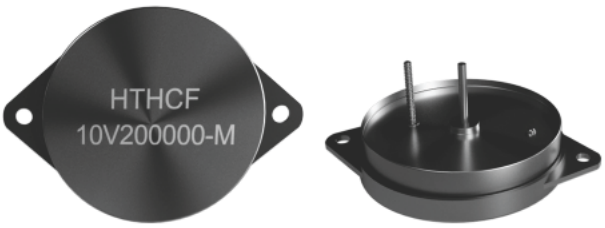
High Energy Tantalum Hybrid Capacitor With Mounting Flange - HTHCF Series

◆Features:

1. All tantalum shell, hermetic seal, lead out in the same direction, polarized, with flange junction structure, easy to install.
2. The product is a hybrid capacitor composed of tantalum electrolytic capacitors and electrochemical capacitors device, small in size and large in energy storage, it is the first innovative product in China.
3. Excellent and stable electrical performance, high reliability, long life, high energy density per unit volume.



◆Specifications:

1. Operating Temperature Range: -55℃~ +125℃. For the Derated Design please see guide line on page 4~6
2. Capacitance Tolerance: K: ± 10%, M: ± 20%
3. Storage temperature: -62℃ ~ +130 ℃

◆Electrical Characteristics

Table 1 Rated Voltage, Category Voltage, Surge Voltage, Nominal Capacitance and Main Features

Rated Voltage(V)	Category Voltage(V)	Surage Voltage(V)	Nominal Capacitance (μF)	tg δ (%)	ESR (Ω) 1kHz	Leakage Current max(μA)		Impedance max (Ω) 100Hz	Capacitance Variation(%)		Dimension D X H (mm)	Max Weight (g)
						25℃	85℃ 125℃	-55℃	-55℃	85℃		
10	6	11	50000	180	0.05	150	900	1.0	-75	140	35.5x8	67
			100000	180	0.035	300	1800		-80	160	35.5x12	90
			150000		0.025						35.5x16	115
			200000	190	0.025	400	1800		-80	160	35.5x20	160
			230000								35.5x24	180
16	9.5	17.6	30000	160	0.05	150	900	1.0	-70	140	35.5x8	67
			60000	165	0.035	300	1800		-80	160	35.5x12	90
			90000		0.025						35.5x16	115
			120000	170	0.025	400	1800		-80	160	35.5x20	160
			140000								35.5x24	180
25	15	27.5	18000	120	0.05	150	900	1.0	-65	120	35.5x8	67
			36000	130	0.040	300	1800		-75	160	35.5x12	90
			54000		0.035						35.5x16	115
			70000	140	0.025	400	1800		-75	160	35.5x20	160
			86000								35.5x24	180
35	20	38.5	12000	90	0.065	150	900	1.0	-50	120	35.5x8	67
			24000	95	0.040	300	1800		-70	160	35.5x12	90
			36000		0.035						35.5x16	115
			50000	100	0.025	400	1800		-70	160	35.5x20	160
			60000								35.5x24	180
50	30	55	8000	65	0.07	170	1000	1.2	-40	120	35.5x8	67
			16000	70	0.040	400	2400		-55	135	35.5x 12	90
			24000		0.035						35.5x16	115
			30000	75	0.025	400	1600		-60	160	35.5x20	160
			32000								35.5x20	160
			33000								35.5x24	180

