

Surface Mount Type

Series: **FP** Type: **V**

FP High temperature Lead-Free reflow (suffix:A*)



■ Features

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

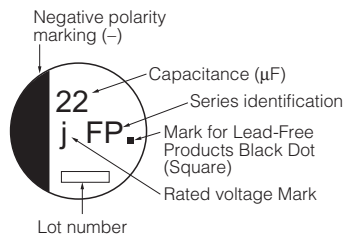
■ Specifications

| | | | | | | | | |
|------------------------------------|---|---|----|----|----|----|----|-----------------------------|
| Category Temp. Range | -55 °C to +105 °C | | | | | | | |
| Rated W.V. Range | 6.3 V.DC to 50 V.DC | | | | | | | |
| Nominal Cap. Range | 10 μ F to 1800 μ F | | | | | | | |
| Capacitance Tolerance | ± 20 % (120 Hz/+20 °C) | | | | | | | |
| DC Leakage Current | $I \leq 0.01$ CV or 3 (μ A) After 2 minutes (whichever is greater) | | | | | | | |
| tan δ | Please see the attached standard products list | | | | | | | |
| Characteristics at Low Temperature | W.V. (V) | 6.3 | 10 | 16 | 25 | 35 | 50 | (Impedance ratio at 120 Hz) |
| | Z(-25 °C)/Z(+20 °C) | 2 | 2 | 2 | 2 | 2 | 2 | |
| | Z(-40°C)/Z(+20 °C) | 3 | 3 | 3 | 3 | 3 | 3 | |
| | Z(-55°C)/Z(+20 °C) | 4 | 4 | 4 | 3 | 3 | 3 | |
| Endurance | After applying rated working voltage at +105 °C ± 2 °C for 2000 hours the capacitors shall meet the limits specified below. Post-test requirement at +20 °C | | | | | | | |
| | Capacitance change | ± 30 % of initial measured value | | | | | | |
| | tan δ | ≤ 200 % of initial specified value | | | | | | |
| | DC leakage current | \leq initial specified value | | | | | | |
| Shelf Life | After storage for 1000 hours at +105 °C ± 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 | ± 10 % of initial measured value | | | | | | |
| | tan δ | \leq initial specified value | | | | | | |
| | DC leakage current | \leq initial specified value | | | | | | |

■ Marking

Example: 6.3 V 22 μ F

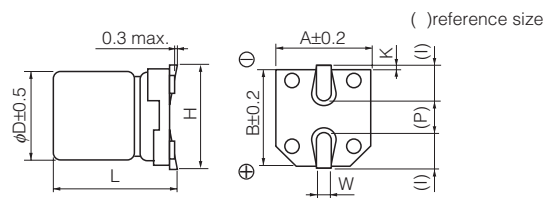
Marking color: BLACK



Rated Voltage Mark

| | |
|---|-------|
| j | 6.3 V |
| A | 10 V |
| C | 16 V |
| E | 25 V |
| V | 35 V |
| H | 50 V |

■ Dimensions in mm(not to scale)



| Size code | D | L | A, B | H | I | W | P | K |
|-----------|------|-----------------|------|-----------|-----|----------------|-----|-------------------------|
| B | 4.0 | 5.8 \pm 0.30 | 4.3 | 5.5 max. | 1.8 | 0.65 \pm 0.1 | 1.0 | 0.35 $^{+0.15}_{-0.20}$ |
| C | 5.0 | 5.8 \pm 0.30 | 5.3 | 6.5 max. | 2.2 | 0.65 \pm 0.1 | 1.5 | 0.35 $^{+0.15}_{-0.20}$ |
| D | 6.3 | 5.8 \pm 0.30 | 6.6 | 7.8 max. | 2.6 | 0.65 \pm 0.1 | 1.8 | 0.35 $^{+0.15}_{-0.20}$ |
| D8 | 6.3 | 7.7 \pm 0.30 | 6.6 | 7.8 max. | 2.6 | 0.65 \pm 0.1 | 1.8 | 0.35 $^{+0.15}_{-0.20}$ |
| E | 8.0 | 6.2 \pm 0.30 | 8.3 | 9.5 max. | 3.4 | 0.65 \pm 0.1 | 2.2 | 0.35 $^{+0.15}_{-0.20}$ |
| F | 8.0 | 10.2 \pm 0.30 | 8.3 | 10.0 max. | 3.4 | 0.90 \pm 0.2 | 3.1 | 0.70 \pm 0.20 |
| G | 10.0 | 10.2 \pm 0.30 | 10.3 | 12.0 max. | 3.5 | 0.90 \pm 0.2 | 4.6 | 0.70 \pm 0.20 |

