AC Filtering Metalized Polypropylene Film Capacitor Radial Type

FEATURES

- Robustness under high humidity
- THB 40 °C, 93 % RH, 56 days at U_{NAC}
- High peak current capabilities
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free

RoHS COMPLIANT

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	± 10 %, other tolerances available on request
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}
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 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
Lifetime expectancy (2)	RT: < 10 x 10^9/h (10 per 10^9 component hours) at 0.5 x U_{NAC}, 40 °C
Marking	Manufacturer's name, C-value, tolerance, rated voltage, manufacturer's type designation, code for dielectric material, manufacturer location, year and week

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. See APPLICATION NOTES AND LIMITING CONDITIONS on page 12 for intended continuous mains voltage.

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

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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	1847C	6	12	25	5	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}

TOLERANCE	
5	± 10 %

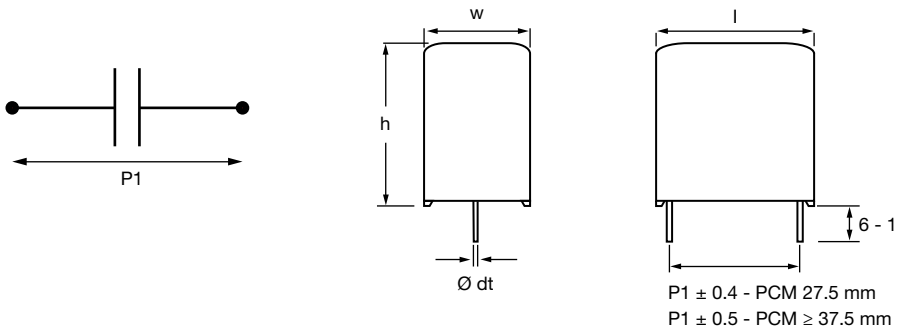
SPECIAL CODE FOR TERMINAL	
2	2 pins
4	4 pins P2 = 10.2 mm
5	4 pins P2 = 20.3 mm
(1)	Customized

Note

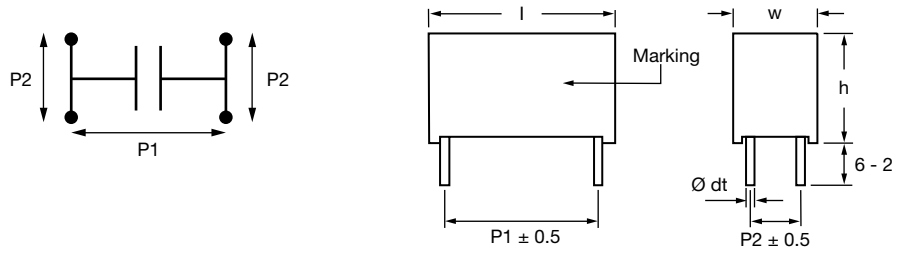
(1) Tabs terminals or customized terminals are available on request

