

### Surface Mount Type

Series: FK Type : V

Country of Origin

- 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. ( $\phi 8 \pm$ )
  - RoHS directive compliant (Parts No: EEV+ $\phi 12.5 \pm$ , EEE+)

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 iGi india. 8 to 10 are 5000hours) 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 page 184 for recommendable temperature profile.) and then being stabilized at +20°C, capacitor shall meet the following limits.   |  |    |    |    |    |    |    |    |     |                             |
| Resistance to Soldering Heat       | After reflow soldering ( Refer to page 184 for recommendable temperature profile.) and then being stabilized at +20°C, capacitor 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. 16V10 $\mu$ F  
Marking color : BLACK

( $\geq \phi 12.5$ )

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./100kHz+105°C)

| Capacitance<br>( $\mu\text{F}$ ) | 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<br>( $\mu\text{F}$ ) | 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            | F(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<br>( $\mu\text{F}$ ) | 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)

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

| W.V.<br>(V) | Cap.<br>(±20%)<br>(μF) | Case size    |                |              | Specification                                     |  |                             | Part No.<br>(RoHS:<br>not compliant) | Reflow      | Part No.<br>(RoHS:<br>compliant) | Reflow | Min.<br>Packaging<br>Q'ty<br><br>Taping<br>(pcs) |
|-------------|------------------------|--------------|----------------|--------------|---|--|-----------------------------|--------------------------------------|-------------|----------------------------------|--------|--|
|             |                        | Dia.<br>(mm) | Length<br>(mm) | Size<br>Code | Ripple<br>current<br>(100kHz)<br>(+105°C)<br>(mA) | Impe-<br>dance<br>(100kHz)<br>(+20°C)<br>(Ω) | tan δ<br>(120Hz)<br>(+20°C) |                                      |             |                                  |        |  |
| 6.3         | 22                     | 4            | 5.8            | B            | 90  | 1.35   | 0.26                        | EEVFK0J220R                          | (1)         | EEEFK0J220R                      | (4)    | 2000   |
|             | 47                     | 4            | 5.8            | B            | 90  | 1.35   | 0.26                        | EEVFK0J470UR                         | (1)         | EEEFK0J470UR                     | (4)    | 2000   |
|             |                        | 5            | 5.8            | C            | 160   | 0.70   | 0.26                        | EEVFK0J470R                          | (1)         | EEEFK0J470R                      | (4)    | 1000   |
|             | 100                    | 5            | 5.8            | C            | 160   | 0.70   | 0.26                        | EEVFK0J101UR                         | (1)         | EEEFK0J101UR                     | (4)    | 1000   |
|             |                        | 6.3          | 5.8            | D            | 240   | 0.36   | 0.26                        | EEVFK0J101P                          | (1)         | EEEFK0J101P                      | (4)    | 1000   |
|             | 220                    | 6.3          | 5.8            | D            | 240   | 0.36   | 0.26                        | EEVFK0J221P                          | (1)         | EEEFK0J221P                      | (4)    | 1000   |
|             | 330                    | 6.3          | 7.7            | D8           | 280   | 0.34   | 0.26                        | EEVFK0J331XP                         | (1)         | EEEFK0J331XP                     | (4)    | 900  |
|             |                        | 8            | 6.2            | E            | 300   | 0.26   | 0.26                        | EEVFK0J331P                          | (2)         | EEEFK0J331P                      | (5)    | 1000   |
|             | 470                    | 8            | 10.2           | F            | 600   | 0.16   | 0.26                        | EEVFK0J471P                          | (2)         | EEEFK0J471P                      | (5)    | 500  |
|             | 1000                   | 8            | 10.2           | F            | 600   | 0.16   | 0.26                        | EEVFK0J102P                          | (2)         | EEEFK0J102P                      | (5)    | 500  |
|             | 1500                   | 10           | 10.2           | G            | 850   | 0.08   | 0.26                        | EEVFK0J152P                          | (2)         | EEEFK0J152P                      | (5)    | 500  |
| 3300        | 12.5                   | 13.5         | H13            | 1100         | 0.06  | 0.30   |                             |                                      | EEVFK0J332Q | (2)                              | 200    |  |
| 6800        | 16                     | 16.5         | J16            | 1800         | 0.035   | 0.36   |                             |                                      | EEVFK0J682M | (2)                              | 125    |  |
| 10          | 22                     | 4            | 5.8            | B            | 90  | 1.35   | 0.19                        | EEVFK1A220R                          | (1)         | EEEFK1A220R                      | (4)    | 2000   |
|             | 33                     | 4            | 5.8            | B            | 90  | 1.35   | 0.19                        | EEVFK1A330UR                         | (1)         | EEEFK1A330UR                     | (4)    | 2000   |
|             |                        | 5            | 5.8            | C            | 160   | 0.70   | 0.19                        | EEVFK1A330R                          | (1)         | EEEFK1A330R                      | (4)    | 1000   |
|             | 150                    | 6.3          | 5.8            | D            | 240   | 0.36   | 0.19                        | EEVFK1A151P                          | (1)         | EEEFK1A151P                      | (4)    | 1000   |
|             | 220                    | 6.3          | 7.7            | D8           | 280   | 0.34   | 0.19                        | EEVFK1A221XP                         | (1)         | EEEFK1A221XP                     | (4)    | 900  |
