

### Surface Mount Type

Series: FK Type : V

#### ■ Features

- Endurance: 2000 to 5000h at 105°C
- Low impedance (40 to 60% less than FC series)
- Miniaturization (30 to 50% less than FC series)
- Vibration-proof product is available upon request. ( $\phi 8 \leq$ )

Country of Origin

Japan



#### ■ Specifications

Category temp. range	-55 to +105°C										
Rated W.V. Range	6.3 to 100V .DC										
Nominal Cap. Range	3.3 to 6800 $\mu$ F										
Capacitance Tolerance	$\pm 20\%$ (120Hz/+20°C)										
DC Leakage Current	$I \leq 0.01 CV$ or $3(\mu A)$ After 2 minutes application of rated working voltage at +20°C. (Whichever is greater)										
tan $\delta$	Please see the attached standard products list										
Characteristics at Low Temperature	W.V. (V)	6.3	10	16	25	35	50	63	80	100	(Impedance ratio at 120 Hz)
	Z(-25°C) / Z(+20°C)	2	2	2	2	2	2	2	2	2	
	Z(-40°C) / Z(+20°C)	3	3	3	3	3	3	3	3	3	
	Z(-55°C) / Z(+20°C)	4	4	4	3	3	3	3	3	3	
Endurance	After the life with DC rated working voltage at +105 $\pm$ 2°C for 2000 hours ( $\geq$ dia.12.5 and suffix "G" in dia.8 to 10mm are 5000 hours) the capacitors shall meet the limits specified below. post-test requirement at +20°C.										
	Capacitance change	$\pm 30\%$ of initial measured value (Suffix "G" is 35%)									
	tan $\delta$	$\leq 200\%$ of initial specified value (Suffix "G" is 300%)									
	DC leakage current	$\leq$ initial specified value									
Shelf Life	After storage for 1000hours at +105 $\pm$ 2 °C with no voltage applied and then being stabilized at +20°C, capacitors shall meet the limits specified in Endurance.(With voltage treatment)										
	After reflow soldering ( Refer to the "Application Guide" for recommended temperature profile.) and then being stabilized at +20°C, capacitor shall meet the following limits.										
Resistance to Soldering Heat	After reflow soldering ( Refer to the "Application Guide" for recommended temperature profile.) and then being stabilized at +20°C, capacitor shall meet the following limits.										
	Capacitance change	$\pm 10\%$ of initial measured value									
	D.F. tan $\delta$	$\leq$ initial specified value									
	DC leakage current	$\leq$ initial specified value									

#### ■ Marking

Example. 16V10 $\mu$ F  
Marking color : BLACK

W.V. code

Negative polarity marking

Capacitance ( $\mu$ F)

Series identification

Lot number

( $\geq \phi 12.5$ )

W.V. code

Negative polarity marking

Capacitance ( $\mu$ F)

Series identification

Lot number

W.V. code

V	6.3	10	16	25	35
Code	j	A	C	E	V

V	50	63	80	100
Code	H	J	K	2A

#### ■ Dimensions in mm (not to scale)

( ) reference size

Size code	D	L	A,B	H max.	I	W	P	K
B	4.0	5.8	4.3	5.5	1.8	0.65 $\pm$ 0.1	1.0	0.35 -0.20 to +0.15
C	5.0	5.8	5.3	6.5	2.2	0.65 $\pm$ 0.1	1.5	0.35 -0.20 to +0.15
D	6.3	5.8	6.6	7.8	2.6	0.65 $\pm$ 0.1	1.8	0.35 -0.20 to +0.15
D8	6.3	7.7	6.6	7.8	2.6	0.65 $\pm$ 0.1	1.8	0.35 -0.20 to +0.15
E	8.0	6.2	8.3	9.5	3.4	0.65 $\pm$ 0.1	2.2	0.35 -0.20 to +0.15
F	8.0	10.2	8.3	10.0	3.4	0.90 $\pm$ 0.2	3.1	0.70 $\pm$ 0.20
G	10.0	10.2	10.3	12.0	3.5	0.90 $\pm$ 0.2	4.6	0.70 $\pm$ 0.20
H13	12.5	13.5	13.5	15.0	4.7	0.90 $\pm$ 0.3	4.4	0.70 $\pm$ 0.30
J16	16.0	16.5	17.0	19.0	5.5	1.20 $\pm$ 0.3	6.7	0.70 $\pm$ 0.30
K16	18.0	16.5	19.0	21.0	6.7	1.20 $\pm$ 0.3	6.7	0.70 $\pm$ 0.30