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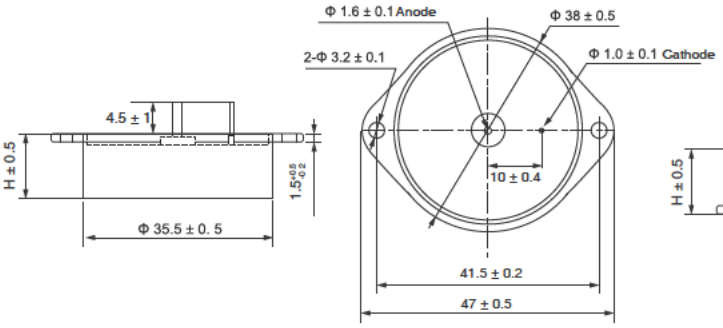
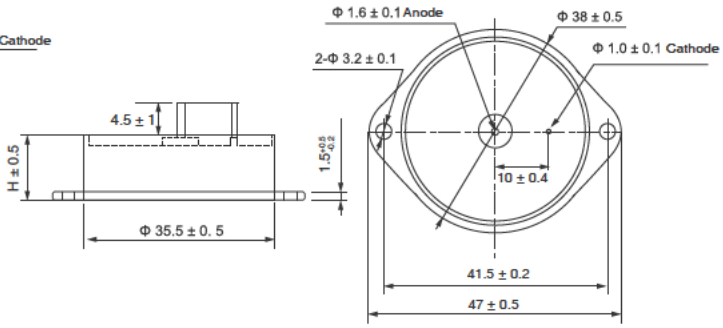
						25℃	85℃ 125℃	-55℃	-55℃	85℃		
63	38	70	1800	40	0.200	126	1000	1.4	-20	60	35.5×8	67
			4000	45	0.100	170			-30	80		
			8000	50	0.040	400	2400		-45	90	35.5×12	90
			12000		0.035						35.5×16	115
			16000	55	0.035	400	1600		-50	100	35.5×20	160
			18000								35.5×24	180
80	48	88	1600	20	0.150	100	1000	1.6	-20	60	35.5×8	70
			2800	40	0.100	200	1200		-30	80		
			5600	40	0.060	500	3000		-40	90	35.5×12	95
			8200		0.040						35.5×16	115
			11000	45	0.035	500	2500		-40	100	35.5×20	160
			13000								35.5×24	180
100	60	110	1200	35	0.125	200	1200	1.8	-25	60	35.5×8	70
			2400	35	0.080	500	3000		-30	80	35.5×12	95
			3600		0.050						35.5×16	125
			4800	40	0.035	500	2500		-30	80	35.5×20	160
			6000								35.5×20	160
110	66	121	580	35	0.2	200	1200	2.0	-20	50	35.5×8	70
			1200	35	0.080	500	3000		-25	60	35.5×12	95
			1800		0.075						35.5×16	125
125	75	138	560	35	0.2	200	1200	2.4	-15	50	35.5×8	70
			1100	30	0.080	500	3000		-25	50	35.5×12	95
			1600		0.075						35.5×16	125
			2200	35	0.05	500	2500		-25	50	35.5×20	160
			2800						-20	40	35.5×24	180

Table 2 Rated Voltage, Category Voltage, Surge Voltage, Nominal Capacitance and Main Features

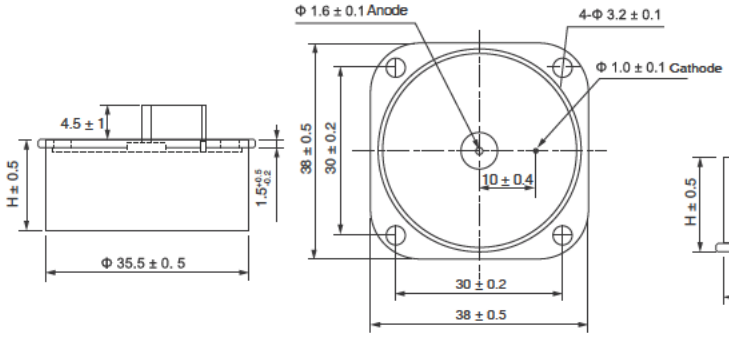
Rated Voltage(V)	Category Voltage(V)	Surage Voltage(V)	Nominal Capacitance (μF)	tg δ (%)	ESR (Ω) 1kHz	Leakage Current max(μA)		Impedance max (Ω) 100Hz	Capacitance Variation(%)		Dimension D X H (mm)	Max Weight (g)
						25℃	85℃ 125℃	-55℃	-55℃	85℃		
10	6	11	30000	120	0.4	200	1600	8	-70	140	19×12	32
16	9.5	17.6	20000	120	0.4	200	1600	8	-70	140	19×12	32
25	15	27.5	12000	90	0.4	200	1600	8	-60	140	19×12	32
30	18	33	10000	85	0.45	200	1600	8	-60	120	19×12	32
35	20	38.5	8000	60	0.45	150	1200	8	-55	100	19×12	32
50	30	55	6000	50	0.45	200	1600	9.6	-55	90	19×12	32
63	38	70	3300	40	0.55	200	1600	11.2	-30	70	19×12	32
75	48	82.5	2200	35	0.65	160	1300	12.8	-25	70	19×12	35
100	60	110	1000	35	0.85	100	800	14.4	-20	30	19×12	35
125	75	138	600	30	1.5	75	600	19.2	-20	30	19×12	35



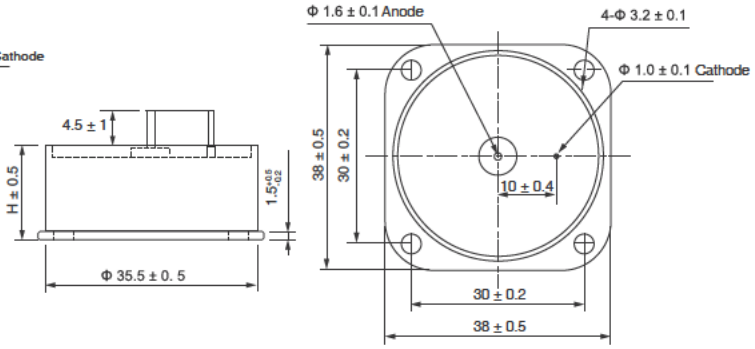
Mounting Dimensional Diagram of HTHCF (Type A)



