

Surface Mount Type

# SP-Cap

Series: **S**

## Large Cap



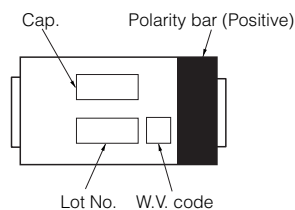
### ■ Features

- Super Low-ESR (4.5 mΩ to 9 mΩ)
- Lower ESR and Higher Capacitance at the same case size as conventional products.
- Excellent Noise-absorbent Characteristics
- High Ripple Current
- RoHS directive compliant

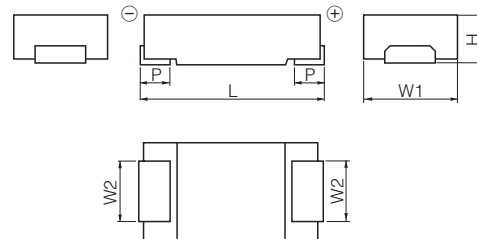
### ■ Specifications

| Series & Size Code    | SL  | SX                                 |            |            |
|-----------------------|---|------------------------------------|------------|------------|
| Category Temp. Range  | -40 °C to +105 °C   |                                    |            |            |
| Rated W.V.Range       | 2 V.DC to 6.3 V.DC  |                                    |            |            |
| Nominal Cap.Range     | 56 μF to 220 μF   | 82 μF to 560 μF                    |            |            |
| Capacitance Tolerance | ±20 %   |                                    |            |            |
| DC Leakage Current    | Reflow 240 °C : $I \leq 0.06 CV (\mu A)$ 2 minutes (2 V.DC to 4 V.DC)<br>$I \leq 0.04 CV (\mu A)$ 2 minutes (6.3 V.DC)<br>Reflow 260 °C : $I \leq 0.1 CV (\mu A)$ 2 minutes |                                    |            |            |
| tan δ                 | ≤ 0.06 (120 Hz/+20 °C)  |                                    |            |            |
| Surge Voltage         | Rated Working Voltage × 1.25 (15 °C to 35 °C)   |                                    |            |            |
| Endurance             | After applying rated working 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   |
|                       |   | +70, -20 %                         | +60, -20 % | +50, -20 % |
|                       | tan δ   | ≤ 200 % of initial specified value |            |            |
|                       | DC leakage current  | ≤ Initial specified value          |            |            |

### ■ Marking



### ■ Dimensions in mm(not to scale)



(mm)

| Series & Size Code | L±0.2 | W1±0.2 | W2±0.1 | H       | P±0.3 |
|--------------------|-------|--------|--------|---------|-------|
| SL                 | 7.3   | 4.3    | 2.4    | 1.8±0.1 | 1.3   |
| SX                 | 7.3   | 4.3    | 2.4    | 1.9±0.2 | 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.

