in box	lead length 3.5 mm	±10%	–	–	–	–	60

Metallized polyester film capacitors

MKT 467

MKT 467 GENERAL DATA

PITCH 10 mm (kinked leads)



Specific reference data for the 100 V DC capacitors

DESCRIPTION	VALUE	
	at 1 kHz	at 10 kHz
Tangent of loss angle: $0.56 \mu\text{F} < C \leq 1.0 \mu\text{F}$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 100 V (DC)	30 V/ μs	
RC between leads, for $C > 0.33 \mu\text{F}$ at 100 V; 1 minute	> 5000 s	
R between interconnecting leads and casing; 100 V; 1 minute	> 30000 M Ω	
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	160 V; 1 minute	
Withstanding (DC) voltage between leads and case	200 V; 1 minute	

Available 100 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5$ mm	$\pm 10\%$	2222 467 04...	preferred
		$\pm 5\%$	2222 467 05...	preferred
	$l_t = 19.0 \pm 4.0$ mm	$\pm 10\%$	2222 467 51...	on request
		$\pm 5\%$	2222 467 52...	on request
Taped on reel	H = 16.0 mm; note 2	$\pm 10\%$	2222 467 06...	on request
		$\pm 5\%$	2222 467 07...	on request

Notes

1. For SPQ refer to this handbook, chapter "Packaging information".
2. H = in-tape height; for detailed specifications refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT 467

 $U_{Rdc} = 100 \text{ V}$; $U_{Rac} = 63 \text{ V}$

C (μF)	DIMENSIONS $b_{\text{max}} \times h_{\text{max}} \times l_{\text{max}}$ (mm)	MASS (g)	CATALOGUE NUMBER	
			LOOSE IN BOX	
			C-tol = $\pm 10\%$	C-tol = $\pm 5\%$
			catalogue number ⁽¹⁾	last 5 digits ⁽¹⁾
Pitch = $10.0 \pm 0.4 \text{ mm}$; $d_t = 0.60 \pm 0.06 \text{ mm}$; $A = 2.0 \pm 0.5 \text{ mm}$				
0.56	$4.6 \times 13.6 \times 12.5$	0.5	2222 467 04 564	.. 05 564
0.68	$5.0 \times 14.0 \times 12.5$	0.6	2222 467 04 684	.. 05 684
0.82	$5.5 \times 14.5 \times 12.5$	0.7	2222 467 04 824	.. 05 824
1.0	$6.0 \times 15.0 \times 12.5$	0.7	2222 467 04 105	.. 05 105

Note

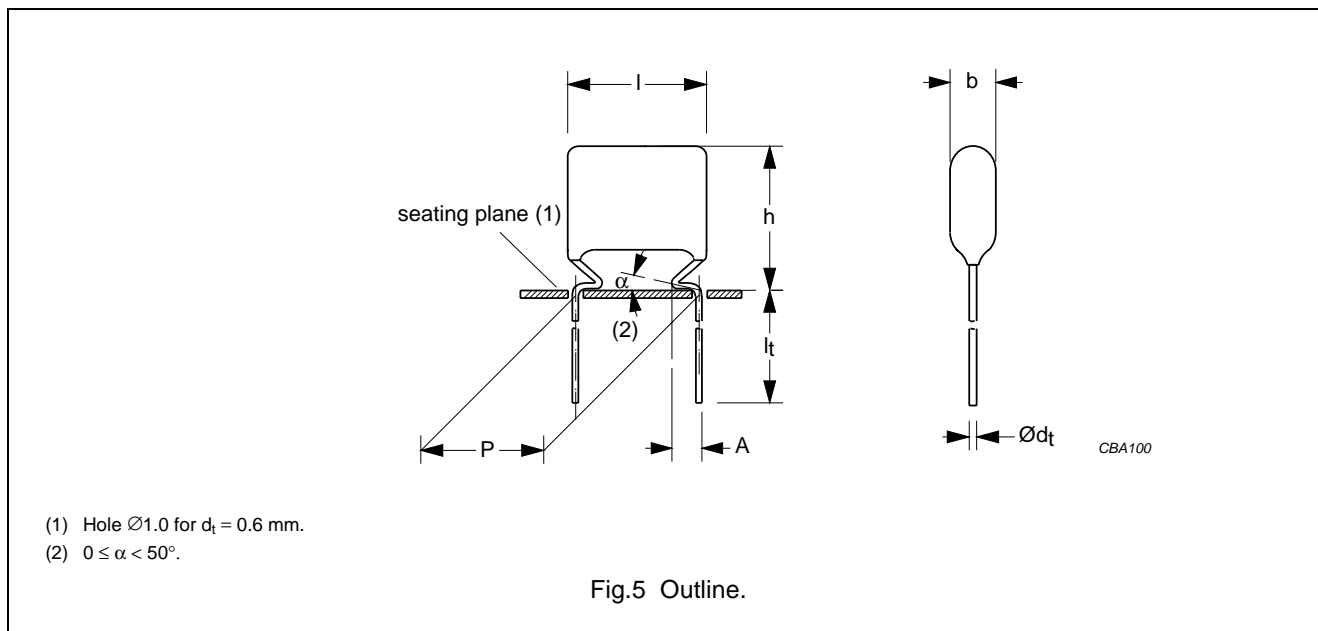
1. The shading indicates preferred types.

Metallized polyester film capacitors

MKT 467

MKT 467 GENERAL DATA

PITCH 10 mm (kinked leads)



Specific reference data for the 250 V DC capacitors

DESCRIPTION	VALUE		
	at 1 kHz	at 10 kHz	at 100 kHz
Tangent of loss angle: $0.18 \mu\text{F} < C \leq 0.22 \mu\text{F}$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 250 V (DC)	120 V/ μs		
R between leads, for $C \leq 0.33 \mu\text{F}$ at 100 V; 1 minute	$> 30000 \text{ M}\Omega$		
R between interconnecting leads and casing; 100 V; 1 minute	$> 30000 \text{ M}\Omega$		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	400 V; 1 minute		
Withstanding (DC) voltage between leads and case	500 V; 1 minute		

Available 250 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5$ mm	$\pm 10\%$	2222 467 16...	preferred
		$\pm 5\%$	2222 467 17...	preferred
	$l_t = 19.0 \pm 4.0$ mm	$\pm 10\%$	2222 467 53...	on request
		$\pm 5\%$	2222 467 54...	on request
Taped on reel	$H = 16.0$ mm; note 2	$\pm 10\%$	2222 467 18...	on request
		$\pm 5\%$	2222 467 19...	on request

Notes

- For SPQ refer to this handbook, chapter "Packaging information".
- H = in-tape height; for detailed specifications refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT 467

 $U_{Rdc} = 250 \text{ V}$; $U_{Rac} = 160 \text{ V}$

C (μF)	DIMENSIONS $b_{\max} \times h_{\max} \times l_{\max}$ (mm)	MASS (g)	CATALOGUE NUMBER	
			LOOSE IN BOX	
			C-tol = $\pm 10\%$	C-tol = $\pm 5\%$
			catalogue number ⁽¹⁾	last 5 digits ⁽¹⁾
Pitch = $10.0 \pm 0.4 \text{ mm}$; $d_t = 0.60 \pm 0.06 \text{ mm}$; $A = 2.0 +1.0/-0.5 \text{ mm}$				
0.18	$5.2 \times 14.2 \times 12.5$	0.6	2222 467 16 184	.. 17 184
0.22	$5.8 \times 14.8 \times 12.5$	0.6	2222 467 16 224	.. 17 224

Note

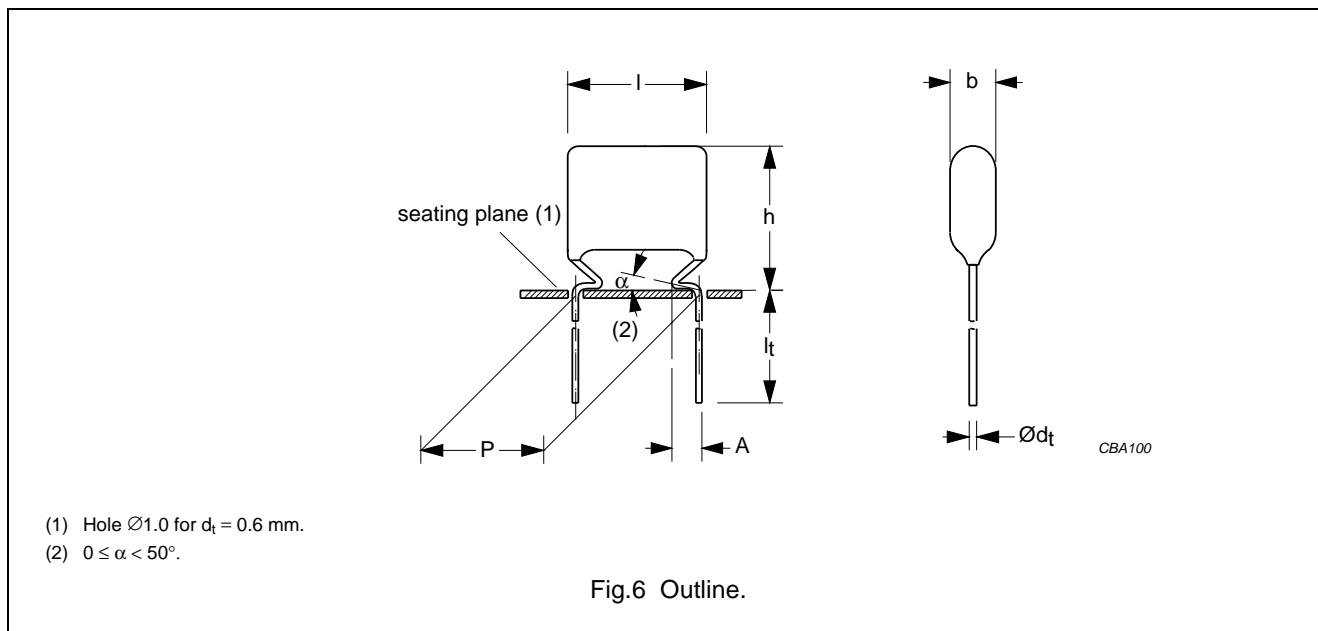
1. The shading indicates preferred types.

Metalized polyester film capacitors

MKT 467

MKT 467 GENERAL DATA

PITCH 10 mm (kinked leads)



Specific reference data for the 400 V DC capacitors

DESCRIPTION	VALUE		
	at 1 kHz	at 10 kHz	at 100 kHz
Tangent of loss angle: $C \leq 0.1 \mu\text{F}$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 400 V (DC)	170 V/ μs		
R between leads, for $C \leq 0.33 \mu\text{F}$ at 100 V; 1 minute	$> 30000 \text{ M}\Omega$		
R between interconnecting leads and casing; 100 V; 1 minute	$> 30000 \text{ M}\Omega$		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	640 V; 1 minute		
Withstanding (DC) voltage between leads and case	800 V; 1 minute		

Available 400 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5 \text{ mm}$	$\pm 10\%$	2222 467 28...	preferred
		$\pm 5\%$	2222 467 29...	preferred
	$l_t = 19.0 \pm 4.0 \text{ mm}$	$\pm 10\%$	2222 467 55...	on request
		$\pm 5\%$	2222 467 56...	on request
Taped on reel	$H = 16.0 \text{ mm}$; note 2	$\pm 10\%$	2222 467 30...	on request
		$\pm 5\%$	2222 467 31...	on request

Notes

- For SPQ refer to this handbook, chapter "Packaging information".
- H = in-tape height; for detailed specifications refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT 467

 $U_{Rdc} = 400 \text{ V}$; $U_{Rac} = 200 \text{ V}$

C (μF)	DIMENSIONS $b_{\text{max}} \times h_{\text{max}} \times l_{\text{max}}$ (mm)	MASS (g)	CATALOGUE NUMBER	
			LOOSE IN BOX	
			C-tol = $\pm 10\%$	C-tol = $\pm 5\%$
			catalogue number ⁽¹⁾	last 5 digits ⁽¹⁾
Pitch = $10.0 \pm 0.4 \text{ mm}$; $d_t = 0.60 \pm 0.06 \text{ mm}$; $A = 2.0 +1.0/-0.5 \text{ mm}$				
0.039	$5.0 \times 13.9 \times 12.5$	0.5	2222 467 28393	.. 29393
0.047	$5.4 \times 14.4 \times 12.5$	0.6	2222 467 28473	.. 29473
0.056	$4.4 \times 13.4 \times 12.5$	0.5	2222 467 28563	.. 29563
0.068	$4.8 \times 13.8 \times 12.5$	0.5	2222 467 28683	.. 29683
0.082	$5.4 \times 14.3 \times 12.5$	0.6	2222 467 28823	.. 29823
0.1	$5.6 \times 14.6 \times 12.5$	0.6	2222 467 28104	.. 29104

Note

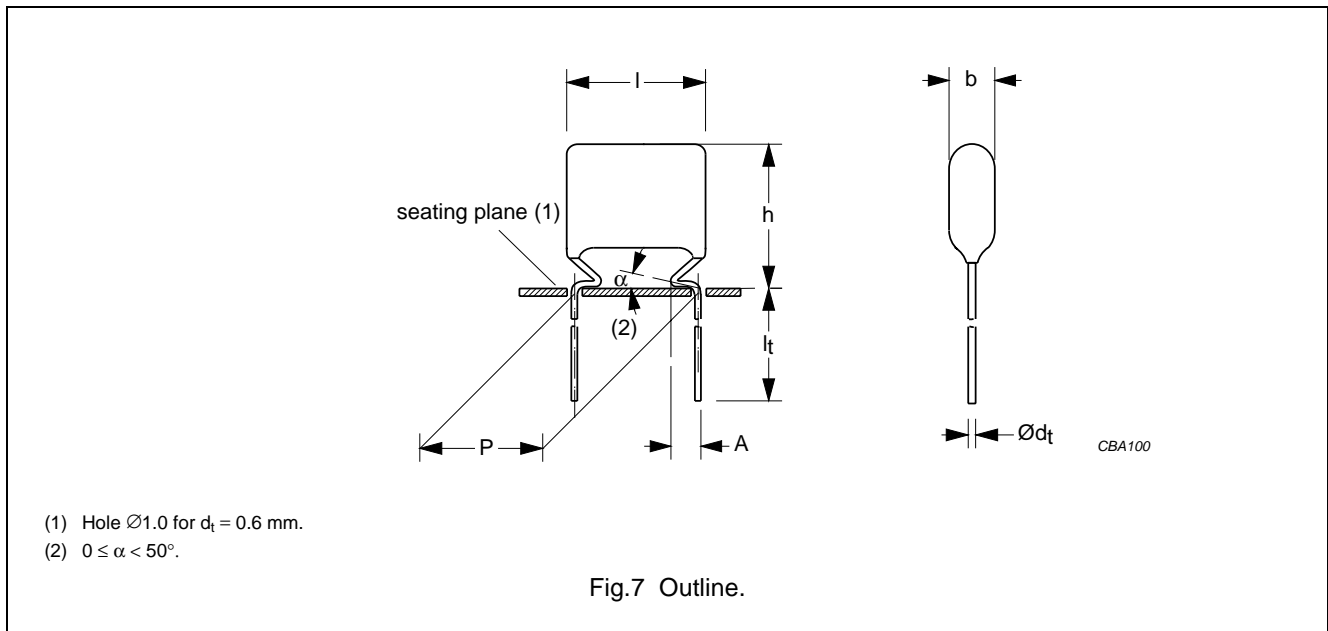
1. The shading indicates preferred types.