|             |                        | 8            | 6.2            | E            | 300   | 0.26   | 0.19                        | EEVFK1A221P                          | (2)         | EEEFK1A221P                      | (5)    | 1000   |
|             | 330                    | 8            | 10.2           | F            | 600   | 0.16   | 0.19                        | EEVFK1A331P                          | (2)         | EEEFK1A331P                      | (5)    | 500  |
|             | 470                    | 8            | 10.2           | F            | 600   | 0.16   | 0.19                        | EEVFK1A471P                          | (2)         | EEEFK1A471P                      | (5)    | 500  |
|             | 680                    | 8            | 10.2           | F            | 600   | 0.16   | 0.19                        | EEVFK1A681P                          | (2)         | EEEFK1A681P                      | (5)    | 500  |
|             | 1000                   | 10           | 10.2           | G            | 850   | 0.08   | 0.19                        | EEVFK1A102P                          | (2)         | EEEFK1A102P                      | (5)    | 500  |
|             | 2200                   | 12.5         | 13.5           | H13          | 1100  | 0.06   | 0.21                        |                                      |             | EEVFK1A222Q                      | (2)    | 200  |
| 4700        | 16                     | 16.5         | J16            | 1800         | 0.035   | 0.25   |                             |                                      | EEVFK1A472M | (2)                              | 125    |  |
| 6800        | 18                     | 16.5         | K16            | 2060         | 0.033   | 0.29   |                             |                                      | EEVFK1A682M | (2)                              | 125    |  |
| 16          | 10                     | 4            | 5.8            | B            | 90  | 1.35   | 0.16                        | EEVFK1C100R                          | (1)         | EEEFK1C100R                      | (4)    | 2000   |
|             | 22                     | 4            | 5.8            | B            | 90  | 1.35   | 0.16                        | EEVFK1C220UR                         | (1)         | EEEFK1C220UR                     | (4)    | 2000   |
|             |                        | 5            | 5.8            | C            | 160   | 0.70   | 0.16                        | EEVFK1C220R                          | (1)         | EEEFK1C220R                      | (4)    | 1000   |
|             | 47                     | 5            | 5.8            | C            | 160   | 0.70   | 0.16                        | EEVFK1C470UR                         | (1)         | EEEFK1C470UR                     | (4)    | 1000   |
|             |                        | 6.3          | 5.8            | D            | 240   | 0.36   | 0.16                        | EEVFK1C470P                          | (1)         | EEEFK1C470P                      | (4)    | 1000   |
|             | 68                     | 6.3          | 5.8            | D            | 240   | 0.36   | 0.16                        | EEVFK1C680P                          | (1)         | EEEFK1C680P                      | (4)    | 1000   |
|             | 100                    | 6.3          | 5.8            | D            | 240   | 0.36   | 0.16                        | EEVFK1C101P                          | (1)         | EEEFK1C101P                      | (4)    | 1000   |
|             | 150                    | 6.3          | 7.7            | D8           | 280   | 0.34   | 0.16                        | EEVFK1C151XP                         | (1)         | EEEFK1C151XP                     | (4)    | 900  |
|             | 220                    | 6.3          | 7.7            | D8           | 280   | 0.34   | 0.16                        | EEVFK1C221XP                         | (1)         | EEEFK1C221XP                     | (4)    | 900  |
|             |                        | 8            | 6.2            | E            | 300   | 0.26   | 0.16                        | EEVFK1C221P                          | (2)         | EEEFK1C221P                      | (5)    | 1000   |
|             | 330                    | 8            | 10.2           | F            | 600   | 0.16   | 0.16                        | EEVFK1C331P                          | (2)         | EEEFK1C331P                      | (5)    | 500  |
|             | 470                    | 8            | 10.2           | F            | 600   | 0.16   | 0.16                        | EEVFK1C471P                          | (2)         | EEEFK1C471P                      | (5)    | 500  |
|             | 680                    | 10           | 10.2           | G            | 850   | 0.08   | 0.16                        | EEVFK1C681P                          | (2)         | EEEFK1C681P                      | (5)    | 500  |
|             | 1500                   | 12.5         | 13.5           | H13          | 1100  | 0.06   | 0.16                        |                                      |             | EEVFK1C152Q                      | (2)    | 200  |
| 3300        | 16                     | 16.5         | J16            | 1800         | 0.035   | 0.20   |                             |                                      | EEVFK1C332M | (2)                              | 125    |  |
| 4700        | 18                     | 16.5         | K16            | 2060         | 0.033   | 0.22   |                             |                                      | EEVFK1C472M | (2)                              | 125    |  |
| 25          | 10                     | 4            | 5.8            | B            | 90  | 1.35   | 0.14                        | EEVFK1E100R                          | (1)         | EEEFK1E100R                      | (4)    | 2000   |
|             | 22                     | 5            | 5.8            | C            | 160   | 0.7  | 0.14                        | EEVFK1E220R                          | (1)         | EEEFK1E220R                      | (4)    | 1000   |

