ALUMINUM ELECTROLYTIC CAPACITORS

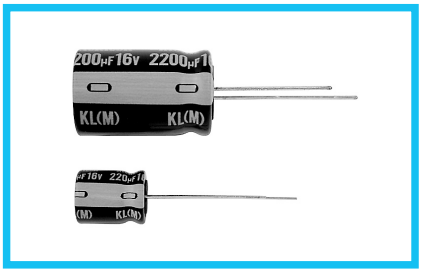
nichicon

KL Low Leakage Current series

Low Leakage Current | Anti-Solvent Feature

- Standard low leakage current series.
- Compliant to the RoHS directive (2011/65/EU).

VR → Low Leakage Current → **KL**



■Specifications

Item	Performance Characteristics
Category Temperature Range	−40 to +85°C (※ −40 to +105°C product is also available upon request, but product rated at up to 50V less than or equal to φ10 × 12.5 Lmm)
Rated Voltage Range	6.3 to 100V
Rated Capacitance Range	0.1 to 10000μF
Capacitance Tolerance	±20% (M), ±10% (K) at 120Hz 20°C
Leakage Current	After 1 minute's (for case size 10 × 12.5 or smaller) or 2 minutes' (for case size 10 × 16 or larger) application of rated voltage at 20°C, leakage current is not more than 0.002CV or 0.2 (μA) whichever is greater.
Tangent of loss angle (tan δ)	See table below. 120Hz, 20°C
stability at Low Temperature	See table below. 120Hz
Endurance	The specifications listed at right shall be met when the capacitors are restored to 20°C after the rated voltage is applied for 2000 hours at 85°C, or 1000 hours at 105°C.
Shelf Life	After storing the capacitors under no load at 85˚C for 1000 hours and then performing voltage treatment based on JIS C 5101-4 clause 4.1 at 20°C, they shall meet the specified values for the endurance characteristics listed above.
Marking	Printed with white color letter on black sleeve.

Rated voltage (V)		6.3	10	16	25	35	50	63	100
tan δ (MAX.)	Less than φ10 × 12.5	0.18	0.15	0.12	0.08	0.08	0.08	0.07	0.07
	φ10 × 16 or more	0.21	0.17	0.14	0.12	0.12	0.10	0.08	0.08

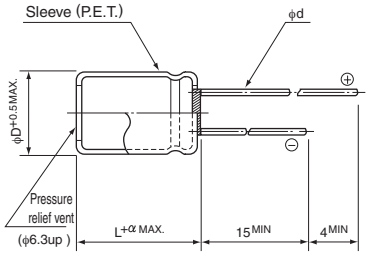
For capacitance of more than 1000μF, add 0.02 for every increase of 1000μF.

Rated voltage (V)		6.3	10	16	25	35	50	63	100
Impedance ratio ZT / Z20 (MAX.)	Z−25°C / Z+20°C	3 (4)	2 (3)	2	1.5	1.5	1.5	1.5	1.5
	Z−40°C / Z+20°C	5 (8)	4 (6)	3 (4)	2 (4)	2 (3)	2 (3)	2 (3)	2 (3)

Values in ( ) applicable to φ10 × 16 or larger case size.

Capacitance change	Within ±15% of the initial capacitance value (6.3V : Within ±20%)
tan δ	150% or less than the initial specified value
Leakage current	Less than or equal to the initial specified value

■Radial Lead Type



(mm)

α	
	(φ10 × 12.5 or smaller) 1.0
	(φ10 × 16 or greater) 1.5

φD	5	6.3	8	10	12.5	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8

• Please refer to page 20 about the end seal configuration.

Type numbering system (Example : 10V 47μF)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
U	K	L	1	A	4	7	0	M	D	D	A	N	A

※2
Configuration ※1
Capacitance tolerance (M : ±20%, K : ±10%)
Rated capacitance (47μF)
Rated voltage (10V)
Series name
Type

※2 In case 105°C unit is required

※1 Configuration

φ D	Pb-free leadwire Pb-free PET sleeve
5	DD
6.3	ED
8 · 10	PD
12.5 to 18	HD

● Frequency coefficient of rated ripple current

Cap.(μF) \ Frequency	50Hz	120Hz	300Hz	1kHz	10kHz or more
0.1 to 68	0.75	1.00	1.35	1.57	2.00
100 to 680	0.80	1.00	1.23	1.34	1.50
1000 to 10000	0.85	1.00	1.10	1.13	1.15

Please refer to page 20, 21, 22 about the formed or taped product spec.
Please refer to page 4 for the minimum order quantity.
●Dimension table in next page.

