

Surface Mount Type **SP-Cap**

Series: **CS, CT, CX** (High Voltage Products)



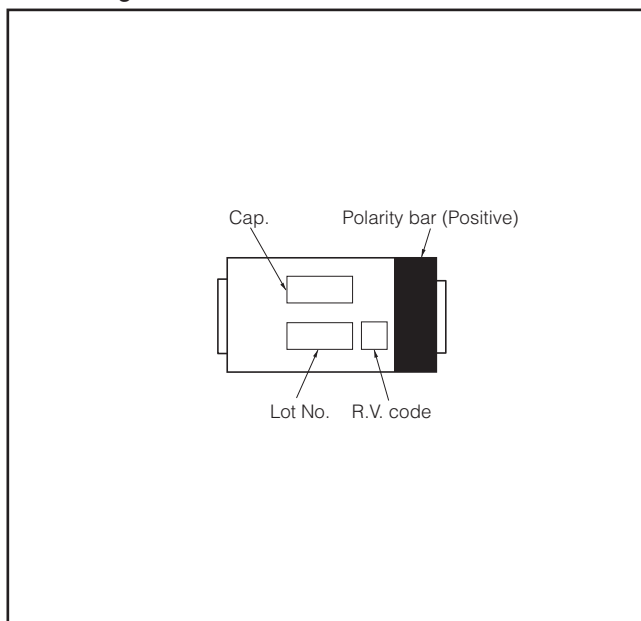
■ **Features**

- High voltage. (10 V to 35 V)
- Low profile (1.1 mm, 1.4 mm, 1.9 mm height)
- High ripple current (3.2 Ar.m.s.)
- RoHS directive compliant

■ **Specifications**

| Series & Size Code    | CS  | CT                                 | CX              |
|-----------------------|---|------------------------------------|-----------------|
| Category Temp. Range  | -55 °C to +105 °C   |                                    |                 |
| Rated Voltage Range   | 10 V.DC to 35 V.DC  |                                    |                 |
| Nominal Cap.Range     | 10 μF to 47 μF  | 15 μF to 68 μF                     | 15 μF to 100 μF |
| Capacitance Tolerance | ±20 % (120 Hz / + 20 °C)  |                                    |                 |
| DC Leakage Current    | $I \leq 0.3 CV (\mu A) 2minutes$  |                                    |                 |
| tan δ                 | $\leq 0.06 (120 Hz/+20 °C)$   |                                    |                 |
| Surge Voltage         | Rated Voltage × 1.25 [10 V.DC to 16 V.DC], × 1.15 [20 V.DC to 35 V.DC](15 °C to 35 °C)  |                                    |                 |
| Endurance             | After applying rated voltage for 2000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits. |                                    |                 |
|                       | Capacitance change  | ±20% of initial measured value     |                 |
|                       | tan δ   | ≤ 200 % of 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  | 10 V.DC to 35 V.DC                 |                 |
|                       |   | +60, -20 %                         |                 |
|                       | tan δ   | ≤ 200 % of initial specified value |                 |
|                       | DC leakage current  | ≤ 300 % of 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±0.1 | P±0.3 |
|--------------------|-------|--------|--------|-------|-------|
| CS                 | 7.3   | 4.3    | 2.4    | 1.1   | 1.3   |
| CT                 | 7.3   | 4.3    | 2.4    | 1.4   | 1.3   |
| CX                 | 7.3   | 4.3    | 2.4    | 1.9   | 1.3   |

\* Externals of figure are the reference.

■ Standard Products

Reflow \*3 <Standard>

| Series & Size Code | Rated Voltage (V.DC) | Capacitance (±20 %) (μF) | Case Size |        |        | Specification               |                  | Part number | Min. Packaging Qty (pcs) *4 |
|--------------------|----------------------|--------------------------|-----------|--------|--------|-----------------------------|------------------|-------------|-----------------------------|
|                    |                      |                          | L (mm)    | W (mm) | H (mm) | Ripple current *1 (Ar.m.s.) | ESR *2 (mΩ max.) |             |                             |
| CS                 | 10                   | 47                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1A470R | 3500                        |
|                    | 16                   | 15                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1C150R | 3500                        |
|                    |                      | 22                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1C220R | 3500                        |
|                    |                      | 33                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1C330R | 3500                        |
|                    | 20                   | 10                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1D100R | 3500                        |
|                    |                      | 15                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1D150R | 3500                        |
|                    |                      | 22                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1D220R | 3500                        |
|                    | 25                   | 10                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1E100R | 3500                        |
|                    |                      | 15                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1E150R | 3500                        |
|                    | 35                   | 10                       | 7.3       | 4.3    | 1.1    | 3.2                         | 40               | EEFCS1V100R | 3500                        |
| CT                 | 10                   | 68                       | 7.3       | 4.3    | 1.4    | 3.2                         | 40               | EEFCT1A680R | 3500                        |
|                    | 16                   | 47                       | 7.3       | 4.3    | 1.4    | 3.2                         | 40               | EEFCT1C470R | 3500                        |
|                    | 20                   | 33                       | 7.3       | 4.3    | 1.4    | 3.2                         | 40               | EEFCT1D330R | 3500                        |
|                    |                      | 47                       | 7.3       | 4.3    | 1.4    | 3.2                         | 40               | EEFCT1D470R | 3500                        |
|                    | 25                   | 22                       | 7.3       | 4.3    | 1.4    | 3.2                         | 40               | EEFCT1E220R | 3500                        |
|                    | 35                   | 15                       | 7.3       | 4.3    | 1.4    | 3.2                         | 40               | EEFCT1V150R | 3500                        |
| CX                 | 10                   | 47                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1A470R | 3500                        |
|                    |                      | 68                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1A680R | 3500                        |
|                    |                      | 100                      | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1A101R | 3500                        |
|                    | 16                   | 15                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1C150R | 3500                        |
|                    |                      | 22                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1C220R | 3500                        |
|                    |                      | 33                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1C330R | 3500                        |
|                    |                      | 47                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1C470R | 3500                        |
|                    |                      | 68                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1C680R | 3500                        |
|                    | 20                   | 22                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1D220R | 3500                        |
|                    |                      | 33                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1D330R | 3500                        |
|                    |                      | 47                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1D470R | 3500                        |
|                    |                      | 56                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1D560R | 3500                        |
|                    | 25                   | 15                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1E150R | 3500                        |
|                    |                      | 22                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1E220R | 3500                        |
|                    |                      | 33                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1E330R | 3500                        |
|                    | 35                   | 15                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1V150R | 3500                        |
|                    |                      | 22                       | 7.3       | 4.3    | 1.9    | 3.2                         | 40               | EEFCX1V220R | 3500                        |

\*1: Ripple current (100 kHz/ +45°C), \*2: ESR (100 kHz/+20 °C)

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

\*4: Please contact us when 500 pcs packing is necessary.

| Temperature Compensation Multipliers for Ripple Current |                   |                    |
|---|-------------------|--------------------|
| T ≤ 45 °C   | 45 °C < T ≤ 85 °C | 85 °C < T ≤ 105 °C |
| 1.0   | 0.8               | 0.5                |

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