



Film Capacitors – Power Electronics Capacitors

General purpose applications

Series/Type:	FilterCap MKD AC - Single phase
Ordering code:	B3237X Series
Date:	2020-11-16
Version:	06

Construction and general data

General data	
Dielectric	Metallized polypropylene film
Resin filling	Non PCB, soft polyurethane
Safety device	Overpressure disconnecter, self-healing technology
Mounting and grounding	Stud on bottom of aluminum can
Cooling	Naturally air-cooled (or forced air cooling)
Degree of protection	IP00 (B32370, B32371 and B32373 series), IP20 (B32374 series), IP54 upon request
Discharge resistor	Upon request
Mechanical shock	5g
Reference standards	IEC 61071, UL 810, GB/T 17702, RoHS compliance, CE Optional IEC 60831
Safety approvals	For B32370, B32371 type A, B32373 type A and B32374: UL 810, CSA C22.2, No 190, Max. 600 V _{RMS} , 50/60Hz, "Protected", 10k AFC, max. +70 °C. For B32371 type B and B32373 type B: UL 810, CSA C22.2, No 190, Max.1000 V RMS. 50/60Hz, "Protected", 10k AFC, max. +70 °C. File no.: E487229, CCN:CYWT2/8
Terminals	B32370 series: Fast-on terminals B32371 (M6) and B32373 (M10) series: Screw terminals B32374 series: Clamp terminals

B32370
**B32371
Type A**
**B32371
Type B**
**B32373
Type A**
**B32373
Type B**
B32374


Figure 1: Capacitor MKD-AC series B32370, B32371, B32373 and B32374

Specifications and characteristics

Rated capacitance C_R : 5 ... 600 μF (for $\geq 400 \mu\text{F}$ customized design), Tolerance: $\pm 5\%$

Voltage V_{RMS} (line to line)	Rated AC voltage V_R (line to line)	DC voltage V_{RDC}
250	350	675
330	460	900
420	590	1050
480	680	1200
530	750	1350
600	850	1500
660	935	1650
720	1020	1800
780	1100	1950
850	1200	2100
1000	1415	2475

Test data

Voltage between terminals V_{TT}	$2.15 \cdot V_{\text{RMS}}, 2 \text{ s}$
Voltage between terminals and Case V_{TC}	4000 V AC, 10 s
Dissipation factor $\tan \delta$ at 100Hz	$\leq 1.0 \cdot 10^{-3}$
Life test	According to IEC 61071
Life expectancy*	100000 hours for $V_{\text{RMS}}, \Delta C/C \leq 3\%$

Climatic category 40/70/21

T_{stg}^{**}	$-40 \dots +85 \text{ }^\circ\text{C}$
T_{min}	$-40 \text{ }^\circ\text{C}$
T_{max}^{***}	$+70 \text{ }^\circ\text{C}$
T_{hs}^{****}	$+85 \text{ }^\circ\text{C}$
Max. permissible humidity	95% (test = 21 days)
Max. permissible altitude	2000 m above sea level

Mechanical characteristics

Terminal cross section	Fast-on terminals - B32370 series: 5 mm ² Screw terminals - B32371 (M6): 25 mm ² Screw terminals - B32373 (M10) series: 100 mm ² Clamp terminals - B32374 series: 25 mm ²
Max. torque (case)	M12: 12 Nm
Max. torque (for screw terminal)	M6: 4 Nm (B32371 series) M10: 10 Nm (B32373 series) Screw clamp terminal: 2Nm (B32374 series)
Max insertion and withdraw force (for fast-on terminal)	50 N

* Note that this life expectancy occurs for the worst case with a maximum temperature hot-spot of +85° Celsius degree. For other operation temperatures please check the life time curve for further details.

** : T_{stg} – Storage temperature.

*** : T_{max} – Maximum operation ambient temperature.

**** : T_{hs} – Maximum temperature allowed at the capacitors hot spot.

Considering mounting position with terminals to the top. For other mounting positions, please request evaluation.

Design data	
Dimensions (D x H)	According to specification table
Weight approx.	According to specification table
Max. terminal current	Fast-on terminal: 15 A (B32370) M6: 30 A (B32371 type A) 50 A (B32371 type B) M10: 100 A (B32373) Screw clamp terminal: 50 A (B32374)

Electrical characteristics: Clearance and creepage distances

Series	Diameter mm	Max. height mm	Terminal to terminal		Terminal to case	
			Min. clearance mm	Min. creepage mm	Min. clearance mm	Min. creepage mm
B32370	50/63.5	137	10	36	16	19
B32371 Type A	63.5	142	23	34	13	14
B32371 Type B	75/85/96/116/136	265	20	28	19	20
B32373 Type A	75/85/96/116/136	265	15	28	15	20
B32373 Type B	75/85/96/116/136	265	15	39	20.5	25.6
B32374	75/85/96/116/136	265	35	32	18	25

Capacitor catalog number (type or series designation)

FilterCap MKD AC series					A	B	C	D		E	F	G	H	I
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
B	3	2	3	7	3	A	3	4	0	7	J	0	3	0

A. Indicates termination type

0 = 6.3 mm x 0.8 mm (2 x) Fast-on terminals

1 = M6 (2 x) screw terminals

3 = M10 (2 x) screw terminals

4 = M5 (4 x) clamp terminals

B. Indicates revision status (any letter), in case of S letter it means customized design
C. Indicates first number of voltage V_{RMS} value (any digit)
D. Indicates first and second figure of capacitance value (any two digits)
E. Indicates exponent used as multiplier (any digit)
F. Indicates capacitor tolerance for PEC AC capacitor

J = $\pm 5\%$; K = $\pm 10\%$;

G. Indicates coded capacitance value
H. Indicates second number of voltage V_{RMS} value (any digit)
I. Indicates Accessories (any digit)

B32373A3157J030

150 μF **$\pm 5\%$**

V_{RMS} 330V~

V_N 460V~

I_s 4.8kA

IEC 61071 50/60Hz

No PCB -40...+70°C

Overpressure disconnecter SH

Protected 10k AFC UL File E487229

Maximum torque of terminals : 10Nm

Discharge capacitor before handling

Made by EPCOS 36 Z 2020

123456789001

Label information
Date code explanation
WW Z YYYY

WW Z YYYY: production weeks (e.g.: 45)

WW Z YYYY: produced in Zhuhai (China)

WW Z YYYY: production year (e.g.: 2020)

Bar code explanation

Bar code consists of batch number and serial number.

Batch number: 9 digits (e.g.: 123456789)

Serial number: 3 digits (e.g.: 001)

