

**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**

- Low equivalent series resistance *ESR*
- Low impedance
- High ripple current capability

**Construction**

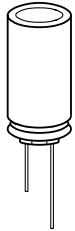
- Radial leads
- Charge-discharge proof, polar
- Aluminum case with insulating sleeve
- Minus pole marking on insulating sleeve
- Case with safety vent
- Stand off rubber seal

**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

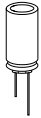
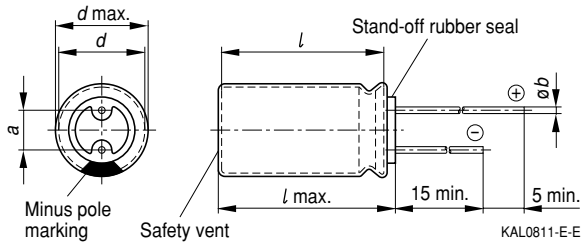


**B41856**

**Low Impedance – 105 °C**

**Specifications and characteristics in brief**

|   |   |   |
|---|---|---|
| Rated voltage $U_R$                     | 6,3 ... 100 VDC   |   |
| Surge voltage $U_S$                     | $1,15 \cdot U_R$  |   |
| Rated capacitance $C_R$                 | 22 ... 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>$\Delta C/C \leq \pm 20 \%$ of initial value<br>$\tan \delta \leq 2$ times initial specified limit<br>$I_L \leq$ initial specified limit   |
| Vibration resistance                    | To IEC 60068-2-6, 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>40/105/56 (– 40 °C/+ 105 °C/56 days damp heat test)  |   |
| Sectional specification                 | IEC 60384-4   |   |


**Dimensional drawings**

**Dimensions and weights**

| Dimensions (mm) |                            |             |             | Approx. weight |
|-----------------|----------------------------|-------------|-------------|----------------|
| $d \times l$    | $d_{\max} \times l_{\max}$ | $a \pm 0,5$ | $b$         | g              |
| 8 × 11          | 8,5 × 12                   | 3,5         | 0,60 ± 0,05 | 1,0            |
| 10 × 12,5       | 10,5 × 13,5                | 5,0         | 0,60 ± 0,05 | 1,6            |
| 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 × 25         | 16,5 × 27                  | 7,5         | 0,80 ± 0,05 | 7,5            |
| 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             |


**B41856**
**Low Impedance – 105 °C**
**Overview of available types**

| $U_R$ (VDC)      | 6,3                               | 10       | 16      | 25       | 35      | 50       | 63       | 100      |
|------------------|-----------------------------------|----------|---------|----------|---------|----------|----------|----------|
| $C_R$ ( $\mu$ F) | Case dimensions $d \times l$ (mm) |          |         |          |         |          |          |          |
| 22               |                                   |          |         |          |         |          |          | 10 ×12,5 |
| 33               |                                   |          |         |          |         |          |          | 10 ×16   |
| 47               |                                   |          |         |          |         |          | 10 ×12,5 | 10 ×20   |
| 100              |                                   |          |         |          | 8×11    | 10 ×12,5 | 10 ×20   | 12,5×25  |
| 220              |                                   |          | 8×11    | 10 ×12,5 | 10×12,5 | 10 ×16   | 12,5×25  | 16 ×31,5 |
| 330              |                                   | 8 ×11    |         | 10 ×12,5 | 10×16   | 10 ×20   | 12,5×25  | 18 ×31,5 |
| 470              |                                   | 10 ×12,5 | 10×16   |          | 10×20   | 12,5×25  | 16 ×25   | 18 ×35   |
| 1 000            |                                   | 10 ×16   | 10×20   | 12,5×25  | 16×20   | 16 ×25   | 18 ×35   |          |
| 1 500            | 10×20                             |          |         |          |         |          |          |          |
| 2 200            |                                   | 12,5×25  | 16×20   | 16 ×25   | 16×31,5 | 18 ×40   |          |          |
| 3 300            |                                   | 16 ×20   | 16×25   | 16 ×31,5 | 18×35   |          |          |          |
| 4 700            |                                   | 16 ×25   | 16×31,5 | 18 ×35   |         |          |          |          |

