Metallized Polypropylene Film Capacitor AC Filtering Radial Type

FEATURES

- High peak current capabilities
- Long lifetime
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

HALOGEN FREE

GREEN (5-2008)

APPLICATIONS

- AC filtering
- UPS systems
- Renewable energy - grid interface
- Harmonic filter
- Welding equipment

QUICK REFERENCE DATA	
Rated capacitance range	1 µF to 70 µF
Capacitance tolerance	± 5 % and 10 %
Maximum continuous AC voltage (50 Hz / 60 Hz) range, U_{NAC}	230 V_{AC}, 250 V_{AC}, 275 V_{AC}, 310 V_{AC}, 350 V_{AC}, 440 V_{AC}
Climatic testing class	40/85/56
Maximum application temperature	105 °C
Maximum permissible case temperature	105 °C
Reference standards	IEC 61071, IEC 60068
Dielectric	Polypropylene film
Electrodes	Metallized dielectric film
Construction	Mono and internal serial construction
Encapsulation	Plastic case sealed with resin; flame retardant
Terminals	Tinned wire
Self inductance (L_S)	< 1 nH per mm of lead spacing
Withstanding DC voltage between terminals (1)	1.5 U_{NDC} for 10 s, cut off current 10 mA, rise time ≤ 1000 V/s
Insulation resistance	RC between leads, after 1 min > 10 000 s Measuring voltage: 500 V
Life time expectancy (2)	Useful lifetime: > 60 000 h at intended mains voltage (3) FIT: < 10 x 10^{-9}/h (10 per 10^9 component hours) at 0.5 x U_{NAC}, 40 °C
Marking	C-value; tolerance; rated voltage; code for dielectric material; code for manufacturing origin; manufacturer's type designation; manufacturer location, year and week; manufacturer's logo or name

Notes

- For more detailed data and test requirements, contact dc-film@vishay.com
- For general information like characteristics and definitions used for film capacitors follow the link: www.vishay.com/doc?28147

(1) See document "Voltage Proof Test for Metalized Capacitors" (www.vishay.com/doc?28169)

(2) Statements about life time are based on calculations which are based on internal tests. They have to be understood exclusively as estimations. Also due to external factors, the life time in the field application may deviate from the calculated life time

(3) Intended operational continuous mains voltage: see www.vishay.com/doc?28245

MAXIMUM AC VOLTAGE RATINGS (V_{RMS})						
U_{NAC}	230 V	250 V	275 V	310 V	350 V	440 V
U_{OPAC} at 85 °C	230 V	250 V	275 V	310 V	350 V	440 V
U_{OPAC} at 105 °C	160 V	175 V	190 V	210 V	240 V	300 V

COMPOSITION OF CATALOG NUMBER

MULTIPLIER (nF)	
10	4
100	5
1000	6
10 000	7

CAPACITANCE (numerically)

Example		
512	1200 nF	1.2 µF
612	12 000 nF	12 µF
680	80 000 nF	80 µF

P1 (mm)	PITCH CODE
27.5	K
37.5	P
52.5	Y

MKP	1847	6	12	25	4	P	2

TYPE CONSTRUCTION

METALLIZED POLYPROPYLENE

VOLTAGE
U_N = 23 = 230 V_{RMS}
U_N = 25 = 250 V_{RMS}
U_N = 27 = 275 V_{RMS}
U_N = 31 = 310 V_{RMS}
U_N = 35 = 350 V_{RMS}
U_N = 38 = 380 V_{RMS}
U_N = 44 = 440 V_{RMS}

TOLERANCE	
4	± 5 %
5	± 10 %

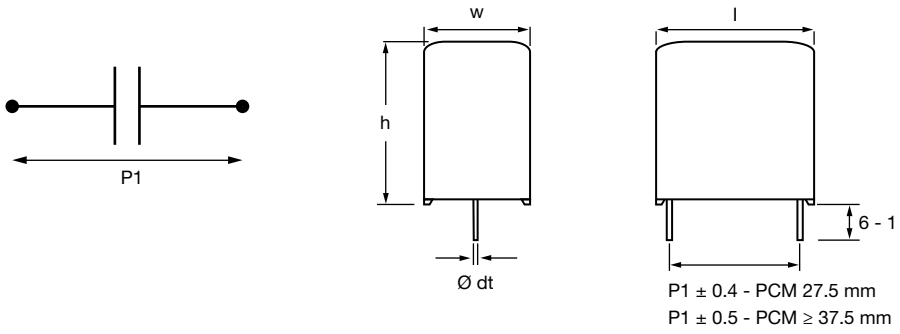
SPECIAL CODE FOR TERMINAL	
2	2 pins
4	4 pins P2 = 10.2 mm
5	4 pins P2 = 20.3 mm
(1)	Customized

Note

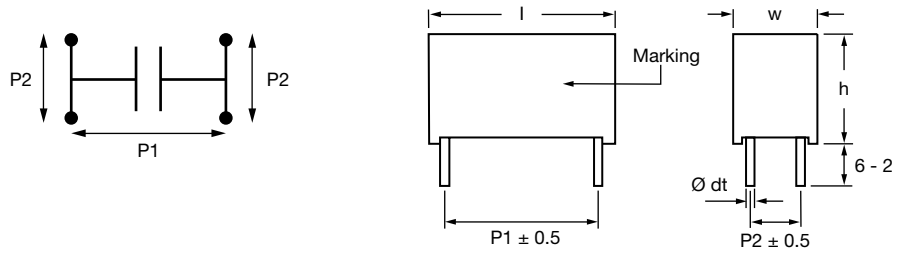
(1) Tabs terminals or customized terminals are available on request

