

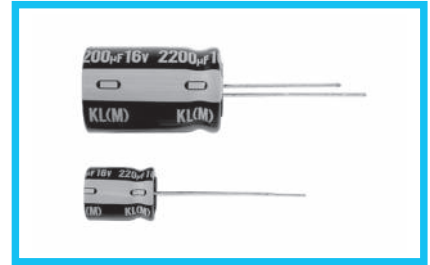
# ALUMINUM ELECTROLYTIC CAPACITORS

# UKL

Low Leakage Current



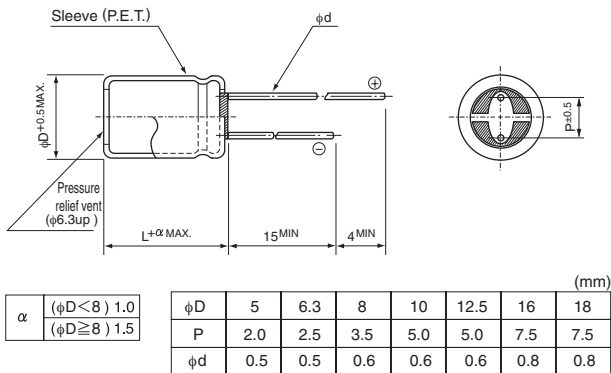
- Standard low leakage current series.
- Compliant to the RoHS directive (2011/65/EU,(EU)2015/863).



## 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	1.5 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)	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>Less than φ10 × 12.5</td> <td>0.18</td> <td>0.15</td> <td>0.12</td> <td>0.08</td> <td>0.08</td> <td>0.08</td> <td>0.07</td> <td>0.07</td> </tr> <tr> <td>φ10 × 16 or more</td> <td>0.21</td> <td>0.17</td> <td>0.14</td> <td>0.12</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> <td>0.08</td> </tr> </tbody> </table> <p>120Hz, 20°C</p> <p>For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF.</p>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	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
Rated voltage (V)	6.3	10	16	25	35	50	63	100																				
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																				
stability at Low Temperature	<table border="1"> <thead> <tr> <th>Rated voltage (V)</th> <th>6.3</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> </tr> </thead> <tbody> <tr> <td>Z-25°C / Z+20°C</td> <td>3 (4)</td> <td>2 (3)</td> <td>2</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> <td>1.5</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>5 (8)</td> <td>4 (6)</td> <td>3 (4)</td> <td>2 (4)</td> <td>2 (3)</td> <td>2 (3)</td> <td>2 (3)</td> <td>2 (3)</td> </tr> </tbody> </table> <p>120Hz</p> <p>Values in ( ) applicable to φ10 × 16 or larger case size.</p>	Rated voltage (V)	6.3	10	16	25	35	50	63	100	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)
Rated voltage (V)	6.3	10	16	25	35	50	63	100																				
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)																				
Endurance	<p>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.</p> <table border="1"> <tbody> <tr> <td>Capacitance change</td> <td>Within ±15% of the initial capacitance value (6.3V : Within ±20%)</td> </tr> <tr> <td>tan δ</td> <td>150% or less than the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td>Less than or equal to the initial specified value</td> </tr> </tbody> </table>	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																					
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tan δ	150% or less than the initial specified value																											
Leakage current	Less than or equal to the initial specified value																											
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.																											

## Radial Lead Type

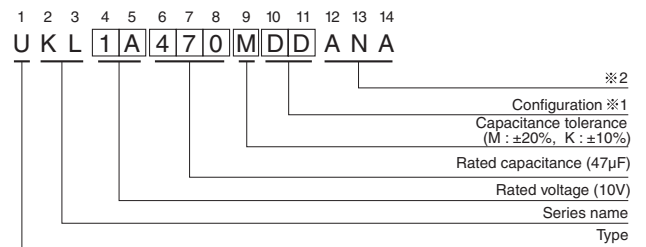


- Please refer to the Guidelines for Aluminum Electrolytic Capacitors for end seal configuration information.

