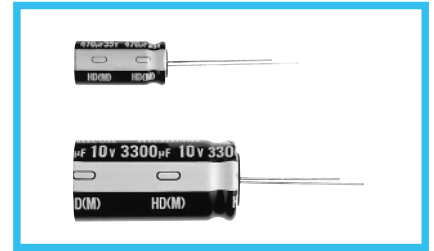
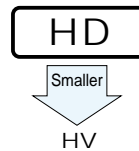


# ALUMINUM ELECTROLYTIC CAPACITORS

**HD** High Ripple Low Impedance series



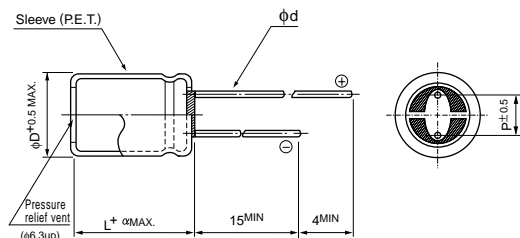
- Lower impedance at high frequency range.
- Smaller case size and high ripple current.
- Compliant to the RoHS directive (2002/95/EC).



## Specifications

Item	Performance Characteristics													
Category Temperature Range	-40 to +105°C													
Rated Voltage Range	6.3 to 50V													
Rated Capacitance Range	22 to 6800µF													
Capacitance Tolerance	±20% at 120Hz, 20°C													
Leakage Current	After 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3 (µA), whichever is greater.													
Tangent of loss angle (tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	120Hz 20°C						
	tan δ (MAX.)	0.22	0.19	0.16	0.14	0.12	0.10							
For capacitance of more than 1000µF, add 0.02 for every increase of 1000µF.														
Stability at Low Temperature	Rated voltage (V)	6.3	10	16	25	35	50	120Hz						
	Impedance ratio ZT / Z20 (MAX.)	Z-25°C / Z+20°C	2	2	2	2	2		2					
		Z-40°C / Z+20°C	3	3	3	3	3	3						
Endurance	<p>The specifications listed at right shall be met when the capacitors are restored to 20°C after D.C. bias plus rated ripple current is applied for 5000 hours (2000 hours for φD=5 and 6.3, 3000 hours for φD=8, 4000 hours for φD=10), at 105°C, the peak voltage shall not exceed the rated voltage.</p> <table border="1"> <tr> <td>Capacitance change</td> <td>Within ±25% 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 ±25% 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
Capacitance change	Within ±25% 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													
Marking	Printed with white color letter on black sleeve.													

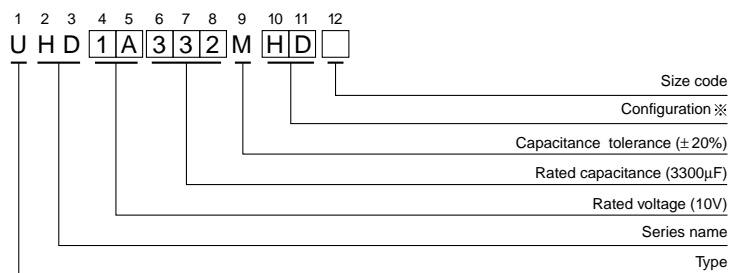
## Radial Lead Type



α	(mm)					
	(L < 20)	1.5	2.0	2.5	3.5	5.0
	(L ≥ 20)	2.0	2.0	2.5	3.5	5.0
	φd	0.5	0.5	0.6	0.6	0.8

\*In case L > 25 for the φ12.5 dia. unit, lead dia. φd = 0.8mm.

## Type numbering system (Example : 10V 3300µF)



※ Configuration

φ D	Pb-free leadwire Pb-free PET sleeve
5	DD
6.3	ED
8-10	PD
12.5-16	HD

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

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.

### Standard Ratings

V (Code) Cap. (μF) / Item Code		6.3 (0J)				10 (1A)			
		Case size φ D × L (mm)	Impedance (Ω) MAX.		Rated ripple (mArms) 105°C / 100kHz	Case size φ D × L (mm)	Impedance (Ω) MAX.		Rated ripple (mArms) 105°C / 100kHz
			20°C / 100kHz	-10°C / 100kHz			20°C / 100kHz	-10°C / 100kHz	
100	101				5 × 11	0.30	1.0	250	
150	151	5 × 11	0.30	1.0	250				
220	221				6.3 × 11	0.13	0.41	405	
330	331	6.3 × 11	0.13	0.41	405				
470	471				8 × 11.5	0.072	0.22	760	
560	561	8 × 11.5	0.072	0.22	760				
680	681	8 × 15			8 × 15	0.056	0.17	995	
		▲ 10 × 12.5			▲ 10 × 12.5	0.053	0.16	1030	
820	821	8 × 15	0.056	0.17	995				
1000	102	10 × 12.5	0.053	0.16	1030	8 × 20	0.041	0.13	1250
					▲ 10 × 16	0.038	0.12	1430	
1200	122	8 × 20	0.041	0.13	1250	10 × 20	0.023	0.069	1820
		▲ 10 × 16	0.038	0.12	1430				
1500	152	10 × 20	0.023	0.069	1820	10 × 25	0.022	0.066	2150
2200	222	10 × 25	0.022	0.066	2150	12.5 × 20	0.021	0.053	2360
3300	332	12.5 × 20	0.021	0.053	2360	12.5 × 25	0.018	0.045	2770
3900	392	12.5 × 25	0.018	0.045	2770	12.5 × 31.5	0.016	0.041	3290
						▲ 16 × 20	0.018	0.045	3140
4700	472	12.5 × 31.5	0.016	0.041	3290	12.5 × 35.5	0.015	0.039	3400
5600	562	12.5 × 35.5	0.015	0.039	3400	16 × 25	0.016	0.043	3460
		▲ 16 × 20	0.018	0.045	3140				
6800	682	16 × 25	0.016	0.043	3460				