Dimensional drawings

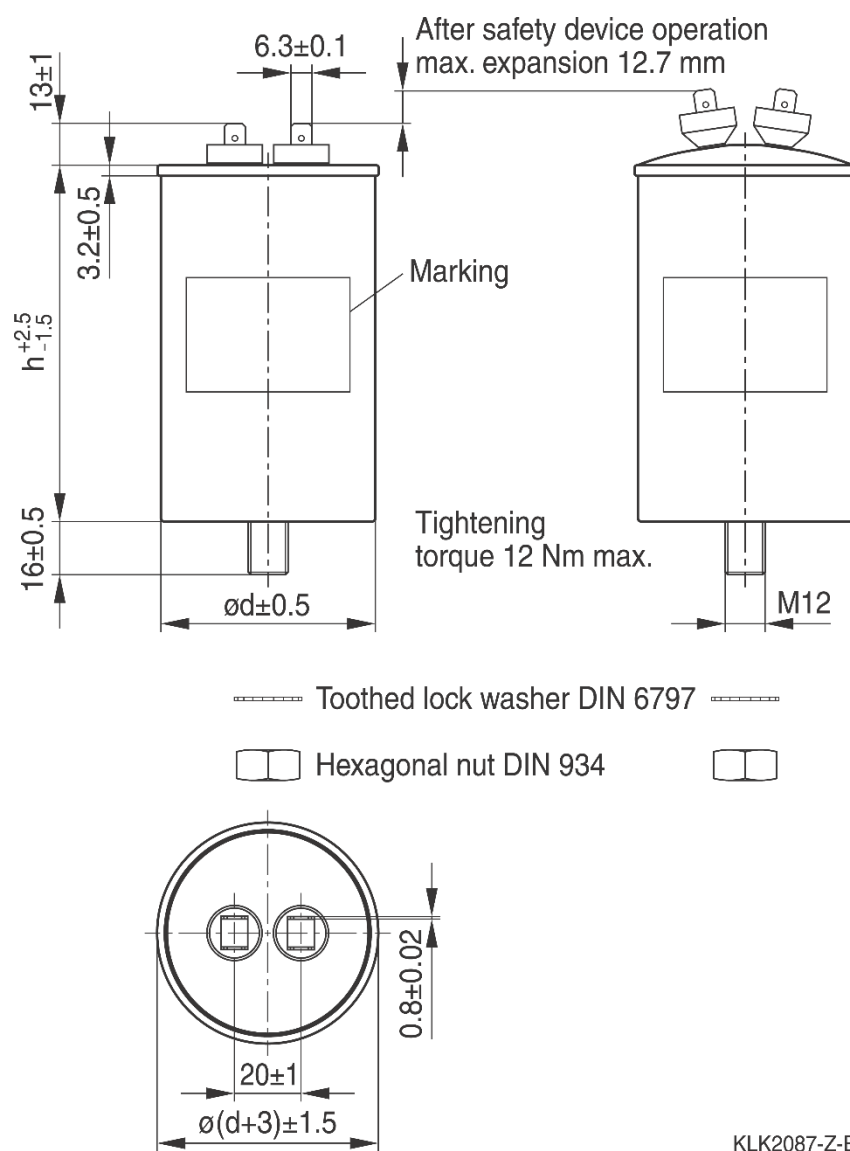


Figure 2: Series B32370 – fast on terminal

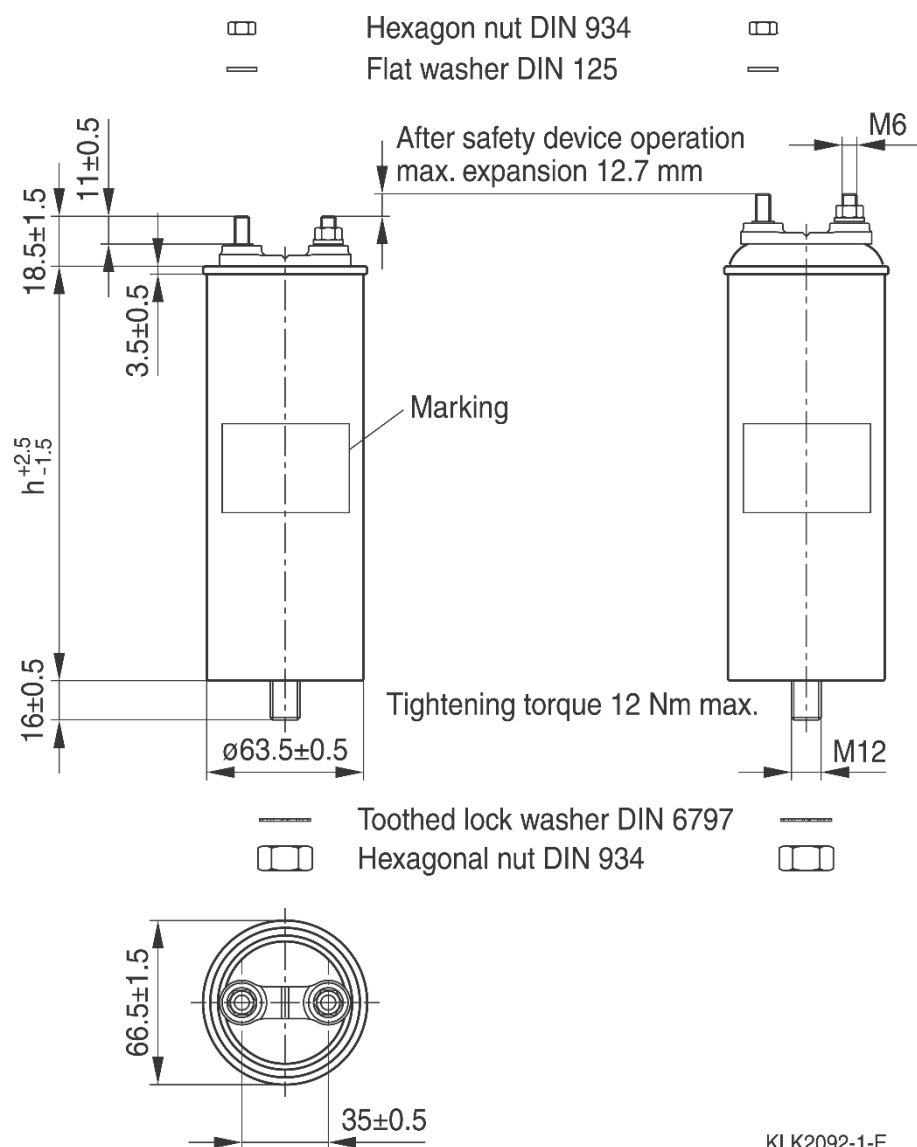


Figure 3: B32371 series – M6 screw terminal type A

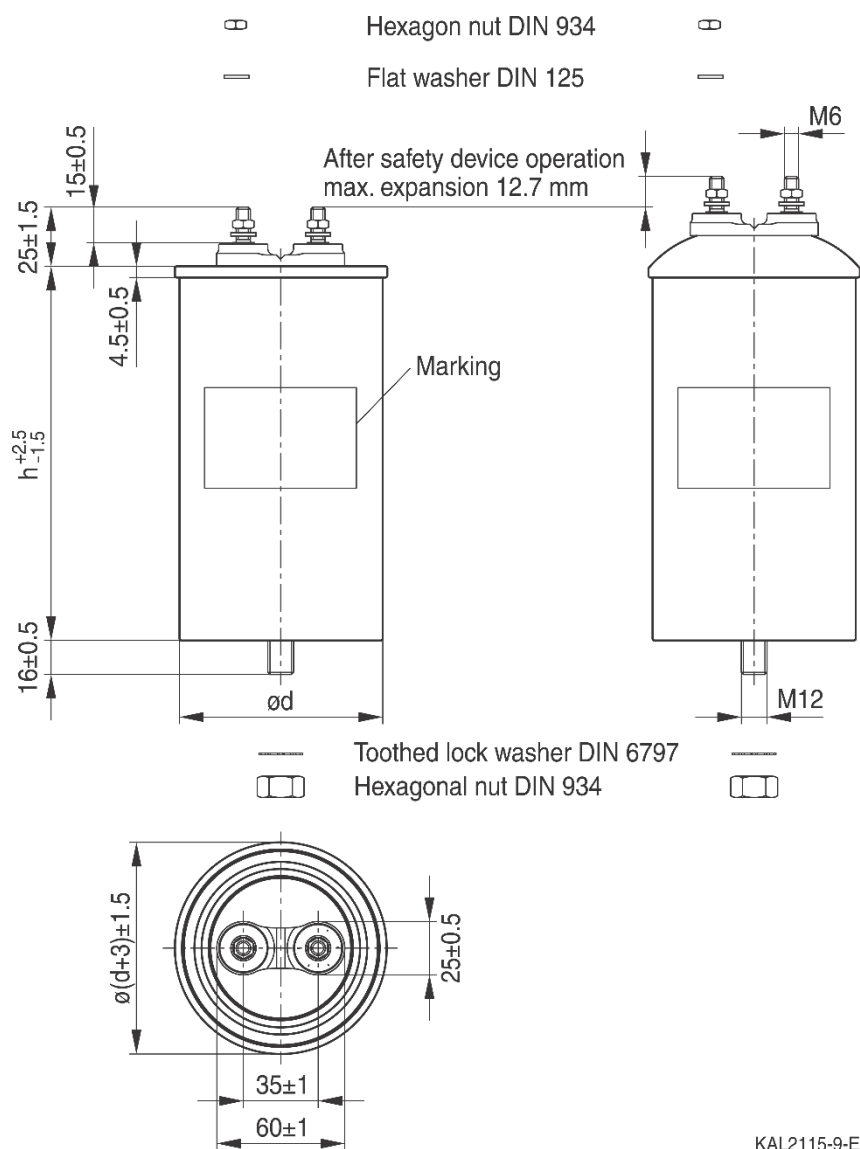


Figure 4: B32371 series – M6 screw terminal type B

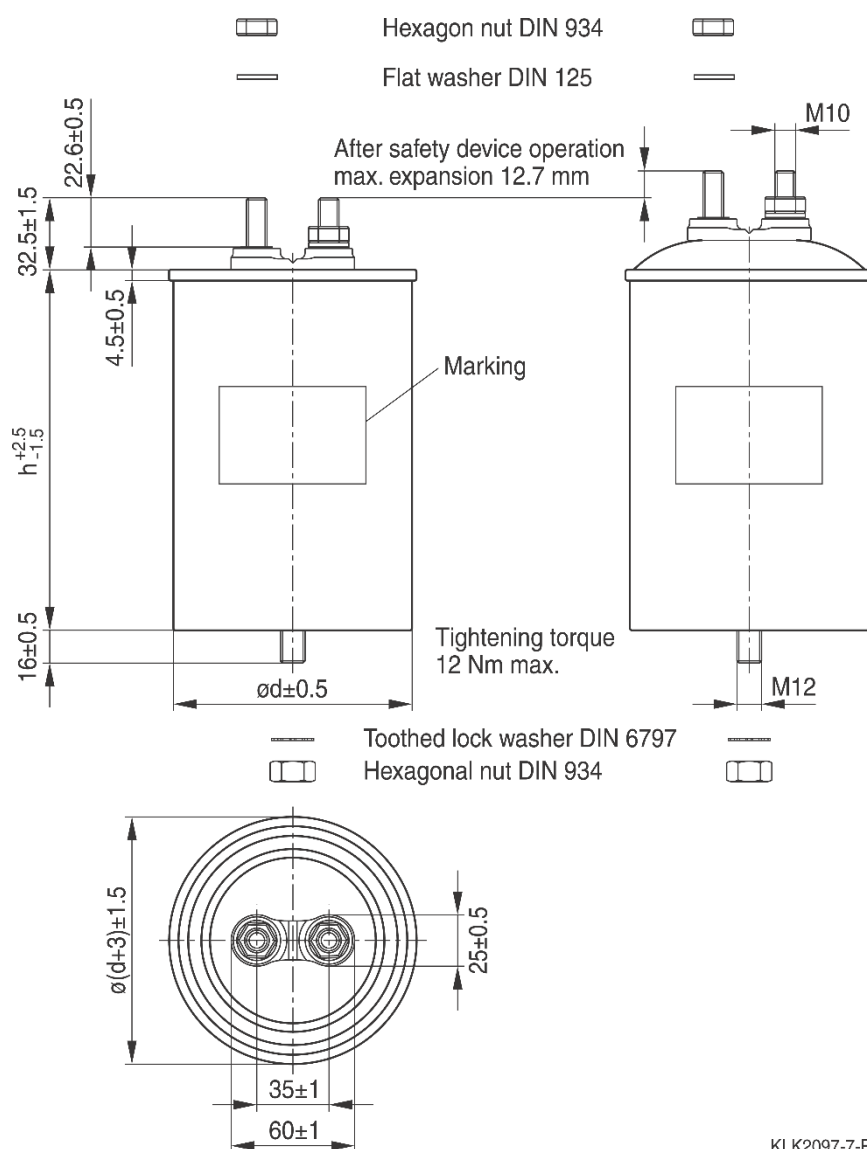


Figure 5: B32373 series – M10 screw terminal type A

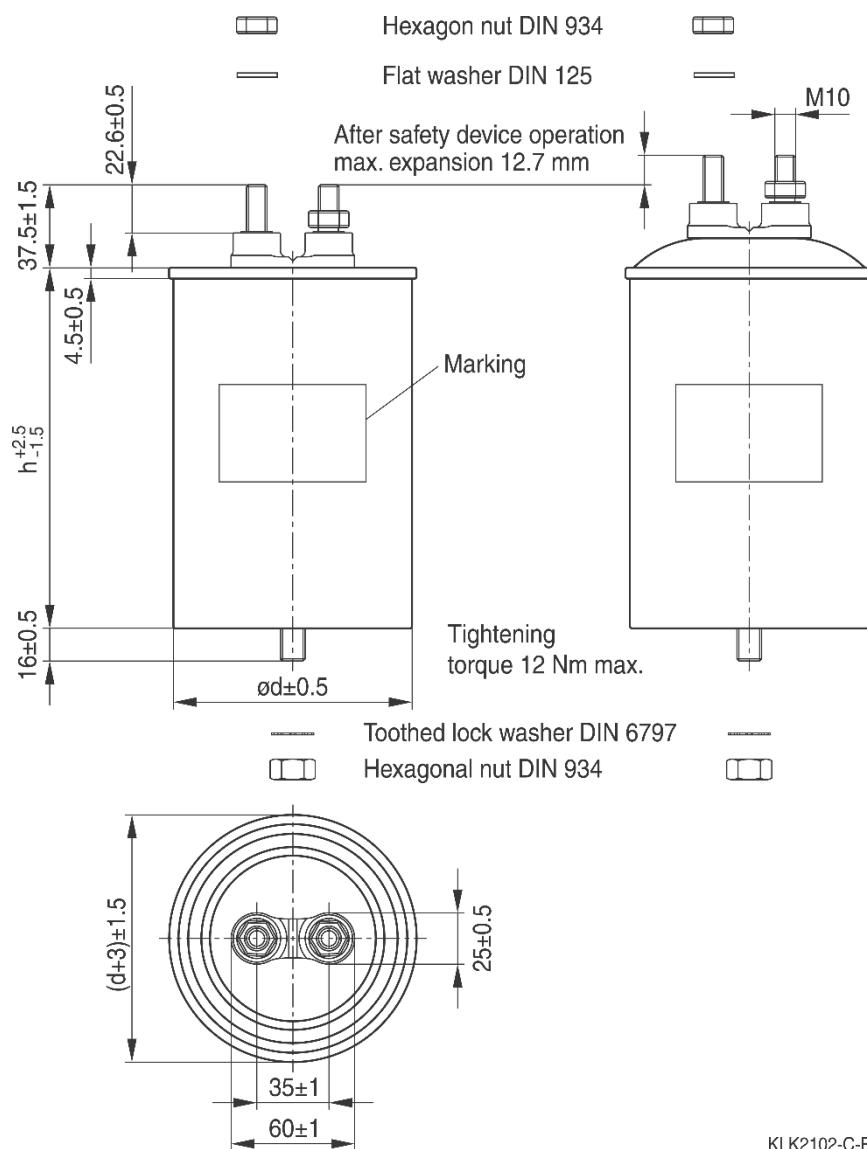


Figure 6: Series B32373 series – M10 screw terminal type B

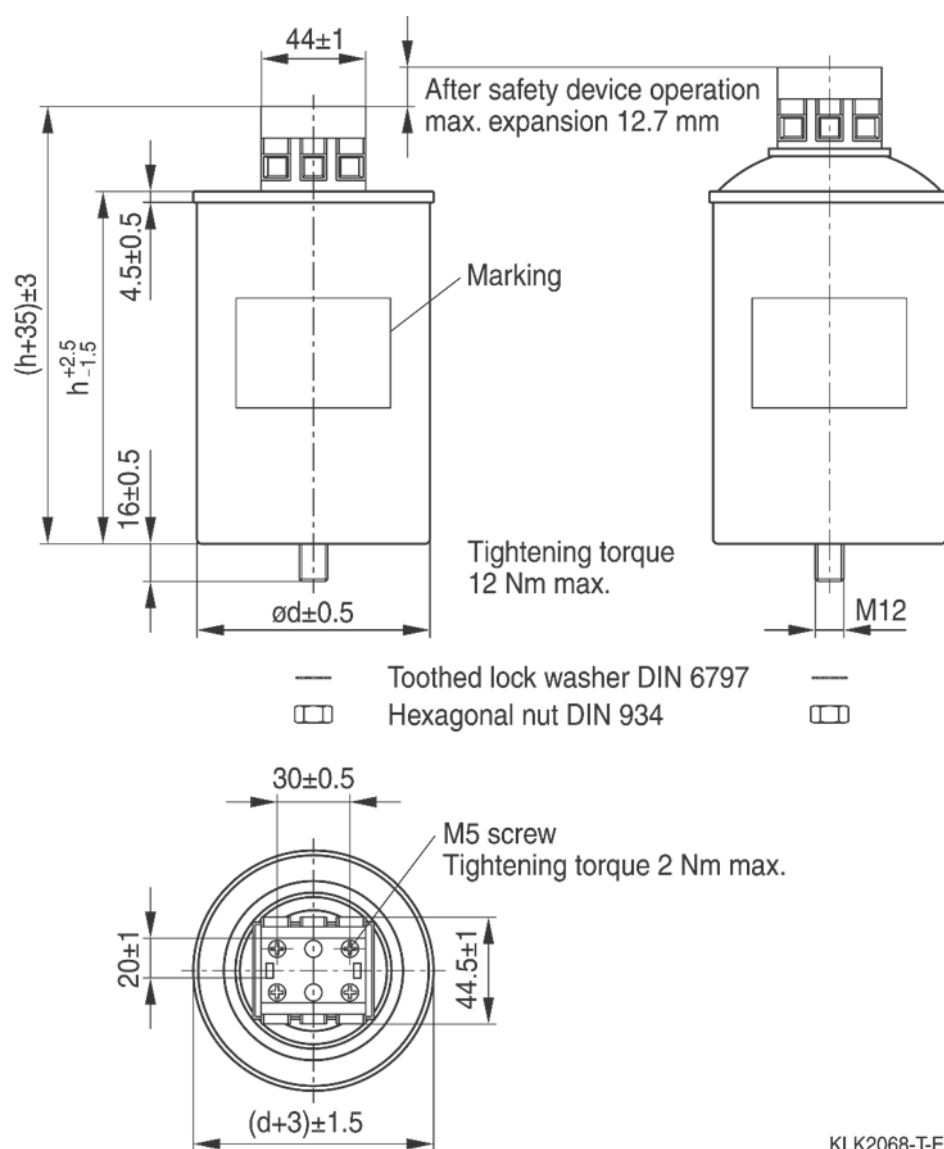


Figure 7: Series B32374 series – M5 screw clamp terminal