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>μF | Case<br>dimensions<br>$d \times l$<br>mm | $I_{L, \max}$<br>5 min<br>20 °C<br>μA | $\tan \delta_{\max}$<br>120 Hz<br>20 °C | $ESR_{\max}$<br>120 Hz<br>20 °C<br>Ω | $Z_{\max}$<br>100 kHz<br>20 °C<br>Ω | $I_{\sim R}$<br>100 kHz<br>105 °C<br>mA | Ordering code <sup>1)</sup> |
|-------|--------------------------------|--|---------------------------------------|---|--------------------------------------|-------------------------------------|---|-----------------------------|
| 6,3   | 1 500                          | 10 × 20                                  | 95                                    | 0,22                                    | 0,24                                 | 0,044                               | 1 200                                   | B41856A2158M00*             |
| 10    | 330                            | 8 × 11                                   | 99                                    | 0,20                                    | 1,01                                 | 0,340                               | 310                                     | B41856A3337M00*             |
|       | 470                            | 10 × 12,5                                | 141                                   | 0,20                                    | 0,71                                 | 0,340                               | 370                                     | B41856A3477M00*             |
|       | 1 000                          | 10 × 16                                  | 300                                   | 0,20                                    | 0,33                                 | 0,170                               | 640                                     | B41856A3108M00*             |
|       | 2 200                          | 12,5 × 25                                | 660                                   | 0,22                                    | 0,17                                 | 0,090                               | 1 000                                   | B41856A3228M00*             |
|       | 3 300                          | 16 × 20                                  | 990                                   | 0,24                                    | 0,12                                 | 0,069                               | 1 250                                   | B41856A3338M00*             |
|       | 4 700                          | 16 × 25                                  | 1 410                                 | 0,26                                    | 0,09                                 | 0,046                               | 1 400                                   | B41856A3478M00*             |
| 16    | 220                            | 8 × 11                                   | 106                                   | 0,16                                    | 1,21                                 | 0,340                               | 328                                     | B41856A4227M00*             |
|       | 470                            | 10 × 16                                  | 226                                   | 0,16                                    | 0,56                                 | 0,230                               | 480                                     | B41856A4477M00*             |
|       | 1 000                          | 10 × 20                                  | 480                                   | 0,16                                    | 0,27                                 | 0,140                               | 800                                     | B41856A4108M00*             |
|       | 2 200                          | 16 × 20                                  | 1 056                                 | 0,18                                    | 0,14                                 | 0,069                               | 1 150                                   | B41856A4228M00*             |
|       | 3 300                          | 16 × 25                                  | 1 584                                 | 0,20                                    | 0,10                                 | 0,046                               | 1 400                                   | B41856A4338M00*             |
|       | 4 700                          | 16 × 31,5                                | 2 256                                 | 0,22                                    | 0,08                                 | 0,040                               | 1 750                                   | B41856A4478M00*             |
| 25    | 220                            | 10 × 12,5                                | 165                                   | 0,14                                    | 1,06                                 | 0,340                               | 328                                     | B41856A5227M00*             |
|       | 330                            | 10 × 12,5                                | 248                                   | 0,14                                    | 0,70                                 | 0,230                               | 480                                     | B41856A5337M00*             |
|       | 1 000                          | 12,5 × 25                                | 750                                   | 0,14                                    | 0,23                                 | 0,090                               | 1 000                                   | B41856A5108M00*             |
|       | 2 200                          | 16 × 25                                  | 1 650                                 | 0,16                                    | 0,12                                 | 0,046                               | 1 400                                   | B41856A5228M00*             |
|       | 3 300                          | 16 × 31,5                                | 2 475                                 | 0,18                                    | 0,09                                 | 0,040                               | 1 750                                   | B41856A5338M00*             |
|       | 4 700                          | 18 × 35                                  | 3 555                                 | 0,20                                    | 0,07                                 | 0,036                               | 2 000                                   | B41856A5478M00*             |
| 35    | 100                            | 8 × 11                                   | 105                                   | 0,12                                    | 1,99                                 | 0,340                               | 328                                     | B41856A7107M00*             |
|       | 220                            | 10 × 12,5                                | 231                                   | 0,12                                    | 0,90                                 | 0,230                               | 480                                     | B41856A7227M00*             |
|       | 330                            | 10 × 16                                  | 347                                   | 0,12                                    | 0,60                                 | 0,170                               | 640                                     | B41856A7337M00*             |
|       | 470                            | 10 × 20                                  | 494                                   | 0,12                                    | 0,42                                 | 0,140                               | 800                                     | B41856A7477M00*             |
|       | 1 000                          | 16 × 20                                  | 1 050                                 | 0,12                                    | 0,20                                 | 0,069                               | 1 150                                   | B41856A7108M00*             |
|       | 2 200                          | 16 × 31,5                                | 2 310                                 | 0,14                                    | 0,11                                 | 0,040                               | 1 750                                   | B41856A7228M00*             |
|       | 3 300                          | 18 × 35                                  | 3 465                                 | 0,16                                    | 0,08                                 | 0,036                               | 2 000                                   | B41856A7338M00*             |

