

**Long-life grade capacitors  
for professional applications**

**Applications**

- For use in output circuits of switch-mode power supplies of compact design
- For professional industrial electronics, telecommunications and data processing equipment

**Features**

- Very low impedance at high frequency
- Very low equivalent series resistance *ESR*
- High ripple current capability
- Wide temperature range

**Construction**

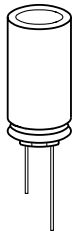
- Radial leads
- Charge-discharge proof, polar
- Aluminum case with insulating sleeve
- Minus pole marking on the insulating sleeve
- Case with safety vent
- Stand off rubber seal

**Delivery mode**

Special terminal configurations and packing:

- Bulk
- Taped, Ammo pack
- Cut
- Kinked
- PAPR (protection against polarity reversal)

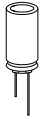
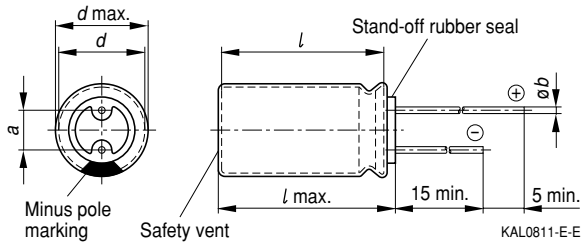
Refer to page 503 for further details and ordering example.



KAL0707-F


**B41859**
**Very Low Impedance – 105 °C**
**Specifications and characteristics in brief**

|   |  |   |
|---|--|---|
| Rated voltage $U_R$                     | 6,3 ... 50 VDC   |   |
| Surge voltage $U_S$                     | $1,15 \cdot U_R$   |   |
| Rated capacitance $C_R$                 | 100 ... 4 700 $\mu\text{F}$  |   |
| Capacitance tolerance                   | $\pm 20 \% \triangleq M$   |   |
| Useful life<br>105 °C; $U_R$ ; $I_{-R}$ | > 4 000 h  | Requirements:<br>$\Delta C/C \leq \pm 40 \%$ of initial value<br>$\tan \delta \leq 3$ times initial specified limit<br>$I_L \leq$ initial specified limit<br>Failure percentage: $\leq 1 \%$<br>Failure rate: $\leq 100$ fit ( $\leq 100 \cdot 10^{-9}/\text{h}$ )<br>(for definition "fit", refer to chapter "Quality", page 62) |
| Voltage endurance test<br>105 °C; $U_R$ | 2 000 h  | Post test requirements:<br>$\Delta C/C \leq \pm 30 \%$ of initial value<br>$\tan \delta \leq 2$ times initial specified limit<br>$I_L \leq$ initial specified limit   |
| Vibration resistance                    | To IEC 68068-2-6, test Fc:<br>displacement amplitude 0,75 mm, frequency range 10 ... 2 000 Hz,<br>acceleration max.10 g, duration $3 \times 2$ h |   |
| IEC climatic category                   | To IEC 60068-1:<br>55/105/56 (– 55 °C/+ 105 °C/56 days damp heat test)   |   |
| Sectional specification                 | IEC 60384-4  |   |


**Dimensional drawing**

**Dimensions and weights**

| Dimensions (mm) |                            |             |             | Approx. weight<br>g |
|-----------------|----------------------------|-------------|-------------|---------------------|
| $d \times l$    | $d_{\max} \times l_{\max}$ | $a \pm 0,5$ | $b$         |                     |
| 8 × 11          | 8,5 × 12                   | 3,5         | 0,60 ± 0,05 | 1,0                 |
| 10 × 16         | 10,5 × 17                  | 5,0         | 0,60 ± 0,05 | 1,9                 |
| 10 × 20         | 10,5 × 22                  | 5,0         | 0,60 ± 0,05 | 2,6                 |
| 12,5 × 25       | 13 × 27                    | 5,0         | 0,60 ± 0,05 | 4,5                 |
| 16 × 20         | 16,5 × 22                  | 7,5         | 0,80 ± 0,05 | 5,5                 |
| 16 × 31,5       | 16,5 × 33,5                | 7,5         | 0,80 ± 0,05 | 7,8                 |
| 18 × 31,5       | 18,5 × 32,5                | 7,5         | 0,80 ± 0,1  | 11                  |
| 18 × 35         | 18,5 × 36                  | 7,5         | 0,80 ± 0,1  | 13                  |
| 18 × 40         | 18,5 × 41                  | 7,5         | 0,80 ± 0,1  | 16                  |