Installation space requirements

- 1) A minimum distance of 20 mm between the capacitors is necessary to maintain sufficient cooling.
- 2) Keep at least 20 mm space above the capacitor and do not attach any mounting components at the crimp or on top. This gap will allow a longitudinal extension of the can in order to ensure that the over-pressure disconnecter can fully extend.

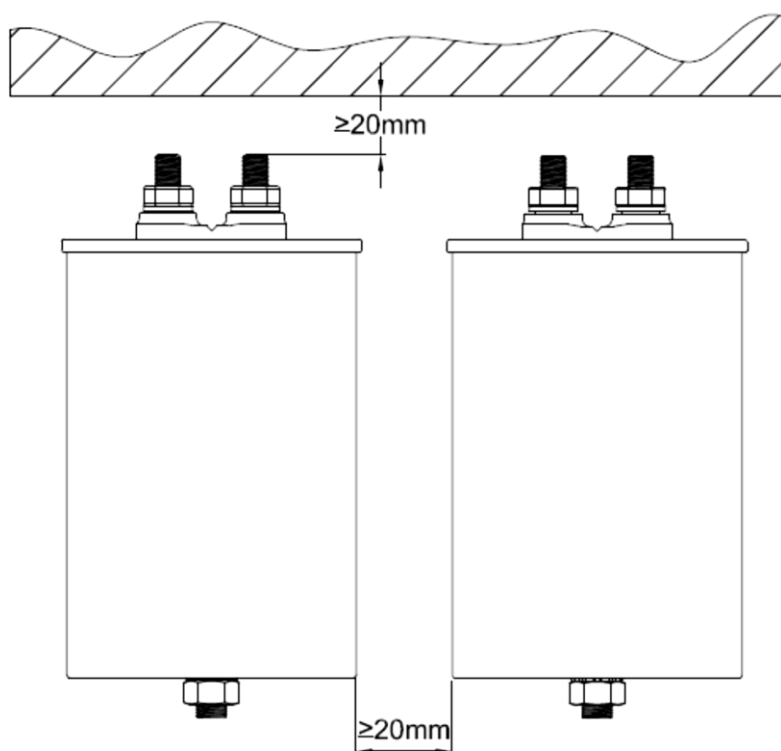


Figure 8: Installation space requirements

Note: For further details, please check installation manual for MKD-AC capacitors.