DIMENSIONS in millimeters

2 PINS



4 PINS



Note

- Ø dt ± 10 % of standard diameter specified

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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_{OPAC} AT 85 °C = 230 V_{RMS}, U_{OPAC} AT 105 °C = 160 V_{RMS}, C-TOL. = ± 10 % (U_{NDC} = 450 V)														
230	2	11.0	21.0	32.0	27.5	-	45	90	3.5	-	7	-	30	-	MKP1847C 520 235K2
	3	13.0	23.0	32.0	27.5	-	45	135	5.0	-	7	-	30	-	MKP1847C 530 235K2
	4	15.0	25.0	32.0	27.5	-	45	180	6.0	-	7	-	30	-	MKP1847C 540 235K2
	5	18.0	28.0	32.0	27.5	-	45	225	7.5	-	7	-	30	-	MKP1847C 550 235K2
	6	18.0	28.0	32.0	27.5	-	45	270	8.0	-	7	-	30	-	MKP1847C 560 235K2
	7	18.0	28.0	32.0	27.5	-	45	315	8.5	-	7	-	30	-	MKP1847C 570 235K2
	8	21.0	31.0	32.0	27.5	-	45	360	10.0	-	7	-	30	-	MKP1847C 580 235K2
	9	21.0	31.0	32.0	27.5	-	45	405	10.5	-	7	-	30	-	MKP1847C 590 235K2
	10	20.0	35.0	32.0	27.5	-	45	450	11.5	-	7	-	30	-	MKP1847C 610 235K2
	10	18.5	35.5	43.0	37.5	-	20	200	7.5	-	10	-	75	-	MKP1847C 610 235P2
	12	18.5	35.5	43.0	37.5	-	20	240	8.5	-	10	-	75	-	MKP1847C 612 235P2
	15	21.5	38.5	42.0	37.5	10.2	20	300	10.0	12.0	10	8	75	70	MKP1847C 615 235 P*
	20	24.0	44.0	42.0	37.5	10.2	20	400	12.5	14.5	10	8	75	70	MKP1847C 620 235P*
	22	24.0	44.0	42.0	37.5	10.2	20	440	13.0	15.5	10	8	75	70	MKP1847C 622 235P*
	25	30.0	45.0	42.0	37.5	10.2 / 20.3	20	500	15.0	17.5	10	8	75	70	MKP1847C 625 235P*
	30	30.0	45.0	42.0	37.5	10.2 / 20.3	20	600	16.5	19.0	10	8	75	70	MKP1847C 630 235P*
	30	25.0	45.0	57.5	52.5	10.2	10	300	12.5	15.0	20	17	150	135	MKP1847C 630 235Y*
	35	25.0	45.0	57.5	52.5	10.2	10	350	13.5	16.0	20	17	150	135	MKP1847C 635 235Y*
	40	30.0	45.0	57.5	52.5	20.3	10	400	15.5	18.0	20	17	150	135	MKP1847C 640 235Y*
	45	30.0	45.0	57.5	52.5	20.3	10	450	16.5	19.0	20	17	150	135	MKP1847C 645 235Y*
	50	35.0	50.0	57.5	52.5	20.3	10	500	18.5	21.5	20	17	150	135	MKP1847C 650 235Y*
	55	35.0	50.0	57.5	52.5	20.3	10	550	19.5	22.5	20	17	150	135	MKP1847C 655 235Y*
	60	35.0	50.0	57.5	52.5	20.3	10	600	20.5	23.5	20	17	150	135	MKP1847C 660 235Y*
	65	45.0	45.0	57.5	52.5	20.3	10	650	-	25.5	-	17	-	135	MKP1847C 665 235Y5
	70	45.0	45.0	57.5	52.5	20.3	10	700	-	26.0	-	17	-	135	MKP1847C 670 235Y5
	U_{OPAC} AT 85 °C = 250 V_{RMS}, U_{OPAC} AT 105 °C = 175 V_{RMS}, C-TOL. = ± 10 % (U_{NDC} = 500 V)														
250	2	11.0	21.0	32.0	27.5	-	50	100	4.0	-	7	-	25	-	MKP1847C 520 255K2
	3	13.0	23.0	32.0	27.5	-	50	150	5.0	-	7	-	25	-	MKP1847C 530 255K2
	4	15.0	25.0	32.0	27.5	-	50	200	6.0	-	7	-	25	-	MKP1847C 540 255K2
	5	18.0	28.0	32.0	27.5	-	50	250	7.0	-	7	-	25	-	MKP1847C 550 255K2
	6	18.0	28.0	32.0	27.5	-	50	300	7.5	-	7	-	25	-	MKP1847C 560 255K2
	7	21.0	31.0	32.0	27.5	-	50	350	8.0	-	7	-	25	-	MKP1847C 570 255K2
	8	21.0	31.0	32.0	27.5	-	50	400	9.0	-	7	-	25	-	MKP1847C 580 255K2
	9	20.0	35.0	32.0	27.5	-	50	450	11.0	-	7	-	25	-	MKP1847C 590 255K2
	5	18.5	35.5	43.0	37.5	-	25	125	7.0	-	10	-	70	-	MKP1847C 550 255P2
	6	18.5	35.5	43.0	37.5	-	25	150	7.0	-	10	-	70	-	MKP1847C 560 255P2
	7	18.5	35.5	43.0	37.5	-	25	175	7.0	-	10	-	70	-	MKP1847C 570 255P2
	8	18.5	35.5	43.0	37.5	-	25	200	8.0	-	10	-	70	-	MKP1847C 580 255P2
	9	18.5	35.5	43.0	37.5	-	25	225	8.0	-	10	-	70	-	MKP1847C 590 255P2
	10	18.5	35.5	43.0	37.5	-	25	250	9.0	-	10	-	70	-	MKP1847C 610 255P2
	12	18.5	35.5	43.0	37.5	-	25	300	10.0	-	10	-	70	-	MKP1847C 612 255P2
	15	21.5	38.5	42.0	37.5	10.2	25	375	11.0	12.0	10	8	70	65	MKP1847C 615 255P*
	20	30.0	45.0	42.0	37.5	10.2 / 20.3	25	500	14.0	15.0	10	8	70	65	MKP1847C 620 255P*
	22	30.0	45.0	42.0	37.5	10.2 / 20.3	25	550	15.0	16.0	10	8	70	65	MKP1847C 622 255P*
	25	30.0	45.0	42.0	37.5	10.2 / 20.3	25	625	16.0	17.0	10	8	70	65	MKP1847C 625 255P*
	15	25.0	45.0	57.5	52.5	10.2	12	180	12.0	13.0	16	14	135	125	MKP1847C 615 255Y*
	20	25.0	45.0	57.5	52.5	10.2	12	240	12.0	13.0	16	14	135	125	MKP1847C 620 255Y*
	22	25.0	45.0	57.5	52.5	10.2	12	264	12.0	13.0	16	14	135	125	MKP1847C 622 255Y*
	25	25.0	45.0	57.5	52.5	10.2	12	300	13.0	14.0	16	14	135	125	MKP1847C 625 255Y*
	30	30.0	45.0	57.5	52.5	20.3	12	360	15.0	16.0	16	14	135	125	MKP1847C 630 255Y*
	35	30.0	45.0	57.5	52.5	20.3	12	420	16.0	17.0	16	14	135	125	MKP1847C 635 255Y*
	40	35.0	50.0	57.5	52.5	20.3	12	480	19.0	20.0	16	14	135	125	MKP1847C 640 255Y*
	45	35.0	50.0	57.5	52.5	20.3	12	540	20.0	21.0	16	14	135	125	MKP1847C 645 255Y*
	50	35.0	50.0	57.5	52.5	20.3	12	600	21.0	22.0	16	14	135	125	MKP1847C 650 255Y*
	55	45.0	45.0	57.5	52.5	20.3	12	660	-	24.0	-	14	-	125	MKP1847C 655 255Y5
	60	45.0	45.0	57.5	52.5	20.3	12	720	-	25.0	-	14	-	125	MKP1847C 660 255Y5

