Plastic Film Capacitors

List of Contents

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■ Product Symbol System for Plastic Film Capacitors

N Y D	–	□□□□	V	□□□	□	□□□	6	B	B
①		②		③	④	⑤			
N Y E	–	□□□□	V	□□□	□	□□□	□	B	
①		②		③	④	⑤	⑥		
N X *	–	□□□□	V	□□□	□	□□□	□	B	
①		②		③	④	⑤	⑦		

① Series code

Please refer to the page of each series.

② Rated voltage

Please refer to the page of each series.

③ Rated capacitance symbol

Example of series NYD, NYE

Capacitance (μF)	Capacitance symbol	Capacitance (μF)	Capacitance symbol
70	700	420	421
100	101	440	441
110	111	450	451
140	141	480	481
160	161	550	551
170	171	610	611
220	221	700	701
230	231	750	751
260	261	940	941
280	281	970	971
350	351	1100	112
400	401	1500	152

Example of series NXA, NXB

Capacitance (μF)	Capacitance symbol	Capacitance (μF)	Capacitance symbol
0.15	154	1.3	135
0.2	204	1.4	145
0.22	224	1.5	155
0.3	304	1.6	165
0.33	334	1.7	175
0.4	404	1.8	185
0.45	454	2	205
0.47	474	2.2	225
0.55	554	2.5	255
0.56	564	2.8	285
0.6	604	3	305
0.65	654	3.3	335
0.68	684	3.5	355
0.7	704	4	405
0.8	804	4.2	425
0.82	824	4.5	455
0.85	854	4.8	485
1	105	5	505
1.1	115	6	605
1.2	125	7	705

④ Capacitance tolerance symbol

Example

Contents	symbol
±5%	J
±10%	K
±20%	M

⑤ Casing symbol

Please refer to the page of each series.

⑥ Terminal code

Please refer to the page of each series.

⑦ Shape code

Please refer to the page of each series.

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

■ Cautions for Using Film Capacitors

1 Operation voltage

The plastic film capacitor varies in the maximum applicable voltage depending on the applied voltage waveform, current waveform frequency, ambient temperature (capacitor surface temperature), capacitance value, etc.
Be sure to use capacitors within the specified values by checking the voltage waveform, current waveform, and frequency applied to them (In the application of high frequency, the permissible voltage varies with the type of the capacitor.
For detail see the specification).

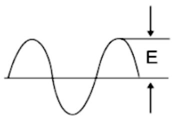
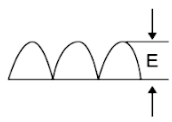
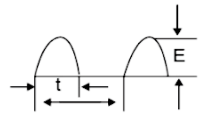
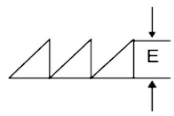
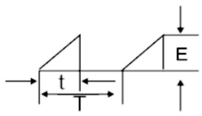
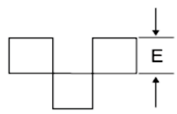
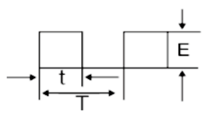
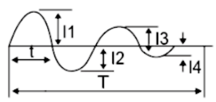
2 Operating Current

The pulse (or AC) current flowing through the capacitor is expressed as: I=C x dV/dt

Due to the fact that dissipation factor of the capacitor will generate the internal heat under the application of high frequency or high pulse current, temperature rise in it will occur and may cause deterioration of with standing voltage, even lead to break down (smoking or firing).
Therefore, the safety use of capacitor must be within the rated voltage(or category voltage)and the permissible current.
The rated current must be considered by dividing into pulse current (peak current) and continuous current (rms current) depending on the break down mode, and when using, should make sure the both currents are within the permissible values.

3 Calculation of rms in various waveforms

In each waveform, calculate the rms value in the following formula.

type	1	2	3	4
waveform				
(rms)	$E/\sqrt{2}$	$E/\sqrt{2}$	$E\sqrt{t/(2T)}$	$E/\sqrt{3}$
type	**5**	**6**	**7**	**8**
waveform				
(rms)	$E\sqrt{t/(3T)}$	E	$E\sqrt{t/T}$	$\sqrt{\frac{t}{2T(I1^2+I2^2+ +I3^2+I4^2)}}$

4 Charging and discharging

Because the charging and discharging current of capacitor is obtained by the product of voltage rise rate (dV/dt) and capacitance, low voltage charging and discharging may also cause deterioration of capacitor such as shorting and open due to sudden charging and discharging current.
When charging and discharging, pass though a resistance of 20Ω/V to 1000Ω/V or more to limit current.
When connecting multiple film capacitors in parallel in withstand voltage test or life test, connect a resistance of 20Ω/V to 1000Ω/V or more in series to each capacitor. (For detail see the specification)
In additional, capacitors must be discharged with resistor before handling.
Because the capacitor hasn't discharge resistor inside, so there is residual but maybe deathful electric energy contained.

5 Buzzing noise

Any buzzing noise produced by capacitor is caused by the vibration of the film due to the coulomb force that is generated between the electrodes with opposite poles.
If the wave-form with a high distortion rate or frequency is applied across the capacitor, the buzzing noise will become louder.
But the buzzing noise is of no damage to capacitor.

6 Surface over temperature Δθcase

When continuing current flows through the capacitor, the temperature inside the capacitor will rise, induced by accumulated heat.
If the temperature exceeds allowed hot-spot temperature, it might cause a short circuit or fire.
The limits described in the catalogue are not exceeded and it's necessary to check the temperature on the capacitor surface when it works.

7 Flame retardation

Although flame retardation epoxy resin or plastic case is used in the coating or encapsulating of plastic film capacitor, continuous outer high temperature or firing will break the coating layer or plastic case of the capacitor, and may lead to melting and firing of the capacitor element.

flame time (s)

Class \ volume (mm^3)	≦250	250<, ≦500	500<, ≦1750	1750<	Max. flame time (s)
A	15	30	60	120	3
B	10	20	30	60	10
C	5	10	20	30	30

8 Humid ambient

If used for a long time in a humid ambient, the capacitor might absorb humidity and oxidize the electrodes causing breakage of the capacitor.
If case of AC application, high humidity would increase the corona effect. This phenomenon causes a drop of capacitance and a increase of capacitor losses.

9 Storage conditions

1) Capacitors may not be stored in corrosive atmospheres, particularly not when chlorides, sulfides, acids, lye, salts, organic solvents or similar substances are present.
2) It shouldn't be located in particularly high temperature and high humidity, it must submit to the following conditions(unchanging primal package):
Temperature : ≦35°C
Humidity : ≦80% RH, no dew allowed on the capacitor.
Storage time: ≦24 months (from the dale marked on the capacitor's body or the label glued to the package)

For DC-Link Circuits Capacitors

85°C DC-LINK

- Used in DC-Link circuits, can replace electrolytic capacitor.
- PP film design, good temperature characteristics, stable capacity, low ESR, high ripple current handing capabilities, low Ls, long life.
- Aluminum case, filled with fire-retardant resin.
- Self-healing property.
- Used in Inverters of wind power and solar power, HEV or EV, welders, elevators, Motor Driver systems.