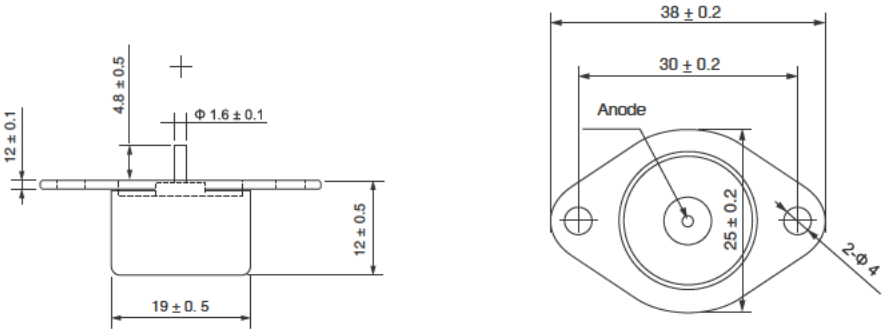
Mounting Dimensional Diagram of HTHCF (Type B)



Mounting Dimensional Diagram of HTHCF (Type C)



Mounting Dimensional Diagram of HTHCF (Type D)



Mounting Dimensional Diagram of HTHCF (Type E)

Figure 1 Outline Structure and Mounting Dimensional Diagram

P.S.: 1. It is forbidden to use a multimeter to measure tantalum capacitors regardless of polarity;

2. The measurement frequency of capacitance and loss tangent is 100Hz, and the measurement method is equivalent series circuit, $U_{\sim}$=2.2$^{\circ}_{-1.0}$V, U_{-}=1.0$^{\circ}_{-0.5}$V (effective value);
3. When measuring the leakage current at 125°C, please apply a category voltage; the leakage current parameter is a 5-minute reading.
4. Products with large capacity or special sizes exceeding this standard can be produced through negotiation with our company.

◆Derated Design guide line:

1. Derating Recommendations

1.1:

The failure rate of tantalum capacitors is for the DC rating (85°C, rated voltage), and varies with usage conditions (ambient temperature, applied voltage, circuit resistance, etc.). In actual circuits, there are often voltage or current peak impulses and ripple currents, or other unexpected electrical impulses, so derating design is necessary in actual use. Only in this way can the safety and reliability of the circuit be

1.2: Rated voltage and derated voltage

The rated voltage (UR) of tantalum capacitors refers to the maximum DC voltage allowed to be applied to the capacitor at a rated temperature of 85°C. If it is used beyond the rated voltage, the dielectric strength of the dielectric oxide film Ta.0. will be exceeded, which will lead to deterioration of the capacitor performance, and even dielectric breakdown and failure in severe cases.

The environment in which the actual circuit is used is very complex, so in the circuit design, derating design is generally adopted. According to the "Component Derating Criteria" standard, the derating levels of tantalum capacitors are divided into 1, Ⅱ, and Ⅲ. , Class I derating is derated by 50% of the benchmark DC working voltage, class II derating is derated by 60% of the benchmark DC working voltage, and class III derating is derated by 70% of the benchmark DC working voltage.

When the ambient temperature is not more than 85°C, the derated reference DC working voltage is the rated voltage (Ur); when the ambient temperature is more than 85°C, the derated reference DC working voltage is the derated voltage specified in this manual for each model (Ur). Uc). In the derating design, non-solid electrolyte tantalum capacitors and conductive polymer electrolyte tantalum capacitors should be derated at least according to level III. When these two types of tantalum capacitors are used in circuits or filter circuits with high reliability requirements, it is recommended that they should be at least level II Derating; solid electrolyte (manganese dioxide) tantalum capacitors are derated at a minimum of 65% of the reference DC working voltage. When this type of tantalum capacitors are used in circuits or filter circuits with high reliability requirements, it is recommended to derate at least according to class I.

Under the conditions allowed by the design, the derating range should be increased as much as possible. For tantalum capacitors, the larger the derating range, the higher the reliability.

2. Reverse voltage

2.1:

The rated voltage (UR) of tantalum capacitors refers to the maximum DC voltage allowed to be applied to the capacitor at a rated temperature of 85°C. If it is used beyond the rated voltage, the dielectric strength of the dielectric oxide film Ta.0. will be exceeded, which will lead to deterioration of the capacitor performance, and even dielectric breakdown and failure in severe cases.

