

# Film Capacitors

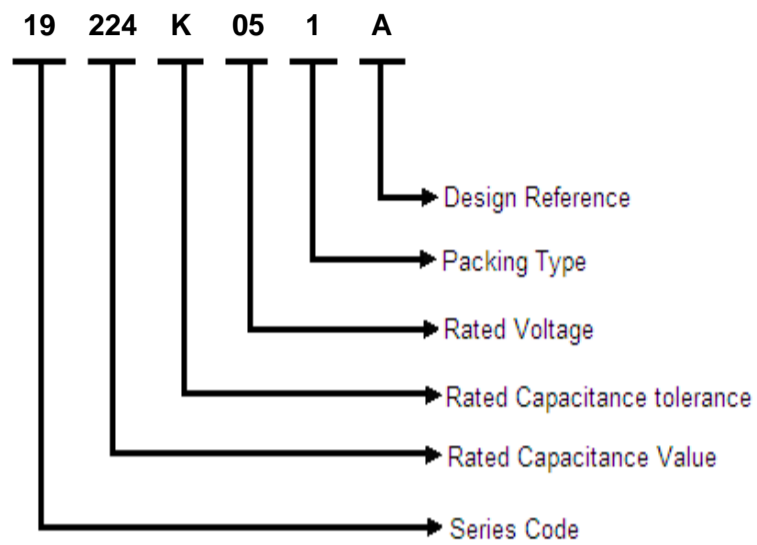
**Series/Type:** Interference Suppression Capacitors

Class X1

**Series code:** 19

# 19 Interference Suppression Capacitors Class X1

## Part Number Description



## Rated Capacitance

Three-digit (224) indicate rated capacitance in Pico Farad (First two digits indicate value & third digit indicates number of zeroes to be suffixed to first two digits).

For example:

103	= 10 ×	10 <sup>3</sup>	=	10000 pF	=	10 nF	=	0.01 μF
104	= 10 ×	10 <sup>4</sup>	=	100000 pF	=	100 nF	=	0.1 μF
105	= 10 ×	10 <sup>5</sup>	=	1000000 pF	=	1000 nF	=	1 μF
106	= 10 ×	10 <sup>6</sup>	=	10000000 pF	=	10000 nF	=	10 μF

## Capacitance Tolerance

In 3rd group of the part number-

F = ±1%, G = ±2%, H = ±2.5%, I = ±3.5%, J = ±5%, K = ±10%, L = ±15%, M = ±20%, N = ±40%

## Rated Voltage

In 4th group of the part number, one numeric digit and one letter (Ex.-2A) indicate DC voltage rating while two numeric digits (Ex.03) indicate AC voltage rating.

## Rated Voltage Codification

For AC Rated Voltage													
01	02	03	04	05	06	07	08	09	10	11	12	13	14
190 VAC	250 VAC	275 VAC	305 VAC	310 VAC	440 VAC	500 VAC	600 VAC	700 VAC	63 VAC	230 VAC	330 VAC	400 VAC	450 VAC
15	16	17	18	19	20	21	22	23	24	25	26	27	28
350 VAC	300 VAC	415 VAC	420 VAC	460 VAC	480 VAC	530 VAC	660 VAC	720 VAC	780 VAC	850 VAC	900 VAC	1000 VAC	550 VAC

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## \*Packing Type details:

- 1: Bulk packing (original pitch)
- 2: Bulk packing (after forming & cutting)
- 3: Ammo packing (after forming & taping)
- 4: Bulk packing (after forming in original pitch without cut)
- 5: Bulk packing (after formed & without cut)
- 6: Ammo packing (Straight lead)
- 7: Bulk packing (Straight lead cut)
- 8: Reel packing (Straight lead)