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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_{OPAC} AT 85 °C = 275 V_{RMS}, U_{OPAC} AT 105 °C = 190 V_{RMS}, C-TOL. = ± 10 % (U_{NDC} = 600 V)														
	2	13.0	23.0	32.0	27.5	-	55	110	4.5	-	5	-	25	-	MKP1847C 520 275K2
	3	15.0	25.0	32.0	27.5	-	55	165	5.5	-	5	-	25	-	MKP1847C 530 275K2
	4	18.0	28.0	32.0	27.5	-	55	220	7.0	-	5	-	25	-	MKP1847C 540 275K2
	5	21.0	31.0	32.0	27.5	-	55	275	8.0	-	5	-	25	-	MKP1847C 550 275K2
	6	21.0	31.0	32.0	27.5	-	55	330	9.0	-	5	-	25	-	MKP1847C 560 275K2
	7	20.0	35.0	32.0	27.5	-	55	385	10.0	-	5	-	25	-	MKP1847C 570 275K2
	5	18.5	35.5	43.0	37.5	-	30	150	7.0	-	8	-	65	-	MKP1847C 550 275P2
	6	18.5	35.5	43.0	37.5	-	30	180	7.0	-	8	-	65	-	MKP1847C 560 275P2
	7	18.5	35.5	43.0	37.5	-	30	210	8.0	-	8	-	65	-	MKP1847C 570 275P2
	8	18.5	35.5	43.0	37.5	-	30	240	8.0	-	8	-	65	-	MKP1847C 580 275P2
	9	18.5	35.5	43.0	37.5	-	30	270	9.0	-	8	-	65	-	MKP1847C 590 275P2
275	10	21.5	38.5	42.0	37.5	10.2	30	300	10.0	11.0	8	7	65	55	MKP1847C 610 275P*
	12	21.5	38.5	42.0	37.5	10.2	30	360	11.0	12.0	8	7	65	55	MKP1847C 612 275P*
	15	24.0	44.0	42.0	37.5	10.2	30	450	13.0	14.0	8	7	65	55	MKP1847C 615 275P*
	20	30.0	45.0	42.0	37.5	10.2 / 20.3	30	600	16.0	17.0	8	7	65	55	MKP1847C 620 275P*
	15	25.0	45.0	57.5	52.5	10.2	13	195	11.0	12.0	15	12	125	105	MKP1847C 615 275Y*
	20	25.0	45.0	57.5	52.5	10.2	13	260	12.0	13.0	15	12	125	105	MKP1847C 620 275Y*
	22	25.0	45.0	57.5	52.5	10.2	13	286	13.0	14.0	15	12	125	105	MKP1847C 622 275Y*
	25	30.0	45.0	57.5	52.5	20.3	13	325	15.0	16.0	15	12	125	105	MKP1847C 625 275Y*
	30	30.0	45.0	57.5	52.5	20.3	13	390	16.0	17.0	15	12	125	105	MKP1847C 630 275Y*
	35	35.0	50.0	57.5	52.5	20.3	13	455	19.0	20.0	15	12	125	105	MKP1847C 635 275Y*
	40	35.0	50.0	57.5	52.5	20.3	13	520	20.0	21.0	15	12	125	105	MKP1847C 640 275Y*
	45	45.0	45.0	57.5	52.5	20.3	13	585	-	23.0	-	12	-	105	MKP1847C 645 275Y5
	50	45.0	45.0	57.5	52.5	20.3	13	650	-	24.0	-	12	-	105	MKP1847C 650 275Y5
	U_{OPAC} AT 85 °C = 310 V_{RMS}, U_{OPAC} AT 105 °C = 210 V_{RMS}, C-TOL. = ± 10 % (U_{NDC} = 630 V)														
	1	11.0	21.0	32.0	27.5	-	68	68	3	-	5	-	20	-	MKP1847C 510 315 K2
	2	15.0	25.0	32.0	27.5	-	68	136	5	-	5	-	20	-	MKP1847C 520 315 K2
	3	18.0	28.0	32.0	27.5	-	68	204	7	-	5	-	20	-	MKP1847C 530 315 K2
	4	21.0	31.0	32.0	27.5	-	68	272	8	-	5	-	20	-	MKP1847C 540 315 K2
	5	21.0	31.0	32.0	27.5	-	68	340	9	-	5	-	20	-	MKP1847C 550 315 K2
	5	18.5	35.5	43.0	37.5	-	35	175	7	-	7	-	55	-	MKP1847C 550 315 P2
	6	18.5	35.5	43.0	37.5	-	35	210	8	-	7	-	55	-	MKP1847C 560 315 P2
	7	18.5	35.5	43.0	37.5	-	35	245	9	-	7	-	55	-	MKP1847C 570 315 P2
	8	21.5	38.5	42.0	37.5	10.2	35	280	10	11	7	6	55	50	MKP1847C 580 315 P*
	9	21.5	38.5	42.0	37.5	10.2	35	315	10	11	7	6	55	50	MKP1847C 590 315 P*
310	10	21.5	38.5	42.0	37.5	10.2	35	350	11	12	7	6	55	50	MKP1847C 610 315 P*
	12	24.0	44.0	42.0	37.5	10.2	35	420	12	13	7	6	55	50	MKP1847C 612 315 P*
	15	30.0	45.0	42.0	37.5	10.2 / 20.3	35	525	15	16	7	6	55	50	MKP1847C 615 315 P*
	10	25.0	45.0	57.5	52.5	10.2	15	150	10	11	12	10	105	90	MKP1847C 610 315 Y*
	12	25.0	45.0	57.5	52.5	10.2	15	180	10	11	12	10	105	90	MKP1847C 612 315 Y*
	15	25.0	45.0	57.5	52.5	10.2	15	225	12	13	12	10	105	90	MKP1847C 615 315 Y*
	20	30.0	45.0	57.5	52.5	20.3	15	300	14	15	12	10	105	90	MKP1847C 620 315 Y*
	22	35.0	50.0	57.5	52.5	20.3	15	330	16	17	12	10	105	90	MKP1847C 622 315 Y*
	25	35.0	50.0	57.5	52.5	20.3	15	375	17	18	12	10	105	90	MKP1847C 625 315 Y*
	30	45.0	45.0	57.5	52.5	20.3	15	450	-	21	-	10	-	90	MKP1847C 630 315 Y5
	35	45.0	45.0	57.5	52.5	20.3	15	525	-	22	-	10	-	90	MKP1847C 635 315 Y5

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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	
350	U_{OPAC} AT 85 °C = 350 V_{RMS}, U_{OPAC} AT 105 °C = 240 V_{RMS}, C-TOL. = ± 10 % (U_{NDC} = 700 V)														
	1	11.0	21.0	32.0	27.5	-	100	100	3	-	7	-	20	-	MKP1847C 510 355 K2
	2	15.0	25.0	32.0	27.5	-	100	200	5	-	7	-	20	-	MKP1847C 520 355 K2
	3	18.0	28.0	32.0	27.5	-	100	300	7	-	7	-	20	-	MKP1847C 530 355 K2
	4	21.0	31.0	32.0	27.5	-	100	400	9	-	7	-	20	-	MKP1847C 540 355 K2
	5	18.5	35.5	43.0	37.5	-	50	250	7	-	7	-	50	-	MKP1847C 550 355 P2
	6	18.5	35.5	43.0	37.5	-	50	300	8	-	7	-	50	-	MKP1847C 560 355 P2
	7	21.5	38.5	42.0	37.5	10.2	50	350	9	10	7	6	50	45	MKP1847C 570 355 P*
	8	21.5	38.5	42.0	37.5	10.2	50	400	10	11	7	6	50	45	MKP1847C 580 355 P*
	9	24.0	44.0	42.0	37.5	10.2	50	450	11	12	7	6	50	45	MKP1847C 590 355 P*
	10	24.0	44.0	42.0	37.5	10.2	50	500	12	13	7	6	50	45	MKP1847C 610 355 P*
	12	30.0	45.0	42.0	37.5	10.2 / 20.3	50	600	14	15	7	6	50	45	MKP1847C 612 355 P*
	10	25.0	45.0	57.5	52.5	10.2	25	250	10	11	12	10	100	85	MKP1847C 610 355 Y*
	12	25.0	45.0	57.5	52.5	10.2	25	300	11	12	12	10	100	85	MKP1847C 612 355 Y*
	15	25.0	45.0	57.5	52.5	10.2	25	375	12	13	12	10	100	85	MKP1847C 615 355 Y*
	20	30.0	45.0	57.5	52.5	20.3	25	500	15	16	12	10	100	85	MKP1847C 620 355 Y*
	22	35.0	50.0	57.5	52.5	20.3	25	550	17	18	12	10	100	85	MKP1847C 622 355 Y*
	25	35.0	50.0	57.5	52.5	20.3	25	625	18	19	12	10	100	85	MKP1847C 625 355 Y*
	30	45.0	45.0	57.5	52.5	20.3	25	750	-	22	-	10	-	85	MKP1847C 630 355 Y5