Preferred types

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

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


**B41856**
**Low Impedance – 105 °C**
**Technical data and ordering codes**

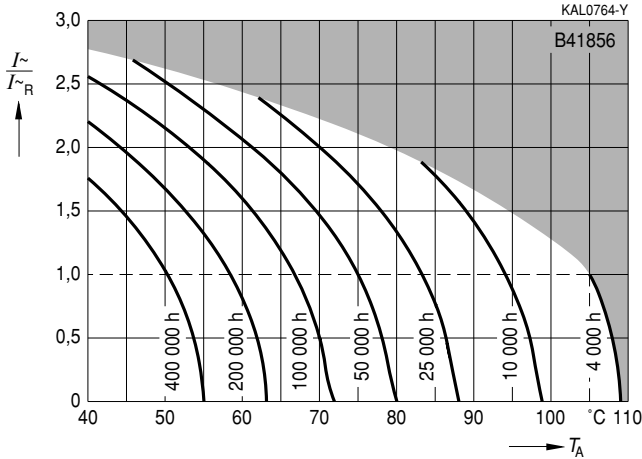
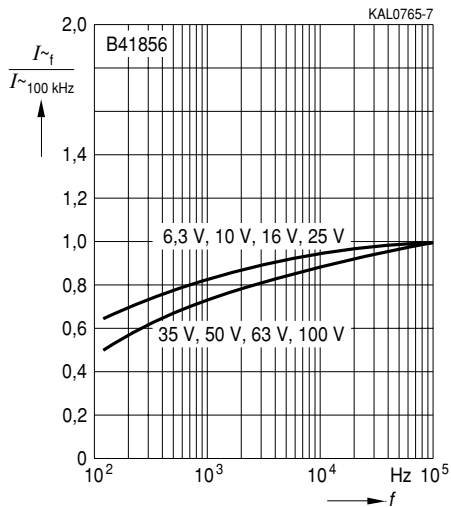
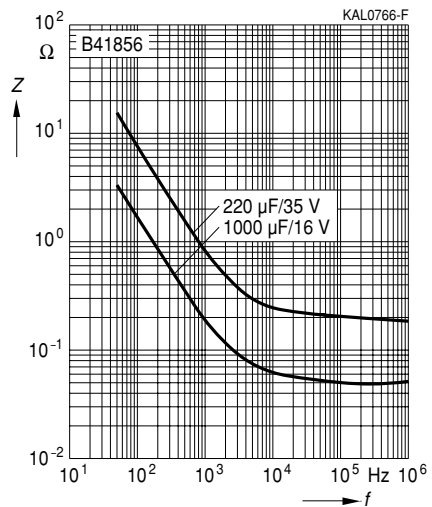
| $U_R$ | $C_R$           | Case dimensions    | $I_{L, \max}$  | $\tan \delta_{\max}$ | $ESR_{\max}$    | $Z_{\max}$       | $I_{\sim R}$      | Ordering code <sup>1)</sup> |
|-------|-----------------|--------------------|----------------|----------------------|-----------------|------------------|-------------------|-----------------------------|
|       | 120 Hz<br>20 °C | $d \times l$<br>mm | 5 min<br>20 °C | 120 Hz<br>20 °C      | 120 Hz<br>20 °C | 100 kHz<br>20 °C | 100 kHz<br>105 °C |                             |
| VDC   | $\mu F$         |                    | $\mu A$        |                      | $\Omega$        | $\Omega$         | mA                |                             |
| 50    | 100             | 10 × 12,5          | 150            | 0,10                 | 1,66            | 0,400            | 270               | B41856A6107M00*             |
|       | 220             | 10 × 16            | 330            | 0,10                 | 0,75            | 0,220            | 500               | B41856A6227M00*             |
|       | 330             | 10 × 20            | 495            | 0,10                 | 0,50            | 0,180            | 640               | B41856A6337M00*             |
|       | 470             | 12,5 × 25          | 705            | 0,10                 | 0,35            | 0,160            | 800               | B41856A6477M00*             |
|       | 1 000           | 16 × 25            | 1 500          | 0,10                 | 0,17            | 0,060            | 1 200             | B41856A6108M00*             |
|       | 2 200           | 18 × 35            | 3 300          | 0,12                 | 0,09            | 0,042            | 1 700             | B41856A6228M00*             |
| 63    | 47              | 10 × 12,5          | 89             | 0,08                 | 2,82            | 0,70             | 280               | B41856A8476M00*             |