00 Sep. 2010

■ Low ESR Products

| Series & Size Code | Rated W.V. (V.DC) | Capacitance (±20 %) (μF) | Case Size |        |        | Specification                          |                             | Part number                             |  | Min. Packaging Qty (pcs) |      |
|--------------------|-------------------|--------------------------|-----------|--------|--------|--|-----------------------------|---|--|--------------------------|------|
|                    |                   |                          | L (mm)    | W (mm) | H (mm) | Ripple current <sup>*1</sup> (Ar.m.s.) | ESR <sup>*2</sup> (mΩ max.) | <sup>*3</sup> Reflow condition : 240 °C | <sup>*3</sup> Reflow condition : 260 °C [Proposal] |                          |      |
| SL                 | 2                 | 100                      | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0D101R                             | EEFSL0D101ER                                       | 3500                     |      |
|                    |                   | 120                      | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0D121R                             | EEFSL0D121ER                                       | 3500                     |      |
|                    |                   | 150                      | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0D151R                             | EEFSL0D151ER                                       | 3500                     |      |
|                    |                   | 180                      | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0D181R                             | EEFSL0D181ER                                       | 3500                     |      |
|                    |                   | 220                      | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0D221R                             | EEFSL0D221ER                                       | 3500                     |      |
|                    | 2.5               | 100                      | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0E101R                             | EEFSL0E101ER                                       | 3500                     |      |
|                    |                   | 120                      | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0E121R                             | EEFSL0E121ER                                       | 3500                     |      |
|                    |                   | 150                      | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0E151R                             | EEFSL0E151ER                                       | 3500                     |      |
|                    | 4                 | 82                       | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0G820R                             | EEFSL0G820ER                                       | 3500                     |      |
|                    | 6.3               | 56                       | 7.3       | 4.3    | 1.8    | 3.0                                    | 9                           | EEFSL0J560R                             | —  | 3500                     |      |
| SX                 | 2                 | 180                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0D181R                             | EEFSX0D181ER                                       | 3500                     |      |
|                    |                   | 220                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0D221R                             | EEFSX0D221ER                                       | 3500                     |      |
|                    |                   | 270                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0D271R                             | EEFSX0D271ER                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.5                                    | 6                           | EEFSX0D271XR                            | EEFSX0D271XE                                       | 3500                     |      |
|                    |                   | 7.3                      | 4.3       | 1.9    | 3.8    | 4.5                                    | —                           | EEFSX0D271E4                            | 3500   |                          |      |
|                    |                   |                          | 330       | 7.3    | 4.3    | 1.9                                    | 3.0                         | 9                                       | EEFSX0D331R  | EEFSX0D331ER             | 3500 |
|                    |                   |                          |           | 7.3    | 4.3    | 1.9                                    | 3.5                         | 6                                       | EEFSX0D331XR                                       | EEFSX0D331XE             | 3500 |
|                    |                   | 7.3                      |           | 4.3    | 1.9    | 3.8                                    | 4.5                         | —                                       | EEFSX0D331E4                                       | 3500                     |      |
|                    |                   | 390                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0D391R                             | EEFSX0D391ER                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.5                                    | 6                           | EEFSX0D391XR                            | EEFSX0D391XE                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.8                                    | 4.5                         | —                                       | EEFSX0D391E4                                       | 3500                     |      |
|                    |                   | 470                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0D471R                             | EEFSX0D471ER                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.5                                    | 6                           | EEFSX0D471XR                            | EEFSX0D471XE                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.8                                    | 4.5                         | —                                       | EEFSX0D471E4                                       | 3500                     |      |
|                    |                   | 560                      | 7.3       | 4.3    | 1.9    | 3.8                                    | 4.5                         | —                                       | EEFSX0D561E4                                       | 3500                     |      |
|                    | 2.5               | 150                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0E151R                             | EEFSX0E151ER                                       | 3500                     |      |
|                    |                   | 180                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0E181R                             | EEFSX0E181ER                                       | 3500                     |      |
|                    |                   | 220                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0E221R                             | EEFSX0E221ER                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.5                                    | 7                           | —                                       | EEFSX0E221E7                                       | 3500                     |      |
|                    |                   | 270                      | 7.3       | 4.3    | 1.9    | 3.5                                    | 7                           | —                                       | EEFSX0E271E7                                       | 3500                     |      |
|                    |                   |                          | 330       | 7.3    | 4.3    | 1.9                                    | 3.0                         | 9                                       | EEFSX0E331R  | EEFSX0E331ER             | 3500 |
|                    |                   |                          |           | 7.3    | 4.3    | 1.9                                    | 3.5                         | 6                                       | EEFSX0E331XR                                       | EEFSX0E331XE             | 3500 |
|                    |                   | 7.3                      |           | 4.3    | 1.9    | 3.8                                    | 4.5                         | —                                       | EEFSX0E331E4                                       | 3500                     |      |
|                    |                   | 390                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0E391R                             | EEFSX0E391ER                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.5                                    | 6                           | EEFSX0E391XR                            | EEFSX0E391XE                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.8                                    | 4.5                         | —                                       | EEFSX0E391E4                                       | 3500                     |      |
|                    |                   | 470                      | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | —                                       | EEFSX0E471ER                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.5                                    | 6                           | —                                       | EEFSX0E471XE                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.8                                    | 4.5                         | —                                       | EEFSX0E471E4                                       | 3500                     |      |
|                    |                   | 4                        | 82        | 7.3    | 4.3    | 1.9                                    | 3.0                         | 9                                       | EEFSX0G820R  | EEFSX0G820ER             | 3500 |
|                    | 100               |                          | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | EEFSX0G101R                             | EEFSX0G101ER                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | —                                       | EEFSX0G151ER                                       | 3500                     |      |
|                    | 150               |                          | 7.3       | 4.3    | 1.9    | 3.5                                    | 7                           | —                                       | EEFSX0G151E7                                       | 3500                     |      |
|                    |                   |                          | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | —                                       | EEFSX0G181ER                                       | 3500                     |      |
|                    | 220               |                          | 7.3       | 4.3    | 1.9    | 3.0                                    | 9                           | —                                       | EEFSX0G221ER                                       | 3500                     |      |
|                    | 6.3               | 120                      | 7.3       | 4.3    | 1.9    | 3.5                                    | 7                           | —                                       | EEFSX0J121E7                                       | 3500                     |      |
| 150                |                   | 7.3                      | 4.3       | 1.9    | 3.0    | 9                                      | —                           | EEFSX0J151ER                            | 3500   |                          |      |

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

\*3: Please confirm EE25 in detail of the Mounting Specifications.