Technical data of standard products

B32370 series – fast-on terminals

V_R / V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
350 / 250	30	B32370A2306J050	15	750	50	64.5	0.17	50
	40	B32370A2406J050	15	900	50	64.5	0.17	50
	50	B32370A2506J050	15	900	50	77.5	0.19	50
	60	B32370A2606J050	15	1000	50	77.5	0.19	50
	70	B32370A2706J050	15	1300	63.5	77.5	0.30	12
	75	B32370A2756J050	15	1340	63.5	77.5	0.30	12
	80	B32370A2806J050	15	1500	63.5	77.5	0.30	12
	100	B32370A2107J050	15	1600	63.5	77.5	0.30	12
	120	B32370A2127J050	15	1500	63.5	92.5	0.33	12
	140	B32370A2147J050	15	1520	63.5	102.5	0.35	12
	150	B32370A2157J050	15	1600	63.5	102.5	0.35	12
	160	B32370A2167J050	15	1280	63.5	127.5	0.45	12
460 / 330	20	B32370A3206J030	14	600	50	64.5	0.17	50
	25	B32370A3256J030	15	750	50	64.5	0.17	50
	30	B32370A3306J030	15	650	50	77.5	0.19	50
	40	B32370A3406J030	15	800	50	92.5	0.23	50
	50	B32370B3506J030	15	840	50	92.5	0.23	50
	60	B32370A3606J030	15	790	50	102.5	0.25	50
	70	B32370A3706J030	15	1000	63.5	92.5	0.33	12
	80	B32370A3806J030	15	1150	63.5	102.5	0.35	12
	100	B32370A3107J030	15	1050	63.5	127.5	0.45	12
	120	B32370A3127J030	15	1150	63.5	137.5	0.47	12
590 / 420	20	B32370A4206J020	14	520	50	77.5	0.19	50
	30	B32370A4306J020	15	1150	63.5	64.5	0.25	12
	40	B32370A4406J020	15	1030	63.5	77.5	0.30	12
	50	B32370A4506J020	15	1060	63.5	87.5	0.32	12
	60	B32370A4606J020	15	1000	63.5	102.5	0.35	12
	70	B32370A4706J020	15	870	63.5	127.5	0.45	12
	80	B32370A4806J020	15	990	63.5	127.5	0.45	12
	100	B32370A4107J020	15	1120	63.5	137.5	0.47	12
680 / 480	10	B32370A4106J080	10.5	400	50	64.5	0.17	50
	15	B32370A4156J080	12.5	600	50	77.5	0.19	50
	20	B32370A4206J080	14	600	50	87.5	0.21	50
	25	B32370A4256J080	15	500	50	102.5	0.25	50
	30	B32370A4306J080	15	600	50	102.5	0.25	50
	40	B32370A4406J080	15	750	63.5	102.5	0.35	12
	50	B32370A4506J080	15	950	63.5	102.5	0.35	12
	60	B32370A4606J080	15	850	63.5	127.5	0.45	12
	70	B32370A4706J080	15	1000	63.5	137.5	0.47	12

B32370 series – fast on terminals

V_R/V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
750 / 530	10	B32370A5106J030	10.5	450	50	64.5	0.17	50
	20	B32370A5206J030	15	910	63.5	77.5	0.30	12
	30	B32370A5306J030	15	650	63.5	102.5	0.35	12
	40	B32370A5406J030	15	850	63.5	102.5	0.35	12
	50	B32370A5506J030	15	800	63.5	127.5	0.45	12
	60	B32370A5606J030	15	870	63.5	137.5	0.47	12
850 / 600	10	B32370A6106J000	12.5	520	63.5	64.5	0.25	12
	20	B32370A6206J000	15	750	63.5	77.5	0.28	12
	30	B32370A6306J000	15	730	63.5	102.5	0.35	12
	40	B32370A6406J000	15	720	63.5	127.5	0.45	12
	45	B32370A6456J000	15	800	63.5	127.5	0.45	12

B32371 series - M6 screw terminals (Type A)

V_R/V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
350 / 250	50	B32371A2506J050	23	1250	63.5	70.5	0.28	12
	60	B32371A2606J050	24	1500	63.5	70.5	0.28	12
	70	B32371A2706J050	25	1600	63.5	70.5	0.28	12
	75	B32371A2756J050	25.5	1400	63.5	70.5	0.28	12
	80	B32371A2806J050	26	1450	63.5	82.5	0.31	12
	100	B32371A2107J050	27.5	1650	63.5	82.5	0.31	12
	130	B32371A2137J050	28	1500	63.5	107.5	0.40	12
	150	B32371A2157J050	30	1600	63.5	132.5	0.48	12
	200	B32371A2207J050	30	1750	63.5	132.5	0.48	12
460 / 330	30	B32371A3306J030	19.5	940	63.5	70.5	0.28	12
	40	B32371A3406J030	21.5	1250	63.5	70.5	0.28	12
	50	B32371A3506J030	23	1100	63.5	82.5	0.31	12
	60	B32371A3606J030	24	1095	63.5	92.5	0.33	12
	70	B32371A3706J030	24.5	1000	63.5	107.5	0.40	12
	80	B32371A3806J030	25	1150	63.5	107.5	0.40	12
	100	B32371A3107J030	25.5	1050	63.5	132.5	0.48	12
	120	B32371A3127J030	27.5	1160	63.5	142.5	0.50	12
590 / 420	10	B32371A4106J020	12.5	350	63.5	70.5	0.28	12
	15	B32371A4156J020	15	530	63.5	70.5	0.28	12
	20	B32371A4206J020	17	710	63.5	70.5	0.28	12
	25	B32371A4256J020	18.5	890	63.5	70.5	0.28	12
	30	B32371A4306J020	20	1050	63.5	70.5	0.28	12
	40	B32371A4406J020	22	760	63.5	82.5	0.31	12
	50	B32371A4506J020	23	1230	63.5	97.5	0.35	12
	60	B32371A4606J020	24	1000	63.5	107.5	0.40	12
	70	B32371A4706J020	25	1030	63.5	117.5	0.41	12

B32371 series - M6 screw terminals (Type A)

V_R/V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
590 /	80	B32371A4806J020	25	990	63.5	132.5	0.48	12
420	100	B32371A4107J020	26	1120	63.5	142.5	0.50	12
680 /	10	B32371A4106J080	13	400	63.5	70.5	0.28	12
480	15	B32371A4156J080	15.5	600	63.5	70.5	0.28	12
	20	B32371A4206J080	17	800	63.5	70.5	0.28	12
	25	B32371A4256J080	18.5	750	63.5	82.5	0.31	12
	30	B32371A4306J080	20	880	63.5	82.5	0.31	12
	40	B32371A4406J080	21.5	760	63.5	107.5	0.40	12
	50	B32371A4506J080	23	960	63.5	107.5	0.40	12
	60	B32371A4606J080	23.5	850	63.5	132.5	0.48	12
	70	B32371A4706J080	24	900	63.5	142.5	0.50	12
750 /	10	B32371A5106J030	13	470	63.5	70.5	0.30	12
530	20	B32371A5206J030	18	680	63.5	82.5	0.31	12
	30	B32371A5306J030	20	650	63.5	107.5	0.40	12
	40	B32371A5406J030	21.5	760	63.5	117.5	0.41	12
	50	B32371A5506J030	23	800	63.5	132.5	0.48	12
850 /	10	B32371A6106J000	13	520	63.5	70.5	0.28	12
600	20	B32371A6206J000	17.5	695	63.5	92.5	0.33	12
	30	B32371A6306J000	20	730	63.5	107.5	0.40	12
	40	B32371A6406J000	21.5	720	63.5	132.5	0.48	12

B32371 series - M6 screw terminals (Type B)

V_R/V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
1020 / 720	70	B32371A7706J020	30	2230	85	195	1.30	9
1200 / 850	33	B32371A8336J050	30	1700	85	145	1.00	4

B32373 series - M10 screw terminals (Type A)

V_R/V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
350 / 250	150	B32373A2157J050	41.5	1800	75	117	0.65	9
	200	B32373A2207J050	45	2160	75	117	0.65	9
	250	B32373A2257J050	45	2000	75	142	0.75	6
	300	B32373A2307J050	60	3770	75	175	0.95	6
	330	B32373A2337J050	60	3560	75	195	1.05	9
	400	B32373A2407J050	60	3790	75	215	1.25	6
	500	B32373A2507J050	60	5400	85	195	1.30	9
	600	B32373A2607J050	60	4800	85	245	1.55	4
460 / 330	100	B32373A3107J030	36	1440	75	117	0.65	9
	120	B32373A3127J030	39	1720	75	117	0.65	9
	150	B32373A3157J030	40	1600	75	142	0.75	6
	200	B32373A3207J030	48	2130	85	142	0.95	4
	250	B32373A3257J030	60	3600	85	195	1.30	9
	300	B32373A3307J030	60	4320	85	195	1.30	9
	330	B32373A3337J030	60	4160	85	215	1.40	4
	400	B32373A3407J030	60	4260	85	245	1.55	4
590 / 420	500	B32373A3507J030	60	5330	96	245	2.00	4
	60	B32373A4606J020	32	1270	75	102	0.60	6
	70	B32373A4706J020	33	1175	75	117	0.65	9
	80	B32373A4806J020	35	1340	75	117	0.65	9
	100	B32373A4107J020	35.5	1245	75	142	0.75	6
	120	B32373A4127J020	51	2550	75	165	0.90	6
	150	B32373A4157J020	59	3195	85	165	1.15	4
	200	B32373A4207J020	60	3360	85	195	1.30	9
	250	B32373A4257J020	60	3110	85	245	1.55	4
	300	B32373A4307J020	60	3730	85	245	1.55	4
680 / 480	350	B32373A4357J020	60	4350	96	245	2.00	4
	400	B32373A4407J020	60	6720	116	195	2.25	4
	60	B32373A4606J080	32	1150	75	117	0.65	9
	66	B32373A4666J080	33	1260	75	117	0.65	9
	68	B32373A4686J080	38	1655	85	102	0.65	4
	70	B32373A4706J080	43	2050	75	145	0.75	6
	80	B32373A4806J080	46	2360	75	145	0.75	6
	86	B32373A4866J080	50	3400	85	120	0.80	4
	100	B32373B4107J080	50	2430	75	165	0.90	6
	120	B32373A4127J080	52	2300	75	195	1.05	9
	150	B32373A4157J080	60	2880	85	195	1.30	9

