



# **Aluminum electrolytic capacitors**

## Alu-X product lines

4-pin snap-in capacitors

**Series/Type:** B41201, B43201  
**Date:** April 2008

## General-purpose grade capacitors

### Applications

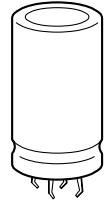
- Professional switch-mode power supplies

### Features

- High ripple current capability
- RoHS-compatible
- Load life of 2000 h at 85 °C

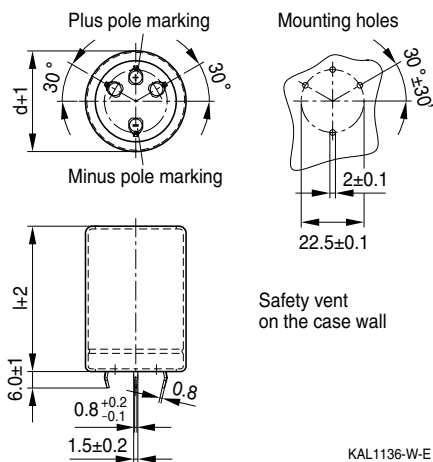
### Construction

- Aluminum case, fully insulated
- Charge/discharge-proof
- Minus pole marking on the insulating sleeve
- Case with safety vent



**Specifications and characteristics in brief**

Rated voltage $V_R$	10 ... 500 V DC											
Operating temperature range	$V_R \leq 250$ V DC: $-40$ °C ... $+85$ °C $V_R \geq 315$ V DC: $-25$ °C ... $+85$ °C											
Rated capacitance $C_R$ (20 °C, 120 Hz)	100 ... 68000 $\mu$ F											
Capacitance tolerance	$\pm 20\% \triangleq M$											
Load life (85 °C, $V_R$ , $I_{AC,R}$ )	2000 h	Requirements: $\Delta C/C \leq \pm 20\%$ of initial value $\tan \delta \leq 2$ times initial specified limit $I_{leak} \leq$ initial specified limit										
Leakage current $I_{leak}$ (20 °C, after 5 minutes)	$I_{leak} \leq 0.02 \mu A \cdot \left( \frac{C_R}{\mu F} \cdot \frac{V_R}{V} \right)$											
Dissipation factor (max.) (20 °C, 120 Hz)	$V_R$ (V DC)	10	16	25	35	50	63	80	100	160 ... 200	250 ... 400	450 ... 500
	$\tan \delta$	0.50	0.50	0.40	0.40	0.30	0.25	0.20	0.15	0.12	0.15	0.20
Low temperature stability (impedance ratio) (120 Hz)	$V_R$ (V DC)	10		16 ... 160		200 ... 250		315 ... 400		450 ... 500		
	$\frac{Z(-25 \text{ °C})}{Z(+20 \text{ °C})}$	5		4		7		8		8		
	$\frac{Z(-40 \text{ °C})}{Z(+20 \text{ °C})}$	18		15		12		–		–		
Shelf life	After storage for 1000 h at 85 °C, the capacitors shall meet the requirement of load life test after reforming process. After test: $V_R$ to be applied for 30 minutes, 24 to 48 hours before measurement.											
Frequency multiplier for rated ripple current		50 Hz	120 Hz	1 kHz	10 kHz	20 kHz						
	$\leq 50$ V	0.95	1.00	1.10	1.15	1.15						
	63 ... 100 V	0.95	1.00	1.16	1.30	1.33						
	$\geq 160$ V	0.90	1.00	1.20	1.50	1.55						
Temperature multiplier for rated ripple current		+40 °C	+55 °C	+70 °C	+85 °C							
	$< 160$ V	2.1	2.1	1.5	1.0							
	$\geq 160$ V	1.7	1.5	1.3	1.0							

**Dimensional drawing**

**Overview of available types B41201**

$V_R$ (V DC)	10	16	25	35
	Case dimensions $d \times l$ (mm)			
$C_R$ (µF)				
12000				35 × 30
15000				35 × 35
18000				35 × 40
22000			35 × 30	35 × 45
27000		35 × 25	35 × 35	
33000	35 × 25	35 × 30	35 × 40	
39000	35 × 30	35 × 35	35 × 45	
47000	35 × 30	35 × 40		
56000	35 × 35	35 × 45		
68000	35 × 40	35 × 50		