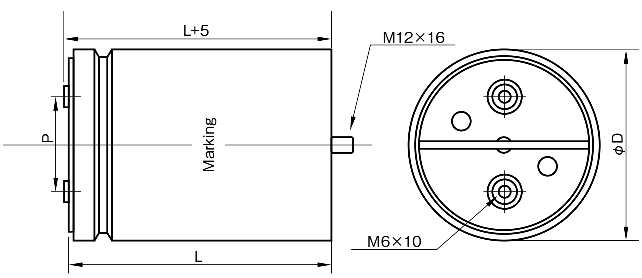
Specifications

Item		Performance
Category temperature range (℃)		−55 to +85 (at Hotspot in capacitor)
Tolerance at rated capacitance (%)		±5, ±10 (20℃, 50 to 120Hz)
Over Voltage	Rated voltage ×1.1	30% of on-load-duration
	Rated voltage ×1.15	30 min/day
	Rated voltage ×1.2	5 min/day
	Rated voltage ×1.3	1 min/day
	Rated voltage ×1.5	30 ms every time, 100ms/day
Dielectric Dissipation Factor		2×10^{-4} or less
Life Expectancy		100000 hours (at Hotspot in capacitor = 70℃)
Failure Rate		50Fit
Withstanding DC Voltage	Between Terminals	Rated voltage × 1.5 10s
	Between Terminals and Case	(2x(Ratef voltage)/$\sqrt{2}$)+1000 or 3000 VAC whichever is lager 10 s (20℃, 50Hz)
Insulation Resistance		5000MΩ・μF or more (20℃, 100V DC, 1min)
Reference Standard		IEC 61071

Outline Drawing

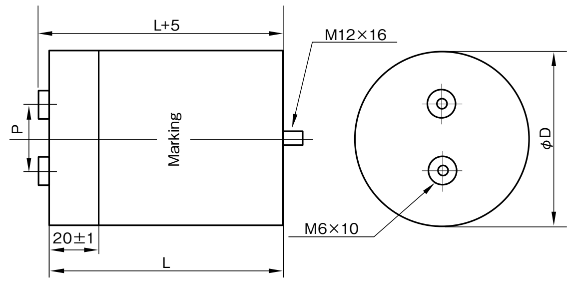
Unit : mm

Shape 1



φD	85	116
P	32	50

Shape 2



φD	76	86
P	32	32

Part numbering system (example : 1100V420μF)

NYD	—	1100	V	421	K	F(S)D6	6BB
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Optional symbol

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Standard Ratings

Rated voltage	Rated capacitance	Case (mm)		Casing symbol	Maximum current	Thermal resistance	Maximum peak current	Series resistance	Self-inductance	ELNA Parts No.
U_R (V)	C_R (μF)	φD	L		Imax (Arms)	R_{th} (K/W)	Î (A)	R_S (mΩ)	L_S (nH)	
800	350	76	120	EC0	60	4.7	3500	2.4	60	NYD-800V351∗EC06BB
	400	76	136	ED6	56	4.6	3600	2.8	60	NYD-800V401∗ED66BB
	480	85	120	FC0	61	4.7	3840	2.3	60	NYD-800V481∗FC06BB
		86	120	FSC0	61	4.7	3840	2.3	60	NYD-800V481∗FSC06BB
	550	85	136	FD6	58	4.6	3850	2.6	60	NYD-800V551∗FD66BB
		86	136	FSD6	58	4.6	3850	2.6	60	NYD-800V551∗FSD66BB
	970	116	120	HC0	69	5	5820	1.7	60	NYD-800V971∗HC06BB
	1000	85	225	FM5	79	4	6000	1.6	80	NYD-800V102∗FM56BB
		86	225	FSM5	79	4	6000	1.6	80	NYD-800V102∗FSM56BB
	1100	116	136	HD6	67	4.9	6600	1.8	60	NYD-800V112∗HD66BB
	1900	116	230	HN0	100	2.7	11400	1.4	80	NYD-800V192∗HN06BB
900	350	76	120	EC0	54	4.7	3500	2.9	60	NYD-900V351∗EC06BB
	400	76	136	ED6	51	4.6	3600	3.3	60	NYD-900V401∗ED66BB
	480	85	120	FC0	55	4.7	3840	2.8	60	NYD-900V481∗FC06BB
		86	120	FSC0	55	4.7	3840	2.8	60	NYD-900V481∗FSC06BB
	550	85	136	FD6	53	4.6	3850	3.1	60	NYD-900V551∗FD66BB
		86	136	FSD6	53	4.6	3850	3.1	60	NYD-900V551∗FSD66BB
	970	116	120	HC0	60	5	5820	2.2	60	NYD-900V971∗HC06BB
	1000	85	225	FM5	69	4	6000	2.1	80	NYD-900V102∗FM56BB
		86	225	FSM5	69	4	6000	2.1	80	NYD-900V102∗FSM56BB
	1100	116	136	HD6	60	4.9	6600	2.3	60	NYD-900V112∗HD66BB
	1900	116	230	HN0	88	2.7	11400	1.9	80	NYD-900V192∗HN06BB
1100	170	76	95	E95	50	5.6	1700	3	60	NYD-1100V171∗E956BB
	230	76	120	EC0	50	4.7	1840	3.4	60	NYD-1100V231∗EC06BB
	240	85	95	F95	56	5.1	1920	2.5	60	NYD-1100V241∗F956BB
		86	95	FS95	56	5.1	1920	2.5	60	NYD-1100V241∗FS956BB
	260	76	136	ED6	50	4.6	2080	3.6	60	NYD-1100V261∗ED66BB
	310	85	120	FC0	57	4.7	2480	2.6	60	NYD-1100V311∗FC06BB
		86	120	FSC0	57	4.7	2480	2.6	60	NYD-1100V311∗FSC06BB
	350	76	175	EH5	68	4.3	2800	2	80	NYD-1100V351∗EH56BB
	420	85	136	FD6	56	4.6	3360	2.8	60	NYD-1100V421∗FD66BB
		86	136	FSD6	56	4.6	3360	2.8	60	NYD-1100V421∗FSD66BB
	420	85	155	FF5	75	4.5	4200	1.6	60	NYD-1100V421∗FF56BB
		86	155	FSF5	75	4.5	4200	1.6	60	NYD-1100V421∗FSF56BB
	450	116	95	H95	61	5.4	4500	2	60	NYD-1100V451∗H956BB
	480	85	175	FH5	72	4.3	4800	1.8	80	NYD-1100V481∗FH56BB
		86	175	FSH5	72	4.3	4800	1.8	80	NYD-1100V481∗FSH56BB
	600	85	225	FM5	71	4	6000	2	80	NYD-1100V601∗FM56BB
		86	225	FSM5	71	4	6000	2	80	NYD-1100V601∗FSM56BB
	610	116	120	HC0	60	5	4880	2.2	60	NYD-1100V611∗HC06BB
	680	116	136	HD6	58	4.9	5440	2.4	60	NYD-1100V681∗HD66BB
	940	116	175	HH5	99	3.4	8460	1.2	80	NYD-1100V941∗HH56BB
	1100	116	230	HN0	100	2.7	9900	1.3	80	NYD-1100V112∗HN06BB
	1200	116	230	HN0	100	2.7	10800	1.3	80	NYD-1100V122∗HN06BB
1200	220	76	136	ED6	46	4.6	2200	4.2	60	NYD-1200V221∗ED66BB
	300	85	136	FD6	50	4.6	3000	3.5	60	NYD-1200V301∗FD66BB
		86	136	FSD6	50	4.6	3000	3.5	60	NYD-1200V301∗FSD66BB
	450	116	136	HD6	54	4.9	4050	2.8	60	NYD-1200V451∗HD66BB
	470	86	225	HM5	67	4	4230	2.2	80	NYD-1200V471∗FSM56BB
1300	100	76	95	E95	46	5.6	1400	3.4	60	NYD-1300V101∗E956BB
	160	76	120	EC0	50	4.7	1920	3.6	60	NYD-1300V161∗EC06BB
	160	85	95	F95	53	5.1	2240	2.8	60	NYD-1300V161∗F956BB
		86	95	FS95	53	5.1	2240	2.8	60	NYD-1300V161∗FS956BB
	220	85	120	FC0	53	4.7	2640	3	60	NYD-1300V221∗FC06BB
		86	120	FSC0	53	4.7	2640	3	60	NYD-1300V221∗FSC06BB
	310	116	95	H95	58	5.4	3720	2.2	60	NYD-1300V311∗H956BB
	310	85	175	FH5	45	4.3	3720	4.9	60	NYD-1300V311∗FH56BB
		86	175	FSH5	45	4.3	3720	4.9	60	NYD-1300V311∗FSH56BB
	420	116	120	HC0	57	5	4200	2.5	60	NYD-1300V421∗HC06BB
	470	85	225	FM5	65	4	4700	2.4	80	NYD-1300V471∗FM56BB
		86	225	FSM5	65	4	4700	2.4	80	NYD-1300V471∗FSM56BB
	620	116	175	HH5	92	3.4	5580	1.4	80	NYD-1300V621∗HH56BB
	800	116	230	HN0	95	2.7	6400	1.5	80	NYD-1300V801∗HN06BB
1500	400	116	155	HF5	85	4.3	4000	1.3	60	NYD-1500V401∗HF56BB

