

# ALUMINUM ELECTROLYTIC CAPACITORS

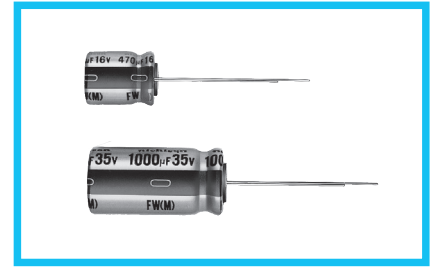
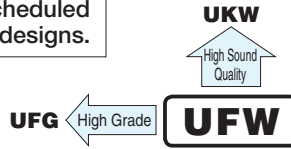
# UFW

Standard, For Audio Equipment



- Compliant to the RoHS directive (2011/65/EU,(EU)2015/863).

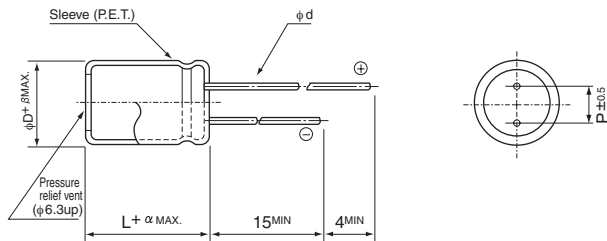
Valued marked with an ※ in the dimension table are scheduled to be discontinued and are not recommended for new designs.



## Specifications

Item	Performance Characteristics																													
Category Temperature Range	-40 to +85°C																													
Rated Voltage Range	6.3 to 100V																													
Rated Capacitance Range	2.2 to 33000µF																													
Capacitance Tolerance	±20% at 120Hz, 20°C																													
Leakage Current	After 1 minute's application of rated voltage at 20°C, leakage current is not more than 0.03 CV or 4 (µA), whichever is greater. After 2 minutes' application of rated voltage at 20°C, leakage current is not more than 0.01 CV or 3 (µA), whichever is greater.																													
Tangent of loss angle (tan δ)	<table border="1"> <tr> <td>Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>tan δ (MAX.)</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.08</td> </tr> </table> <p>Measurement frequency : 120Hz at 20°C 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	tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08											
Rated voltage (V)	6.3	10	16	25	35	50	63	100																						
tan δ (MAX.)	0.28	0.24	0.20	0.16	0.14	0.12	0.10	0.08																						
Stability at Low Temperature	<table border="1"> <tr> <td colspan="2">Rated voltage (V)</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td rowspan="2">Impedance ratio (MAX.)</td> <td>Z-25°C / Z+20°C</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z-40°C / Z+20°C</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table> <p>Measurement frequency : 120Hz</p>	Rated voltage (V)		6.3	10	16	25	35	50	63	100	Impedance ratio (MAX.)	Z-25°C / Z+20°C	5	4	3	2	2	2	2	2	Z-40°C / Z+20°C	12	10	8	5	4	3	3	3
Rated voltage (V)		6.3	10	16	25	35	50	63	100																					
Impedance ratio (MAX.)	Z-25°C / Z+20°C	5	4	3	2	2	2	2	2																					
	Z-40°C / Z+20°C	12	10	8	5	4	3	3	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.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>Within ±20% of the initial capacitance value</td> </tr> <tr> <td>tan δ</td> <td>200% 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> </table>	Capacitance change	Within ±20% of the initial capacitance value	tan δ	200% or less than the initial specified value	Leakage current	Less than or equal to the initial specified value																							
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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 black color letter on Gold sleeve.																													

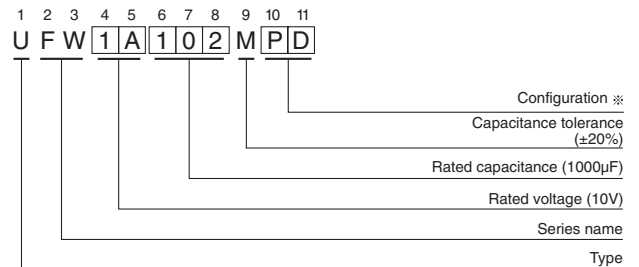
## Radial Lead Type



	(mm)									
φD	5	6.3	8	10	12.5	16	18	20	22	25
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	10	12.5
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0	1.0
β	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	1.0

α	(φD < 20) 1.5
	(φD ≥ 20) 2.0

## Type numbering system (Example : 10V 1000µF)



※ Configuration

φ D	Pb-free leadwire Pb-free PET sleeve
5	DD
6.3	ED
8 - 10	PD
12.5 to 18	HD
20 to 25	RD

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

## Frequency coefficient of rated ripple current

Cap.(µF)	Frequency	50Hz	120Hz	300Hz	1kHz	10kHz or more
2.2 to 47		0.75	1.00	1.35	1.57	2.00
100 to 470		0.80	1.00	1.23	1.34	1.50
1000 to 33000		0.85	1.00	1.10	1.13	1.15

Dimension table in next page.

