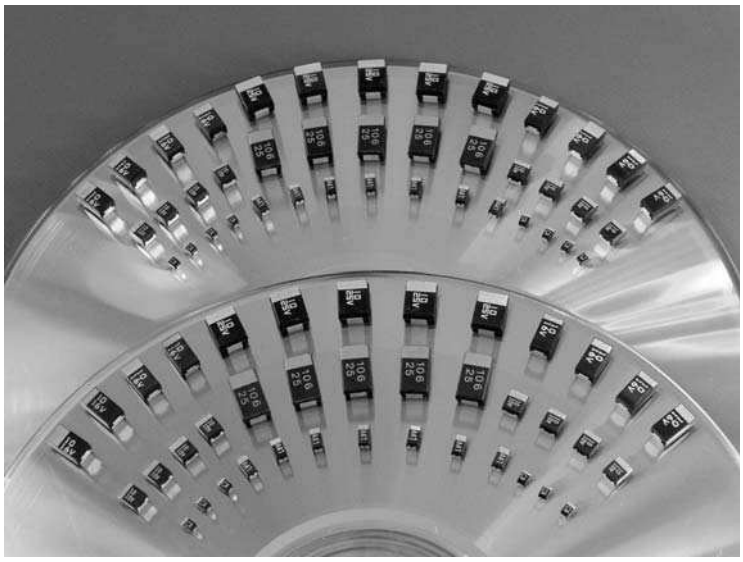
A

Tantalum Capacitor



INTRODUCTION

Tantalum capacitor are designed with excellent performance characteristics for filtering, blocking, and R.C tunning circuits. They are used extensively in industrial, commercial, entertainment and medical electronic equipment. They exhibit the proven characteristics of wide temperature rangeand long-term stability.

The advantages of tantalum capacitor electrolytic capacitor consist of their chemical stability, thelow thickness and high dielectric constant of the tantalum oxide layer, and the capability of sintering an odes with a very large surface from tantalum powder.

The low reactivity of the tantalum oxide layer allows the employment of highly conductive electrolytes, and thus achieves a low series resistance. Capacitance and dissipation factor in relation to temperature and frequency thus prove to be very favourable. Additionally, there is also the wide temperature range of several types form -55℃ to +125℃.

A further advantage of the dielectric being inactive is a leakage current that is smaller than of aluminium electrolytic capacitor which does not rise considerably even at dead storage. Tantalum electrolytic capacitor thus show a very long life during operation and storage.

The capacitance of the tantalum electrolytic capacitor is very high due to the high dielectric constant and the low thickness of tantalum oxide layer. The use of sintered anodes with a large surface allows very small dimensions that can not be reached or exceeded by any other capacitor.

The tantalum electrolytic capacitor at issue are polarized capacitors. In the case of polarized electrolytic capacitor, the dielectric is structured in such a manner that the flow of current is interrupted in one direction. It is therefore necessary to observe the indications regarding polarity when using these capacitor (positive pole on anode and negative pole on cathode). In the case of tantalum capacitor, a mispolarizing is permissible up to the values indicated in reversal voltage.

The tantalum capacitor is a polar electrolytic capacitor. The anode is a porous body of sintered tantalum powder. A layer of tantalum oxide is formed over the whole sintered anode surface by an electrolytic oxidation process.

This oxide layer, which has a high dielectric constant ($\varepsilon \approx 27$), functions as the dielectric medium of the capacitor. The final thickness of the layer determines the rated working voltage of the capacitor. Manganese dioxide, a solid semiconducting electrolytic, is deposited in the pores and on the external surface of the formed anode to serve as the cathode. Electrical connection to the cathode is effected by applying a metallic coating to the outer MnO2 layer.

As a result of the high stability of the oxide layer the leakage current to the capacitor is very small,even after prolonged storage. The use of a solid semiconducting electrolytic guarantees high stability of the electrical properties over long periods of time and over a wide range of temperatures and frequencies.

介 绍

钽质电容器的设计具备了极好的过滤，R.C 调谐电路性能，它们被广泛地用于工业、商业、娱乐和医疗电子设备，它们也展示了宽广的温度波动和长期稳定性的特性。

钽质电容器和铝质电解电容器的优点是由它们化学稳定性、低厚度，以及高非传导性钽质氧化层组成的，另外，正极表面有大面积钽质粉沫。

钽质氧化层的低反应可以起到高传导电解的作用，这样就可以达到很低的阻抗，与温度、频率相关的因素—容量、分散力，也已经证实非常有用。另外，还有一些温度域很广的电容器，它们的温度范围可以从-50℃达到+125℃。

钽质电容器比铝质电解电容器的一个更好的优点就在于，当钽电容发生电流泄露的时候，不会像铝质电解电容那样持续上升，就这样，钽质电容器在使用、操作和储存方面都有很强的生命力。

钽质电容器的容量相当高，基于其高度的非传导性，恒量和低厚度的钽质氧化层，烧结正极上大表面积的用途，就可以让其它电容器无法达到或者超过体积，这也是其它电容器望而莫及的，钽质电容器中存在争议的是其两极化，极性电解电容器，其电解结构是以这样方式的，那就是在其一个电流方向中干扰。这样，当我们在使用过程中就不难找出其极性了（正端脚是正极，负端脚为负极）。在钽质电容器方面，极性混淆只能在其电压范围内才被允许的，即超出其电压范围把极性调换是绝不允许的。钽质电容器是一种极性化的电解电容器，一个钽质氧化层是在整个烧结正极表上的电解质氧化过程形成的。

这种氧化层有一种高度电解恒量（$\varepsilon \approx 27$），功能跟电容器的电解媒介一样，最里一层的厚度决定电容的额定电压，二氧化锰——种固体半导体电解质，被储存在孔里，在形成正极的外表面是为负极而服务的，阴极电流连结是由电容器外表面的二氧化锰金属性外表面起作用的。