The taping dimension are explained on p.187 of our Catalog.  
Please use it as a reference guide.

Endurance: 2000 to 5000h at 105°C

Reflow Profile(Fig-1 to Fig-5) listed in a last page.

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

| W.V. | Cap.<br>(±20%)<br><br>(μF) | Case size    |                |              | Specification                                     |  |                             | Part No.<br>(RoHS:<br>not compliant) | Reflow      | Part No.<br>(RoHS:<br>compliant) | Reflow | Min.<br>Packaging<br>Q'ty<br><br>Taping<br>(pcs) |
|------|----------------------------|--------------|----------------|--------------|---|--|-----------------------------|--------------------------------------|-------------|----------------------------------|--------|--|
|      |                            | Dia.<br>(mm) | Length<br>(mm) | Size<br>Code | Ripple<br>current<br>(100kHz)<br>(+105°C)<br>(mA) | Impe-<br>dance<br>(100kHz)<br>(+20°C)<br>(Ω) | tan δ<br>(120Hz)<br>(+20°C) |                                      |             |                                  |        |  |
| 25   | 33                         | 5            | 5.8            | C            | 160   | 0.7  | 0.14                        | EEVFK1E330UR                         | (1)         | EEEFK1E330UR                     | (4)    | 1000   |
|      |                            | 6.3          | 5.8            | D            | 240   | 0.36   | 0.14                        | EEVFK1E330P                          | (1)         | EEEFK1E330P                      | (4)    | 1000   |
|      | 47                         | 6.3          | 5.8            | D            | 240   | 0.36   | 0.14                        | EEVFK1E470P                          | (1)         | EEEFK1E470P                      | (4)    | 1000   |
|      | 68                         | 6.3          | 5.8            | D            | 240   | 0.36   | 0.14                        | EEVFK1E680P                          | (1)         | EEEFK1E680P                      | (4)    | 1000   |
|      | 100                        | 6.3          | 7.7            | D8           | 280   | 0.34   | 0.14                        | EEVFK1E101XP                         | (1)         | EEEFK1E101XP                     | (4)    | 900  |
|      |                            | 8            | 6.2            | E            | 300   | 0.26   | 0.14                        | EEVFK1E101P                          | (2)         | EEEFK1E101P                      | (5)    | 1000   |
|      | 150                        | 8            | 10.2           | F            | 600   | 0.16   | 0.14                        | EEVFK1E151P                          | (2)         | EEEFK1E151P                      | (5)    | 500  |
|      | 220                        | 8            | 10.2           | F            | 600   | 0.16   | 0.14                        | EEVFK1E221P                          | (2)         | EEEFK1E221P                      | (5)    | 500  |
|      | 330                        | 8            | 10.2           | F            | 600   | 0.16   | 0.14                        | EEVFK1E331P                          | (2)         | EEEFK1E331P                      | (5)    | 500  |
|      | 470                        | 10           | 10.2           | G            | 850   | 0.08   | 0.14                        | EEVFK1E471P                          | (2)         | EEEFK1E471P                      | (5)    | 500  |
|      | 1000                       | 12.5         | 13.5           | H13          | 1100  | 0.06   | 0.14                        |                                      | (2)         | EEVFK1E102Q                      | (2)    | 200  |
| 35   | 4.7                        | 4            | 5.8            | B            | 90  | 1.35   | 0.12                        | EEVFK1V4R7R                          | (1)         | EEEFK1V4R7R                      | (4)    | 2000   |
|      |                            | 5            | 5.8            | C            | 160   | 0.70   | 0.12                        | EEVFK1V100R                          | (1)         | EEEFK1V100R                      | (4)    | 1000   |
|      | 10                         | 4            | 5.8            | B            | 90  | 1.35   | 0.12                        | EEVFK1V100UR                         | (1)         | EEEFK1V100UR                     | (4)    | 2000   |
|      | 22                         | 5            | 5.8            | C            | 160   | 0.70   | 0.12                        | EEVFK1V220R                          | (1)         | EEEFK1V220R                      | (4)    | 1000   |
|      |                            | 6.3          | 5.8            | D            | 240   | 0.36   | 0.12                        | EEVFK1V330P                          | (1)         | EEEFK1V330P                      | (4)    | 1000   |
|      | 47                         | 6.3          | 5.8            | D            | 240   | 0.36   | 0.12                        | EEVFK1V470P                          | (1)         | EEEFK1V470P                      | (4)    | 1000   |
|      | 68                         | 6.3          | 7.7            | D8           | 280   | 0.34   | 0.12                        | EEVFK1V680XP                         | (1)         | EEEFK1V680XP                     | (4)    | 900  |
|      | 100                        | 6.3          | 7.7            | D8           | 280   | 0.34   | 0.12                        | EEVFK1V101XP                         | (1)         | EEEFK1V101XP                     | (4)    | 900  |
