DAWNCAP®

Catalogue

DAWN CAPACITORS
POWER ELECTRONIC CAPACITORS

At any time, we may change the contents of this manual. For more information, please refer to our website or consult the sales staff.

http://www.dawncap.cn www.dawncapacitors.com

E-mail:dawncapacitor@163.com

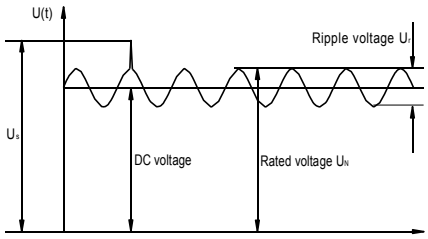
1.Technical terms and definitions

1.1 rated capacitance cn

The test condition is 20 ± 5 ° C, 100Hz, and the measured capacitor capacity.

1.2 Rated voltage Un

The design rating of capacitor refers to the maximum or peak value of non reverse voltage waveform.



1.3Unrepeatable peak (aperiodic surge) voltage us

For the voltage exceeding the rated value caused by equipment switch or line fault, the duration of each time shall not exceed 50dms,

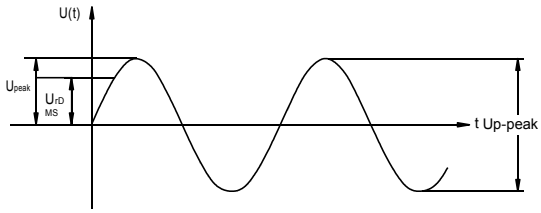
and the maximum number of times allowed is 1000.

1.4 ripple voltage ur Ur

Peak to peak of AC component of unidirectional rectified voltage

1.5 Rated AC voltage Ur DMS

Root mean square of the maximum sine wave AC voltage in continuous operation.



1.6 A.C Peak voltage Upeak

Allowable A.C peak voltage in continuous operation

1.7 DU/DT

The rise or fall time of the maximum voltage is generally described
as the value that the capacitor can withstand the rise or fall of voltage per microsecond

1.8 Maximum non repeatable voltage rise (du/dt)s

Transient and non repeatable voltage rise peak due to fault。

1.9 Test voltage between electrodes Ut-t

Routine test items under room temperature before delivery. At the user's site, it is allowed to conduct another test according to 80% of the test voltage indicated in the product specification.

1.10 test voltage ut-c between electrode and shell

For the routine test items at room temperature, the withstand voltage between the electrode and the shell shall be tested after the electrode is short circuited. Repeated tests are allowed at the user's site.

1.11 peak current ipeak

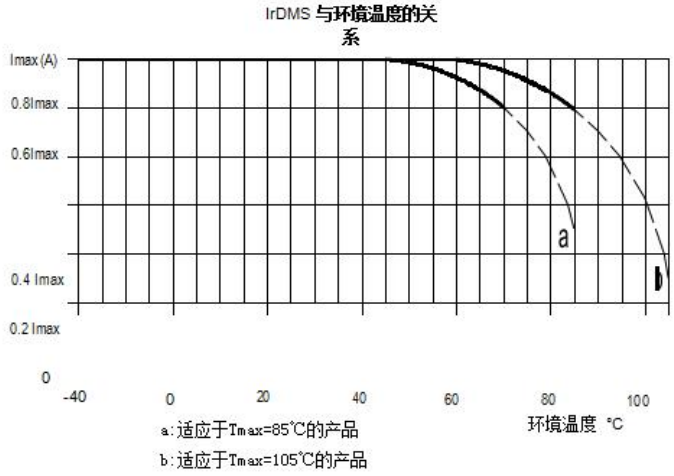
Maximum allowable repeatable current amplitude during continuous operation. Ipeak = Cn x (du/dt)

1.12 maximum current Imax

The maximum effective current during continuous operation. The maximum current given in the data sheet depends on the maximum power loss or the current limit of the capacitor terminal.