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) Equivalent series resistance typical values at f = 10 kHz
(6) Change the "*" symbol with special code for the terminals

PACKAGING INFORMATION

U_{NAC} (V)	CAP. [1] (µF)	Ø dt (mm)	ORDERING CODE [2]	MASS (g)	SPQ [3] (pcs)
230	2	0.8	MKP1847C520235K2	9	130
	3	0.8	MKP1847C530235K2	10	115
	4	0.8	MKP1847C540235K2	12	100
	5	0.8	MKP1847C550235K2	17	80
	6	0.8	MKP1847C560235K2	15	80
	7	0.8	MKP1847C570235K2	16	80
	8	0.8	MKP1847C580235K2	23	65
	9	0.8	MKP1847C590235K2	22	65
	10	0.8	MKP1847C610235K2	22	70
	10	1.0	MKP1847C610235P2	33	105
	12	1.0	MKP1847C612235P2	31	105
	15	1.0	MKP1847C615235P*	39	91
	20	1.0	MKP1847C620235P*	50	77
	22	1.0	MKP1847C622235P*	49	77
	25	1.0	MKP1847C625235P*	66	63
	30	1.0	MKP1847C630235P*	60	63
	30	1.2	MKP1847C630235Y*	73	55
	35	1.2	MKP1847C635235Y*	70	55
	40	1.2	MKP1847C640235Y*	97	45
	45	1.2	MKP1847C645235Y*	93	45
	50	1.2	MKP1847C650235Y*	115	40
	55	1.2	MKP1847C655235Y*	110	40
	60	1.2	MKP1847C660235Y*	105	40
	65	1.2	MKP1847C665235Y5	130	30
	70	1.2	MKP1847C670235Y5	126	30

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PACKAGING INFORMATION

U_{NAC} (V)	CAP. (1) (µF)	Ø dt (mm)	ORDERING CODE (2)	MASS (g)	SPQ (3) (pcs)
250	2	0.8	MKP1847C520255K2	9	130
	3	0.8	MKP1847C530255K2	10	115
	4	0.8	MKP1847C540255K2	12	100
	5	0.8	MKP1847C550255K2	17	80
	6	0.8	MKP1847C560255K2	15	80
	7	0.8	MKP1847C570255K2	22	65
	8	0.8	MKP1847C580255K2	21	65
	9	0.8	MKP1847C590255K2	21	70
	5	1.0	MKP1847C550255P2	36	105
	6	1.0	MKP1847C560255P2	35	105
	7	1.0	MKP1847C570255P2	34	105
	8	1.0	MKP1847C580255P2	33	105
	9	1.0	MKP1847C590255P2	32	105
	10	1.0	MKP1847C610255P2	31	105
	12	1.0	MKP1847C612255P2	28	105
	15	1.0	MKP1847C615255P*	35	91
	20	1.0	MKP1847C620255P*	65	63
	22	1.0	MKP1847C622255P*	62	63
	23	1.0	MKP1847C625255P*	59	63
	15	1.2	MKP1847C615255Y*	84	55
	20	1.2	MKP1847C620255Y*	78	55
	22	1.2	MKP1847C622255Y*	76	55
	23	1.2	MKP1847C625255Y*	73	55
	30	1.2	MKP1847C630255Y*	100	45
	35	1.2	MKP1847C635255Y*	93	45
	40	1.2	MKP1847C640255Y*	114	40
	45	1.2	MKP1847C645255Y*	108	40
	50	1.2	MKP1847C650255Y*	102	40
	55	1.2	MKP1847C655255Y5	126	30
	60	1.2	MKP1847C660255Y5	121	30
275	2	0.8	MKP1847C520275K2	11	115
	3	0.8	MKP1847C530275K2	12	100
	4	0.8	MKP1847C540275K2	17	80
	5	0.8	MKP1847C550275K2	23	65
	6	0.8	MKP1847C560275K2	21	65
	7	0.8	MKP1847C570275K2	21	70
	5	1.0	MKP1847C550275P2	35	105
	6	1.0	MKP1847C560275P2	33	105
	7	1.0	MKP1847C570275P2	32	105
	8	1.0	MKP1847C580275P2	31	105
	9	1.0	MKP1847C590275P2	29	105
	10	1.0	MKP1847C610275P*	39	91
	12	1.0	MKP1847C612275P*	36	91
	15	1.0	MKP1847C615275P*	47	77
	20	1.0	MKP1847C620275P*	59	63
	15	1.2	MKP1847C615275Y*	80	55
	20	1.2	MKP1847C620275Y*	73	55
	22	1.2	MKP1847C622275Y*	71	55
	25	1.2	MKP1847C625275Y*	99	45
	30	1.2	MKP1847C630275Y*	92	45
	35	1.2	MKP1847C635275Y*	112	40
	40	1.2	MKP1847C640275Y*	103	40
	45	1.2	MKP1847C645275Y5	126	30
	50	1.2	MKP1847C650275Y5	116	30