2.2:

In principle, it is forbidden to use a three-meter electrical barrier to test the circuit with tantalum capacitors or the capacitor itself regardless of polarity (it is easy to apply reverse electricity.

2.3:

In the process of measurement and use, if the tantalum capacitor is accidentally applied to the reverse voltage exceeding the specified value. Even if its electrical parameters are still qualified, the capacitor should be scrapped.
Because the quality hidden danger caused by the reverse voltage of the capacitor has a certain latency period, it may not be manifested at that time.

Table 1 Recommended voltage for various types of products

Product Type	Series	Recommended voltage	
		-55℃~85℃	85℃~125℃
Non-Solid Electrolyte Tantalum Capacitors (Tantalum Case)	HCAK38,HCAK39, HCAK39H,HTHC1 etc.	65%U_R	42%U_R
Non-solid Electrolyte Tantalum Capacitors (Silver Case)	HCAK35,HCAK86 etc.	65%U_R	42%U_R
MnO. Solid Electrolyte Tantalum Capacitors (Metal Case)	HCAK,HCAK- 1 etc.	(50%-60%)U_R	40% U_R
Polymer Solid Electrolyte Tantalum Capacitors (Metal Case)	HCAK66 etc.	(50%-60%)U_R	40% U_R
MnO. Chip Type Solid Electrolytic Tantalum Capacitor (Molded Plastic Package)	HCAK45,HCAK45L, HCAK45U,HCAK45M etc.	50%U_R	33%U_R
Chip Polymer Solid Electrolyte Tantalum Capacitor (Molded Plastic Package)	HCAK55,HCAK55H etc.	50%U_R	33% U_R
MnO. Solid Electrolyte Tantalum Capacitors (Molded Plastic)	HCAK44,HCAK41 etc.	50%U_R	33% U_R

When the circuit adopts all tantalum capacitors above 35V (including 35V), it should be able to withstand the reverse test of the 1.5V power supply of the three-meter, and the 9V power supply should be absolutely prohibited.

3. Influence factors of failure rate

3.1:

The lower the voltage across the actually added tantalum capacitor is lower than the rated voltage, the lower the failure rate of the tantalum capacitor. The failure rate of tantalum capacitors is evaluated under the maximum allowable load conditions at the rated voltage of 85℃.

3.2:

Another factor that affects the failure is the series resistance connected to the outer circuit of the capacitor. The greater the resistance in series with the capacitor in the outer circuit circuit, the lower the failure rate.

Failure rate grade: 2.0%/1000h is expressed as L; 1.0%/1000h is expressed as M; 0.1%/1000h is expressed as P; 0.01%/1000h is expressed as R, 0.001%/1000h is expressed as S.

Table 2 Reverse voltage resistance of various types of products

Product Type		Series	Withstand reverse voltage
Non-Solid Electrolyte Tantalum Capacitors	All tantalum capacitors with tantalum case	HCAK38, HCAK39, HCAK38T etc.	Resistant to 3V reverse voltage
	Hybrid Tantalum Capacitors	HTHC1, HTHC2, HTHC1W, HCAK36S1, HCAK36S1W etc.	Not resistant to reverse voltage
	Silver case	HCAK35, HCAK35X, HCAK86, HCAK81 etc.	Not resistant to reverse voltage
Solid Electrolyte Tantalum Capacitors		HCAK, HCAK-1, HCAK-8, HGCA, HGCA411C etc.	Generally, reverse voltage is not allowed, let alone used in pure AC circuits. If it is unavoidable, it is allowed to apply a reverse voltage not greater than the following in a short period of time, and its value is: below 25°C: ≤10%U_R or 1V (whichever is smaller); below 85°C: ≤ 5%U_R or 0.5V (whichever is smaller); below 125°C: ≤1% U_R or 0.1V (whichever is smaller). Note: If the capacitor needs to work in a circuit with reverse voltage for a long time, please use a bipolar tantalum capacitor, but it can only be used in a DC or pulsating circuit with a low frequency of polarity change.
Polymer Solid Electrolyte Tantalum Capacitors		HCAK66 etc.	Not resistant to reverse voltage
Solid Electrolyte Tantalum Capacitors		HCAK44, HCAK41 etc.	Not resistant to reverse voltage
Chip Tantalum Solid Electrolyte Tantalum Capacitors		HCAK45, HCAK45L, HCAK45U, HCAK45M etc.	Not resistant to reverse voltage
Chip Polymer Solid Electrolyte Tantalum Capacitors		HCAK55, HCAK55H etc.	Not resistant to reverse voltage

Note: Specification is subject to change without further notice. For more details and updates, please visit our website.