Relationship between irdms and ambient temperature:

a: 85 ° C
b:105 ° C



1.13 non repetitive peak current (surge) is

The maximum current that occurs temporarily and unrepeatedly due to a fault. The duration of each time shall not exceed 50dms, and the maximum number of occurrences allowed is 1000. Is=Cn × (du / dt) s

1.14 equivalent series resistance ESR

The equivalent resistance value of all resistance related factors in the capacitor. Circuit power loss used to calculate current.

1.15 self inductance LS

The inductance of a capacitor due to its own structure.

1.16 insulation resistance I.R

It is usually expressed by the charging time constant R · C: under the ambient temperature of 20 ± 5 ° C and the voltage of 100VDC, the reading 1 minute after the capacitor is fully charged, measure the leakage current and calculate the IR It is usually expressed by charging time constant R.C. the unit of R.C is s:

s= MΩ × μF

1.17 resonance frequency fr

Capacitance and self inductance will form a series resonant circuit. Outside this resonant frequency, if the inductive reactance of the LC line is dominant, the capacitor will present the characteristics of an inductance

$$Fr = \frac{1}{2\pi\sqrt{Cn \times Ls}}$$

1.18 Dielectric loss factor Tanδ0

Fixed loss factor of capacitor dielectric material at rated frequency.

1.19 loss factor Tan δ

tan δ= two × π × f × Cn × ESR

1.20 thermal resistance RTH

It refers to the rising value of the hot spot temperature of the capacitor corresponding to the loss of the capacitor.

1.21 maximum power loss Pmax

$$Pmax = \frac{Ths - Te}{Rth}$$

1.22 ambient temperature te

The air temperature around the capacitor, the test point is 10 cm away from the vertical height of the capacitor shell.Hot spot temperature ths The highest temperature inside the capacitor

1.23Hot spot temperature ths

The highest temperature inside the capacitor.

1.24 minimum climate temperature Tmin

Minimum allowable temperature of capacitor in use

1.25 maximum climate temperature Tmax

The maximum allowable temperature when the capacitor is used, that is, the maximum temperature of the shell.

1.26 rated energy storage WN

Energy storage capacity of capacitor during charging at rated voltage

Wn = 1/2 x Cn x (Un)2

1.27 air gap L

The shortest distance between the conductive parts of the electrode or between the electrode and the housing.

1.28 creepage distance K

The shortest distance between the conductive parts of the electrode or the insulating surface between the electrode and the shell.

1.29 altitude

The maximum allowable altitude is 2000 meters. With the decrease of atmospheric pressure, arc discharge is more likely to occur between electrodes. When used at high altitude, the capacitor is not easy to dissipate heat, which will lead to increased loss and failure.

1.30 storage temperature

Allowable storage temperature range of capacitor.

1.31 life expectancy Le

The expected life of capacitor depends on the internal temperature and dielectric field strength. Relationship between life expectancy and voltage

Le = Ln x (Un/Uw)7

Le = life expectancy at operating voltage (H) ln = life expectancy at rated voltage (H) UN = rated voltage (V)

UW = working voltage (V)

Relationship between life expectancy and temperature

Le = LTo x 2(To-Ths)/11

Le = life expectancy at actual hot spot temperature (H) LTO = hot spot temperature 70 ° Life expectancy at C (H) to = hot spot temperature 70 ° C (° C)

Ths = hot spot temperature in actual operation (° C)

2. Installation and operation guide

2.1 overvoltage circuit breaker

When using explosion-proof capacitors, it must be ensured that:

the connecting wire must have a certain elasticity to prevent the connecting wire from pulling and losing the explosion-prooffunction during explosion-proof action. an expansion space ≥ 12mm shall be reserved above the electrode of the capacitor.

