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Surface Mount Type **SP-Cap**

Series: **FD, CD, UD, UE**

Old series



[Our Requests]

Since this series is old, we don't recommend you to adopt it but CX & SX series for your new design.

■ **Features**

- Low ESR
- Excellent Noise-absorbent Characteristics
- RoHS directive compliant

■ **Specifications**

| Series & Size Code | FD | CD | UD | UE | |
|-----------------------|---|------------------------------------|------------------------|------------------|-------------------|
| Category Temp. Range | -40 °C to +105 °C | | | | |
| Rated Voltage Range | 2 V.DC to 12.5 V.DC | 2 V.DC to 16 V.DC | 2 V.DC to 8 V.DC | 2 V.DC to 8 V.DC | |
| Nominal Cap.Range | 15 μF to 68 μF | 2.2 μF to 220 μF | 68 μF to 470 μF | 100 μF to 560 μF | |
| Capacitance Tolerance | ±20 % | | | | |
| DC Leakage Current | Reflow 240 °C : I ≤ 0.06 CV (μA) 2minutes (2 V.DC to 4 V.DC) I ≤ 0.04 CV or 3 (μA) 2 minutes (6.3 V.DC to 16 V.DC) (Whichever is greater) Reflow 260 °C : I ≤ 0.1 CV (μA) 2 minutes | | | | |
| tan δ | ≤ 0.06 (120 Hz/+20 °C) | | ≤ 0.10 (120 Hz/+20 °C) | | |
| Surge Voltage | Rated Voltage × 1.25 (15 °C to 35 °C) | | | | |
| Endurance | After applying rated voltage for 1000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits. | | | | |
| | Capacitance change | ±10% of initial measured value | | | |
| | tan δ | ≤ Initial specified value | | | |
| | DC leakage current | ≤ Initial specified value | | | |
| Moisture resistance | After storing for 500 hours at 60 °C, 90 % | | | | |
| | Capacitance change of initial measured value | 2, 2.5 V.DC | 4 V.DC | 6.3 V.DC | 8 V.DC to 16 V.DC |
| | | +70, -20 % | +60, -20 % | +50, -20 % | +40, -20 % |
| | tan δ | ≤ 200 % of initial specified value | | | |
| DC leakage current | ≤ Initial specified value | | | | |

■ **Marking**



■ **Dimensions in mm(not to scale)**

(Unit : mm)

| Series & Size Code | L±0.2 | W1±0.2 | W2±0.1 | H | P±0.3 |
|--------------------|-------|--------|--------|---------|-------|
| FD | 7.3 | 4.3 | 2.4 | 1.1±0.1 | 1.3 |
| CD | 7.3 | 4.3 | 2.4 | 1.8±0.1 | 1.3 |
| UD | 7.3 | 4.3 | 2.4 | 2.8±0.2 | 1.3 |
| UE | 7.3 | 4.3 | 2.4 | 4.2±0.1 | 1.3 |

* Externals of figure are the reference.