**Overview of available types B41201**

$V_R$ (V DC)	50	63	80	100
	Case dimensions $d \times l$ (mm)			
$C_R$ ( $\mu$ F)				
2700				35 × 30
3300				35 × 35
3900				35 × 35
4700	35 × 25	35 × 30	35 × 30	35 × 40
5600	35 × 25	35 × 30	35 × 35	35 × 45
6800	35 × 30	35 × 30	35 × 40	
8200	35 × 30	35 × 35	35 × 45	
10000	35 × 35	35 × 40		
12000	35 × 40	35 × 45		
15000	35 × 45			
18000	35 × 50			

**Overview of available types B43201**

$V_R$ (V DC)	160	200	250	315
	Case dimensions $d \times l$ (mm)			
$C_R$ ( $\mu$ F)				
180				35 × 20
220				35 × 20
270				35 × 25
330			35 × 20	35 × 30
390		35 × 20	35 × 20	35 × 30
470		35 × 20	35 × 25	35 × 35
560	35 × 20	35 × 20	35 × 25	35 × 40
680	35 × 20	35 × 25	35 × 30	35 × 45
820	35 × 25	35 × 30	35 × 35	35 × 50
1000	35 × 25	35 × 30	35 × 40	
1200	35 × 30	35 × 35	35 × 45	
1500	35 × 35	35 × 40	35 × 50	
1800	35 × 40	35 × 45		

**Overview of available types B43201**

$V_R$ (V DC)	350	400	450	500
	Case dimensions $d \times l$ (mm)			
$C_R$ ( $\mu$ F)				
100			35 × 20	
120			35 × 20	
150		35 × 20	35 × 25	
180	35 × 20	35 × 25	35 × 25	
220	35 × 35	35 × 25	35 × 30	
270	35 × 25	35 × 30	35 × 35	35 × 45
330	35 × 30	35 × 30	35 × 40	35 × 50
390	35 × 35	35 × 35	35 × 45	
470	35 × 40	35 × 40	35 × 50	
560	35 × 45	35 × 45		
680	35 × 50			

**Technical data and ordering codes B41201**

$V_R$	$C_R$ 120 Hz 20 °C	Case dimensions $d \times l$ mm	$I_{AC,R}$ 120 Hz 85 °C A	Ordering code
V DC 10	33000	35 × 25	5.81	B41201D3339M000
	39000	35 × 30	6.38	B41201C3399M000
	47000	35 × 30	6.62	B41201C3479M000
	56000	35 × 35	7.18	B41201B3569M000
	68000	35 × 40	7.76	B41201A3689M000
16	27000	35 × 25	5.80	B41201C4279M000
	33000	35 × 30	6.41	B41201B4339M000
	39000	35 × 35	6.96	B41201B4399M000
	47000	35 × 40	7.54	B41201B4479M000
	56000	35 × 45	8.08	B41201A4569M000
	68000	35 × 50	8.63	B41201A4689M000
25	22000	35 × 30	5.51	B41201B5229M000
	27000	35 × 35	6.12	B41201B5279M000
	33000	35 × 40	6.74	B41201B5339M000
	39000	35 × 45	7.35	B41201A5399M000
35	12000	35 × 30	5.24	B41201B7129M000
	15000	35 × 35	5.88	B41201B7159M000
	18000	35 × 40	6.46	B41201B7189M000
	22000	35 × 45	7.07	B41201A7229M000
50	4700	35 × 25	4.19	B41201D6478M000
	5600	35 × 25	4.44	B41201D6568M000
	6800	35 × 30	5.04	B41201D6688M000
	8200	35 × 30	5.26	B41201C6828M000
	10000	35 × 35	5.97	B41201B6109M000
	12000	35 × 40	6.55	B41201B6129M000
	15000	35 × 45	7.20	B41201A6159M000
	18000	35 × 50	7.74	B41201A6189M000
	63	4700	35 × 30	4.19
5600		35 × 30	4.70	B41201C8568M000
6800		35 × 30	5.04	B41201C8688M000
8200		35 × 35	5.53	B41201B8828M000
10000		35 × 40	6.25	B41201B8109M000
12000		35 × 45	6.83	B41201A8129M000