2.2 installation position

In addition to the specially specified series, for example, DAF / DMB / DRG series can only be installed vertically, that is, the electrode is above, and other capacitors can adopt different installation directions. However, pay attention to the following situations: aluminum shell capacitors and rectangular metal shell capacitors with voltage higher than 3600v must be installed horizontally. for capacitors with high voltage or circular steel shell, horizontal installation is allowed, but the manufacturer should be consulted in advance.

2.3 assembly

If the vibration stress does not exceed 5g, the bolts at the bottom of aluminum shell capacitor with diameter 60 mm and height 160 mm can be used for fixing. For larger diameter and vibration stress greater than 5g, the capacitor needs to be fixed with clamp ring.

Bolt installation data:

Bolt diameter	Bolt length	Maximum torque
M8	10mm	4.5N.m
M10	12mm	6N.m
M12	16mm	8N.m

2.4 installing terminals

The tightening torque of bolts and nuts for installing terminals can be referred to a separate data sheet. These torques cannot be used on plastic parts.

Bolt diameter	Maximum torque
M5	2.5N.m
M6	4.5N.m
M8	8.5N.m

Screw diameter	Maximum torque
M8	8.5N.m
M10	12N.m
M12	15N.m

2.4.1 the maximum cross section of connecting wire shall be in accordance with VDE / din

Flexible wires should be used for terminals with ceramics as insulators, so as to avoid mechanical stress on ceramics.

The wiring outside the capacitor needs to consider that the heat cannot be transmitted to other components, and also consider keeping the heat away from the terminal of the capacitor.

2.5 grounding

According to VDE 0100, both bottom bolts and iron hoops can be used for grounding. Single pole and fully insulated capacitors can not be grounded. When the metal clamp is used for grounding, the paint on the surface of the clamp needs to be removed.

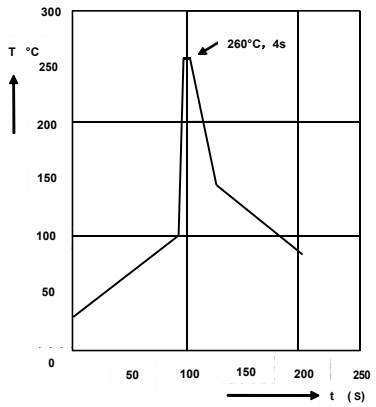
2.6 safety protection measures

When using, pay attention to the self charging phenomenon, and the capacitor contains high electric energy, and observe appropriate safety protection measures.

2.7 welding conditions of axial and box capacitors on PCB

In order to control the temperature inside the capacitor, the setting of welding temperature shall not exceed the following limit: soldering bath temperature 260 ± 5 ° C. For box capacitors with a foot distance greater than 10mm, the welding time is 4S. When welding, it must be ensured that the capacitor will not be damaged due to overheating: if the cross section of the conductor is greater than 1.5 mm2, the welding method shall not be adopted, but the fastening connection method shall be adopted.

do not weld in the heat concentrated part.



Tin dipping depth	The horizontal plane of capacitor body or substrate is upward 2.0 +0/-0.5mm
Protective plate	Heat absorption plate, (1.5 ± 0.5) mm thick, It is placed between the capacitor body and the tin material
Evaluation criteria: Visual inspection C/C○ Tanδ	 No visible damage 2％for DTC/DTG/DRB/DTG 5％for DTC/DTG/DRB/DTG

3. End of product life and waste disposal

Dawncap capacitor materials strictly comply with national regulations:
chemical prohibition regulations
CFC halogen prohibition regulations
Our products do not contain PCB, so there is no need to deal with scrapped products according to the special management regulations on waste disposal.
We need to be responsible for the environment, so we hope users should be careful when dealing with waste products. In any case, we hope users will consult the waste disposal department for relevant regulations.

4. Transportation and packaging

In terms of product packaging, dawncap naturally supports the needs of environmental protection.
use environmentally friendly materials and try to use product packaging.
pallets shall be used as far as possible, and the pallets shall be fixed with environmental friendly PE or PP plastic belts.
cardboard is preferred for the isolation layer of pallet and packing box.