Metallized polyester film capacitors

MKT 467

MKT 467 GENERAL DATA

PITCH 10 mm (kinked leads)



Specific reference data for the 630 V DC capacitors

DESCRIPTION	VALUE		
	at 1 kHz	at 10 kHz	at 100 kHz
Tangent of loss angle: $C \leq 0.033 \mu\text{F}$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 630 V (DC)	120 V/ μs		
R between leads, for $C \leq 0.33 \mu\text{F}$ at 500 V; 1 minute	$> 30000 \text{ M}\Omega$		
R between interconnecting leads and casing; 100 V; 1 minute	$> 30000 \text{ M}\Omega$		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	1008 V; 1 minute		
Withstanding (DC) voltage between leads and case	1260 V; 1 minute		

Available 630 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5 \text{ mm}$	$\pm 10\%$	2222 467 40...	preferred
		$\pm 5\%$	2222 467 41...	preferred
	$l_t = 19.0 \pm 4.0 \text{ mm}$	$\pm 10\%$	2222 467 57...	on request
		$\pm 5\%$	2222 467 58...	on request
Taped on reel	$H = 16.0 \text{ mm}$; note 2	$\pm 10\%$	2222 467 42...	on request
		$\pm 5\%$	2222 467 43...	on request

Notes

- For SPQ refer to this handbook, chapter "Packaging information".
- H = in-tape height; for detailed specifications refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT 467

 $U_{Rdc} = 630 \text{ V}$; $U_{Rac} = 250 \text{ V}$

C (μF)	DIMENSIONS $b_{\text{max}} \times h_{\text{max}} \times l_{\text{max}}$ (mm)	MASS (g)	CATALOGUE NUMBER	
			LOOSE IN BOX	
			C-tol = $\pm 10\%$	C-tol = $\pm 5\%$
			catalogue number ⁽¹⁾	last 5 digits ⁽¹⁾
Pitch = $10.0 \pm 0.4 \text{ mm}$; $d_t = 0.60 \pm 0.06 \text{ mm}$; $A = 2.0 +1.0/-0.5 \text{ mm}$				
0.01	$4.1 \times 13.1 \times 12.5$	0.4	2222 467 40 103	.. 41 103
0.012	$4.5 \times 13.5 \times 12.5$	0.5	2222 467 40 123	.. 41 123
0.015	$4.9 \times 13.9 \times 12.5$	0.5	2222 467 40 153	.. 41 153
0.018	$5.4 \times 14.4 \times 12.5$	0.6	2222 467 40 183	.. 41 183
0.022	$4.8 \times 13.8 \times 12.5$	0.5	2222 467 40 223	.. 41 223
0.027	$5.3 \times 14.3 \times 12.5$	0.6	2222 467 40 273	.. 41 273
0.033	$5.9 \times 14.9 \times 12.5$	0.6	2222 467 40 333	.. 41 333

Note

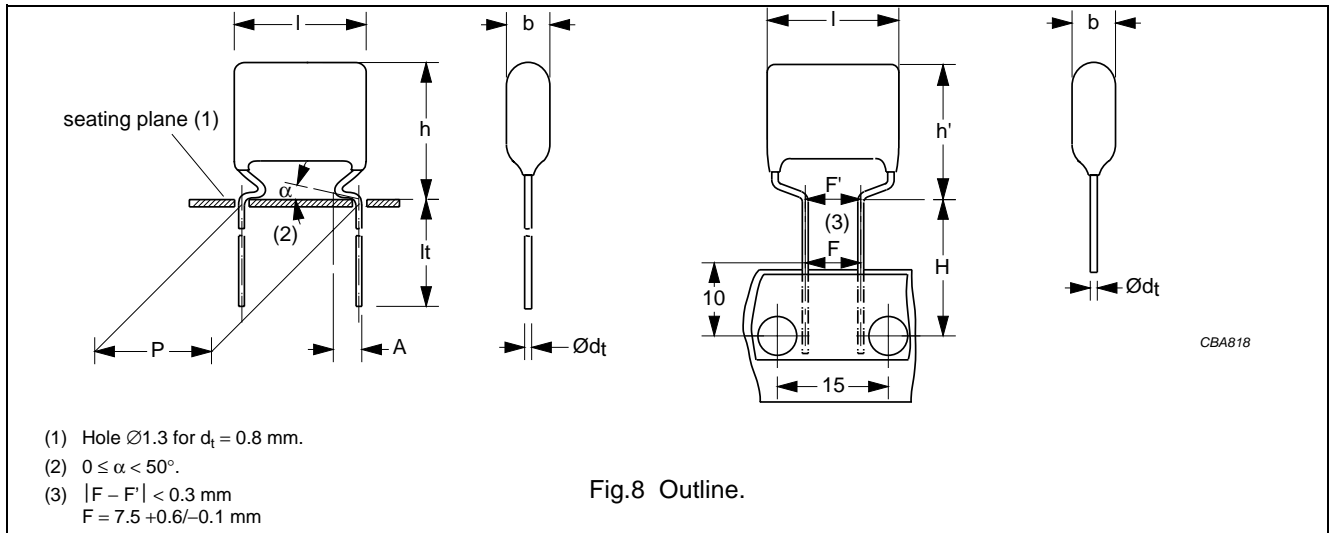
1. The shading indicates preferred types.

Metallized polyester film capacitors

MKT 468

MKT 468 GENERAL DATA

PITCH 15/22.5 mm
PITCH 7.5 mm (bent back leads)



Specific reference data for the 100 V DC capacitors

DESCRIPTION	VALUE	
	at 1 kHz	at 10 kHz
$C \leq 10.0 \mu\text{F}$	$\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 100 V (DC): $l_{\text{max}} = 17.5$ mm $l_{\text{max}} = 26.0$ mm	20 V/ μs 10 V/ μs	
RC between leads, for $C > 0.33 \mu\text{F}$ at 100 V; 1 minute	> 5000 s	
R between interconnecting leads and casing; 100 V; 1 minute	> 30000 M Ω	
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	160 V; 1 minute	
Withstanding (DC) voltage between leads and case	200 V; 1 minute	

Available 100 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5$ mm	$\pm 10\%$	2222 468 04...	preferred
		$\pm 5\%$	2222 468 05...	preferred
	long leads; note 2	$\pm 10\%$	2222 468 51...	on request
		$\pm 5\%$	2222 468 52...	on request
Taped on reel	$H = 16.0$ mm; $P_0 = 12.7$ mm; note 3	$\pm 10\%$	2222 468 06...	on request
		$\pm 5\%$	2222 468 07...	on request
Taped on reel (bent back)	$H = 16.0$ mm; $P_0 = 15.0$ mm; note 3	$\pm 10\%$	2222 468 61...	preferred
		$\pm 5\%$	2222 468 62...	preferred

Notes

- For SPQ refer to this handbook, chapter "Packaging information".
- Length of long leads: $l_t = 19.0 \pm 4.0$ mm for lead pitch = 15.0 mm and 25.0 ± 4.0 mm for lead pitch = 22.5 mm.
- H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT 468

 $U_{Rdc} = 100 \text{ V}$; $U_{Rac} = 63 \text{ V}$

C (μF)	DIMENSIONS ⁽¹⁾ $b_{\max} \times h (h')_{\max} \times l_{\max}$ (mm)	MASS (g)	CATALOGUE NUMBER				
			LOOSE IN BOX		REEL DIAMETER = 500 mm; H = 16.0 mm; $P_0 = 15.0 \text{ mm}$ ⁽²⁾		
			short leads		pitch 7.5 mm (bent back)		
			C-tol = $\pm 10\%$	C-tol = $\pm 5\%$	C-tol = $\pm 10\%$	C-tol = $\pm 5\%$	
			catalogue number ⁽³⁾	last 5 digits ⁽³⁾	last 5 digits ⁽³⁾		
Pitch = 15.0 ± 0.4 mm (Pitch = 7.5 ± 0.4 mm for bent back leads); $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm							
1.2	5.5 \times 14.5 (16.0) \times 17.5	0.7	2222 468 04125	.. 05125	.. 61125	.. 62125	
1.5	6.0 \times 15.0 (16.5) \times 17.5	0.9	2222 468 04155	.. 05155	.. 61155	.. 62155	
1.8	6.5 \times 15.5 (17.0) \times 17.5	1.0	2222 468 04185	.. 05185	.. 61185	.. 62185	
2.2	7.0 \times 16.0 (17.5) \times 17.5	1.2	2222 468 04225	.. 05225	.. 61225	.. 62225	
2.7	8.0 \times 17.0 (18.5) \times 17.5	1.4	2222 468 04275	.. 05275	.. 61275	.. 62275	
3.3	8.5 \times 17.5 (19.0) \times 17.5	1.5	2222 468 04335	.. 05335	.. 61335	.. 62335	
Pitch = 22.5 ± 0.4 mm; $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm							
3.9	6.5 \times 18.5 \times 26.0	2.8	2222 468 04395	.. 05395	not available		
4.7	7.0 \times 19.5 \times 26.0	3.2	2222 468 04475	.. 05475			
5.6	7.5 \times 20.0 \times 26.0	3.5	2222 468 04565	.. 05565			
6.8	8.5 \times 21.5 \times 26.0	4.1	2222 468 04685	.. 05685			
8.2	9.5 \times 22.5 \times 26.0	4.8	2222 468 04825	.. 05825			
10.0	10.5 \times 23.5 \times 26.0	5.5	2222 468 04106	.. 05106			

Notes

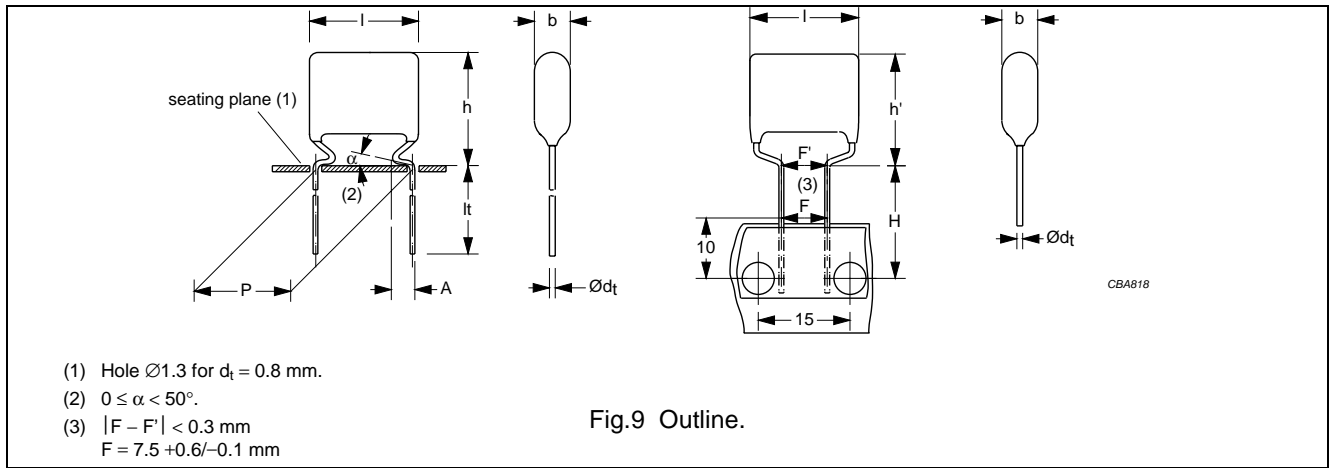
- Dimensions in brackets for bent back leads.
- H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to this handbook, chapter "Packaging information".
 - For pitch = 15.0 mm: H = 16.0 mm and $P_0 = 12.7$ mm.
 - For pitch = 15/7.5 mm (bent back): H = 16.0 mm and $P_0 = 15.0$ mm.
Standard reel diameter = 500 mm. Small reel diameter = 356 mm is available on request.
- The shading indicates preferred types.

Metallized polyester film capacitors

MKT 468

MKT 468 GENERAL DATA

PITCH 15/22.5/27.5 mm
PITCH 7.5 mm (bent back leads)



Specific reference data for the 250 V DC capacitors

DESCRIPTION	VALUE		
	at 1 kHz	at 10 kHz	at 100 kHz
Tangent of loss angle: $C \leq 0.47 \mu\text{F}$ $C > 0.47 \mu\text{F}$	$\leq 75 \times 10^{-4}$ $\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$ $\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$ -
Rated voltage pulse slope $(dU/dt)_R$ at 250 V (DC): $l_{\text{max}} = 17.5$ mm $l_{\text{max}} = 26.0$ mm $l_{\text{max}} = 30.0$ mm		45 V/ μs 20 V/ μs 15 V/ μs	
R between leads, for $C \leq 0.33 \mu\text{F}$ at 100 V; 1 minute		>30000 M Ω	
RC between leads, for $C > 0.33 \mu\text{F}$ at 100 V; 1 minute		>10000 s	
R between interconnecting leads and casing; 100 V; 1 minute		>30000 M Ω	
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s		400 V; 1 minute	
Withstanding (DC) voltage between leads and case		500 V; 1 minute	

Available 250 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5$ mm	$\pm 10\%$	2222 468 16...	preferred
		$\pm 5\%$	2222 468 17...	preferred
	long leads; note 2	$\pm 10\%$	2222 468 53...	on request
		$\pm 5\%$	2222 468 54...	on request
Taped on reel	$H = 16.0$ mm; $P_0 = 12.7$ mm; note 3	$\pm 10\%$	2222 468 18...	on request
		$\pm 5\%$	2222 468 19...	on request
Taped on reel (bent back)	$H = 16.0$ mm; $P_0 = 15.0$ mm; note 3	$\pm 10\%$	2222 468 63...	preferred
		$\pm 5\%$	2222 468 64...	preferred

Notes

- For SPQ refer to this handbook, chapter "Packaging information"; taped on reel pitch = 27.5 mm is not available.
- Length of long leads: $l_t = 19.0 \pm 4.0$ mm for lead pitch = 15.0 mm, 25.0 ± 4.0 mm for lead pitch = 22.5 mm and 24.0 ± 4.0 mm for lead pitch = 27.5 mm.
- H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT 468

 $U_{Rdc} = 250 \text{ V}$; $U_{Rac} = 160 \text{ V}$

C (μF)	DIMENSIONS ⁽¹⁾ $b_{\text{max}} \times h (h')_{\text{max}} \times l_{\text{max}}$ (mm)	MASS (g)	CATALOGUE NUMBER			
			LOOSE IN BOX		REEL DIAMETER = 500 mm; H = 16.0 mm; $P_0 = 15.0 \text{ mm}$ ⁽²⁾	
			short leads		pitch 7.5 mm (bent back)	
			C-tol = $\pm 10\%$	C-tol = $\pm 5\%$	C-tol = $\pm 10\%$	C-tol = $\pm 5\%$
			catalogue number ⁽³⁾	last 5 digits ⁽³⁾	last 5 digits ⁽³⁾	
Pitch = 15.0 ± 0.4 mm (Pitch = 7.5 ± 0.4 mm for bent back leads); $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
0.27	5.0 \times 14.0 (15.5) \times 17.5	0.6	2222 468 16274	.. 17274	.. 63274	.. 64274
0.33	5.5 \times 14.5 (16.0) \times 17.5	0.7	2222 468 16334	.. 17334	.. 63334	.. 64334
0.39	6.0 \times 15.0 (16.5) \times 17.5	0.9	2222 468 16394	.. 17394	.. 63394	.. 64394
0.47	6.5 \times 15.5 (17.0) \times 17.5	1.0	2222 468 16474	.. 17474	.. 63474	.. 64474
0.56	7.5 \times 16.5 (18.0) \times 17.5	1.3	2222 468 16564	.. 17564	.. 63564	.. 64564
0.68	8.0 \times 17.0 (18.5) \times 17.5	1.4	2222 468 16684	.. 17684	.. 63684	.. 64684
0.82	8.5 \times 17.5 (19.0) \times 17.5	1.5	2222 468 16824	.. 17824	.. 63824	.. 64824
1.0	8.0 \times 20.0 (21.5) \times 17.5	1.7	2222 468 16105	.. 17105	.. 63105	.. 64105
Pitch = 22.5 ± 0.4 mm; $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
1.2	7.0 \times 19.0 \times 26.0	3.2	2222 468 16125	.. 17125	.. 63125	.. 64125
1.5	8.0 \times 21.0 \times 26.0	3.8	2222 468 16155	.. 17155	.. 63155	.. 64155
1.8	9.0 \times 22.0 \times 26.0	4.1	2222 468 16185	.. 17185	.. 63185	.. 64185
2.2	9.8 \times 23.0 \times 26.0	4.8	2222 468 16225	.. 17225	.. 63225	.. 64225
2.7	11.0 \times 24.0 \times 26.0	5.9	2222 468 16275	.. 17275	.. 63275	.. 64275
3.3	12.5 \times 25.5 \times 26.0	6.9	2222 468 16335	.. 17335	.. 63335	.. 64335
3.9	13.5 \times 26.5 \times 26.0	7.5	2222 468 16395	.. 17395	.. 63395	.. 64395
4.7	14.9 \times 28.0 \times 26.0	8.6	2222 468 16475	.. 17475	.. 63475	.. 64475
Pitch = 27.5 ± 0.4 mm; $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
5.6	15.0 \times 28.0 \times 30.0	9.1	2222 468 16565	.. 17565	.. 63565	.. 64565