■ Case size VS Capacitance, Impedance and Ripple current

Impedance: ( $\Omega/100\text{kHz}, +20^\circ\text{C}$ ),  
Ripple current: (mA r.m.s./ $100\text{kHz}+105^\circ\text{C}$ )

Capacitance ( $\mu\text{F}$ )	W.V.	6.3			10			16		
		Size	Impedance	Ripple current	Size	Impedance	Ripple current	Size	Impedance	Ripple current
10								B	1.35	90
22	B	1.35	90	B	1.35	90	C(B)	0.7(1.35)	160(90)	
33				C(B)	0.7(1.35)	160(90)				
47	C(B)	0.7(1.35)	160(90)				D(C)	0.36(0.7)	240(160)	
68							D	0.36	240	
100	D(C)	0.36(0.7)	240(160)				D	0.36	240	
150				D	0.36	240	D8	0.34	280	
220	D	0.36	240	D8	0.34	280	D8	0.34	280	
				E	0.26	300	E	0.26	300	
330	D8	0.34	280	⊙F	0.16	600	⊙F	0.16	600	
	E	0.26	300							
470	⊙F	0.16	600	⊙F	0.16	600	⊙F	0.16	600	
680				⊙F	0.16	600	⊙G	0.08	850	
1000	⊙F	0.16	600	⊙G	0.08	850				
1500	⊙G	0.08	850				H13	0.06	1100	
2200				H13	0.06	1100				
3300	H13	0.06	1100				J16	0.035	1800	
4700				J16	0.035	1800	K16	0.033	2060	
6800	J16	0.035	1800	K16	0.033	2060				

Capacitance ( $\mu\text{F}$ )	W.V.	25			35			50		
		Size	Impedance	Ripple current	Size	Impedance	Ripple current	Size	Impedance	Ripple current
4.7				B	1.35	90	B	2.9	60	
10	B	1.35	90	C(B)	0.7(1.35)	160(90)	D(C)	0.88(1.52)	165(85)	
22	C	0.7	160	C	0.7	160	D	0.88	165	
33	D(C)	0.36(0.7)	240(160)	D	0.36	240	D8	0.68	195	
							E	0.68	195	
47	D	0.36	240	D	0.36	240	E(D8)	0.68	195	
68	D	0.36	240	D8	0.34	280				
100	D8	0.34	280	D8	0.34	280	⊙F	0.34	350	
	E	0.26	300	⊙F	0.16	600				
150	⊙F	0.16	600	⊙F	0.16	600	⊙G	0.18	670	
220	⊙F	0.16	600	⊙F	0.16	600	⊙G	0.18	670	
330	⊙F	0.16	600	⊙G	0.08	850	H13	0.12	900	
390							H13	0.12	900	
470	⊙G	0.08	850	H13	0.06	1100	J16	0.073	1610	
680				H13	0.06	1100	J16	0.073	1610	
1000	H13	0.06	1100	J16	0.035	1800	J16	0.073	1610	
1500				J16	0.035	1800				
2200	J16	0.035	1800							
3300	K16	0.033	2060							

Capacitance ( $\mu\text{F}$ )	W.V.	63			80			100		
		Size	Impedance	Ripple current	Size	Impedance	Ripple current	Size	Impedance	Ripple current
3.3				C	5	25				
4.7	C	3	50	D	3	40				
10	D	1.5	80	D8	2.4	60				
				E	2.4	60				
22	D8	1.2	120	F	1.3	130	F	1.3	130	
	E	1.2	120	F	1.3	130				
33	F	0.65	250	F	1.3	130	G	0.7	200	
47	F	0.65	250	G	0.7	200	H13	0.32	500	
68	F	0.65	250	H13	0.32	500	H13	0.32	500	
100	G	0.35	400	H13	0.32	500	J16	0.17	793	
150	H13	0.16	800	H13	0.32	500	J16	0.17	793	
220	H13	0.16	800				K16	0.153	917	
330				J16	0.17	793	K16	0.153	917	
470	J16	0.082	1410	K16	0.153	917				
680	K16	0.080	1690							

( ); Miniaturization type    ⊙ Life time 5000h available upon request(suffix : G)