|      |                            | 8            | 10.2           | F            | 600   | 0.16   | 0.12                        | EEVFK1V101P                          | (2)         | EEEFK1V101P                      | (5)    | 500  |
|      | 150                        | 8            | 10.2           | F            | 600   | 0.16   | 0.12                        | EEVFK1V151P                          | (2)         | EEEFK1V151P                      | (5)    | 500  |
|      | 220                        | 8            | 10.2           | F            | 600   | 0.16   | 0.12                        | EEVFK1V221P                          | (2)         | EEEFK1V221P                      | (5)    | 500  |
|      | 330                        | 10           | 10.2           | G            | 850   | 0.08   | 0.12                        | EEVFK1V331P                          | (2)         | EEEFK1V331P                      | (5)    | 500  |
|      | 470                        | 12.5         | 13.5           | H13          | 1100  | 0.06   | 0.12                        |                                      |             | EEVFK1V471Q                      | (2)    | 200  |
|      | 680                        | 12.5         | 13.5           | H13          | 1100  | 0.06   | 0.12                        |                                      |             | EEVFK1V681Q                      | (2)    | 200  |
| 1000 | 16                         | 16.5         | J16            | 1800         | 0.035   | 0.12   |                             |                                      | EEVFK1V102M | (2)                              | 125    |  |
| 1500 | 16                         | 16.5         | J16            | 1800         | 0.035   | 0.12   |                             |                                      | EEVFK1V152M | (2)                              | 125    |  |
| 50   | 4.7                        | 4            | 5.8            | B            | 60  | 2.9  | 0.10                        | EEVFK1H4R7R                          | (1)         | EEEFK1H4R7R                      | (4)    | 2000   |
|      |                            | 5            | 5.8            | C            | 85  | 1.52   | 0.10                        | EEVFK1H100UR                         | (1)         | EEEFK1H100UR                     | (4)    | 1000   |
|      | 10                         | 6.3          | 5.8            | D            | 165   | 0.88   | 0.10                        | EEVFK1H100P                          | (1)         | EEEFK1H100P                      | (4)    | 1000   |
|      |                            | 6.3          | 5.8            | D            | 165   | 0.88   | 0.10                        | EEVFK1H220P                          | (1)         | EEEFK1H220P                      | (4)    | 1000   |
|      | 33                         | 6.3          | 7.7            | D8           | 195   | 0.68   | 0.10                        | EEVFK1H330XP                         | (1)         | EEEFK1H330XP                     | (4)    | 900  |
|      |                            | 8            | 6.2            | E            | 195   | 0.68   | 0.10                        | EEVFK1H330P                          | (2)         | EEEFK1H330P                      | (5)    | 1000   |
|      | 47                         | 6.3          | 7.7            | D8           | 195   | 0.68   | 0.10                        | EEVFK1H470XP                         | (1)         | EEEFK1H470XP                     | (4)    | 900  |
|      |                            | 8            | 6.2            | E            | 195   | 0.68   | 0.10                        | EEVFK1H470P                          | (2)         | EEEFK1H470P                      | (5)    | 1000   |
|      | 100                        | 8            | 10.2           | F            | 350   | 0.34   | 0.10                        | EEVFK1H101P                          | (2)         | EEEFK1H101P                      | (5)    | 500  |
|      | 150                        | 10           | 10.2           | G            | 670   | 0.18   | 0.10                        | EEVFK1H151P                          | (2)         | EEEFK1H151P                      | (5)    | 500  |
|      | 220                        | 10           | 10.2           | G            | 670   | 0.18   | 0.10                        | EEVFK1H221P                          | (2)         | EEEFK1H221P                      | (5)    | 500  |
|      | 330                        | 12.5         | 13.5           | H13          | 900   | 0.12   | 0.10                        |                                      |             | EEVFK1H331Q                      | (2)    | 200  |
|      | 390                        | 12.5         | 13.5           | H13          | 900   | 0.12   | 0.10                        |                                      |             | EEVFK1H391Q                      | (2)    | 200  |
|      | 470                        | 16           | 16.5           | J16          | 1610  | 0.073  | 0.10                        |                                      |             | EEVFK1H471M                      | (2)    | 125  |
| 680  | 16                         | 16.5         | J16            | 1610         | 0.073   | 0.10   |                             |                                      | EEVFK1H681M | (2)                              | 125    |  |
| 1000 | 16                         | 16.5         | J16            | 1610         | 0.073   | 0.10   |                             |                                      | EEVFK1H102M | (2)                              | 125    |  |