## Frequency coefficient of rated ripple current

Cap. (µF)	Frequency				
1.5 to 68	50Hz	120Hz	300Hz	1kHz	10kHz or more
	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

## Type numbering system (Example : 10V 47µF)



※1 Configuration

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

※2 In case 105°C unit is required

• Dimension table in next page.

UKL

## ■ Dimensions

Rated Voltage (V) (code)	Rated Capacitance ( $\mu$ F)	Case Size $\phi$ D×L (mm)	tan $\delta$	Leakage Current ( $\mu$ A)		Rated Ripple (mArms) (85°C/120Hz)	Part Number
				at 20°C after 1 minute	at 20°C after 2 minutes		
6.3 (0J)	470	10×12.5	0.18	5.922	—	390	UKL0J471MPD
	680	10×16	0.21	—	8.568	480	UKL0J681MPD
	1000	10×20	0.21	—	12.6	650	UKL0J102MPD
	1500	12.5×25	0.21	—	18.9	910	UKL0J152MHD
	2200	12.5×25	0.23	—	27.72	1060	UKL0J222MHD
	3300	16×25	0.25	—	41.58	1270	UKL0J332MHD
	4700	16×31.5	0.27	—	59.22	1500	UKL0J472MHD
	6800	18×35.5	0.31	—	85.68	1760	UKL0J682MHD
10000	18×40	0.39	—	126	1900	UKL0J103MHD	
10 (1A)	47	5×11	0.15	0.94	—	110	UKL1A470MDD
	68	6.3×11	0.15	1.36	—	150	UKL1A680MED
	100	6.3×11	0.15	2	—	180	UKL1A101MED
	150	8×11.5	0.15	3	—	250	UKL1A151MPD
	220	8×11.5	0.15	4.4	—	310	UKL1A221MPD
	330	10×12.5	0.15	6.6	—	400	UKL1A331MPD
	470	10×16	0.17	—	9.4	530	UKL1A471MPD
	680	10×20	0.17	—	13.6	600	UKL1A681MPD
	1000	12.5×20	0.17	—	20	810	UKL1A102MHD
	1500	12.5×25	0.17	—	30	1020	UKL1A152MHD
	2200	16×25	0.19	—	44	1200	UKL1A222MHD
	3300	16×31.5	0.21	—	66	1420	UKL1A332MHD
	4700	16×35.5	0.23	—	94	1650	UKL1A472MHD
6800	18×35.5	0.27	—	136	1890	UKL1A682MHD	
16 (1C)	10	5×11	0.12	0.32	—	55	UKL1C100MDD
	15	5×11	0.12	0.48	—	70	UKL1C150MDD
	22	5×11	0.12	0.704	—	85	UKL1C220MDD
	33	5×11	0.12	1.056	—	100	UKL1C330MDD
	47	6.3×11	0.12	1.504	—	140	UKL1C470MED
	68	6.3×11	0.12	2.176	—	160	UKL1C680MED
	100	8×11.5	0.12	3.2	—	230	UKL1C101MPD
	150	8×11.5	0.12	4.8	—	280	UKL1C151MPD
	220	10×12.5	0.12	7.04	—	370	UKL1C221MPD
	330	10×16	0.14	—	10.56	420	UKL1C331MPD
	470	10×20	0.14	—	15.04	550	UKL1C471MPD
	680	12.5×20	0.14	—	21.76	730	UKL1C681MHD
	1000	12.5×25	0.14	—	32	910	UKL1C102MHD
	1500	16×25	0.14	—	48	1150	UKL1C152MHD
	2200	16×25	0.16	—	70.4	1300	UKL1C222MHD
3300	16×35.5	0.18	—	105.6	1550	UKL1C332MHD	
4700	18×35.5	0.20	—	150.4	1820	UKL1C472MHD	
25 (1E)	4.7	5×11	0.08	0.235	—	45	UKL1E4R7MDD
	6.8	5×11	0.08	0.34	—	55	UKL1E6R8MDD
	10	5×11	0.08	0.5	—	70	UKL1E100MDD
	15	5×11	0.08	0.75	—	85	UKL1E150MDD
	22	5×11	0.08	1.1	—	100	UKL1E220MDD
	33	6.3×11	0.08	1.65	—	140	UKL1E330MED

For cut leads, formed leads or taped parts, please add the appropriate code after the size code (12th digit).  
If there is no size code in the part number, please add size code "1" and then add the appropriate code.