(Note) ∗ : If tolerance at rated capacitance is 5% = J, 10% = K

PLASTIC FILM

NYE PLASTIC FILM CAPACITORS

ELNA

For DC-Link Circuits Capacitors 85˚C DC-LINK

- Used in DC-Link circuits, can replace electrolytic capacitor.
- PP film design, good temperature characteristics, stable capacity, low ESR, high ripple current handing capabilities, low Ls, long life.
- Plastic case , filled with fire-retardant resin.
- Self-healing property.
- Used in Inverters of wind power and solar power, welders, elevators, Motor Driver systems.

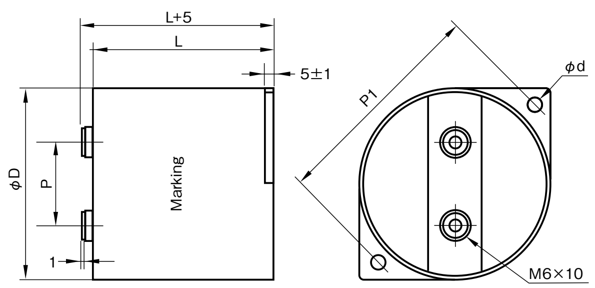
Specifications

Item	Performance		
Category temperature range (℃)	− 40 to +85		(at Hotspot in capacitor)
Tolerance at rated capacitance (%)	±5, ±10		(20℃, 50 to 120Hz)
Over Voltage	Rated voltage ×1.1	30% of on-load-duration	
	Rated voltage ×1.15	30 min/day	
	Rated voltage ×1.2	5 min/day	
	Rated voltage ×1.3	1 min/day	
	Rated voltage ×1.5	30 ms every time, 100ms/day	
Dielectric Dissipation Factor	2×10^{-4} or less		
Life Expectancy	100000 hours		(at Hotspot in capacitor = 70℃)
Failure Rate	50Fit		
Withstanding DC Voltage	Between Terminals	Rated voltage × 1.5 VDC 10 s	
	Between Terminals and Case	(2x(Ratef voltage)/$\sqrt{2}$)+1000 or 3000 VAC whichever is lager 10 s	(20℃, 50Hz)
Insulation Resistance	5000MΩ・μF or more		(20℃, 100V DC, 1min)
Reference Standard	IEC 61071		

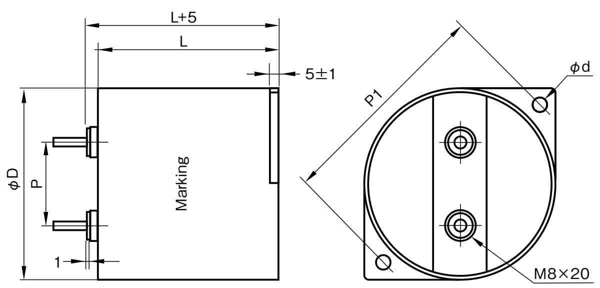
Outline Drawing

Unit : mm

Shape 1 (Terminal code Y)



Shape 2 (Terminal code N)



φD	85	85
L	65	51
P	45	45
P1	101	101
φd	5.5	5.5

Part numbering system (example : 1000V110μF)

NYE	—	1000	V	111	K	F65	Y	B
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Terminal code	Optional symbol

PLASTIC FILM

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Standard Ratings

Rated voltage	Rated capacitance	Case (mm)		Casing symbol	Maximum current	Thermal resistance	Maximum peak current	Series resistance	Self-inductance	ELNA Parts No.
U_R (V)	C_R (μF)	ϕD	L		Imax (Arms)	R_{th} (K/W)	Î (A)	Rs (mΩ)	Ls (nH)	
600	200	85	51	F51	55	4.2	4000	1.2	20	NYE-600V201∗F51□B
	280	85	65	F65	65	5.5	3700	1.4	30	NYE-600V281∗F65□B
800	120	85	51	F51	55	4.2	3000	1.2	20	NYE-800V121∗F51□B
	220	85	65	F65	65	5.5	3000	1.4	30	NYE-800V221∗F65□B
1000	75	85	51	F51	50	4.2	2400	1.4	20	NYE-1000V750∗F51□B
	110	85	65	F65	60	5.5	2300	1.7	30	NYE-1000V111∗F65□B
1200	50	85	51	F51	50	4.2	2000	1.6	20	NYE-1200V500∗F51□B
	80	85	65	F65	60	5.5	2000	2.0	30	NYE-1200V800∗F65□B

(Note) ∗ : If tolerance at rated capacitance is 5% = J, 10% = K
□ : Terminal code

For High-frequency Circuits Capacitors

85°C | High frequency

- Widely used in high voltage, high frequency circuit.
- Low loss and small inherent temperature rise.
- Excellent active and passive flame resistant circuit.
- Especially designed as snubber capacitor for IGBT.

