

### Surface Mount Type

Series: **FK** Type: **V**



#### ■ Features

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

#### ■ Specifications

Category Temp. Range	-55 °C to +105 °C										
Rated W.V.Range	6.3 V.DC to 100 V.DC										
Nominal Cap.Range	3.3 $\mu$ F to 6800 $\mu$ F										
Capacitance Tolerance	$\pm 20$ % (120 Hz/+20 °C)										
DC Leakage Current	$I \leq 0.01 CV$ or 3 ( $\mu$ A) After 2 minutes (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 applying rated working voltage for 2000 hours at +105 °C $\pm 2$ °C and then being stabilized at +20 °C, Capacitors shall meet the following limits. ( $\geq \phi 12.5$ and suffix "G" in $\phi 8 \times 10.2$ , $\phi 10 \times 10.2$ are 5000 hours)										
	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 1000 hours at +105 °C $\pm 2$ °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 and then being stabilized at +20 °C, capacitors shall meet the following limits.										
Resistance to Soldering Heat	After reflow soldering and then being stabilized at +20 °C, capacitors shall meet the following limits.										
	Capacitance change	$\pm 10$ % of initial measured value									
	$\tan \delta$	$\leq$ initial specified value									
	DC leakage current	$\leq$ initial specified value									

#### ■ Marking

**Example: 6.3 V 22  $\mu$ F, 6.3 V 3300  $\mu$ F**  
**Marking color : BLACK**  
 $\leq \phi 10$

$\geq \phi 12.5$

Rated Voltage Mark			
j	6.3 V	H	50 V
A	10 V	J	63 V
C	16 V	K	80 V
E	25 V	2A	100 V
V	35 V		

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

Size code	D	L	A, B	H	I	W	P	K
B	4.0	5.8 $\pm 0.3$	4.3	5.5 max.	1.8	0.65 $\pm 0.1$	1.0	0.35 $^{+0.15}_{-0.2}$
C	5.0	5.8 $\pm 0.3$	5.3	6.5 max.	2.2	0.65 $\pm 0.1$	1.5	0.35 $^{+0.15}_{-0.2}$
D	6.3	5.8 $\pm 0.3$	6.6	7.8 max.	2.6	0.65 $\pm 0.1$	1.8	0.35 $^{+0.15}_{-0.2}$
D8	6.3	7.7 $\pm 0.3$	6.6	7.8 max.	2.6	0.65 $\pm 0.1$	1.8	0.35 $^{+0.15}_{-0.2}$
E	8.0	6.2 $\pm 0.3$	8.3	9.5 max.	3.4	0.65 $\pm 0.1$	2.2	0.35 $^{+0.15}_{-0.2}$
F	8.0	10.2 $\pm 0.3$	8.3	10.0 max.	3.4	0.90 $\pm 0.2$	3.1	0.70 $\pm 0.2$
G	10.0	10.2 $\pm 0.3$	10.3	12.0 max.	3.5	0.90 $\pm 0.2$	4.6	0.70 $\pm 0.2$
H13	12.5	13.5 $\pm 0.5$	13.5	15.0 max.	4.7	0.90 $\pm 0.3$	4.4	0.70 $\pm 0.3$
J16	16.0	16.5 $\pm 0.5$	17.0	19.0 max.	5.5	1.20 $\pm 0.3$	6.7	0.70 $\pm 0.3$
K16	18.0	16.5 $\pm 0.5$	19.0	21.0 max.	6.7	1.20 $\pm 0.3$	6.7	0.70 $\pm 0.3$

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Sep. 2010

### Standard Products

Endurance : 105 °C 2000 h ( ≥ ϕ12.5 : 5000 h)