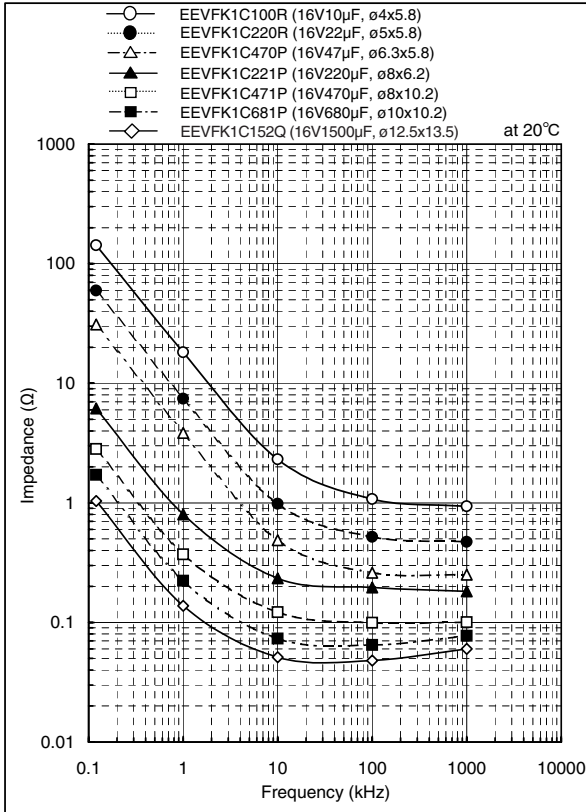
W.V. [V.DC]	Cap. [μF]	Part No.	tan δ	R.C. [mA rms]	Imp./ESR [Ω]	Size	
						D	L
6.3	22	EEVFK0J220R	0.26	90	1.35	4	5.8
	47	EEVFK0J470UR	0.26	90	1.35	4	5.8
	47	EEVFK0J470R	0.26	160	0.70	5	5.8
	100	EEVFK0J101UR	0.26	160	0.70	5	5.8
	100	EEVFK0J101P	0.26	240	0.36	6.3	5.8
	220	EEVFK0J221P	0.26	240	0.36	6.3	5.8
	330	EEVFK0J331XP	0.26	280	0.34	6.3	7.7
	330	EEVFK0J331P	0.26	300	0.26	8	6.2
	470	EEVFK0J471P	0.26	600	0.16	8	10.2
	1000	EEVFK0J102P	0.26	600	0.16	8	10.2
	1500	EEVFK0J152P	0.26	850	0.080	10	10.2
	3300	EEVFK0J332Q	0.30	1100	0.060	12.5	13.5
	6800	EEVFK0J682M	0.36	1800	0.035	16	16.5
	10	22	EEVFK1A220R	0.19	90	1.35	4
33		EEVFK1A330UR	0.19	90	1.35	4	5.8
33		EEVFK1A330R	0.19	160	0.70	5	5.8
150		EEVFK1A151P	0.19	240	0.36	6.3	5.8
220		EEVFK1A221XP	0.19	280	0.34	6.3	7.7
220		EEVFK1A221P	0.19	300	0.26	8	6.2
330		EEVFK1A331P	0.19	600	0.16	8	10.2
470		EEVFK1A471P	0.19	600	0.16	8	10.2
680		EEVFK1A681P	0.49	600	0.16	8	10.2
1000		EEVFK1A102P	0.19	850	0.080	10	10.2
2200		EEVFK1A222Q	0.21	1100	0.060	12.5	13.5
4700		EEVFK1A472M	0.25	1800	0.035	16	16.5
6800		EEVFK1A682M	0.29	2060	0.033	18	16.5
16		10	EEVFK1C100R	0.16	90	1.35	4
	22	EEVFK1C220UR	0.16	90	1.35	4	5.8
	22	EEVFK1C220R	0.16	160	0.70	5	5.8
	47	EEVFK1C470UR	0.16	160	0.70	5	5.8
	47	EEVFK1C470P	0.16	240	0.36	6.3	5.8
	68	EEVFK1C680P	0.16	240	0.36	6.3	5.8
	100	EEVFK1C101P	0.16	240	0.36	6.3	5.8
	150	EEVFK1C151XP	0.16	280	0.34	6.3	7.7
	220	EEVFK1C221XP	0.16	280	0.34	6.3	7.7
	220	EEVFK1C221P	0.16	300	0.26	8	6.2
	330	EEVFK1C331P	0.16	600	0.16	8	10.2
	470	EEVFK1C471P	0.16	600	0.16	8	10.2
	680	EEVFK1C681P	0.16	850	0.08	10	10.2
	1500	EEVFK1C152Q	0.16	1100	0.060	12.5	13.5
3300	EEVFK1C332M	0.20	1800	0.035	16	16.5	
4700	EEVFK1C472M	0.22	2060	0.033	18	16.5	
25	10	EEVFK1E100R	0.14	90	1.35	4	5.8
	22	EEVFK1E220R	0.14	160	0.70	5	5.8
	33	EEVFK1E330UR	0.14	160	0.70	5	5.8
	33	EEVFK1E330P	0.14	240	0.36	6.3	5.8
	47	EEVFK1E470P	0.14	240	0.36	6.3	5.8
	68	EEVFK1E680P	0.14	240	0.36	6.3	5.8
	100	EEVFK1E101XP	0.14	280	0.34	6.3	7.7
	100	EEVFK1E101P	0.14	300	0.26	8	6.2
	150	EEVFK1E151P	0.14	600	0.16	8	10.2
	220	EEVFK1E221P	0.14	600	0.16	8	10.2
	330	EEVFK1E331P	0.14	600	0.16	8	10.2
	470	EEVFK1E471P	0.14	850	0.080	10	10.2
	1000	EEVFK1E102Q	0.14	1100	0.060	12.5	13.5
	2200	EEVFK1E222M	0.16	1800	0.035	16	16.5
3300	EEVFK1E332M	0.18	2060	0.033	18	16.5	