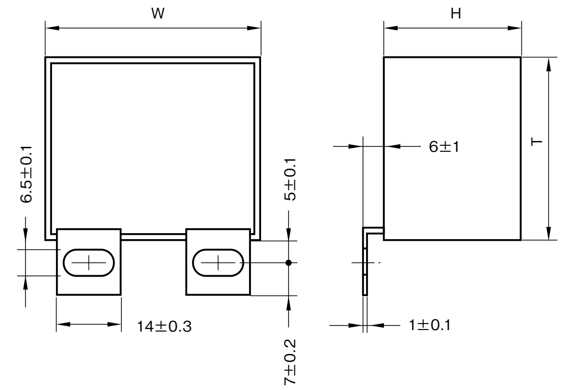
Specifications

Item	Performance		
Category temperature range (℃)	− 40 to +85		(at Hotspot in capacitor)
Tolerance at rated capacitance (%)	±5, ±10		(20℃, 50 to 120Hz)
Dielectric Dissipation Factor	2×10^{-4} or less		
Life Expectancy	100000 hours		(at Hotspot in capacitor = 70°C)
Failure Rate	100Fit		
Withstanding DC Voltage	Between Terminals	Rated voltage ×1.5 VDC 10 s	
	Between Terminals and Case	3000 VAC 10 s	(20℃, 50Hz)
Insulation Resistance	3000MΩ· μF or more		(20℃, 100V DC, 1min)
Reference Standard	IEC 61071		

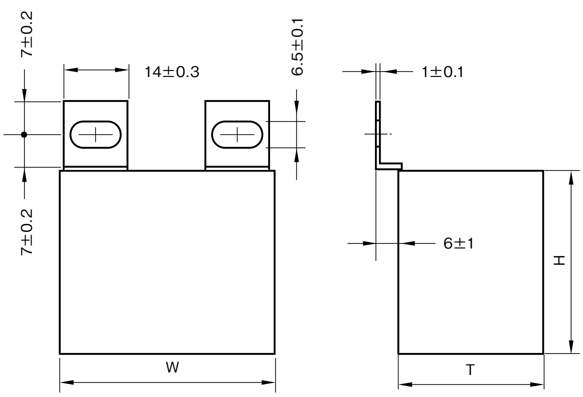
Outline Drawing

Unit : mm

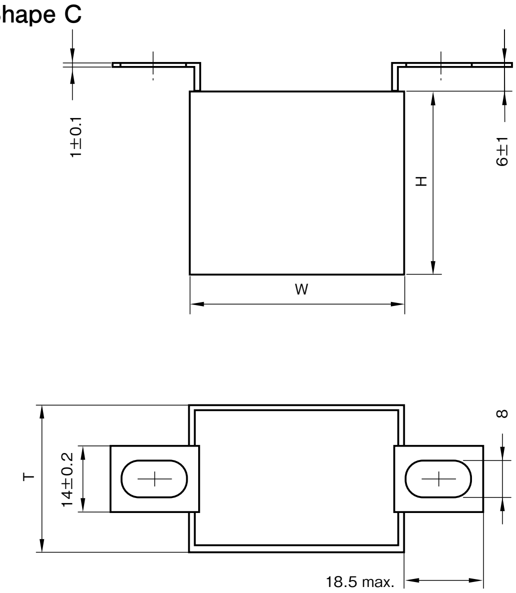
Shape A



Shape B



Shape C



W Size	W Code	H Size	H Code	T Size	T Code
42.5	A	25.5	A	14	A
43	B	28	B	24	B
57.5	C	32	C	25.5	C
		33	D	29.5	D
		35.5	E	30	E
		36	F	33	F
		43	G	33.5	G
		43.5	H	35	H
		45	J	40	J
		50	K	42	K
		55	L	45	L

(Note) Tolerance at size : ±1.0

Part numbering system (example : 1200V2.2μF)

NXA	—	1200	V	225	K	CHD	A	B
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Shape code	Optional symbol

PLASTIC FILM

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Standard Ratings

Rated voltage	Rated capacitance	Case (mm)			Casing symbol	Maximum rate of voltage rise	Maximum Peak current	ESR	Maximum current	Self-inductance	ELNA Parts No.
UR (V)	CR (µF)	W	H	T		dV/dt (V/µS)	Î (A)	(mΩ/100kHz Max.)	Imax (A)	Ls (nH)	
630VDC (330VAC)	1	42.5	28	14	ABA	100	100	12	7.5	20	NXA-630V105∗ABA□B
	1.2	42.5	32	14	ACA	100	120	11	9.4	20	NXA-630V125∗ACA□B
	1.5	42.5	25.5	25.5	AAC	100	150	10	11	20	NXA-630V155∗AAC□B
	2	42.5	28	24	ABB	100	200	8	12.6	20	NXA-630V205∗ABB□B
	3	42.5	36	24	AFB	100	300	7	17.2	20	NXA-630V305∗AFB□B
	3.5	42.5	33	33	ADF	100	350	6	19.2	20	NXA-630V355∗ADF□B
	4	42.5	35.5	33.5	AEG	100	400	5	20.5	20	NXA-630V405∗AEG□B
	4.5	42.5	45	30	AJE	100	450	4	23	20	NXA-630V455∗AJE□B
	7	42.5	43	42	AGK	100	700	3	28	20	NXA-630V705∗AGK□B
700VDC (380VAC)	0.8	42.5	28	14	ABA	132	105.6	12	7.2	20	NXA-700V804∗ABA□B
	1	42.5	32	14	ACA	132	132	12	9.2	20	NXA-700V105∗ACA□B
	1.2	42.5	25.5	25.5	AAC	132	158.4	10	10.8	20	NXA-700V125∗AAC□B
	1.6	42.5	28	24	ABB	132	211.2	10	12.4	20	NXA-700V165∗ABB□B
	2.5	42.5	36	24	AFB	132	330	8	16.8	20	NXA-700V255∗AFB□B
	3	42.5	33	33	ADF	132	396	7	18.8	20	NXA-700V305∗ADF□B
	3.5	42.5	35.5	33.5	AEG	132	462	6	20.3	20	NXA-700V355∗AEG□B
	4	42.5	45	30	AJE	132	528	5	22.4	20	NXA-700V405∗AJE□B
	6	42.5	43	42	AGK	132	792	4	25	20	NXA-700V605∗AGK□B
850VDC (450VAC)	0.7	42.5	28	14	ABA	200	140	12	6.4	20	NXA-850V704∗ABA□B
	0.8	42.5	32	14	ACA	200	160	12	8.8	20	NXA-850V804∗ACA□B
	1	42.5	25.5	25.5	AAC	200	200	10	10.4	20	NXA-850V105∗AAC□B
	1.2	42.5	28	24	ABB	200	240	10	11.8	20	NXA-850V125∗ABB□B
	2	42.5	36	24	AFB	200	400	9	15.8	20	NXA-850V205∗AFB□B
	2.5	42.5	33	33	ADF	200	500	8	17.6	20	NXA-850V255∗ADF□B
	2.8	42.5	35.5	33.5	AEG	200	560	7	19.8	20	NXA-850V285∗AEG□B
	3.3	42.5	45	30	AJE	200	660	6	21.5	20	NXA-850V335∗AJE□B
	4	42.5	43	42	AGK	200	800	5	24	20	NXA-850V405∗AGK□B
1000VDC (480VAC)	0.47	42.5	28	14	ABA	225	105.75	12	6.2	20	NXA-1000V474∗ABA□B
	0.56	42.5	32	14	ACA	225	126	12	8.6	20	NXA-1000V564∗ACA□B
	0.82	42.5	25.5	25.5	AAC	225	184.5	10	9.8	20	NXA-1000V824∗AAC□B
	1	42.5	28	24	ABB	225	225	10	11.6	20	NXA-1000V105∗ABB□B
	1.5	42.5	36	24	AFB	225	337.5	9	15.5	20	NXA-1000V155∗AFB□B
	1.8	42.5	33	33	ADF	225	405	8	17.5	20	NXA-1000V185∗ADF□B
	2	42.5	35.5	33.5	AEG	225	450	7	18.8	20	NXA-1000V205∗AEG□B
	2.5	42.5	45	30	AJE	225	562.5	6	21	20	NXA-1000V255∗AJE□B
	3	42.5	43	42	AGK	225	675	5	23	20	NXA-1000V305∗AGK□B
	3.3	57.5	43.5	29.5	CHD	130	429	6	23	20	NXA-1000V335∗CHD□B
	3.5	57.5	45	30	CJE	130	455	5	24	20	NXA-1000V355∗CJE□B
	4.2	57.5	45	35	CJH	130	546	5	24	20	NXA-1000V425∗CJH□B
	4.8	57.5	50	35	CKH	130	624	4	25	20	NXA-1000V485∗CKH□B
	5	57.5	45	45	CJL	130	650	4	25	20	NXA-1000V505∗CJL□B
	6	57.5	55	40	CLJ	130	780	4	28	20	NXA-1000V605∗CLJ□B
1200VDC (500VAC)	0.33	42.5	28	14	ABA	225	74.25	12	6	20	NXA-1200V334∗ABA□B
	0.4	42.5	32	14	ACA	225	90	12	8.5	20	NXA-1200V404∗ACA□B
	0.56	42.5	25.5	25.5	AAC	225	126	11	9.6	20	NXA-1200V564∗AAC□B
	0.68	42.5	28	24	ABB	225	153	10	11.5	20	NXA-1200V684∗ABB□B
	1	42.5	36	24	AFB	225	225	10	15.4	20	NXA-1200V105∗AFB□B
	1.1	42.5	33	33	ADF	225	247.5	9	17.2	20	NXA-1200V115∗ADF□B
	1.3	42.5	35.5	33.5	AEG	225	292.5	8	18.6	20	NXA-1200V135∗AEG□B
	1.6	42.5	45	30	AJE	225	360	7	20.6	20	NXA-1200V165∗AJE□B
	2	42.5	43	42	AGK	225	450	6	22	20	NXA-1200V205∗AGK□B
	2.2	57.5	43.5	29.5	CHD	150	330	6	22	20	NXA-1200V225∗CHD□B
	2.5	57.5	45	30	CJE	150	375	6	23	20	NXA-1200V255∗CJE□B
	2.8	57.5	45	35	CJH	150	420	5	24	20	NXA-1200V285∗CJH□B
	3.3	57.5	50	35	CKH	150	495	5	24	20	NXA-1200V335∗CKH□B
	3.5	57.5	45	45	CJL	150	525	4	25	20	NXA-1200V355∗CJL□B
	4	57.5	55	40	CLJ	150	600	4	26	20	NXA-1200V405∗CLJ□B
1600VDC (550VAC)	0.2	42.5	28	14	ABA	225	45	12	6	20	NXA-1600V204∗ABA□B
	0.22	42.5	32	14	ACA	225	49.5	12	8.4	20	NXA-1600V224∗ACA□B
	0.33	42.5	25.5	25.5	AAC	225	74.25	11	9.5	20	NXA-1600V334∗AAC□B
	0.45	42.5	28	24	ABB	225	101.25	11	11.4	20	NXA-1600V454∗ABB□B
	0.6	42.5	36	24	AFB	225	135	10	15.2	20	NXA-1600V604∗AFB□B
	0.7	43	33	33	BDF	225	157.5	10	17	20	NXA-1600V704∗BDF□B
	0.85	43	35.5	33.5	BEG	225	191.25	9	18.4	20	NXA-1600V854∗BEG□B
	1	42.5	45	30	AJE	225	225	8	20.5	20	NXA-1600V105∗AJE□B
	1.3	42.5	43	42	AGK	225	292.5	7	21	20	NXA-1600V135∗AGK□B
	1.5	57.5	43.5	29.5	CHD	150	225	6	22	20	NXA-1600V155∗CHD□B
	1.6	57.5	45	30	CJE	150	240	6	22	20	NXA-1600V165∗CJE□B
	1.8	57.5	45	35	CJH	150	270	5	23	20	NXA-1600V185∗CJH□B
	2	57.5	50	35	CKH	150	300	5	24	20	NXA-1600V205∗CKH□B
	2.2	57.5	45	45	CJL	150	330	4	24	20	NXA-1600V225∗CJL□B
	2.5	57.5	55	40	CLJ	150	375	4	25	20	NXA-1600V255∗CLJ□B

