



## SEA Series

## Features

- 85°C, 2,000 hours assured, standard miniature type with 7mm height for compact circuits
- RoHS Compliance

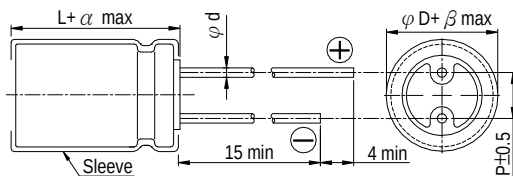


Sleeve &amp; Marking Color: Blue &amp; Black

## Specifications

|                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|--------|------|------|------|----|------------------------------------------|-----------|--------------------|------------------------------|------|-----------------------------------|-----------------|------------------------|------|------------|-----------------|-----------------|--------------|------|------|------|------|------|---|---|-----------------|----|----|---|---|---|---|---|---|
| Items                                      | Performance                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Category Temperature Range                 | -40℃ ~ +85℃                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Capacitance Tolerance                      | ±20% (at 120Hz, 20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Leakage Current (at 20℃)                   | I = 0.01CV or 3 (μA) whichever is greater (after 2 minutes)<br>Where, C = rated capacitance in μF    V = rated DC working voltage in V                                                                                                                                                                                                                                                                                                                                                                  |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Tanδ (at 120Hz, 20℃)                       | <table><tr><td>Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td>Tanδ (max)</td><td>0.35</td><td>0.23</td><td>0.20</td><td>0.16</td><td>0.14</td><td>0.12</td><td>0.10</td><td>0.10</td></tr></table>                                                                                                                                                                                                                              |      |      |      |        |      |      |      |    | Rated Voltage                            | 4         | 6.3                | 10                           | 16   | 25                                | 35              | 50                     | 63   | Tanδ (max) | 0.35            | 0.23            | 0.20         | 0.16 | 0.14 | 0.12 | 0.10 | 0.10 |   |   |                 |    |    |   |   |   |   |   |   |
| Rated Voltage                              | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 6.3  | 10   | 16   | 25     | 35   | 50   | 63   |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Tanδ (max)                                 | 0.35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0.23 | 0.20 | 0.16 | 0.14   | 0.12 | 0.10 | 0.10 |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Low Temperature Characteristics (at 120Hz) | <p>Impedance ratio shall not exceed the values given in the table below.</p> <table><tr><td colspan="2">Rated Voltage</td><td>4</td><td>6.3</td><td>10</td><td>16</td><td>25</td><td>35</td><td>50</td><td>63</td></tr><tr><td rowspan="2">Impedance Ratio</td><td>Z(-25℃)/Z(+20℃)</td><td>7</td><td>4</td><td>3</td><td>3</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Z(-40℃)/Z(+20℃)</td><td>14</td><td>10</td><td>8</td><td>6</td><td>4</td><td>4</td><td>4</td><td>4</td></tr></table> |      |      |      |        |      |      |      |    | Rated Voltage                            |           | 4                  | 6.3                          | 10   | 16                                | 25              | 35                     | 50   | 63         | Impedance Ratio | Z(-25℃)/Z(+20℃) | 7            | 4    | 3    | 3    | 2    | 2    | 2 | 2 | Z(-40℃)/Z(+20℃) | 14 | 10 | 8 | 6 | 4 | 4 | 4 | 4 |
| Rated Voltage                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 4    | 6.3  | 10   | 16     | 25   | 35   | 50   | 63 |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Impedance Ratio                            | Z(-25℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 7    | 4    | 3    | 3      | 2    | 2    | 2    | 2  |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
|                                            | Z(-40℃)/Z(+20℃)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 14   | 10   | 8    | 6      | 4    | 4    | 4    | 4  |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Endurance                                  | <table><tr><td>Test Time</td><td>2,000 Hrs</td></tr><tr><td>Capacitance Change</td><td>Within ±20% of initial value</td></tr><tr><td>Tanδ</td><td>Less than 200% of specified value</td></tr><tr><td>Leakage Current</td><td>Within specified value</td></tr></table> <p>* The above Specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage applied with rated ripple current for 2,000 hours at 85℃.</p>                                                    |      |      |      |        |      |      |      |    | Test Time                                | 2,000 Hrs | Capacitance Change | Within ±20% of initial value | Tanδ | Less than 200% of specified value | Leakage Current | Within specified value |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Test Time                                  | 2,000 Hrs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Capacitance Change                         | Within ±20% of initial value                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Tanδ                                       | Less than 200% of specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Leakage Current                            | Within specified value                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Shelf Life Test                            | Test time: 500 hours; other items are the same as those for the Endurance.                                                                                                                                                                                                                                                                                                                                                                                                                              |      |      |      |        |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Ripple Current & Frequency Multipliers     | <table><tr><td><div>Freq.(Hz)</div><div>Cap.(μF)</div></td><td>60 (50)</td><td>120</td><td>500</td><td>1k</td><td>10k up</td></tr><tr><td>Under 47</td><td>0.70</td><td>1.00</td><td>1.20</td><td>1.30</td><td>1.45</td></tr><tr><td>100 to 1,000</td><td>0.80</td><td>1.00</td><td>1.10</td><td>1.15</td><td>1.20</td></tr></table>                                                                                                                                                                    |      |      |      |        |      |      |      |    | <div>Freq.(Hz)</div> <div>Cap.(μF)</div> | 60 (50)   | 120                | 500                          | 1k   | 10k up                            | Under 47        | 0.70                   | 1.00 | 1.20       | 1.30            | 1.45            | 100 to 1,000 | 0.80 | 1.00 | 1.10 | 1.15 | 1.20 |   |   |                 |    |    |   |   |   |   |   |   |
| <div>Freq.(Hz)</div> <div>Cap.(μF)</div>   | 60 (50)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 120  | 500  | 1k   | 10k up |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| Under 47                                   | 0.70                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.00 | 1.20 | 1.30 | 1.45   |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |
| 100 to 1,000                               | 0.80                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1.00 | 1.10 | 1.15 | 1.20   |      |      |      |    |                                          |           |                    |                              |      |                                   |                 |                        |      |            |                 |                 |              |      |      |      |      |      |   |   |                 |    |    |   |   |   |   |   |   |