W.V. [V.DC]	Cap. [μF]	Part No.	tan δ	R.C. [mA rms]	Imp./ESR [Ω]	Size	
						D	L
35	4.7	EEVFK1V4R7R	0.12	90	1.35	4	5.8
	10	EEVFK1V100UR	0.12	90	1.35	4	5.8
	10	EEVFK1V100R	0.12	160	0.70	5	5.8
	22	EEVFK1V220R	0.12	160	0.70	5	5.8
	33	EEVFK1V330P	0.12	240	0.36	6.3	5.8
	47	EEVFK1V470P	0.12	240	0.36	6.3	5.8
	68	EEVFK1V680XP	0.12	280	0.34	6.3	7.7
	100	EEVFK1V101XP	0.12	280	0.34	6.3	7.7
	100	EEVFK1V101P	0.12	600	0.16	8	10.2
	150	EEVFK1V151P	0.12	600	0.16	8	10.2
	220	EEVFK1V221P	0.12	600	0.16	8	10.2
	330	EEVFK1V331P	0.12	850	0.080	10	10.2
	470	EEVFK1V471Q	0.12	1100	0.060	12.5	13.5
	680	EEVFK1V681Q	0.12	1100	0.060	12.5	13.5
1000	EEVFK1V102M	0.12	1800	0.035	16	16.5	
1500	EEVFK1V152M	0.12	1800	0.035	16	16.5	
50	4.7	EEVFK1H4R7R	0.10	60	2.90	4	5.8
	10	EEVFK1H100UR	0.10	85	1.52	5	5.8
	10	EEVFK1H100P	0.10	165	0.88	6.3	5.8
	22	EEVFK1H220P	0.10	165	0.88	6.3	5.8
	33	EEVFK1H330XP	0.10	195	0.68	6.3	7.7
	33	EEVFK1H330P	0.10	195	0.68	8	6.2
	47	EEVFK1H470XP	0.10	195	0.68	6.3	7.7
	47	EEVFK1H470P	0.10	195	0.68	8	6.2
	100	EEVFK1H101P	0.10	350	0.34	8	10.2
	150	EEVFK1H151P	0.10	670	0.18	10	10.2
	220	EEVFK1H221P	0.10	670	0.18	10	10.2
	330	EEVFK1H331Q	0.10	900	0.12	12.5	13.5
	680	EEVFK1H681M	0.10	1610	0.073	16	16.5
	1000	EEVFK1H102M	0.10	1610	0.073	16	16.5
63	4.7	EEVFK1J4R7R	0.08	50	3.00	5	5.8
	10	EEVFK1J100P	0.08	80	1.50	6.3	5.8
	22	EEVFK1J220XP	0.08	120	1.20	6.3	7.7
	22	EEVFK1J220P	0.08	120	1.20	8	6.2
	33	EEVFK1J330P	0.08	250	0.65	8	10.2
	47	EEVFK1J470P	0.08	250	0.65	8	10.2
	68	EEVFK1J680P	0.08	400	0.35	10	10.2
	100	EEVFK1J101P	0.08	400	0.35	10	10.2
	150	EEVFK1J151Q	0.08	800	0.16	12.5	13.5
	220	EEVFK1J221Q	0.08	800	0.16	12.5	13.5
	470	EEVFK1J471M	0.08	1410	0.082	16	16.5
	680	EEVFK1J681M	0.08	1690	0.080	18	16.5
	3.3	EEVFK1K3R3R	0.08	25	5.00	5	5.8
	4.7	EEVFK1K4R7P	0.08	40	3.00	6.3	5.8
10	EEVFK1K100XP	0.08	60	2.40	6.3	7.7	
10	EEVFK1K100P	0.08	60	2.40	8	6.2	
22	EEVFK1K220P	0.08	130	1.30	8	10.2	
33	EEVFK1K330P	0.08	130	1.30	8	10.2	
47	EEVFK1K470P	0.08	200	0.70	10	10.2	
68	EEVFK1K680Q	0.08	500	0.32	12.5	13.5	
100	EEVFK1K101Q	0.08	500	0.32	12.5	13.5	
150	EEVFK1K151Q	0.08	500	0.32	12.5	13.5	
330	EEVFK1K331M	0.08	793	0.17	16	16.5	
470	EEVFK1K471M	0.08	917	0.153	18	16.5	
100	22	EEVFK2A220P	0.07	130	1.30	8	10.2
	33	EEVFK2A330P	0.07	200	0.70	10	10.2
	47	EEVFK2A470Q	0.07	500	0.32	12.5	13.5
	68	EEVFK2A680Q	0.07	500	0.32	12.5	13.5
	100	EEVFK2A101M	0.07	793	0.17	16	16.5
	150	EEVFK2A151M	0.07	793	0.17	16	16.5
	220	EEVFK2A221M	0.07	917	0.153	18	16.5
	330	EEVFK2A331M	0.07	917	0.153	18	16.5