Notes

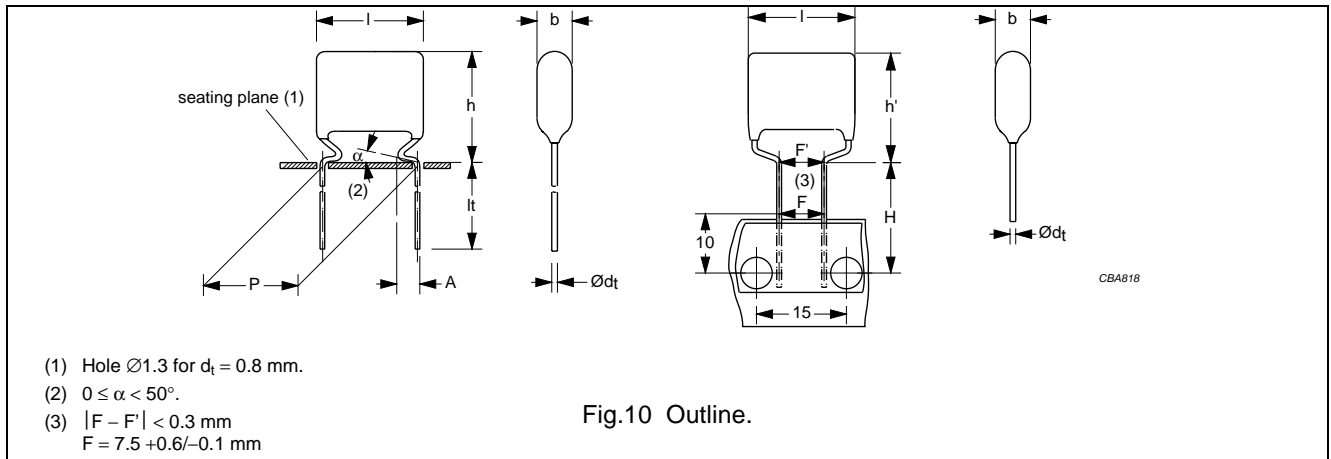
- Dimensions in brackets for bent back leads.
- H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to this handbook, chapter "Packaging information".
 - For pitch = 15.0 mm: H = 16.0 mm and $P_0 = 12.7$ mm.
 - For pitch = 15/7.5 mm (bent back): H = 16.0 mm and $P_0 = 15.0$ mm.
Standard reel diameter = 500 mm. Small reel diameter = 356 mm is available on request.
- The shading indicates preferred types.

Metallized polyester film capacitors

MKT 468

MKT 468 GENERAL DATA

**PITCH 15/22.5/27.5 mm
PITCH 7.5 mm (bent back leads)**



Specific reference data for the 400 V DC capacitors

DESCRIPTION	VALUE		
	at 1 kHz	at 10 kHz	at 100 kHz
Tangent of loss angle: $0.12 < C \leq 0.47 \mu\text{F}$ $C > 0.47 \mu\text{F}$	$\leq 75 \times 10^{-4}$ $\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$ $\leq 120 \times 10^{-4}$	$\leq 225 \times 10^{-4}$ -
Rated voltage pulse slope $(dU/dt)_R$ at 400 V (DC): $I_{\text{max}} = 17.5$ mm $I_{\text{max}} = 26.0$ mm $I_{\text{max}} = 30.0$ mm	65 V/ μs 30 V/ μs 25 V/ μs		
R between leads, for $C \leq 0.33 \mu\text{F}$ at 100 V; 1 minute	$>30000 \text{ M}\Omega$		
RC between leads, for $C > 0.33 \mu\text{F}$ at 100 V; 1 minute	$>10000 \text{ s}$		
R between interconnecting leads and casing; 100 V; 1 minute	$>30000 \text{ M}\Omega$		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	640 V; 1 minute		
Withstanding (DC) voltage between leads and case	800 V; 1 minute		

Available 400 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5$ mm	$\pm 10\%$	2222 468 28...	preferred
		$\pm 5\%$	2222 468 29...	preferred
	long leads; note 2	$\pm 10\%$	2222 468 55...	on request
		$\pm 5\%$	2222 468 56...	on request
Taped on reel	$H = 16.0$ mm; $P_0 = 12.7$ mm; note 3	$\pm 10\%$	2222 468 30...	on request
		$\pm 5\%$	2222 468 31...	on request
Taped on reel (bent back)	$H = 16.0$ mm; $P_0 = 15.0$ mm; note 3	$\pm 10\%$	2222 468 65...	preferred
		$\pm 5\%$	2222 468 66...	preferred

Notes

- For SPQ refer to this handbook, chapter "Packaging information"; taped on reel pitch = 27.5 mm is not available.
- Length of long leads: $l_t = 19.0 \pm 4.0$ mm for lead pitch = 15.0 mm, 25.0 ± 4.0 mm for lead pitch = 22.5 mm and 24.0 ± 4.0 mm for lead pitch = 27.5 mm.
- H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT 468

 $U_{Rdc} = 400 \text{ V}$; $U_{Rac} = 200 \text{ V}$

C (μF)	DIMENSIONS ⁽¹⁾ $b_{\text{max}} \times h \text{ (h')}_{\text{max}} \times l_{\text{max}}$ (mm)	MASS (g)	CATALOGUE NUMBER			
			LOOSE IN BOX		REEL DIAMETER = 500 mm; H = 16.0 mm; $P_0 = 15.0 \text{ mm}$ ⁽²⁾	
			short leads		pitch 7.5 mm (bent back)	
			C-tol = $\pm 10\%$	C-tol = $\pm 5\%$	C-tol = $\pm 10\%$	C-tol = $\pm 5\%$
			catalogue number ⁽³⁾	last 5 digits ⁽³⁾	last 5 digits ⁽³⁾	
Pitch = 15.0 ± 0.4 mm (Pitch = 7.5 ± 0.4 mm for bent back leads); $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
0.12	5.0 \times 14.0 (15.5) \times 17.5	0.6	2222 468 28124	.. 29124	.. 65124	.. 66124
0.15	5.8 \times 15.0 (16.5) \times 17.5	0.9	2222 468 28154	.. 29154	.. 65154	.. 66154
0.18	6.5 \times 15.5 (17.0) \times 17.5	1.0	2222 468 28184	.. 29184	.. 65184	.. 66184
0.22	7.0 \times 15.5 (17.5) \times 17.5	1.2	2222 468 28224	.. 29224	.. 65224	.. 66224
0.27	7.4 \times 16.5 (18.0) \times 17.5	1.3	2222 468 28274	.. 29274	.. 65274	.. 66274
0.33	8.5 \times 17.5 (19.0) \times 17.5	1.5	2222 468 28334	.. 29334	.. 65334	.. 66334
0.39	7.4 \times 19.5 (21.0) \times 17.5	1.3	2222 468 28394	.. 29394	.. 65394	.. 66394
0.47	8.4 \times 20.5 (22.0) \times 17.5	1.5	2222 468 28474	.. 29474	.. 65474	.. 66474
Pitch = 22.5 ± 0.4 mm; $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
0.56	7.5 \times 19.5 \times 26.0	3.2	2222 468 28564	.. 29564	.. 65564	.. 66564
0.68	8.0 \times 21.0 \times 26.0	3.8	2222 468 28684	.. 29684	.. 65684	.. 66684
0.82	9.0 \times 22.0 \times 26.0	4.5	2222 468 28824	.. 29824	.. 65824	.. 66824
1.0	9.9 \times 23.0 \times 26.0	5.2	2222 468 28105	.. 29105	.. 65105	.. 66105
1.2	11.0 \times 24.0 \times 26.0	5.9	2222 468 28125	.. 29125	.. 65125	.. 66125
Pitch = 27.5 ± 0.4 mm; $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
1.5	11.5 \times 24.5 \times 30.0	6.5	2222 468 28155	.. 29155	.. 65155	.. 66155
1.8	12.5 \times 25.5 \times 30.0	7.1	2222 468 28185	.. 29185	.. 65185	.. 66185
2.2	14.0 \times 27.0 \times 30.0	8.2	2222 468 28225	.. 29225	.. 65225	.. 66225

Notes

- Dimensions in brackets for bent back leads.
- H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to this handbook, chapter "Packaging information".
 - For pitch = 15.0 mm: H = 16.0 mm and $P_0 = 12.7$ mm.
 - For pitch = 15/7.5 mm (bent back): H = 16.0 mm and $P_0 = 15.0$ mm.
Standard reel diameter = 500 mm. Small reel diameter = 356 mm is available on request.
- The shading indicates preferred types.

Metalized polyester film capacitors

MKT 468

MKT 468 GENERAL DATA

**PITCH 15/22.5/27.5 mm
PITCH 7.5 mm (bent back leads)**

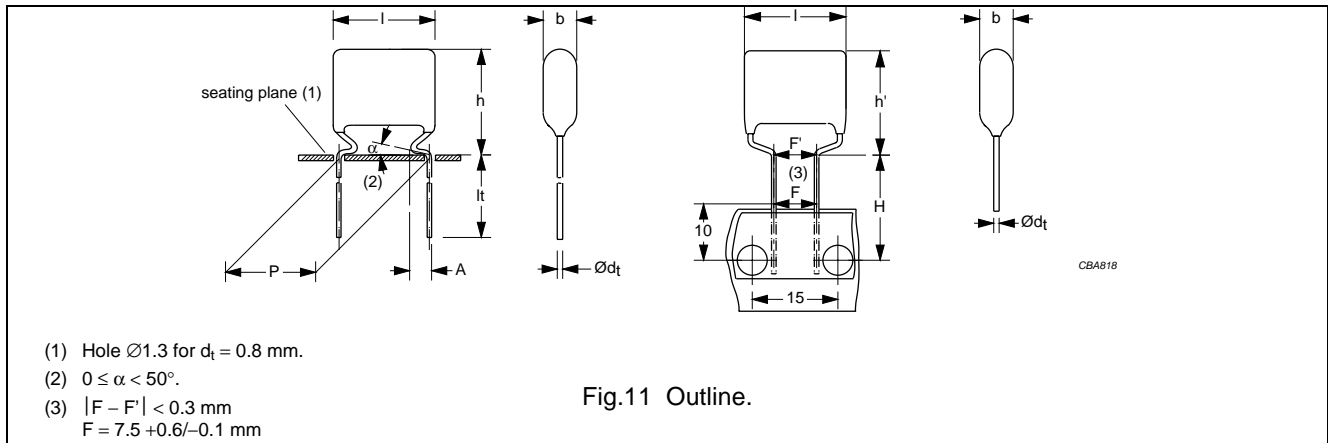


Fig.11 Outline.

Specific reference data for the 630 V DC capacitors

DESCRIPTION	VALUE		
	at 1 kHz	at 10 kHz	at 100 kHz
Tangent of loss angle: $C \leq 0.1 \mu\text{F}$ $0.1 \mu\text{F} < C \leq 0.47 \mu\text{F}$ $C > 0.47 \mu\text{F}$	$\leq 75 \times 10^{-4}$ $\leq 75 \times 10^{-4}$ $\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$ $\leq 120 \times 10^{-4}$ $\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$ $\leq 225 \times 10^{-4}$ -
Rated voltage pulse slope $(dU/dt)_R$ at 630 V (DC): $I_{\text{max}} = 17.5$ mm $I_{\text{max}} = 26.0$ mm $I_{\text{max}} = 30.0$ mm	90 V/ μs 35 V/ μs 30 V/ μs		
R between leads, for $C \leq 0.33 \mu\text{F}$ at 500 V; 1 minute	>30000 M Ω		
RC between leads, for $C > 0.33 \mu\text{F}$ at 500 V; 1 minute	>10000 s		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 M Ω		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	1008 V; 1 minute		
Withstanding (DC) voltage between leads and case	1260 V; 1 minute		

Available 630 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5$ mm	$\pm 10\%$	2222 468 40...	preferred
		$\pm 5\%$	2222 468 41...	preferred
	long leads; note 2	$\pm 10\%$	2222 468 57...	on request
		$\pm 5\%$	2222 468 58...	on request
Taped on reel	$H = 16.0$ mm; $P_0 = 12.7$ mm; note 3	$\pm 10\%$	2222 468 42...	on request
		$\pm 5\%$	2222 468 43...	on request
Taped on reel (bent back)	$H = 16.0$ mm; $P_0 = 15.0$ mm; note 3	$\pm 10\%$	2222 468 67...	preferred
		$\pm 5\%$	2222 468 68...	preferred

Notes

- For SPQ refer to this handbook, chapter "Packaging information"; taped on reel pitch = 27.5 mm is not available.
- Length of long leads: $l_t = 19.0 \pm 4.0$ mm for lead pitch = 15.0 mm, 25.0 ± 4.0 mm for lead pitch = 22.5 mm and 24.0 ± 4.0 mm for lead pitch = 27.5 mm.
- H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT 468

 $U_{Rdc} = 630 \text{ V}$; $U_{Rac} = 250 \text{ V}$

C (μF)	DIMENSIONS ⁽¹⁾ $b_{\max} \times h (h')_{\max} \times l_{\max}$ (mm)	MASS (g)	CATALOGUE NUMBER			
			LOOSE IN BOX		REEL DIAMETER = 500 mm; H = 16.0 mm; $P_0 = 15.0 \text{ mm}$ ⁽²⁾	
			short leads		pitch 7.5 mm (bent back)	
			C-tol = $\pm 10\%$	C-tol = $\pm 5\%$	C-tol = $\pm 10\%$	C-tol = $\pm 5\%$
			catalogue number ⁽³⁾	last 5 digits ⁽³⁾	last 5 digits ⁽³⁾	
Pitch = 15.0 ± 0.4 mm (Pitch = 7.5 ± 0.4 mm for bent back leads); $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
0.039	5.0 \times 14.0 (15.5) \times 17.5	0.6	2222 468 40393	.. 41393	.. 67393	.. 68393
0.047	5.5 \times 14.5 (16.0) \times 17.5	0.7	2222 468 40473	.. 41473	.. 67473	.. 68473
0.056	5.9 \times 15.0 (16.5) \times 17.5	0.9	2222 468 40563	.. 41563	.. 67563	.. 68563
0.068	6.5 \times 16.0 (17.5) \times 17.5	1.2	2222 468 40683	.. 41683	.. 67683	.. 68683
0.082	7.3 \times 16.5 (18.0) \times 17.5	1.3	2222 468 40823	.. 41823	.. 67823	.. 68823
0.1	7.9 \times 17.0 (18.5) \times 17.5	1.4	2222 468 40104	.. 41104	.. 67104	.. 68104
0.12	7.5 \times 19.5 (21.0) \times 17.5	1.3	2222 468 40124	.. 41124	.. 67124	.. 68124
0.15	8.5 \times 20.5 (22.0) \times 17.5	1.5	2222 468 40154	.. 41154	.. 67154	.. 68154
Pitch = 22.5 ± 0.4 mm; $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
0.18	7.5 \times 19.5 \times 26.0	3.5	2222 468 40184	.. 41184	.. 67184	.. 68184
0.22	8.0 \times 21.0 \times 26.0	3.8	2222 468 40224	.. 41224	.. 67224	.. 68224
0.27	9.0 \times 22.0 \times 26.0	4.5	2222 468 40274	.. 41274	.. 67274	.. 68274
0.33	10.0 \times 23.0 \times 26.0	5.2	2222 468 40334	.. 41334	.. 67334	.. 68334
0.39	11.5 \times 24.0 \times 26.0	5.9	2222 468 40394	.. 41394	.. 67394	.. 68394
0.47	12.5 \times 25.5 \times 26.0	6.9	2222 468 40474	.. 41474	.. 67474	.. 68474
0.56	13.5 \times 26.6 \times 26.0	7.5	2222 468 40564	.. 41564	.. 67564	.. 68564
0.68	15.0 \times 28.0 \times 26.0	8.6	2222 468 40684	.. 41684	.. 67684	.. 68684
Pitch = 27.5 ± 0.4 mm; $d_t = 0.80 \pm 0.08$ mm; A = 2.5 +1.4/-0.5 mm						
0.82	15.0 \times 28.0 \times 30.0	8.8	2222 468 40824	.. 41824	.. 67824	.. 68824

