

### KKL Series

#### Features

- Endurance : 105°C 3000~5000 H
- Designed for reflow soldering
- Designed for surface mounting on high-density PCB
- RoHS 2.0 compliant
- 219 SVHC & REACH compliant

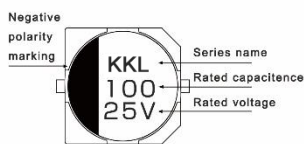


Marking color : Black

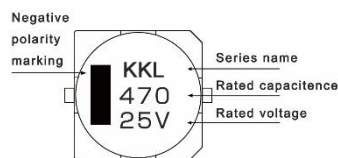
Specifications										
Category temp. range	-55°C to +105°C									
Capacitance tolerance	±20% (120 Hz / +20 °C)									
Leakage current	$I \leq 0.01 CV$ or 3 $\mu A$ whichever is greater (after 2 minutes)									
Tan $\delta$	Please see the attached characteristics list									
Characteristics at low temperature(Impedance ratio at 120 Hz)	Rated voltage ( V )	6.3	10	16	25	35	50	63	80	100
	Z (-25 °C) / Z (+20 °C)	4	4	3	2	2	2	2	3	3
	Z (-55 °C) / Z (+20 °C)	15	8	6	4	4	4	3	3	3
Endurance	After applying rated working voltage for 3000/5000 hours at +105 °C ± 2 °C, and then being stabilized at +20 °C , capacitors shall meet the following limits.									
	Test Time	$\phi D \leq 6.3mm$ : 3000H, $\phi D \geq 8mm$ : 5000H								
	Capacitance change	Within ±30% of the initial value								
	Dissipation factor (tan $\delta$ )	Less than 300% of the initial value								
	Leakage current	Within the initial limit								
Shelf life	After storage for 1000 h at +105 °C ± 2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in endurance.									
Resistance to soldering heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.									
	Capacitance change	Within ±10% of the initial value								
	Dissipation factor (tan $\delta$ )	Within the initial limit								
	Leakage current	Within the initial limit								
Frequency correction factor for ripple current	Frequency	50Hz	120Hz	1kHz	10kHz $\leq$					
	C $\leq$ 1000 $\mu F$	0.7	1.0	1.2	1.3					
	C > 1000 $\mu F$	0.85	1.0	1.1	1.15					

#### Marking :

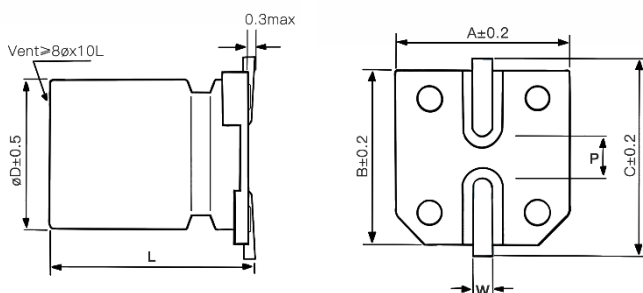
$\phi D \leq 10mm$



$\phi D \geq 12.5mm$



#### Dimensions :



Dimensions							Unit : mm
$\phi D$	L	A	B	C	W	P $\pm 0.2$	
4	5.7 $\pm 0.3$	4.3	4.3	5.1	0.5~0.8	1.0	
5	5.7 $\pm 0.3$	5.3	5.3	6.1	0.5~0.8	1.3	
6.3	5.7 $\pm 0.3$	6.6	6.6	7.3	0.5~0.8	2.2	
6.3	7.7 $\pm 0.3$	6.6	6.6	7.3	0.5~0.8	2.2	
8	10.5 $\pm 0.5$	8.3	8.3	9.2	0.7~1.2	3.1	
10	10.5 $\pm 0.5$	10.3	10.3	11.2	0.7~1.2	4.4	
10	13 $\pm 0.5$	10.3	10.3	11.2	0.7~1.2	4.4	
12.5	13.5 $\pm 0.5$	13.0	13.0	14.0	1.0~1.4	4.4	

Part Number System :

KKL series    16V                    220 $\mu$ F                     $\pm$ 20 %                    8  $\phi$  X10.5L

**KKL**                    **1C**                    **221**                    **M**                    **0810**

Series name    Rated voltage    Capacitance    Capacitance tolerance    Case Size