(Note) ∗ : If tolerance at rated capacitance is 5% = J, 10% = K
□ : Shape code

For High-frequency Circuits Capacitors

85°C | High frequency

- Widely used in high voltage, high frequency circuit.
- Low loss and small inherent temperature rise.
- Excellent active and passive flame resistant circuit.
- Double side metallized.
- Especially designed as snubber capacitor for I GBT.

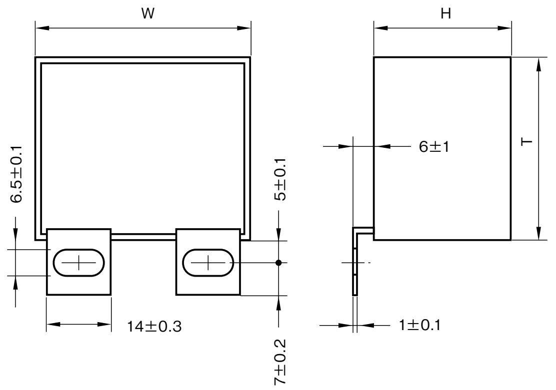
Specifications

Item	Performance		
Category temperature range (℃)	−40 to +85		(at Hotspot in capacitor)
Tolerance at rated capacitance (%)	±5, ±10		(20℃, 50 to 120Hz)
Dielectric Dissipation Factor	2×10^{-4} or less		
Life Expectancy	100000 hours		(at Hotspot in capacitor = 70°C)
Failure Rate	100Fit		
Withstanding DC Voltage	Between Terminals	Rated voltage ×1.5 VDC 10 s	
	Between Terminals and Case	3000 VAC 10 s	(20℃, 50Hz)
Insulation Resistance	3000MΩ· μF or more		(20℃, 100V DC, 1min)
Reference Standard	IEC 61071		

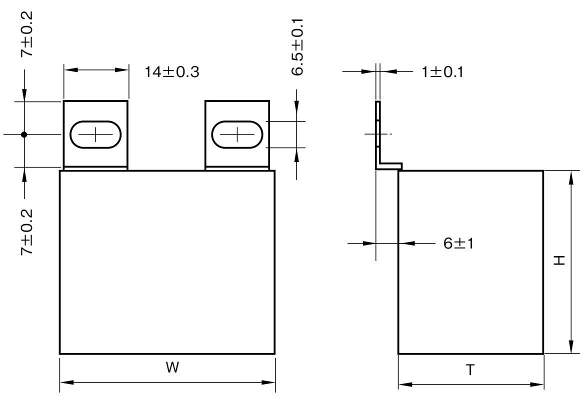
Outline Drawing

Unit : mm

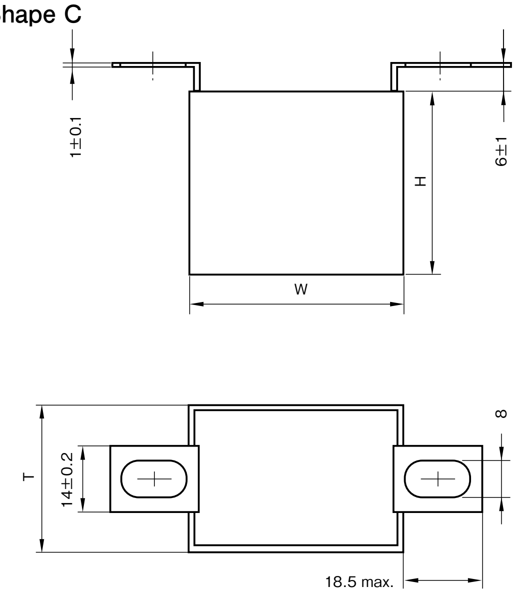
Shape A



Shape B



Shape C



W		H		T	
Size	Code	Size	Code	Size	Code
42.5	A	25.5	A	14	A
43	B	28	B	24	B
57.5	C	32	C	25.5	C
		33	D	29.5	D
		35.5	E	30	E
		36	F	33	F
		43	G	33.5	G
		43.5	H	35	H
		45	J	40	J
		50	K	42	K
		55	L	45	L