|       | 100             | 10 × 20            | 189            | 0,08                 | 1,33            | 0,40             | 500               | B41856A8107M00*             |
|       | 220             | 12,5 × 25          | 416            | 0,08                 | 0,60            | 0,23             | 850               | B41856A8227M00*             |
|       | 330             | 12,5 × 25          | 624            | 0,08                 | 0,40            | 0,20             | 890               | B41856A8337M00*             |
|       | 470             | 16 × 25            | 888            | 0,08                 | 0,28            | 0,10             | 1 400             | B41856A8477M00*             |
|       | 1 000           | 18 × 35            | 1 890          | 0,08                 | 0,13            | 0,070            | 1 900             | B41856A8108M00*             |
| 100   | 22              | 10 × 12,5          | 66             | 0,07                 | 5,28            | 0,70             | 280               | B41856A9226M00*             |
|       | 33              | 10 × 16            | 99             | 0,07                 | 3,52            | 0,42             | 480               | B41856A9336M00*             |
|       | 47              | 10 × 20            | 141            | 0,07                 | 2,47            | 0,35             | 550               | B41856A9476M00*             |
|       | 100             | 12,5 × 25          | 300            | 0,07                 | 1,16            | 0,18             | 850               | B41856A9107M00*             |
|       | 220             | 16 × 31,5          | 660            | 0,07                 | 0,53            | 0,13             | 1 400             | B41856A9227M00*             |
|       | 330             | 18 × 31,5          | 990            | 0,07                 | 0,35            | 0,085            | 1 700             | B41856A9337M00*             |
|       | 470             | 18 × 35            | 1 410          | 0,07                 | 0,25            | 0,062            | 2 000             | B41856A9477M00*             |

Preferred types

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

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


**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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