**Technical data and ordering codes B41201**

$V_R$	$C_R$ 120 Hz 20 °C	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz 85 °C A	Ordering code
80	4700	35 × 30	5.27	B41201C0478M000
	5600	35 × 35	5.81	B41201B0568M000
	6800	35 × 40	5.46	B41201A0688M000
	8200	35 × 45	6.91	B41201A0828M000
100	2700	35 × 30	4.37	B41201C9278M000
	3300	35 × 35	4.85	B41201C9338M000
	3900	35 × 35	5.27	B41201B9398M000
	4700	35 × 40	5.80	B41201B9478M000
	5600	35 × 45	6.34	B41201A9568M000



**Technical data and ordering codes B43201**

$V_R$	$C_R$ 120 Hz 20 °C	Case dimensions $d \times l$ mm	$I_{AC,R}$ 120 Hz 85 °C A	Ordering code
160	560	35 × 20	2.12	B43201D1567M000
	680	35 × 20	2.33	B43201D1687M000
	820	35 × 25	2.73	B43201D1827M000
	1000	35 × 25	3.01	B43201D1108M000
	1200	35 × 30	3.26	B43201C1128M000
	1500	35 × 35	3.83	B43201B1158M000
	1800	35 × 40	4.39	B43201A1188M000
200	390	35 × 20	1.77	B43201D2397M000
	470	35 × 20	1.94	B43201D2477M000
	560	35 × 20	2.25	B43201D2567M000
	680	35 × 25	2.48	B43201D2687M000
	820	35 × 30	2.88	B43201D2827M000
	1000	35 × 30	3.18	B43201B2108M000
	1200	35 × 35	3.43	B43201B2128M000
	1500	35 × 40	4.01	B43201B2158M000
	1800	35 × 45	4.58	B43201A2188M000
250	330	35 × 20	1.62	B43201I2337M000
	390	35 × 20	1.77	B43201I2397M000
	470	35 × 25	2.06	B43201I2477M000
	560	35 × 25	2.25	B43201I2567M000
	680	35 × 30	2.62	B43201H2687M000
	820	35 × 35	3.03	B43201G2827M000
	1000	35 × 40	3.50	B43201G2108M000
	1200	35 × 45	3.74	B43201F2128M000
	1500	35 × 50	4.35	B43201F2158M000
	315	180	35 × 20	1.20
220		35 × 20	1.33	B43201D0227M000
270		35 × 25	1.56	B43201D0277M000
330		35 × 30	1.83	B43201D0337M000
390		35 × 30	1.99	B43201C0397M000
470		35 × 35	2.29	B43201B0477M000
560		35 × 40	2.62	B43201A0567M000
680		35 × 45	3.01	B43201A0687M000
820		35 × 50	3.44	B43201A0827M000

**Technical data and ordering codes B43201**

$V_R$	$C_R$ 120 Hz 20 °C	Case dimensions d × l mm	$I_{AC,R}$ 120 Hz 85 °C A	Ordering code
V DC	μF			
350	180	35 × 20	1.20	B43201D4187M000
	220	35 × 35	1.41	B43201D4227M000
	270	35 × 25	1.65	B43201C4277M000
	330	35 × 30	1.83	B43201C4337M000
	390	35 × 35	2.09	B43201B4397M000
	470	35 × 40	2.40	B43201B4477M000
	560	35 × 45	2.73	B43201A4567M000
	680	35 × 50	3.13	B43201A4687M000
400	150	35 × 20	1.09	B43201D9157M000
	180	35 × 25	1.28	B43201D9187M000
	220	35 × 25	1.41	B43201D9227M000
	270	35 × 30	1.65	B43201C9277M000
	330	35 × 30	1.83	B43201C9337M000
	390	35 × 35	2.09	B43201B9397M000
	470	35 × 40	2.40	B43201B9477M000
	560	35 × 45	2.73	B43201A9567M000
450	100	35 × 20	0.68	B43201D5107M000
	120	35 × 20	0.75	B43201D5127M000
	150	35 × 25	0.89	B43201D5157M000
	180	35 × 25	0.98	B43201C5187M000
	220	35 × 30	1.14	B43201C5227M000
	270	35 × 35	1.33	B43201B5277M000
	330	35 × 40	1.54	B43201B5337M000
	390	35 × 45	1.74	B43201A5397M000
	470	35 × 50	1.99	B43201A5477M000
500	270	35 × 45	1.45	B43201A6277M000
	330	35 × 50	1.66	B43201A6337M000