## Reference Data

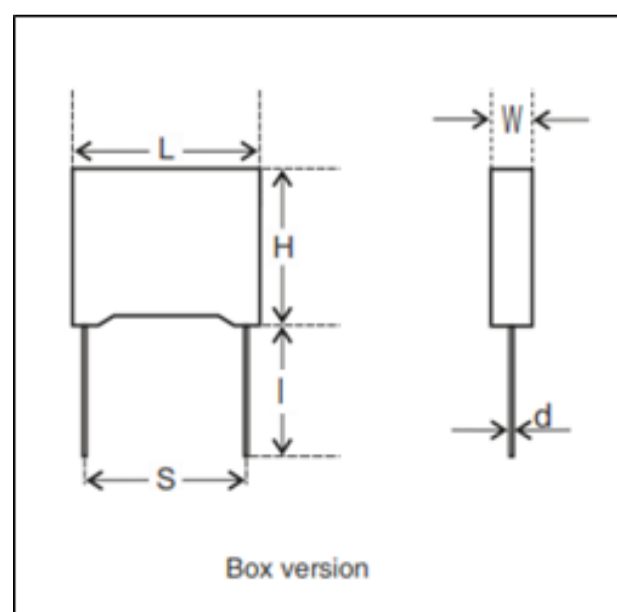
Capacitance	0.0047 $\mu$ F to 1 $\mu$ F
Capacitance tolerance	$\pm$ 10% and $\pm$ 20%
Rated AC voltage at 50/60 Hz	440,480VAC
Rated DC voltage	1000Vdc
Climatic testing class according to IEC 60068-1 & Passive flammability	40/110/56/B
Operating temperature range	-40°C to +110°C
THB Grade*	Grade II (as per IEC 60384-14)
Reference standards	IEC 60384-14
Dielectric	Polypropylene
Electrodes	Metallized
Construction	Mono or series
Encapsulation	Encased in flame retardant box filled with resin
Leads	Tinned wire
Marking on capacitor body	<p style="text-align: center;">Example</p> Trademark, Sub-class (X1), rated cap. (224), cap. tolerance(K), traceability code (1J01) rated voltage(440VAC), climatic category (40/110/56),

\*Available on request

Traceability code (4 alphanumeric digits) contains the following information- 1(Year-2021), J (Month-October) 01 (Serial number of the lot for that Particular month- First lot).

This series is designed to use in "Across the line" applications.

## Dimensions Description



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Rated Capacitance (μF)	Dimensions (mm)						Item Code
	L	H	W	S	d	l	
	(±0.5)	(±0.5)	(±0.5)		(±0.05)		
0.0010	13	11	4	10±0.75	0.6	15 Min.	19 102 M 20 1 E
0.0047	13	9	4	10±0.75	0.6	15 Min.	19 472 K 06 1 D
0.0068	13	11	5	10±0.75	0.6	15 Min.	19 682 K 06 1 D
0.0082	13	12	6	10±0.75	0.6	15 Min.	19 822 K 06 1 D
0.01	18	11	5	15±0.75	0.6	15 Min.	19 103 K 06 1 A
0.01	13	12	6	10±0.75	0.6	15 Min.	19 103 K 06 1 D
0.01	13	12	6	10±0.75	0.6	15 Min.	19 103 M 20 6 A
0.012	18	11	5	15±0.75	0.6	15 Min.	19 123 K 06 1 A
0.015	18	11	5	15±0.75	0.6	15 Min.	19 153 K 06 1 A
0.018	18	11	5	15±0.75	0.6	15 Min.	19 183 K 06 1 A
0.022	18	12	6	15±0.75	0.6	15 Min.	19 223 K 06 1 A
0.027	18	12	6	15±0.75	0.6	15 Min.	19 273 K 06 1 A
0.033	18	12	6	15±0.75	0.6	15 Min.	19 333 K 06 1 A
0.039	18	13.5	7.5	15±0.75	0.6	15 Min.	19 393 K 06 1 A
0.047	26.5	15	6	22.5±1.0	0.8	15 Min.	19 473 K 06 1 B
0.047	18	17.5	6	15±0.75	0.6	15 Min.	19 473 K 06 1 E
0.047	26.5	13.5	6.5	22.5±1.0	0.8	15 Min.	19 473 K 06 1 G
0.047	18	13.5	7.5	15±0.75	0.6	15 Min.	19 473 K 06 1 A
0.047	18	12.5	9	15±0.75	0.6	15 Min.	19 473 K 06 1 F
0.056	18	14.5	8.5	15±0.75	0.6	15 Min.	19 563 K 06 1 A
0.068	26.5	15	6	22.5±1.0	0.8	15 Min.	19 683 K 06 1 B
0.068	18	18.5	7.5	15±0.75	0.8	15 Min.	19 683 K 06 1 E
0.068	18	16	10	15±0.75	0.8	15 Min.	19 683 K 06 1 A
0.068	18	12	13	15±0.75	0.8	15 Min.	19 683 K 06 1 F
0.082	18	16	10	15±0.75	0.8	15 Min.	19 823 K 06 1 A
0.1	26.5	16	7	22.5±1.0	0.8	15 Min.	19 104 K 06 1 B
0.1	18	19	11	15±0.75	0.8	15 Min.	19 104 K 06 1 A
0.1	18	16	10	15±0.75	0.8	15 Min.	19 104 M 20 6 A
0.1	18	16	10	15±0.75	0.8	15 Min.	19 104 M 06 1 A
0.12	26.5	17	8.5	22.5±1.0	0.8	15 Min.	19 124 K 06 1 B
0.15	32	17	9	27.5±1.0	0.8	15 Min.	19 154 K 06 1 C
0.15	26.5	18.5	10	22.5±1.0	0.8	15 Min.	19 154 K 06 1 B
0.18	32	17	9	27.5±1.0	0.8	15 Min.	19 184 K 06 1 C
0.18	26.5	18.5	10	22.5±1.0	0.8	15 Min.	19 184 K 06 1 B
0.22	32	17	9	27.5±1.0	0.8	15 Min.	19 224 K 06 1 C
0.22	26.5	20	11	22.5±1.0	0.8	15 Min.	19 224 K 06 1 B
0.27	32	17	9	27.5±1.0	0.8	15 Min.	19 274 K 06 1 C
0.27	26.5	22	13	22.5±1.0	0.8	15 Min.	19 274 K 06 1 B
0.33	32	20	11	27.5±1.0	0.8	15 Min.	19 334 K 06 1 C
0.33	26.5	22	13	22.5±1.0	0.8	15 Min.	19 334 K 06 1 B
0.39	32	20	11	27.5±1.0	0.8	15 Min.	19 394 K 06 1 C
0.47	32	22	13	27.5±1.0	0.8	15 Min.	19 474 K 06 1 C
0.56	32	22	13	27.5±1.0	0.8	15 Min.	19 564 K 06 1 C
0.68	32	28	14	27.5±1.0	0.8	15 Min.	19 684 K 06 1 C
0.82	32	33	18	27.5±1.0	0.8	15 Min.	19 824 K 06 1 C
1	32	33	18	27.5±1.0	0.8	15 Min.	19 105 K 06 1 C
3.3	42	44	24	37.5±1.0	1.0	15 Min.	19 335 M 20 1 A