KL series

■Dimensions

Cap.(μF) \ V	6.3		10		16		25	
Code	0J		1A		1C		1E	
4.7	4R7						5 × 11	45
6.8	6R8						5 × 11	55
10	100				5 × 11	55	5 × 11	70
15	150				5 × 11	70	5 × 11	85
22	220				5 × 11	85	5 × 11	100
33	330				5 × 11	100	6.3 × 11	140
47	470		5 × 11	110	6.3 × 11	140	6.3 × 11	170
68	680		6.3 × 11	150	6.3 × 11	160	8 × 11.5	230
100	101		6.3 × 11	180	8 × 11.5	230	8 × 11.5	280
150	151		8 × 11.5	250	8 × 11.5	280	10 × 12.5	370
220	221		8 × 11.5	310	10 × 12.5	370	10 × 16	400
330	331		10 × 12.5	400	10 × 16	420	10 × 20	490
470	471	10 × 12.5	390	10 × 16	530	10 × 20	550	12.5 × 20	660
680	681	10 × 16	480	10 × 20	600	12.5 × 20	730	12.5 × 25	810
1000	102	10 × 20	650	12.5 × 20	810	12.5 × 25	910	16 × 25	1010
1500	152	12.5 × 25	910	12.5 × 25	1020	16 × 25	1150	16 × 31.5	1270
2200	222	12.5 × 25	1060	16 × 25	1200	16 × 25	1300	16 × 35.5	1440
3300	332	16 × 25	1270	16 × 31.5	1420	16 × 35.5	1550	18 × 40	1720
4700	472	16 × 31.5	1500	16 × 35.5	1650	18 × 35.5	1820		
6800	682	18 × 35.5	1760	18 × 35.5	1890				
10000	103	18 × 40	1900						

Cap.(μF) \ V	35		50		63		100	
Code	1V		1H		1J		2A	
0.1	0R1			5 × 11	1.1			5 × 11	2.1
0.15	R15			5 × 11	1.6			5 × 11	3.2
0.22	R22			5 × 11	2.3			5 × 11	4.7
0.33	R33			5 × 11	3.5			5 × 11	7.0
0.47	R47			5 × 11	5.0			5 × 11	10.1
0.68	R68			5 × 11	7.3			5 × 11	14.5
1	010			5 × 11	10.7			5 × 11	19
1.5	1R5			5 × 11	16			5 × 11	23
2.2	2R2			5 × 11	23			5 × 11	28
3.3	3R3			5 × 11	40			5 × 11	45
4.7	4R7			5 × 11	45			5 × 11	50
6.8	6R8			5 × 11	55	5 × 11	59	6.3 × 11	65
10	100			5 × 11	70	6.3 × 11	75	8 × 11.5	90
15	150	5 × 11	85	6.3 × 11	95	6.3 × 11	100	8 × 11.5	110
22	220	6.3 × 11	110	6.3 × 11	110	8 × 11.5	115	10 × 12.5	136
33	330	6.3 × 11	140	8 × 11.5	165	8 × 11.5	170	10 × 16	180
47	470	8 × 11.5	190	8 × 11.5	190	10 × 12.5	200	10 × 20	220
68	680	8 × 11.5	230	10 × 12.5	250	10 × 16	270	10 × 20	290
100	101	10 × 12.5	300	10 × 16	320	10 × 20	330	12.5 × 20	370
150	151	10 × 16	400	10 × 20	420	12.5 × 20	450	12.5 × 25	470
220	221	10 × 20	440	12.5 × 20	490	12.5 × 20	550	16 × 25	580
330	331	12.5 × 20	550	12.5 × 20	600	12.5 × 25	710	16 × 31.5	730
470	471	12.5 × 25	680	16 × 25	760	16 × 25	850	18 × 35.5	910
680	681	16 × 25	840	16 × 25	910	16 × 31.5	1050		
1000	102	16 × 25	1100	16 × 31.5	1140	18 × 35.5	1330		
1500	152	16 × 35.5	1390	18 × 40	1480			Case size φD × L (mm)	Rated ripple
2200	222	18 × 35.5	1580						

Rated ripple current (mArms) at 85°C 120Hz

Rated ripple current (mArms) of 105°C product : 70 percent value of rated ripple of 85°C product at 105°C 120Hz