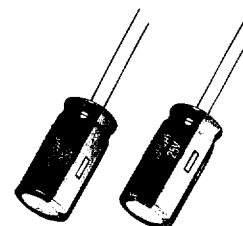


HFG Series

Features

- High CV value per standard case size (same size with SU series)
- Low impedance (approx. 1/2 of HFS series)
- Long life: 2000~5000 hours at +105°C

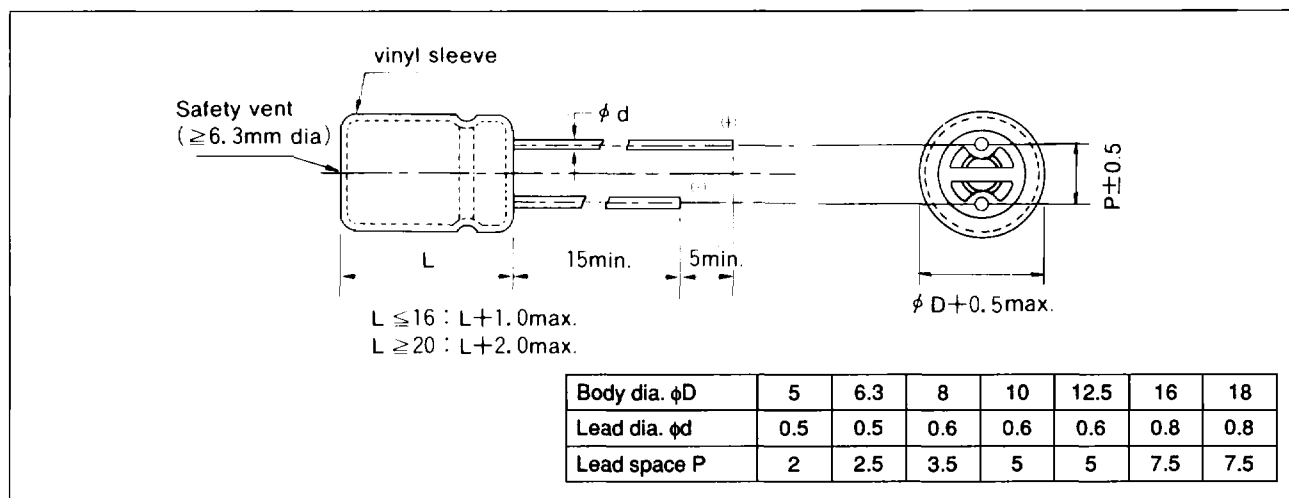


Specifications

Item	Performance Characteristics																																										
Operating Temperature Range	-55 to + 105°C																																										
Rated Working Voltage Range	6.3 to 63V DC																																										
Nominal Capacitance Range	0.1 to 15000μF																																										
Capacitance Tolerance	±20% (120Hz, +20°C)																																										
Leakage Current	I ≤ 0.01CV or 3 [μA] whichever is greater measured after 2 minutes application of rated working voltage at +20°C.																																										
tan δ (120Hz, +20°C)	<table><tr><td>Working 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></tr><tr><td>tan δ max.</td><td>0.22</td><td>0.19</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.08</td></tr></table>								Working voltage [V]	6.3	10	16	25	35	50	63	tan δ max.	0.22	0.19	0.16	0.14	0.12	0.10	0.08																			
	Working voltage [V]	6.3	10	16	25	35	50	63																																			
	tan δ max.	0.22	0.19	0.16	0.14	0.12	0.10	0.08																																			
For capacitance value > 1000μF, add 0.02 per another 1000μF.																																											
Impedance at High Frequency	Refer to standard products table. (100kHz, +20°C)																																										
	<table><tr><td colspan="2">Freq. [Hz]</td><td>50/60</td><td>120</td><td>1k</td><td>10k</td><td>100k</td></tr><tr><td colspan="2">Cap. [μF]</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">0.1 ~ 330</td><td>0.55</td><td>0.65</td><td>0.85</td><td>0.90</td><td>1.00</td></tr><tr><td colspan="2">470 ~ 3300</td><td>0.75</td><td>0.80</td><td>0.90</td><td>0.95</td><td>1.00</td></tr><tr><td colspan="2">4700 ~</td><td>0.80</td><td>0.85</td><td>0.95</td><td>1.00</td><td>1.00</td></tr></table>								Freq. [Hz]		50/60	120	1k	10k	100k	Cap. [μF]							0.1 ~ 330		0.55	0.65	0.85	0.90	1.00	470 ~ 3300		0.75	0.80	0.90	0.95	1.00	4700 ~		0.80	0.85	0.95	1.00	1.00
	Freq. [Hz]		50/60	120	1k	10k	100k																																				
	Cap. [μF]																																										
	0.1 ~ 330		0.55	0.65	0.85	0.90	1.00																																				
470 ~ 3300		0.75	0.80	0.90	0.95	1.00																																					
4700 ~		0.80	0.85	0.95	1.00	1.00																																					
Ripple Current	Refer to standard products table. (100kHz, +105°C)																																										