only better

## Specific Data

Description	Value	
Maximum tangent of loss angle(Tanδ)	≤0.002 at 1 kHz	
Voltage proof test between leads (Routine test)	2700VDC for 2sec	
Voltage proof test between leads (Type test)	2700VDC for 60sec	
Voltage proof test between leads and case	2 times of rated voltage+1500VAC with a minimum 2000 Vac for 2 second	
Insulation Resistance (R <sub>IS</sub> ) (or) time constant T= C <sub>R</sub> × R <sub>IS</sub> at 25° C, relative humidity ≤70%	C <sub>R</sub> ≤0.33 μF ≥15000 MΩ	C <sub>R</sub> >0.33 μF ≥5000 s

## Endurance Test

Loaded at 1.25 times of rated voltage at 110°C for 1000 hours with once per hour voltage increased to 1000 Vrms for 0.1 second. These voltages shall be applied to each capacitor individually through a resistor of 47Ω ± 5%.

### After The Test

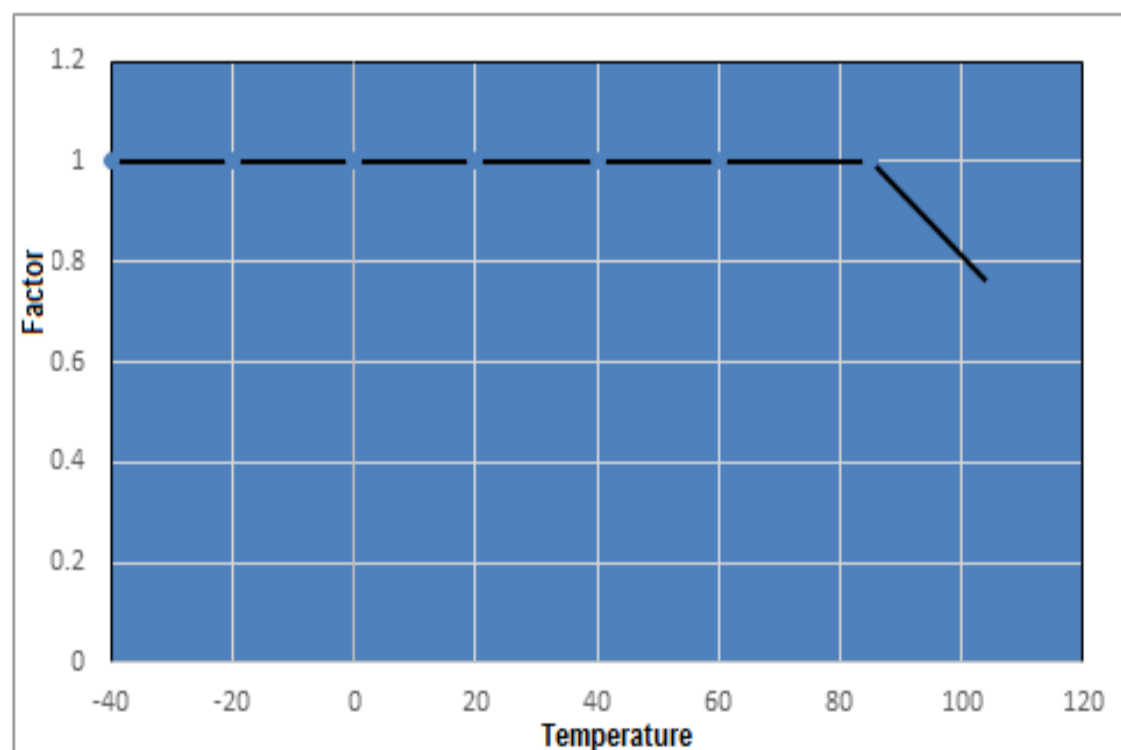
ΔC/C : ≤ 10% of initial value.