UFW

## ■ 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		
6.3 (0J)	330	6.3 $\times$ 11	0.28	62.37	20.79	265	※UFW0J331MED
	470	6.3 $\times$ 11	0.28	88.83	29.61	310	※UFW0J471MED
	1000	8 $\times$ 11.5	0.28	189	63	530	UFW0J102MPD
	2200	10 $\times$ 20	0.30	415.8	138.6	980	UFW0J222MPD
	3300	10 $\times$ 20	0.32	623.7	207.9	1170	UFW0J332MPD
	4700	12.5 $\times$ 20	0.34	888.3	296.1	1350	UFW0J472MHD
	6800	12.5 $\times$ 25	0.38	1285.2	428.4	1600	UFW0J682MHD
	10000	16 $\times$ 25	0.46	1890	630	2000	UFW0J103MHD
	15000	16 $\times$ 35.5	0.56	2835	945	2550	UFW0J153MHD
	22000	18 $\times$ 40	0.70	4158	1386	3200	UFW0J223MHD
33000	22 $\times$ 50	0.92	6237	2079	3900	※UFW0J333MRD	
10 (1A)	100	5 $\times$ 11	0.24	30	10	145	※UFW1A101MDD
	220	6.3 $\times$ 11	0.24	66	22	230	※UFW1A221MED
	330	6.3 $\times$ 11	0.24	99	33	270	※UFW1A331MED
	470	6.3 $\times$ 11	0.24	141	47	330	※UFW1A471MED
	1000	10 $\times$ 12.5	0.24	300	100	630	UFW1A102MPD
	2200	10 $\times$ 20	0.26	660	220	1050	UFW1A222MPD
	3300	12.5 $\times$ 20	0.28	990	330	1420	UFW1A332MHD
	4700	12.5 $\times$ 25	0.30	1410	470	1800	UFW1A472MHD
	6800	16 $\times$ 25	0.34	2040	680	2150	UFW1A682MHD
	10000	16 $\times$ 35.5	0.42	3000	1000	2500	UFW1A103MHD
	15000	18 $\times$ 35.5	0.52	4500	1500	2720	UFW1A153MHD
	22000	20 $\times$ 40	0.66	6600	2200	3700	※UFW1A223MRD
33000	22 $\times$ 50	0.88	9900	3300	4500	※UFW1A333MRD	
16 (1C)	100	5 $\times$ 11	0.20	48	16	155	※UFW1C101MDD
	220	6.3 $\times$ 11	0.20	105.6	35.2	250	※UFW1C221MED
	330	8 $\times$ 11.5	0.20	158.4	52.8	360	UFW1C331MPD
	470	8 $\times$ 11.5	0.20	225.6	75.2	420	UFW1C471MPD
	1000	10 $\times$ 16	0.20	480	160	770	UFW1C102MPD
	2200	12.5 $\times$ 20	0.22	1056	352	1250	UFW1C222MHD
	3300	12.5 $\times$ 25	0.24	1584	528	1700	UFW1C332MHD
	4700	16 $\times$ 25	0.26	2256	752	2100	UFW1C472MHD
	6800	16 $\times$ 35.5	0.30	3264	1088	2500	UFW1C682MHD
	10000	18 $\times$ 35.5	0.38	4800	1600	2640	UFW1C103MHD
	15000	20 $\times$ 40	0.48	7200	2400	3400	※UFW1C153MRD
	22000	22 $\times$ 50	0.62	10560	3520	4200	※UFW1C223MRD
	33000	25 $\times$ 50	0.84	15840	5280	4800	※UFW1C333MRD

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.

