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

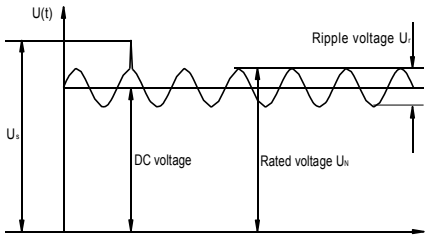
1.Technical terms and definitions

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,

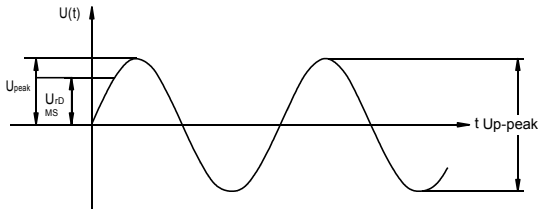
and the maximum number of times allowed is 1000.

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

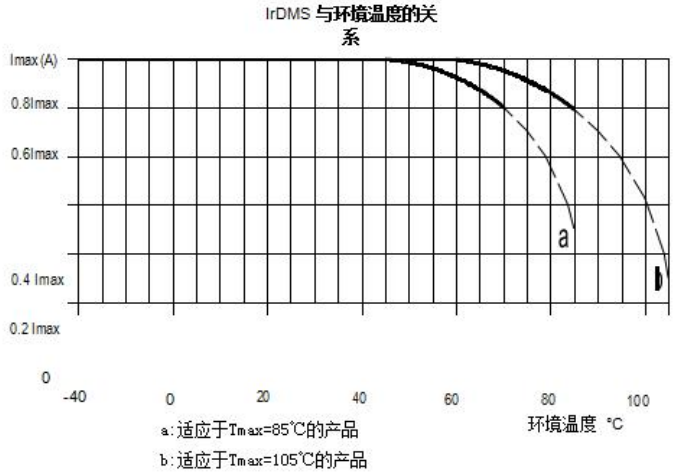
Maximum allowable repeatable current amplitude during continuous operation. Ipeak = Cn x (du/dt)

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.

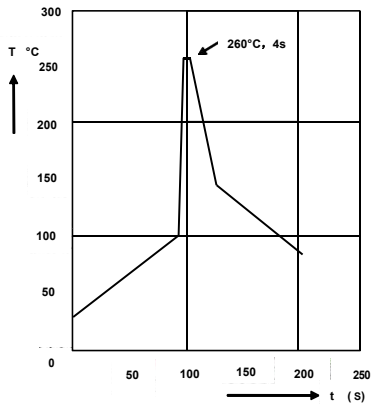
2.6 safety protection measures

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:

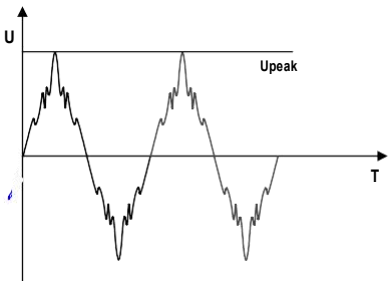
Repetitive surge voltage	Maximum duration
1.1 × Un	Working time totle 30%
1.15 × Un	30 min/d 5
1.2× Un	min/d 1
1.3× Un	min/d
1.5 × Un	100 DMS ，No more than 1000 次

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

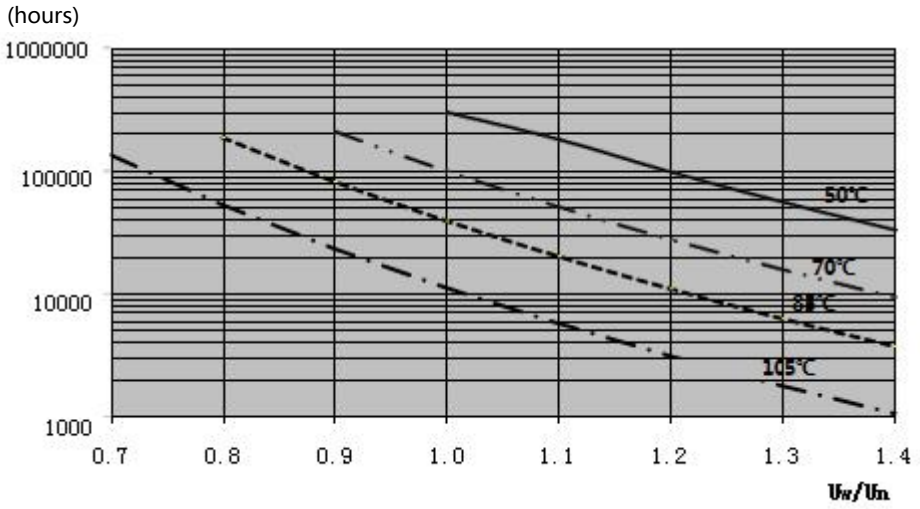
The standard for selecting the rated voltage UN of AC filter capacitor is not the effective voltage urdms, but the peak voltage formed by the superposition of various harmonics, which is calculated by instrument test or according to the harmonic data provided. In any case, the rated voltage of the capacitor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