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

Reflow *3 <260 °C>

| Series & Size Code | Rated Voltage (V.DC) | Capacitance (±20%) (μF) | Case Size | | | Specification | | Part number | Reflow | | Min. Packaging Qty (pcs) | |
|--------------------|----------------------|-------------------------|-----------|--------|--------|--------------------------------|---------------------|--------------|--------------|--------|--------------------------|------|
| | | | L (mm) | W (mm) | H (mm) | *1 Ripple current (Ar.m.s.) | *2 ESR (mΩ max.) | | *4 240 °C | 260 °C | | |
| FD | 2 | 68 | 7.3 | 4.3 | 1.1 | 2.0 | 28 | EEFFD0D680R | ○ | — | 3500 | |
| | 2.5 | 56 | 7.3 | 4.3 | 1.1 | 2.0 | 28 | EEFFD0E560R | ○ | — | 3500 | |
| | 4 | 39 | 7.3 | 4.3 | 1.1 | 2.0 | 28 | EEFFD0G390R | ○ | — | 3500 | |
| | | 47 | 7.3 | 4.3 | 1.1 | 2.0 | 28 | EEFFD0G470R | ○ | — | 3500 | |
| | 6.3 | 33 | 7.3 | 4.3 | 1.1 | 2.0 | 28 | EEFFD0J330R | ○ | — | 3500 | |
| | 8 | 22 | 7.3 | 4.3 | 1.1 | 2.0 | 28 | EEFFD0K220R | ○ | — | 3500 | |
| | 12.5 | 15 | 7.3 | 4.3 | 1.1 | 1.4 | 40 | EEFFD1B150R | ○ | — | 3500 | |
| CD | 2 | 100 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0D101ER | — | ○ | 3500 | |
| | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0D101XE | — | ○ | 3500 | |
| | | 120 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0D121ER | — | ○ | 3500 | |
| | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0D121XE | — | ○ | 3500 | |
| | | | 150 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0D151ER | — | ○ | 3500 |
| | | | 180 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0D181ER | — | ○ | 3500 |
| | 2.5 | 82 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0E820ER | — | ○ | 3500 | |
| | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0E820XE | — | ○ | 3500 | |
| | | 100 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0E101ER | — | ○ | 3500 | |
| | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0E101XE | — | ○ | 3500 | |
| | | | 120 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0E121ER | — | ○ | 3500 |
| | | | 150 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0E151ER | — | ○ | 3500 |
| | 4 | 56 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0G560ER | — | ○ | 3500 | |
| | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0G560XE | — | ○ | 3500 | |
| | | 68 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0G680ER | — | ○ | 3500 | |
| | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0G680XE | — | ○ | 3500 | |
| | | | 82 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0G820ER | — | ○ | 3500 |
| | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0G820XE | — | ○ | 3500 | |
| | 6.3 | 100 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0G101ER | — | ○ | 3500 | |
| | | | 10 | 7.3 | 4.3 | 1.8 | 1.4 | 55 | EEFCD0J100ER | — | ○ | 3500 |
| | | 22 | 7.3 | 4.3 | 1.8 | 1.6 | 40 | EEFCD0J220ER | — | ○ | 3500 | |
| | | | 33 | 7.3 | 4.3 | 1.8 | 2.0 | 28 | EEFCD0J330ER | — | ○ | 3500 |
| | | | 47 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0J470ER | — | ○ | 3500 |
| | | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0J470XE | — | ○ | 3500 |
| | | 68 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0J680ER | — | ○ | 3500 | |
| | | | 7.3 | 4.3 | 1.8 | 2.7 | 15 | EEFCD0J680XE | — | ○ | 3500 | |
| | | 8 | 8.2 | 7.3 | 4.3 | 1.8 | 1.4 | 55 | EEFCD0K8R2ER | — | ○ | 3500 |
| | | | 15 | 7.3 | 4.3 | 1.8 | 1.6 | 40 | EEFCD0K150ER | — | ○ | 3500 |
| | | | 22 | 7.3 | 4.3 | 1.8 | 2.0 | 28 | EEFCD0K220ER | — | ○ | 3500 |
| | | | 33 | 7.3 | 4.3 | 1.8 | 2.5 | 18 | EEFCD0K330ER | — | ○ | 3500 |
| | 47 | | 7.3 | 4.3 | 1.8 | 1.8 | 25 | EEFCD0K470ER | — | ○ | 3500 | |
| | 10 | 22 | 7.3 | 4.3 | 1.8 | 1.6 | 30 | EEFCD1A220ER | — | ○ | 3500 | |
| | | 33 | 7.3 | 4.3 | 1.8 | 1.8 | 25 | EEFCD1A330ER | — | ○ | 3500 | |
| | | 39 | 7.3 | 4.3 | 1.8 | 1.8 | 25 | EEFCD1A390ER | — | ○ | 3500 | |
| | 12.5 | 4.7 | 7.3 | 4.3 | 1.8 | 1.0 | 80 | EEFCD1B4R7R | ○ | — | 3500 | |
| | | 10 | 7.3 | 4.3 | 1.8 | 1.0 | 60 | EEFCD1B100R | ○ | — | 3500 | |
| | | 15 | 7.3 | 4.3 | 1.8 | 1.3 | 50 | EEFCD1B150R | ○ | — | 3500 | |
| | | 22 | 7.3 | 4.3 | 1.8 | 1.6 | 30 | EEFCD1B220R | ○ | — | 3500 | |
| | 16 | 2.2 | 7.3 | 4.3 | 1.8 | 1.0 | 110 | EEFCD1C2R2R | ○ | — | 3500 | |
| | | 4.7 | 7.3 | 4.3 | 1.8 | 1.0 | 80 | EEFCD1C4R7R | ○ | — | 3500 | |
| | | 6.8 | 7.3 | 4.3 | 1.8 | 1.0 | 70 | EEFCD1C6R8R | ○ | — | 3500 | |
| | | 8.2 | 7.3 | 4.3 | 1.8 | 1.3 | 45 | EEFCD1C8R2R | ○ | — | 3500 | |
| | UD | 2 | 330 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0D331ER | — | ○ | 2000 |
| | | | | 7.3 | 4.3 | 2.8 | 3.3 | 12 | EEFUD0D331XE | — | ○ | 2000 |
| | | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0D331LE | — | ○ | 2000 |
| | | | 390 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0D391ER | — | ○ | 2000 |
| | | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0D391LE | — | ○ | 2000 |
| | | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0D471LE | — | ○ | 2000 |
| 2.5 | | 220 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0E221ER | — | ○ | 2000 | |
| | | | 7.3 | 4.3 | 2.8 | 3.3 | 12 | EEFUD0E221XE | — | ○ | 2000 | |
| | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0E221LE | — | ○ | 2000 | |
| | | 270 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0E271ER | — | ○ | 2000 | |
| | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0E271LE | — | ○ | 2000 | |

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

*4: Please contact Panasonic for details of allowable 240 °C reflow condition.