High Temperature Loading	Test conditions Duration : 2000 hours (for φ5 ~ φ8mm) 3000 hours (for φ10mm) 5000 hours (for φ12 ~ φ18mm) Ambient temperature : +105°C Applied voltage : DC voltage with maximum permissible ripple current specified at +105°C (≤ Rated working voltage) Post test requirements at +20°C Leakage current : ≤ Initial specified value Capacitance change : ≤ ±20% of initial measured value tan δ : ≤ 200% of initial specified value																																										
Shelf Life	Test conditions Duration : 1000 hours Ambient temperature : +105°C Applied voltage : (none) Post test requirements at +20°C Same limit for high temperature loading.																																										
Cleaning	Capacitors shall be capable of withstanding exposure to following cleaning solvents. <table><tr><td colspan="2">Conditions</td><td>Solvent condition</td><td>Exposure time</td><td>Temperature</td><td>Ultrasonic wave</td></tr><tr><td>Solvents</td><td>Freon-TE, TES, TP35 or equivalents</td><td>Liquid or vapor</td><td>≤ 5 min (total)</td><td>≤ boiling point at 1 atm</td><td>Acceptable</td></tr></table>								Conditions		Solvent condition	Exposure time	Temperature	Ultrasonic wave	Solvents	Freon-TE, TES, TP35 or equivalents	Liquid or vapor	≤ 5 min (total)	≤ boiling point at 1 atm	Acceptable																							
Conditions		Solvent condition	Exposure time	Temperature	Ultrasonic wave																																						
Solvents	Freon-TE, TES, TP35 or equivalents	Liquid or vapor	≤ 5 min (total)	≤ boiling point at 1 atm	Acceptable																																						

Dimensions

[mm]



Case Size Table

$\phi D \times L$ [mm]

W.V. [V.DC] Cap. [μF]	6.3 (0J)	10 (1A)	16 (1C)	25 (1E)	35 (1V)	50 (1H)	63 (1J)
0.1 (0R1)						5 × 11	
0.22 (R22)						5 × 11	
0.33 (R33)						5 × 11	
0.47 (R47)						5 × 11	
1 (010)						5 × 11	
2.2 (2R2)						5 × 11	
3.3 (3R3)						5 × 11	
4.7 (4R7)						5 × 11	
10 (100)						5 × 11	5 × 11
22 (220)						5 × 11	6.3 × 11.2
33 (330)					5 × 11	6.3 × 11.2	6.3 × 11.2
47 (470)			5 × 11	5 × 11	6.3 × 11.2	6.3 × 11.2	8 × 11.5
100 (101)	5 × 11	5 × 11	6.3 × 11.2	6.3 × 11.2	8 × 11.5	8 × 11.5	10 × 12.5
220 (221)	6.3 × 11.2	6.3 × 11.2	8 × 11.5	8 × 11.5	10 × 12.5	10 × 16	10 × 20
330 (331)	6.3 × 11.2	8 × 11.5	8 × 11.5	10 × 12.5	10 × 16	10 × 20	12.5 × 20
470 (471)	8 × 11.5	8 × 11.5	10 × 12.5	10 × 16	10 × 20	12.5 × 20	12.5 × 25
1000 (102)	10 × 12.5	10 × 16	10 × 20	12.5 × 20	12.5 × 25	16 × 25	16 × 31.5
2200 (222)	12.5 × 20	12.5 × 20	12.5 × 25	16 × 25	16 × 31.5	18 × 35.5	
3300 (332)	12.5 × 20	12.5 × 25	16 × 25	16 × 31.5	18 × 35.5		
4700 (472)	16 × 25	16 × 25	16 × 31.5	18 × 35.5			
6800 (682)	16 × 25	16 × 31.5	18 × 35.5				
10000 (103)	16 × 31.5	18 × 35.5					
15000 (153)	18 × 35.5						