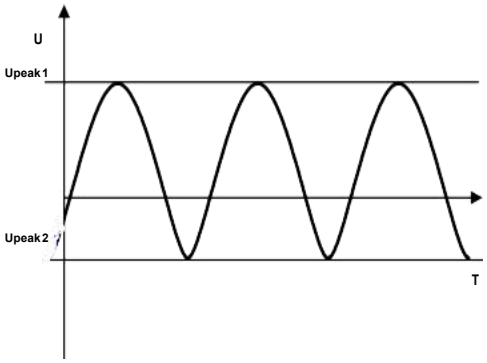


5.5 Life Declaration and invalidation

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.

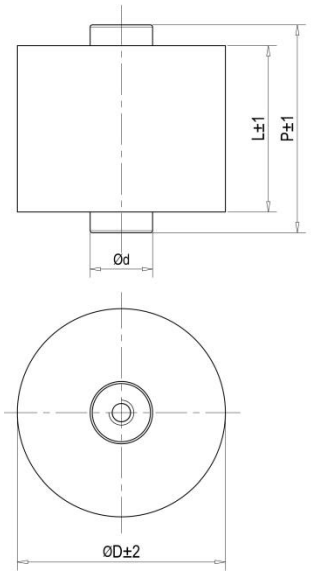


Product features

Reference standard : IEC 61071
medium : Metallized polypropylene film
structure : Dry non inductive structure, polyester tape packaging, resin filling（UL94 V-0）

Electrical characteristics

working temperature : -40 ~+85 ˚C
Capacity range : 0.068 ~3.0μF
Rated voltage : 4K ~20KVDC
Capacity deviation : ± 5% , ± 10%
Loss factor : ≤8×10^{-4} @ 1KHz, 20±5˚C
life expectancy : 100,000 hour @ Un, 70 ˚C (Hot spot temperature)
Interelectrode withstand voltage : 1.5Un (DC) @ 10s, 20±5˚C
Polar shell withstand voltage : (1.5Un+1000)VAC, minimum3000VAC (10s,50Hz)
insulation resistance : (IR×Cn) 30000s (No more than30GΩ), 100VDC (20±5˚C), 1minute