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PACKAGING INFORMATION

U_{NAC} (V)	CAP. [1] (µF)	Ø dt (mm)	ORDERING CODE [2]	MASS (g)	SPQ [3] (pcs)
310	1	0.8	MKP1847C510315K2	9	130
	2	0.8	MKP1847C520315K2	13	100
	3	0.8	MKP1847C530315K2	17	80
	4	0.8	MKP1847C540315K2	23	65
	5	0.8	MKP1847C550315K2	21	65
	5	1.0	MKP1847C550315P2	33	105
	6	1.0	MKP1847C560315P2	31	105
	7	1.0	MKP1847C570315P2	30	105
	8	1.0	MKP1847C580315P*	39	91
	9	1.0	MKP1847C590315P*	37	91
	10	1.0	MKP1847C610315P*	35	91
	12	1.0	MKP1847C612315P*	48	77
	15	1.0	MKP1847C615315P*	61	63
	10	1.2	MKP1847C610315Y*	84	55
	12	1.2	MKP1847C612315Y*	80	55
	15	1.2	MKP1847C615315Y*	75	55
	20	1.2	MKP1847C620315Y*	98	45
	22	1.2	MKP1847C622315Y*	122	40
	23	1.2	MKP1847C623315Y*	116	40
	30	1.2	MKP1847C630315Y5	135	30
	35	1.2	MKP1847C635315Y5	128	30
350	1	0.8	MKP1847C510355K2	9	130
	2	0.8	MKP1847C520355K2	12	100
	3	0.8	MKP1847C530355K2	16	80
	4	0.8	MKP1847C540355K2	22	65
	5	1.0	MKP1847C550355P2	32	105
	6	1.0	MKP1847C560355P2	29	105
	7	1.0	MKP1847C570355P*	38	91
	8	1.0	MKP1847C580355P*	36	91
	9	1.0	MKP1847C590355P*	49	77
	10	1.0	MKP1847C610355P*	47	77
	12	1.0	MKP1847C612355P*	63	63
	10	1.2	MKP1847C610355Y*	80	55
	12	1.2	MKP1847C612355Y*	76	55
	15	1.2	MKP1847C615355Y*	71	55
	20	1.2	MKP1847C620355Y*	93	45
	22	1.2	MKP1847C622355Y*	115	40
	23	1.2	MKP1847C623355Y*	107	40
	30	1.2	MKP1847C630355Y5	126	30

Notes

(1) Intermediate capacitance values available on request
(2) Change the "*" symbol with special code for the terminals
(3) SPQ = Standard Packing Quantity

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CONSTRUCTION

Low inductive wound cell elements of metallized polypropylene film, 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.

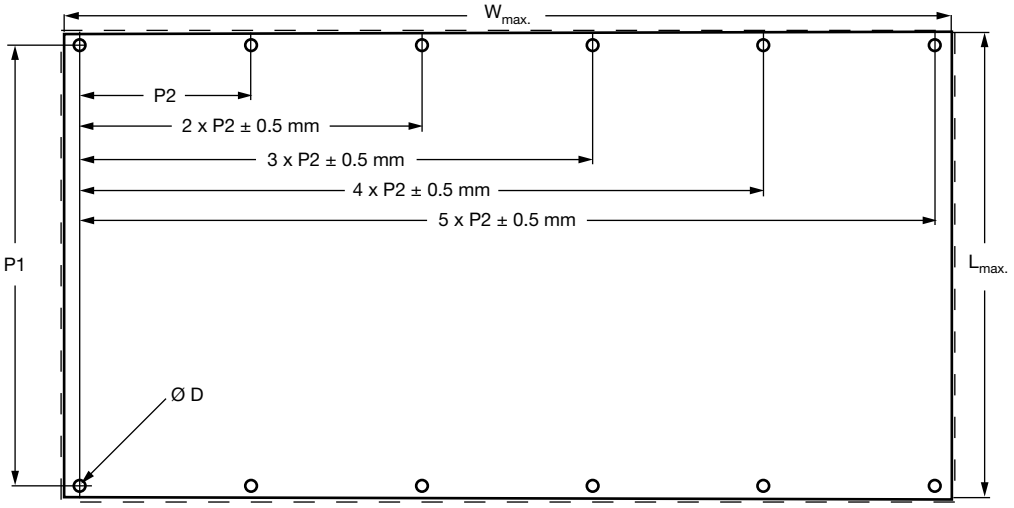
The capacitors shall be mechanically fixed by the leads and the body clamped.

SPACE REQUIREMENTS ON PRINTED-CIRCUIT BOARD AND DIMENSIONS 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)	$L_{max.}$ (mm)	$W_{max.}$ (mm)	Ø D (mm)	Δh (mm)
27.5	l + 2	w + 1.6	1.2	0.2
37.5	l + 3	w + 2.0	1.5	0.5
52.5	l + 4	w + 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 = 1.5 mm, and Δw = Δh = 0.5 mm

For products with pitch = 37.5 mm, Δl = 1.5 mm, and Δw = Δh = 1.0 mm

For products with pitch = 52.5 mm, Δl = 1.5 mm, and Δw = Δh = 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} = -23 °C to +35 °C with relative humidity of 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 of 50 % ± 2 %.