由于氧化层高度的稳定性，电容器泄露电流很少。固体半导体电解质的使用可以在经过相当长时间里仍然保持高度的稳定性和一个宽广的温度及频率波动范围。

FEATURE AND APPLICATION

Feature

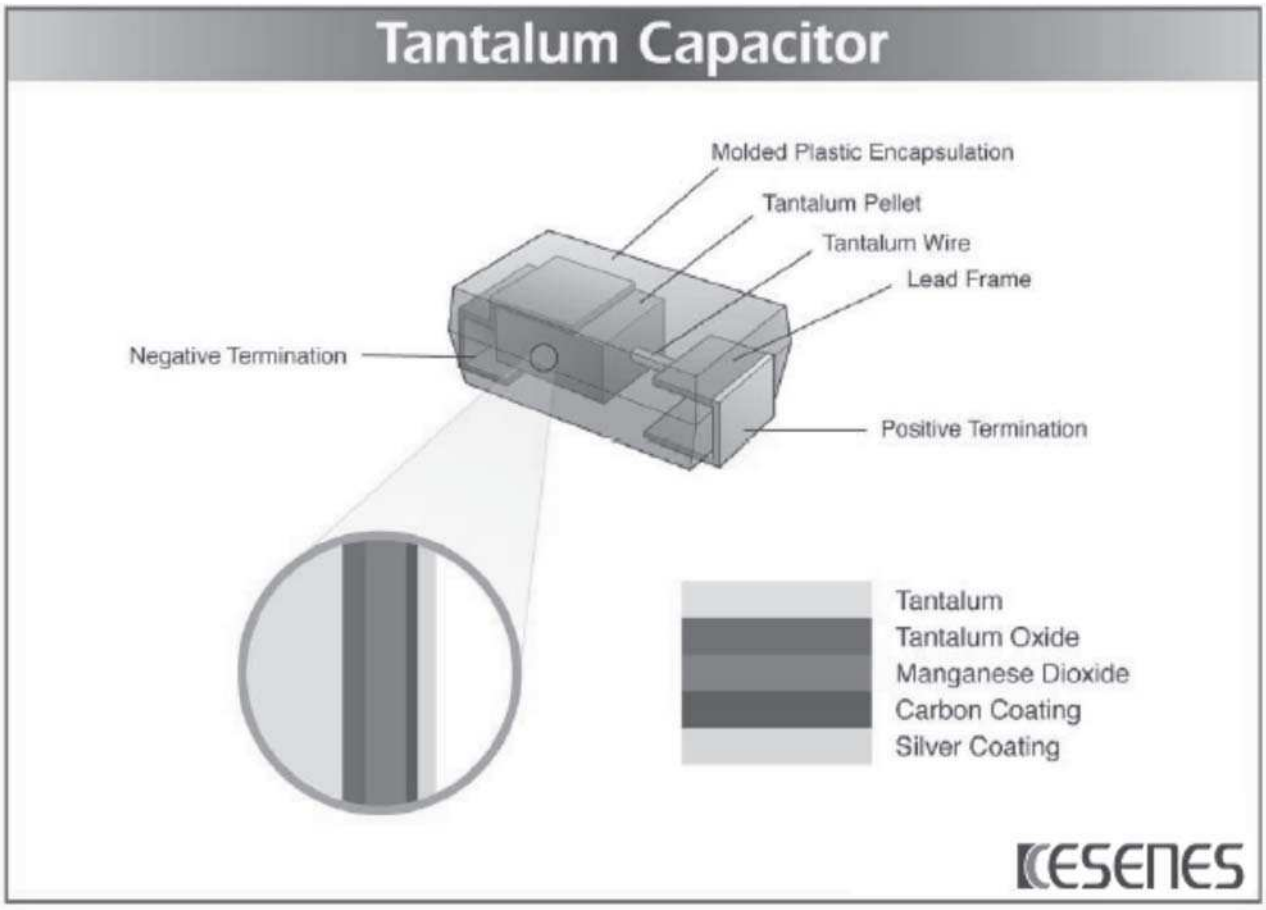
The product is a standard type that has been most widely used among tantalum chip capacitors.

- Molded Case available in four case codes.
- Compatible with automatic pick and place equipment.
- Meets or Exceeds EIA standard 535BAAC.

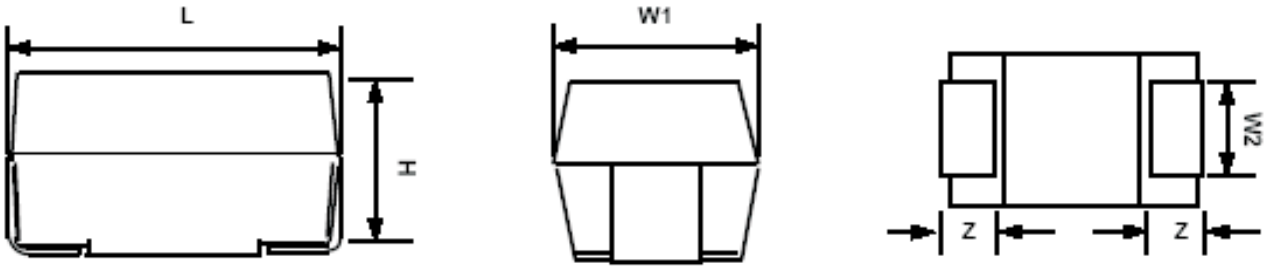
Application

- General electronic equipment
- Smoothing Circuit of DC-DC Converters & Output side of AC-DC Converters
- De-Coupling Circuit of High Speed Ics & MPUs
- Various Other High Frequency Circuit Applications

STRUCTURE（结构）



APPEARANCE AND DIMENSION（外观与尺寸）



Case Code	EIA code	DIMENSION (mm)				
		L	W1	W2	H	Z
J	-	1.6 ± 0.1	0.8 ± 0.1	0.6 ± 0.1	0.8 ± 0.1	0.3 ± 0.15
P	2012	2.0 ± 0.2	1.25 ± 0.2	0.9 ± 0.1	1.1 ± 0.1	0.5 ± 0.1
A2	3216L	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.1 ± 0.1	0.8 ± 0.2
A	3216	3.2 ± 0.2	1.6 ± 0.2	1.2 ± 0.1	1.6 ± 0.2	0.8 ± 0.2
B2	3528L	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.1 ± 0.1	0.8 ± 0.2
B	3528	3.5 ± 0.2	2.8 ± 0.2	2.2 ± 0.1	1.9 ± 0.2	0.8 ± 0.2
C2	-	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	1.4 ± 0.1	1.3 ± 0.2
C	6032	6.0 ± 0.2	3.2 ± 0.2	2.2 ± 0.1	2.5 ± 0.2	1.3 ± 0.2
D	7343	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	2.8 ± 0.2	1.3 ± 0.2
E	7343H	7.3 ± 0.2	4.3 ± 0.2	2.4 ± 0.1	4.1 ± 0.2	1.3 ± 0.2
V	7361	7.3 ± 0.2	6.1 ± 0.2	3.1 ± 0.1	3.45 ± 0.3	1.4 ± 0.2

PART NUMBERING（型号命名方式）

Product symbol（产品代码）

CA45	C	106	M	1C	A
①	②	③	④	⑤	⑥

① Type (类型)
KESENES Tantalum Capacitor Normal - Standard series
(珂西尼钽电容标准系列)

② Dimension (尺寸)

Case Code	J	P	A	B	C	D	E	V
EIA Code	—	2012	3216	3528	6032	7343	7343H	7361

③ Capacitance (容量)
The first two digits are significant, The last digit specifies the number of zeros to follow;Third aode idicate the power unit. (标称容量是采用三位数表示法，前二位数表示有效数字，第三位表示“0”的个数，单位pF.)