The taping dimension are explained on p.187 of our Catalog.

Endurance: 2000 to 5000h at 105°C

Please use it as a reference guide.

Reflow Profile(Fig-1 to Fig-5) listed in a last page.

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

| W.V.<br>(V) | Cap.<br>(±20%)<br>(μF) | Case size    |                |              | Specification                                     |  |                             | Part No.<br>(RoHS:<br>not compliant) | Reflow      | Part No.<br>(RoHS:<br>compliant) | Reflow | Min.<br>Packaging<br>Q'ty<br><br>Taping<br>(pcs) |
|-------------|------------------------|--------------|----------------|--------------|---|--|-----------------------------|--------------------------------------|-------------|----------------------------------|--------|--|
|             |                        | Dia.<br>(mm) | Length<br>(mm) | Size<br>Code | Ripple<br>current<br>(100kHz)<br>(+105°C)<br>(mA) | Impe-<br>dance<br>(100kHz)<br>(+20°C)<br>(Ω) | tan δ<br>(120Hz)<br>(+20°C) |                                      |             |                                  |        |  |
| 63          | 4.7                    | 5            | 5.8            | C            | 50  | 3.0  | 0.08                        | EEVFK1J4R7R                          | (1)         | EEEFK1J4R7R                      | (4)    | 1000   |
|             | 10                     | 6.3          | 5.8            | D            | 80  | 1.5  | 0.08                        | EEVFK1J100P                          | (1)         | EEEFK1J100P                      | (4)    | 1000   |
|             | 22                     | 6.3          | 7.7            | D8           | 120   | 1.2  | 0.08                        | EEVFK1J220XP                         | (1)         | EEEFK1J220XP                     | (4)    | 900  |
|             |                        | 8            | 6.2            | E            | 120   | 1.2  | 0.08                        | EEVFK1J220P                          | (2)         | EEEFK1J220P                      | (5)    | 1000   |
|             | 33                     | 8            | 10.2           | F            | 250   | 0.65   | 0.08                        | EEVFK1J330P                          | (2)         | EEEFK1J330P                      | (5)    | 500  |
|             | 47                     | 8            | 10.2           | F            | 250   | 0.65   | 0.08                        | EEVFK1J470P                          | (2)         | EEEFK1J470P                      | (5)    | 500  |
|             | 68                     | 8            | 10.2           | F            | 250   | 0.65   | 0.08                        | EEVFK1J680UP                         | (2)         | EEEFK1J680UP                     | (5)    | 500  |
|             | 100                    | 10           | 10.2           | G            | 400   | 0.35   | 0.08                        | EEVFK1J101P                          | (2)         | EEEFK1J101P                      | (5)    | 500  |
|             | 150                    | 12.5         | 13.5           | H13          | 800   | 0.16   | 0.08                        |                                      |             | EEVFK1J151Q                      | (2)    | 200  |
|             | 220                    | 12.5         | 13.5           | H13          | 800   | 0.16   | 0.08                        |                                      |             | EEVFK1J221Q                      | (2)    | 200  |
|             | 470                    | 16           | 16.5           | J16          | 1410  | 0.082  | 0.08                        |                                      |             | EEVFK1J471M                      | (2)    | 125  |
| 680         | 18                     | 16.5         | K16            | 1690         | 0.08  | 0.08   |                             |                                      | EEVFK1J681M | (2)                              | 125    |  |
| 80          | 3.3                    | 5            | 5.8            | C            | 25  | 5.0  | 0.08                        | EEVFK1K3R3R                          | (1)         | EEEFK1K3R3R                      | (4)    | 1000   |
|             | 4.7                    | 6.3          | 5.8            | D            | 40  | 3.0  | 0.08                        | EEVFK1K4R7P                          | (1)         | EEEFK1K4R7P                      | (4)    | 1000   |