5.Product application description

5.1dc Link Application

The rated voltage of the capacitor must be equal to or greater than the sum of the applied voltage and the line ripple voltage: UN ≥ UDC + ur / 2
Select the corresponding capacitance CN and rated voltage UN according to the parameters in the data sheet; At the same time, the maximum effective current that the capacitor can withstand during long-term operation needs to be verified. Maximum effective
IMAX depends on the terminals of the capacitor and the values specified in the data sheet.
The surge voltage in the following range will not have a significant impact on the shortening of the expected life of the capacitor:

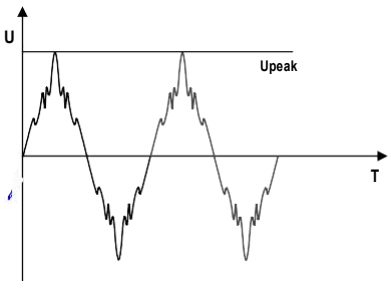
Repetitive surge voltage	Maximum duration
1.1 × Un	Working time totle 30%
1.15 × Un	30 min/d 5
1.2× Un	min/d 1
1.3× Un	min/d
1.5 × Un	100 DMS ，No more than 1000 次

5.2 Ac application

The rated voltage of the capacitor must be equal to or greater than the maximum of upeak1 and upeak2. Select the corresponding capacitance CN and rated voltage UN according to the parameters in the data sheet; At the same time, the maximum effective current that the capacitor can withstand during long-term operation needs to be verified. The maximum effective IMAX depends on the terminals of the capacitor and the values specified in the data sheet.

5.3 Ac filtering application

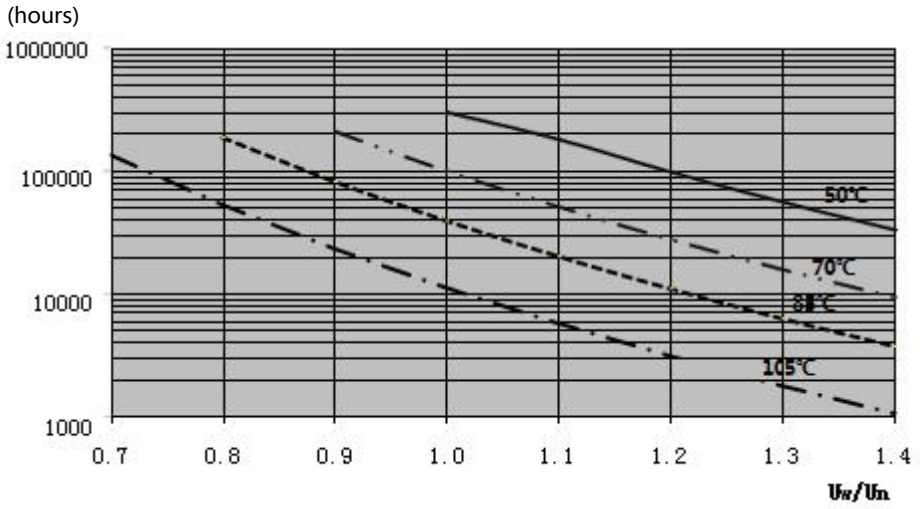
The standard for selecting the rated voltage UN of AC filter capacitor is not the effective voltage urdms, but the peak voltage formed by the superposition of various harmonics, which is calculated by instrument test or according to the harmonic data provided. In any case, the rated voltage of the capacitor must be greater than the peak voltage in the line.



5.4 service life

The working life of the capacitor depends on the temperature and dielectric field strength inside the capacitor under working conditions. The average life of the capacitor design is 100000 hours. (allowable failure rate ≤ 150ppm). These values are related to the hot spot temperature indicated in the selection table.