DIMENSIONS in millimeters

2 PINS



4 PINS



Note

- Ø dt ± 10 % of standard diameter specified

ELECTRICAL DATA AND ORDERING CODE

U_{NAC} (V)	CAP. (1) (µF)	DIMENSION (2) (mm)			P1 (mm)	P2 (mm)	dV/dt (3) (V/µs)	I_{PEAK} (A)	I_{RMS} (4) (A)		tan δ 1 kHz (< 10^{-4}) (5)		tan δ 10 kHz (< 10^{-4}) (5)		ORDERING CODE (6)
		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
	U_{NDC} = 450 V; U_{OPAC} AT 85 °C= 230 V_{RMS}; U_{OPAC} AT 105 °C = 160 V_{RMS}														
230	1	9.0	19.0	32.0	27.5	-	45	45	2.5	-	5	-	30	-	MKP1847510234K2
	2	11.0	21.0	32.0	27.5	-	45	90	3.5	-	5	-	30	-	MKP1847520234K2
	3	13.0	23.0	32.0	27.5	-	45	135	5.0	-	5	-	30	-	MKP1847530234K2
	4	15.0	25.0	32.0	27.5	-	45	180	6.0	-	5	-	30	-	MKP1847540234K2
	5	18.0	28.0	32.0	27.5	-	45	225	7.5	-	5	-	30	-	MKP1847550234K2
	6	18.0	28.0	32.0	27.5	-	45	270	8.0	-	5	-	30	-	MKP1847560234K2
	7	18.0	28.0	32.0	27.5	-	45	315	8.5	-	5	-	30	-	MKP1847570234K2
	8	21.0	31.0	32.0	27.5	-	45	360	10.0	-	5	-	30	-	MKP1847580234K2
	9	21.0	31.0	32.0	27.5	-	45	405	10.5	-	5	-	30	-	MKP1847590234K2
	10	20.0	35.0	32.0	27.5	-	45	450	11.5	-	5	-	30	-	MKP1847610234K2
	10	18.5	35.5	43.0	37.5	10.2	20	200	8.0	9.0	10	8	75	70	MKP1847610234P*
	12	18.5	35.5	43.0	37.5	10.2	20	240	9.0	10.0	10	8	75	70	MKP1847612234P*
	15	21.5	38.5	42.0	37.5	10.2	20	300	11.0	12.0	10	8	75	70	MKP1847615234P*
	20	24.0	44.0	42.0	37.5	10.2	20	400	13.5	14.5	10	8	75	70	MKP1847620234P*
	22	24.0	44.0	42.0	37.5	10.2	20	440	14.0	15.5	10	8	75	70	MKP1847622234P*
	25	30.0	45.0	42.0	37.5	10.2 / 20.3	20	500	16.0	17.5	10	8	75	70	MKP1847625234P*
	30	30.0	45.0	42.0	37.5	10.2 / 20.3	20	600	17.5	19.0	10	8	75	70	MKP1847630234P*
	30	25.0	45.0	57.5	52.5	10.2	10	300	13.5	15.0	20	17	150	135	MKP1847630234Y*
	35	25.0	45.0	57.5	52.5	10.2	10	350	14.5	16.0	20	17	150	135	MKP1847635234Y*
	40	30.0	45.0	57.5	52.5	20.3	10	400	16.5	18.0	20	17	150	135	MKP1847640234Y*
	45	30.0	45.0	57.5	52.5	20.3	10	450	17.5	19.0	20	17	150	135	MKP1847645234Y*
	50	35.0	50.0	57.5	52.5	20.3	10	500	20.0	21.5	20	17	150	135	MKP1847650234Y*
	55	35.0	50.0	57.5	52.5	20.3	10	550	21.0	22.5	20	17	150	135	MKP1847655234Y*
	60	35.0	50.0	57.5	52.5	20.3	10	600	21.5	23.5	20	17	150	135	MKP1847660234Y*
	65	45.0	45.0	57.5	52.5	20.3	10	650	-	25.5	-	17	-	135	MKP1847665234Y5
	70	45.0	45.0	57.5	52.5	20.3	10	700	-	26.0	-	17	-	135	MKP1847670235Y5
	U_{NDC} = 500 V; U_{OPAC} AT 85 °C = 250 V_{RMS}; U_{OPAC} AT 105 °C = 175 V_{RMS}														
250	1	9.0	19.0	32.0	27.5	-	50	50	2.5	-	5	-	25	-	MKP1847510254K2
	2	11.0	21.0	32.0	27.5	-	50	100	4	-	5	-	25	-	MKP1847520254K2
	3	13.0	23.0	32.0	27.5	-	50	150	5	-	5	-	25	-	MKP1847530254K2
	4	15.0	25.0	32.0	27.5	-	50	200	6	-	5	-	25	-	MKP1847540254K2
	5	18.0	28.0	32.0	27.5	-	50	250	7	-	5	-	25	-	MKP1847550254K2
	6	18.0	28.0	32.0	27.5	-	50	300	6	-	5	-	25	-	MKP1847560254K2
	7	21.0	31.0	32.0	27.5	-	50	350	8	-	5	-	25	-	MKP1847570254K2
	8	21.0	31.0	32.0	27.5	-	50	400	9	-	5	-	25	-	MKP1847580254K2
	9	20.0	35.0	32.0	27.5	-	50	450	11	-	5	-	25	-	MKP1847590254K2
	5	18.5	35.5	43.0	37.5	10.2	25	125	7	8	10	8	70	65	MKP1847550254P*
	6	18.5	35.5	43.0	37.5	10.2	25	150	7	8	10	8	70	65	MKP1847560254P*
	7	18.5	35.5	43.0	37.5	10.2	25	175	7	8	10	8	70	65	MKP1847570254P*
	8	18.5	35.5	43.0	37.5	10.2	25	200	8	9	10	8	70	65	MKP1847580254P*
	9	18.5	35.5	43.0	37.5	10.2	25	225	8	9	10	8	70	65	MKP1847590254P*
	10	18.5	35.5	43.0	37.5	10.2	25	250	9	10	10	8	70	65	MKP1847610254P*
	12	18.5	35.5	43.0	37.5	10.2	25	300	10	11	10	8	70	65	MKP1847612254P*
	15	21.5	38.5	42.0	37.5	10.2	25	375	11	12	10	8	70	65	MKP1847615254P*

ELECTRICAL DATA AND ORDERING CODE

U_{NAC} (V)	CAP. (1) (µF)	DIMENSION (2) (mm)			P1 (mm)	P2 (mm)	dV/dt (3) (V/µs)	I_{PEAK} (A)	I_{RMS} (4) (A)		tan δ 1 kHz (< 10^{-4}) (5)		tan δ 10 kHz (< 10^{-4}) (5)		ORDERING CODE (6)
		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
250	U_{NDC} = 500 V; U_{OPAC} AT 85 °C = 250 V_{RMS}; U_{OPAC} AT 105 °C = 175 V_{RMS}														
	20	30.0	45.0	42.0	37.5	10.2 / 20.3	25	500	10	11	10	8	70	65	MKP1847620254P*
	22	30.0	45.0	42.0	37.5	10.2 / 20.3	25	550	15	16	10	8	70	65	MKP1847622254P*
	25	30.0	45.0	42.0	37.5	10.2 / 20.3	25	625	16	17	10	8	70	65	MKP1847625254P*
	15	25.0	45.0	57.5	52.5	10.2	12	180	12	13	16	14	135	125	MKP1847615254Y*
	20	25.0	45.0	57.5	52.5	10.2	12	240	12	13	16	14	135	125	MKP1847620254Y*
	22	25.0	45.0	57.5	52.5	10.2	12	264	12	13	16	14	135	125	MKP1847622254Y*
	25	25.0	45.0	57.5	52.5	10.2	12	300	13	14	16	14	135	125	MKP1847625254Y*
	30	30.0	45.0	57.5	52.5	20.3	12	360	15	16	16	14	135	125	MKP1847630254Y*
	35	30.0	45.0	57.5	52.5	20.3	12	420	16	17	16	14	135	125	MKP1847635254Y*
	40	35.0	50.0	57.5	52.5	20.3	12	480	19	20	16	14	135	125	MKP1847640254Y*
	45	35.0	50.0	57.5	52.5	20.3	12	540	20	21	16	14	135	125	MKP1847645254Y*
	50	35.0	50.0	57.5	52.5	20.3	12	600	21	22	16	14	135	125	MKP1847650254Y*
	55	45.0	45.0	57.5	52.5	20.3	12	660	-	24	-	14	-	125	MKP1847655254Y5
	60	45.0	45.0	57.5	52.5	20.3	12	720	-	25	-	14	-	125	MKP1847660255Y5
275	U_{NDC} = 600 V; U_{OPAC} AT 85 °C = 275 V_{RMS}; U_{OPAC} AT 105 °C = 190 V_{RMS}														
	1	9.0	19.0	32.0	27.5	-	55	55	2.5	-	5	-	25	-	MKP1847510274K2
	2	13.0	23.0	32.0	27.5	-	55	110	4.5	-	5	-	25	-	MKP1847520274K2
	3	15.0	25.0	32.0	27.5	-	55	165	5.5	-	5	-	25	-	MKP1847530274K2
	4	18.0	28.0	32.0	27.5	-	55	220	7	-	5	-	25	-	MKP1847540274K2
	5	21.0	31.0	32.0	27.5	-	55	275	8	-	5	-	25	-	MKP1847550274K2
	6	21.0	31.0	32.0	27.5	-	55	330	7	-	5	-	25	-	MKP1847560274K2
	7	20.0	35.0	32.0	27.5	-	55	385	10	-	5	-	25	-	MKP1847570274K2
	5	18.5	35.5	43.0	37.5	10.2	30	150	7	8	8	7	65	55	MKP1847550274P*
	6	18.5	35.5	43.0	37.5	10.2	30	180	7	8	8	7	65	55	MKP1847560274P*
	7	18.5	35.5	43.0	37.5	10.2	30	210	8	9	8	7	65	55	MKP1847570274P*
	8	18.5	35.5	43.0	37.5	10.2	30	240	8	9	8	7	65	55	MKP1847580274P*
	9	18.5	35.5	43.0	37.5	10.2	30	270	9	10	8	7	65	55	MKP1847590274P*
	10	21.5	38.5	42.0	37.5	10.2	30	300	10	11	8	7	65	55	MKP1847610274P*
	12	21.5	38.5	42.0	37.5	10.2	30	360	11	12	8	7	65	55	MKP1847612274P*
	15	24.0	44.0	42.0	37.5	10.2	30	450	13	14	8	7	65	55	MKP1847615274P*
	20	30.0	45.0	42.0	37.5	10.2 / 20.3	30	600	16	17	8	7	65	55	MKP1847620274P*
	15	25.0	45.0	57.5	52.5	10.2	13	195	11	12	15	12	125	105	MKP1847615274Y*
	20	25.0	45.0	57.5	52.5	10.2	13	260	12	13	15	12	125	105	MKP1847620274Y*
	22	25.0	45.0	57.5	52.5	10.2	13	286	13	14	15	12	125	105	MKP1847622274Y*
	25	30.0	45.0	57.5	52.5	20.3	13	325	15	16	15	12	125	105	MKP1847625274Y*
	30	30.0	45.0	57.5	52.5	20.3	13	390	16	17	15	12	125	105	MKP1847630274Y*
	35	35.0	50.0	57.5	52.5	20.3	13	455	19	20	15	12	125	105	MKP1847635274Y*
	40	35.0	50.0	57.5	52.5	20.3	13	520	20	21	15	12	125	105	MKP1847640274Y*
	45	45.0	45.0	57.5	52.5	20.3	13	585	-	23	-	12	-	105	MKP1847645274Y5
	50	45.0	45.0	57.5	52.5	20.3	13	650	-	24	-	12	-	105	MKP1847650275Y5