|             | 10                     | 6.3          | 7.7            | D8           | 60  | 2.4  | 0.08                        | EEVFK1K100XP                         | (1)         | EEEFK1K100XP                     | (4)    | 900  |
|             |                        | 8            | 6.2            | E            | 60  | 2.4  | 0.08                        | EEVFK1K100P                          | (2)         | EEEFK1K100P                      | (5)    | 1000   |
|             | 22                     | 8            | 10.2           | F            | 130   | 1.3  | 0.08                        | EEVFK1K220P                          | (2)         | EEEFK1K220P                      | (5)    | 500  |
|             | 33                     | 8            | 10.2           | F            | 130   | 1.3  | 0.08                        | EEVFK1K330P                          | (2)         | EEEFK1K330P                      | (5)    | 500  |
|             | 47                     | 10           | 10.2           | G            | 200   | 0.7  | 0.08                        | EEVFK1K470P                          | (2)         | EEEFK1K470P                      | (5)    | 500  |
|             | 68                     | 12.5         | 13.5           | H13          | 500   | 0.32   | 0.08                        |                                      |             | EEVFK1K680Q                      | (2)    | 200  |
|             | 100                    | 12.5         | 13.5           | H13          | 500   | 0.32   | 0.08                        |                                      |             | EEVFK1K101Q                      | (2)    | 200  |
|             | 150                    | 12.5         | 13.5           | H13          | 500   | 0.32   | 0.08                        |                                      |             | EEVFK1K151Q                      | (2)    | 200  |
|             | 330                    | 16           | 16.5           | J16          | 793   | 0.17   | 0.08                        |                                      |             | EEVFK1K331M                      | (2)    | 125  |
| 470         | 18                     | 16.5         | K16            | 917          | 0.153   | 0.08   |                             |                                      | EEVFK1K471M | (2)                              | 125    |  |
| 100         | 22                     | 8.0          | 10.2           | F            | 130   | 1.3  | 0.07                        | EEVFK2A220P                          | (2)         | EEEFK2A220P                      | (5)    | 500  |
|             | 33                     | 10           | 10.2           | G            | 200   | 0.7  | 0.07                        | EEVFK2A330P                          | (2)         | EEEFK2A330P                      | (5)    | 500  |
|             | 47                     | 12.5         | 13.5           | H13          | 500   | 0.32   | 0.07                        |                                      |             | EEVFK2A470Q                      | (2)    | 200  |
|             | 68                     | 12.5         | 13.5           | H13          | 500   | 0.32   | 0.07                        |                                      |             | EEVFK2A680Q                      | (2)    | 200  |
|             | 100                    | 16           | 16.5           | J16          | 793   | 0.17   | 0.07                        |                                      |             | EEVFK2A101M                      | (2)    | 125  |
|             | 150                    | 16           | 16.5           | J16          | 793   | 0.17   | 0.07                        |                                      |             | EEVFK2A151M                      | (2)    | 125  |
|             | 220                    | 18           | 16.5           | K16          | 917   | 0.153  | 0.07                        |                                      |             | EEVFK2A221M                      | (2)    | 125  |
| 330         | 18                     | 16.5         | K16            | 917          | 0.153   | 0.07   |                             |                                      | EEVFK2A331M | (2)                              | 125    |  |