Symbol	105	685	106	476	107	477
Capacitance (μF)	1.0	6.8	10	47	100	470
Pico Farad (pF)	$10x10^5$	$68x10^5$	$10x10^6$	$47x10^6$	$10x10^7$	$47x10^7$

④ Tolerance (容量偏差)

Symbol	J	K	M
Tolerance (%)	±5	±10	±20

⑤ Rated Voltage (额定电压)

Symbol	0E	0G	0J	1A	1C	1D	1E	1V	1T
DC Rated Voltage (V)	2.5	4	6.3	10	16	20	25	35	50

⑥ Packing (包装)
T: Bulk (散装), 500pcs/B ;
A: Tape Reel (编带盘装),
J: 4000pcs/Reel ;
P: 3000pcs/Reel ;
A,B: 2000pcs/Reel ;
C,D,E,V: 500pcs/Reel .

MARKING (标记)

J Case

DC Working Voltage and Capacitance

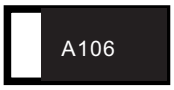
Polarity (White)

P Case

DC Working Voltage and Capacitance

Polarity (White)

A Case



Capacitance Code

DC Working Voltage

Polarity (White)

A Case

Polarity (White)

Capacitance Code

DC Working Voltage & KESENES I.D. Symbol

1st Digit = Year
2nd & 3rd Digits = Week
"412" = The 12nd week of 2004

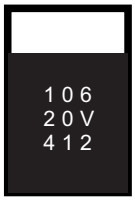
B Case

Capacitance in μF

DC Working Voltage

Polarity (White)

B Case



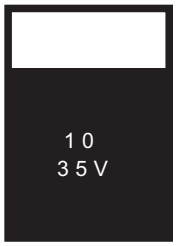
Polarity (White)

Capacitance Code

DC Working Voltage & KESENES I.D. Symbol

1st Digit = Year
2nd & 3rd Digits = Week
"412" = The 12nd week of 2004

C、D、E、V Case

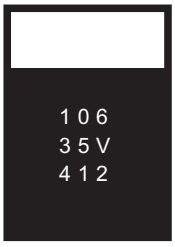


Polarity (White)

Capacitance in μF

DC Working Voltage

C、D、E 、V Case



Polarity (White)

Capacitance Code

DC Working Voltage & KESENES I.D. Symbol

1st Digit = Year
2nd & 3rd Digits = Week
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STANDARD VALUE AND CASE SIZE (标准的数值和尺寸)

UR / μF	2.5V (0E)	4V (0G)	6.3V (0J)	10V (1A)	16V (1C)	20V (1D)	25V (1E)	35V (1V)	50V (1T)
0.10								A	A
0.15								A	A,B
0.22								A	A,B
0.33							A	A	A,B
0.47					P	A2	A	A,B	A,B,C
0.68					P	A2,A	A	A,B	B,C
1.0			P	P	J,P,A	P,A2,A	P,A2,A,B	A2,A,B	B,C
1.5			P	J,P,A	J,A	A2,A	A,B	A,B,C	B,C,D
2.2		P	J,P,A	J,P,A,B	P,A2,A,B	P,A2,A,B	A,B,C	A,B,C	C,D
3.3		P,A	J,P,A	J,P,A2,A	P,A2,A,B	A2,A,B2,B	A,B,C	B2,B,C	C,D
4.7		P,A	J,P,A2,A,B	J,P,A2,A,B	A2,A,B2,B	A2,A,B2,B,C	A,B2,B,C	B,C,D	D
6.8		J,P,A2,A	J,P,A2,A,B	P,A2,A,B2,B	A,B2,B,C	A,B2,B,C2,C	B,C	C,D	D,E
10	J	J,P,A2,A,B	J,P,A2,A,B2,B,C	P,A2,A,B2,B,C	A,B2,B,C2,C	B,C2,C	B,C2,C,D	C,D,E	D,E
15	J	P,A2,A,B2,B	P,A2,A,B2,B,C	A2,A,B2,B,C2,C	A,B,C2,C	B,C,D	C,D	C,D,E	E
22	P,A2	P,A2,A,B2,B,C	P,A2,A,B2,B,C2,C	A,B2,B,C2,C	B2,B,C2,C,D	B,C2,C,D	C,D	D,E	V
33	P,A2,A	P,A2,A,B2,B,C2,C	A2,A,B2,B,C2,C	A,B2,B,C2,C,D	B,C2,C,D	C,D	D,E	D,E,V	
47	P,A2,A	P,A2,A,B2,B,C2,C	A,B2,B,C2,C,D	B,C2,C,D	C,D	C,D,E	D,E	E,V	
68	A	A,B2,B,C2,C,D	A,B2,B,C2,C,D	B,C2,C,D	C,D	D,E	E,V	V	
100	B2,B	A,B2,B,C2,C,D	B2,B,C2,C,D	B,C2,C,D,E	D,E	D,E,V	V		
150	A,B2,B,C2	B,C2,C,D	C,D,E	C,D,E	D,E,V	E,V			
220	B2,B,C2,D	B,C,D,E	C,D,E	D,E	D,E,V				
330	B,C,D	C,D,E	C,D,E,V	D,E,V	E,V				
470	B,C,D	D,E	D,E,V	E,V					
680	D,E	D,E	E,V	V					
1000	D,E	D,E,V	V						
1500	D,E,V								
2200	V								