UKL

## ■ Dimensions

Rated Voltage (V) (code)	Rated Capacitance ( $\mu$ F)	Case Size $\phi$ D×L (mm)	tan $\delta$	Leakage Current ( $\mu$ A)		Rated Ripple (mArms) (85°C/120Hz)	Part Number
				at 20°C after 1 minute	at 20°C after 2 minutes		
25 (1E)	47	6.3×11	0.08	2.35	—	170	UKL1E470MED
	68	8×11.5	0.08	3.4	—	230	UKL1E680MPD
	100	8×11.5	0.08	5	—	280	UKL1E101MPD
	150	10×12.5	0.08	7.5	—	370	UKL1E151MPD
	220	10×16	0.12	—	11	400	UKL1E221MPD
	330	10×20	0.12	—	16.5	490	UKL1E331MPD
	470	12.5×20	0.12	—	23.5	660	UKL1E471MHD
	680	12.5×25	0.12	—	34	810	UKL1E681MHD
	1000	16×25	0.12	—	50	1010	UKL1E102MHD
	1500	16×31.5	0.12	—	75	1270	UKL1E152MHD
	2200	16×35.5	0.14	—	110	1440	UKL1E222MHD
	3300	18×40	0.16	—	165	1720	UKL1E332MHD
35 (1V)	15	5×11	0.08	1.05	—	85	UKL1V150MDD
	22	6.3×11	0.08	1.54	—	110	UKL1V220MED
	33	6.3×11	0.08	2.31	—	140	UKL1V330MED
	47	8×11.5	0.08	3.29	—	190	UKL1V470MPD
	68	8×11.5	0.08	4.76	—	230	UKL1V680MPD
	100	10×12.5	0.08	7	—	300	UKL1V101MPD
	150	10×16	0.12	—	10.5	400	UKL1V151MPD
	220	10×20	0.12	—	15.4	440	UKL1V221MPD
	330	12.5×20	0.12	—	23.1	550	UKL1V331MHD
	470	12.5×25	0.12	—	32.9	680	UKL1V471MHD
	680	16×25	0.12	—	47.6	840	UKL1V681MHD
	1000	16×25	0.12	—	70	1100	UKL1V102MHD
	1500	16×35.5	0.12	—	105	1390	UKL1V152MHD
2200	18×35.5	0.14	—	154	1580	UKL1V222MHD	
50 (1H)	1.5	5×11	0.08	0.2	—	16	UKL1H1R5MDD
	2.2	5×11	0.08	0.22	—	23	UKL1H2R2MDD
	3.3	5×11	0.08	0.33	—	40	UKL1H3R3MDD
	4.7	5×11	0.08	0.47	—	45	UKL1H4R7MDD
	6.8	5×11	0.08	0.68	—	55	UKL1H6R8MDD
	10	5×11	0.08	1	—	70	UKL1H100MDD
	15	6.3×11	0.08	1.5	—	95	UKL1H150MED
	22	6.3×11	0.08	2.2	—	110	UKL1H220MED
	33	8×11.5	0.08	3.3	—	165	UKL1H330MPD
	47	8×11.5	0.08	4.7	—	190	UKL1H470MPD
	68	10×12.5	0.08	6.8	—	250	UKL1H680MPD
	100	10×16	0.10	—	10	320	UKL1H101MPD
	150	10×20	0.10	—	15	420	UKL1H151MPD
	220	12.5×20	0.10	—	22	490	UKL1H221MHD
	330	12.5×20	0.10	—	33	600	UKL1H331MHD
	470	16×25	0.10	—	47	760	UKL1H471MHD
	680	16×25	0.10	—	68	910	UKL1H681MHD
1000	16×31.5	0.10	—	100	1140	UKL1H102MHD	
1500	18×40	0.10	—	150	1480	UKL1H152MHD	