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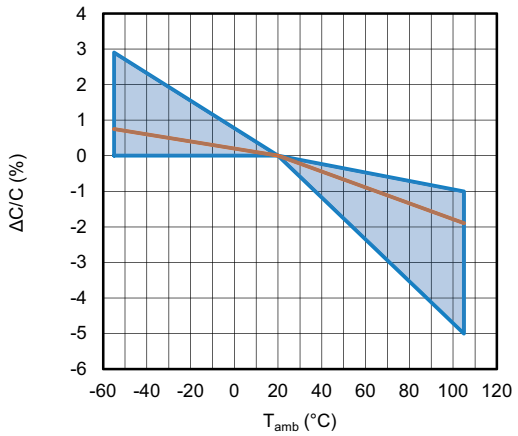
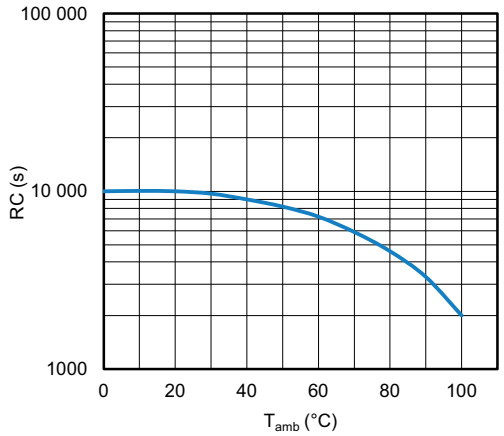
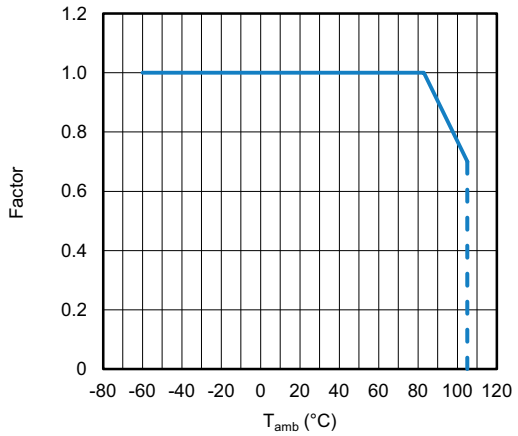
CHARACTERISTICS



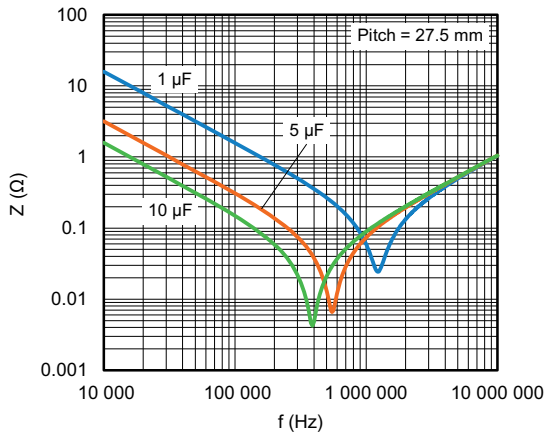
Capacitance as a function of ambient temperature (typical)



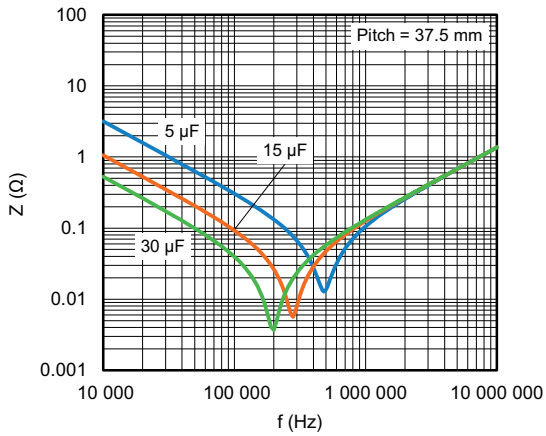
Insulation resistance as a function of ambient temperature (typical)



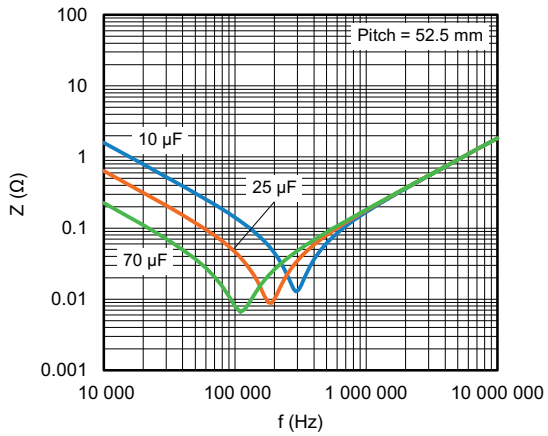
RMS voltage in function of temperature



Impedance vs. Frequency (typical)



Impedance vs. Frequency (typical)



Impedance vs. Frequency (typical)

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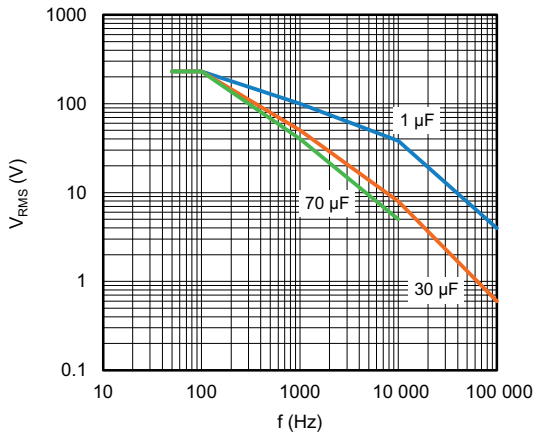
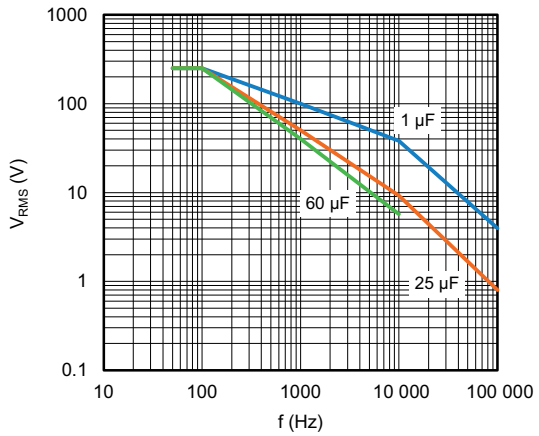
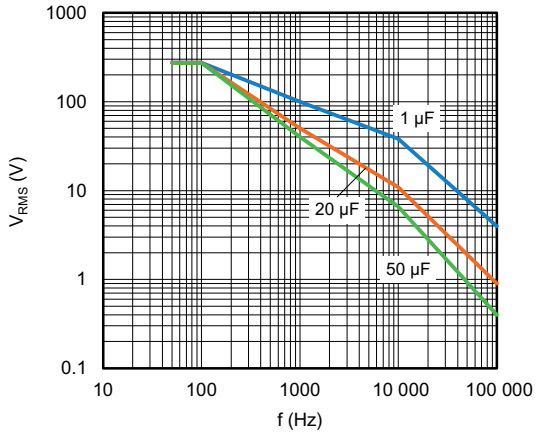