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping  (pcs)
(V)	(μF)	(mm)	(mm)							
6.3	22	4	5.8	B	90	1.35	0.26	EEEFK0J220R	(1)	2000
	47	4	5.8	(B)	90	1.35	0.26	EEEFK0J470UR	(1)	2000
		5	5.8	C	160	0.70	0.26	EEEFK0J470R	(1)	1000
	100	5	5.8	(C)	160	0.70	0.26	EEEFK0J101UR	(1)	1000
		6.3	5.8	D	240	0.36	0.26	EEEFK0J101P	(1)	1000
	220	6.3	5.8	D	240	0.36	0.26	EEEFK0J221P	(1)	1000
	330	6.3	7.7	D8	280	0.34	0.26	EEEFK0J331XP	(1)	900
		8	6.2	E	300	0.26	0.26	EEEFK0J331P	(2)	1000
	470	8	10.2	F	600	0.16	0.26	EEEFK0J471P	(2)	500
	1000	8	10.2	F	600	0.16	0.26	EEEFK0J102P	(2)	500
1500	10	10.2	G	850	0.08	0.26	EEEFK0J152P	(2)	500	
3300	12.5	13.5	H13	1100	0.06	0.30	EEVFK0J332Q	(3)	200	
6800	16	16.5	J16	1800	0.035	0.36	EEVFK0J682M	(3)	125	
10	22	4	5.8	B	90	1.35	0.19	EEEFK1A220R	(1)	2000
	33	4	5.8	(B)	90	1.35	0.19	EEEFK1A330UR	(1)	2000
		5	5.8	C	160	0.70	0.19	EEEFK1A330R	(1)	1000
	150	6.3	5.8	D	240	0.36	0.19	EEEFK1A151P	(1)	1000
	220	6.3	7.7	D8	280	0.34	0.19	EEEFK1A221XP	(1)	900
		8	6.2	E	300	0.26	0.19	EEEFK1A221P	(2)	1000
	330	8	10.2	F	600	0.16	0.19	EEEFK1A331P	(2)	500
	470	8	10.2	F	600	0.16	0.19	EEEFK1A471P	(2)	500
	680	8	10.2	F	600	0.16	0.19	EEEFK1A681P	(2)	500
	1000	10	10.2	G	850	0.08	0.19	EEEFK1A102P	(2)	500
2200	12.5	13.5	H13	1100	0.06	0.21	EEVFK1A222Q	(3)	200	
4700	16	16.5	J16	1800	0.035	0.25	EEVFK1A472M	(3)	125	
6800	18	16.5	K16	2060	0.033	0.29	EEVFK1A682M	(3)	125	
16	10	4	5.8	B	90	1.35	0.16	EEEFK1C100R	(1)	2000
	22	4	5.8	(B)	90	1.35	0.16	EEEFK1C220UR	(1)	2000
		5	5.8	C	160	0.70	0.16	EEEFK1C220R	(1)	1000
	47	5	5.8	(C)	160	0.70	0.16	EEEFK1C470UR	(1)	1000
		6.3	5.8	D	240	0.36	0.16	EEEFK1C470P	(1)	1000
	68	6.3	5.8	D	240	0.36	0.16	EEEFK1C680P	(1)	1000
	100	6.3	5.8	D	240	0.36	0.16	EEEFK1C101P	(1)	1000
	150	6.3	7.7	D8	280	0.34	0.16	EEEFK1C151XP	(1)	900
		6.3	7.7	D8	280	0.34	0.16	EEEFK1C221XP	(1)	900
	220	8	6.2	E	300	0.26	0.16	EEEFK1C221P	(2)	1000
330	8	10.2	F	600	0.16	0.16	EEEFK1C331P	(2)	500	
470	8	10.2	F	600	0.16	0.16	EEEFK1C471P	(2)	500	
680	10	10.2	G	850	0.08	0.16	EEEFK1C681P	(2)	500	
1500	12.5	13.5	H13	1100	0.06	0.16	EEVFK1C152Q	(3)	200	
3300	16	16.5	J16	1800	0.035	0.20	EEVFK1C332M	(3)	125	
4700	18	16.5	K16	2060	0.033	0.22	EEVFK1C472M	(3)	125	
25	10	4	5.8	B	90	1.35	0.14	EEEFK1E100R	(1)	2000
	22	5	5.8	C	160	0.70	0.14	EEEFK1E220R	(1)	1000
		5	5.8	(C)	160	0.70	0.14	EEEFK1E330UR	(1)	1000
	33	6.3	5.8	D	240	0.36	0.14	EEEFK1E330P	(1)	1000
		6.3	5.8	D	240	0.36	0.14	EEEFK1E470P	(1)	1000
	68	6.3	5.8	D	240	0.36	0.14	EEEFK1E680P	(1)	1000
	100	6.3	7.7	D8	280	0.34	0.14	EEEFK1E101XP	(1)	900
		8	6.2	E	300	0.26	0.14	EEEFK1E101P	(2)	1000
	150	8	10.2	F	600	0.16	0.14	EEEFK1E151P	(2)	500
	220	8	10.2	F	600	0.16	0.14	EEEFK1E221P	(2)	500
330	8	10.2	F	600	0.16	0.14	EEEFK1E331P	(2)	500	
470	10	10.2	G	850	0.08	0.14	EEEFK1E471P	(2)	500	
1000	12.5	13.5	H13	1100	0.06	0.14	EEVFK1E102Q	(3)	200	
1500	16	16.5	J16	1800	0.035	0.14	EEVFK1E152M	(3)	125	
2200	16	16.5	J16	1800	0.035	0.16	EEVFK1E222M	(3)	125	
3300	18	16.5	K16	2060	0.033	0.18	EEVFK1E332M	(3)	125	

\* Size code( ):Miniaturization product

The taping dimensions are explained on EE188 of our Catalog. Please use it as a reference guide.  
Reflow Profile(Fig-1 to Fig-8) listed on EE186 of our Catalog.

