

# ALS30/31 SERIES

## Screw Terminals - Plain and Stud Mountings

This range offers high CV per unit volume coupled with high ripple currents and long life performance. They are also capable of handling high peak voltages and currents.

**Capacitance range** ..... 68 $\mu$ F to 1,000,000 $\mu$ F

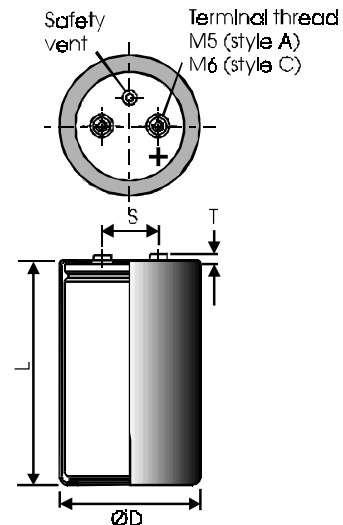
**Capacitance tolerance** .....  $\pm$ 20%

**Voltage range** ..... 10V to 600V d.c.

**Temperature range** ..... -40°C to +85°C

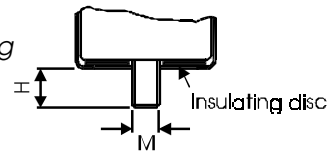
**Case sizes** ..... 36 x 52mm to 91 x 146mm

### ALS30



### ALS31

#### Stud Mounting



### DIMENSIONS (sleeved) mm

CASE CODE	D $\pm$ 1	L $\pm$ 2	S $\pm$ 0.5	T $\pm$ 0.8	M THREAD	H $\pm$ 1	MOUNTING CLIP
DA	36	52	12.7	6.4	M8	12	V3/H2/UTE2736
DB	36	62	12.7	6.4	M8	12	V3/H2/UTE2736
DE	36	82	12.7	6.4	M8	12	V3/H2/UTE2736
DF	36	105	12.7	6.4	M8	12	V3/H2/UTE2736
KE	51	82	22.2	5.0	M12	16	V4/UTE2737
KF	51	105	22.2	5.0	M12	16	V4/UTE2737
MF	66	105	28.5	5.0	M12	16	V10/UTE2738
ND	77	75	31.7	5.0	M12	16	V11
NF	77	105	31.7	5.0	M12	16	V11
NP	77	146	31.7	5.0	M12	16	V11
NT	77	220	31.7	5.0	M12	16	V11
RD	91	75	31.7	5.0	M12	16	V90
RH	91	98	31.7	5.0	M12	16	V90
RP	91	146	31.7	5.0	M12	16	V90

### Terminations

Aluminium inserts with M5 threads as standard, max torque 2NM. Optional M6 threaded inserts available on 77 & 91mm dia products, max torque 4NM. Max torque for stud M8:4NM/M12:8NM.

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## TECHNICAL DATA

### Related documents

IEC 384-4

### Temperature range

Storage -55°C to +85°C

Operating -40°C to +85°C

Environmental classification 40/085/56

### Surge voltage

1000 surges (30 seconds) at 85°C with surge voltage applied. See electrical characteristics.

SHORT DURATION SURGE VOLTAGE (<500 ms)

RATED VOLTAGE	SURGE VOLTAGE
200	350
250	400
350	500
400	520
415	530
450	550
500	600

### Charge/discharge

10<sup>6</sup> cycles at 25°C and rated voltage. One cycle per second with a time constant of 0.1.

### D.C. leakage current

After application of rated d.c. voltage for 5 minutes at 20°C, the d.c. leakage current shall not exceed 0.006 C<sub>R</sub> U<sub>R</sub> or 10mA whichever is the smaller. Where C<sub>R</sub> is the rated capacitance in µF and U<sub>R</sub> is the rated d.c. voltage.

### Vibration

10Hz to 55Hz at 0.75mm or 10g for 3x2hrs duration. Except 220mm long cans 10-55hz at 0.35mm or 5g for 3x0.5hrs duration.

### Insulation resistance

≥ 100MΩ at 100V d.c., across insulating sleeve.

### Voltage proof

≥ 2500V d.c., across insulating sleeve.

### Ripple current

The following values are approximate only, to give an indication of the effects of frequency and temperature on ripple current. More accurate data can be obtained by referring to the Application Notes available from BHC Aerovox.

### FREQUENCY CORRECTION

Capacitors shall withstand the rated r.m.s. ripple current as given in the tables at upper category temperature in circulating air. For frequencies other than those shown the following formula should be used:

$$\text{Ripple current} = \frac{F \times A^2 \times B^2}{100 \times (B^2 - A^2) + (F \times A^2)}$$

A = 100Hz ripple current

B = 10kHz ripple current

F = Required frequency (Hz)

### TEMPERATURE CORRECTION

For ambient temperatures other than 85°C the following multipliers should be applied to the 85°C ripple current.