STANDARD RATINGS（标准参数值）

Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
2.5	CA45J106*0EA	10	J	0.5	20	6.5
	CA45J156*0EA	15	J	0.5	20	8
	CA45P226*0EA	22	P	0.5	20	4
	CA45A2226*0EA	22	A2	0.5	12	3
	CA45P336*0EA	33	P	0.8	20	4
	CA45A2336*0EA	33	A2	0.8	12	4
	CA45A336*0EA	33	A	1.0	6	4
	CA45P476*0EA	47	P	1.1	30	6
	CA45A2476*0EA	47	A2	1.1	12	4.5
	CA45A476*0EA	47	A	1.1	12	4.5
	CA45A686*0EA	68	A	1.7	18	4.5
	CA45B2107*0EA	100	B2	2.5	18	1.3
	CA45B107*0EA	100	B	2.5	8	1
	CA45A157*0EA	150	A	3.7	30	2
	CA45B2157*0EA	150	B2	3.7	20	1
	CA45B157*0EA	150	B	3.0	10	1.6
	CA45C2157*0EA	150	C2	3.7	12	0.8
	CA45B2227*0EA	220	B2	5.5	30	1
	CA45B227*0EA	220	B	5.5	18	0.6
	CA45C2227*0EA	220	C2	5.5	12	0.8
	CA45D227*0EA	220	D	5.5	8	0.3
	CA45B337*0EA	330	B	8.2	25	0.6
	CA45C337*0EA	330	C	8.2	16	0.3
	CA45D337*0EA	330	D	8.2	8	0.3
	CA45B477*0EA	470	B	11.7	35	0.6
	CA45C477*0EA	470	C	11.7	18	1.5
	CA45D477*0EA	470	D	11.7	14	0.5
	CA45D687*0EA	680	D	17.0	16	0.2
	CA45E687*0EA	680	E	17.0	10	0.2
	CA45D108*0EA	1000	D	25.0	20	0.2
	CA45E108*0EA	1000	E	20.0	14	0.4
	CA45D158*0EA	1500	D	37.5	60	0.2
	CA45E158*0EA	1500	E	37.0	20	0.2
	CA45V158*0EA	1500	V	30.0	20	0.2
	CA45V228*0EA	2200	V	55.0	50	0.2
4	CA45P225*0GA	2.2	P	0.5	8	12
	CA45P335*0GA	3.3	P	0.5	20	20
	CA45A335*0GA	3.3	A	0.5	6	7.6
	CA45P475*0GA	4.7	P	0.5	8	6
	CA45A475*0GA	4.7	A	0.5	6	6.3
	CA45J685*0GA	6.8	J	0.5	20	7.5
	CA45P685*0GA	6.8	P	0.5	10	6
	CA45A2685*0GA	6.8	A2	0.5	6	15
	CA45A685*0GA	6.8	A	0.5	6	5.5
	CA45J106*0GA	10	J	0.5	20	6.5
	CA45P106*0GA	10	P	0.5	20	6

* To complete KESENES Part Number, insert M for ±20% tolerance or K for ±10% tolerance.

Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
4	CA45A2106*0GA	10	A2	0.5	6	15
	CA45A106*0GA	10	A	0.5	6	5.1
	CA45B106*0GA	10	B	0.5	6	3.5
	CA45P156*0GA	15	P	0.6	20	5
	CA45A2156*0GA	15	A2	0.6	10	15
	CA45A156*0GA	15	A	0.6	6	3.4
	CA45B2156*0GA	15	B2	0.6	6	5
	CA45B156*0GA	15	B	0.6	6	2.9
	CA45P226*0GA	22	P	0.8	20	4
	CA45A2226*0GA	22	A2	0.8	12	2.8
	CA45A226*0GA	22	A	0.8	8	2.5
	CA45B2226*0GA	22	B2	0.9	6	5
	CA45B226*0GA	22	B	0.9	6	2.5
	CA45C226*0GA	22	C	0.9	6	1.8
	CA45P336*0GA	33	P	1.3	20	4
	CA45A2336*0GA	33	A2	1.3	8	4.5
	CA45A336*0GA	33	A	1.3	10	3
	CA45B2336*0GA	33	B2	1.3	8	5
	CA45B336*0GA	33	B	1.3	6	2
	CA45C2336*0GA	33	C2	1.3	6	1.8
	CA45C336*0GA	33	C	1.3	6	1.8
	CA45P476*0GA	47	P	1.8	30	3
	CA45A2476*0GA	47	A2	1.8	15	4.5
	CA45A476*0GA	47	A	1.8	12	2.5
	CA45B2476*0GA	47	B2	1.8	12	1.7
	CA45B476*0GA	47	B	1.9	6	1.9
	CA45C2476*0GA	47	C2	1.9	6	1.8
	CA45C476*0GA	47	C	1.9	6	1.8
	CA45A686*0GA	68	A	2.7	12	2.5
	CA45B2686*0GA	68	B2	2.7	15	1.5
	CA45B686*0GA	68	B	2.7	6	1.9
	CA45C2686*0GA	68	C2	2.7	6	1.8
	CA45C686*0GA	68	C	2.7	6	1.4
	CA45D686*0GA	68	D	2.7	6	0.8
	CA45A107*0GA	100	A	4.0	30	2
	CA45B2107*0GA	100	B2	4.0	20	1.3
	CA45B107*0GA	100	B	4.0	12	0.8
	CA45C2107*0GA	100	C2	4.0	10	0.8
	CA45C107*0GA	100	C	4.0	6	0.8
	CA45D107*0GA	100	D	4.0	6	0.7
	CA45B157*0GA	150	B	6.0	18	0.7
	CA45C2157*0GA	150	C2	6.0	10	0.8
	CA45C157*0GA	150	C	6.0	12	0.7
	CA45D157*0GA	150	D	6.0	8	0.6
	CA45B227*0GA	220	B	8.8	18	0.5
	CA45C227*0GA	220	C	8.8	12	0.6

* To complete KESENES Part Number, insert M for ±20% tolerance or K for ±10% tolerance.

Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
4	CA45D227*0GA	220	D	8.8	8	0.6
	CA45E227*0GA	220	E	8.8	8	0.5
	CA45C337*0GA	330	C	13.2	14	0.2
	CA45D337*0GA	330	D	13.2	8	0.6
	CA45E337*0GA	330	E	13.2	8	0.5
	CA45D477*0GA	470	D	18.8	16	0.3
	CA45E477*0GA	470	E	18.8	10	0.5
	CA45D687*0GA	680	D	27.2	24	0.3
	CA45E687*0GA	680	E	27.2	12	0.5
	CA45D108*0GA	1000	D	40.0	60	0.2
	CA45E108*0GA	1000	E	40.0	12	0.5
	CA45V108*0GA	1000	V	40	15	0.2
6.3	CA45P105*0JA	1.0	P	0.5	8	12
	CA45P155*0JA	1.5	P	0.5	10	25
	CA45J225*0JA	2.2	J	0.5	20	17.5
	CA45P225*0JA	2.2	P	0.5	8	12
	CA45A225*0JA	2.2	A	0.5	6	7.6
	CA45J335*0JA	3.3	J	0.5	20	13.5
	CA45P335*0JA	3.3	P	0.5	8	12
	CA45A335*0JA	3.3	A	0.5	6	6.3
	CA45J475*0JA	4.7	J	0.5	20	8.5
	CA45P475*0JA	4.7	P	0.5	20	10
	CA45A2475*0JA	4.7	A2	0.5	6	15
	CA45A475*0JA	4.7	A	0.5	8	5.5
	CA45B475*0JA	4.7	B	0.5	6	5
	CA45J685*0JA	6.8	J	0.5	20	7
	CA45P685*0JA	6.8	P	0.5	20	7
	CA45A2685*0JA	6.8	A2	0.5	8	6.5
	CA45A685*0JA	6.8	A	0.5	6	5
	CA45B685*0JA	6.8	B	0.5	6	3.4
	CA45J106*0JA	10	J	0.6	20	8
	CA45P106*0JA	10	P	0.6	20	6
	CA45A2106*0JA	10	A2	0.6	8	4.5
	CA45A106*0JA	10	A	0.6	8	3.2
	CA45B2106*0JA	10	B2	0.6	6	5
	CA45B106*0JA	10	B	0.6	6	2.9
	CA45C106*0JA	10	C	0.6	6	2.5
	CA45P156*0JA	15	P	0.9	20	5
	CA45A2156*0JA	15	A2	0.9	12	4
	CA45A156*0JA	15	A	0.9	8	3
	CA45B2156*0JA	15	B2	0.9	6	5
	CA45B156*0JA	15	B	0.9	6	2.5
	CA45C156*0JA	15	C	0.9	6	1.8
	CA45P226*0JA	22	P	1.3	20	4
	CA45A2226*0JA	22	A2	1.3	12	2.8
	CA45A226*0JA	22	A	1.3	10	3

* To complete KESENES Part Number, insert M for ±20% tolerance or K for ±10% tolerance.

Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
6.3	CA45B2226*0JA	22	B2	1.3	8	2
	CA45B226*0JA	22	B	1.3	8	1.6
	CA45C2226*0JA	22	C2	1.4	6	1.8
	CA45C226*0JA	22	C	1.3	6	1.8
	CA45A2336*0JA	33	A2	2.0	18	3
	CA45A336*0JA	33	A	2.0	12	2.5
	CA45B2336*0JA	33	B2	2.0	12	1.7
	CA45B336*0JA	33	B	2.0	6	1.9
	CA45C2336*0JA	33	C2	2.0	6	1.8
	CA45C336*0JA	33	C	2.0	6	1.5
	CA45A476*0JA	47	A	2.9	12	2
	CA45B2476*0JA	47	B2	2.9	12	1.7
	CA45B476*0JA	47	B	2.9	8	1.3
	CA45C2476*0JA	47	C2	2.9	6	1.8
	CA45C476*0JA	47	C	2.9	8	0.9
	CA45D476*0JA	47	D	2.8	6	0.8
	CA45A686*0JA	68	A	4.2	30	2
	CA45B2686*0JA	68	B2	4.2	20	2
	CA45B686*0JA	68	B	4.2	10	1
	CA45C2686*0JA	68	C2	4.2	10	0.8
	CA45C686*0JA	68	C	4.1	6	0.8
	CA45D686*0JA	68	D	4.1	6	0.7
	CA45B2107*0JA	100	B2	6.3	20	1.3
	CA45B107*0JA	100	B	6.3	12	0.9
	CA45C2107*0JA	100	C2	6.3	10	0.8
	CA45C107*0JA	100	C	6.3	10	0.6
	CA45D107*0JA	100	D	6.0	6	0.7
	CA45C157*0JA	150	C	9.4	10	0.6
	CA45D157*0JA	150	D	9.0	8	0.6
	CA45E157*0JA	150	E	9.0	8	0.5
	CA45C227*0JA	220	C	13.8	14	1.2
	CA45D227*0JA	220	D	13.8	12	0.5
	CA45E227*0JA	220	E	13.2	8	0.5
	CA45C337*0JA	330	C	20.7	14	0.6
	CA45D337*0JA	330	D	20.7	14	0.5
	CA45E337*0JA	330	E	19.8	8	0.5
	CA45V337*0JA	330	V	20.8	8	0.5
	CA45D477*0JA	470	D	29.6	20	0.3
	CA45E477*0JA	470	E	28.2	10	0.5
	CA45V477*0JA	470	V	29.6	10	0.4
	CA45E687*0JA	680	E	42.8	10	0.5
	CA45V687*0JA	680	V	40.8	12	0.5
	CA45V108*0JA	1000	V	63.0	16	0.4
10	CA45P105*1AA	1.0	P	0.5	10	25
	CA45J155*1AA	1.5	J	0.5	20	25.5
	CA45P155*1AA	1.5	P	0.5	20	25

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Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
10	CA45A155*1AA	1.5	A	0.5	6	8
	CA45J225*1AA	2.2	J	0.5	20	17.5
	CA45P225*1AA	2.2	P	0.5	20	19
	CA45A225*1AA	2.2	A	0.5	6	6.3
	CA45B225*1AA	2.2	B	0.5	6	3.5
	CA45J335*1AA	3.3	J	0.5	20	25
	CA45P335*1AA	3.3	P	0.5	20	13
	CA45A2335*1AA	3.3	A2	0.5	8	8
	CA45A335*1AA	3.3	A	0.5	6	5.5
	CA45J475*1AA	4.7	J	0.5	20	10
	CA45P475*1AA	4.7	P	0.5	20	6
	CA45A2475*1AA	4.7	A2	0.5	8	8
	CA45A475*1AA	4.7	A	0.5	8	4.5
	CA45B475*1AA	4.7	B	0.5	6	3.4
	CA45P685*1AA	6.8	P	0.5	8	6
	CA45A2685*1AA	6.8	A2	0.6	8	8
	CA45A685*1AA	6.8	A	0.6	8	4.5
	CA45B2685*1AA	6.8	B2	0.7	6	5
	CA45B685*1AA	6.8	B	0.7	6	2.9
	CA45P106*1AA	10	P	1.0	20	6
	CA45A2106*1AA	10	A2	1.0	8	8
	CA45A106*1AA	10	A	1.0	8	3.2
	CA45B2106*1AA	10	B2	1.0	6	5
	CA45B106*1AA	10	B	1.0	8	2.4
	CA45C106*1AA	10	C	1.0	6	1.8
	CA45A2156*1AA	15	A2	1.5	12	3
	CA45A156*1AA	15	A	1.5	6	2.9
	CA45B2156*1AA	15	B2	1.5	8	2.7
	CA45B156*1AA	15	B	1.5	6	2
	CA45C2156*1AA	15	C2	1.5	6	1.8
	CA45C156*1AA	15	C	1.5	6	1.8
	CA45A226*1AA	22	A	2.2	12	2.5
	CA45B2226*1AA	22	B2	2.2	8	1.9
	CA45B226*1AA	22	B	2.2	8	1.4
	CA45C2226*1AA	22	C2	2.2	6	1.8
	CA45C226*1AA	22	C	2.2	6	1.5
	CA45A336*1AA	33	A	3.3	8	1.7
	CA45B2336*1AA	33	B2	3.3	12	1.7
	CA45B336*1AA	33	B	3.3	8	1.4
	CA45C2336*1AA	33	C2	3.3	6	1.8
	CA45C336*1AA	33	C	3.3	6	1.4
	CA45D336*1AA	33	D	3.3	6	0.8
	CA45B476*1AA	47	B	4.7	8	1
	CA45C2476*1AA	47	C2	4.7	8	1
	CA45C476*1AA	47	C	4.7	8	0.9
	CA45D476*1AA	47	D	4.7	6	0.7