Notes

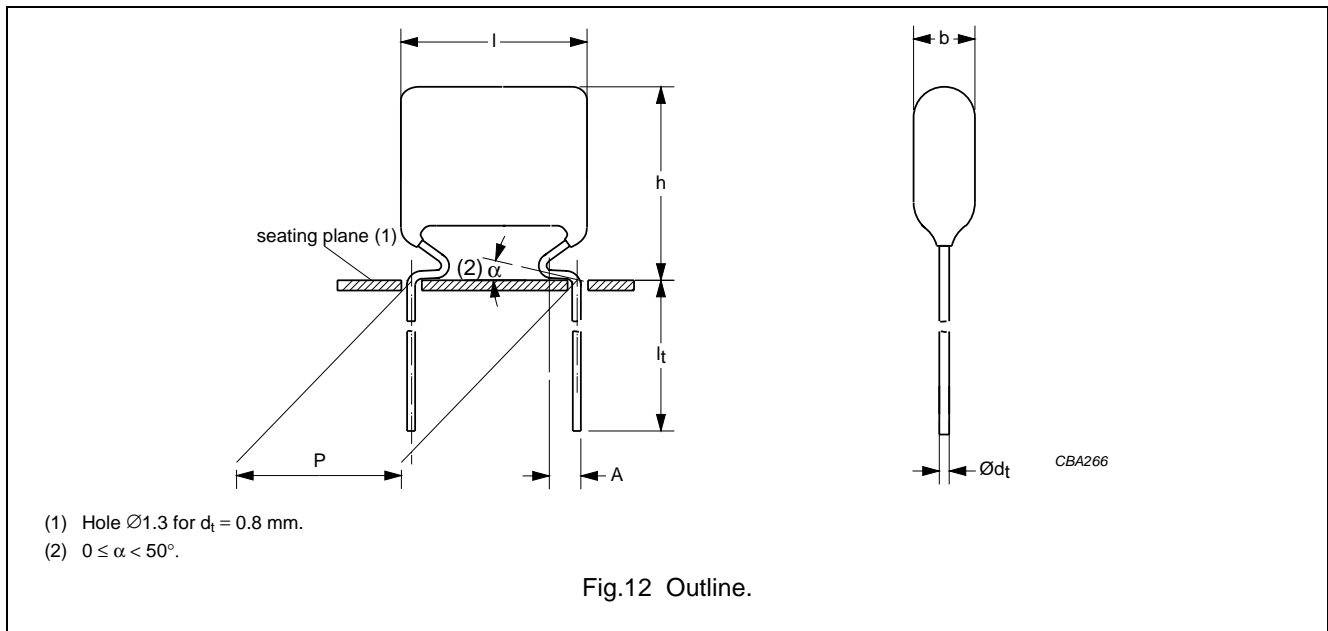
- Dimensions in brackets for bent back leads.
- H = in-tape height; P_0 = sprocket hole distance; for detailed specifications refer to this handbook, chapter "Packaging information".
 - For pitch = 15.0 mm: H = 16.0 mm and $P_0 = 12.7$ mm.
 - For pitch = 15/7.5 mm (bent back): H = 16.0 mm and $P_0 = 15.0$ mm.
Standard reel diameter = 500 mm. Small reel diameter = 356 mm is available on request.
- The shading indicates preferred types.

Metallized polyester film capacitors

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MKT/MKT 468 GENERAL DATA

PITCH 27.5 mm



Specific reference data for the 1000 V DC capacitors

DESCRIPTION	VALUE		
	at 1 kHz	at 10 kHz	at 100 kHz
Tangent of loss angle: $C \leq 0.1 \mu\text{F}$ $0.1 \mu\text{F} < C \leq 0.22 \mu\text{F}$	$\leq 75 \times 10^{-4}$ $\leq 75 \times 10^{-4}$	$\leq 120 \times 10^{-4}$ $\leq 120 \times 10^{-4}$	$\leq 200 \times 10^{-4}$ $\leq 225 \times 10^{-4}$
Rated voltage pulse slope $(dU/dt)_R$ at 1000 V (DC) $P = 15$ mm $P = 22.5$ mm $P = 27.5$ mm	200 V/ μs 120 V/ μs 100 V/ μs		
R between leads, for $C \leq 0.33 \mu\text{F}$ at 500 V; 1 minute	>30000 M Ω		
R between interconnecting leads and casing; 100 V; 1 minute	>30000 M Ω		
Withstanding (DC) voltage (cut off current 10 mA); rise time 100 V/s	1600; 1 minute		
Withstanding (DC) voltage between leads and case	2000 V; 1 minute		

Available 1000 V DC versions

PACKAGING ⁽¹⁾	DIMENSIONS	C-tol	FIRST 9 DIGITS OF CATALOGUE NUMBER	ORDERING
Loose in box	$l_t = 3.5 \pm 0.5$ mm	$\pm 10\%$	2222 468 60...	preferred

Note

1. For SPQ refer to this handbook, chapter "Packaging information".

Metallized polyester film capacitors

MKT/MKT 468

 $U_{Rdc} = 1000\text{ V}$; $U_{Rac} = 400\text{ V}$

C (μF)	DIMENSIONS $b_{\max} \times h_{\max} \times l_{\max}$ (mm)	MASS (g)	CATALOGUE NUMBER ⁽¹⁾
			LOOSE IN BOX; $l_t = 3.5 \pm 0.5\text{ mm}$
			C-tol = $\pm 10\%$
Pitch = $15.0 \pm 0.4\text{ mm}$; $d_t = 0.80 \pm 0.08\text{ mm}$; $A = 2.5+1.4/-0.5\text{ mm}$			
0.015	$5.0 \times 16.0 \times 17.5$	0.6	2222 468 60153
0.018	$5.5 \times 16.5 \times 17.5$	0.7	2222 468 60183
0.022	$6.0 \times 17.0 \times 17.5$	0.9	2222 468 60223
0.027	$6.5 \times 18.0 \times 17.5$	1.0	2222 468 60273
0.033	$8.0 \times 18.5 \times 17.5$	1.4	2222 468 60333
0.039	$8.5 \times 19.5 \times 17.5$	1.5	2222 468 60393
0.047	$9.5 \times 20.0 \times 17.5$	1.8	2222 468 60473
Pitch = $22.5 \pm 0.4\text{ mm}$; $d_t = 0.80 \pm 0.08\text{ mm}$; $A = 2.5+1.4/-0.5\text{ mm}$			
0.056	$7.0 \times 20.0 \times 26.0$	3.2	2222 468 60563
0.068	$8.0 \times 21.0 \times 26.0$	3.8	2222 468 60683
0.082	$8.5 \times 21.5 \times 26.0$	4.1	2222 468 60823
0.1	$9.5 \times 22.5 \times 26.0$	4.8	2222 468 60104
0.12	$10.5 \times 23.5 \times 26.0$	5.5	2222 468 60124
Pitch = $27.5 \pm 0.4\text{ mm}$; $d_t = 0.80 \pm 0.08\text{ mm}$; $A = 2.5+1.4/-0.5\text{ mm}$			
0.15	$10.5 \times 23.5 \times 30.0$	5.8	2222 468 60154
0.18	$11.5 \times 24.5 \times 30.0$	6.5	2222 468 60184
0.22	$13.0 \times 26.0 \times 30.0$	7.5	2222 468 60224

Note

1. The shading indicates preferred types.

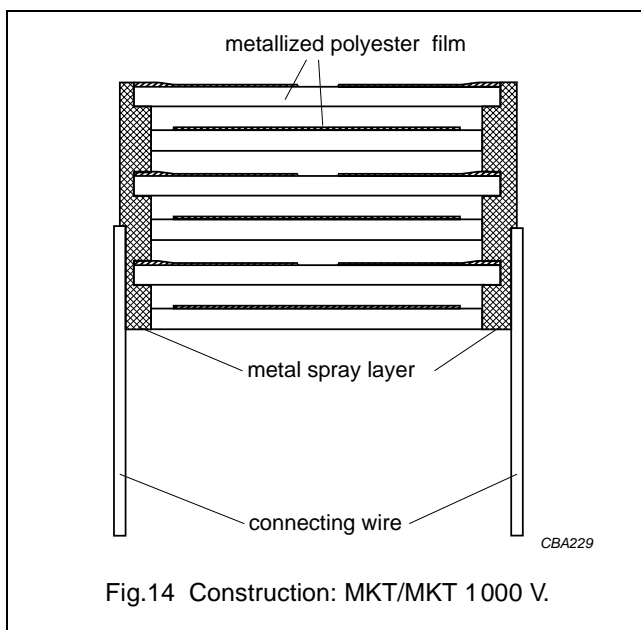
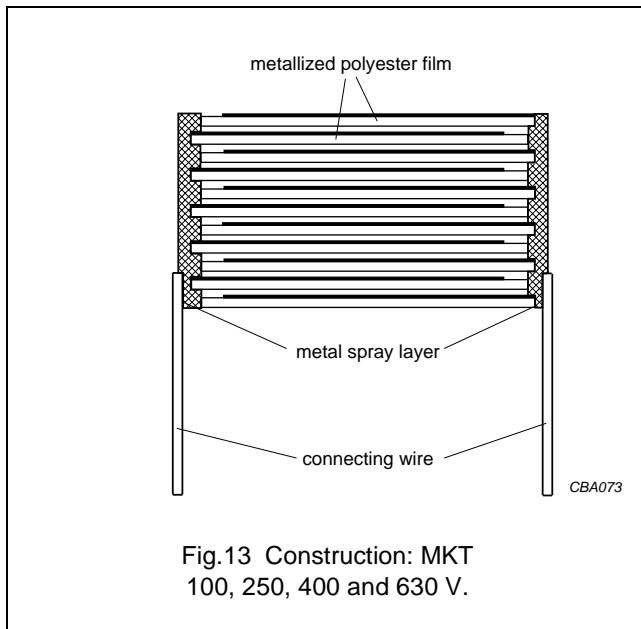
Metallized polyester film capacitors

MKT 467/468
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CONSTRUCTION

Description

- Low-inductive wound cell of metallized polyethylene terephthalate film
- Protected by a hard, water repellent, solvent resistant epoxy lacquer
- Radial leads, copper wire, solder coated.



Mounting

NORMAL USE

The capacitors are designed for mounting on printed-circuit boards. The capacitors packed in bandoliers are designed for mounting on printed-circuit boards by means of automatic insertion machines. For detailed tape specifications refer to this handbook, chapter "Packaging information".

SPECIFIC METHOD OF MOUNTING TO WITHSTAND VIBRATION AND SHOCK

In order to withstand vibration and shock tests, it must be ensured that the underside of the crimps 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: $T_{stg} = -25$ 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 to 106 kPa and a relative humidity of $50 \pm 2\%$.

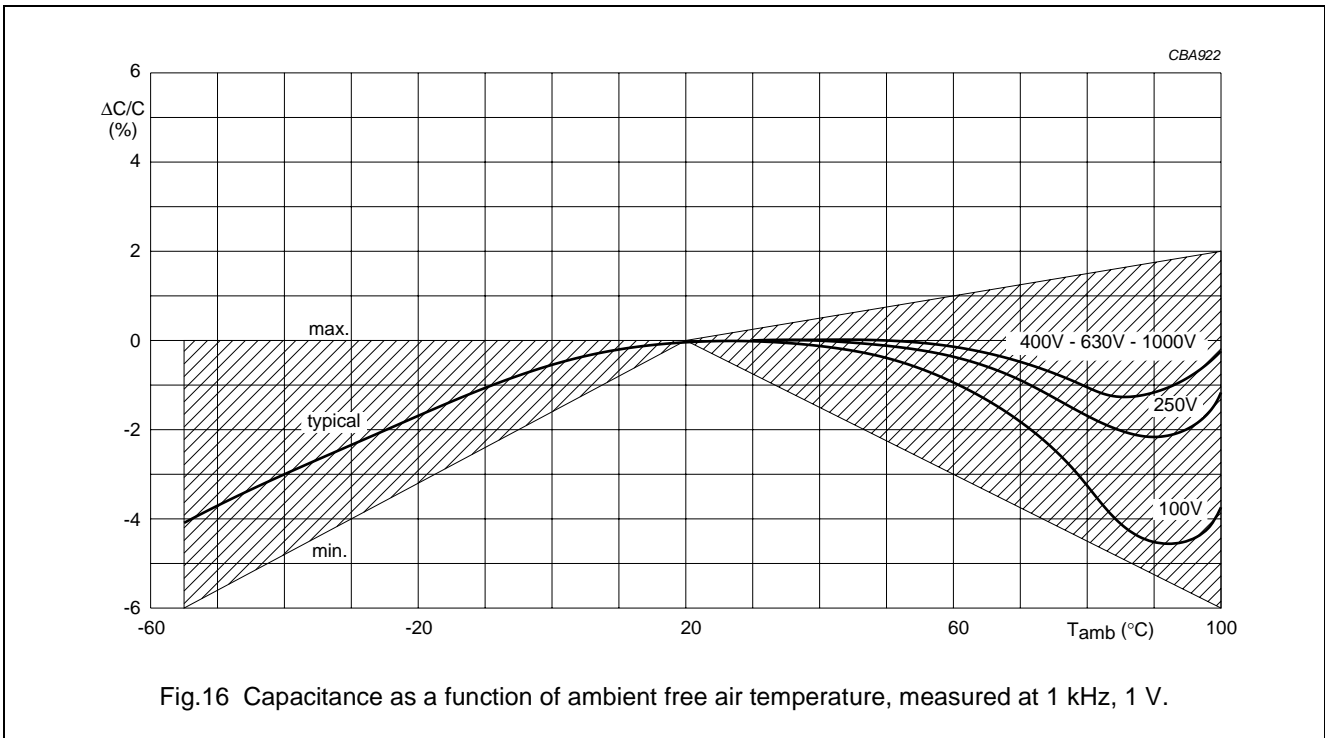
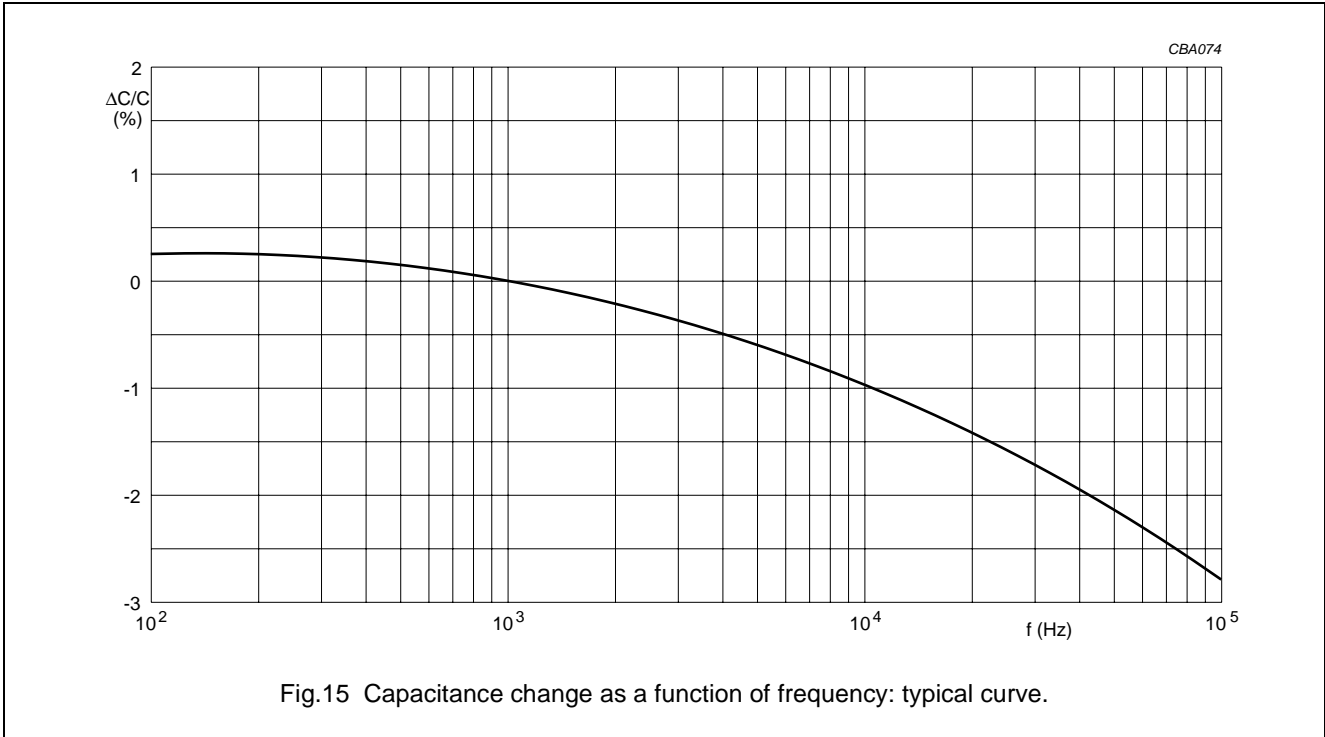
For reference testing, a conditioning period shall be applied over 96 ± 4 hours by heating the products in a circulating air oven at the rated temperature and a relative humidity not exceeding 20%.