For cut leads, formed leads or taped parts, please add the appropriate code after the size code (12th digit).  
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## UKL

### ■ Dimensions

Rated Voltage (V) (code)	Rated Capacitance ( $\mu$ F)	Case Size $\phi$ D $\times$ L (mm)	tan $\delta$	Leakage Current ( $\mu$ A)		Rated Ripple (mArms) (85°C/120Hz)	Part Number
				at 20°C after 1 minute	at 20°C after 2 minutes		
63 (1J)	6.8	5 $\times$ 11	0.07	0.8568	—	59	UKL1J6R8MDD
	10	6.3 $\times$ 11	0.07	1.26	—	75	UKL1J100MED
	15	6.3 $\times$ 11	0.07	1.89	—	100	UKL1J150MED
	22	8 $\times$ 11.5	0.07	2.772	—	115	UKL1J220MPD
	33	8 $\times$ 11.5	0.07	4.158	—	170	UKL1J330MPD
	47	10 $\times$ 12.5	0.07	5.922	—	200	UKL1J470MPD
	68	10 $\times$ 16	0.08	—	8.568	270	UKL1J680MPD
	100	10 $\times$ 20	0.08	—	12.6	330	UKL1J101MPD
	150	12.5 $\times$ 20	0.08	—	18.9	450	UKL1J151MHD
	220	12.5 $\times$ 20	0.08	—	27.72	550	UKL1J221MHD
	330	12.5 $\times$ 25	0.08	—	41.58	710	UKL1J331MHD
	470	16 $\times$ 25	0.08	—	59.22	850	UKL1J471MHD
	680	16 $\times$ 31.5	0.08	—	85.68	1050	UKL1J681MHD
1000	18 $\times$ 35.5	0.08	—	126	1330	UKL1J102MHD	
100 (2A)	1.5	5 $\times$ 11	0.07	0.3	—	23	UKL2A1R5MDD
	2.2	5 $\times$ 11	0.07	0.44	—	28	UKL2A2R2MDD
	3.3	5 $\times$ 11	0.07	0.66	—	45	UKL2A3R3MDD
	4.7	5 $\times$ 11	0.07	0.94	—	50	UKL2A4R7MDD
	6.8	6.3 $\times$ 11	0.07	1.36	—	65	UKL2A6R8MED
	10	8 $\times$ 11.5	0.07	2	—	90	UKL2A100MPD
	15	8 $\times$ 11.5	0.07	3	—	110	UKL2A150MPD
	22	10 $\times$ 12.5	0.07	4.4	—	136	UKL2A220MPD
	33	10 $\times$ 16	0.08	—	6.6	180	UKL2A330MPD
	47	10 $\times$ 20	0.08	—	9.4	220	UKL2A470MPD
	68	10 $\times$ 20	0.08	—	13.6	290	UKL2A680MPD
	100	12.5 $\times$ 20	0.08	—	20	370	UKL2A101MHD
	150	12.5 $\times$ 25	0.08	—	30	470	UKL2A151MHD
	220	16 $\times$ 25	0.08	—	44	580	UKL2A221MHD
	330	16 $\times$ 31.5	0.08	—	66	730	UKL2A331MHD
470	18 $\times$ 35.5	0.08	—	94	910	UKL2A471MHD	

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If there is no size code in the part number, please add size code "1" and then add the appropriate code.

- For formed lead or taped product specifications and minimum order quantity, please refer to the Guidelines for Aluminum Electrolytic Capacitors.

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