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### Standard Products

Endurance : 105 °C 2000 h ( ≥ φ12.5 : 5000 h)

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty	
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping  (pcs)	
(V)	(μF)	(mm)	(mm)								
35	4.7	4	5.8	B	90	1.35	0.12	EEEFK1V4R7R	(1)	2000	
	10	4	5.8	(B)	90	1.35	0.12	EEEFK1V100UR	(1)	2000	
		5	5.8	C	160	0.70	0.12	EEEFK1V100R	(1)	1000	
	22	5	5.8	C	160	0.70	0.12	EEEFK1V220R	(1)	1000	
	33	6.3	5.8	D	240	0.36	0.12	EEEFK1V330P	(1)	1000	
	47	6.3	5.8	D	240	0.36	0.12	EEEFK1V470P	(1)	1000	
	68	6.3	7.7	D8	280	0.34	0.12	EEEFK1V680XP	(1)	900	
		6.3	7.7	D8	280	0.34	0.12	EEEFK1V101XP	(1)	900	
	100	8	10.2	F	600	0.16	0.12	EEEFK1V101P	(2)	500	
		8	10.2	F	600	0.16	0.12	EEEFK1V151P	(2)	500	
	220	8	10.2	F	600	0.16	0.12	EEEFK1V221P	(2)	500	
	330	10	10.2	G	850	0.08	0.12	EEEFK1V331P	(2)	500	
	470	12.5	13.5	H13	1100	0.06	0.12	EEVFK1V471Q	(3)	200	
	680	12.5	13.5	H13	1100	0.06	0.12	EEVFK1V681Q	(3)	200	
	1000	16	16.5	J16	1800	0.035	0.12	EEVFK1V102M	(3)	125	
1500	16	16.5	J16	1800	0.035	0.12	EEVFK1V152M	(3)	125		
50	4.7	4	5.8	B	60	2.90	0.10	EEEFK1H4R7R	(1)	2000	
	10	5	5.8	(C)	85	1.52	0.10	EEEFK1H100UR	(1)	1000	
		6.3	5.8	D	165	0.88	0.10	EEEFK1H100P	(1)	1000	
	22	6.3	5.8	D	165	0.88	0.10	EEEFK1H220P	(1)	1000	
		6.3	7.7	D8	195	0.68	0.10	EEEFK1H330XP	(1)	900	
	33	8	6.2	E	195	0.68	0.10	EEEFK1H330P	(2)	1000	
		6.3	7.7	D8	195	0.68	0.10	EEEFK1H470XP	(1)	900	
	47	8	6.2	E	195	0.68	0.10	EEEFK1H470P	(2)	1000	
		8	10.2	F	350	0.34	0.10	EEEFK1H101P	(2)	500	
	150	10	10.2	G	670	0.18	0.10	EEEFK1H151P	(2)	500	
	220	10	10.2	G	670	0.18	0.10	EEEFK1H221P	(2)	500	
	330	12.5	13.5	H13	900	0.12	0.10	EEVFK1H331Q	(3)	200	
	390	12.5	13.5	H13	900	0.12	0.10	EEVFK1H391Q	(3)	200	
	470	16	16.5	J16	1610	0.073	0.10	EEVFK1H471M	(3)	125	
	560	16	16.5	J16	1610	0.073	0.10	EEVFK1H561M	(3)	125	
680	16	16.5	J16	1610	0.073	0.10	EEVFK1H681M	(3)	125		
1000	16	16.5	J16	1610	0.073	0.10	EEVFK1H102M	(3)	125		
63	4.7	5	5.8	C	50	3.00	0.08	EEEFK1J4R7R	(1)	1000	
	10	6.3	5.8	D	80	1.50	0.08	EEEFK1J100P	(1)	1000	
		6.3	7.7	D8	120	1.20	0.08	EEEFK1J220XP	(1)	900	
	22	8	6.2	E	120	1.20	0.08	EEEFK1J220P	(2)	1000	
		8	10.2	F	250	0.65	0.08	EEEFK1J330P	(2)	500	
	47	8	10.2	F	250	0.65	0.08	EEEFK1J470P	(2)	500	
	68	8	10.2	(F)	250	0.65	0.08	EEEFK1J680UP	(2)	500	
	100	10	10.2	G	400	0.35	0.08	EEEFK1J101P	(2)	500	
	150	12.5	13.5	H13	800	0.16	0.08	EEVFK1J151Q	(3)	200	
	220	12.5	13.5	H13	800	0.16	0.08	EEVFK1J221Q	(3)	200	
	470	16	16.5	J16	1410	0.082	0.08	EEVFK1J471M	(3)	125	
	680	18	16.5	K16	1690	0.08	0.08	EEVFK1J681M	(3)	125	
	80	3.3	5	5.8	C	25	5.00	0.08	EEEFK1K3R3R	(1)	1000
		4.7	6.3	5.8	D	40	3.00	0.08	EEEFK1K4R7P	(1)	1000
			6.3	7.7	D8	60	2.40	0.08	EEEFK1K100XP	(1)	900
10		8	6.2	E	60	2.40	0.08	EEEFK1K100P	(2)	1000	
		8	10.2	F	130	1.30	0.08	EEEFK1K220P	(2)	500	
33		8	10.2	F	130	1.30	0.08	EEEFK1K330P	(2)	500	
47		10	10.2	G	200	0.70	0.08	EEEFK1K470P	(2)	500	
68		12.5	13.5	H13	500	0.32	0.08	EEVFK1K680Q	(3)	200	
100		12.5	13.5	H13	500	0.32	0.08	EEVFK1K101Q	(3)	200	
150		12.5	13.5	H13	500	0.32	0.08	EEVFK1K151Q	(3)	200	
330		16	16.5	J16	793	0.17	0.08	EEVFK1K331M	(3)	125	
470		18	16.5	K16	917	0.153	0.08	EEVFK1K471M	(3)	125	