Part Number System

E	C	A			F	G				
Common code			W.V. code		Series code		Capacitance code			Suffix (see page: 15 ~ 18)

Standard Products Table

W.V. [V.DC]	Cap. [μF]	Part No.	D.C.L. (+20°C/2 min.) [μA] max.	tan δ (120Hz, +20°C) max.	Impedance (100kHz/+20°C) [Ω] max.	Ripple current (100kHz/+105°C) [mA] rms max.	Dimensions [mm]			
							φD	L	P	φd
6.3	100	ECA0JFG101	6.3	0.22	1.0	140	5	11	2.0	0.5
	220	ECA0JFG221	13.8	0.22	0.42	245	6.3	11.2	2.5	0.5
	330	ECA0JFG331	20.7	0.22	0.42	245	6.3	11.2	2.5	0.6
	470	ECA0JFG471	29.6	0.22	0.21	400	8	11.5	3.5	0.6
	1000	ECA0JFG102	63.0	0.22	0.15	560	10	12.5	5.0	0.6
	2200	ECA0JFG222	138.6	0.24	0.050	1280	12.5	20	5.0	0.6
	3300	ECA0JFG332	207.9	0.26	0.050	1280	12.5	20	5.0	0.6
	4700	ECA0JFG472	296.1	0.28	0.031	1970	16	25	7.5	0.8
	6800	ECA0JFG682	428.4	0.32	0.031	1970	16	25	7.5	0.8
	10000	ECA0JFG103	630.0	0.40	0.028	2220	16	31.5	7.5	0.8
	15000	ECA0JFG153	945.0	0.50	0.023	2770	18	35.5	7.5	0.8
10	100	ECA1AFG101	10.0	0.19	1.0	140	5	11	2.0	0.5
	220	ECA1AFG221	22.0	0.19	0.42	245	6.3	11.2	2.5	0.5
	330	ECA1AFG331	33.0	0.19	0.21	400	8	11.5	3.5	0.6
	470	ECA1AFG471	47.0	0.19	0.21	400	8	11.5	3.5	0.6
	1000	ECA1AFG102	100.0	0.19	0.11	720	10	16	5.0	0.6
	2200	ECA1AFG222	220.0	0.21	0.050	1280	12.5	20	5.0	0.6
	3300	ECA1AFG332	330.0	0.23	0.040	1560	12.5	25	5.0	0.6
	4700	ECA1AFG472	470.0	0.25	0.031	1970	16	25	7.5	0.8
	6800	ECA1AFG682	680.0	0.29	0.028	2220	16	31.5	7.5	0.8
	10000	ECA1AFG103	1000.0	0.37	0.023	2770	18	35.5	7.5	0.8
16	47	ECA1CFG470	7.5	0.16	1.0	140	5	11	2.0	0.5
	100	ECA1CFG101	16.0	0.16	0.42	245	6.3	11.2	2.5	0.5
	220	ECA1CFG221	35.2	0.16	0.21	400	8	11.5	3.5	0.6
	330	ECA1CFG331	52.8	0.16	0.21	400	8	11.5	3.5	0.6
	470	ECA1CFG471	75.2	0.16	0.15	560	10	12.5	5.0	0.6
	1000	ECA1CFG102	160.0	0.16	0.076	940	10	20	5.0	0.6
	2200	ECA1CFG222	352.0	0.18	0.040	1560	12.5	25	5.0	0.6
	3300	ECA1CFG332	528.0	0.20	0.031	1970	16	25	7.5	0.8
	4700	ECA1CFG472	752.0	0.22	0.028	2220	16	31.5	7.5	0.8
	6800	ECA1CFG682	1088.0	0.26	0.023	2770	18	35.5	7.5	0.8
25	47	ECA1EFG470	11.7	0.14	1.0	140	5	11	2.0	0.5
	100	ECA1EFG101	25.0	0.14	0.57	245	6.3	11.2	2.5	0.5
	220	ECA1EFG221	55.0	0.14	0.21	400	8	11.5	3.5	0.6
	330	ECA1EFG331	82.5	0.14	0.15	560	10	12.5	5.0	0.6
	470	ECA1EFG471	117.5	0.14	0.11	720	10	16	5.0	0.6
	1000	ECA1EFG102	250.0	0.14	0.050	1280	12.5	20	5.0	0.6
	2200	ECA1EFG222	550.0	0.16	0.031	1970	16	25	7.5	0.8
	3300	ECA1EFG332	825.0	0.18	0.028	2220	16	31.5	7.5	0.8
	4700	ECA1EFG472	1175.0	0.20	0.023	2770	18	35.5	7.5	0.8
35	33	ECA1VFG330	11.5	0.12	1.3	125	5	11	2.0	0.5
	47	ECA1VFG470	16.4	0.12	0.57	210	6.3	11.2	2.5	0.5
	100	ECA1VFG101	35.0	0.12	0.32	325	8	11.5	3.5	0.6