The taping dimension are explained on p.187 of our Catalog.  
Please use it as a reference guide.  
Reflow Profile(Fig-1 to Fig-5) listed in a last page.

Endurance: 2000 to 5000h at 105°C

| Part Number | Prefix | Suffix | Size        | RoHS | Terminal Finish Materials | Reflow Condition  |
|-------------|--------|--------|-------------|------|---------------------------|---|
| ECEV•••R    | ECEV   | R      | 3φ to 5φ    | No   | Sn-Pb                     | Peak Temp.: 240deg.C(within 5s),within 20s(time in 200deg.C or more)<br>Fig.1   |
| ECEV•••P    |        | P      | 6φ to 10φ   | No   | Sn-Pb                     | 6φ ••• Peak Temp.: 240deg.C(within 5s),within 20s(time in 200deg.C or more)<br>8 and 10φ ••• Peak Temp.: 230deg.C(within 5s),within 20s(time in 200deg.C or more)<br>Fig.1<br>Fig.2   |
| EEV•••R     | EEV    | R      | 4φ and 5φ   | No   | Sn-Pb                     | Peak Temp.: 240deg.C(within 5s),within 20s(time in 200deg.C or more)<br>Fig.1   |
| EEV•••P     |        | P      | 6φ to 10φ   | No   | Sn-Pb                     | 6φ ••• Peak Temp.: 240deg.C(within 5s),within 20s(time in 200deg.C or more)<br>8 and 10φ ••• Peak Temp.: 230deg.C(within 5s),within 20s(time in 200deg.C or more)<br>Fig.1<br>Fig.2   |
| EEV•••Q     |        | Q      | 12.5φ       | OK   | Sn                        | Peak Temp.: 230deg.C(within 5s),within 20s(time in 200deg.C or more)<br>Fig.2 (Except for EB series)  |
| EEV•••M     |        | M      | 16φ and 18φ | OK   | Sn                        | Fig.3 (EB series only)  |
| EEE•••R     | EEE    | R      | 3φ to 5φ    | OK   | Sn-Bi                     | Peak Temp.: 250deg.C(within 5s),within 60s(time in 200deg.C or more)<br>Fig. 4  |
| EEE•••P     |        | P      | 6φ to 10φ   | OK   | Sn-Bi                     | 6φ ••• Peak Temp.: 250deg.C(within 5s),within 60s(time in 200deg.C or more)<br>8 and 10φ ••• Peak Temp.: 235deg.C(within 5s),within 60s(time in 200deg.C or more)<br>Fig. 4<br>Fig. 5 |