B32373 series - M10 screw terminals (Type A)

V_R / V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
680 / 480	166	B32373A4167J680	60	3200	85	195	1.30	9
	180	B32373A4187J080	60	4400	96	165	1.35	4
	200	B32373A4207J080	60	2840	85	245	1.55	4
	250	B32373A4257J080	60	3550	96	245	2.00	4
	280	B32373A4287J080	60	6250	116	175	2.05	4
	300	B32373A4307J080	60	5840	116	195	2.25	4
	350	B32373A4357J080	60	5970	116	215	2.45	4
750 / 530	30	B32373A5306J030	25.5	938	75	102	0.60	6
	33	B32373A5336J030	29	1100	85	92	0.60	4
	47	B32373A5476J030	36	2210	75	120	0.65	9
	50	B32373A5506J030	40	2280	75	120	0.65	9
	60	B32373A5606J030	43	2740	85	120	0.80	4
	65	B32373A5656J030	44	2960	85	120	0.80	4
	70	B32373A5706J030	37	1325	85	127	0.85	4
	75	B32373A5756J030	43	1880	96	107	0.85	4
	80	B32373A5806J030	41	1280	85	142	1.00	4
	100	B32373A5107J030	60	3330	96	145	1.15	4
	105	B32373B5107J530	60	3670	96	145	1.15	4
	110	B32373A5117J030	60	3750	96	145	1.15	4
	116	B32373A5117J630	60	3860	96	145	1.15	4
	120	B32373A5127J030	60	2590	85	195	1.30	9
	150	B32373A5157J030	60	5100	116	145	1.70	4
	200	B32373A5207J030	60	5570	116	165	1.90	4
	220	B32373A5227J030	60	5530	116	175	2.05	4
	250	B32373A5257J030	60	5480	116	195	2.15	4
	300	B32373A5307J030	60	4850	116	245	2.85	4
	330	B32373B5337J030	60	5200	116	245	2.85	4
	350	B32373A5357J030	60	5650	116	245	2.85	4
850 / 600	33	B32373A6336J000	27	930	75	107	0.60	6
	41	B32373A6416J000	29	1000	75	117	0.65	9
	47	B32373A6476J000	34	1330	85	107	0.65	4
	50	B32373A6506J000	34	1220	85	117	0.80	4
	53	B32373A6536J000	35	1230	85	117	0.80	4
	60	B32373A6606J000	37.5	1700	96	107	0.85	4
	70	B32373A6706J000	48.5	2430	85	165	1.15	4
	80	B32373A6806J000	50.5	2130	85	195	1.30	9

B32373 series - M10 screw terminals (Type A)

V_R / V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
	94	B32373A6946J000	54	3130	96	165	1.35	4
	100	B32373A6107J000	58	2660	96	195	1.60	4
	120	B32373A6127J000	60	3195	96	195	1.60	4
	130	B32373A6137J000	60	3170	96	195	1.60	4
	150	B32373A6157J000	60	2875	96	245	2.00	4
	180	B32373A6187J000	60	4800	116	195	2.15	4
	200	B32373B6207J000	60	3830	116	245	2.85	4
	250	B32373A6257J000	60	4790	116	245	2.85	4
	270	B32373A6277J000	60	5175	116	245	2.85	4
	300	B32373A6307J000	60	5750	136	245	3.80	4

B32373 series - M10 screw terminals (Type B)

V_R / V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
930 / 660	20	B32373A6206J060	22	910	75	92	0.55	6
	22	B32373A6226J060	23	810	75	102	0.60	6
	25	B32373A6256J060	24	840	75	107	0.60	6
	33	B32373A6336J060	29.5	1100	85	107	0.65	4
	41	B32373A6416J060	32	1165	85	117	0.80	4
	50	B32373A6506J060	33	1030	85	142	1.00	4
	68	B32373B6686J060	40	1400	96	142	1.15	4
	80	B32373A6806J060	55.5	2940	96	165	1.35	4
	90	B32373A6906J060	58	3000	96	175	1.45	4
	100	B32373A6107J060	60	2840	96	195	1.55	4
	120	B32373B6127J060	60	4240	116	165	1.90	4
	150	B32373A6157J060	60	4260	116	195	2.15	4
	200	B32373A6207J060	60	4120	116	245	2.85	4
	220	B32373A6227J060	60	4530	116	245	2.85	4
	250	B32373A6257J060	60	5150	136	245	3.8	4
	300	B32373A6307J060	60	6180	136	245	3.8	4
1020 / 720	20	B32373A7206J020	24	800	75	102	0.60	6
	22	B32373B7226J020	26.5	1100	85	92	0.60	4
	25	B32373A7256J020	28.5	1000	85	102	0.65	4
	31	B32373A7316J020	31.5	960	85	117	0.80	4
	33	B32373A7336J020	34.5	1320	96	102	0.85	4
	36	B32373A7366J020	33.5	1115	85	117	0.80	4
	45	B32373A7456J020	36.5	1010	85	142	1.00	4

B32373 series - M10 screw terminals (Type B)

V_R / V_{RMS} V	C_R μF	Ordering code	I_{max} A	\bar{I} A	D Mm	H mm	Weight kg	Packing unit
1020 / 720	50	B32373A7506J020	38	1125	85	142	1.00	4
	60	B32373A7606J020	44	1350	96	142	1.15	4
	65	B32373A7656J020	54.5	2600	96	165	1.35	4
	70	B32373A7706J020	53.5	1860	85	195	1.30	9
	80	B32373A7806J020	60	2480	96	195	1.60	4
	90	B32373A7906J020	60	2020	85	245	1.55	4
	100	B32373A7107J020	60	2250	85	245	1.55	4
	120	B32373A7127J020	60	2670	96	245	2.00	4
	150	B32373A7157J020	60	4000	116	215	2.45	4
	180	B32373A7187J020	60	4050	116	245	2.85	4
1100 / 780	15	B32373A7156J080	21	650	75	102	0.60	6
	20	B32373A7206J080	24	740	75	107	0.60	6
	22	B32373A7226J080	25	700	75	117	0.65	9
	33	B32373B7336J080	32	800	85	142	1.00	4
	47	B32373A7476J080	40	1150	96	142	1.15	4
	53	B32373B7536J080	42	1290	96	142	1.15	4
	68	B32373A7686J080	55	2280	96	195	1.60	4
	75	B32373A7756J080	57	2520	96	195	1.60	4
	82	B32373A7826J080	58	2000	85	245	1.55	4
	100	B32373A7107J080	60	2440	96	245	2.00	4
	120	B32373A7127J080	60	4030	116	195	2.15	4
	150	B32373A7157J080	60	3660	116	245	2.85	4
	180	B32373A7187J080	60	4390	136	245	3.80	4
1200 / 850	20	B32373A8206J050	26	935	85	102	0.65	4
	25	B32373A8256J050	29	900	85	117	0.80	4
	33	B32373A8336J050	38	1920	85	145	1.00	4
	40	B32373A8406J050	42	1870	85	165	1.15	4
	47	B32373A8476J050	48.5	2200	96	165	1.35	4
	53	B32373A8536J050	48.5	1920	85	195	1.30	9
	60	B32373B8606J050	55	2170	96	195	1.60	4
	68	B32373A8686J050	55	1785	85	245	1.55	4
	80	B32373B8806J050	60	2890	116	175	2.05	4
	82	B32373B8826J050	60	2965	116	175	2.05	4
	100	B32373B8107J050	60	3615	116	195	2.15	4
	150	B32373A8157J050	60	5420	136	195	2.95	4
	180	B32373A8187J050	60	4720	136	245	3.80	4

B32373 series - M10 screw terminals (Type B)

V_R / V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
1200 / 850	200	B32373A8207J050	60	5250	136	245	3.80	4
1415 / 1000	15	B32373A1156J000	22	2175	75	142	0.75	6
	20	B32373A1206J000	27	2900	85	142	1.00	4
	22	B32373A1226J000	28	3190	85	142	1.00	4
	30	B32373A1306J000	34.5	4360	96	142	1.15	4
	45	B32373A1456J000	47	6500	85	245	1.55	4
	60	B32373A1606J000	57	8700	96	245	2.00	4

B32374 series - clamp terminals

V_R / V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
350 / 250	100	B32374A2107J050	38	1850	75	92	0.55	6
	120	B32374A2127J050	40	2150	75	92	0.55	6
	150	B32374A2157J050	42.5	2050	75	102	0.60	6
	200	B32374A2207J050	44.5	2160	75	117	0.65	9
	250	B32374A2257J050	45	2000	75	142	0.75	6
	300	B32374A2307J050	46	2400	75	152	0.80	6
	330	B32374A2337J050	47.5	3560	75	195	1.05	6
	400	B32374A2407J050	50	4300	75	195	1.05	6
	500	B32374A2507J050	50	4690	85	245	1.55	4
460 / 330	100	B32374A3107J030	37	1800	75	107	0.60	6
	120	B32374A3127J030	39	1585	75	117	0.65	6
	150	B32374A3157J030	40	1600	75	142	0.75	6
	200	B32374A3207J030	50	2850	75	195	1.05	6
	250	B32374A3257J030	50	2650	75	245	1.25	6
	300	B32374A3307J030	50	3500	75	245	1.25	6
590 / 420	60	B32374A4606J020	32.5	1270	75	102	0.60	6
	70	B32374A4706J020	33.5	1175	75	117	0.65	6
	80	B32374A4806J020	35	1340	75	117	0.65	6
	100	B32374A4107J020	35.5	1245	75	142	0.75	6
	120	B32374A4127J020	50	2550	75	165	0.90	6
	150	B32374A4157J020	50	1690	85	152	0.90	4
	200	B32374A4207J020	50	3360	85	195	1.30	4
680 / 480	40	B32374A4406J080	28	1070	75	102	0.60	6
	50	B32374A4506J080	30.5	1030	75	107	0.60	6