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

| 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.) | E.S.R. (100 kHz) (+20 °C) (Ω) | tan δ (120 Hz) (+20 °C) | | | Taping |
| (V) | (μF) | (mm) | (mm) | | | | | | (pcs) | |
| 6.3 | 22 | 4 | 5.8 | B | 160 | 0.85 | 0.26 | EEFFP0J220AR | (5) | 2000 |
| | 47 | 4 | 5.8 | (B) | 160 | 0.85 | 0.26 | EEFFPJ470UAR | (5) | 2000 |
| | | 5 | 5.8 | C | 240 | 0.36 | 0.26 | EEFFP0J470AR | (5) | 1000 |
| | 100 | 5 | 5.8 | (C) | 240 | 0.36 | 0.26 | EEFFPJ101UAR | (5) | 1000 |
| | | 6.3 | 5.8 | D | 300 | 0.26 | 0.26 | EEFFP0J101AP | (5) | 1000 |
| | 220 | 6.3 | 5.8 | D | 300 | 0.26 | 0.26 | EEFFP0J221AP | (5) | 1000 |
| | 330 | 6.3 | 7.7 | D8 | 600 | 0.16 | 0.26 | EEFFPJ331XAP | (5) | 900 |
| | | 8 | 6.2 | E | 500 | 0.18 | 0.26 | EEFFP0J331AP | (6) | 1000 |
| | 470 | 8 | 10.2 | F | 850 | 0.08 | 0.26 | EEFFP0J471AP | (6) | 500 |
| | 1000 | 8 | 10.2 | F | 850 | 0.08 | 0.26 | EEFFP0J102AP | (6) | 500 |
| 1500 | 10 | 10.2 | G | 1190 | 0.06 | 0.26 | EEFFP0J152AP | (6) | 500 | |
| 1800 | 10 | 10.2 | (G) | 850 | 0.08 | 0.26 | EEFFPJ182UAP | (6) | 500 | |
| 10 | 22 | 4 | 5.8 | B | 160 | 0.85 | 0.19 | EEFFP1A220AR | (5) | 2000 |
| | 33 | 4 | 5.8 | (B) | 160 | 0.85 | 0.19 | EEFFPA330UAR | (5) | 2000 |
| | | 5 | 5.8 | C | 240 | 0.36 | 0.19 | EEFFP1A330AR | (5) | 1000 |
| | 150 | 6.3 | 5.8 | D | 300 | 0.26 | 0.19 | EEFFP1A151AP | (5) | 1000 |
| | 220 | 6.3 | 7.7 | D8 | 600 | 0.16 | 0.19 | EEFFPA221XAP | (5) | 900 |
| | | 8 | 6.2 | E | 500 | 0.18 | 0.19 | EEFFP1A221AP | (6) | 1000 |
| | 330 | 8 | 10.2 | F | 850 | 0.08 | 0.19 | EEFFP1A331AP | (6) | 500 |
| | 470 | 8 | 10.2 | F | 850 | 0.08 | 0.19 | EEFFP1A471AP | (6) | 500 |
| | 680 | 8 | 10.2 | F | 850 | 0.08 | 0.19 | EEFFP1A681AP | (6) | 500 |
| | 1000 | 10 | 10.2 | G | 1190 | 0.06 | 0.19 | EEFFP1A102AP | (6) | 500 |
| 1200 | 10 | 10.2 | (G) | 850 | 0.08 | 0.19 | EEFFPA122UAP | (6) | 500 | |
| 16 | 10 | 4 | 5.8 | B | 160 | 0.85 | 0.16 | EEFFP1C100AR | (5) | 2000 |
| | 22 | 4 | 5.8 | (B) | 160 | 0.85 | 0.16 | EEFFPC220UAR | (5) | 2000 |
| | | 5 | 5.8 | C | 240 | 0.36 | 0.16 | EEFFP1C220AR | (5) | 1000 |
| | 47 | 5 | 5.8 | (C) | 240 | 0.36 | 0.16 | EEFFPC470UAR | (5) | 1000 |
| | | 6.3 | 5.8 | D | 300 | 0.26 | 0.16 | EEFFP1C470AP | (5) | 1000 |
| | 68 | 6.3 | 5.8 | D | 300 | 0.26 | 0.16 | EEFFP1C680AP | (5) | 1000 |
| | 100 | 6.3 | 5.8 | D | 300 | 0.26 | 0.16 | EEFFP1C101AP | (5) | 1000 |
| | | 6.3 | 7.7 | D8 | 600 | 0.16 | 0.16 | EEFFPC101XAP | (5) | 900 |
| | 150 | 6.3 | 7.7 | D8 | 600 | 0.16 | 0.16 | EEFFPC151XAP | (5) | 900 |
| | 220 | 6.3 | 7.7 | D8 | 600 | 0.16 | 0.16 | EEFFPC221XAP | (5) | 900 |
| | | 8 | 6.2 | E | 500 | 0.18 | 0.16 | EEFFP1C221AP | (6) | 1000 |
| | 330 | 8 | 10.2 | F | 850 | 0.08 | 0.16 | EEFFP1C331AP | (6) | 500 |
| | 470 | 8 | 10.2 | F | 850 | 0.08 | 0.16 | EEFFP1C471AP | (6) | 500 |
| 680 | 10 | 10.2 | G | 1190 | 0.06 | 0.16 | EEFFP1C681AP | (6) | 500 | |
| 820 | 10 | 10.2 | (G) | 850 | 0.08 | 0.16 | EEFFPC821UAP | (6) | 500 | |
| 25 | 10 | 4 | 5.8 | B | 160 | 0.85 | 0.14 | EEFFP1E100AR | (5) | 2000 |
| | 22 | 5 | 5.8 | C | 240 | 0.36 | 0.14 | EEFFP1E220AR | (5) | 1000 |
| | | 5 | 5.8 | (C) | 240 | 0.36 | 0.14 | EEFFPE330UAR | (5) | 1000 |
| | 33 | 6.3 | 5.8 | D | 300 | 0.26 | 0.14 | EEFFP1E330AP | (5) | 1000 |
| | | 6.3 | 5.8 | D | 300 | 0.26 | 0.14 | EEFFP1E470AP | (5) | 1000 |
| | 68 | 6.3 | 5.8 | D | 300 | 0.26 | 0.14 | EEFFP1E680AP | (5) | 1000 |
| | 100 | 6.3 | 7.7 | D8 | 600 | 0.16 | 0.14 | EEFFPE101XAP | (5) | 900 |
| | | 8 | 6.2 | E | 500 | 0.18 | 0.14 | EEFFP1E101AP | (6) | 1000 |
| | 150 | 8 | 10.2 | F | 850 | 0.08 | 0.14 | EEFFP1E151AP | (6) | 500 |
| | 220 | 8 | 10.2 | F | 850 | 0.08 | 0.14 | EEFFP1E221AP | (6) | 500 |
| | 330 | 8 | 10.2 | F | 850 | 0.08 | 0.14 | EEFFP1E331AP | (6) | 500 |
| | 470 | 10 | 10.2 | G | 1190 | 0.06 | 0.14 | EEFFP1E471AP | (6) | 500 |
| | 560 | 10 | 10.2 | (G) | 850 | 0.08 | 0.14 | EEFFPE561UAP | (6) | 500 |