ELECTRICAL DATA AND ORDERING CODE

U_{NAC} (V)	CAP. (1) (µF)	DIMENSION (2) (mm)			P1 (mm)	P2 (mm)	dV/dt (3) (V/µs)	I_{PEAK} (A)	I_{RMS} (4) (A)		tan δ 1 kHz (< 10^{-4}) (5)		tan δ 10 kHz (< 10^{-4}) (5)		ORDERING CODE (6)
		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
310	U_{NDC} = 630 V; U_{OPAC} AT 85 °C = 310 V_{RMS}; U_{OPAC} AT 105 °C = 210 V_{RMS}														
	1	11.0	21.0	32.0	27.5	-	68	68	3	-	5	-	20	-	MKP1847510314K2
	2	15.0	25.0	32.0	27.5	-	68	136	5	-	5	-	20	-	MKP1847520314K2
	3	18.0	28.0	32.0	27.5	-	68	204	7	-	5	-	20	-	MKP1847530314K2
	4	21.0	31.0	32.0	27.5	-	68	272	8	-	5	-	20	-	MKP1847540314K2
	5	21.0	31.0	32.0	27.5	-	68	340	9	-	5	-	20	-	MKP1847550314K2
	5	18.5	35.5	43.0	37.5	10.2	35	175	7	8	7	6	55	50	MKP1847550314P*
	6	18.5	35.5	43.0	37.5	10.2	35	210	8	9	7	6	55	50	MKP1847560314P*
	7	18.5	35.5	43.0	37.5	10.2	35	245	9	10	7	6	55	50	MKP1847570314P*
	8	21.5	38.5	42.0	37.5	10.2	35	280	10	11	7	6	55	50	MKP1847580314P*
	9	21.5	38.5	42.0	37.5	10.2	35	315	10	11	7	6	55	50	MKP1847590314P*
	10	21.5	38.5	42.0	37.5	10.2	35	350	11	12	7	6	55	50	MKP1847610315P*
	12	24.0	44.0	42.0	37.5	10.2	35	420	12	13	7	6	55	50	MKP1847612314P*
	15	30.0	45.0	42.0	37.5	10.2 / 20.3	35	525	15	16	7	6	55	50	MKP1847615314P*
	10	25.0	45.0	57.5	52.5	10.2	15	150	10	11	12	10	105	90	MKP1847610314Y*
	12	25.0	45.0	57.5	52.5	10.2	15	180	10	11	12	10	105	90	MKP1847612314Y*
	15	25.0	45.0	57.5	52.5	10.2	15	225	12	13	12	10	105	90	MKP1847615314Y*
	20	30.0	45.0	57.5	52.5	20.3	15	300	14	15	12	10	105	90	MKP1847620314Y*
	22	35.0	50.0	57.5	52.5	20.3	15	330	16	17	12	10	105	90	MKP1847622314Y*
	25	35.0	50.0	57.5	52.5	20.3	15	375	17	18	12	10	105	90	MKP1847625314Y*
	30	45.0	45.0	57.5	52.5	20.3	15	450	-	21	-	10	-	90	MKP1847630314Y5
	35	45.0	45.0	57.5	52.5	20.3	15	525	-	22	-	10	-	90	MKP1847635314Y5
350	U_{NDC} = 700 V; U_{OPAC} AT 85 °C = 350 V_{RMS}; U_{OPAC} AT 105 °C = 240 V_{RMS}														
	1	11.0	21.0	32.0	27.5	-	100	100	3	-	5	-	20	-	MKP1847510354K2
	2	15.0	25.0	32.0	27.5	-	100	200	5	-	5	-	20	-	MKP1847520354K2
	3	18.0	28.0	32.0	27.5	-	100	300	7	-	5	-	20	-	MKP1847530354K2
	4	21.0	31.0	32.0	27.5	-	100	400	9	-	5	-	20	-	MKP1847540354K2
	5	18.5	35.5	43.0	37.5	10.2	50	250	7	8	7	6	50	45	MKP1847550354P*
	6	18.5	35.5	43.0	37.5	10.2	50	300	8	9	7	6	50	45	MKP1847560354P*
	7	21.5	38.5	42.0	37.5	10.2	50	350	9	10	7	6	50	45	MKP1847570354P*
	8	21.5	38.5	42.0	37.5	10.2	50	400	10	11	7	6	50	45	MKP1847580354P*
	9	24.0	44.0	42.0	37.5	10.2	50	450	11	12	7	6	50	45	MKP1847590354P*
	10	24.0	44.0	42.0	37.5	10.2	50	500	12	13	7	6	50	45	MKP1847610354P*
	12	30.0	45.0	42.0	37.5	10.2 / 20.3	50	600	14	15	7	6	50	45	MKP1847612354P*
	10	25.0	45.0	57.5	52.5	10.2	25	250	10	11	12	10	100	85	MKP1847610354Y*
	12	25.0	45.0	57.5	52.5	10.2	25	300	11	12	12	10	100	85	MKP1847612354Y*
	15	25.0	45.0	57.5	52.5	10.2	25	375	12	13	12	10	100	85	MKP1847615354Y*
	20	30.0	45.0	57.5	52.5	20.3	25	500	15	16	12	10	100	85	MKP1847620354Y*
	22	35.0	50.0	57.5	52.5	20.3	25	550	17	18	12	10	100	85	MKP1847622354Y*
	25	35.0	50.0	57.5	52.5	20.3	25	625	18	19	12	10	100	85	MKP1847625354Y*
	30	45.0	45.0	57.5	52.5	20.3	25	750	-	22	-	10	-	85	MKP1847630354Y5