Metallized polyester film capacitors

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CHARACTERISTICS

Capacitance



Metallized polyester film capacitors

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Impedance

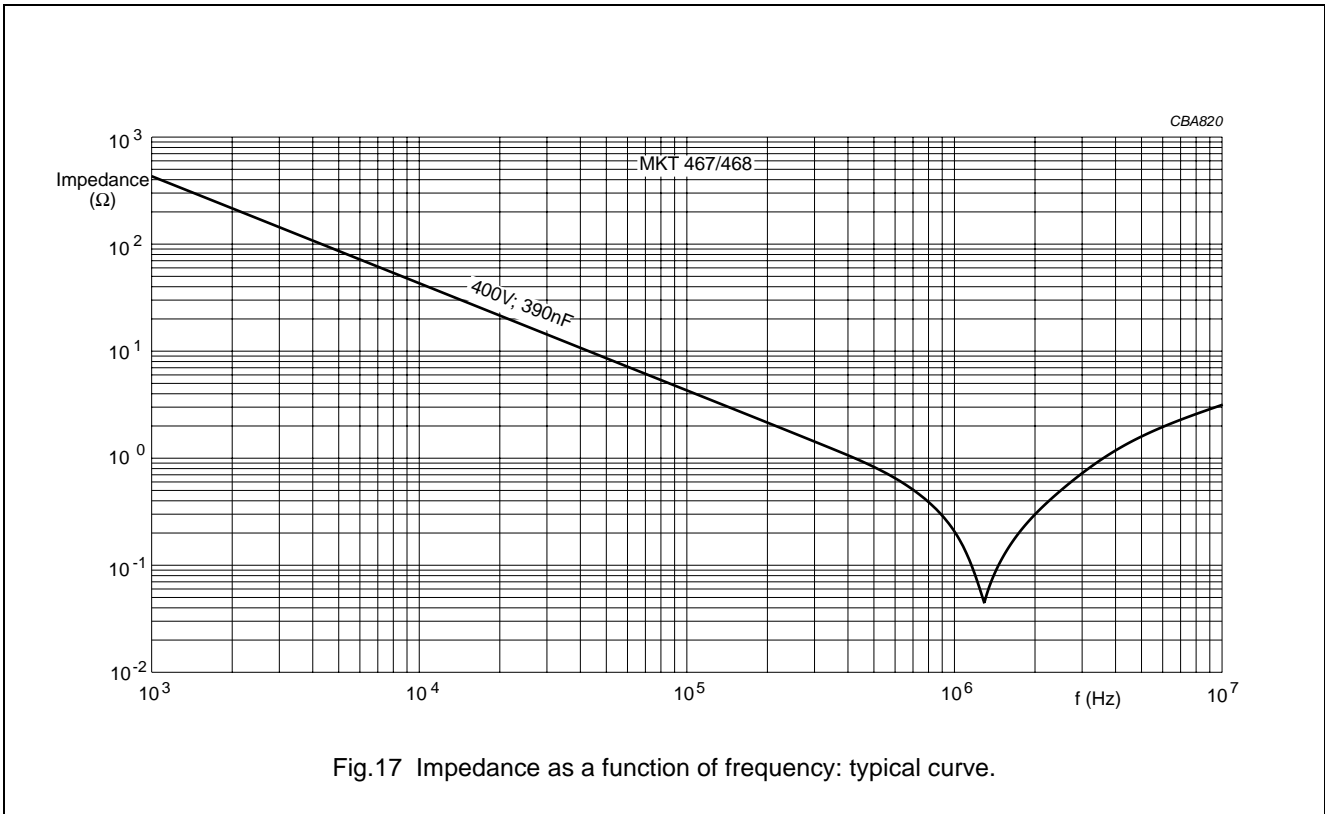


Fig.17 Impedance as a function of frequency: typical curve.

Maximum DC and AC voltage as a function of temperature

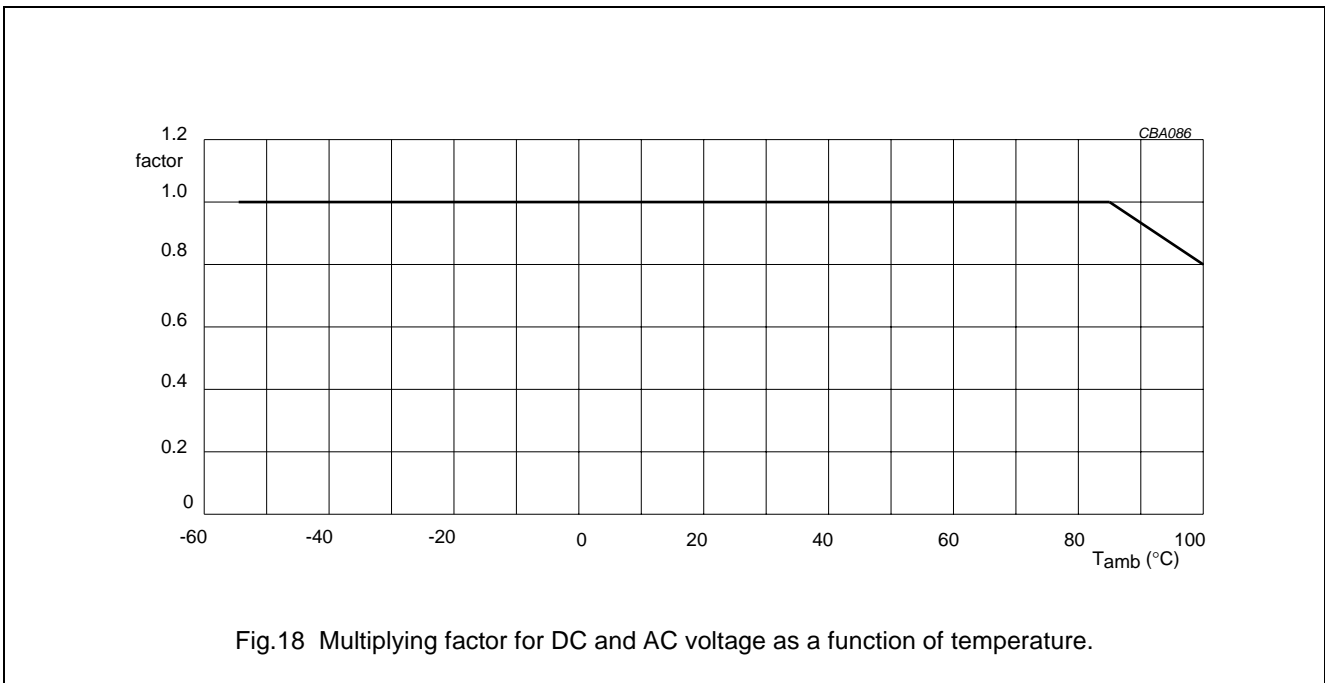
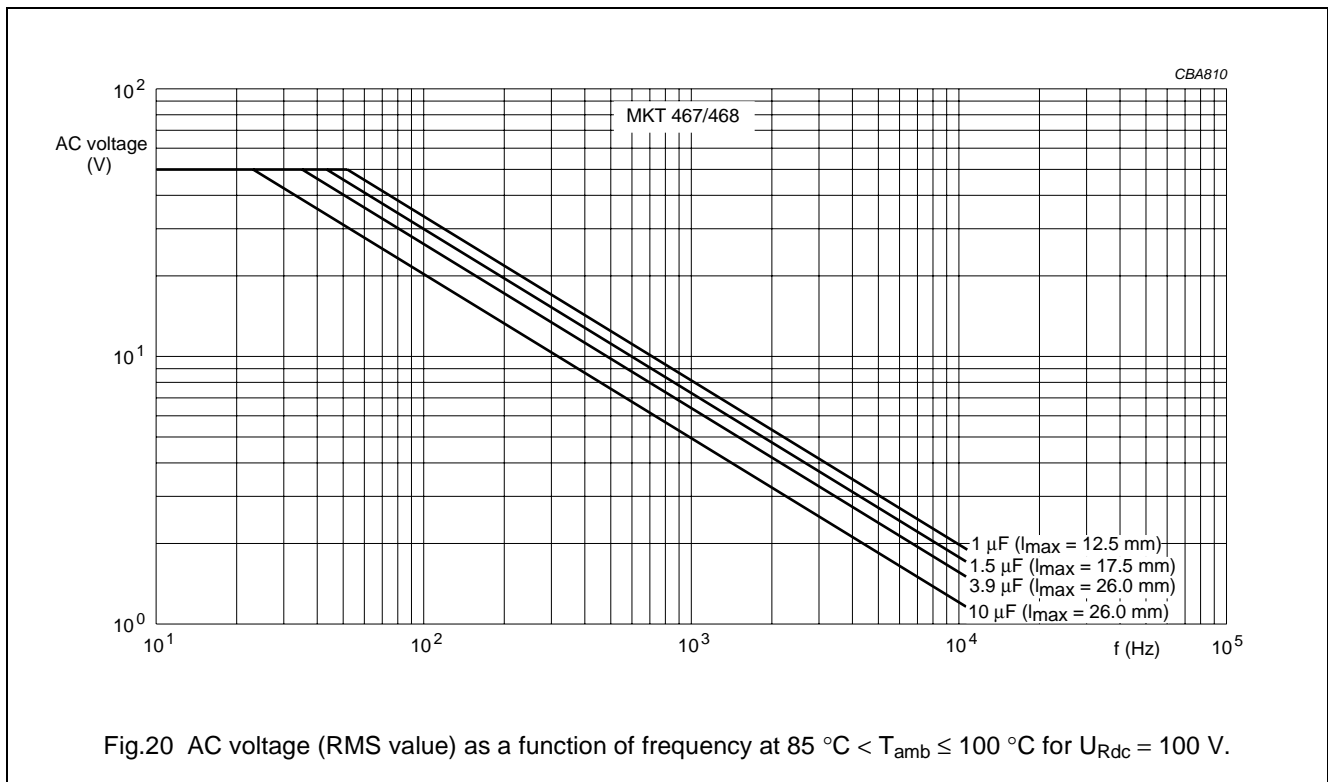
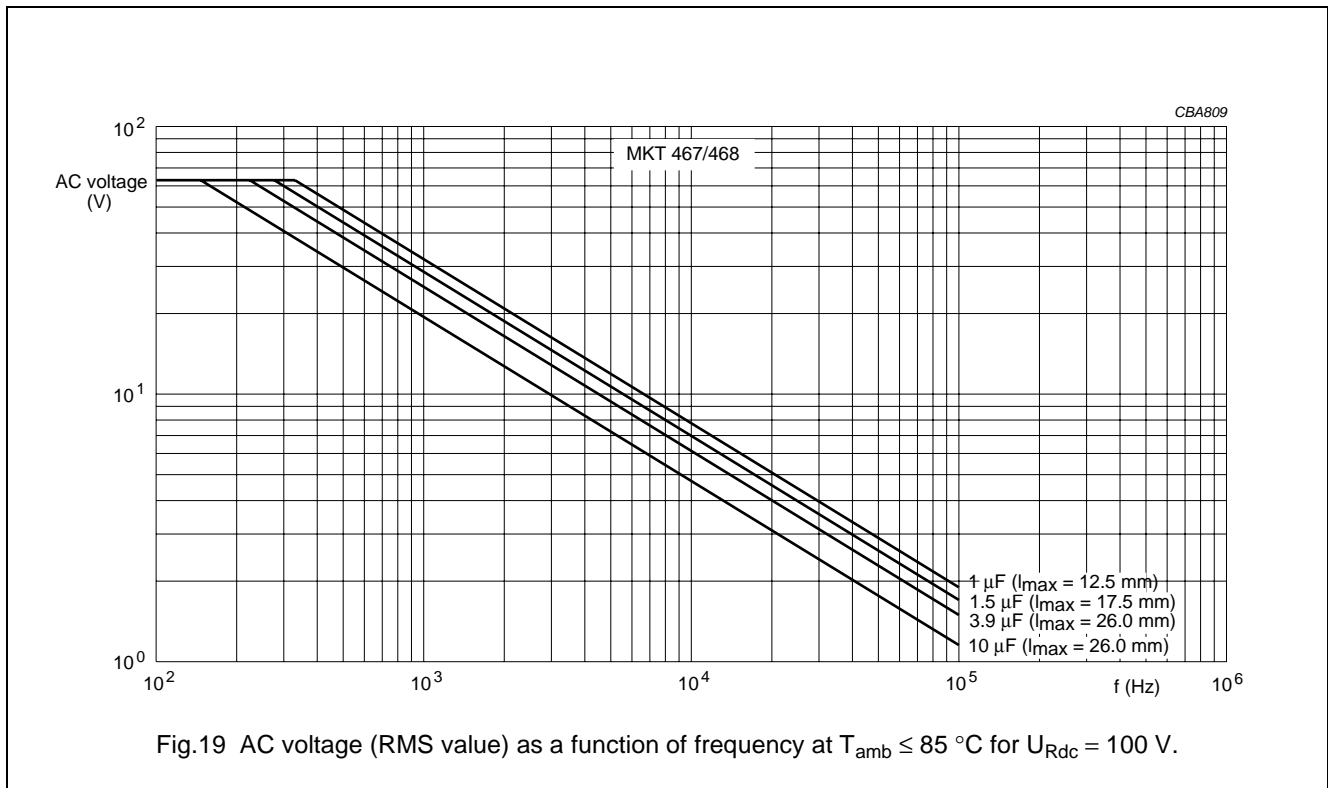


Fig.18 Multiplying factor for DC and AC voltage as a function of temperature.