B32374 series - clamp terminals

V_R / V_{RMS} V	C_R μF	Ordering code	I_{max} A	\hat{I} A	D mm	H mm	Weight kg	Packing unit
680 / 480	60	B32374A4606J080	32	1150	75	117	0.65	6
	70	B32374A4706J080	38	1550	85	107	0.65	4
	80	B32374A4806J080	39	1540	85	117	0.80	4
	100	B32374B4107J080	46	2370	96	117	1.05	4
	150	B32374A4157J080	50	2050	96	142	1.15	4
	200	B32374A4207J080	50	3750	116	142	1.70	4
	250	B32374A4257J080	50	3450	116	165	1.80	4
750 / 530	50	B32374A5506J030	30.5	1100	75	117	0.65	6
	60	B32374B5606J030	33	1315	75	117	0.65	6
	100	B32374A5107J030	50	3400	96	145	1.15	4
	120	B32374A5127J030	50	3050	85	175	1.10	4
	150	B32374A5157J030	50	5100	116	145	1.70	4
	200	B32374A5207J030	50	5570	116	165	1.90	4
850 / 600	100	B32374A6107J000	50	2660	96	195	1.60	4
	120	B32374A6127J000	50	3195	96	195	1.60	4
	150	B32374A6157J000	50	2875	96	245	2.00	4

Display of ordering codes for TDK Electronics products

The ordering code for one and the same product can be represented differently in data sheets, data books, other publications, on the company website, or in order-related documents such as shipping notes, order confirmations and product labels. **The varying representations of the ordering codes are due to different processes employed and do not affect the specifications of the respective products.** Detailed information can be found on the Internet under www.tdk-electronics.tdk.com/orderingcodes.

Terms

Design

The winding element of the MKD capacitor consists of metallized polypropylene film. This winding construction achieves low losses and a high pulse-current withstand capability. Soft PU resin is used for impregnation of the capacitor.

Contacting

The end faces of the windings are contacted by metal spraying to ensure a reliable and low-inductance connection between the leads and layers. The leads are welded or soldered to these end faces, brought out through insulating elements (plastic) and soldered to the terminals.

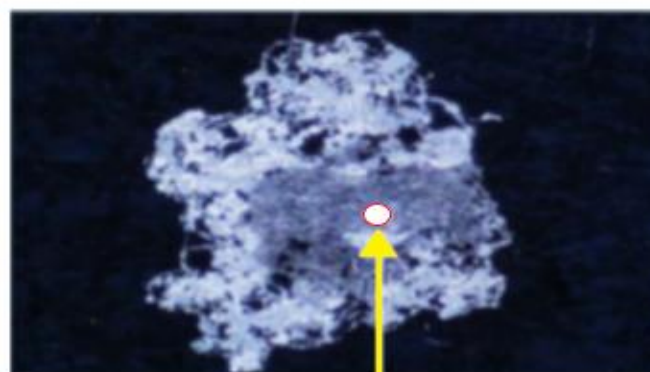
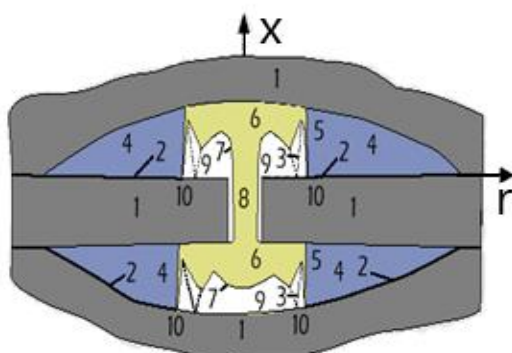
Impregnation

All hollows between the windings and between the windings and the case are filled with an impregnating agent. Besides increasing dielectric strength, this improves heat dissipation from inside a capacitor. The impregnating agents that we use are free of PCB and halogens.

Self-healing

All MKD capacitors are self-healing, i.e. voltage breakdowns heal in a matter of microseconds and hence do not produce a short circuit.

Breakdowns can occur under heavy electrical load as a result of weaknesses or pores in the dielectric. The integrity of self-healing capacitors is not affected by such breakdowns.



Breakdown

1. Dielectric (Polypropylene)
2. Metallization
3. Material-displacing shock wave
4. Air gap with metal vapor
- 5,6. Plasma zone

7. Boundary layer between gas-phase dielectric and plasma zones
8. Puncture channel
9. Gas-phase dielectric
10. Zone of displaced metallization and dielectric

Figure 9: Description of self-healing technology

When a breakdown occurs, the dielectric in a breakdown channel is broken down into its atomic components by the electric arc that forms between the electrodes. At the high temperatures of as much as 6000 K, a plasma is created that explodes out of the channel region and pushes the dielectric layers apart. The actual self-healing process starts with the continuation of the electric arc in the propagating plasma. Here the metal layers are removed from the metal edges by evaporation. Insulation areas are formed. The rapid expansion of the plasma beyond the areas of insulation and its cooling in the areas of less field strength allow the discharge to extinguish after a few microseconds.

The area of insulation that is created is highly resistive and voltage-proof for all operating requirements of the capacitor. The self-healing breakdown is limited in current and so it does not represent a short circuit. The self-healing process is so brief and low in energy that the capacitor also remains fully functional during the breakdown.

Characteristics

Equivalent circuit diagram

Any real capacitor can be modelled by the following schematic:

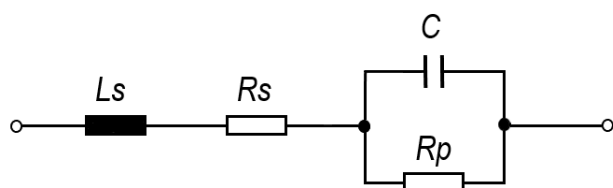


Figure 10: Equivalent circuit diagram

Symbol	Description	Unit
L_s	series inductance	H
R_s	series resistance, due to contacts(leads, sprayed metal and film metallization)	Ω
R_p	parallel resistance, due to insulation resistance	Ω
C	capacitance	F

C , R_s and L_s are magnitudes that vary in the frequency domain (AC).

R_p is a magnitude defined in DC (insulation resistance).

Rated capacitance C_R

It is referred to a test temperature of +20 °C and a measuring frequency range of 50 Hz to 1 kHz.

Capacitance tolerance range

It is the range within which the actual capacitance may differ from rated capacitance. The actual capacitance is to be measured at a temperature of +20 °C. This range results from variances in materials and manufacturing processes. The standard manufacturing tolerance for PP film capacitors is $\pm 10\%$ or 'K' tolerance or $\pm 5\%$, 'J' tolerance.

Temperature dependence of capacitance

The capacitance variation in the permissible temperature range is not linear, but it is reversible, the characteristic change in capacitance $\Delta C/C$ as a function of test temperature is shown as follows:

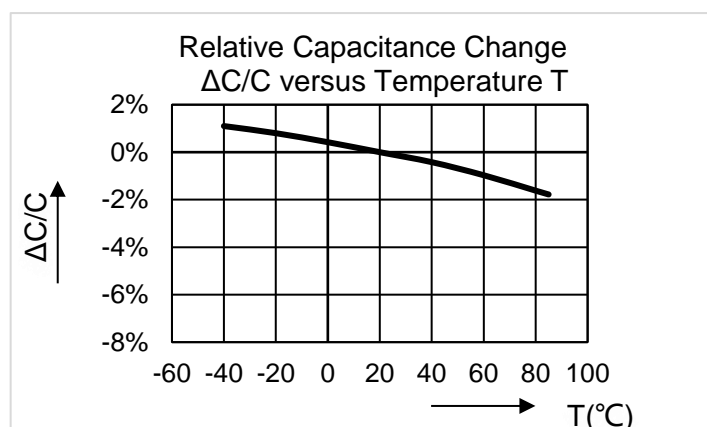


Figure 11: Temperature dependence of capacitance

Capacitance drift

Capacitance is subject to irreversible in addition to reversible changes, i.e. capacitance drift, the sum of all time-dependent, irreversible changes of capacitance during operating life. This variation is stated in percent of the value at delivery. The typical figure is +1/–3%.

Rated AC voltage V_R

The maximum operating peak recurrent voltage of either polarity of a reversing type waveform for which the capacitor has been designed.

Unlike what is common in other standard (e.g. B32304* 3-phase capacitor series for PFC application) therefore, the rated voltage V_R **is not the RMS** value, but the maximum or peak value of the capacitor voltage. The voltage at which the capacitor may be operated is dependent on other factors (especially current and frequency) besides rated voltage.

Voltage V_{RMS}

It is the Root Mean Square (RMS) voltage of maximum permissible value of sinusoidal AC voltage in continuous operation.

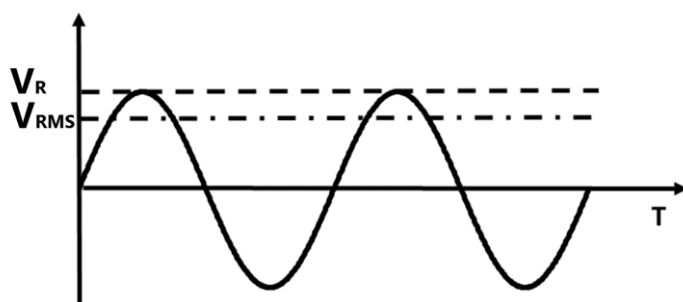


Figure 12: Voltage V_{RMS}

Rated DC voltage V_{RDC}

It is the maximum operating peak voltage of either polarity but of non-reversing type waveform, for which the capacitor has been designed, for continuous operation.

Non-recurrent surge voltage V_s

A peak voltage induced by a switching or any other disturbance of the system which is allowed for a limited number of times and for durations shorter than the basic period.