ELECTRICAL DATA AND ORDERING CODE

U_{NAC} (V)	CAP. (1) (µF)	DIMENSION (2) (mm)			P1 (mm)	P2 (mm)	dV/dt (3) (V/µs)	I_{PEAK} (A)	I_{RMS} (4) (A)		tan δ 1 kHz (< 10^{-4}) (5)		tan δ 10 kHz (< 10^{-4}) (5)		ORDERING CODE (6)
		w	h	l					2 PINS	4 PINS	2 PINS	4 PINS	2 PINS	4 PINS	
440	U_{NDC} = 1000 V; U_{OPAC} AT 85 °C = 440 V_{RMS}; U_{OPAC} AT 105 °C = 300 V_{RMS}														
	1.0	15.7	28.5	41.5	37.5	10.2	80	80	5	-	7	-	25	-	MKP1847510444P*
	1.5	18.5	35.5	43.0	37.5	10.2	80	120	7	-	7	-	25	-	MKP1847515444P*
	2.0	21.5	38.5	43.0	37.5	10.2	80	160	9	10	7	6	25	20	MKP1847520444P*
	2.2	21.5	38.5	43.0	37.5	10.2	80	176	9	10	7	6	25	20	MKP1847522444P*
	3	24.0	44.0	42.0	37.5	10.2 / 20.3	80	240	12	13	7	6	25	20	MKP1847530444P*
	3.3	24.0	44.0	42.0	37.5	10.2 / 20.3	80	264	12	13	7	6	25	20	MKP1847533444P*
	4	30.0	45.0	42.0	37.5	10.2 / 20.3	80	320	14	15	7	6	25	20	MKP1847540444P*
	5	30.0	57.0	42.0	37.5	20.3	80	400	17	18	7	6	25	20	MKP1847550444P*
	5	25.0	45.0	57.5	52.5	10.2	35	175	13	14	12	10	50	40	MKP1847550444Y*
	6	30.0	45.0	57.5	52.5	20.3	35	210	14	15	12	10	50	40	MKP1847560444Y*
	7	35.0	50.0	57.5	52.5	20.3	35	245	17	18	12	10	50	40	MKP1847570444Y*
	8	35.0	50.0	57.5	52.5	20.3	35	280	18	19	12	10	50	40	MKP1847580444Y*
	9	35.0	50.0	57.5	52.5	20.3	35	315	19	20	12	10	50	40	MKP1847590444Y*
	10	35.0	50.0	57.5	52.5	20.3	35	350	20	21	12	10	50	40	MKP1847610444Y*
	12	45.0	45.0	57.5	52.5	20.3	35	420	-	24	-	10	-	40	MKP1847612444Y5

Notes

(1) Intermediate capacitance values available on request
(2) Standard dimension. For tolerances see chapter “Space Requirements for Printed-Circuit Board Applications and Dimension Tolerances”
(3) Rated voltage pulse slope (dU/dt) R at voltage U_{NDC}
(4) Maximum RMS current at 10 kHz, +85 °C, capacitance tolerance specified
(5) The ESR (Equivalent Series Resistance) can be calculated as tan δ (f)/(2 x π x f x C)
(6) Change the * symbol with special code for the terminals

PACKAGING INFORMATION

U_{NAC} (V)	CAP. (1) (µF)	Ø dt	ORDERING CODE (2)	MASS (g)	SPQ (3) (pcs)
230	1	0.8	MKP1847510234K2	6	160
	2	0.8	MKP1847520234K2	9	130
	3	0.8	MKP1847530234K2	11	115
	4	0.8	MKP1847540234K2	12	100
	5	0.8	MKP1847550234K2	17	80
	6	0.8	MKP1847560234K2	16	80
	7	0.8	MKP1847570234K2	15	80
	8	0.8	MKP1847580234K2	22	65
	9	0.8	MKP1847590234K2	21	65
	10	0.8	MKP1847610234K2	21	70
	10	1.0	MKP1847610234P*	32	105
	12	1.0	MKP1847612234P*	30	105
	15	1.0	MKP1847615234P*	37	91
	20	1.0	MKP1847620234P*	48	77
	22	1.0	MKP1847622234P*	45	77
	25	1.0	MKP1847625234P*	62	63
	30	1.0	MKP1847630234P*	56	63
	30	1.2	MKP1847630234Y*	69	55
	35	1.2	MKP1847635234Y*	65	55
	40	1.2	MKP1847640234Y*	91	45
	45	1.2	MKP1847645234Y*	86	45
	50	1.2	MKP1847650234Y*	107	40
	55	1.2	MKP1847655234Y*	101	40
	60	1.2	MKP1847660234Y*	96	40
	65	1.2	MKP1847665234Y5	121	30
	70	1.2	MKP1847670235Y5	120	30

PACKAGING INFORMATION

U_{NAC} (V)	CAP. [1] (µF)	Ø dt	ORDERING CODE [2]	MASS (g)	SPQ [3] (pcs)
250	1	0.8	MKP1847510254K2	6	160
	2	0.8	MKP1847520254K2	9	130
	3	0.8	MKP1847530254K2	10	115
	4	0.8	MKP1847540254K2	12	100
	5	0.8	MKP1847550254K2	16	80
	6	0.8	MKP1847560254K2	15	80
	7	0.8	MKP1847570254K2	22	65
	8	0.8	MKP1847580254K2	21	65
	9	0.8	MKP1847590254K2	20	70
	5	1.0	MKP1847550254P*	36	105
	6	1.0	MKP1847560254P*	35	105
	7	1.0	MKP1847570254P*	34	105
	8	1.0	MKP1847580254P*	32	105
	9	1.0	MKP1847590254P*	31	105
	10	1.0	MKP1847610254P*	30	105
	12	1.0	MKP1847612254P*	27	105
	15	1.0	MKP1847615254P*	34	91
	20	1.0	MKP1847620254P*	63	63
	22	1.0	MKP1847622254P*	61	63
	25	1.0	MKP1847625254P*	57	63
	15	1.2	MKP1847615254Y*	83	55
	20	1.2	MKP1847620254Y*	77	55
	22	1.2	MKP1847622254Y*	75	55
	25	1.2	MKP1847625254Y*	71	55
	30	1.2	MKP1847630254Y*	97	45
	35	1.2	MKP1847635254Y*	91	45
	40	1.2	MKP1847640254Y*	111	40
	45	1.2	MKP1847645254Y*	105	40
	50	1.2	MKP1847650254Y*	98	40
	55	1.2	MKP1847655254Y5	123	30
	60	1.2	MKP1847660255Y5	120	30
275	1	0.8	MKP1847510274K2	6	160
	2	0.8	MKP1847520274K2	11	115
	3	0.8	MKP1847530274K2	12	100
	4	0.8	MKP1847540274K2	16	80
	5	0.8	MKP1847550274K2	22	65
	6	0.8	MKP1847560274K2	21	65
	7	0.8	MKP1847570274K2	20	70
	5	1.0	MKP1847550274P*	34	105
	6	1.0	MKP1847560274P*	33	105
	7	1.0	MKP1847570274P*	31	105
	8	1.0	MKP1847580274P*	30	105
	9	1.0	MKP1847590274P*	28	105
	10	1.0	MKP1847610274P*	37	91
	12	1.0	MKP1847612274P*	34	91
	15	1.0	MKP1847615274P*	45	77
	20	1.0	MKP1847620274P*	56	63
	15	1.2	MKP1847615274Y*	78	55
	20	1.2	MKP1847620274Y*	70	55
	22	1.2	MKP1847622274Y*	67	55
	25	1.2	MKP1847625274Y*	95	45
	30	1.2	MKP1847630274Y*	86	45
	35	1.2	MKP1847635274Y*	106	40
	40	1.2	MKP1847640274Y*	96	40
	45	1.2	MKP1847645274Y5	186	30
	50	1.2	MKP1847650275Y5	186	30