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

Reflow *3 <260 °C>

| Series & Size Code | Rated Voltage (V.DC) | Capacitance (±20 %) (μF) | Case Size | | | Specification | | Part number | Reflow | | Min. Packaging Qty (pcs) |
|--------------------|----------------------|--------------------------|-----------|--------|--------|--------------------------------|---------------------|--------------|--------------|--------|--------------------------|
| | | | L (mm) | W (mm) | H (mm) | *1 Ripple current (Ar.m.s.) | *2 ESR (mΩ max.) | | *4 240 °C | 260 °C | |
| UD | 4 | 120 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0G121ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.4 | 12 | EEFUD0G121XE | — | ○ | 2000 |
| | | 150 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0G151ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.3 | 12 | EEFUD0G151XE | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0G151LE | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0G181LE | — | ○ | 2000 |
| | 180 | 7.3 | 4.3 | 2.8 | 2.5 | 18 | EEFUD0G181ER | — | ○ | 2000 | |
| | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0G181LE | — | ○ | 2000 | |
| | 6.3 | 100 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0J101ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.3 | 12 | EEFUD0J101XE | — | ○ | 2000 |
| | | 120 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0J121ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.3 | 12 | EEFUD0J121XE | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0J121LR | ○ | — | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0J151LR | ○ | — | 2000 |
| | | 150 | 7.3 | 4.3 | 2.8 | 2.5 | 18 | EEFUD0J151ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 2.8 | 3.4 | 9 | EEFUD0J151LR | ○ | — | 2000 |
| 8 | 68 | 7.3 | 4.3 | 2.8 | 3.0 | 15 | EEFUD0K680ER | — | ○ | 2000 | |
| | 100 | 7.3 | 4.3 | 2.8 | 2.5 | 18 | EEFUD0K101ER | — | ○ | 2000 | |
| UE | 2 | 270 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0D271ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0D271XE | — | ○ | 2000 |
| | | 330 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0D331ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0D331XE | — | ○ | 2000 |
| | | 390 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0D391ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0D391XE | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0D391LE | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0D471LE | — | ○ | 2000 |
| | | 470 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0D471ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0D471XE | — | ○ | 2000 |
| | | 560 | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0D561ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0D561LE | — | ○ | 2000 |
| | 2.5 | 220 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0E221ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0E221XE | — | ○ | 2000 |
| | | 270 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0E271ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0E271XE | — | ○ | 2000 |
| | | 330 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0E331ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0E331XE | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0E331LE | — | ○ | 2000 |
| | | 390 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0E391ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0E391LE | — | ○ | 2000 |
| | | 470 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0E471ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0E471LE | — | ○ | 2000 |
| | | 4 | 180 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0G181ER | — | ○ |
| | 7.3 | | | 4.3 | 4.2 | 3.5 | 10 | EEFUE0G181XE | — | ○ | 2000 |
| | 220 | | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0G221ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0G221XE | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0G221LE | — | ○ | 2000 |
| | 270 | | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0G271ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0G271LE | — | ○ | 2000 |
| | 330 | | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0G331ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0G331ER | — | ○ | 2000 |
| | 6.3 | | 150 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0J151ER | — | ○ |
| | | 7.3 | | 4.3 | 4.2 | 3.5 | 10 | EEFUE0J151XE | — | ○ | 2000 |
| | | 180 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0J181ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.5 | 10 | EEFUE0J181XE | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0J181LR | ○ | — | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0J221LR | ○ | — | 2000 |
| | | 220 | 7.3 | 4.3 | 4.2 | 3.0 | 15 | EEFUE0J221ER | — | ○ | 2000 |
| | | | 7.3 | 4.3 | 4.2 | 3.7 | 7 | EEFUE0J221LR | ○ | — | 2000 |
| | 8 | 100 | 7.3 | 4.3 | 4.2 | 3.3 | 12 | EEFUE0K101ER | — | ○ | 2000 |
| | | 150 | 7.3 | 4.3 | 4.2 | 3.0 | 15 | EEFUE0K151ER | — | ○ | 2000 |

*1: Ripple current (100 kHz/ +20 to +105 °C), *2: ESR (100 kHz/+20 °C)

*3: Please refer to the page of "Mounting Specifications".

*4: Please contact Panasonic for details of allowable 240 °C reflow condition.