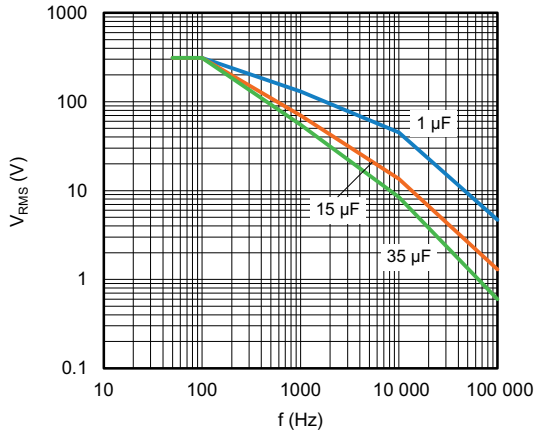
Maximum RMS voltage as function of frequency
$T_{amb} \leq 85$ °C; $U_r = 230$ V_{AC}



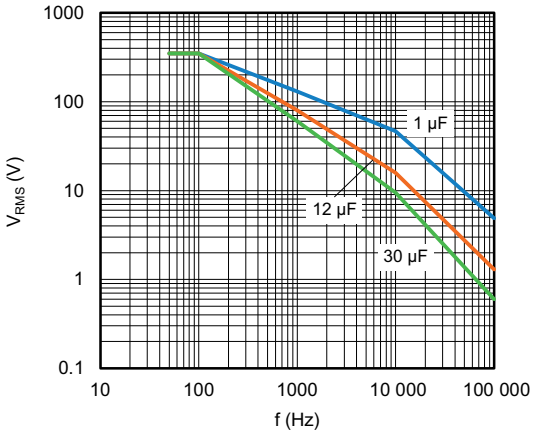
Maximum RMS voltage as function of frequency
$T_{amb} \leq 85$ °C; $U_r = 250$ V_{AC}



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



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



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

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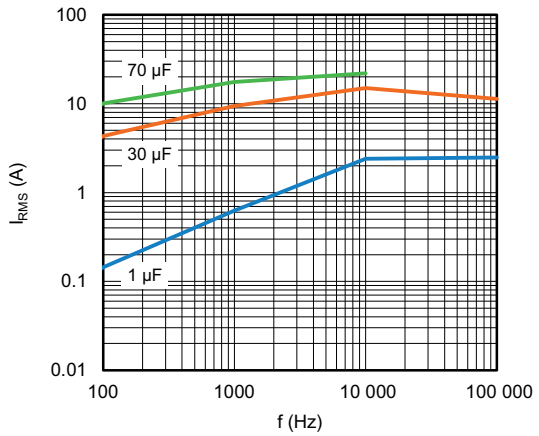
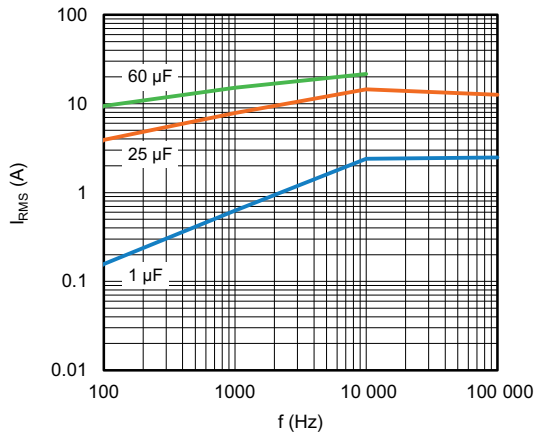
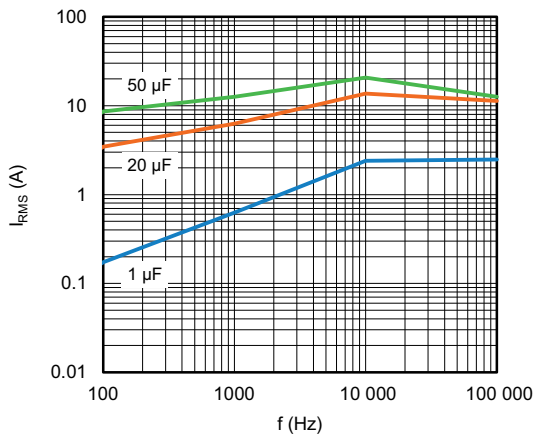


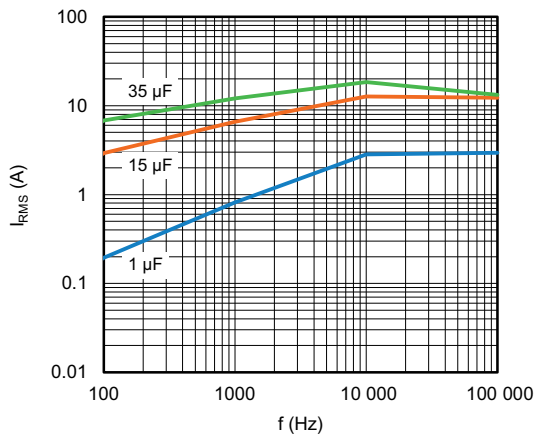
Maximum RMS current as function of frequency
$T_{amb} \leq 85$ °C; $U_r = 230\ V_{AC}$



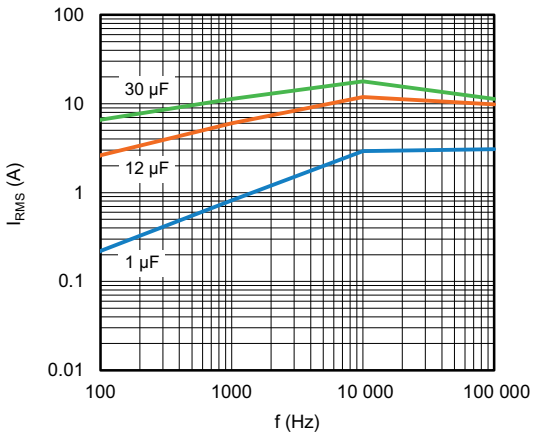
Maximum RMS current as function of frequency
$T_{amb} \leq 85$ °C; $U_r = 250\ V_{AC}$