Metallized polyester film capacitors

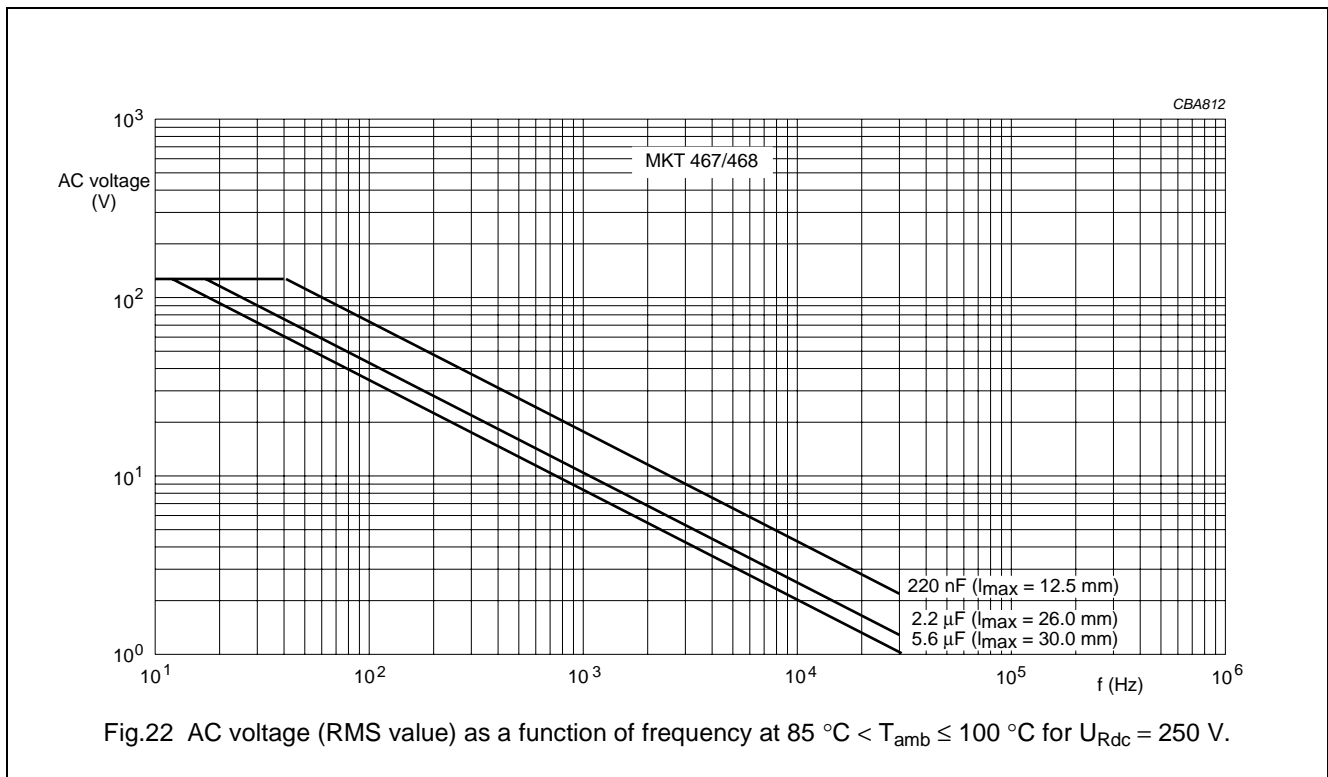
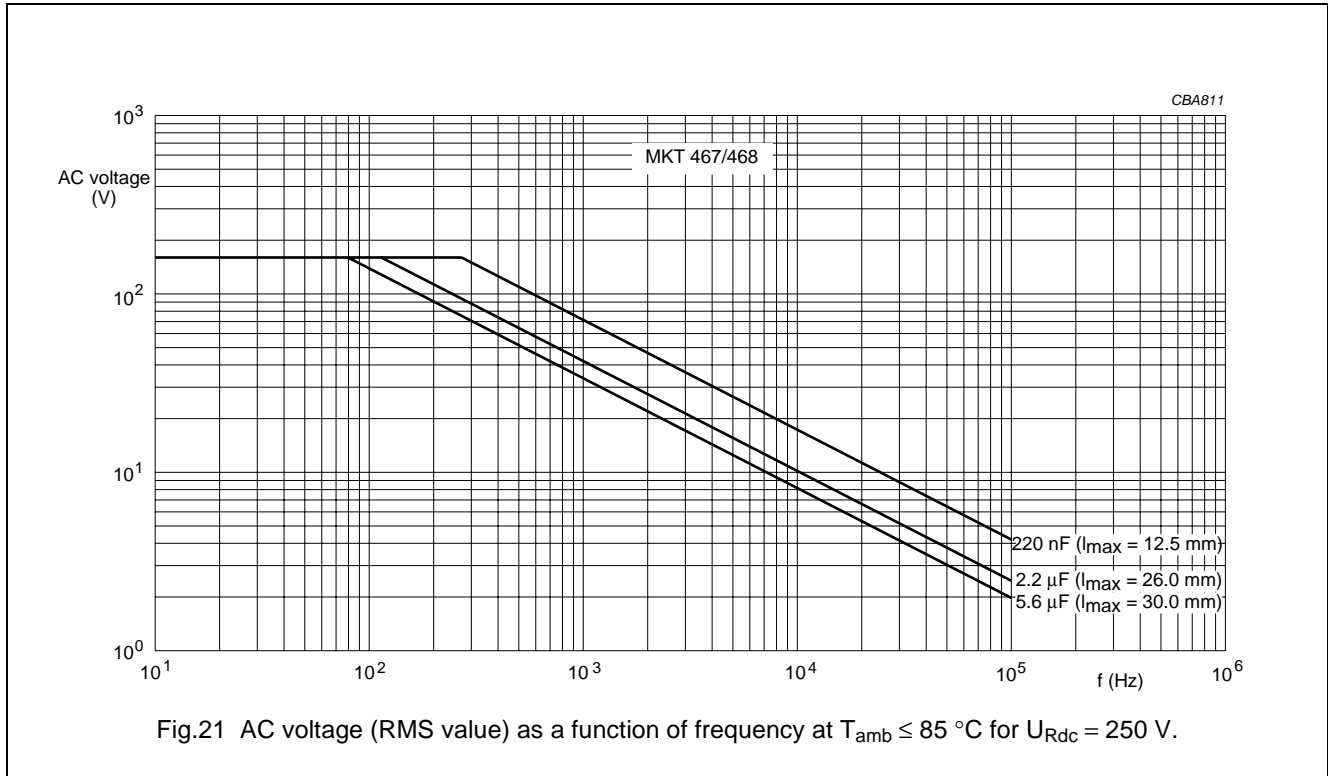
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Maximum RMS voltage and AC current (sinewave) as a function of frequency



Metallized polyester film capacitors

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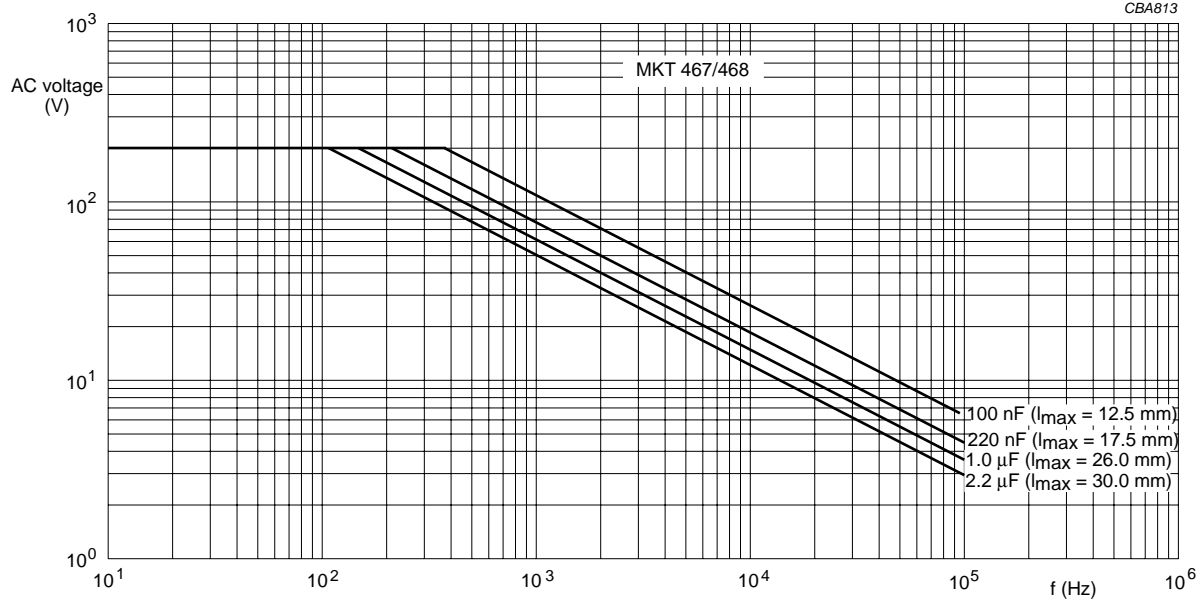


Fig.23 AC voltage (RMS value) as a function of frequency at $T_{amb} \leq 85$ °C for $U_{Rdc} = 400$ V.

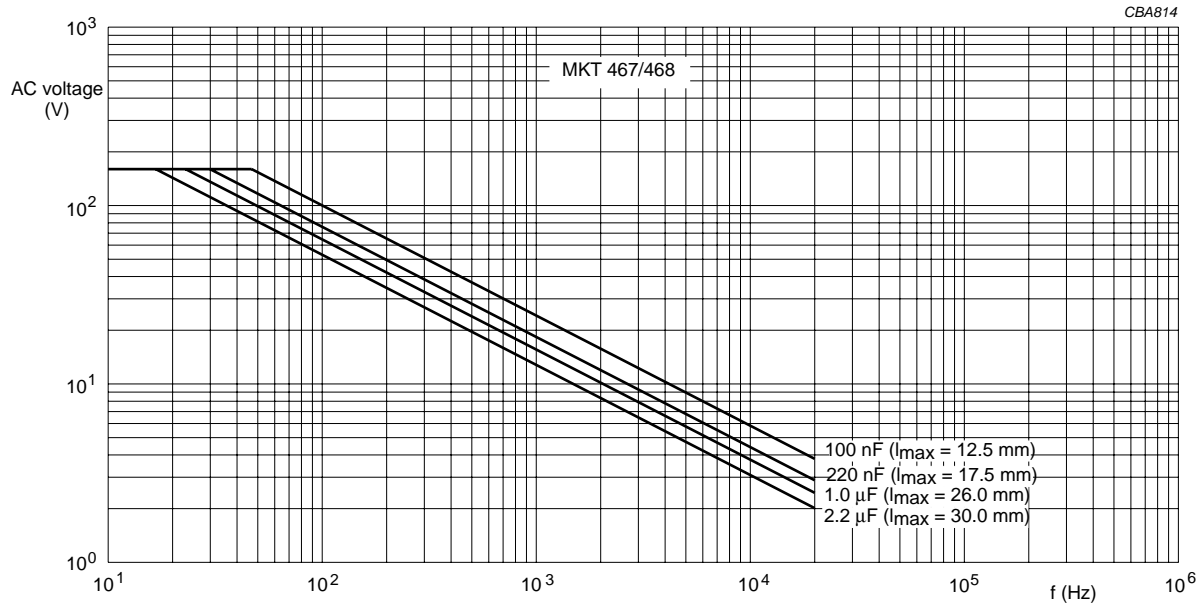


Fig.24 AC voltage (RMS value) as a function of frequency at 85 °C $< T_{amb} \leq 100$ °C for $U_{Rdc} = 400$ V.

Metallized polyester film capacitors

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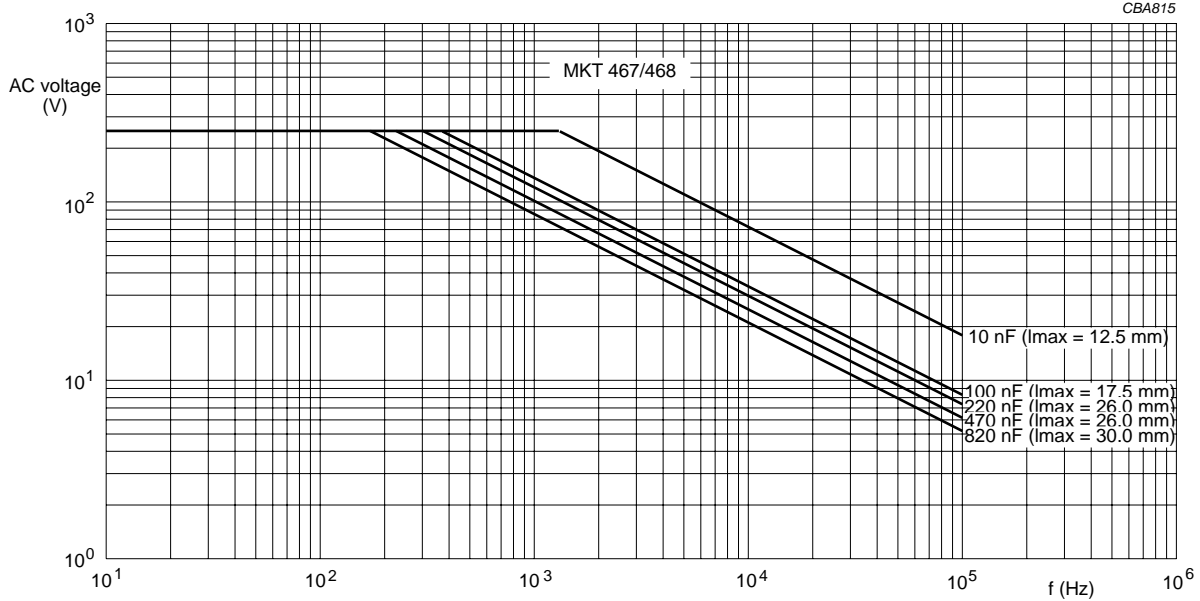


Fig.25 AC voltage (RMS value) as a function of frequency at $T_{amb} \leq 85 \text{ }^\circ\text{C}$ for $U_{Rdc} = 630 \text{ V}$.