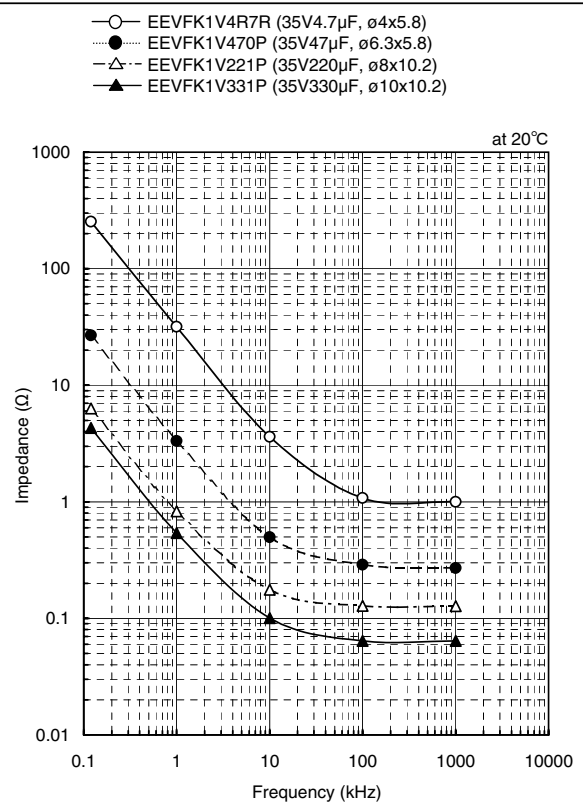
Tan δ = at 120Hz/+20°C  
Ripple current = at 100kHz/+105°C  
Impedance/ESR = at 100kHz/+20°C