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Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
10	CA45B686*1AA	68	B	6.8	12	0.9
	CA45C2686*1AA	68	C2	6.8	10	1
	CA45C686*1AA	68	C	6.8	8	0.7
	CA45D686*1AA	68	D	6.8	6	0.7
	CA45B107*1AA	100	B	10.0	8	1.4
	CA45C2107*1AA	100	C2	10.0	10	0.8
	CA45C107*1AA	100	C	10.0	10	0.5
	CA45D107*1AA	100	D	10.0	8	0.6
	CA45E107*1AA	100	E	10.0	8	0.5
	CA45C157*1AA	150	C	15.0	8	0.9
	CA45D157*1AA	150	D	15.0	10	0.6
	CA45E157*1AA	150	E	15.0	8	0.5
	CA45D227*1AA	220	D	22.0	12	0.6
	CA45E227*1AA	220	E	22.0	8	0.5
	CA45D337*1AA	330	D	33.0	8	0.9
	CA45E337*1AA	330	E	33.0	10	0.5
	CA45V337*1AA	330	V	33.0	10	0.5
	CA45E477*1AA	470	E	47.0	10	0.2
	CA45V447*1AA	470	V	47.0	12	0.5
	CA45V687*1AA	680	V	68.0	12	0.9
16	CA45P474*1CA	0.47	P	0.5	10	35
	CA45P684*1CA	0.68	P	0.5	10	25
	CA45J105*1CA	1.0	J	0.5	10	25.5
	CA45P105*1CA	1.0	P	0.5	10	20
	CA45A105*1CA	1.0	A	0.5	4	9.3
	CA45J155*1CA	1.5	J	0.5	10	25
	CA45A155*1CA	1.5	A	0.5	4	6
	CA45P225*1CA	2.2	P	0.5	10	19
	CA45A2225*1CA	2.2	A2	0.5	6	10
	CA45A225*1CA	2.2	A	0.5	6	6
	CA45B225*1CA	2.2	B	0.5	6	4.6
	CA45P335*1CA	3.3	P	0.5	10	8
	CA45A2335*1CA	3.3	A2	0.5	8	7
	CA45A335*1CA	3.3	A	0.5	6	4.5
	CA45B335*1CA	3.3	B	0.5	6	3.5
	CA45A2475*1CA	4.7	A2	0.7	8	4.5
	CA45A475*1CA	4.7	A	0.7	6	4
	CA45B2475*1CA	4.7	B2	0.8	6	5
	CA45B475*1CA	4.7	B	0.8	6	2.9
	CA45A685*1CA	6.8	A	1.0	6	4
	CA45B2685*1CA	6.8	B2	1.0	6	4.1
	CA45B685*1CA	6.8	B	1.1	6	2.5
	CA45C685*1CA	6.8	C	1.1	6	1.9
	CA45A106*1CA	10	A	1.6	8	3.2
	CA45B2106*1CA	10	B2	1.6	8	3.5
	CA45B106*1CA	10	B	1.6	6	2

* To complete KESENES Part Number, insert M for ±20% tolerance or K for ±10% tolerance.

Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
16	CA45C2106*1CA	10	C2	1.6	6	1.8
	CA45C106*1CA	10	C	1.6	6	1.8
	CA45A156*1CA	15	A	2.4	12	5
	CA45B156*1CA	15	B	2.4	6	2
	CA45C2156*1CA	15	C2	2.4	6	1.8
	CA45C156*1CA	15	C	2.4	6	1.5
	CA45B2226*1CA	22	B2	3.5	10	2.2
	CA45B226*1CA	22	B	3.5	6	2.2
	CA45C2226*1CA	22	C2	3.6	10	3
	CA45C226*1CA	22	C	3.5	6	1.5
	CA45D226*1CA	22	D	3.5	6	0.8
	CA45B336*1CA	33	B	5.2	8	1.4
	CA45C2336*1CA	33	C2	5.2	6	1.4
	CA45C336*1CA	33	C	5.2	6	1.1
	CA45D336*1CA	33	D	5.3	6	0.7
	CA45C476*1CA	47	C	7.5	6	0.8
	CA45D476*1CA	47	D	7.5	6	0.7
	CA45C686*1CA	68	C	10.8	6	0.7
	CA45D686*1CA	68	D	10.8	6	0.7
	CA45D107*1CA	100	D	16.0	8	0.5
	CA45E107*1CA	100	E	16.0	8	0.6
	CA45D157*1CA	150	D	24.0	12	0.7
	CA45E157*1CA	150	E	24.0	8	0.5
	CA45V157*1CA	150	V	24.0	8	0.5
	CA45D227*1CA	220	D	35.2	12	0.5
	CA45E227*1CA	220	E	35.2	10	0.5
	CA45V227*1CA	220	V	35.2	7.2	0.9
	CA45E337*1CA	330	E	40.0	12	0.9
	CA45V337*1CA	330	V	40.0	12	0.7
20	CA45A2474*1DA	0.47	A2	0.5	6	25
	CA45A2684*1DA	0.68	A2	0.5	6	15
	CA45A684*1DA	0.68	A	0.5	4	10
	CA45P105*1DA	1.0	P	0.5	6	20
	CA45A2105*1DA	1.0	A2	0.5	6	12
	CA45A105*1DA	1.0	A	0.5	4	8.4
	CA45A2155*1DA	1.5	A2	0.5	6	7.4
	CA45A155*1DA	1.5	A	0.5	6	6.3
	CA45P225*1DA	2.2	P	0.5	10	8
	CA45A2225*1DA	2.2	A2	0.5	6	7
	CA45A225*1DA	2.2	A	0.5	6	6
	CA45B225*1DA	2.2	B	0.5	6	3.5
	CA45A2335*1DA	3.3	A2	0.6	8	5
	CA45A335*1DA	3.3	A	0.6	6	5
	CA45B2335*1DA	3.3	B2	0.6	6	3.9
	CA45B335*1DA	3.3	B	0.7	6	3
	CA45A2475*1DA	4.7	A2	0.9	15	5

