

OS-CON Line-up

Guidelines and precautions for use

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Image of case size
Products list
Packing specifications (SMD type)
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Selection guide

Recommended soldering condition
Fundamental structure
Characteristics
Reliability

Technical data

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SVPD
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Surface mount type

SEPF
SEPC
SEQP
SEP

Radial lead type

Catalog Deletion and EOL series

POSCAP

Line-up

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Marking

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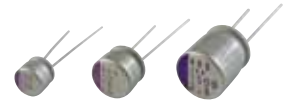
Technical data

TPU
TPH
TPG
TPSF
TPE
TPB/TPC
TPL·TPLF
TPF
TA
TV
TH
TQC

Surface mount type

Catalog Deletion and EOL models

SEP series is a radial lead version of SVP series using conductive polymer.
Lead free-flow is supported.*2

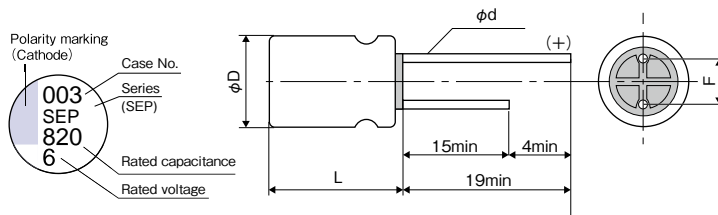


Specifications

| Items | | Condition | | Specifications | | | | | | |
|--|--|--|---------------------|---|-----|-----|----|----|----|----|
| Rated voltage | (V) | - | | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 | 25 |
| Surge voltage | (V) | Room temperature | | 3.3 | 5.2 | 8.2 | 12 | 18 | 23 | 25 |
| Category temperature range | (°C) | - | | -55 to +105 | | | | | | |
| Capacitance tolerance | (%) | 120Hz/20°C | | M : ±20 | | | | | | |
| Dissipation Factor (DF) | | 120Hz/20°C | | Please see the attached characteristics list | | | | | | |
| Leakage current*1 | | Rated voltage applied, after 2 minutes | | Please see the attached characteristics list | | | | | | |
| Equivalent series resistance (ESR) | | 100kHz to 300kHz/20°C | | Please see the attached characteristics list | | | | | | |
| Characteristics of impedance ratio at high temp. and low temp. | Based the value at 100kHz, +20°C | -55°C | Z/Z _{20°C} | 0.75 to 1.25 | | | | | | |
| | | +105°C | Z/Z _{20°C} | 0.75 to 1.25 | | | | | | |
| Endurance | 105°C, 3,000h, Rated voltage applied (2.5V → 2,000h) (25V → 20V applied) | ΔC/C | | Within ±20% of the initial value | | | | | | |
| | | DF | | Within 1.5 times of the initial limit | | | | | | |
| | | ESR | | Within 1.5 times of the initial limit | | | | | | |
| | | LC | | Within the initial limit | | | | | | |
| Damp heat(Steady state) | 60°C, 90 to 95%RH, 1,000h, No-applied voltage | ΔC/C | | Within ±20% of the initial value | | | | | | |
| | | DF | | Within 1.5 times of the initial limit | | | | | | |
| | | ESR | | Within 1.5 times of the initial limit | | | | | | |
| | | LC | | Within the initial limit (after voltage processing) | | | | | | |
| Resistance to soldering heat*2 | Flow method (260±5°C X 10s) | ΔC/C | | Within ±5% of the initial value | | | | | | |
| | | DF | | Within the initial limit | | | | | | |
| | | ESR | | Within the initial limit | | | | | | |
| | | LC | | Within the initial limit (after voltage processing) | | | | | | |

*1 In case of some problems for measured values, measure after applying rated voltage for 2.5 to 20V products or temperature derating voltage for 25V products for 120 minutes at 105°C.
*2 Please refer to page 26 for flow soldering conditions.

Marking and dimensions



(unit : mm)

| Size code | φD ±0.5 | L max | F | φd ±0.05 |
|-----------|---------|-------|----------|----------|
| C6 | 6.3 | 6.0 | 2.5 ±0.5 | 0.45 |
| E7 | 8.0 | 7.0 | 3.5 ±0.5 | 0.45 |
| F8 | 10.0 | 8.0 | 5.0 ±0.5 | 0.50 |
| E12 | 8.0 | 12.0 | 3.5 ±0.5 | 0.60 |
| F13 | 10.0 | 13.0 | 5.0 ±0.5 | 0.60 |

Size list

RV : Rated voltage

| μF | RV | 2.5 | 4.0 | 6.3 | 10 | 16 | 20 | 25 |
|-------|-----|-----|-----|-----|-----|-----|--------|-----|
| 6.8 | | | | | | | | C6 |
| 10 | | | | | | | | E7 |
| 22 | | | | | | | C6 | F8 |
| 33 | | | | | | | E7 | E12 |
| 39 | | | | | | C6 | | |
| 47 | | | | | | | E7 | |
| 56 | | | | | C6 | | F8 | F13 |
| 68 | | | | | | | F8 | |
| 82 | | | | C6 | | E7 | | |
| 100 | | | C6 | | | | F8,E12 | |
| 120 | | | | | E7 | | | |
| 150 | | C6 | E7 | | | F8 | F13 | |
| 180 | | | | | | E12 | | |
| 220 | | E7 | | | | | | |
| 270 | | | | | F8 | | | |
| 330 | | | E7 | F8 | E12 | F13 | | |
| 470 | | | F8 | E12 | | | | |
| 560 | | | E12 | | F13 | | | |
| 680 | E12 | | F8 | | | | | |
| 820 | | | | F13 | | | | |
| 1,200 | | | F13 | | | | | |
| 1,500 | F13 | | | | | | | |