Increase of Tanδ : ≤ 0.008 at 1 kHz

Insulation Resistance: ≥ 50% of the value mentioned in specific data.

## Temperature De-rating Graph

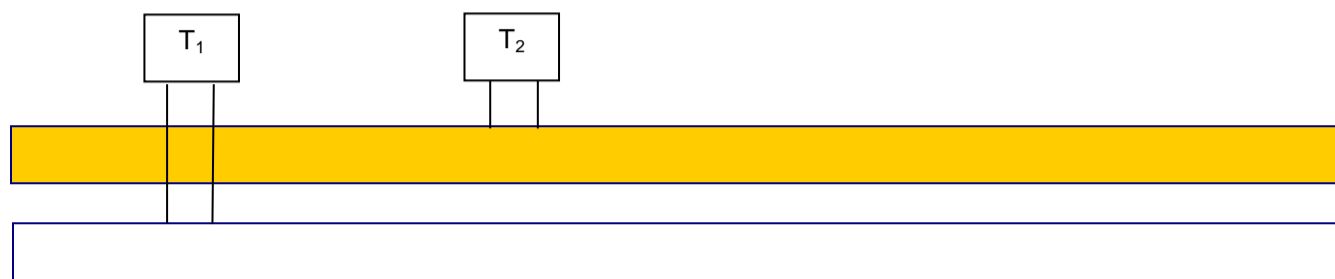
For temperature between 85°C and 100°C a derating factor of 1.25% per °C on the rated voltage V<sub>R</sub> has to be applied.



## Power Dissipation and Maximum Component Temperature Rise

After applying the A.C voltage to the capacitor with certain frequency, we can measure the hot spot temperature of the capacitor. From that we can calculate  $\Delta T$ .

$\Delta T$  = hot spot temperature – ambient temperature



T1 is the capacitor under test (Connected in the circuit)

T2 is capacitor which has no connection

Distance between T1 and T2 should be about 50mm and 100mm from other components. To avoid radiation or convection, the capacitor should be tested in a wind-free box. The capacitor under test is separated by polystyrene.

$$\Delta T_{\max} = T_1 - T_2$$

at one frequency level the  $\Delta T_{\max}$  reach  $10^{\circ}\text{C}$ . That is the frequency which we have to start frequency derating.

## THB Test

- Temperature:  $85^{\circ}\text{C}$
- Humidity: 85% RH
- Duration: 1000hrs
- Voltage: 0.8 x Rated AC voltage

### After The Test

$\Delta C/C$  :  $\leq 10\%$  of initial value.

Increase of  $\text{Tan } \delta$  :  $\leq 0.015$  at 1 kHz

Insulation resistance :  $\geq 50\%$  of the value mentioned in specific data.

## Storage Conditions

Avoid storing the capacitors in places where the environmental conditions differ from the following:

Storage time:  $\leq 24$  months from the date marked on the label glued to the package.

- Temperature:  $-40$  to  $80^{\circ}\text{C}$
- Humidity:

- Average per year:  $\leq 70\%$
- For 30 full days randomly distributed throughout the year:  $\leq 85\%$
- Dew: absent

After a longer period of storage or use, the tolerance can increase; but, according to standard specification, it may never exceed twice the value measured at the time of delivery.

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## Disclaimer

All our capacitors are designed, manufactured and tested to specifications. We strictly adhere to standards in procurement of materials, in the laid down manufacturing processes and consistently apply stringent process controls and testing parameters. This ensures that our capacitors always perform to the offered specifications.

Appropriateness of use in a specific circuit and fitness to a particular application however needs to be verified and its reliability through expected lifetime is required to be validated by the customer. Deki's responsibility is limited to ensuring that the capacitor performs as claimed in the specification/ data sheets provided by Deki. Deki specifically disclaims any implied warranties of fitness for any particular purpose. Liability, in any case is limited to the price paid for the capacitors.