### ■ Frequency Characteristics (Impedance)

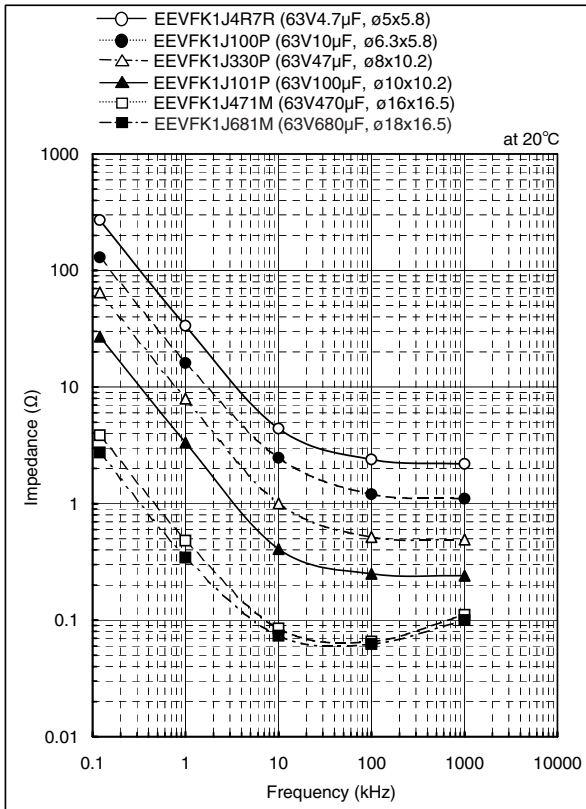
● 16WV



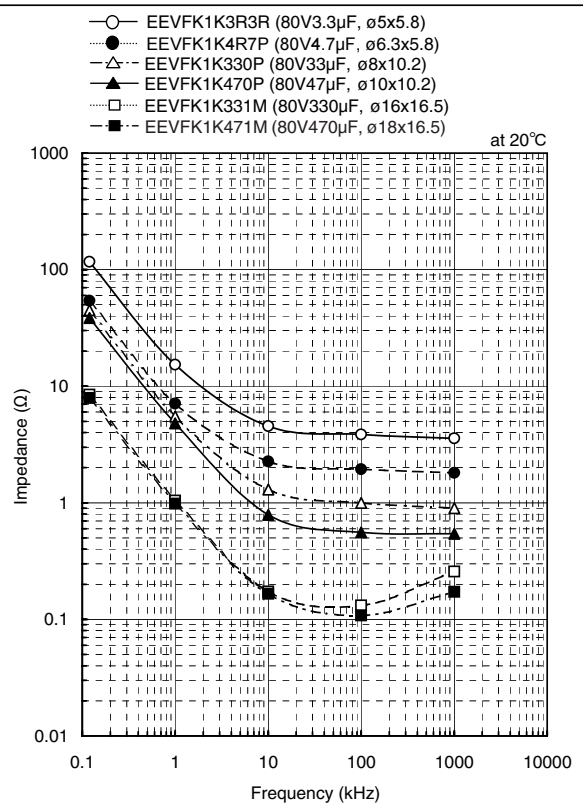
● 35WV



● 63WV

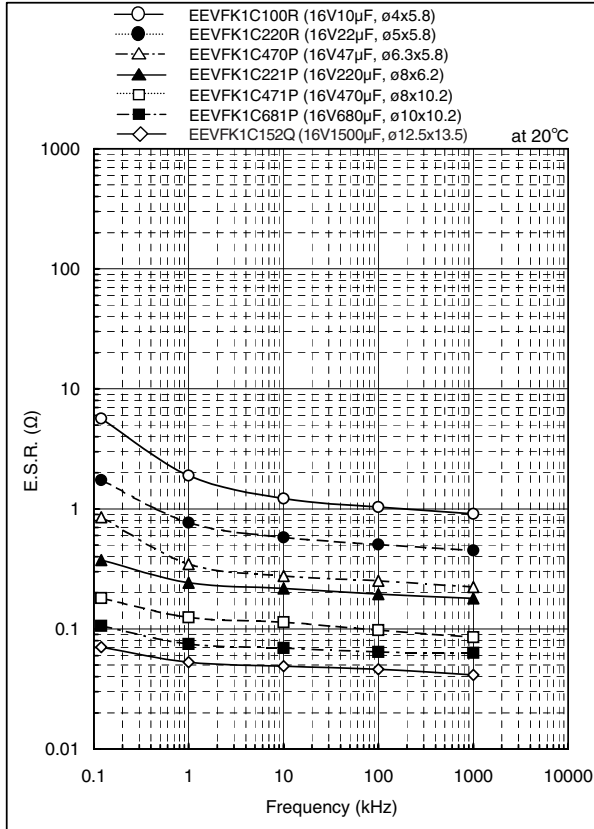


● 80WV