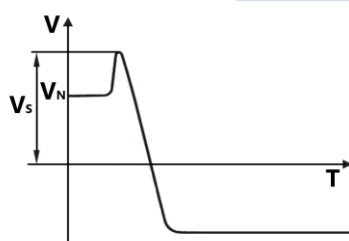


Figure 13: Non-recurrent surge voltage V_s

Maximum duration: 50 ms/pulse

Maximum number of occurrences: 1000 (during load)

Max. Recurrent peak voltage \hat{u}

This is the permissible, max. Recurrent peak voltage that may appear for max.1% of the period.

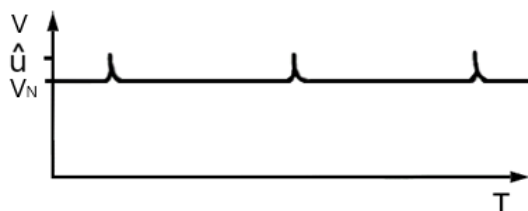


Figure 14: Max. Recurrent peak voltage \hat{u}

Symmetric alternating voltage \hat{u}_{ac}

The peak values of a symmetrical alternating voltage applied to the capacitor is a decisive factor for the dielectric losses.

$$\text{For AC capacitors: } \hat{u}_{ac} = V_R$$

Insulation voltage V_i

It is the RMS rated value of the insulation voltage of capacitive elements and terminals to case or earth. If not specified, the RMS value of the insulating voltage is equivalent to the rated voltage divided by $\sqrt{2}$.

Maximum current I_{\max}

It is the maximum rms current for continuous operation which could not be higher than maximum terminal current.

Note that rms current with different harmonic distortions could generate different self-heating temperatures. A higher current than I_{\max} value could be possible if the hot-spot temperature (T_{hs}) is lower than 85°C and self-heating temperature is lower 25°C (avoiding local over heating). On the contrary, same rms current with more harmonic distortions at higher frequency could have higher self-heating temperature that makes T_{hs} higher than 85°C (dangerous for capacitor). For that reason, **we strongly suggest end customers to qualify capacitor using samples with thermal couples temperature sensor (upon request) in order to verify the real operating temperature inside of capacitor under real application or to check with TDK company for detail discussions.**

Maximum peak current \hat{I}

It is the maximum current amplitude which occurs instantaneously during continuous operation. The maximum peak current and the maximum rate of voltage rise $(dV/dt)_{\max}$ on a capacitor are related as follows:

$$\hat{I} = C_R \cdot \left(\frac{dV}{dt} \right)_{\max}$$

Maximum surge current I_s

It is the peak non-repetitive current induced by switching or any other disturbance of the system permitted for a limited number of times, at durations shorter than the basic period.

$$I_s = C_R \cdot \left(\frac{dV}{dt} \right)_s$$

Maximum duration: 50 ms/pulse

Maximum number of occurrences: 1000 (during load)

Fault current (AFC)

It is a failure mode in which capacitor is intentionally internally faulted to represent dielectric breakdown that would occur within the capacitor over time.

The fault current test is intended to address protection of the capacitor from available fault currents over the life of the capacitor. The maximum fault current test levels represent a complete internal dielectric breakdown in the capacitor with the maximum fault current available. The lower fault current test levels represent the various stages of internal dielectric breakdown during the life of the capacitor where the available fault current will be less.

Self-inductance L_{self}

The self-inductance is produced by the inductance of the terminals and the windings. Because of the special kind of contacting in self-healing capacitors (large area metal spraying covering all windings), the self-inductance is particularly low. It allows the resonance frequency to be determined:

$$f = \frac{1}{2\pi\sqrt{L_{\text{self}} \cdot C_R}}$$

The resonance frequency is high for all capacitors accordingly.

Insulation Resistance (R_{ins})

The dielectric of a capacitor has a large area and a short length. Even if the material is a good isolator there always flows a certain current between the charged electrodes (the current increases exponentially with the temperature). This leakage can be described as a parallel resistance with a high value, an Insulation Resistance.

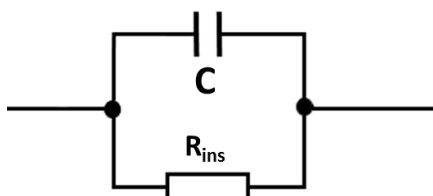


Figure 15: Insulation Resistance (R_{ins})

Insulation resistance and self-discharge time constant

The insulation values for the individual components according to the capacitance are stated as an insulation resistance R_{ins} in MΩ or a self-discharge time constant τ in seconds.

$$\tau = R_{\text{ins}} \cdot C_R$$

Series resistance R_s

Resistive losses occur in the electrodes in the contacting and in the inner wiring. These are comprised in the series resistance R_s of a capacitor.

The series resistance R_s generates the ohmic losses ($I^2 \times R_s$) in a capacitor. It is largely independent of frequency. The figures stated in selection charts apply to +20°C capacitor temperature.

Dissipation factor $\tan \delta$

The equivalent circuit diagram used for the losses in a capacitor can be shown as follows:

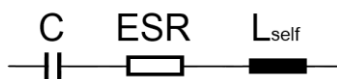


Figure 16: Simplified equivalent circuit diagram of a capacitor

Symbol	Description	Unit
C	Capacitor	F
L_{self}	Self-inductance	H
ESR	Equivalent series resistance, representing the entire active power in capacitor	Ω

The self-inductance and capacitance of a capacitor produce its resonance frequency (natural frequency).

$$\tan \delta(f) = \tan \delta_0 + R_s \cdot \omega \cdot C$$

From the frequency dependence of the equivalent series resistance can be derived:

$$ESR = \frac{\tan \delta}{\omega \cdot C} = R_s + \frac{\tan \delta_0}{\omega \cdot C}$$

Symbol	Description	Unit
$\tan \delta$	Dissipation factor of capacitor	-
$\tan \delta_0$	Dissipation factor of dielectric	-
R_s	Series resistance	Ω

Dielectric dissipation factor $\tan \delta_0$

The dissipation factor $\tan \delta_0$ of the dielectric is assumed to be constant for all capacitors in their frequency range of use. The figures stated in data sheets apply to rated operation.

Expected Fit rate λ

The FIT (Failure In Time) of a component is defined as the number of expected failures in 10^9 hours of operation.

The FIT rate is calculated on the basis of the number of components operating in the field and the estimated hours of operation. All the reports of failures are taken into consideration for this calculation, which is updated every year. The other values in the graph are given as indication and calculated based on acceleration factors.

The failure criterion is capacitance drop higher than 3%.

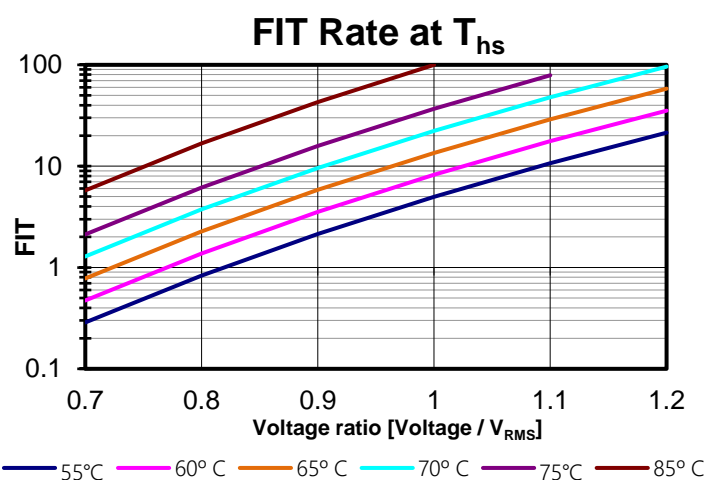


Figure 17: Expected Fit rate λ

Thermal design

In order to scale a capacitor correctly for a particular application, the permissible ambient temperature has to be determined. This can be taken from the diagram “Permissible ambient temperature T_A vs total power dissipation P ” after calculating the power dissipation (for further details please check individual data sheets).

Calculation of power dissipation P

The total power dissipation P is composed of the dielectric losses (P_D) and the resistive losses (P_R):
Generally a secondary sinusoidal AC voltage can be used for calculating with sufficient accuracy.

$$P = P_D + P_R$$

$$P_D = \hat{u}_{ac}^2 \cdot \pi \cdot f_0 \cdot C \cdot \tan \delta_0$$

Symbol	Description	Unit
\hat{u}_{ac}	Peak value of symmetrical AC voltage applied to capacitor	V
f_0	Fundamental frequency	Hz
C	Capacitance	F
$\tan \delta_0$	Dissipation factor of dielectric	

$$P_R = I^2 \cdot R_S$$

Symbol	Description	Unit
I	RMS value of capacitor current	A
R_S	Series resistance at maximum hot-spot temperature	Ω

The R_S figure at maximum hot-spot temperature is used to calculate the resistive losses. In selection charts and data sheets the figure is stated for 20°C capacitor temperature. The conversion factor is as follows:

$$R_{S85^\circ} = 1.25 \cdot R_{S20^\circ}$$

Thermal resistance R_{th}

The thermal resistance is defined as the ratio of a temperature difference and the power dissipation produced in a capacitor. The decisive factor here is ΔT_{cap} where the temperature difference between an external reference point of the coolant (e.g. air) surrounding the capacitor and the hot spot (zone with highest temperature occurring in the component). In a steady state:

$$R_{th} = \frac{\Delta T_{cap}}{P}$$

Symbol	Description	Unit
R_{th}	Thermal resistance	K/W
ΔT_{cap}	Temperature difference between hot-spot and ambient	K
P	Power dissipation	W

The temperature difference depends on a large number of different factors. The thermal resistance is a function of several parameters such as the working temperature and the power dissipation of the capacitor.