SEP series characteristics list

| Size code | Part number | Rated voltage (V) | Rated capacitance (μF) | ESR(mΩ) (max) 100kHz to 300kHz/20°C | Rated ripple current 100kHz (mA _{rms}) at 105°C | DF (% max) | Leakage current (μA)(max) After 2 minutes |
|------------|-------------|-------------------|------------------------|-------------------------------------|---|------------|---|
| C6 | 25SEP6R8M*1 | 25 | 6.8 | 80 | 1200 | 10 | 170 |
| | 20SEP22M | 20 | 22 | 60 | 1450 | 10 | 220 |
| | 16SEP39M | 16 | 39 | 50 | 1620 | 10 | 312 |
| | 10SEP56M | 10 | 56 | 45 | 1700 | 12 | 280 |
| | 6SEP82M | 6.3 | 82 | 45 | 1700 | 12 | 258 |
| | 4SEP100M | 4.0 | 100 | 40 | 1810 | 12 | 200 |
| | 4SEP150M | 4.0 | 150 | 40 | 1810 | 12 | 300 |
| E7 | 25SEP10M*1 | 25 | 10 | 60 | 1500 | 10 | 250 |
| | 20SEP33M | 20 | 33 | 45 | 1890 | 12 | 330 |
| | 20SEP47M | 20 | 47 | 45 | 1890 | 12 | 470 |
| | 16SEP82M | 16 | 82 | 40 | 2120 | 12 | 656 |
| | 10SEP120M | 10 | 120 | 35 | 2560 | 12 | 600 |
| | 6SEP150M | 6.3 | 150 | 35 | 2560 | 12 | 472 |
| | 4SEP220M | 4.0 | 220 | 35 | 2560 | 12 | 440 |
| | 4SEP330M | 4.0 | 330 | 35 | 2560 | 12 | 660 |
| | F8 | 25SEP22M*1 | 25 | 22 | 50 | 2000 | 10 |
| 20SEP56M | | 20 | 56 | 40 | 2400 | 12 | 224 |
| 20SEP68M | | 20 | 68 | 40 | 2400 | 12 | 272 |
| 20SEP100MX | | 20 | 100 | 35 | 2570 | 12 | 400 |
| 16SEP150M | | 16 | 150 | 30 | 3020 | 12 | 480 |
| 10SEP270M | | 10 | 270 | 25 | 3700 | 12 | 540 |
| 6SEP330M | | 6.3 | 330 | 25 | 3700 | 12 | 416 |
| 4SEP470M | | 4.0 | 470 | 25 | 3700 | 12 | 376 |
| 4SEP680M | | 4.0 | 680 | 25 | 3700 | 12 | 544 |
| E12 | 25SEP33M*1 | 25 | 33 | 30 | 2980 | 12 | 413 |
| | 20SEP100M | 20 | 100 | 24 | 3320 | 15 | 400 |
| | 16SEP180M | 16 | 180 | 20 | 3640 | 15 | 576 |
| | 10SEP330M | 10 | 330 | 17 | 3950 | 15 | 660 |
| | 6SEP470M | 6.3 | 470 | 15 | 4210 | 15 | 592 |
| | 4SEP560M | 4.0 | 560 | 13 | 4520 | 15 | 448 |
| | 2R5SEP680M | 2.5 | 680 | 13 | 4520 | 15 | 340 |
| F13 | 25SEP56M*1 | 25 | 56 | 28 | 3800 | 12 | 700 |
| | 20SEP150M | 20 | 150 | 20 | 4320 | 15 | 600 |
| | 16SEP330M | 16 | 330 | 16 | 4720 | 15 | 792 |
| | 10SEP560M | 10 | 560 | 13 | 5230 | 15 | 840 |
| | 6SEP820M | 6.3 | 820 | 12 | 5440 | 15 | 775 |
| | 4SEP1200M | 4.0 | 1200 | 12 | 5440 | 18 | 960 |
| | 2R5SEP1500M | 2.5 | 1500 | 12 | 5440 | 18 | 750 |

*1 The surge voltage of 25V products is 25V. Please consider SEPF series 25V products (whose surge voltage is 29V) in placing a new order.

Frequency coefficient for ripple current

| Frequency | 120Hz ≤ f < 1kHz | 1kHz ≤ f < 10kHz | 10kHz ≤ f < 100kHz | 100kHz ≤ f ≤ 500kHz |
|-------------|------------------|------------------|--------------------|---------------------|
| Coefficient | 0.05 | 0.3 | 0.7 | 1 |

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