**B41859**
**Very Low Impedance – 105 °C**
**Overview of available types**

| $U_R$ (VDC)      | 6,3                               | 10        | 16        | 25        | 35        | 50        |
|------------------|-----------------------------------|-----------|-----------|-----------|-----------|-----------|
| $C_R$ ( $\mu$ F) | Case dimensions $d \times l$ (mm) |           |           |           |           |           |
| 100              |                                   |           |           | 8 × 11    | 8 × 11    | 10 × 16   |
| 220              |                                   |           | 8 × 11    | 10 × 16   | 10 × 16   | 10 × 20   |
| 330              |                                   | 8 × 11    | 10 × 16   | 10 × 16   | 10 × 20   | 12,5 × 25 |
| 470              | 8 × 11                            | 10 × 16   | 10 × 16   | 10 × 20   | 10 × 20   | 16 × 20   |
| 680              | 8 × 11                            |           |           |           |           |           |
| 1 000            | 10 × 16                           | 10 × 20   | 10 × 20   | 12,5 × 25 | 12,5 × 25 | 18 × 31,5 |
| 1 500            | 10 × 20                           |           |           |           |           |           |
| 2 200            | 12,5 × 25                         | 12,5 × 25 | 16 × 20   | 16 × 31,5 | 18 × 35   |           |
| 3 300            |                                   | 16 × 20   | 16 × 31,5 | 18 × 35   | 18 × 40   |           |
| 4 700            |                                   | 16 × 31,5 | 18 × 35   | 18 × 40   |           |           |

Other capacitance and voltage ratings are available upon request.

**Technical data and ordering codes**

| $U_R$      | $C_R$<br>120 Hz<br>20 °C<br>$\mu$ F | Case<br>dimensions<br>$d \times l$<br>mm | $I_{L, \max}$<br>5 min<br>20 °C<br>$\mu$ A | $\tan \delta_{\max}$<br>120 Hz<br>20 °C | $ESR_{\max}$<br>120 Hz<br>20 °C<br>$\Omega$ | $Z_{\max}$<br>100 kHz<br>20 °C<br>$\Omega$ | $I_{-R}$<br>100 kHz<br>105 °C<br>mA | Ordering code <sup>1)</sup> |
|------------|-------------------------------------|--|--|---|---|--|-------------------------------------|-----------------------------|
| VDC<br>6,3 | 470                                 | 8 × 11                                   | 30   | 0,22                                    | 0,78  | 0,190                                      | 4 454                               | B41859A2477M00*             |
|            | 680                                 | 8 × 11                                   | 43   | 0,22                                    | 0,54  | 0,150                                      | 555                                 | B41859A2867M00*             |
|            | 1 000                               | 10 × 16                                  | 63   | 0,22                                    | 0,36  | 0,068                                      | 780                                 | B41859A2108M00*             |
|            | 1 500                               | 10 × 20                                  | 95   | 0,22                                    | 0,24  | 0,034                                      | 1 200                               | B41859A2158M00*             |
|            | 2 200                               | 12,5 × 25                                | 139  | 0,24                                    | 0,18  | 0,030                                      | 1 400                               | B41859A2228M00*             |
| 10         | 330                                 | 8 × 11                                   | 33   | 0,19                                    | 0,95  | 0,170                                      | 440                                 | B41859A3337M00*             |
|            | 470                                 | 10 × 16                                  | 47   | 0,19                                    | 0,67  | 0,120                                      | 640                                 | B41859A3477M00*             |
|            | 1 000                               | 10 × 20                                  | 100  | 0,19                                    | 0,31  | 0,062                                      | 1 120                               | B41859A3108M00*             |
|            | 2 200                               | 12,5 × 25                                | 220  | 0,21                                    | 0,16  | 0,034                                      | 1 620                               | B41859A3228M00*             |
|            | 3 300                               | 16 × 20                                  | 330  | 0,23                                    | 0,12  | 0,030                                      | 1 700                               | B41859A3338M00*             |
|            | 4 700                               | 16 × 31,5                                | 470  | 0,25                                    | 0,09  | 0,024                                      | 2 210                               | B41859A3478M00*             |

1) \* = "0" for bulk version.