Application

GTO thyristor protection High voltage application of diaphragm

M6*8	M8*8
d= 15mm	d= 18mm
4.5 N.m Max	8.5 N.m Max

Characteristic parameter

ordering code	Cap. (μF)	Size (mm) L	D	Screw mouth	P	ESR @10K Hz(mΩ)	Ls (nH)	Du/dt (v/μs)	Ipeak (A)	UrDMS (VAC)	IrDMS@60˚C @10KHz(A)
Un 4000VDC , Us 6000V											
DTH-4000-0.68-50F6	0.68	50	50	M6*8	61	2.1	≤25	1010	687	1600	16
DTH-4000-0.75-50F6	0.75	50	52	M6*8	61	1.9	≤25	1010	758	1600	17
DTH-4000-1.0-50F8	1.0	50	60	M8*8	61	1.5	≤25	1010	1010	1600	21
DTH-4000-1.25-50F8	1.25	50	67	M8*8	61	1.3	≤25	1010	1263	1600	25
DTH-4000-1.5-50F8	1.5	50	73	M8*8	61	1.1	≤25	1010	1515	1600	28
DTH-4000-2.0-50F8	2.0	50	84	M8*8	61	0.9	≤25	1010	2020	1600	35
DTH-4000-2.5-50F8	2.5	50	93	M8*8	61	0.8	≤25	1010	2525	1600	41
DTH-4000-0.68-64F6	0.68	64	38	M6*8	76	4.0	≤25	770	524	1500	13
DTH-4000-1.0-64F6	1.0	64	45	M6*8	76	3.0	≤25	770	770	1500	17
DTH-4000-1.5-64F6	1.5	64	55	M6*8	76	2.5	≤25	770	1155	1500	24
DTH-4000-2.0-64F8	2.0	64	63	M8*8	76	2.0	≤25	770	1540	1500	29
DTH-4000-2.5-64F8	2.5	64	70	M8*8	76	1.8	≤25	770	1925	1500	34
DTH-4000-3.0-64F8	3.0	64	76	M8*8	76	1.6	≤25	770	2310	1500	38
Un 5000VDC , Us 7500V											
DTH-5000-0.50-50F6	0.50	50	53	M6*8	61	2.2	≤25	1130	565	2000	14
DTH-5000-0.68-50F8	0.68	50	62	M8*8	61	1.7	≤25	1130	768	2000	18
DTH-5000-0.75-50F8	0.75	50	65	M8*8	61	1.6	≤25	1130	848	2000	20
DTH-5000-1.0-50F8	1.0	50	74	M8*8	61	1.3	≤25	1130	1130	2000	24
DTH-5000-1.25-50F8	1.25	50	83	M8*8	61	1.1	≤25	1130	1413	2000	29
DTH-5000-1.5-50F8	1.5	50	90	M8*8	61	0.9	≤25	1130	1695	2000	33
DTH-5000-2.0-50F8	2.0	50	102	M8*8	61	0.8	≤25	1130	2260	2000	41
Un 6000VDC , Us 9000V											
DTH-6000-0.50-64F6	0.50	64	52	M6*8	77	2.7	≤25	1240	620	2400	15
DTH-6000-0.68-64F8	0.68	64	61	M8*8	77	2.1	≤25	1240	843	2400	19
DTH-6000-0.75-64F8	0.75	64	64	M8*8	77	1.9	≤25	1240	930	2400	20
DTH-6000-1.0-64F8	1.0	64	73	M8*8	77	1.5	≤25	1240	1240	2400	25
DTH-6000-1.25-64F8	1.25	64	81	M8*8	77	1.3	≤25	1240	1550	2400	30
DTH-6000-1.5-64F8	1.5	64	89	M8*8	77	1.1	≤25	1240	1860	2400	34
DTH-6000-2.0-64F8	2.0	64	100	M8*8	77	0.9	≤25	1240	2480	2400	41