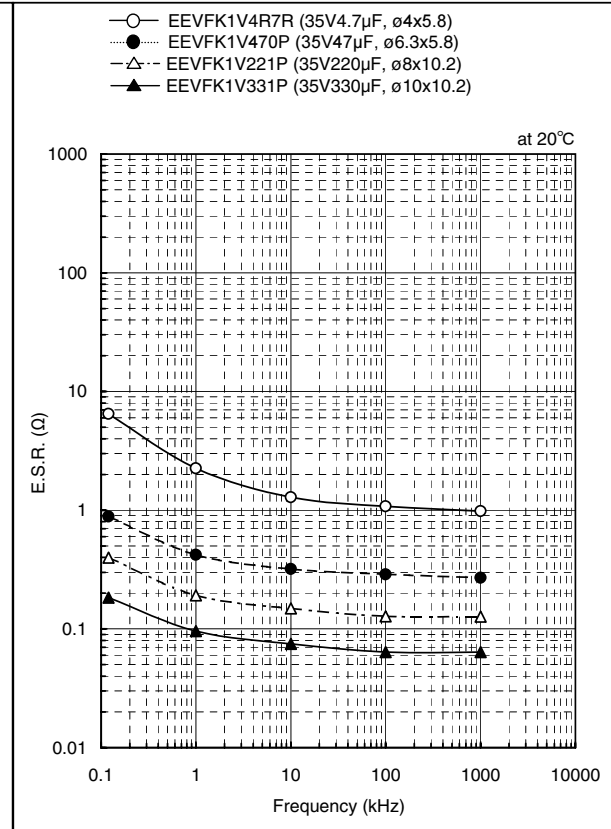


## ■ Frequency Characteristics (ESR)

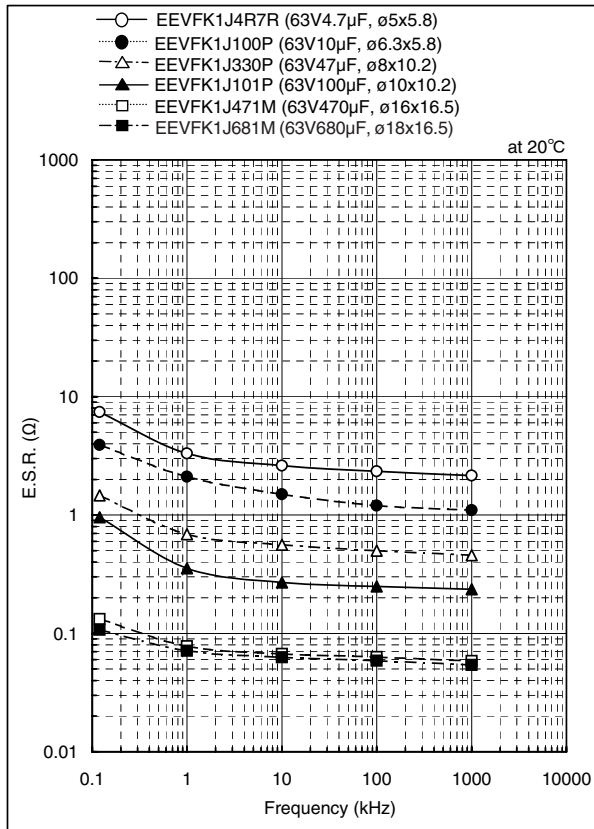
### ● 16WV



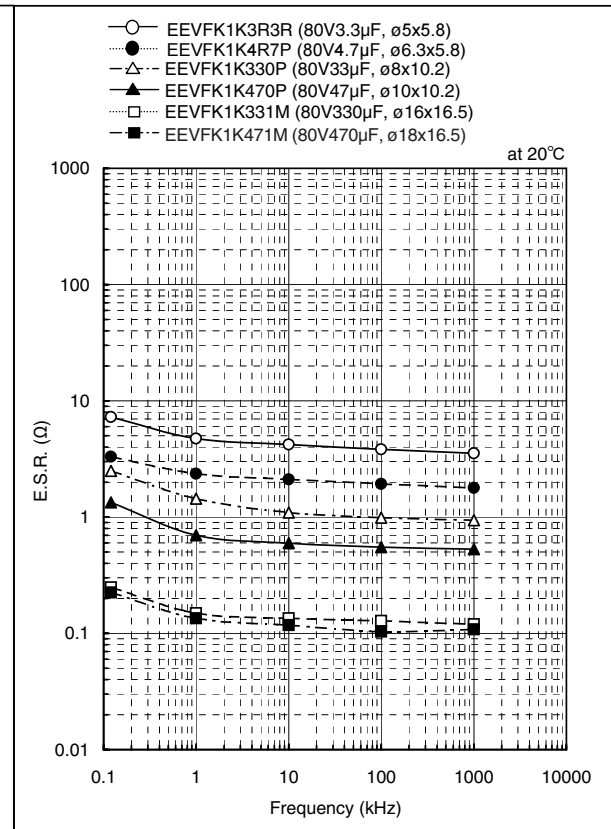