**Characteristics list**

Rated voltage ( V )	Capacitance ( $\pm$ 20% ) ( $\mu$ F )	Case size		Specification		Part Number <sup>③</sup>	Taping&Reel
		$\phi$ D ( mm )	L ( mm )	Rated ripple current <sup>①</sup> ( mA rms )	$\tan \delta$ <sup>②</sup>		MPQ ( pcs/reel )
6.3	22	4	5.7	22	0.30	KKL0J220M0406	2000
	33	5	5.7	35	0.30	KKL0J330M0506	1000
	47	5	5.7	38	0.30	KKL0J470M0506	1000
	100	6.3	5.7	69	0.30	KKL0J101M0606	1000
	220	6.3	7.7	101	0.30	KKL0J221M0607	1000
	330	8	10.5	141	0.30	KKL0J331M0810	500
	470	10	10.5	320	0.30	KKL0J471M1010	500
	1000	10	10.5	410	0.32	KKL0J102M1010	500
	1500	12.5	13.5	500	0.40	KKL0J152M1313	200
	2200	12.5	13.5	600	0.42	KKL0J222M1313	200
10	22	5	5.7	30	0.24	KKL1A220M0506	1000
	33	5	5.7	35	0.24	KKL1A330M0506	1000
	47	6.3	5.7	50	0.24	KKL1A470M0606	1000
	100	6.3	7.7	80	0.24	KKL1A101M0607	1000
	150	8	10.5	125	0.24	KKL1A151M0810	500
	220	8	10.5	140	0.24	KKL1A221M0810	500
	330	10	10.5	290	0.24	KKL1A331M1010	500
	470	10	10.5	320	0.24	KKL1A471M1010	500
	1000	10	13	390	0.26	KKL1A102M1013	400
	1500	12.5	13.5	500	0.36	KKL1A152M1313	200
2200	12.5	13.5	600	0.38	KKL1A222M1313	200	
16	10	4	5.7	18	0.20	KKL1C100M0406	2000
	22	5	5.7	30	0.20	KKL1C220M0506	1000
	33	6.3	5.7	48	0.20	KKL1C330M0606	1000
	47	6.3	5.7	50	0.20	KKL1C470M0606	1000
	100	6.3	7.7	81	0.20	KKL1C101M0607	1000
	220	8	10.5	141	0.20	KKL1C221M0810	500
	330	10	10.5	290	0.20	KKL1C331M1010	500
	470	10	10.5	320	0.20	KKL1C471M1010	500
	1000	12.5	13.5	550	0.32	KKL1C102M1313	200
	1500	12.5	13.5	600	0.32	KKL1C152M1313	200
25	10	5	5.7	27	0.18	KKL1E100M0506	1000
	22	6.3	5.7	44	0.18	KKL1E220M0606	1000
	33	6.3	5.7	50	0.18	KKL1E330M0606	1000
	47	6.3	7.7	63	0.18	KKL1E470M0607	1000
	100	8	10.5	116	0.18	KKL1E101M0810	500
	220	10	10.5	290	0.18	KKL1E221M1010	500
	330	10	10.5	320	0.18	KKL1E331M1010	500
	470	12.5	13.5	400	0.28	KKL1E471M1313	200

① Rated ripple current (120Hz / +105°C)    ②  $\tan \delta$  (120Hz / +20°C)    ③ For plastic reel packaging , the Part Number is appended with "PR" at the end.

※ Please refer to the page of reflow conditions for reflow profile.

**Characteristics list**

Rated voltage ( V )	Capacitance ( ±20% ) ( μF )	Case size		Specification		Part Number <sup>③</sup>	Taping&Reel
		øD ( mm )	L ( mm )	Rated ripple current <sup>①</sup> ( mA rms )	tan δ <sup>②</sup>		MPQ ( pcs/reel )
35	4.7	4	5.7	16	0.16	KKL1V4R7M0406	2000
	10	5	5.7	27	0.16	KKL1V100M0506	1000
	22	6.3	5.7	44	0.16	KKL1V220M0606	1000
	33	6.3	7.7	57	0.16	KKL1V330M0607	1000
	47	8	10.5	92	0.16	KKL1V470M0810	500
	100	10	10.5	151	0.16	KKL1V101M1010	500
	220	10	10.5	320	0.16	KKL1V221M1010	500
	330	12.5	13.5	320	0.22	KKL1V331M1313	200
470	12.5	13.5	350	0.22	KKL1V471M1313	200	
50	1	4	5.7	8	0.14	KKL1H010M0406	2000
	2.2	4	5.7	12	0.14	KKL1H2R2M0406	2000
	3.3	4	5.7	17	0.14	KKL1H3R3M0406	2000
	4.7	5	5.7	22	0.14	KKL1H4R7M0506	1000
	10	6.3	5.7	32	0.14	KKL1H100M0606	1000
	22	6.3	7.7	58	0.14	KKL1H220M0607	1000
	33	8	10.5	130	0.14	KKL1H330M0810	500
	47	8	10.5	141	0.14	KKL1H470M0810	500
	100	10	10.5	160	0.14	KKL1H101M1010	500
	220	12.5	13.5	280	0.16	KKL1H221M1313	200
63	10	6.3	7.7	45	0.14	KKL1J100M0607	1000
	22	8	10.5	65	0.14	KKL1J220M0810	500
	33	10	10.5	80	0.14	KKL1J330M1010	500
	47	10	10.5	110	0.14	KKL1J470M1010	500
	100	12.5	13.5	150	0.14	KKL1J101M1313	200
	220	12.5	13.5	240	0.16	KKL1J221M1313	200
80	100	12.5	13.5	180	0.16	KKL1K101M1313	200
	150	12.5	13.5	220	0.16	KKL1K151M1313	200
100	4.7	6.3	7.7	40	0.14	KKL2A4R7M0607	1000
	10	8	10.5	55	0.14	KKL2A100M0810	500
	22	10	10.5	70	0.14	KKL2A220M1010	500
	33	10	10.5	80	0.14	KKL2A330M1010	500
	47	12.5	13.5	150	0.14	KKL2A470M1313	200
	100	12.5	13.5	220	0.16	KKL2A101M1313	200

① Rated ripple current (120Hz / +105°C)    ② tan δ (120Hz / +20°C)    ③ For plastic reel packaging , the Part Number is appended with "PR" at the end.

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