\* Size code( ):Miniaturization product

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Reflow Profile(Fig-1 to Fig-8) listed on EE186 of our Catalog.

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■ Standard Products

Endurance : 105 °C 2000 h ( ≥ ϕ12.5 : 5000 h)

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	*Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping  (pcs)
(V)	(μF)	(mm)	(mm)							
100	22	8	10.2	F	130	1.30	0.07	EEEFK2A220P	(2)	500
	33	10	10.2	G	200	0.70	0.07	EEEFK2A330P	(2)	500
	47	12.5	13.5	H13	500	0.32	0.07	EEVFK2A470Q	(3)	200
	68	12.5	13.5	H13	500	0.32	0.07	EEVFK2A680Q	(3)	200
	100	16	16.5	J16	793	0.17	0.07	EEVFK2A101M	(3)	125
	150	16	16.5	J16	793	0.17	0.07	EEVFK2A151M	(3)	125

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Reflow Profile(Fig-1 to Fig-8) listed on EE186 of our Catalog.

■ Endurance 5000 h Products

Endurance : 105 °C 5000 h

W.V.	Cap. (±20 %)	Case size			Specification			Part No. (RoHS:compliant)	Reflow	Min. Packaging Q'ty
		Dia.	Length	Size Code	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	tan δ (120 Hz) (+20 °C)			Taping  (pcs)
(V)	(μF)	(mm)	(mm)							
6.3	470	8	10.2	F	600	0.16	0.26	EEEFK0J471GP	(2)	500
	1000	8	10.2	F	600	0.16	0.26	EEEFK0J102GP	(2)	500
	1500	10	10.2	G	850	0.08	0.26	EEEFK0J152GP	(2)	500
10	330	8	10.2	F	600	0.16	0.19	EEEFK1A331GP	(2)	500
	470	8	10.2	F	600	0.16	0.19	EEEFK1A471GP	(2)	500
	680	8	10.2	F	600	0.16	0.19	EEEFK1A681GP	(2)	500
	1000	10	10.2	G	850	0.08	0.19	EEEFK1A102GP	(2)	500
16	330	8	10.2	F	600	0.16	0.16	EEEFK1C331GP	(2)	500
	470	8	10.2	F	600	0.16	0.16	EEEFK1C471GP	(2)	500
	680	10	10.2	G	850	0.08	0.16	EEEFK1C681GP	(2)	500
25	150	8	10.2	F	600	0.16	0.14	EEEFK1E151GP	(2)	500
	220	8	10.2	F	600	0.16	0.14	EEEFK1E221GP	(2)	500
	330	8	10.2	F	600	0.16	0.14	EEEFK1E331GP	(2)	500
	470	10	10.2	G	850	0.08	0.14	EEEFK1E471GP	(2)	500
35	100	8	10.2	F	600	0.16	0.12	EEEFK1V101GP	(2)	500
	150	8	10.2	F	600	0.16	0.12	EEEFK1V151GP	(2)	500
	220	8	10.2	F	600	0.16	0.12	EEEFK1V221GP	(2)	500
	330	10	10.2	G	850	0.08	0.12	EEEFK1V331GP	(2)	500
50	100	8	10.2	F	350	0.34	0.10	EEEFK1H101GP	(2)	500
	150	10	10.2	G	670	0.18	0.10	EEEFK1H151GP	(2)	500
	220	10	10.2	G	670	0.18	0.10	EEEFK1H221GP	(2)	500

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