PACKAGING INFORMATION

U_{NAC} (V)	CAP. [1] (µF)	Ø dt	ORDERING CODE [2]	MASS (g)	SPQ [3] (pcs)
310	1.0	0.8	MKP1847510314K2	9	130
	2.0	0.8	MKP1847520314K2	12	100
	3.0	0.8	MKP1847530314K2	16	80
	4.0	0.8	MKP1847540314K2	22	65
	5.0	0.8	MKP1847550314K2	20	65
	5.0	1.0	MKP1847550314P*	32	105
	6.0	1.0	MKP1847560314P*	30	105
	7.0	1.0	MKP1847570314P*	28	105
	8.0	1.0	MKP1847580314P*	37	91
	9.0	1.0	MKP1847590314P*	35	91
	10	1.0	MKP1847610315P*	34	91
	12	1.0	MKP1847612314P*	44	77
	15	1.0	MKP1847615314P*	58	63
	10	1.2	MKP1847610314Y*	81	55
	12	1.2	MKP1847612314Y*	77	55
	15	1.2	MKP1847615314Y*	71	55
	20	1.2	MKP1847620314Y*	93	45
	22	1.2	MKP1847622314Y*	117	40
	25	1.2	MKP1847625314Y*	111	40
	30	1.2	MKP1847630314Y5	187	30
	35	1.2	MKP1847635314Y5	187	30
350	1.0	0.8	MKP1847510354K2	9	130
	2.0	0.8	MKP1847520354K2	12	100
	3.0	0.8	MKP1847530354K2	15	80
	4.0	0.8	MKP1847540354K2	21	65
	5.0	1.0	MKP1847550354P*	30	105
	6.0	1.0	MKP1847560354P*	28	105
	7.0	1.0	MKP1847570354P*	37	91
	8.0	1.0	MKP1847580354P*	34	91
	9.0	1.0	MKP1847590354P*	48	77
	10	1.0	MKP1847610354P*	45	77
	12	1.0	MKP1847612354P*	60	63
	10	1.2	MKP1847610354Y*	78	55
	12	1.2	MKP1847612354Y*	74	55
	15	1.2	MKP1847615354Y*	67	55
	20	1.2	MKP1847620354Y*	87	45
	22	1.2	MKP1847622354Y*	111	40
	25	1.2	MKP1847625354Y*	102	40
	30	1.2	MKP1847630354Y5	187	30
440	1.0	1.0	MKP1847510444P*	27	70
	1.5	1.0	MKP1847515444P*	42	105
	2.0	1.0	MKP1847520444P*	52	91
	2.2	1.0	MKP1847522444P*	52	91
	3.0	1.0	MKP1847530444P*	61	77
	3.3	1.0	MKP1847533444P*	58	77
	4.0	1.0	MKP1847540444P*	74	63
	5.0	1.0	MKP1847550444P*	83	63
	5.0	1.2	MKP1847550444Y*	100	55
	6.0	1.2	MKP1847560444Y*	135	45
	7.0	1.2	MKP1847570444Y*	155	40
	8.0	1.2	MKP1847580444Y*	152	40
	9.0	1.2	MKP1847590444Y*	145	40
	10	1.2	MKP1847610445Y*	140	40
	12	1.2	MKP1847612445Y5	180	30

Notes

[1] Intermediate capacitance values available on request

[2] Change the * symbols with special code for terminals

[3] SPQ = Standard Packing Quantity

CONSTRUCTION

Low inductive wound cell elements of metallized polypropylene film. Pattern film for pitch ≥ 37.5 mm and standard foil for pitch 27.5 mm, potted with resin in a flame retardant case.

Specific Method of Mounting to Withstand Vibration and Shock

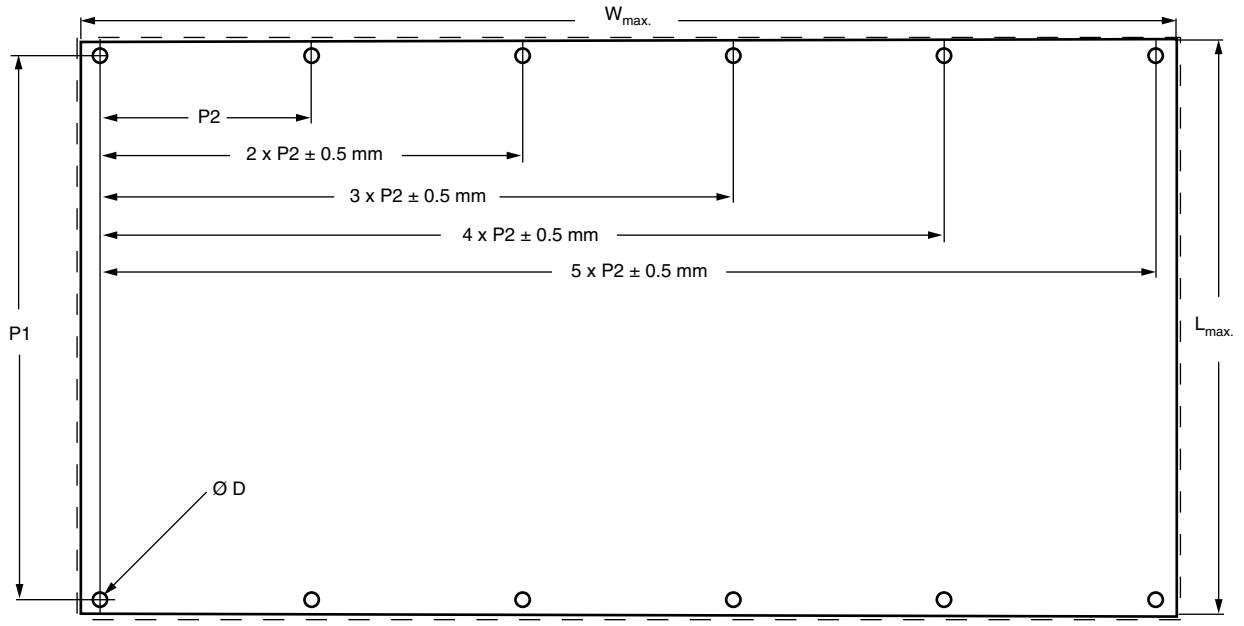
The capacitor unit is designed for mounting on a printed circuit board.
In order to withstand vibration and shock tests, it must be insured that the stand-off pips are in good contact with the printed circuit board.
The capacitors shall be mechanically fixed by the leads and the body clamped.

Space Requirements on Printed-Circuit Board and Dimension Tolerances

For the maximum product dimensions and maximum space requirements for length ($l_{max.}$), width ($w_{max.}$) following tolerances must be taken in account in the envelopment of the components as shown in the drawings below:

$L_{max.} = l + \Delta l$

$W_{max.} = w + \Delta w$



P1 (mm)	ΔL (mm)	ΔW (mm)	Ø D (mm)	Δh (mm)
27.5	2	1.6	1.2	0.2
37.5	3	2.0	1.5	0.5
52.5	4	2.4	1.7	0.5

For the maximum height $h_{max.}$, a Δh of 0.5 mm must be taken in account on the height dimension h.