(Note) Tolerance at size : ±1.0

Part numbering system (example : 850V2.2μF)

NXB	—	850	V	225	K	AJE	C	B
Series code		Rated voltage symbol		Rated capacitance symbol	Capacitance tolerance symbol	Casing symbol	Shape code	Optional symbol

PLASTIC FILM

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

Standard Ratings

Rated voltage	Rated capacitance	Case (mm)			Casing symbol	Maximum rate of voltage rise	Maximum Peak current	ESR	Maximum current	Self-inductance	ELNA Parts No.
U_R (V)	C_R (µF)	W	H	T		dV/dt (V/µS)	Î (A)	(mΩ/100kHz Max.)	Imax (A)	Ls (nH)	
700VDC (380VAC)	0.6	42.5	28	14	ABA	325	195	12	7.2	20	NXB-700V604∗ABA□B
	0.8	42.5	32	14	ACA	325	260	12	9.2	20	NXB-700V804∗ACA□B
	1	42.5	25.5	25.5	AAC	325	325	10	10.8	20	NXB-700V105∗AAC□B
	1.2	42.5	28	24	ABB	325	390	10	12.4	20	NXB-700V125∗ABB□B
	1.8	42.5	36	24	AFB	325	585	8	16.8	20	NXB-700V185∗AFB□B
	2.2	42.5	33	33	ADF	325	715	7	18.8	20	NXB-700V225∗ADF□B
	2.5	42.5	35.5	33.5	AEG	325	813	6	20.3	20	NXB-700V255∗AEG□B
	3	42.5	45	30	AJE	325	975	5	22.4	20	NXB-700V305∗AJE□B
	4	42.5	43	42	AGK	325	1300	4	25	20	NXB-700V405∗AGK□B
850VDC (450VAC)	0.47	42.5	28	14	ABA	400	188	12	6.4	20	NXB-850V474∗ABA□B
	0.55	42.5	32	14	ACA	400	220	12	8.8	20	NXB-850V554∗ACA□B
	0.68	42.5	25.5	25.5	AAC	400	272	10	10.4	20	NXB-850V684∗AAC□B
	0.8	42.5	28	24	ABB	400	320	10	11.8	20	NXB-850V804∗ABB□B
	1.2	42.5	36	24	AFB	400	480	9	15.6	20	NXB-850V125∗AFB□B
	1.5	42.5	33	33	ADF	400	600	8	17.6	20	NXB-850V155∗ADF□B
	1.8	42.5	35.5	33.5	AEG	400	720	7	19.8	20	NXB-850V185∗AEG□B
	2.2	42.5	45	30	AJE	400	880	6	21.5	20	NXB-850V225∗AJE□B
	2.8	42.5	43	42	AGK	400	1120	5	24	20	NXB-850V285∗AGK□B
1000VDC (480VAC)	0.33	42.5	28	14	ABA	500	165	12	6.2	20	NXB-1000V334∗ABA□B
	0.45	42.5	32	14	ACA	500	225	12	8.6	20	NXB-1000V454∗ACA□B
	0.55	42.5	25.5	25.5	AAC	500	275	10	9.8	20	NXB-1000V554∗AAC□B
	0.65	42.5	28	24	ABB	500	325	10	11.6	20	NXB-1000V654∗ABB□B
	1	42.5	36	24	AFB	500	500	9	15.5	20	NXB-1000V105∗AFB□B
	1.2	42.5	33	33	ADF	500	600	8	17.5	20	NXB-1000V125∗ADF□B
	1.4	42.5	35.5	33.5	AEG	500	700	7	18.8	20	NXB-1000V145∗AEG□B
	1.8	42.5	45	30	AJE	500	900	6	21	20	NXB-1000V185∗AJE□B
	2.2	42.5	43	42	AGK	500	1100	5	5	20	NXB-1000V225∗AGK□B
	2.2	57.5	43.5	29.5	CHD	350	770	6	6	20	NXB-1000V225∗CHD□B
	2.5	57.5	45	30	CJE	350	875	5	5	20	NXB-1000V255∗CJE□B
	3	57.5	45	35	CJH	350	1050	5	5	20	NXB-1000V305∗CJH□B
	3.3	57.5	50	35	CKH	350	1155	4	4	20	NXB-1000V335∗CKH□B
	3.5	57.5	45	45	CJL	350	1225	4	4	20	NXB-1000V355∗CJL□B
	4.5	57.5	55	40	CLJ	350	1575	4	28	20	NXB-1000V455∗CLJ□B
1200VDC (500VAC)	0.22	42.5	28	14	ABA	650	143	12	6	20	NXB-1200V224∗ABA□B
	0.3	42.5	32	14	ACA	650	195	12	8.5	20	NXB-1200V304∗ACA□B
	0.4	42.5	25.5	25.5	AAC	650	260	11	9.6	20	NXB-1200V404∗AAC□B
	0.47	42.5	28	24	ABB	650	306	10	11.5	20	NXB-1200V474∗ABB□B
	0.68	42.5	36	24	AFB	650	442	10	15.4	20	NXB-1200V684∗AFB□B
	0.8	42.5	33	33	ADF	650	520	9	17.2	20	NXB-1200V804∗ADF□B
	1	42.5	35.5	33.5	AEG	650	650	8	18.6	20	NXB-1200V105∗AEG□B
	1.2	42.5	45	30	AJE	650	780	7	20.6	20	NXB-1200V125∗AJE□B
	1.5	42.5	43	42	AGK	650	975	6	22	20	NXB-1200V155∗AGK□B
	1.5	57.5	43.5	29.5	CHD	455	683	6	22	20	NXB-1200V155∗CHD□B
	1.8	57.5	45	30	CJE	455	819	6	23	20	NXB-1200V185∗CJE□B
	2	57.5	45	35	CJH	455	910	5	24	20	NXB-1200V205∗CJH□B
	2.2	57.5	50	35	CKH	455	1001	5	24	20	NXB-1200V225∗CKH□B
	2.5	57.5	45	45	CJL	455	1138	4	25	20	NXB-1200V255∗CJL□B
	3	57.5	55	40	CLJ	455	1365	4	26	20	NXB-1200V305∗CLJ□B
1600VDC (550VAC)	0.15	42.5	28	14	ABA	800	120	12	6	20	NXB-1600V154∗ABA□B
	0.2	42.5	32	14	ACA	800	160	12	8.4	20	NXB-1600V204∗ACA□B
	0.3	42.5	25.5	25.5	AAC	800	240	11	9.5	20	NXB-1600V304∗AAC□B
	0.33	42.5	28	24	ABB	800	264	11	11.4	20	NXB-1600V334∗ABB□B
	0.47	42.5	36	24	AFB	800	376	10	15.2	20	NXB-1600V474∗AFB□B
	0.56	42.5	33	33	ADF	800	448	10	17	20	NXB-1600V564∗ADF□B
	0.65	42.5	35.5	33.5	AEG	800	520	9	18.4	20	NXB-1600V654∗AEG□B
	0.8	42.5	45	30	AJE	800	640	8	20.5	20	NXB-1600V804∗AJE□B
	1	42.5	43	42	AGK	800	800	7	21	20	NXB-1600V105∗AGK□B
	1	57.5	43.5	29.5	CHD	560	560	6	22	20	NXB-1600V105∗CHD□B
	1.2	57.5	45	30	CJE	560	672	6	22	20	NXB-1600V125∗CJE□B
	1.4	57.5	45	35	CJH	560	784	5	23	20	NXB-1600V145∗CJH□B
	1.6	57.5	50	35	CKH	560	896	5	24	20	NXB-1600V165∗CKH□B
	1.7	57.5	45	45	CJL	560	952	4	24	20	NXB-1600V175∗CJL□B
	2	57.5	55	40	CLJ	560	1120	4	25	20	NXB-1600V205∗CLJ□B