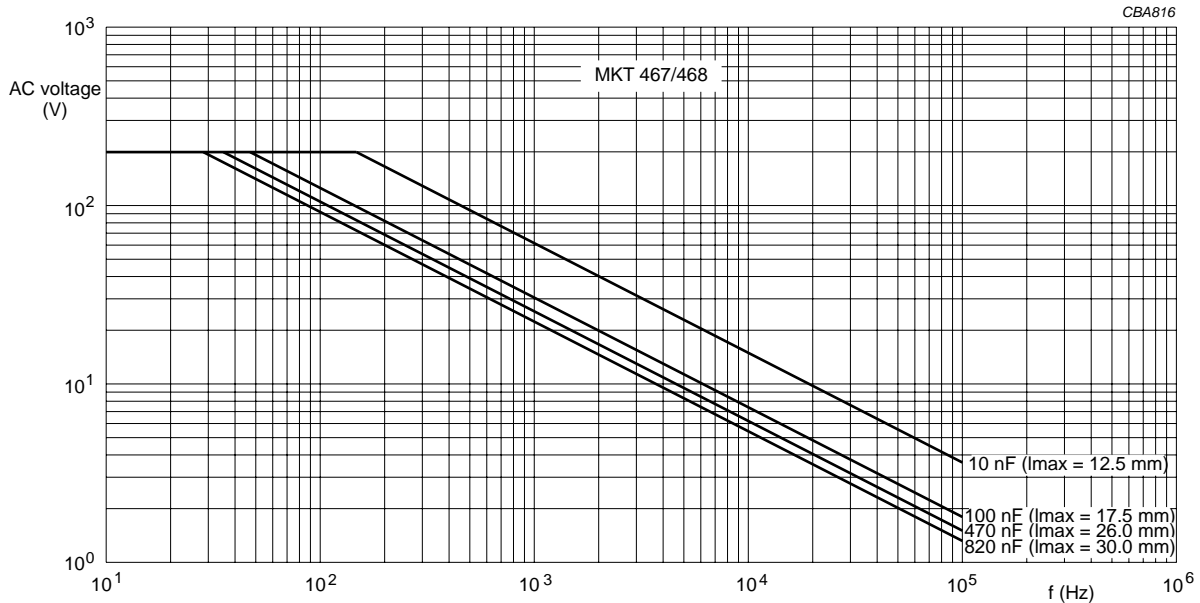
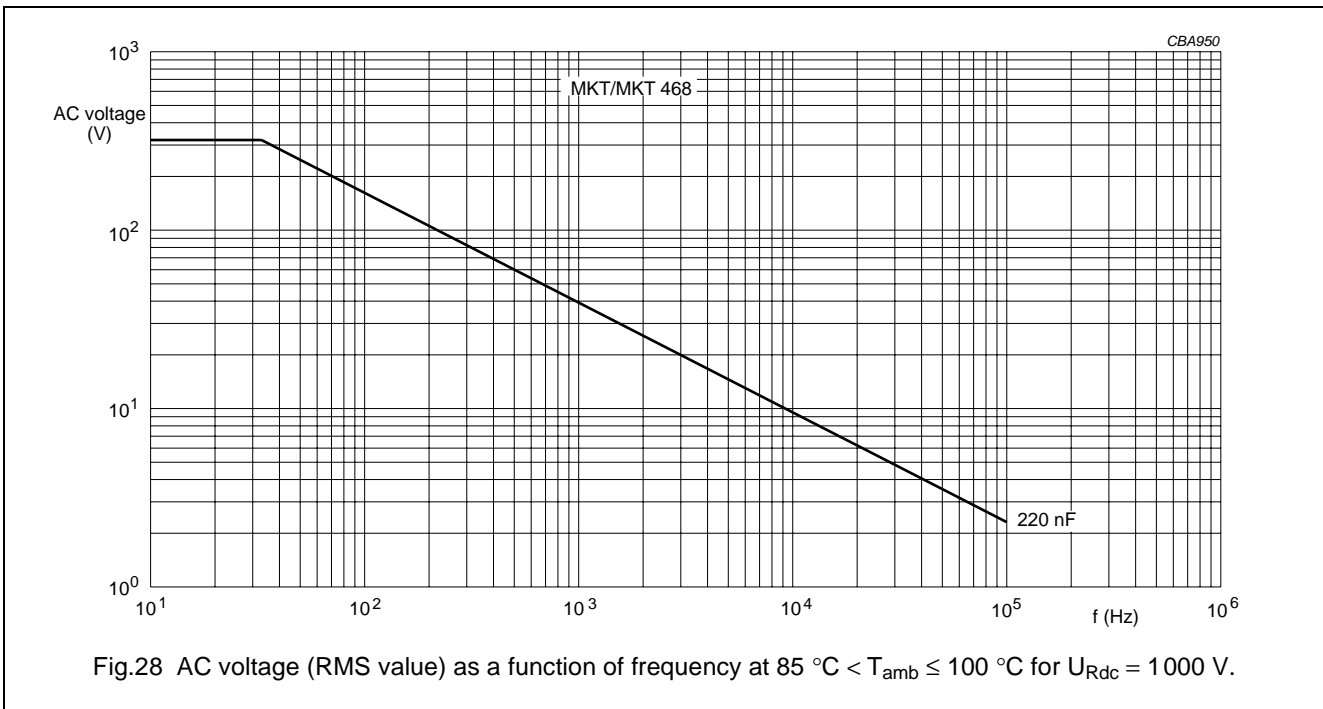
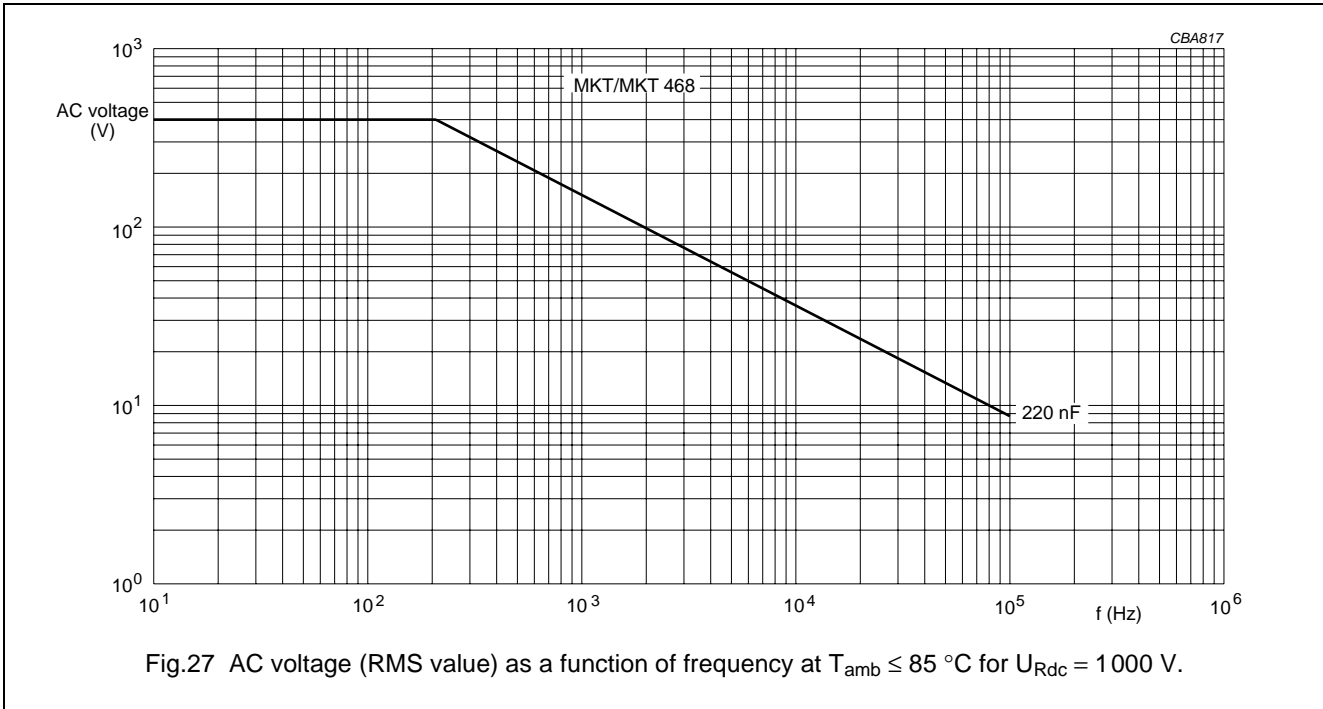


Fig.26 AC voltage (RMS value) as a function of frequency at $85 \text{ }^\circ\text{C} < T_{amb} \leq 100 \text{ }^\circ\text{C}$ for $U_{Rdc} = 630 \text{ V}$.

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Maximum RMS current (sinewave) as a function of frequency

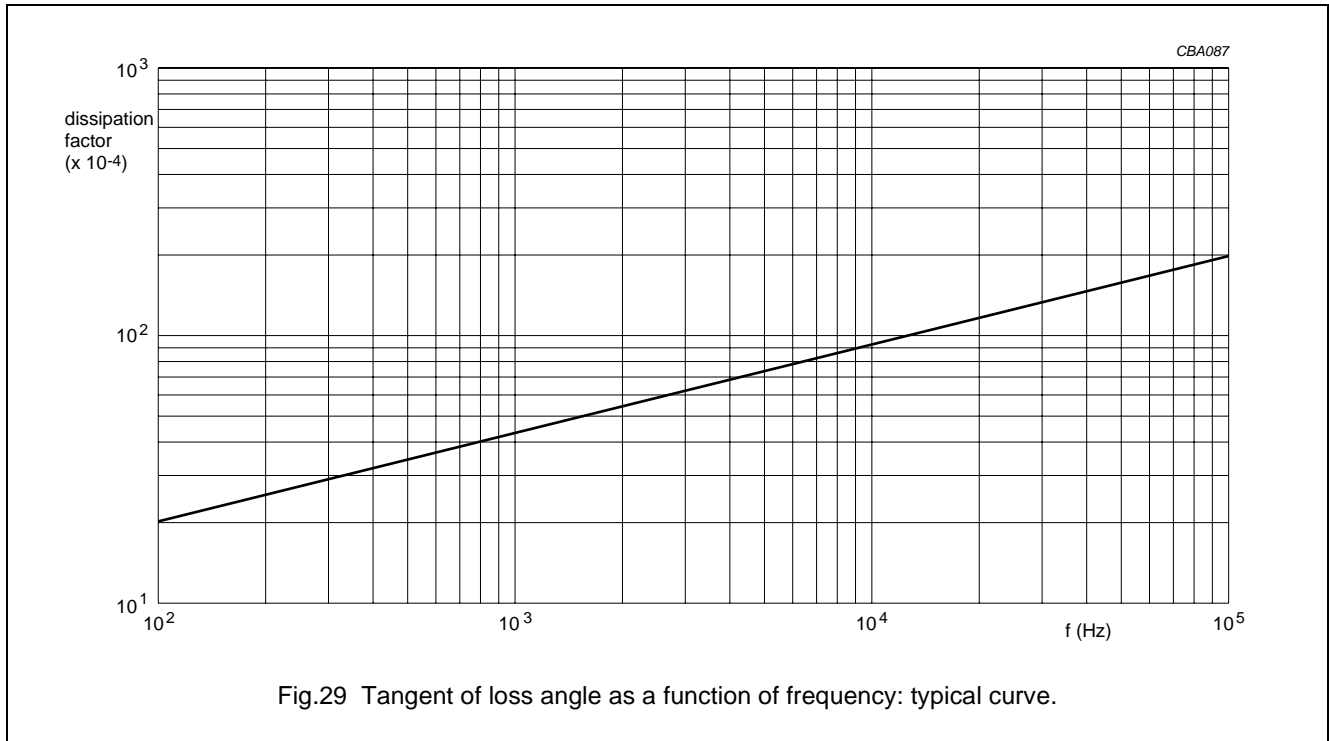
The maximum RMS current is defined by $I_{ac} = \omega \times C \times U_{ac}$.

U_{ac} is the maximum AC voltage depending on the ambient temperature in Figs 19 to 28.

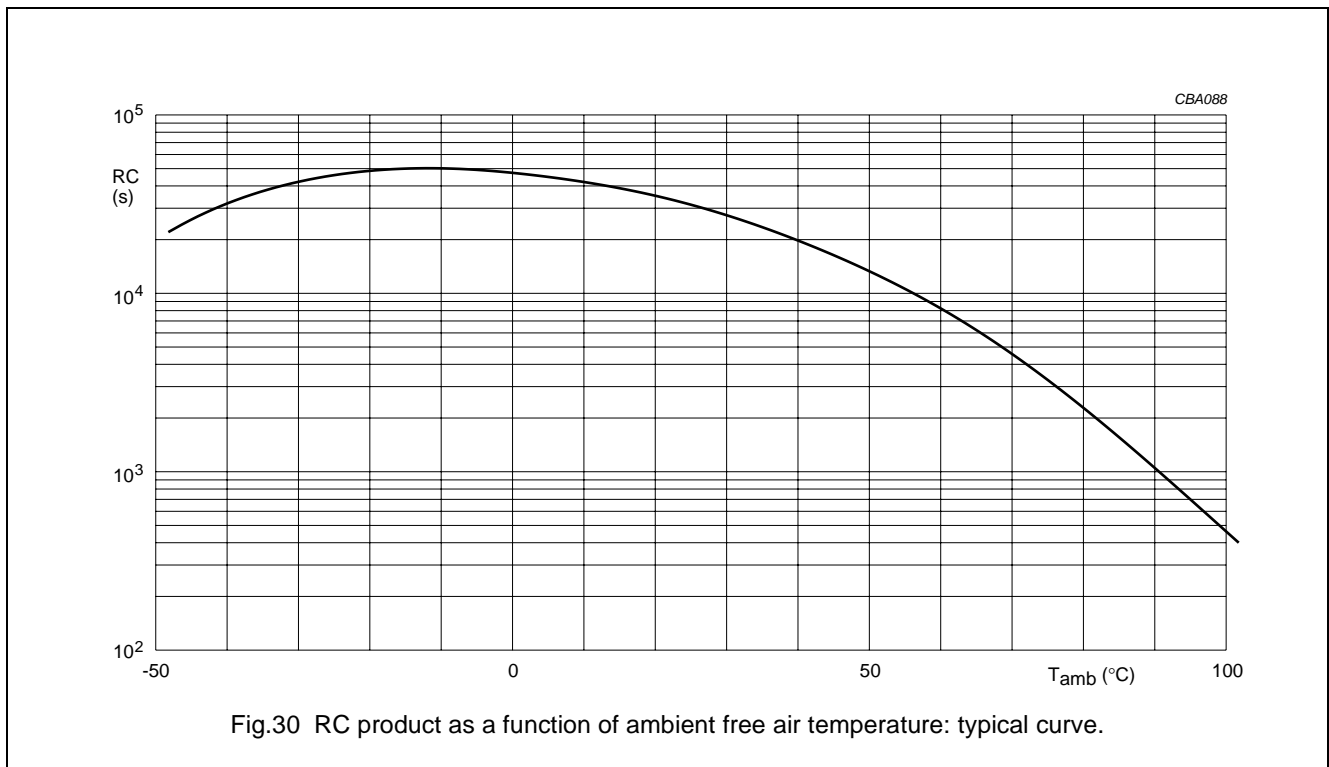
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Tangent of loss angle



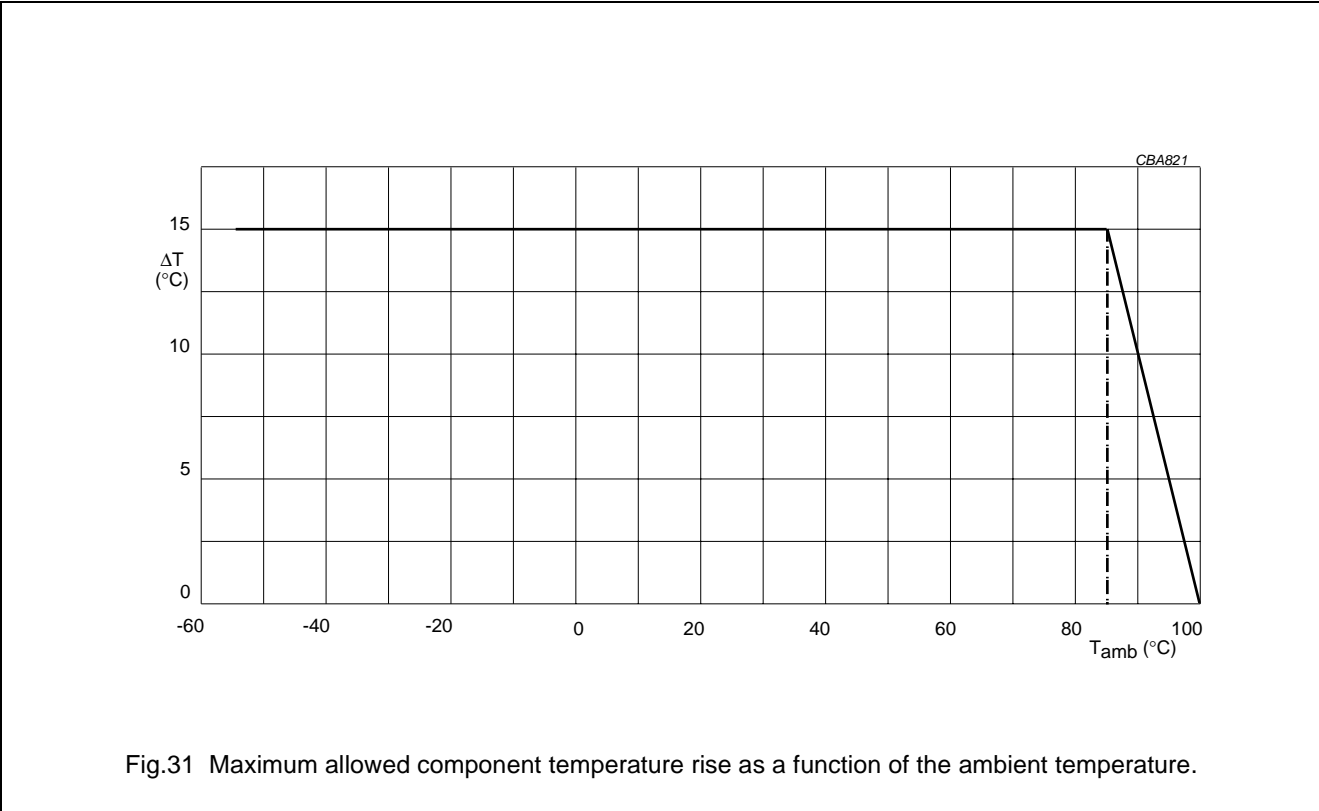
Insulation resistance



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



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Heat conductivity (G) as a function of pitch and capacitor body thickness in mW/°C

Table 1 Heat conductivity

b _{max} (mm)	ORIGINAL PITCH (mm)			
	10	15	22.5	27.5
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
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 air ambient temperature.