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Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
20	CA45A475*1DA	4.7	A	0.9	6	5
	CA45B2475*1DA	4.7	B2	0.9	6	3
	CA45B475*1DA	4.7	B	0.9	6	3
	CA45C475*1DA	4.7	C	0.9	6	2.3
	CA45A685*1DA	6.8	A	1.4	6	4.5
	CA45B2685*1DA	6.8	B2	1.3	6	3
	CA45B685*1DA	6.8	B	1.3	6	2.8
	CA45C2685*1DA	6.8	C2	1.4	6	1.9
	CA45C685*1DA	6.8	C	1.4	6	1.9
	CA45B106*1DA	10	B	2.0	6	2.5
	CA45C2106*1DA	10	C2	2.0	6	1.8
	CA45C106*1DA	10	C	2.0	6	1.7
	CA45B156*1DA	15	B	3.0	6	2.3
	CA45C156*1DA	15	C	3.0	6	1.7
	CA45D156*1DA	15	D	3.0	6	0.9
	CA45B226*1DA	22	B	4.4	6	2.1
	CA45C2226*1DA	22	C2	4.4	6	1.4
	CA45C226*1DA	22	C	4.4	6	1.4
	CA45D226*1DA	22	D	4.4	6	0.8
	CA45C336*1DA	33	C	6.6	6	1
	CA45D336*1DA	33	D	6.6	6	0.8
	CA45C476*1DA	47	C	9.4	6	0.9
	CA45D476*1DA	47	D	9.4	6	0.7
	CA45E476*1DA	47	E	9.4	6	0.6
	CA45D686*1DA	68	D	13.6	6	0.7
	CA45E686*1DA	68	E	13.6	6	0.6
	CA45D107*1DA	100	D	20.0	6	0.9
	CA45E107*1DA	100	E	20.0	8	0.5
	CA45V107*1DA	100	V	20.0	8	0.5
	CA45E157*1DA	150	E	30.0	10	0.5
	CA45V157*1DA	150	V	30.0	8	0.5
25	CA45A334*1EA	0.33	A	0.5	4	15
	CA45A474*1EA	0.47	A	0.5	4	13
	CA45A684*1EA	0.68	A	0.5	6	9
	CA45P105*1EA	1.0	P	0.5	6	8
	CA45A2105*1EA	1.0	A2	0.5	6	13
	CA45A105*1EA	1.0	A	0.5	6	8
	CA45B105*1EA	1.0	B	0.5	4	5
	CA45A155*1EA	1.5	A	0.5	6	6.7
	CA45B155*1EA	1.5	B	0.5	6	4.6
	CA45A225*1EA	2.2	A	0.5	6	7
	CA45B225*1EA	2.2	B	0.6	6	3.8
	CA45C225*1EA	2.2	C	0.6	6	3.5
	CA45A335*1EA	3.3	A	0.8	6	7
	CA45B335*1EA	3.3	B	0.8	6	3.1
	CA45C335*1EA	3.3	C	0.8	6	2.3

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Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
25	CA45A475*1EA	4.7	A	1.2	6	5.5
	CA45B2475*1EA	4.7	B2	1.1	6	3
	CA45B475*1EA	4.7	B	1.1	6	3
	CA45C475*1EA	4.7	C	1.2	6	2
	CA45B685*1EA	6.8	B	1.7	6	2.4
	CA45C685*1EA	6.8	C	1.7	6	1.7
	CA45B106*1EA	10	B	2.5	6	2.3
	CA45C2106*1EA	10	C2	2.5	6	2
	CA45C106*1EA	10	C	2.5	6	1.5
	CA45D106*1EA	10	D	2.5	6	1
	CA45C156*1EA	15	C	3.7	6	1.5
	CA45D156*1EA	15	D	3.8	6	0.8
	CA45C226*1EA	22	C	5.5	6	1.4
	CA45D226*1EA	22	D	5.5	6	0.8
	CA45D336*1EA	33	D	8.2	6	0.7
	CA45E336*1EA	33	E	8.3	6	0.6
	CA45D476*1EA	47	D	11.8	10	0.7
	CA45E476*1EA	47	E	11.8	6	0.6
	CA45E686*1EA	68	E	17.0	8	0.7
	CA45V686*1EA	68	V	17.0	6	0.9
	CA45V107*1EA	100	V	25.0	8	0.4
35	CA45A104*1VA	0.1	A	0.5	4	20
	CA45A154*1VA	0.15	A	0.5	4	18
	CA45A224*1VA	0.22	A	0.5	4	15
	CA45A334*1VA	0.33	A	0.5	4	13
	CA45A474*1VA	0.47	A	0.5	6	12
	CA45B474*1VA	0.47	B	0.5	4	8
	CA45A684*1VA	0.68	A	0.5	6	8
	CA45B684*1VA	0.68	B	0.5	4	6.5
	CA45A2105*1VA	1.0	A2	0.5	6	13
	CA45A105*1VA	1.0	A	0.5	6	7
	CA45B105*1VA	1.0	B	0.5	4	5
	CA45A155*1VA	1.5	A	0.5	6	7
	CA45B155*1VA	1.5	B	0.5	6	4.2
	CA45C155*1VA	1.5	C	0.5	6	3.8
	CA45A225*1VA	2.2	A	0.7	6	5
	CA45B225*1VA	2.2	B	0.7	6	4
	CA45C225*1VA	2.2	C	0.8	6	2.9
	CA45B2335*1VA	3.3	B2	1.1	6	3
	CA45B335*1VA	3.3	B	1.1	6	3.5
	CA45C335*1VA	3.3	C	1.2	6	2.1
	CA45B475*1VA	4.7	B	1.2	6	3.1
	CA45C475*1VA	4.7	C	1.6	6	2.2
	CA45D475*1VA	4.7	D	1.6	6	1.3
	CA45C685*1VA	6.8	C	2.3	6	1.9
	CA45D685*1VA	6.8	D	2.4	6	1.1

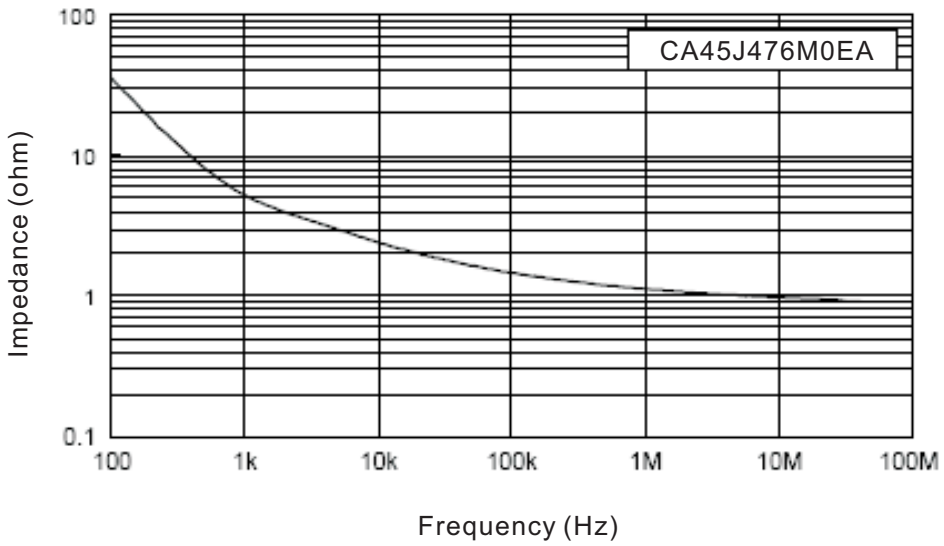
* To complete KESENES Part Number, insert M for ±20% tolerance or K for ±10% tolerance.