Standard Products Table

W.V. [V.DC]	Cap. [μF]	Part No.	D.C.L. (+20°C/2 min.) [μA] max.	tan δ (120Hz, +20°C) max.	Impedance (100kHz/+20°C) [Ω] max.	Ripple current (100kHz/+105°C) [mA] rms max.	Dimensions [mm]			
							φD	L	P	φd
35	220	ECA1VFG221	77.0	0.12	0.23	450	10	12.5	5.0	0.6
	330	ECA1VFG331	115.5	0.12	0.18	565	10	16	5.0	0.6
	470	ECA1VFG471	164.5	0.12	0.13	720	10	20	5.0	0.6
	1000	ECA1VFG102	350.0	0.12	0.074	1140	12.5	25	5.0	0.6
	2200	ECA1VFG222	770.0	0.14	0.034	2010	16	31.5	7.5	0.8
	3300	ECA1VFG332	1155.0	0.16	0.024	2710	18	35.5	7.5	0.8
50	0.1	ECA1HFG0R1	3.0	0.10	24.0	2.0	5	11	2.0	0.5
	0.22	ECA1HFG0R2	3.0	0.10	10.0	4.5	5	11	2.0	0.5
	0.33	ECA1HFG0R3	3.0	0.10	7.2	6.7	5	11	2.0	0.5
	0.47	ECA1HFG0R4	3.0	0.10	5.0	9.5	5	11	2.0	0.5
	1	ECA1HFG010	3.0	0.10	2.4	20	5	11	2.0	0.5
	2.2	ECA1HFG0R2	3.0	0.10	1.3	45	5	11	2.0	0.5
	3.3	ECA1HFG0R3	3.0	0.10	1.3	65	5	11	2.0	0.5
	4.7	ECA1HFG0R7	3.0	0.10	1.3	95	5	11	2.0	0.5
	10	ECA1HFG100	5.0	0.10	1.3	125	5	11	2.0	0.5
	22	ECA1HFG220	11.0	0.10	1.3	125	5	11	2.0	0.5
	33	ECA1HFG330	16.5	0.10	0.57	210	6.3	11.2	2.5	0.5
	47	ECA1HFG470	23.5	0.10	0.57	210	6.3	11.2	2.5	0.5
	100	ECA1HFG101	50.0	0.10	0.32	325	8	11.5	3.5	0.6
	220	ECA1HFG221	110.0	0.10	0.18	565	10	16	5.0	0.6
	330	ECA1HFG331	165.0	0.10	0.13	720	10	20	5.0	0.6
	470	ECA1HFG471	235.0	0.10	0.088	965	12.5	20	5.0	0.6
	1000	ECA1HFG102	500.0	0.10	0.047	1600	16	25	7.5	0.8
	2200	ECA1HFG222	1100.0	0.12	0.024	2710	18	35.5	7.5	0.8
63	10	ECA1JFG100	6.3	0.08	2.2	95	5	11	2.0	0.5
	22	ECA1JFG220	13.8	0.08	0.94	165	6.3	11.2	2.5	0.5
	33	ECA1JFG330	20.7	0.08	0.94	165	6.3	11.2	2.5	0.5
	47	ECA1JFG470	29.6	0.08	0.68	220	8	11.5	3.5	0.6
	100	ECA1JFG101	63.0	0.08	0.36	360	10	12.5	5.0	0.6
	220	ECA1JFG221	138.6	0.08	0.20	580	10	20	5.0	0.6
	330	ECA1JFG331	207.9	0.08	0.14	765	12.5	20	5.0	0.6
	470	ECA1JFG471	296.1	0.08	0.12	900	12.5	25	5.0	0.6
	1000	ECA1JFG102	630.0	0.08	0.052	1630	16	31.5	7.5	0.8