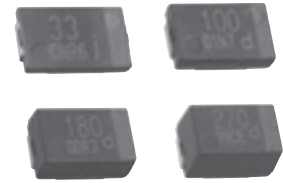


## Surface Mount Type

# 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.

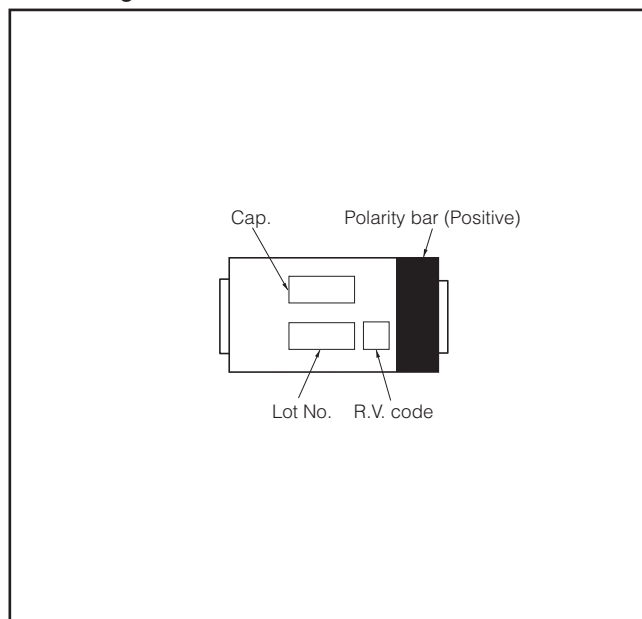
### ■ Features

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

### ■ Specifications

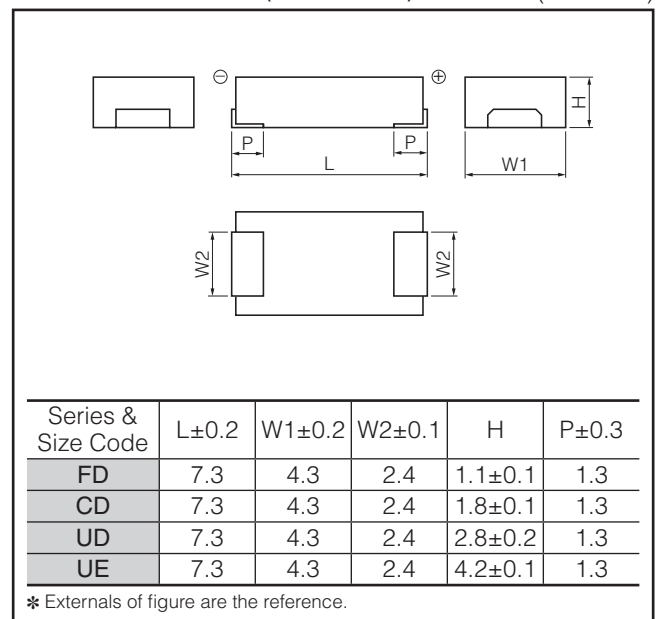
| Series & Size Code    | FD  | CD                                 | UD                     | UE               |                   |
|-----------------------|---|------------------------------------|------------------------|------------------|-------------------|
| Category Temp. Range  | -40 °C to +105 °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)<br>I ≤ 0.04 CV or 3 (μA) 2 minutes (6.3 V.DC to 16 V.DC) (Whichever is greater)<br>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)



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<br>Ripple current (Ar.m.s.) | *2<br>ESR (mΩ max.) |              | *4<br>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                     |      |
|                    | 220                  | 7.3                     | 4.3       | 1.8    | 2.5    | 18                             | EEFCD0D221ER        | —            | ○            | 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                     |      |
|                    | 100                  | 7.3                     | 4.3       | 1.8    | 2.5    | 18                             | EEFCD0G101ER        | —            | ○            | 3500   |                          |      |
|                    | 6.3                  | 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                     |      |
|                    |                      | 22                      | 7.3       | 4.3    | 1.8    | 1.6                            | 30                  | EEFCD1A220ER | —            | ○      | 3500                     |      |
|                    | 10                   | 33                      | 7.3       | 4.3    | 1.8    | 1.8                            | 25                  | EEFCD1A330ER | —            | ○      | 3500                     |      |
|                    |                      | 39                      | 7.3       | 4.3    | 1.8    | 1.8                            | 25                  | EEFCD1A390ER | —            | ○      | 3500                     |      |
|                    |                      | 4.7                     | 7.3       | 4.3    | 1.8    | 1.0                            | 80                  | EEFCD1B4R7R  | ○            | —      | 3500                     |      |
|                    | 12.5                 | 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                     |      |
|                    |                      |                         | 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<br>Ripple current (Ar.m.s.) | *2<br>ESR (mΩ max.) |              | *4<br>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    | 2.5                            | 18                  | EEFUD0G181ER | —            | ○            | 2000                     |      |
|                    | 180                  | 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    | 2.5                            | 18                  | EEFUD0J151ER | —            | ○            | 2000                     |      |
|                    | 150                  | 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    | 3.3                            | 12                  | EEFUE0D471ER | —            | ○            | 2000                     |      |
|                    |                      | 470                      | 7.3       | 4.3    | 4.2    | 3.5                            | 10                  | EEFUE0D471XE | —            | ○            | 2000                     |      |
|                    |                      |                          | 7.3       | 4.3    | 4.2    | 3.7                            | 7                   | EEFUE0D471LE | —            | ○            | 2000                     |      |
|                    |                      |                          | 560       | 7.3    | 4.3    | 4.2                            | 3.3                 | 12           | 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 | —            | ○                        | 2000 |
|                    | 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                     |      |
|                    |                      |                          | 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                     |      |
|                    | 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.