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## ■ 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		
25 (1E)	47	5 $\times$ 11	0.16	35.25	11.75	115	※UFW1E470MDD
	100	6.3 $\times$ 11	0.16	75	25	185	※UFW1E101MED
	220	8 $\times$ 11.5	0.16	165	55	320	UFW1E221MPD
	330	10 $\times$ 12.5	0.16	247.5	82.5	420	UFW1E331MPD
	470	10 $\times$ 12.5	0.16	352.5	117.5	530	UFW1E471MPD
	1000	10 $\times$ 20	0.16	750	250	950	UFW1E102MPD
	2200	12.5 $\times$ 25	0.18	1650	550	1550	UFW1E222MHD
	3300	16 $\times$ 25	0.20	2475	825	1950	UFW1E332MHD
	4700	16 $\times$ 31.5	0.22	3525	1175	2360	UFW1E472MHD
	6800	18 $\times$ 35.5	0.26	5100	1700	2590	UFW1E682MHD
	10000	20 $\times$ 40	0.34	7500	2500	3000	※UFW1E103MRD
	15000	22 $\times$ 50	0.44	11250	3750	3800	※UFW1E153MRD
22000	25 $\times$ 50	0.58	16500	5500	4500	※UFW1E223MRD	
35 (1V)	33	5 $\times$ 11	0.14	34.65	11.55	105	※UFW1V330MDD
	47	5 $\times$ 11	0.14	49.35	16.45	120	※UFW1V470MDD
	100	6.3 $\times$ 11	0.14	105	35	200	※UFW1V101MED
	220	10 $\times$ 12.5	0.14	231	77	370	UFW1V221MPD
	330	10 $\times$ 12.5	0.14	346.5	115.5	470	UFW1V331MPD
	470	10 $\times$ 16	0.14	493.5	164.5	630	UFW1V471MPD
	1000	12.5 $\times$ 20	0.14	1050	350	1100	UFW1V102MHD
	2200	16 $\times$ 25	0.16	2310	770	1800	UFW1V222MHD
	3300	16 $\times$ 35.5	0.18	3465	1155	2220	UFW1V332MHD
	4700	18 $\times$ 35.5	0.20	4935	1645	2490	UFW1V472MHD
	6800	20 $\times$ 40	0.24	7140	2380	3000	※UFW1V682MRD
	10000	22 $\times$ 50	0.32	10500	3500	3700	※UFW1V103MRD
15000	25 $\times$ 50	0.42	15750	5250	4300	※UFW1V153MRD	
50 (1H)	2.2	5 $\times$ 11	0.12	4	3	23	※UFW1H2R2MDD
	3.3	5 $\times$ 11	0.12	4.95	3	35	※UFW1H3R3MDD
	4.7	5 $\times$ 11	0.12	7.05	3	40	※UFW1H4R7MDD
	10	5 $\times$ 11	0.12	15	5	65	※UFW1H100MDD
	22	5 $\times$ 11	0.12	33	11	95	※UFW1H220MDD
	33	5 $\times$ 11	0.12	49.5	16.5	120	※UFW1H330MDD
	47	6.3 $\times$ 11	0.12	70.5	23.5	150	※UFW1H470MED
	100	8 $\times$ 11.5	0.12	150	50	250	UFW1H101MPD
	220	10 $\times$ 12.5	0.12	330	110	410	UFW1H221MPD
	330	10 $\times$ 16	0.12	495	165	570	UFW1H331MPD
	470	12.5 $\times$ 20	0.12	705	235	760	UFW1H471MHD
	1000	12.5 $\times$ 25	0.12	1500	500	1300	UFW1H102MHD
	2200	16 $\times$ 35.5	0.14	3300	1100	2090	UFW1H222MHD
	3300	18 $\times$ 35.5	0.16	4950	1650	2360	UFW1H332MHD
	4700	20 $\times$ 40	0.18	7050	2350	2900	※UFW1H472MRD
6800	22 $\times$ 50	0.22	10200	3400	3500	※UFW1H682MRD	
10000	25 $\times$ 50	0.30	15000	5000	4000	※UFW1H103MRD	

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

## ■ 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)	10	5 $\times$ 11	0.10	18.9	6.3	70	※UFW1J100MDD
	22	5 $\times$ 11	0.10	41.58	13.86	100	※UFW1J220MDD
	33	6.3 $\times$ 11	0.10	62.37	20.79	140	※UFW1J330MED
	47	6.3 $\times$ 11	0.10	88.83	29.61	165	※UFW1J470MED
	100	10 $\times$ 12.5	0.10	189	63	300	UFW1J101MPD
	220	10 $\times$ 16	0.10	415.8	138.6	470	UFW1J221MPD
	330	10 $\times$ 20	0.10	623.7	207.9	650	UFW1J331MPD
	470	12.5 $\times$ 20	0.10	888.3	296.1	880	UFW1J471MHD
	1000	16 $\times$ 25	0.10	1890	630	1300	UFW1J102MHD
	2200	18 $\times$ 35.5	0.12	4158	1386	2200	UFW1J222MHD
	3300	20 $\times$ 40	0.14	6237	2079	2700	※UFW1J332MRD
	4700	22 $\times$ 50	0.16	8883	2961	3400	※UFW1J472MRD
6800	25 $\times$ 50	0.20	12852	4284	3500	※UFW1J682MRD	
100 (2A)	2.2	5 $\times$ 11	0.08	6.6	3	30	※UFW2A2R2MDD
	3.3	5 $\times$ 11	0.08	9.9	3.3	40	※UFW2A3R3MDD
	4.7	5 $\times$ 11	0.08	14.1	4.7	45	※UFW2A4R7MDD
	10	6.3 $\times$ 11	0.08	30	10	75	※UFW2A100MED
	22	6.3 $\times$ 11	0.08	66	22	120	※UFW2A220MED
	33	8 $\times$ 11.5	0.08	99	33	160	UFW2A330MPD
	47	10 $\times$ 12.5	0.08	141	47	210	UFW2A470MPD
	100	10 $\times$ 20	0.08	300	100	350	UFW2A101MPD
	220	12.5 $\times$ 25	0.08	660	220	600	UFW2A221MHD
	330	12.5 $\times$ 25	0.08	990	330	750	UFW2A331MHD
	470	16 $\times$ 25	0.08	1410	470	1000	UFW2A471MHD
	1000	18 $\times$ 40	0.08	3000	1000	1370	UFW2A102MHD
	2200	22 $\times$ 50	0.10	6600	2200	2400	※UFW2A222MRD
3300	25 $\times$ 50	0.12	9900	3300	2900	※UFW2A332MRD	

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