For taping versions, other lead configurations and packing information see page 503.

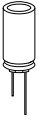

**Technical data and ordering codes**

| $U_R$ | $C_R$<br>120 Hz<br>20 °C<br>$\mu\text{F}$ | Case<br>dimensions<br>$d \times l$<br>mm | $I_{L, \max}$<br>5 min<br>20 °C<br>$\mu\text{A}$ | $\tan \delta_{\max}$<br>120 Hz<br>20 °C | $ESR_{\max}$<br>120 Hz<br>20 °C<br>$\Omega$ | $Z_{\max}$<br>100 kHz<br>20 °C<br>$\Omega$ | $I_{\sim R}$<br>100 kHz<br>105 °C<br>mA | Ordering code <sup>1)</sup> |
|-------|---|--|--|---|---|--|---|-----------------------------|
| 16    | 220                                       | 8 × 11                                   | 35   | 0,16                                    | 1,21  | 0,120                                      | 530                                     | B41859A4227M00*             |
|       | 330                                       | 10 × 16                                  | 53   | 0,16                                    | 0,80  | 0,100                                      | 640                                     | B41859A4337M00*             |
|       | 470                                       | 10 × 16                                  | 75   | 0,16                                    | 0,56  | 0,084                                      | 840                                     | B41859A4477M00*             |
|       | 1 000                                     | 10 × 20                                  | 160  | 0,16                                    | 0,27  | 0,050                                      | 1 340                                   | B41859A4108M00*             |
|       | 2 200                                     | 16 × 20                                  | 352  | 0,18                                    | 0,14  | 0,030                                      | 1 800                                   | B41859A4228M00*             |
|       | 3 300                                     | 16 × 31,5                                | 528  | 0,20                                    | 0,10  | 0,024                                      | 2 310                                   | B41859A4338M00*             |
|       | 4 700                                     | 16 × 35                                  | 752  | 0,22                                    | 0,08  | 0,018                                      | 2 790                                   | B41859A4478M00*             |
| 25    | 100                                       | 8 × 11                                   | 25   | 0,14                                    | 2,32  | 0,180                                      | 340                                     | B41859A5107M00*             |
|       | 220                                       | 10 × 16                                  | 55   | 0,14                                    | 1,06  | 0,120                                      | 620                                     | B41859A5227M00*             |
|       | 330                                       | 10 × 16                                  | 83   | 0,14                                    | 0,70  | 0,084                                      | 830                                     | B41859A5337M00*             |
|       | 470                                       | 10 × 20                                  | 118  | 0,14                                    | 0,49  | 0,062                                      | 1 080                                   | B41859A5477M00*             |
|       | 1 000                                     | 12,5 × 25                                | 250  | 0,14                                    | 0,23  | 0,034                                      | 1 690                                   | B41859A5108M00*             |
|       | 2 200                                     | 16 × 31,5                                | 550  | 0,16                                    | 0,12  | 0,024                                      | 2 310                                   | B41859A5228M00*             |
|       | 3 300                                     | 18 × 35                                  | 825  | 0,18                                    | 0,09  | 0,018                                      | 2 790                                   | B41859A5338M00*             |
|       | 4 700                                     | 18 × 40                                  | 1 175  | 0,20                                    | 0,07  | 0,015                                      | 3 090                                   | B41859A5478M00*             |
| 35    | 100                                       | 8 × 11                                   | 35   | 0,12                                    | 1,99  | 0,120                                      | 500                                     | B41859A7107M00*             |
|       | 220                                       | 10 × 16                                  | 77   | 0,12                                    | 0,90  | 0,084                                      | 820                                     | B41859A7227M00*             |
|       | 330                                       | 10 × 20                                  | 116  | 0,12                                    | 0,60  | 0,062                                      | 1 090                                   | B41859A7337M00*             |
|       | 470                                       | 10 × 20                                  | 165  | 0,12                                    | 0,42  | 0,052                                      | 1 200                                   | B41859A7477M00*             |
|       | 1 000                                     | 12,5 × 25                                | 350  | 0,12                                    | 0,20  | 0,034                                      | 1 940                                   | B41859F7108M00*             |
|       | 2 200                                     | 18 × 35                                  | 770  | 0,14                                    | 0,11  | 0,018                                      | 2 850                                   | B41859A7228M00*             |
|       | 3 300                                     | 18 × 40                                  | 1 155  | 0,16                                    | 0,08  | 0,015                                      | 3 150                                   | B41859A7338M00*             |
| 50    | 100                                       | 10 × 16                                  | 50   | 0,10                                    | 1,66  | 0,130                                      | 640                                     | B41859A6107M00*             |
|       | 220                                       | 10 × 20                                  | 110  | 0,10                                    | 0,75  | 0,080                                      | 1 050                                   | B41859A6227M00*             |
|       | 330                                       | 12,5 × 25                                | 165  | 0,10                                    | 0,50  | 0,062                                      | 1 400                                   | B41859A6337M00*             |
|       | 470                                       | 16 × 20                                  | 235  | 0,10                                    | 0,35  | 0,048                                      | 1 240                                   | B41859A6477M00*             |
|       | 1 000                                     | 18 × 31,5                                | 500  | 0,10                                    | 0,17  | 0,030                                      | 2 310                                   | B41859A6108M00*             |