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



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



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

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HEAT CONDUCTIVITY			
DIMENSION (mm)			G (mW/°C)
w	h	l	
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
20.0	35.0	32.0	37
18.5	35.5	43.0	45
21.5	38.5	42.0	52
24.0	44.0	42.0	59
30.0	45.0	42.0	68
25.0	45.0	57.5	78
30.0	45.0	57.5	85
35.0	50.0	57.5	100
45.0	45.0	57.5	109

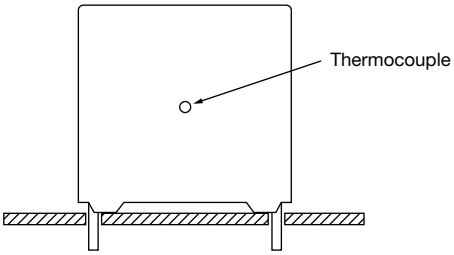
POWER DISSIPATION AND MAXIMUM COMPONENT TEMPERATURE RISE

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 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 NOTES 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 ensure withstanding high humidity requirements in the application the epoxy adhesion at the leads shall not be damaged. Therefore the leads may not be damaged or not be bent before soldering
- To choose a component family please refer to Vishay application note: www.vishay.com/doc?28245 and note additionally following conditions:
  - 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 $2 \times \sqrt{2} \times U_{RMS}$
  - 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.

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

  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

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INSPECTION REQUIREMENTS		
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	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: 2 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 specification 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 Wire diameter / Section / Load d ≤ 0.80 mm / S ≤ 0.5 mm² / 10 N (± 10 %) d ≤ 1.23 mm / S ≤ 1.2 mm² / 20 N (± 10 %) Duration: 10 s ± 1 s Bending, Ub method 1 Wire diameter / Section modulus / Load d ≤ 0.80 mm / Z_x ≤ 0.050 mm³ / 5 N (± 10 %) d ≤ 1.23 mm / Z_x ≤ 0.019 mm³ / 10 N (± 10 %) 4 x 90°, duration: 2 s to 3 s/bend	
5.14.1-6 Resistance to soldering heat IEC 60068-2-20	No pre-drying, method 1A Solder bath: 280 °C ± 5 °C Duration: 10 s ± 1 s	
5.14.4 Final measurements	Capacitance tan δ	$\lvert\Delta C/C\rvert \leq 0.5$ % Increase of tan δ ≤ 0.0050 compared to the 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	10 Hz to 55 Hz; a = ± 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
5.14.3-2 Shock or impact IEC 60068-2-6	Pulse shape: half sine Acceleration: 490 m/s² Duration of pulse: 11 ms	
5.14.4 Final measurements	Visual examination	No visible damage
	Capacitance tan δ	$\lvert\Delta C/C\rvert \leq 0.5$ % Increase of tan δ ≤ 0.0050 compared to the values measured in 5.14.0

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INSPECTION REQUIREMENTS		
SUB-CLAUSE NUMBER AND TEST	**CONDITIONS**	**PERFORMANCE REQUIREMENTS**
5.5.3-1 Initial measurements	Capacitance at 1 kHz tan δ at 10 kHz Insulation resistance	
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 Insulation resistance	|ΔC/C| ≤ 0.5 % Increase of tan δ ≤ 0.0050 Insulation resistance ≥ 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)	
5.9-2 DC voltage test between terminals	Within 5 min after the surge discharge test Duration: 10 s 1.5 x U_{NDC} at T_{amb}	
5.9-3 Final measurements	Capacitance tan δ	|ΔC/C| ≤ 1.0 % tan δ ≤ 1.2 x initial tan δ + 0.0001 compared to the 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	Number of clearings ≤ 5 Clearing = voltage drop of 5 %
5.11-3 Final measurements	Capacitance tan δ	|ΔC/C| ≤ 0.5 % tan δ ≤ 1.2 x initial tan δ + 0.0001 compared to the 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 according 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 according 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	No puncturing or flashover Self healing punctures are permitted
	Capacitance tan δ	|ΔC/C| ≤ 2.0 % Increase of tan δ ≤ 0.0150 compared to the values measured in 5.13-0
5.13A-0 Initial measurements	Capacitance at 1 kHz tan δ at 1 kHz	
5.13A.2 Damp heat steady state with load	T = 40 °C RH = 93 % at U_N Duration: 56 days	
5.13.3 Final measurements	Capacitance at 1 kHz tan δ Insulation resistance	|ΔC/C| < 10 % Increase of tan δ: ≤ 0.008 for: C ≤ 10 μF or ≤ 0.005 for: C > 10 μF Compared to the values measured in 5.13A-0 Insulation resistance ≥ 50 % of specified values

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INSPECTION REQUIREMENTS		
SUB-CLAUSE NUMBER AND TEST	**CONDITIONS**	**PERFORMANCE REQUIREMENTS**
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 $P_{max.}$ = 1.21 x (I^2_{RMS}/w x C) x tan δ(f) with w = 2 x π x f For I_{RMS} see specific reference data f = 10 kHz Duration: 48 h	
5.10-2 Final measurements	Measure the temperature every 1.5 h during the last 6 h	Temperature rise < 1 °C
	Capacitance tan δ at 10 kHz	|ΔC/C| ≤ 2 % 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_{RMS} at 85 °C) at $T_{max.}$ = 85 °C 1.25 x (U_{RMS} at 105 °C) at $T_{max.}$ = 105 °C Duration: 500 h 1000 x discharge at 1.4 x $\hat{I}$ (maximum peak current) 1.25 x (U_{RMS} at 85 °C) at $T_{max.}$ = 85 °C 1.25 x (U_{RMS} at 105 °C) at $T_{max.}$ = 105 °C Duration: 500 h	
5.15-2 Final measurement	Capacitance tan δ	|ΔC/C| ≤ 3.0 % Increase of tan δ ≤ 0.0150 compared to the values measured in 5.15-0
5.16.3-0 Initial measurements	Capacitance at 1 kHz	
5.16.3-1 Destruction test sequence for non-segmented film	The capacitors must be put in an oven at $T_{max.}$ = 85 °C product enveloped with cheese cloth	
High DC voltage test	2 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: 15 min Repeat destruction sequence 3 x	
5.16.3-2 Final measurements	Visual examination	No puncturing, flashover or burning of the cheese cloth. Self-healing punctures are permitted

Note

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

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