* Size code():Miniaturization product

If Part number exceeds 12 digits, voltage code is abbreviated as follows; 0J→J, 1A→A, 1C→C, 1E→E, 1V→V

The taping dimensions are explained on EE188 of our Catalog. Please use it as a reference guide.

Reflow Profile(Fig-1 to Fig-11) listed on EE186 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.

00 Sep. 2010

■ Standard Products

Endurance : 105 °C 2000 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.) | E.S.R. (100 kHz) (+20 °C) (Ω) | tan δ (120 Hz) (+20 °C) | | | Taping (pcs) |
| (V) | (μF) | (mm) | (mm) | | | | | | | |
| 35 | 10 | 4 | 5.8 | (B) | 160 | 0.85 | 0.12 | EEFFPV100UAR | (5) | 2000 |
| | 22 | 5 | 5.8 | C | 240 | 0.36 | 0.12 | EEFFPV1V220AR | (5) | 1000 |
| | 33 | 6.3 | 5.8 | D | 300 | 0.26 | 0.12 | EEFFPV1V330AP | (5) | 1000 |
| | 47 | 6.3 | 5.8 | D | 300 | 0.26 | 0.12 | EEFFPV1V470AP | (5) | 1000 |
| | 68 | 6.3 | 7.7 | D8 | 600 | 0.16 | 0.12 | EEFFPV680XAP | (5) | 900 |
| | 100 | 6.3 | 7.7 | D8 | 600 | 0.16 | 0.12 | EEFFPV101XAP | (5) | 900 |
| | | 8 | 10.2 | F | 850 | 0.08 | 0.12 | EEFFPV1V101AP | (6) | 500 |
| | 150 | 8 | 10.2 | F | 850 | 0.08 | 0.12 | EEFFPV1V151AP | (6) | 500 |
| | 220 | 8 | 10.2 | F | 850 | 0.08 | 0.12 | EEFFPV1V221AP | (6) | 500 |
| | 330 | 10 | 10.2 | G | 1190 | 0.06 | 0.12 | EEFFPV1V331AP | (6) | 500 |
| 390 | 10 | 10.2 | (G) | 850 | 0.08 | 0.12 | EEFFPV391UAP | (6) | 500 | |
| 50 | 100 | 8 | 10.2 | F | 670 | 0.18 | 0.10 | EEFFPV1H101AP | (6) | 500 |
| | 220 | 10 | 10.2 | G | 900 | 0.12 | 0.10 | EEFFPV1H221AP | (6) | 500 |

* Size code():Miniaturization product

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