The following icons illustrate the relationship between life, temperature and operating voltage:

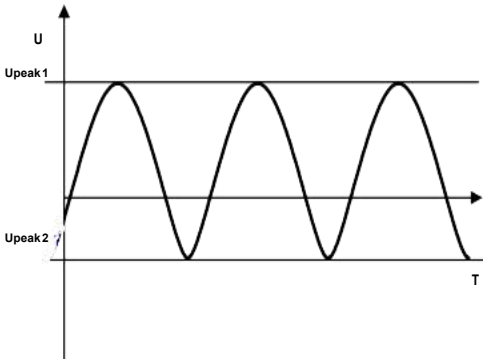


5.5 Life Declaration and invalidation

There may be unreasonable assumptions, and users will form a wrong idea about the service life: as long as the rated service temperature and working voltage are reduced, the service life of the capacitor will be one million hours or more. Please note that the statement about the life of the capacitor is purely theoretical.

5.6 failure modes

Plastic film capacitors have two typical failure modes: open circuit or short circuit (or high resistance short circuit). In addition, capacitance drift, unstable working temperature, high loss or low insulation resistance will lead to capacitor failure. All failures are caused by dielectric degradation caused by exceeding the limits of electrical, mechanical and environmental factors during operation.



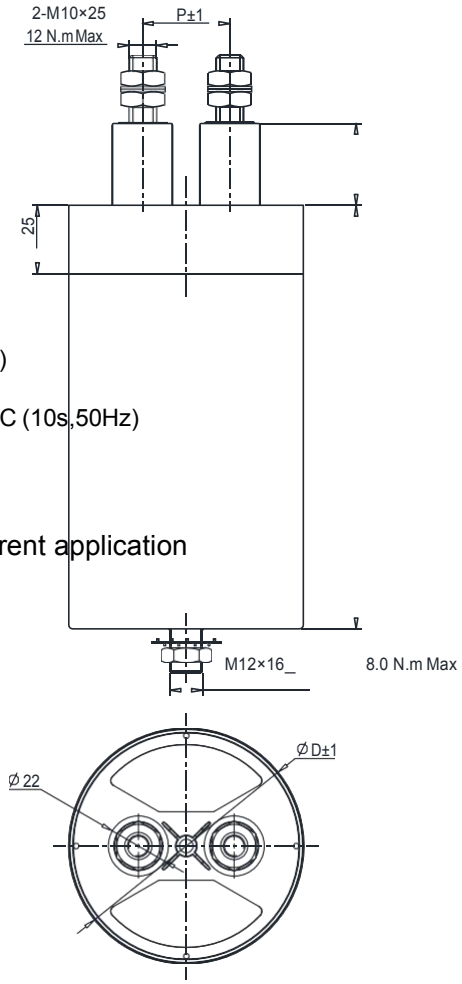
Product features

Reference standard : IEC 61071
medium: Metallized polypropylene film
structure : Dry non inductive structure, aluminum shell packaging, plastic support, resin filling（UL94 V-0）

Electrical characteristics

working temperature : - 40 ~ + 85 ˚C
Capacity range : 0.22 ~ 11 μF
Rated voltage : 2400 ~ 8000 VDC
Capacity deviation : ± 5%, ± 10%
Loss factor: : ≤5×10^{-4} @ 1KHz, 20±5˚C
Life expectancy : 100,000 hours @ Un, 70 ˚C (hot spot temperature)
Withstand voltage between poles : 1.5Un (DC) @ 10s, 20±5˚C
Withstand voltage of polar shel : (1.5Un+1000)VAC, minimum 3000VAC (10s,50Hz)
Insulation resistance : (IR×Cn) 30000s (no more than30GΩ),100VDC(20±5˚C),1minute