(Note) ∗ : If tolerance at rated capacitance is 5% = J, 10% = K
□ : Shape code

PLASTIC FILM

NOTE : Design, Specifications are subject to change without notice.
It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

1 The standard system of fixed plastic film capacitor for use in electronic equipment.

The standard system of fixed plastic film capacitor for use in electronic equipment includes the foundational standard, generic specification, sectional specification, blank detail specification and detail specification, or manufacturer specification.

Generic specification specifies the terminology, inspection procedures and test methods applied in sectional and detail specifications.
Sectional specification is classified according to the specific dielectric material and construction of capacitor, it prescribes preferred rating and characteristics and to elect from generic specification the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of capacitor.
Blank detail specification is a supplementary document to the sectional specification and contains requirements for style, layout and minimum contents of detail specifications.
Following please find the corresponding specification lists for plastic film capacitors.

No.	Standard
GB/T 2693 (IEC 60384-1)	Fixed capacitors for use in electronic equipment Part 1: Generic specification
GB/T 17702 (IEC 61071)	Power electronic capacitors
AEC-Q200	Stress test qualification for passive components
GB/T 25121 (IEC61881)	Railway applications - Rolling stock equipment - Capacitors for power electronics
GB/T21563 (IEC61373)	Railway applications - Rolling stock equipment Shock and vibration tests
GB/T 4798-1 (IEC 60721-3-1)	Classification of environmental conditions Part 3: Classification of groups of environmental parameters and their severities Section 1 Storage
GB/T 4798-2 (IEC60721-3-2)	Classification of environmental conditions Part 3: Classification of groups of environmental parameters and their severities Section 2 Transportation
GB/T 4798-3 (IEC 60721-3-3)	Classification of environmental conditions Part 3: Classification of groups of environmental parameters and their severities Section 3 Stationary use at weather protected locations

2 General Description of Film Capacitors

2-1 Principle of Capacitor Construction

The principle construction of a parallel plate capacitor is shown in Fig. 1.
When a voltage V is applied between the conducting electrodes placed opposite to each other, a certain amount Q of electric charge proportional to the voltage can be stored on the surfaces of the dielectric.
The proportional constant is called capacitance C, designating the ability of a capacitor to store energy in an electric field.

$Q=C \cdot V$
Q: Charge [Coulomb]
V: Voltage [Volt]
C: Capacitance [Farad]
The capacitance C of capacitor can be expressed by the following equation:

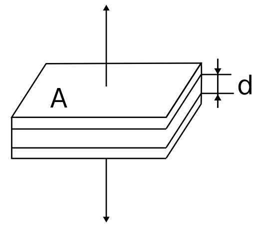


Fig.1

$C[F]=\varepsilon 0 \cdot \varepsilon \cdot A / d$
ε: dielectric constant
ε0: dielectric constant in vacuum (= 8.85×10^{-12}F/m)
A: electrode area [m^2]
d: electrode distance [m]

The dielectric constant of Polypropylene film is 2.2.
Larger capacitances can be obtained by entailing the electrode area A or by reducing the distanced.
Table 1 shows the dieiectric constants of typical film dielectrics used in capacitors.
In many cases, capacitor names are related to their dielectric material used.

Table-1

Dielectric	Dielectric Constant
Polypropylene	2.2
Polyester	3.3
Polyimide	3.5
Polyethylene	2.3
Polycarbonate	2.8
Polytetrafluoroethylene	2

The schematic of an film capacitoris shown in Fig. 2

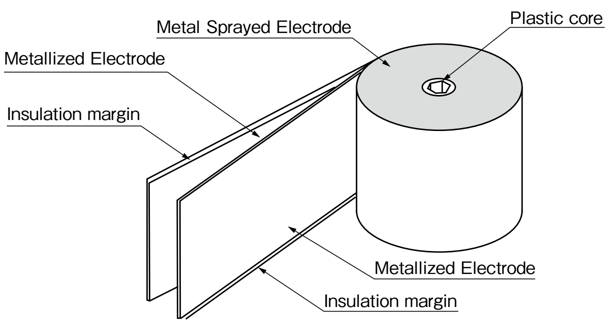


Fig-2

PLASTIC FILM

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It is recommended that you shall obtain technical specifications from ELNA to ensure that the component is suitable for your use.

3 Basic parameters and terms

3-1 Rated capacitance C_R
Nominal value of the capacitance at 20°C and measuring frequency range of 50 to 120 Hz.

3-2 Rated voltage U_R
Maximum operating peak voltage of either polarity but of a non-reversing type waveform, for which the capacitor has been designed, for continuous operation.
It shall be higher than the sum of operating d.c. voltage and operating ripple peak voltage.

3-3 Ripple voltage Ur
Peak-to-peak alternating component of the unidirectional voltage.

3-4 Non-recurrent surge voltage Us
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.
- Maximum duration: 50ms / pulse
- Maximum number of occurrences: 1000 (during load)

3-5 Insulation voltage Ui
Rms value of a.c. voltage designed for the insulation between terminals of the capacitor to case or earth.
The insulation voltage is equal to the rated voltage of the capacitor, divided by $\sqrt{2}$, unless otherwise specified.

3-6 Maximum current Imax
Maximum rms current for continuous operation.

3-7 Maximum rate of voltage rise dV/dt
Maximum permissible repetitive rate of voltage rise of the operational voltage.

3-8 Maximum peak current $\hat{I}$
Maximum permitted repetitive peak current that can occur during continuous operation.
The value is following: $\hat{I}=C_R$ X (dV/dt)

3-9 Maximum surge current $\hat{I}s$
Admissible peak current induced by a switching or any other disturbance of the system.
- Maximum duration: 50ms / pulse
- Maximum number of occurrences: 1000

3-10 Series resistance Rs
Effective ohmic resistance of the conductors of a capacitor under specified operating conditions.

3-11 Equivalent series resistance ESR
The equivalent series resistance (ESR) represents all of the ohmic losses of the capacitor.

$$ESR = \frac{tg\delta}{W \cdot C} = Rs + \frac{tg\delta 0}{W \cdot C}$$

3-12 Dielectric dissipation factor tgδ0
Constant dissipation factor of the dielectric material for all capacitors at their rated frequency.
The typical loss factor of polypropylene film is $2x10^{-4}$.