Rating (V)	Part Number	Capacitance (μF)	Case Code	Max. DC Leakage @ + 25℃ (μA)	DF (%) Max.	ESR (Ω) Max.
35	CA45C106*1VA	10	C	3.5	6	1.5
	CA45D106*1VA	10	D	3.5	6	1
	CA45E106*1VA	10	E	3.5	6	0.9
	CA45C156*1VA	15	C	5.3	6	1.4
	CA45D156*1VA	15	D	5.2	6	0.9
	CA45E156*1VA	15	E	5.3	6	0.7
	CA45D226*1VA	22	D	7.7	6	0.6
	CA45E226*1VA	22	E	7.7	6	0.6
	CA45D336*1VA	33	D	11.6	6	0.9
	CA45E336*1VA	33	E	11.6	6	0.6
	CA45V336*1VA	33	V	11.6	6	0.5
	CA45E476*1VA	47	E	16.5	8	0.6
	CA45V476*1VA	47	V	16.5	10	0.5
	CA45V686*1VA	68	V	23.8	6	0.5
50	CA45A104*1TA	0.1	A	0.5	4	19
	CA45A154*1TA	0.15	A	0.5	4	17
	CA45B154*1TA	0.15	B	0.5	4	14
	CA45A224*1TA	0.22	A	0.5	4	15
	CA45B224*1TA	0.22	B	0.5	4	12
	CA45A334*1TA	0.33	A	0.5	4	14
	CA45B334*1TA	0.33	B	0.5	4	10
	CA45A474*1TA	0.47	A	0.5	4	12
	CA45B474*1TA	0.47	B	0.5	4	8.4
	CA45C474*1TA	0.47	C	0.5	4	6.7
	CA45B684*1TA	0.68	B	0.5	4	7.6
	CA45C684*1TA	0.68	C	0.5	4	5.9
	CA45B105*1TA	1.0	B	0.5	4	6.7
	CA45C105*1TA	1.0	C	0.5	4	4.6
	CA45B155*1TA	1.5	B	0.8	6	6
	CA45C155*1TA	1.5	C	0.8	6	3.4
	CA45D155*1TA	1.5	D	0.8	6	3.5
	CA45C225*1TA	2.2	C	1.1	6	2.9
	CA45D225*1TA	2.2	D	1.1	6	2.1
	CA45C335*1TA	3.3	C	1.7	6	2.5
	CA45D335*1TA	3.3	D	1.7	6	1.7
	CA45D475*1TA	4.7	D	2.4	6	1.2
	CA45D685*1TA	6.8	D	3.4	6	0.9
	CA45E685*1TA	6.8	E	3.4	6	0.9
	CA45D106*1TA	10	D	5.0	6	0.8
	CA45E106*1TA	10	E	5.0	6	0.8
	CA45E156*1TA	15	E	7.5	8	0.7
	CA45V226*1TA	22	V	11	8	0.6

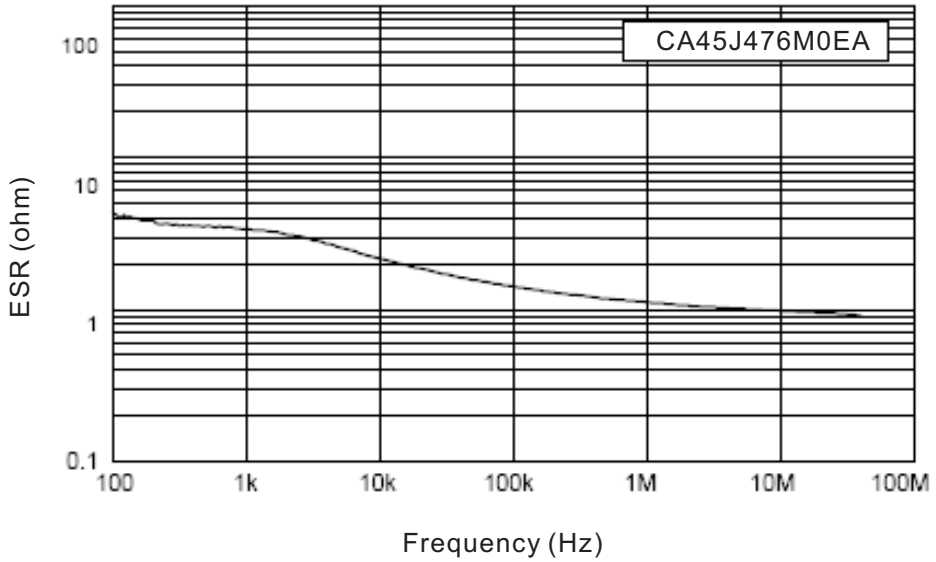
* To complete KESENES Part Number, insert M for ±20% tolerance or K for ±10% tolerance.

■ Characteristics

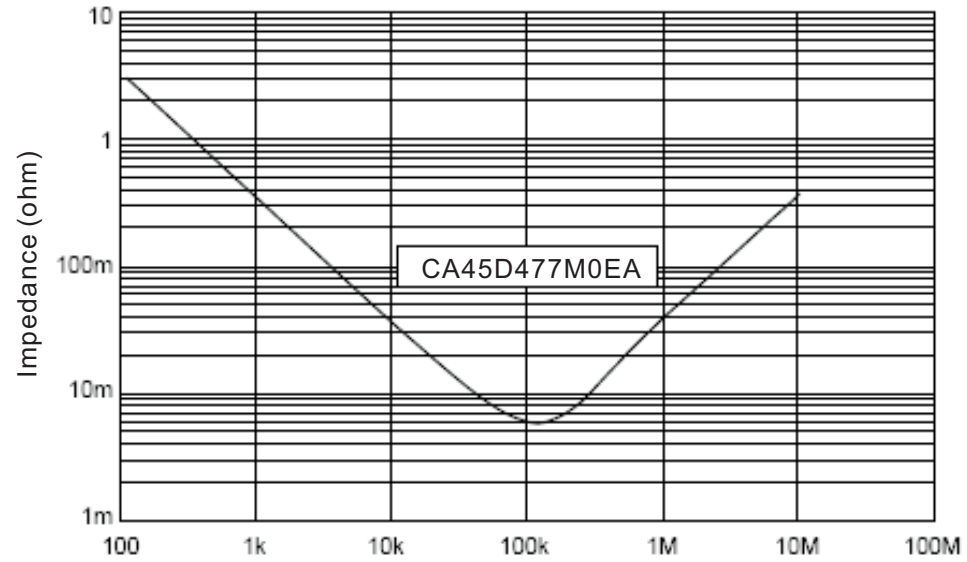
Impedance-frequency characteristics



ESR-frequency characteristics



Impedance-frequency characteristics



ESR-frequency characteristics