Preferred types

1) \* = "0" for bulk version.

For taping versions, other lead configurations and packing information see page 503.



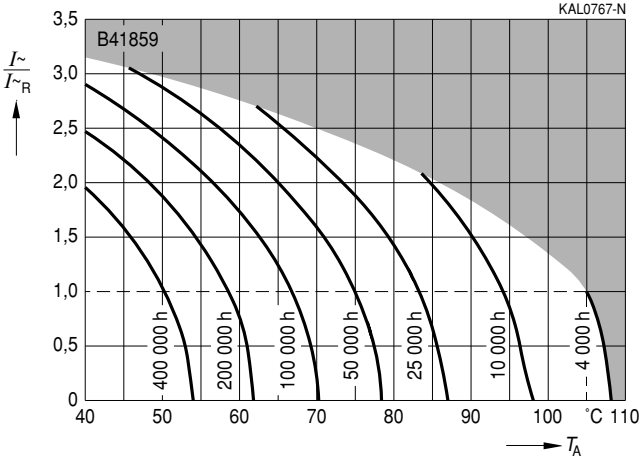
**B41859**

**Very Low Impedance – 105 °C**

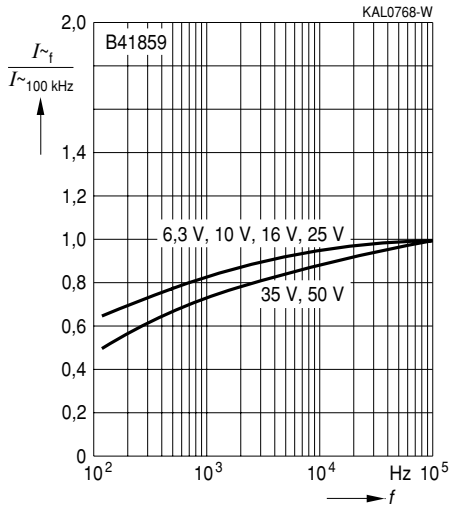
**Useful life**

depending on ambient temperature  $T_A$  under ripple current operating conditions<sup>1)</sup>

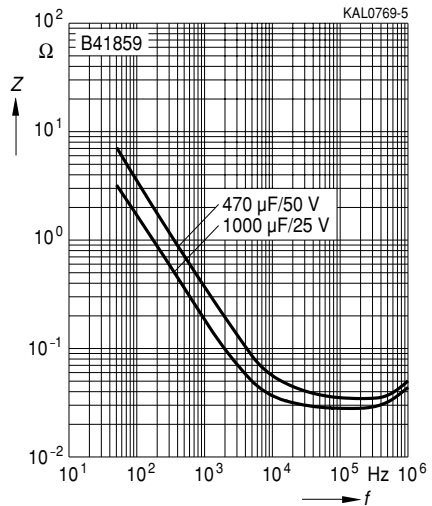
$U_R = 6,3 \dots 50 \text{ VDC}$



**Frequency factor of permissible ripple current  $I_{\sim}$  versus frequency  $f$**



**Impedance Z versus frequency  $f$**   
Typical behavior at 20 °C



1) Refer to page 40 for an explanation on how to interpret the useful life graphs.

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