## Diagram of Dimensions



## Lead Spacing and Diameter

Unit: mm

| φD | 4    | 5   | 6.3 | 8   | 10  |
|----|------|-----|-----|-----|-----|
| P  | 1.5  | 2.0 | 2.5 | 3.5 | 5.0 |
| φd | 0.45 | 0.5 | 0.6 |     |     |
| α  |      | 1.0 | 1.5 |     |     |
| β  |      | 0.5 |     |     |     |

## Dimension &amp; Permissible Ripple Current

Dimension: φD × L(mm)

Ripple Current: mA/rms at 120 Hz, 85°C

| V. DC<br>μF Contents |     | 4V (0G) |     | 6.3V (0J) |     | 10V (1A) |     | 16V (1C) |     | 25V (1E) |     | 35V (1V) |     | 50V (1H) |     | 63V (1J) |     |
|----------------------|-----|---------|-----|-----------|-----|----------|-----|----------|-----|----------|-----|----------|-----|----------|-----|----------|-----|
|                      |     | φ D×L   | mA  | φ D×L     | mA  | φ D×L    | mA  | φ D×L    | mA  | φ D×L    | mA  | φ D×L    | mA  | φ D×L    | mA  | φ D×L    | mA  |
| 1                    | 010 |         |     |           |     |          |     |          |     |          |     |          |     | 4×7      | 10  | 4×7      | 11  |
| 2.2                  | 2R2 |         |     |           |     |          |     |          |     |          |     |          |     | 4×7      | 15  | 4×7      | 17  |
| 3.3                  | 3R3 |         |     |           |     |          |     |          |     |          |     |          |     | 4×7      | 18  | 4×7      | 21  |
| 4.7                  | 4R7 |         |     |           |     |          |     |          |     |          |     | 4×7      | 22  | 5×7*     | 23  | 5×7*     | 26  |
| 10                   | 100 |         |     |           |     |          |     | 4×7      | 25  | 4×7      | 26  | 5×7*     | 30  | 6.3×7*   | 34  | 6.3×7*   | 40  |
| 22                   | 220 |         |     | 4×7       | 31  | 4×7      | 32  | 5×7*     | 39  | 5×7*     | 41  | 6.3×7*   | 47  | 6.3×7    | 53  | 8×7*     | 70  |
| 33                   | 330 | 4×7     | 32  | 4×7       | 32  | 4×7      | 35  | 5×7      | 43  | 6.3×7    | 53  | 8×7*     | 71  | 8×7*     | 76  | 8×7      | 80  |
| 47                   | 470 | 4×7     | 38  | 4×7       | 38  | 5×7*     | 47  | 6.3×7*   | 59  | 6.3×7    | 65  | 8×7*     | 83  | 8×7      | 85  | 8×7      | 95  |
| 100                  | 101 | 5×7     | 61  | 6.3×7*    | 75  | 6.3×7    | 80  | 6.3×7    | 90  | 8×7      | 125 | 8×7      | 115 | 8×9      | 130 | 10×9     | 170 |
| 220                  | 221 | 6.3×7   | 90  | 6.3×7     | 99  | 8×7      | 140 | 8×7      | 146 | 8×9      | 190 | 10×9     | 215 |          |     |          |     |
| 330                  | 331 | 8×7     | 129 | 8×7       | 156 | 8×7      | 165 | 8×9      | 185 | 10×9     | 265 |          |     |          |     |          |     |
| 470                  | 471 | 8×7     | 154 | 8×7       | 175 | 8×9      | 215 | 10×9     | 255 |          |     |          |     |          |     |          |     |
| 1.000                | 102 | 8×9     | 200 | 10×9      | 205 |          |     |          |     |          |     |          |     |          |     |          |     |

Note: Case size in mark of "\*" is available to product down size.

## Part Numbering System

|            |             |                       |               |                              |             |             |                              |
|------------|-------------|-----------------------|---------------|------------------------------|-------------|-------------|------------------------------|
| SEA series | 470μF       | ±20%                  | 6.3V          | Bulk Package                 | Gas Type    | 8 φ × 7L    | Pb-free and PET coating case |
| <b>SEA</b> | <b>471</b>  | <b>M</b>              | <b>0J</b>     | <b>BK</b>                    | <b>-</b>    | <b>0807</b> |                              |
| Series     | Capacitance | Capacitance Tolerance | Rated Voltage | Lead Configuration & Package | Rubber Type | Case Size   | Lead Wire and Coating Type   |

Note: For more details, please refer to "Part Numbering System (Radial Type)" on page 10.



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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