V (Code) Cap. (μF) / Item Code		16 (1C)				25 (1E)			
		Case size φ D × L (mm)	Impedance (Ω) MAX.		Rated ripple (mArms) 105°C / 100kHz	Case size φ D × L (mm)	Impedance (Ω) MAX.		Rated ripple (mArms) 105°C / 100kHz
			20°C / 100kHz	-10°C / 100kHz			20°C / 100kHz	-10°C / 100kHz	
47	470				5 × 11	0.30	1.0	250	
56	560	5 × 11	0.30	1.0	250				
100	101				6.3 × 11	0.13	0.41	405	
120	121	6.3 × 11	0.13	0.41	405				
220	221				8 × 11.5	0.072	0.22	760	
330	331	8 × 11.5	0.072	0.22	760	8 × 15	0.056	0.17	995
					▲ 10 × 12.5	0.053	0.16	1030	
470	471	8 × 15	0.056	0.17	995	8 × 20	0.041	0.13	1250
		▲ 10 × 12.5	0.053	0.16	1030	▲ 10 × 16	0.038	0.12	1430
680	681	8 × 20	0.041	0.13	1250	10 × 20	0.023	0.069	1820
		▲ 10 × 16	0.038	0.12	1430				
820	821				10 × 25	0.022	0.066	2150	
1000	102	10 × 20	0.023	0.069	1820	12.5 × 20	0.021	0.053	2360
1200	122	10 × 25	0.022	0.066	2150				
1500	152	12.5 × 20	0.021	0.053	2360	12.5 × 25	0.018	0.045	2770
1800	182					12.5 × 31.5	0.016	0.041	3290
						▲ 16 × 20	0.018	0.045	3140
2200	222	12.5 × 25	0.018	0.045	2770	12.5 × 35.5	0.015	0.039	3400
2700	272	12.5 × 31.5	0.016	0.041	3290	16 × 25	0.016	0.043	3460
		▲ 16 × 20	0.018	0.045	3140				
3300	332	12.5 × 35.5	0.015	0.039	3400				
3900	392	16 × 25	0.016	0.043	3460				

▲ : In this case, ⑥ will be put at 12th digit of type numbering system.

## ■ Standard Ratings

Cap. (μF)	V (Code)	Item Code	35 (1V)			50 (1H)				
			Case size φD × L (mm)	Impedance (Ω) MAX.		Rated ripple (mA <sub>rms</sub> ) 105°C / 100kHz	Case size φD × L (mm)	Impedance (Ω) MAX.		Rated ripple (mA <sub>rms</sub> ) 105°C / 100kHz
				20°C / 100kHz	-10°C / 100kHz			20°C / 100kHz	-10°C / 100kHz	
22	220					5 × 11	0.34	1.18	238	
33	330		5 × 11	0.30	1.0	250				
56	560		6.3 × 11	0.13	0.41	405	6.3 × 11	0.14	0.50	385
100	101					8 × 11.5	0.074	0.22	724	
120	121					8 × 15	0.061	0.18	950	
150	151		8 × 11.5	0.072	0.22	760	10 × 12.5	0.061	0.18	979
180	181					8 × 20	0.046	0.14	1190	
220	221		8 × 15	0.056	0.17	995	10 × 16	0.042	0.12	1370
		▲	10 × 12.5	0.053	0.16	1030				
270	271		8 × 20	0.041	0.13	1250	10 × 20	0.030	0.090	1580
330	331		10 × 16	0.038	0.12	1430	10 × 25	0.028	0.085	1870
470	471		10 × 20	0.023	0.069	1820	12.5 × 20	0.027	0.068	2050
560	561		10 × 25	0.022	0.066	2150	12.5 × 25	0.023	0.059	2410
680	681		12.5 × 20	0.021	0.053	2360	12.5 × 31.5	0.021	0.052	2860
820	821						12.5 × 35.5	0.019	0.051	2960
		▲	16 × 20	0.023	0.059	2730				
1000	102		12.5 × 25	0.018	0.045	2770	16 × 25	0.021	0.056	3010
1200	122		12.5 × 31.5	0.016	0.041	3290				
		▲	16 × 20	0.018	0.045	3140				
1500	152		12.5 × 35.5	0.015	0.039	3400				
1800	182		16 × 25	0.016	0.043	3460				

▲ : In this case, [6] will be put at 12th digit of type numbering system.

## ● Frequency coefficient of rated ripple current

Cap. (μF)	Frequency	50Hz	120Hz	1kHz	10kHz	100kHz or more
22 to 33		0.45	0.55	0.75	0.90	1.00
47 to 330		0.60	0.70	0.85	0.95	1.00
470 to 1000		0.65	0.75	0.90	0.98	1.00
1200 to 6800		0.75	0.80	0.95	1.00	1.00