For the minimum product dimensions for length ($l_{min.}$), width ($w_{min.}$) and height ($h_{min.}$) following tolerances of the components are valid:

$l_{min.} = l - \Delta l$, $w_{min.} = w - \Delta w$ and $h_{min.} = h - \Delta h$

For products with pitch = 27.5 mm, Δl = 1.0 mm and $\Delta w = \Delta h$ = 0.5 mm

For products with pitch = 37.5 mm, Δl = 1.0 mm and $\Delta w = \Delta h$ = 1.0 mm

For products with pitch = 52.5 mm, Δl = 1.5 mm and $\Delta w = \Delta h$ = 1.0 mm

SOLDERING CONDITIONS

For general soldering conditions and wave soldering profile, we refer to the document:
“Characteristics and Definitions used for Film Capacitors”: www.vishay.com/doc?26033

Storage Temperature

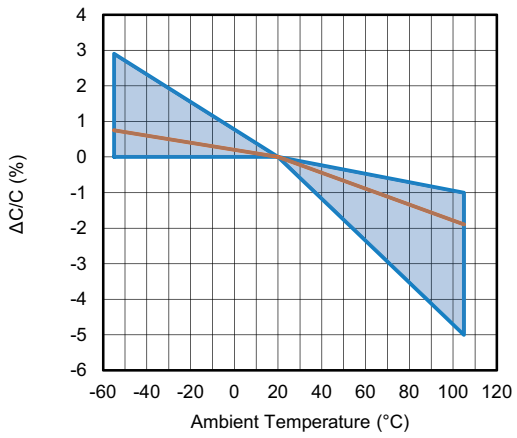
T_{stg} = -25 °C to +35 °C with RH maximum 75 % without condensation.

Ratings and Characteristics Reference Conditions

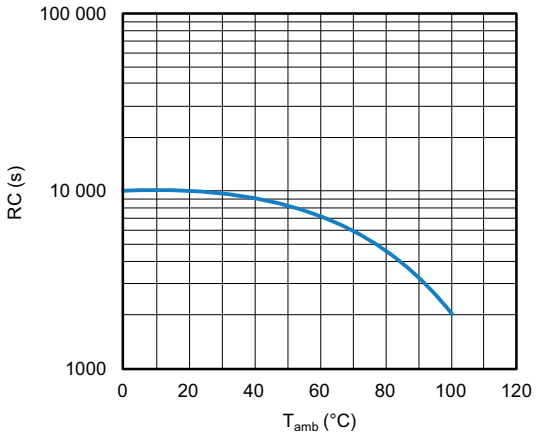
Unless otherwise specified, all electrical values apply to an ambient temperature of 23 °C ± 1 °C, an atmospheric pressure of 86 kPa to 106 kPa and a relative humidity of 50 % ± 2 %.

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

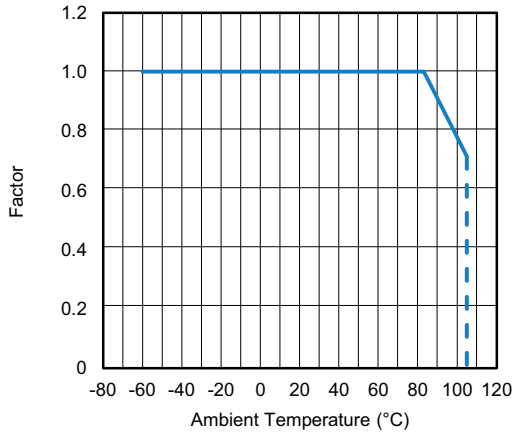
CHARACTERISTICS



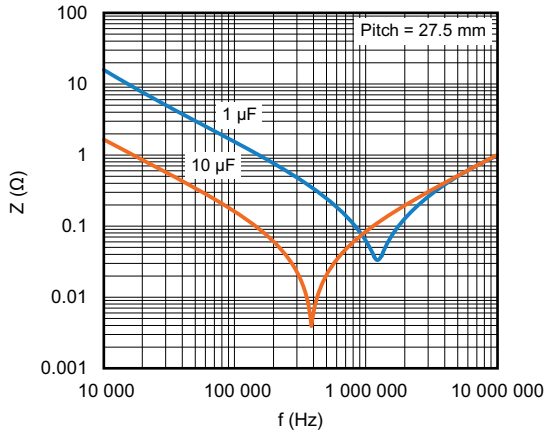
Capacitance as a function of ambient temperature
(typical curve)



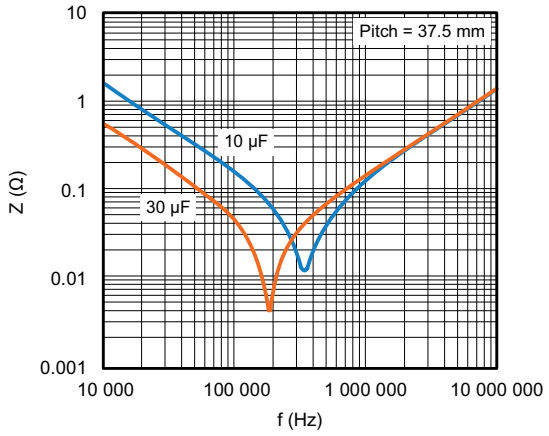
Insulation resistance as a function of ambient temperature
(typical curve)



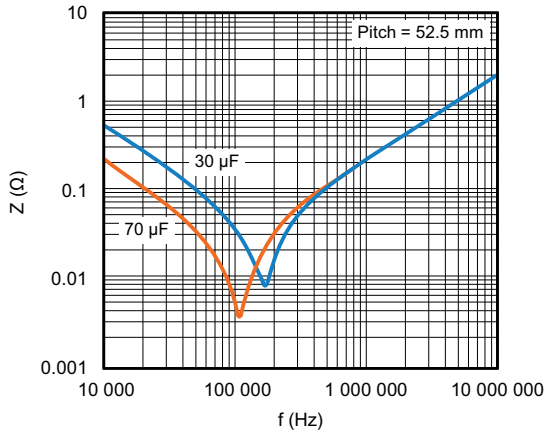
RMS voltage in function of temperature



Impedance vs. frequency
(typical curve)

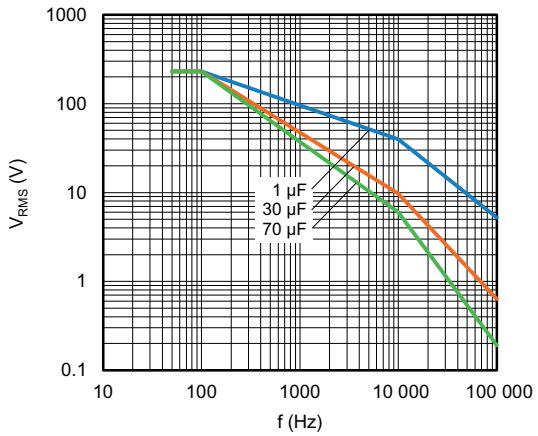


Impedance vs. frequency
(typical curve)

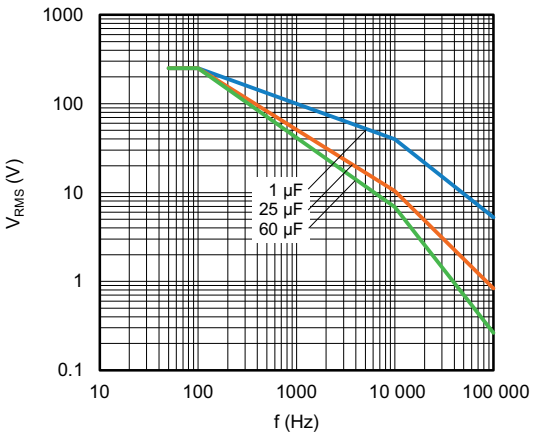


Impedance vs. frequency
(typical curve)