## Cautions and warnings

### General

Also see "Important notes" on page 13.

- 1 Aluminum electrolytic capacitors have a bi-polar structure. This is marked on the body of the capacitor. A capacitor must not be mounted with reversed polarity. The application of an AC or reverse voltage may cause a short circuit or damage the capacitor. Bi-polar capacitors must not be used in AC applications, where the polarity may be reversed in the circuits or is unknown.
- 2 The DC voltage applied to the capacitor terminal must not exceed its rated operating voltage, as this will result in a rapid increase of the leakage current and may damage the capacitor. It is recommended to operate the capacitor at 70–80% of its rated voltage to optimize its service life.
- 3 The ripple current applied to the capacitor must be within the permitted range. An excessive ripple current leads to impaired electrical properties and may damage the capacitor. Note that the sum of the peak values of the ripple voltage and the DC operating voltage must not exceed the rated DC voltage.
- 4 Capacitors must be used within their permitted range of operating temperature. Operation at room temperature optimizes their service life.
- 5 Capacitors with case diameter  $\geq 8$  mm are equipped with a safety vent. In capacitors fitted with a lead or soldering lug, the safety vent is usually located at the base of the case. It needs sufficient space around it to operate optimally. The following dimensions are recommended: for case diameter  $d = 8$  to 16 mm, more than 2 mm; for  $d = 18$  to 35 mm, more than 3 mm; and for  $d = 42$  mm or more, more than 5 mm.
- 6 Capacitors should not be mounted with the safety vent face down on the board. Do not locate any wire or copper trace near the safety vent. Do not reverse the voltage, as this may result in excess pressure and the leakage of electrolyte.
- 7 Gas is released through the safety vent when the pressure inside the capacitor is too high. A gaseous liquid around the safety vent does not indicate a leakage of electrolyte.
- 8 The capacitor should be stored under conditions of normal temperature and in a non-acid, non-alkali environment of normal humidity. Exposure to high temperatures, for example under direct sunlight, will reduce its operating life. If the capacitor is stored in an environment containing acids or alkalis, the solderability of the leads may be affected.
- 9 The leakage current of an aluminum electrolytic capacitor may increase after a long period of storage. After such storage, the capacitor must be aged by applying the rated operating voltage for 6–8 hours before use.
- 10 Manual soldering:
  - a Soldering must be performed within the specified conditions.  
Bit temperature: 350 °C; application time of soldering iron: 3 seconds.
  - b Ensure that the soldering iron does not touch any part of the capacitor body.

## Cautions and warnings

- 11 Do not apply excessive force to the leads and terminals. Do not move the capacitor after soldering it onto the PC board and do not carry the PC board by gripping the capacitor. Observe the following rules to prevent undue stress to the capacitor:
  - a Do not tilt or bend the capacitor after soldering.
  - b Ensure that the terminal spacing matches the corresponding hole spacing on the PC board.
- 12 The aluminum case is not insulated from the cathode. Do not place a conductor under the aluminum capacitors on the PC board as this may cause a short circuit. The case and top of capacitors used in switched mode power supplies have a high-voltage-resistant heat shrink sleeve to ensure safe usage.
- 13 The leads of capacitors with a case diameter exceeding 14 mm cannot be used for fixing.

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