The power dissipation can be calculated according chapter “Introduction”, section “Maximum power dissipation”.

The component temperature rise (ΔT) can be measured (see section “Measuring the component temperature” for more details) or calculated by $\Delta T = P/G$:

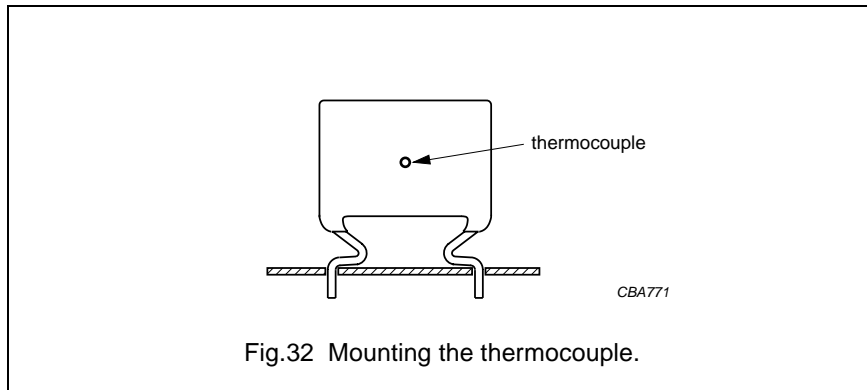
- ΔT = component temperature rise (°C).
- P = power dissipation of the component (mW).
- G = heat conductivity of the component (mW/°C).

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Measuring the component temperature

A thermocouple must be attached to the capacitor body as in Fig.32.



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.

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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 the maximum U_{p-p} 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 in Fig.31.
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 Table 1 "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 following conditions are fulfilled in any case (spikes and surge voltages from the mains included):

VOLTAGE CONDITIONS FOR 6 ABOVE

ALLOWED VOLTAGES	$T_{amb} \leq 85 \text{ °C}$	$85 \text{ °C} < T_{amb} \leq 100 \text{ °C}$
Maximum continuous RMS voltage	U_{Rac}	$0.8 \times U_{Rac}$
Maximum temporary RMS -overvoltage (<24 hours)	$1.25 \times U_{Rac}$	$1.0 \times U_{Rac}$
Maximum peak voltage (V_{o-p}) (<2 s)	$1.6 \times U_{Rdc}$	$1.3 \times U_{Rdc}$

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Example

$C = 3300 \text{ nF} - 100 \text{ V}$ used for the voltage signal shown in Fig.33.

$$U_{p-p} = 80 \text{ V}; U_p = 70 \text{ V}; T_1 = 0.5 \text{ ms}; T_2 = 1 \text{ ms}.$$

The ambient temperature is $35 \text{ }^\circ\text{C}$.

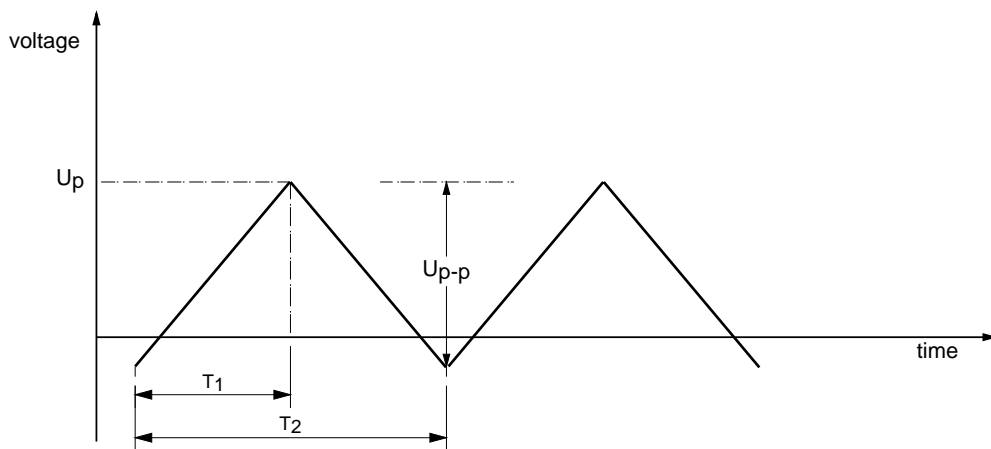
Checking the conditions:

1. The peak voltage $U_p = 70 \text{ V}$ is lower than 100 V (DC).
2. The peak-to-peak voltage 80 V is lower than $\times \sqrt{2} \times 63 \text{ V(AC)} = 178 U_{p-p}$.
3. The voltage pulse slope $dU/dt = 80 \text{ V}/500 \text{ } \mu\text{s} = 0.16 \text{ V}/\mu\text{s}$.
This is lower than $20 \text{ V}/\mu\text{s}$ (see specific reference data for each version).
4. The dissipated power is 60 mW as calculated with Fourier terms.

The temperature rise for $b_{\text{max}} = 8.5 \text{ mm}$ and pitch = 15 mm will be $\frac{60 \text{ mW}}{11 \text{ mW}/^\circ\text{C}} = 5.5 \text{ }^\circ\text{C}$.

This is lower than $15 \text{ }^\circ\text{C}$ temperature rise at $35 \text{ }^\circ\text{C}$; see Fig.31.

5. Not applicable.
6. Not applicable.



CBA865

Fig.33 Voltage signal.

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MARKING

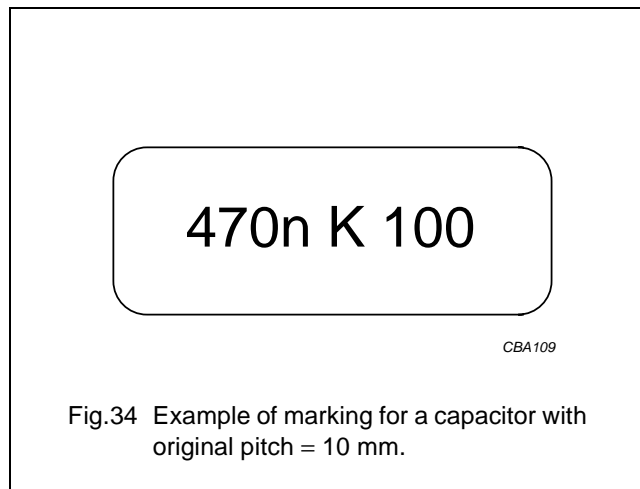
Product marking

STYLE MKT 467/468

Capacitors with original pitch = 10 mm

The capacitors are marked on the top in black ink (see Fig.34) with the following information:

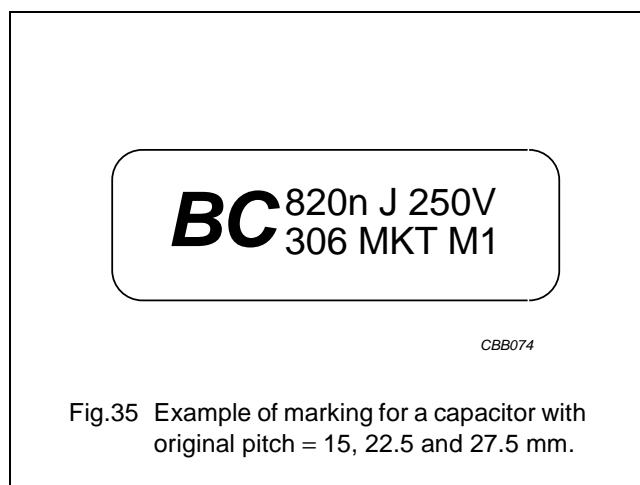
1. Capacitance code in accordance with "IEC 60062"
2. Tolerance on rated capacitance: K = $\pm 10\%$; J = $\pm 5\%$
3. Rated voltage (DC).



Capacitors with original pitch = 15, 22.5 and 27.5 mm

The capacitors are marked on the top in black ink (see Fig.35) with the following information:

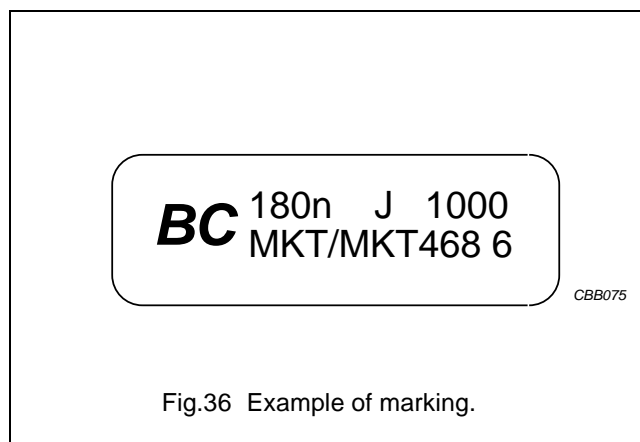
1. Manufacturer's symbol
2. Capacitance code in accordance with "IEC 60062"
3. Tolerance on rated capacitance: K = $\pm 10\%$; J = $\pm 5\%$
4. Rated voltage (DC).



STYLE MKT/MKT 468

The capacitors are marked on the top in black ink (see Fig.36) with the following information:

1. Capacitance code in accordance with "IEC 60062"
2. Tolerance on rated capacitance: K = $\pm 10\%$; J = $\pm 5\%$
3. Rated voltage (DC)
4. Code for dielectric material (MKT/MKT)
5. Manufacturer's symbol.



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Package marking

The package containing the capacitors is marked as shown in Fig.37.

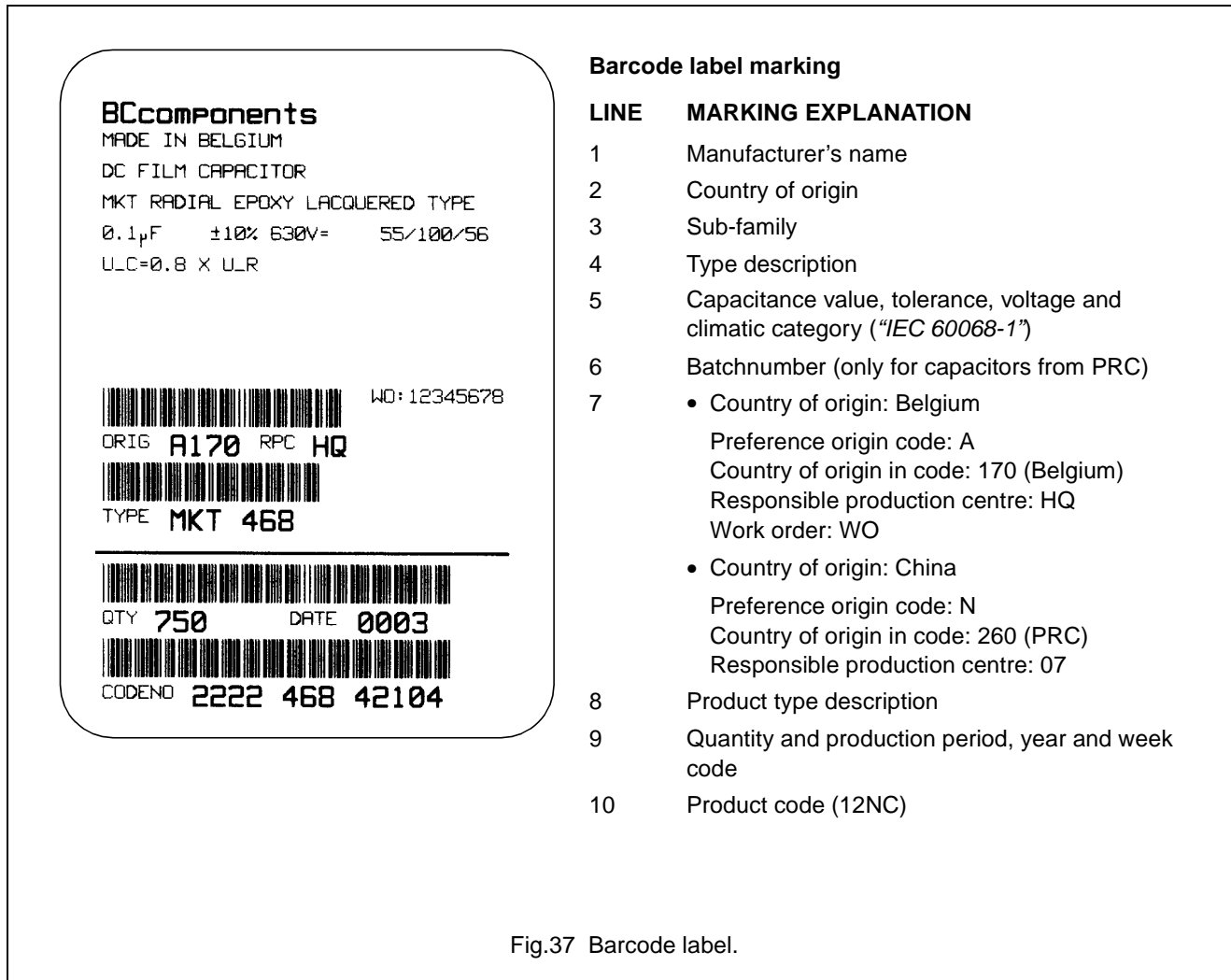


Fig.37 Barcode label.

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QUICK REFERENCE TEST REQUIREMENTS (see note 1)

TEST	PROCEDURE (quick reference)	REQUIREMENTS
Robustness of leads		
Tensile: "IEC 60068-2-21"	load 10 N; 10 s	no visible damage legible marking $ \Delta C/C \leq 2\%$ $\Delta \tan \delta \leq 30 \times 10^{-4}$; note 2
Bending: "IEC 60068-2-21"	load 5 N; $4 \times 90^\circ$	
Resistance to soldering heat "IEC 60068-2-20"	solder bath: 260 °C; 10 s	
Resistance to solvents	isopropyl alcohol; 23 °C; 5 minutes	
Robustness of component		
Vibration: "IEC 60068-2-6"	10 to 55 Hz; amplitude 0.75 mm or acceleration 98 m/s ² ; 6 hours	$ \Delta C/C \leq 3\%$ $\Delta \tan \delta \leq 30 \times 10^{-4}$; note 2
Shock: "IEC 60068-2-27"	half sinewave; 490 m/s ² ; 11 ms	
Climatic sequence		
Dry heat: "IEC 60068-2-2"	16 hours; 100 °C	$ \Delta C/C \leq 5\%$ $\Delta \tan \delta \leq 50 \times 10^{-4}$; note 2 $R_{ins} \geq 50\%$ of specified value
Damp heat cyclic, test Db, first cycle: "IEC 60068-2-30"		
Cold: "IEC 60068-2-1"	2 hours; -55 °C	
Damp heat cyclic, test Db, remaining cycles: "IEC 60068-2-30"		
Other applicable tests		
Damp heat, steady state: "IEC 60068-2-3"	56 days; 40 °C; 90 to 95% RH	$ \Delta C/C \leq 5\%$ $\Delta \tan \delta \leq 50 \times 10^{-4}$; note 2 $R_{ins} \geq 50\%$ of specified value
Endurance (DC): "IEC 60384-2"	2000 hours: $1.25 \times U_{Rdc}$; 85 °C $1 \times U_{Rdc}$; 100 °C	
Heat storage: "IEC 60384-2"	2000 hours; 100 °C	$ \Delta C/C \leq 3\%$ $\Delta \tan \delta \leq 30 \times 10^{-4}$; note 2
Resistance to soldering heat with preheating: "IEC 60384-2"	body temperature: 100 °C; bath temperature: 260 °C; dwell time: 10 s	
		$ \Delta C/C \leq 2\%$ (C ≤ 10 nF) $ \Delta C/C \leq 1\%$ (C > 10 nF) $\Delta \tan \delta \leq 30 \times 10^{-4}$; note 2

Notes

- For detailed information, see "Type detail specification HQN-384-02/102".
- Measuring frequency 10 kHz.