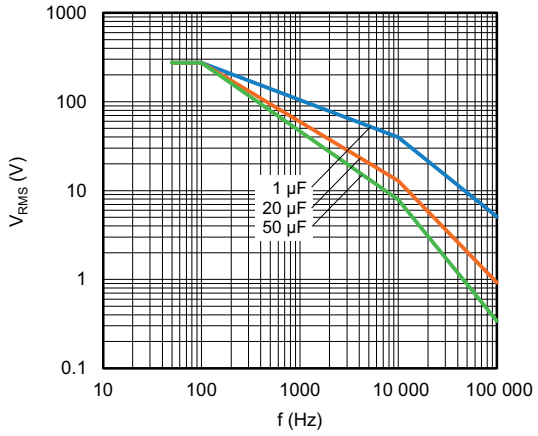
CHARACTERISTICS



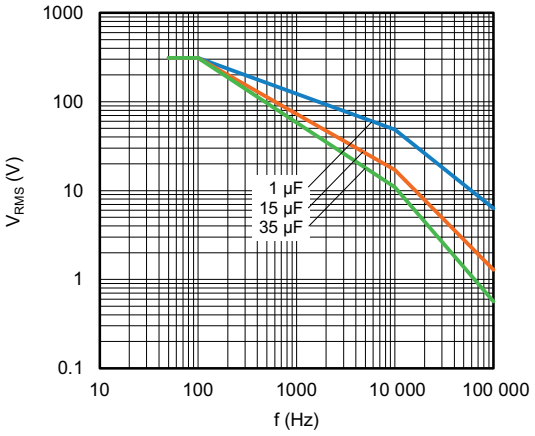
Maximum RMS voltage as function of frequency
$T_{amb} \leq 85$ °C; $U_n = 230$ V_{AC}



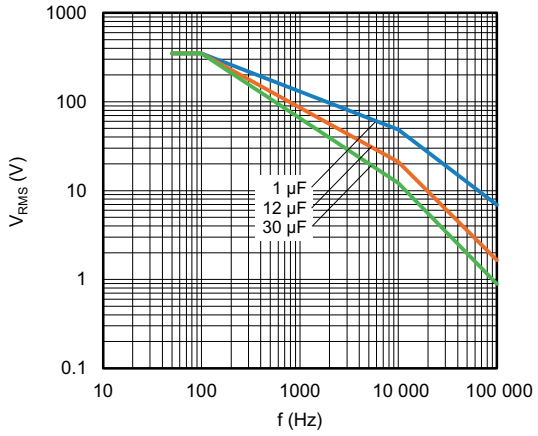
Maximum RMS voltage as function of frequency
$T_{amb} \leq 85$ °C; $U_n = 250$ V_{AC}



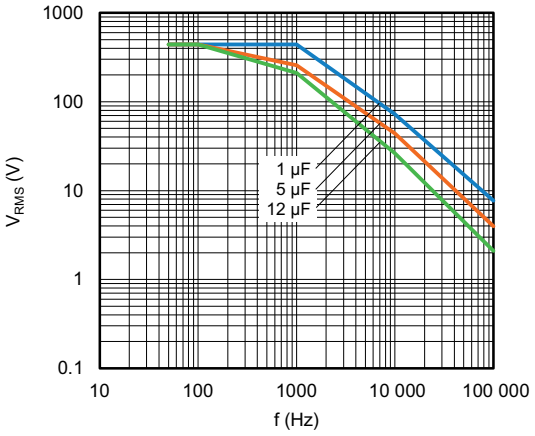
Maximum RMS voltage as function of frequency
$T_{amb} \leq 85$ °C; $U_n = 275$ V_{AC}



Maximum RMS voltage as function of frequency
$T_{amb} \leq 85$ °C; $U_n = 310$ V_{AC}



Maximum RMS voltage as function of frequency
$T_{amb} \leq 85$ °C; $U_n = 350$ V_{AC}



Maximum RMS voltage as function of frequency
$T_{amb} \leq 85$ °C; $U_n = 440$ V_{AC}

HEAT CONDUCTIVITY					
DIMENSIONS (mm)			HEAT CONDUCTIVITY (mW/°C)		
w	h	l	PITCH 27.5 mm	PITCH 37.5 mm	PITCH 52.5 mm
9.0	19.0	32.0	16	-	-
11.0	21.0	32.0	19	-	-
13.0	23.0	32.0	22	-	-
15.0	25.0	32.0	25	-	-
18.0	28.0	32.0	30	-	-
21.0	31.0	32.0	35	-	-
18.5	35.5	43.0	-	45	-
21.5	38.5	42.0	-	51	-
24.0	44.0	42.0	-	59	-
30.0	45.0	42.0	-	68	-
25.0	45.0	57.5	-	-	77
30.0	45.0	57.5	-	-	85
35.0	50.0	57.5	-	-	100
45.0	45.0	57.5	-	-	108

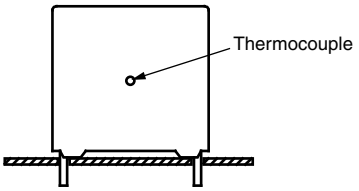
Power Dissipation and Maximum Component Temperature Rise

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 component temperature rise (ΔT) can be measured or calculated by $\Delta T = P/G$:

- ΔT = component temperature rise (°C) with a maximum of 15 °C
- P = power dissipation of the component (mW)
- G = heat conductivity of the component (mW/°C)

MEASURING THE COMPONENT TEMPERATURE



The case 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 thermal radiation or convection, the capacitor must be tested in a closed area from air circulation.

APPLICATION NOTE AND LIMITING CONDITIONS

These capacitors are not suitable for mains applications as across-the-line capacitors without additional protection. 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:

- The peak voltage (U_{P+}) shall not be greater than $\sqrt{2} \times U_{RMS}$
- The peak-to-peak ripple voltage (U_{PP}) shall not be greater than $2 \times \sqrt{2} \times U_{RMS}$ (for U_{RMS} consult above graph: Maximum RMS Voltage as Function of Frequency)
- The voltage pulse slope (dU/dt) shall not exceed the rated pulse slope at the DC voltage rating.
  If the pulse voltage is lower than the rated DC voltage, the rated voltage pulse slope may be multiplied by U_{NDC} and divided by the applied voltage.
  For all other pulses following equation must be fulfilled:

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

  T is the pulse duration
- The maximum component surface temperature must be lower than 105 °C and maximum temperature rise between case and free air ambient shall be lower than 15 °C.
- For continuous operation, 24 hours per day for several years, please refer to application note: www.vishay.com/doc?28245

INSPECTION REQUIREMENTS

General Notes

Sub-clause numbers of tests and performance requirements refer to the “Sectional Specification, Publication IEC 61071”.