Characteristic parameter

ordering code	Cap . (μF)	SIZE (mm)				ESR @10K Hz(mΩ)	Ls (nH)	Du/dt (v/μs)	Ipeak (A)	UrDMS (VAC)	IrDMS@60°C @10KHz(A)
		L	D	Screw mouth	P						
Un 6000VDC , Us 9000V											
DTH-6000-0.50-90F6	0.50	90	40	M6*8	100	5.0	≤25	950	475	2250	13
DTH-6000-0.68-90F6	0.68	90	46	M6*8	100	3.8	≤25	950	646	2250	16
DTH-6000-1.0-90F6	1.0	90	55	M6*8	100	2.7	≤25	950	950	2250	22
DTH-6000-1.5-90F8	1.5	90	66	M8*8	100	1.9	≤25	950	1425	2250	29
DTH-6000-2.0-90F8	2.0	90	76	M8*8	100	1.5	≤25	950	1900	2250	35
DTH-6000-2.2-90F8	2.2	90	80	M8*8	100	1.4	≤25	950	2090	2250	38
Un 8000VDC , Us 12000V											
DTH-8000-0.33-80F6	0.33	80	49	M6*8	93	4.0	≤25	1430	472	3200	12
DTH-8000-0.50-80F8	0.50	80	60	M8*8	93	2.7	≤25	1430	715	3200	17
DTH-8000-0.68-80F8	0.68	80	70	M8*8	93	2.1	≤25	1430	972	3200	22
DTH-8000-0.75-80F8	0.75	80	73	M8*8	93	1.9	≤25	1430	1073	3200	23
DTH-8000-1.0-80F8	1.0	80	84	M8*8	93	1.5	≤25	1430	1430	3200	29
DTH-8000-1.25-80F8	1.25	80	93	M8*8	93	1.3	≤25	1430	1788	3200	34
DTH-8000-1.5-80F8	1.5	80	102	M8*8	93	1.1	≤25	1430	2145	3200	39
DTH-8000-0.33-114F5	0.33	114	38	M5*8	124	7.4	≤25	1100	363	3000	11
DTH-8000-0.50-114F6	0.50	114	45	M6*8	124	5.0	≤25	1100	550	3000	15
DTH-8000-0.68-114F6	0.68	114	52	M6*8	124	3.8	≤25	1100	748	3000	19
DTH-8000-0.82-114F6	0.82	114	57	M6*8	124	3.2	≤25	1100	902	3000	22
DTH-8000-1.0-114F8	1.0	114	63	M8*8	124	2.7	≤25	1100	1100	3000	25
DTH-8000-1.5-114F8	1.5	114	76	M8*8	124	1.9	≤25	1100	1650	3000	33
Un 10000VDC , Us 15000V											
DTH-10000-0.33-98F6	0.33	98	55	M6*8	109	4.0	≤25	1600	528	4000	14
DTH-10000-0.50-98F8	0.50	98	67	M8*8	109	2.7	≤25	1600	800	4000	19
DTH-10000-0.68-98F8	0.68	98	77	M8*8	109	2.1	≤25	1600	1088	4000	24
DTH-10000-0.75-98F8	0.75	98	81	M8*8	109	1.9	≤25	1600	1200	4000	26
DTH-10000-1.0-98F8	1.0	98	93	M8*8	109	1.5	≤25	1600	1600	4000	32
DTH-10000-1.25-98F8	1.25	98	104	M8*8	109	1.3	≤25	1600	2000	4000	38
DTH-10000-0.33-140F6	0.33	140	41	M6*8	148	7.4	≤25	1220	403	3750	12
DTH-10000-0.50-140F6	0.50	140	50	M6*8	148	5.0	≤25	1220	610	3750	17
DTH-10000-0.68-140F6	0.68	140	58	M6*8	148	3.8	≤25	1220	830	3750	21
DTH-10000-0.82-140F8	0.82	140	64	M8*8	148	3.2	≤25	1220	1000	3750	24
DTH-10000-1.0-140F8	1.0	140	70	M8*8	148	2.7	≤25	1220	1220	3750	28
DTH-10000-1.2-140F8	1.2	140	76	M8*8	148	2.3	≤25	1220	1464	3750	32
Un 12000VDC , Us 18000V											
DTH-12000-0.22-114F6	0.22	114	49	M6*8	125	5.8	≤25	1750	385	4800	11
DTH-12000-0.33-114F8	0.33	114	60	M8*8	125	4.0	≤25	1750	578	4800	15
DTH-12000-0.50-114F8	0.50	114	73	M8*8	125	2.7	≤25	1750	875	4800	21
DTH-12000-0.68-114F8	0.68	114	84	M8*8	125	2.1	≤25	1750	1190	4800	26
DTH-12000-0.75-114F8	0.75	114	89	M8*8	125	1.9	≤25	1750	1313	4800	29
DTH-12000-1.0-114F8	1.0	114	102	M8*8	125	1.5	≤25	1750	1750	4800	35
Un 14000Vdc , Us 21000V											
DTH-14000-0.15-130F6	0.15	130	45	M6*8	141	8.3	≤25	1890	284	5600	9
DTH-14000-0.22-130F6	0.22	130	53	M6*8	141	5.8	≤25	1890	416	5600	12
DTH-14000-0.33-130F8	0.33	130	64	M8*8	141	4.0	≤25	1890	624	5600	17
DTH-14000-0.50-130F8	0.50	130	79	M8*8	141	2.7	≤25	1890	945	5600	23
Un 20000VDC , Us 30000V											
DTH-20000-0.068-130F6	0.068	130	45	M6*8	141	12.0	≤25	2320	158	6500	6
DTH-20000-0.10-130F6	0.10	130	54	M6*8	141	8.3	≤25	2320	232	6500	9
DTH-20000-0.15-130F8	0.15	130	65	M8*8	141	5.7	≤25	2320	348	6500	12
DTH-20000-0.22-130F8	0.22	130	79	M8*8	141	4.0	≤25	2320	510	6500	16
DTH-20000-1.0-160F8	1.00	160	115	M8*8	141	3.0	≤25	2320	2320	6500	35