Application resonance Septal straight High current application



Carharacteristic parameter

ordering code	CAP. (μF)	SIZE(mm) D	H	P	IrDMS@45˚C @10KHz (A)	Du/dt (V/μs)	Ipeak (A)	Ls (nH)	ESR@10KHz (mΩ)
Un 2400VDC , UrDMS 1200VAC , Upeak 1680V , Us 3600V									
DGT-2400-1.5-DMS	1.5	76	70	32	35	800	1200	≤150	1.9
DGT-2400-2.2-DMS	2.2	76	70	32	40	800	1760	≤150	1.4
DGT-2400-3.0-DMS	3.0	86	70	32	45	800	2400	≤150	1.1
DGT-2400-4.7-DMS	4.7	76	125	32	55	800	3760	≤150	0.8
DGT-2400-6.0-DMS	6.0	86	125	32	65	800	4800	≤150	0.7
DGT-2400-11-DMS	11	116	130	50	80	800	8800	≤150	0.5
Un 3600VDC , UrDMS 1800VAC , Upeak 2520V , Us 5400V									
DGT-3600-1.0-DMS	1.0	76	95	32	32	1000	1000	≤150	2.7
DGT-3600-1.5-DMS	1.5	76	95	32	40	1000	1500	≤150	1.9
DGT-3600-2.0-DMS	2.0	86	95	32	45	1000	2000	≤150	1.5
DGT-3600-3.0-DMS	3.0	76	175	32	50	1000	3000	≤150	1.1
DGT-3600-4.0-DMS	4.0	86	175	32	65	1000	4000	≤150	0.9
DGT-3600-7.5-DMS	7.5	116	180	50	80	1000	7500	≤150	0.6
Un 4800VDC , UrDMS 2400VAC , Upeak 3360V , Us 7200V									
DGT-4800-0.68-DMS	0.68	76	120	32	30	1200	816	≤150	3.8
DGT-4800-1.0-DMS	1.0	76	120	32	38	1200	1200	≤150	2.7
DGT-4800-1.5-DMS	1.5	86	120	32	42	1200	1800	≤150	1.9
DGT-4800-2.2-DMS	2.2	76	225	32	48	1200	2640	≤150	1.4
DGT-4800-3.0-DMS	3.0	86	225	32	60	1200	3600	≤150	1.1
DGT-4800-5.6-DMS	5.6	116	230	50	80	1200	6720	≤150	0.7

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Carharacteristic parameter

ordering code	CAP. (μF)	SIZE (mm)			IrDMS@45°C @10KHz (A)	Du/dt (V/μs)	Ipeak (A)	Ls (nH)	ESR@10KHz (mΩ)
		D	H	P					
Un 6000VDC , UrDMS 3000VAC , Upeak 4200V , Us 9000V									
DGT-6000-0.68-DMS	0.68	76	145	32	32	1500	1020	≤150	3.8
DGT-6000-0.82-DMS	0.82	76	145	32	37	1500	1230	≤150	3.2
DGT-6000-1.2-DMS	1.2	86	145	32	40	1500	1800	≤150	2.3
DGT-6000-1.8-DMS	1.8	76	275	32	45	1500	2700	≤150	1.6
DGT-6000-2.4-DMS	2.4	86	275	32	60	1500	3600	≤150	1.3
DGT-6000-4.5-DMS	4.5	116	275	50	80	1500	6750	≤150	0.8
Un 8000VDC , UrDMS 4000VAC , Upeak 5600V , Us 12000V									
DGT-8000-0.22-DMS	0.22	76	135	32	33	3000	660	≤150	5.8
DGT-8000-0.33-DMS	0.33	76	135	32	40	3000	990	≤150	4.0
DGT-8000-0.47-DMS	0.47	86	135	32	45	3000	1410	≤150	2.9
DGT-8000-0.68-DMS	0.68	76	260	32	50	3000	2040	≤150	2.1
DGT-8000-1.0-DMS	1.0	86	260	32	60	3000	3000	≤150	1.5
DGT-8000-1.8-DMS	1.8	116	260	50	80	3000	5400	≤150	1.0