### ● 35WV



### ● 63WV

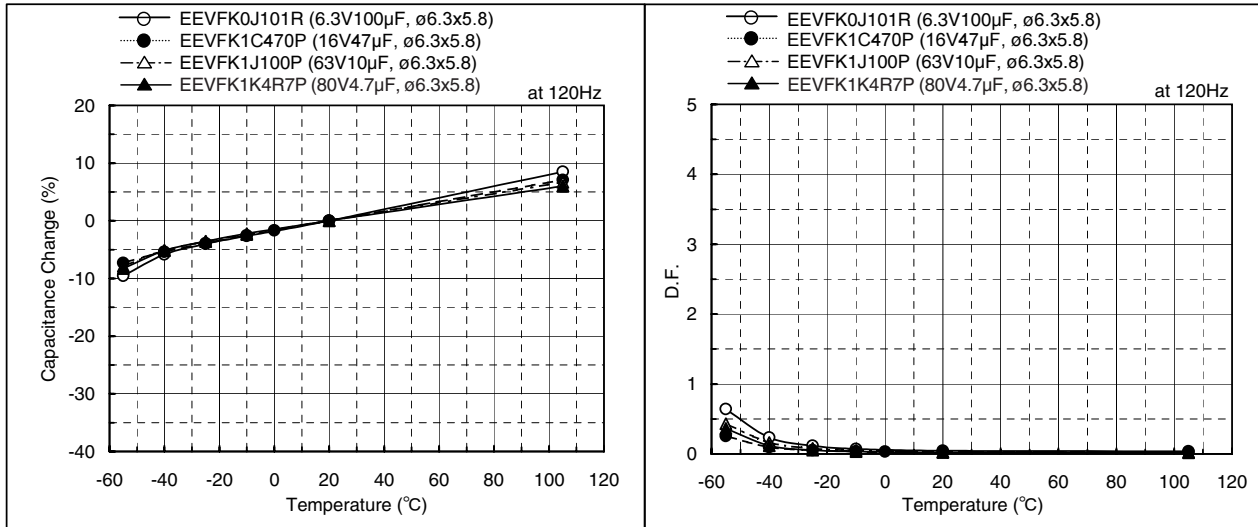


### ● 80WV

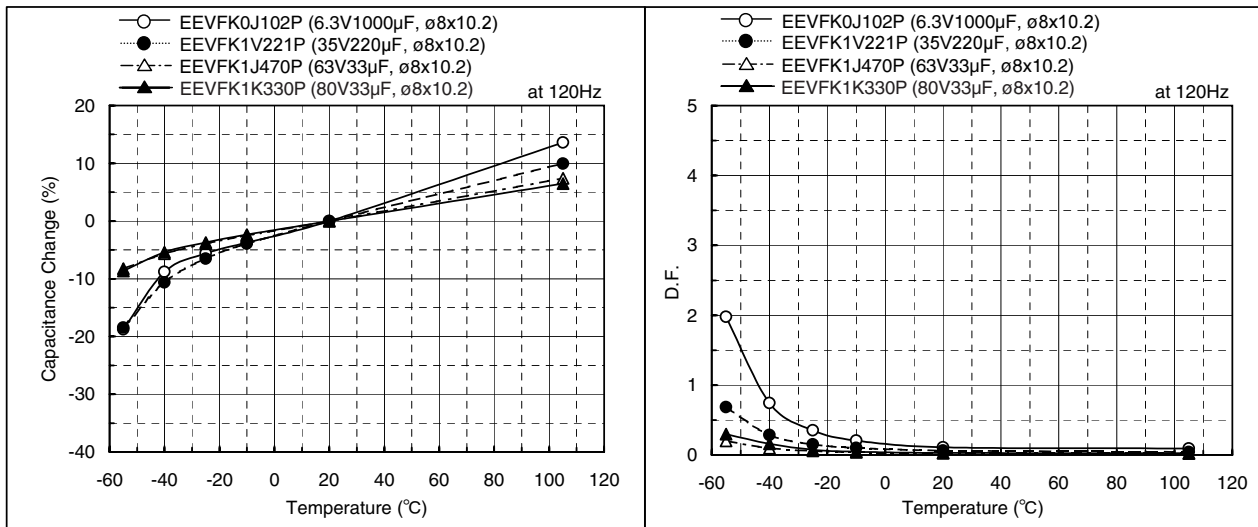


### Temperature Characteristics

#### ● $\phi 6.3 \times 5.8$



#### ● $\phi 8 \times 10.2$



### ■ Load Life