SUB-CLAUSE NUMBER AND TEST		CONDITIONS	PERFORMANCE REQUIREMENTS
ROUTINE TEST - FINAL INSPECTION			
5.14.2.1	External inspection, visual examination		Legible marking as specified
5.14.2.2	Dimensions		See specification drawing
5.3.1	Capacitance	1 kHz at room temperature	See specific reference data
5.3.2	tan δ	1 kHz at room temperature 10 kHz at room temperature	See specific reference data
5.5.1.2	DC voltage test between terminals	1.5 x U_{NDC} at T_{amb} Duration 10 s	No visible damage or puncture No flashover
5.6.1	Voltage test between terminals and case	2200 V_{AC} (50 Hz), 60 s	No visible damage or puncture No flashover
5.7	Insulation resistance	Measuring voltage 500 V at room temperature Duration 1 min	See specific reference data
TYPE TESTS			
5.14.2	External inspection	Check for finish, marking, and overall dimensions	Legible marking and finish as specified Dimensions: see specific drawing
5.14.0	Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.14.1.1.4	Robustness of terminations IEC 60068-2-21	Tensile Ua1: duration 10 s ± 1 s	

Wire diameter	Section	Load
d ≤ 0.80 mm	S ≤ 0.5 mm²	10 N (± 10 %)
d ≤ 1.25 mm	S ≤ 1.2 mm²	20 N (± 10 %)

Bending Ub method 1: 4 x 90 °, duration 2 s to 3 s/bend

Wire diameter	Section modules	Load
d ≤ 0.80 mm	Z_x ≤ 0.050 mm³	5 N (± 10 %)
d ≤ 1.25 mm	Z_x ≤ 0.019 mm³	10 N (± 10 %)

5.14.1.6	Resistance to soldering heat IEC 60068-2-20	No predrying, method 1A Solder bath: 280 °C ± 5 °C Duration 10 s ± 1 s	
5.14.4	Final measurements	Capacitance tan δ	|ΔC/C| ≤ 0.5 % Increase of tan δ ≤ 0.0050 Compared to values measured in 5.14.0
5.14.0	Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.14.3.1	Vibration IEC 60068-2-6	f = 10 Hz to 55 Hz; amplitude ± 0.35 mm or acceleration 98 m/s² Test duration: 10 frequency cycles, 3 axes offset from each other by 90° 1 octave/min Visual examination	No visible damage

SUB-CLAUSE NUMBER AND TEST	CONDITIONS	PERFORMANCE REQUIREMENTS
TYPE TESTS		
5.14.3.2 Shock or impact IEC 60068-2-6	Pulse shape: half sine Acceleration: 490 m/s^2 Duration of pulse: 11 ms Visual examination	 No visible damage
5.14.4 Final measurements	Capacitance tan δ	$\|\Delta C/C\| \leq 0.5$ % Increase of tan $\delta \leq 0.0050$ Compared to values measured in 5.14.0
5.5.3.1 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz R insulation	
5.5.3.2 DC voltage test between terminals	1.5 x U_{NDC} at T_{amb} Duration 10 s	
5.5.3.3 Final measurements	Capacitance tan δ R insulation	$\|\Delta C/C\| \leq 0.5$ % Increase of tan $\delta \leq 0.0050$ R insulation ≥ 50 % of specified values
5.9.1 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.9.2 Surge discharge test	1.1 x U_{NDC} Number of discharges: 5 Time lapse: every 2 min (10 min total)	
5.9.3 DC voltage test between terminals	Within 5 min after the surge discharge test 1.5 x U_{NDC} at T_{amb}, duration 10 s	
5.9.4 Final measurements	Capacitance tan δ at 10 kHz	$\|\Delta C/C\| \leq 1.0$ % tan $\delta \leq 1.2$ x initial tan $\delta + 0.0001$ Compared to values measured in 5.9.1
5.11.1 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.11.2 Self healing test	1.5 x U_{NDC}, duration 10 s Increase the voltage at 100 V/s till 5 clearings occur or until voltage reach max. of 2.5 x U_{NDC}, for a duration of 10 s	
5.11.3 Final measurements	Capacitance tan δ	$\|\Delta C/C\| \leq 0.5$ % tan $\delta \leq 1.2$ x initial tan $\delta + 0.0001$ Compared to values measured in 5.11.1
5.13.0 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.13.1 Change of temperature acc. to IEC 60068-2-14	Test Nb $T_{max.}$ = 85 °C $T_{min.}$ = -40 °C Transition time: 1 h, equivalent to 1 °C/min 5 cycles	
5.13.2 Damp heat steady state acc. to IEC 60068-2-78	Test Ca T = 40 °C ± 2 °C RH = 93 % ± 3 % Duration 56 days	
5.5.3.2 DC voltage test between terminals	1.5 x U_{NDC} at ambient temperature Duration 10 s	
5.13.3 Final measurements	Visual examination Capacitance tan δ at 10 kHz	No puncturing or flashover Self healing punctures are permitted $\|\Delta C/C\| \leq 2.0$ % Increase of tan $\delta \leq 0.0150$ Compared to values measured in 5.13.0

SUB-CLAUSE NUMBER AND TEST		CONDITIONS	PERFORMANCE REQUIREMENTS
TYPE TESTS			
5.10.0	Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.10.1	Thermal stability test under overload conditions	Natural cooling T_{amb} ± 5 °C 1.21 x $P_{max.}$ = (U^2/2) x w_2 x C x tan δ_2 = 1.21 x ($I^2_{RMS.}$/w_2 x C) x tan δ_2 with $w_2 = 2 \times \pi \times f_2$ for I = $I_{RMS.}$ (see specific reference data) f_2 = 10 kHz Duration 48 h Measure the temperature every 1.5 h during the last 6 hours	Temperature rise < 1 °C
5.10.2	Final measurements	Capacitance tan δ at 10 kHz	|ΔC/C| ≤ 2.0 % Increase of tan δ ≤ 0.0150
5.12	Resonance frequency measurement	Impedance analyzer at T_{amb}	> 0.9 times the value as specified in typical curve “Resonant frequency” of this specification
5.15.0	Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz	
5.15.1	Endurance test between terminals	Sequence 1.25 x U_{NAC} at $T_{max.}$ = 85 °C 1.25 x U_{OPAC} at 105 °C at $T_{max.}$ = 105 °C Duration 500 h 1000 x discharge at 1.4 x $\hat{i}$ (maximum repetitive peak current in continuous operation) 1.25 x U_{NAC} at $T_{max.}$ = 85 °C 1.25 x U_{OPAC} at 105 °C at $T_{max.}$ = 105 °C Duration 500 h	
5.15.2	Final measurements	Capacitance tan δ	|ΔC/C| ≤ 3.0 % Increase of tan δ ≤ 0.0150 Compared to values measured in 5.15.0
5.16.3.0A	Initial measurements	Capacitance at 1 kHz	
5.16.3.1.A	Destruction test sequence for non-segment film	The capacitors must be put in an oven at $T_{max.}$ = 85 °C product enveloped with cheese cloth	
	High DC voltage test	3 x U_{NDC} or DC voltage until repetitive product healings occur Duration 15 min	Audible healings or check healings with oscilloscope
	High AC voltage test	AC_{RMS} voltage = 1 x U_{NAC}, with minimum of 250 V_{AC} Duration 5 min Repeat destruction sequence 3 x	
5.16.3.2.A	Final measurements	Visual examination	No puncturing, flashover or burning of the cheese cloth. Self-healing punctures are permitted

SUB-CLAUSE NUMBER AND TEST	CONDITIONS	PERFORMANCE REQUIREMENTS
TYPE TESTS		
5.16.3.0.B Initial measurements	Capacitance at 1 kHz	
5.16.3.1.B Destruction test sequence for segment film	The capacitors must be put in an oven at $T_{max.}$ = 105 °C/2 h and cooled down Product enveloped with cheese cloth	
High DC voltage test (limited to 200 mA)	3 x U_{NDC} with minimum 2000 V_{DC} Duration 1 min	
	Discharge the capacitor Duration 1 min	DC power supply capable of obtaining the desired breakdown voltage
High AC voltage test	AC_{RMS} voltage = 1 x U_{NAC} Duration 15 s	
	The above sequence shall be repeated until the test sample capacitance loss 5 % of its initial measurement in 5.16.3.0.B	
5.16.3.2.B Final measurements	Visual examination	No burning of the cheese cloth. The dielectric must withstand the test sequence conducted.

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