After installation of the capacitor, it is necessary to verify that maximum hot-spot temperature is not exceeded at extreme service conditions. For detail calculations, please refer to single datasheet part number for further details.

Life expectancy t_{LD}

The life expectancy t_{LD} is based on the exclusive effect of Voltage and Temperature (hot-spot T_{hs}) applied to the capacitor dielectric and electrodes (other factors are not considered in the model such as environmental or mechanical effects).

Hot Spot Temperature (T_{hs}): as the sum of ambient temperature plus the heating induced by the current (I_{RMS}) in the dielectric which is measured inside of capacitor. Current is an indirect parameter under consideration which affects the temperature T_{hs} .

Lifetime estimation formula as follows:

$$t_2 = t_1 \cdot e^{(T_1 - T_2)/A} \cdot \left(\frac{V_1}{V_2}\right)^n$$

Symbol	Description	Unit
t_2	Estimated lifetime at temperature T_2 and voltage V_2	hour
t_1	Reference life expectancy (e.g. 100000 hours for V_R $ \Delta C/C \leq 3\%$)	hour
V_2	Variable Voltage (Rated AC voltage)	VAC
V_1	Reference Voltage (Rated AC voltage)	VAC
T_1	Reference temperature (e.g. 70°C)	°C
T_2	Variable temperature	°C
A	Acceleration factor of temperature	-
n	Acceleration factor of voltage	-

Lifetime Expectancy Graphs

The lifetime estimations below show the standard expected lifetime of 100000 hours (at +85 °C hot-spot) are only theoretical calculations based on endurance test results performed according to IEC61071 standard during operation as shown in figure 18.

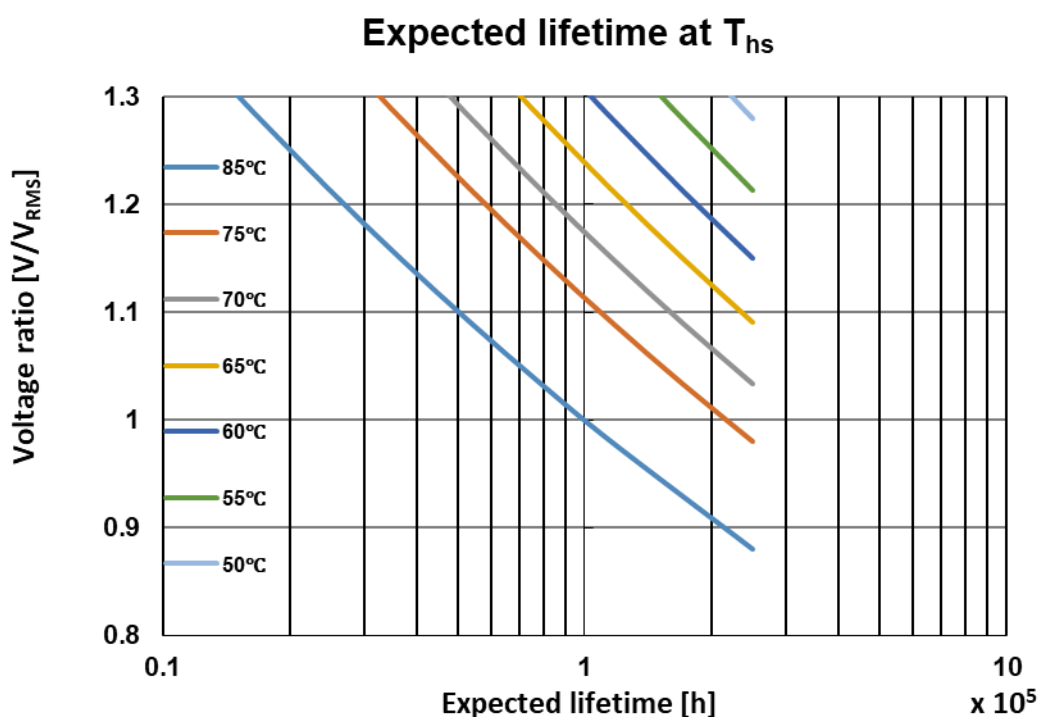


Figure 18: Expected lifetime in hours at different hot-spot temperatures (T_{hs}) and voltages V_{RMS} .

Cautions and warnings

- Capacitors with dents of more than 1 mm depth or any other mechanical damage must not be used.
- Check the tightness of the connections / terminals periodically.
- The energy stored in capacitors may be lethal. To prevent any risk of shock, the capacitors must be discharged and short-circuited before handling.
- Failure to follow cautions may result in the worst case in premature failure, bursting and fire.

Safety

- Electrical or mechanical misapplication of capacitors may be hazardous. Personal injury or property damage may result from bursting of the capacitor or expulsion of molten material due to mechanical disruption of the capacitor.
- Ensure good, effective grounding for capacitor enclosures.
- Observe appropriate safety precautions during operation (self-recharging phenomena and the high energy stored in capacitors).
- Handle capacitors carefully, as they may still be charged even after disconnection.
- The terminals of capacitors, connected busbars and cables as well as other devices may also be energized.
- Follow good engineering practice.
- The maximum permissible fault current (AFC) of 10 kA in accordance with the UL 810 standard must be assured by the application.

Thermal load

- After installing the capacitor, verify that the maximum hot-spot temperature is not exceeded under extreme operating conditions.

Mechanical protection

- The capacitor has to be installed to assure that no mechanical damage or dents in the case occur.

Storage and operating conditions

- Do not use or store capacitors in corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. In dusty environments regular maintenance and cleaning especially of the terminals is required to avoid conductive path between phases and/or phases and ground.

- Capacitors must not be stored in high temperatures and/or high humidity for long periods. We recommend the following storage conditions.
 - Storage temperature $-40^{\circ}\text{C} \sim +40^{\circ}\text{C}$
 - Maximum relative humidity 80%, no dew allowed on the capacitor
- Storage should not exceed 2 years (from datecode printed on the capacitor). After 1 year of storage time, capacitors must be check electrically.

Overpressure disconnecter

- To ensure full functionality of an overpressure safety disconnecter, the following points must be observed:
 1. The elastic elements must not be hindered, i.e.
 - Connecting lines must be flexible leads (cables)
 - There must be sufficient space (min.15 mm) for expansion above the connections
 - The metal cover must not be retained by rigid parts such as busbars.
 2. The stress parameters of the capacitor must be within the IEC 61071 specification.

Service life expectancy

- Electrical components do not have an unlimited service life expectancy: this also applies to self-healing capacitors. The maximum service life expectancy may vary depending on the application in which the capacitor is used.

Important notes

The following applies to all products named in this publication:

1. Some parts of this publication contain **statements about the suitability of our products for certain areas of application**. These statements are based on our knowledge of typical requirements that are often placed on our products in the areas of application concerned. We nevertheless expressly point out **that such statements cannot be regarded as binding statements about the suitability of our products for a particular customer application**. As a rule we are either unfamiliar with individual customer applications or less familiar with them than the customers themselves. For these reasons, it is always ultimately incumbent on the customer to check and decide whether a product with the properties described in the product specification is suitable for use in a particular customer application.
2. We also point out that **in individual cases, a malfunction of electronic components or failure before the end of their usual service life cannot be completely ruled out in the current state of the art, even if they are operated as specified**. In customer applications requiring a very high level of operational safety and especially in customer applications in which the malfunction or failure of an electronic component could endanger human life or health (e.g. in accident prevention or life-saving systems), it must therefore be ensured by means of suitable design of the customer application or other action taken by the customer (e.g. installation of protective circuitry or redundancy) that no injury or damage is sustained by third parties in the event of malfunction or failure of an electronic component.
3. **The warnings, cautions and product-specific notes must be observed.**
4. In order to satisfy certain technical requirements, **some of the products described in this publication may contain substances subject to restrictions in certain jurisdictions (e.g. because they are classed as hazardous)**. Useful information on this will be found in our Material Data Sheets on the Internet (www.tdk-electronics.tdk.com/material). Should you have any more detailed questions, please contact our sales offices.
5. We constantly strive to improve our products. Consequently, **the products described in this publication may change from time to time**. The same is true of the corresponding product specifications. Please check therefore to what extent product descriptions and specifications contained in this publication are still applicable before or when you place an order.

We also **reserve the right to discontinue production and delivery of products**. Consequently, we cannot guarantee that all products named in this publication will always be available. The aforementioned does not apply in the case of individual agreements deviating from the foregoing for customer-specific products.

6. Unless otherwise agreed in individual contracts, **all orders are subject to our General Terms and Conditions of Supply**.
7. **Our manufacturing sites serving the automotive business apply the IATF 16949 standard**. The IATF certifications confirm our compliance with requirements regarding the quality management system in the automotive industry. Referring to customer requirements and customer specific requirements ("CSR") TDK always has and will continue to have the policy of respecting individual agreements. Even if IATF 16949 may appear to support the acceptance of unilateral requirements, we hereby like to emphasize that **only requirements mutually agreed upon can and will be implemented in our Quality Management System**. For clarification purposes we like to point out that obligations from IATF 16949 shall only become legally binding if individually agreed upon.

Important notes

8. The trade names EPCOS, CeraCharge, CeraDiode, CeraLink, CeraPad, CeraPlas, CSMP, CTVS, DeltaCap, DigiSiMic, ExoCore, FilterCap, FormFit, LeaXield, MiniBlue, MiniCell, MKD, MKK, ModCap, MotorCap, PCC, PhaseCap, PhaseCube, PhaseMod, PhiCap, PowerHap, PQSine, PQvar, SIFERRIT, SIFI, SIKOREL, SilverCap, SIMDAD, SiMic, SIMID, SineFormer, SIOV, ThermoFuse, WindCap, XieldCap are **trademarks registered or pending** in Europe and in other countries. Further information will be found on the Internet at www.tdk-electronics.tdk.com/trademarks.

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