

### 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 1500 $\mu$ 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. (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)										
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  
Marking color : BLACK

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

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

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 $\pm$ 0.2
G	10.0	10.2	10.3	12.0	3.5	0.90 $\pm$ 0.2	4.6	0.70 $\pm$ 0.2

### Standard Products

Endurance : 105 °C 2000 h ( $\phi 12.5 \geq$  : 5000 h)

W.V.	Cap. ( $\pm 20\%$ )	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) ( $\Omega$ ))	$\tan \delta$ (120 Hz (+20 °C))			Taping (pcs)
(V)	( $\mu\text{F}$ )	(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	
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
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
	220	6.3	7.7	D8	280	0.34	0.16	EEEFK1C221XP	(1)	900
		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	
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
		47	6.3	5.8	D	240	0.36	0.14	EEEFK1E470P	(1)
	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	

\* Size code( ): Miniaturization product

The taping dimensions are explained on p.177 of our Catalog. Please use it as a reference guide.  
Reflow Profile(Fig-1 to Fig-8) listed on p.175 of our Catalog.

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.

### Standard Products

Endurance : 105 °C 2000 h ( $\phi 12.5 \geq$  : 5000 h)

W.V.	Cap. ( $\pm 20\%$ )	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) ( $\Omega$ )	tan $\delta$ (120 Hz) (+20 °C)			Taping
(V)	( $\mu$ F)	(mm)	(mm)						(pcs)	
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
	100	6.3	7.7	D8	280	0.34	0.12	EEEFK1V101XP	(1)	900
		8	10.2	F	600	0.16	0.12	EEEFK1V101P	(2)	500
	150	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	
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
	33	6.3	7.7	D8	195	0.68	0.10	EEEFK1H330XP	(1)	900
		8	6.2	E	195	0.68	0.10	EEEFK1H330P	(2)	1000
	47	6.3	7.7	D8	195	0.68	0.10	EEEFK1H470XP	(1)	900
		8	6.2	E	195	0.68	0.10	EEEFK1H470P	(2)	1000
	100	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	
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
	22	6.3	7.7	D8	120	1.20	0.08	EEEFK1J220XP	(1)	900
		8	6.2	E	120	1.20	0.08	EEEFK1J220P	(2)	1000
	33	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
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
	10	6.3	7.7	D8	60	2.40	0.08	EEEFK1K100XP	(1)	900
		8	6.2	E	60	2.40	0.08	EEEFK1K100P	(2)	1000
	22	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
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

\* Size code( ):Miniaturization product

The taping dimensions are explained on p.177 of our Catalog. Please use it as a reference guide.  
Reflow Profile(Fig-1 to Fig-8) listed on p.175 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

The taping dimensions are explained on p.177 of our Catalog. Please use it as a reference guide.  
Reflow Profile(Fig-1 to Fig-8) listed on p.175 of our Catalog.