3-13 Loss factor of the capacitor tgδ
The dissipation factor is ratio between reactive power of the impedance of the capacitor and effective power when capacitor is submitted to a sinusoidal voltage of specified frequency, it is that ratio between the equivalent series resistance and the capacitive reactance of a capacitor.

3-14 Dielectric power loss Pd
Loss power induced by dielectric polarization or dielectric conductance.

3-15 Joule power loss Pj
Loss power induced by series resistance of the capacitor under rms current.

3-16 Capacitor losses Pi
Active power dissipated in the capacitor. Pt = I^2rms x ESR

3-17 Maximum power loss Pmax
Maximum power loss at which the capacitor may be operated at the maximum case temperature.

3-18 Self-inductance Ls
Represents the sum of all inductive elements which are for mechanical and construction reasons contained in any capacitor.

3-19 Resonance frequency fr
Lowest frequency at which the impedance of the capacitor becomes minimum.
The value is following : fr = 1/(2π x)

3-20 Ambient temperature Θ_A
Temperature of the air measured at the hottest position of the capacitor, under steady-state conditions, midway between two unite.
If only one unit is involved, it is the temperature of surrounding air, measured 10cm away and at 2/3 of the case height of the capacitor under steady-state conditions.

3-21 Maximum operating temperature Θ_{max}
Highest temperature of the case at which the capacitor may be operated.

3-22 Lowest operating temperature Θ_{min}
Lowest temperature of the dielectric at which the capacitor may be energized.

3-23 Thermal resistance R_{th}
The thermal resistance indicates by how many degrees the capacitor temperature at the hotspot rises above ΘA per watt of the heat dissipation loss.

3-24 Hotspot temperature Θ_{hs}
Temperature at the hottest spot inside the capacitor.
The value is following: $\Theta_{hs} = \Theta_A + P_t \times R_{th}$

3-25 Temperature coefficient of capacitance α
The change rate of capacitance with temperature measured over a specified range of temperature.

3-26 Voltage between terminals U_{TT}
Voltage between terminals.

3-27 Voltage between terminals and case U_{TC}
Voltage between terminals and case.

3-28 Climatic category
The climatic category which the capacitor belongs to is expressed in three numbers separated by slashes, (I EC 60068-1 :example 40/85/56)

40 / 85 / 56
- 56: days relevant to the damp heat test (56days)
- 85: the upper category temperature (+85°C)
- 40: the lower category temperature (-40°C)

3-29 Insulation Resistance (IR) /Time Constant (t)
The insulation resistance is the ratio between an applied D.C. voltage and the resulting leakage current after a minute of charge.
It is expressed in MΩ.
The time constant is expressed in seconds with the following formula: t [s]=IR [MΩ] x C [μF]

3-30 Self-healing (Only for metallized film capacitor)
Process by which the electrical properties of the capacitor, after a local breakdown of the dielectric, are rapidly and essentially restored to the values before the breakdown.
The metal coatings of the metallized film, which are vacuum-deposited directly onto the plastic film, have a thickness of only several tens nm.
At weak points or impurities in the dielectric, a dielectric breakdown would occur.
The energy released by the arc discharge in the breakdown channel is sufficient to totally evaporate the thin metal coating in the vicinity of the channel.
The insulated region thus resulting around the former faulty area will cause the capacitor to regain its full operation ability.

3-31 Failure rate λ
Failure rate refers to the work to a moment has not failed products, at that time, the failure probability of occurrence in a time unit.

$$\lambda = \frac{r}{n \cdot t}$$

t: test time
n: test number
r: number of failures

4 Expected lifetime of the capacitor

The expected lifetime of the capacitor depends on the applied voltage and the hot spot temperature during operation.
For capacitors applied in different situation, the designed average service lifes are different.
The capacitors used in DC-Link circuits will have a expected lifetime of probable 100000 hrs at rated voltage and 70t hot spot temperature.

4-1 The hotspot temperature estimation
During operation, the ripple current flowing through the capacitor will generate heat due to the series resistance (Rs) of the capacitor.
Considering the above factors hotspot temperature estimation formula is as follows:

$$\Theta_{hs} = \Theta_A + I_{rms} \times ESR \times R_{th}$$

Θ_{hs} : Hotspot Temperature
Θ_A : Environment Temperature
I_{rms} : Ripple Current
ESR : Equivalent series resistance
R_{th} : Thermal Resistance

4-2 Estimation of lifetime calculation
Considering the fever caused by ripple current, internal resistance (hotspot temperature), as well as the applied voltage, life estimation formula:

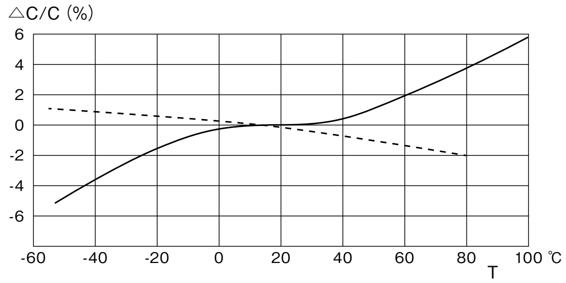
$$L = L_0 \times (U_R / U)^n \times 2^{(\Theta - \Theta_{hs})/m}$$

L : The calculation of Lifetime, hrs
L_0 : Rated Lifetime (100000hrs)
U : Working Voltage, VDC
U_R : Rated Voltage, VDC
n : Acceleration Coefficient of Voltage, experienced value: 8-12
Θ_{hs} : The Actual or Calculated Hotspot Temperature, VC
Θ : Rated Hotspot Temperature, 70 °C
m : Acceleration Coefficient of Temperature, experienced value: 7-10

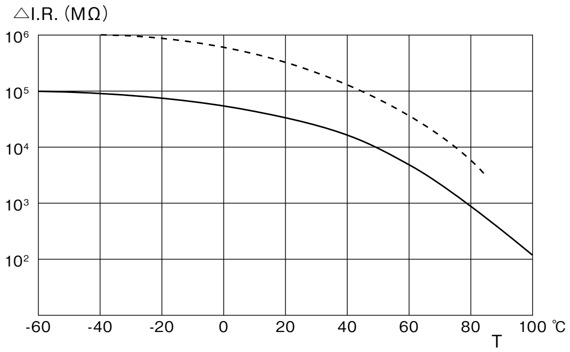
PS: Typically the capacity change rate> ± 3%, determined that product failure

Expected lifetime is a statistical value calculated on the basis of experience and on theoretical evaluations.
The above formula only as a theoretical reference.
The diagrams should be considered only as a theoretical reference.
Please consult our technical department in case of working condition different from the rated ones.

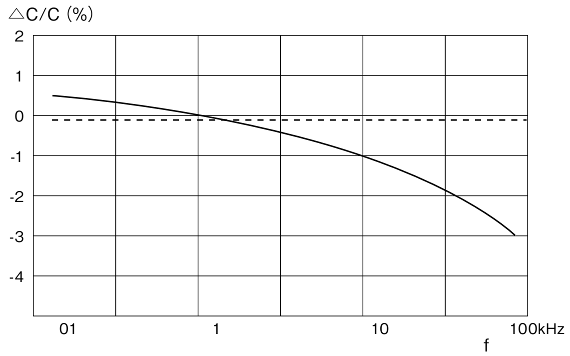
5 Electrical behaviour



Capacitance vs. temperature at 1kHz



IR vs. temperature



Capacitance vs. frequency (room temperature)

- - - - - - Polypropylene Film
——— Polyester Film

Expected life time curve