AMBIENT TEMPERATURE	FACTOR
50°C	2.1
60°C	1.9
70°C	1.7
85°C	1.0

N.B. The sum of the d.c. and a.c. voltage components should not exceed the d.c. voltage rating.

### Life expectancy

At rated temperature with rated voltage and ripple current applied.

CAN DIAMETER (mm)	LIFE EXPECTANCY (hours)
36	11000
51	18000
66	19000
77,91	20000

### Mounting

Any position but refer to mounting section on page 9. For details of mounting clips and stud mounting kits see page 68/69.

### Capacitor marking

The capacitors are marked with items 1 to 6 from the following list as a minimum, and as much of the remaining information as is practical.

1. Rated capacitance in µF
2. Rated voltage d.c.
3. Polarity of terminations
4. Tolerance on rated capacitance
5. Date code/Batch code
6. BHC part number
7. Environmental classification

### Ordering information

For details of ordering see page 70.

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Rated voltage	Cap $\mu\text{F}$	Case Size	ESR $\text{m}\Omega$ at 20°C 100Hz	Impedance $\text{m}\Omega$ at 20 °C, 10 KHz	Ripple current A at 85°C 100 Hz	Ripple current A at 85°C 10 KHz	Type number (Excluding style ref)
10V d.c. (11.5V surge)	33000	36x52	20	18	8.4	8.87	ALS3--333DA010
	47000	36x62	15	14	10.2	10.7	ALS3--473DB010
	68000	36x82	10	9	13.6	14.3	ALS3--683DE010
	100000	36x105	8	8	17.1	17.9	ALS3--104DF010
	150000	51x82	8	7	16.0	18.0	ALS3--154KE010
	220000	51x105	7	6	20.6	22.0	ALS3--224KF010
	330000	77x75	10	10	18.4	18.5	ALS3--334ND010
	330000	66x105	6	5	24.4	26.0	ALS3--334MF010
	470000	91x75	11	11	19.4	19.5	ALS3--474RD010
	470000	77x105	5	5	30.8	32.8	ALS3--474NF010
	680000	91x98	7	6	27.9	28.0	ALS3--684RH010
	680000	77x146	5	4	39.6	41.7	ALS3--684NP010
	1000000	91x146	4	4	45.3	45.6	ALS3--105RP010
	1000000	77x220	4	4	62.8	63.3	ALS3--105NT010
16V d.c. (18.4V surge)	22000	36x52	22	18	8.3	8.8	ALS3--223DA016
	33000	36x62	17	14	10.1	10.6	ALS3--333DB016
	47000	36x82	11	10	13.4	14.1	ALS3--473DE016
	68000	36x105	9	8	16.9	17.7	ALS3--683DF016
	100000	51x82	10	9	16.0	16.9	ALS3--104KE016
	150000	51x105	8	7	20.0	20.9	ALS3--154KF016
	220000	77x75	10	10	18.5	18.6	ALS3--224ND016
	220000	66x105	6	5	29.3	29.7	ALS3--224MF016
	330000	91x75	11	11	19.1	19.2	ALS3--334RD016
	330000	77x105	5	5	28.6	30.8	ALS3--334NF016
	470000	91x98	7	7	27.6	27.8	ALS3--474RH016
	470000	77x146	5	5	38.9	39.6	ALS3--474NP016
	680000	91x146	4	4	45.3	45.5	ALS3--684RP016
	680000	77x220	4	4	62.3	63.2	ALS3--684NT016
25V d.c. (28.5V surge)	15000	36x52	24	20	8.2	8.7	ALS3--153DA025
	22000	36x62	17	15	9.9	10.4	ALS3--223DB025
	33000	36x82	11	10	13.2	13.9	ALS3--333DE025
	47000	36x105	9	7	16.6	17.4	ALS3--473DF025
	68000	51x82	11	10	15.6	16.9	ALS3--683KE025
	100000	51x105	9	8	19.6	20.6	ALS3--104KF025
	150000	77x75	11	11	17.9	18.1	ALS3--154ND025
	150000	66x105	6	6	28.4	28.9	ALS3--154MF025
	220000	91x75	12	12	18.7	18.8	ALS3--224RD025
	220000	77x105	6	6	28.1	30.8	ALS3--224NF025
	330000	91x98	8	8	26.4	26.5	ALS3--334RH025
	330000	77x146	5	5	37.3	39.6	ALS3--334NP025
	470000	91x146	4	4	43.6	43.9	ALS3--474RP025
	470000	77x220	4	4	60.5	61.1	ALS3--474NT025
40V d.c. (46V surge)	10000	36x52	23	20	7.9	8.4	ALS3--103DA040
	15000	36x62	17	14	9.5	10.0	ALS3--153DB040
	22000	36x82	11	10	12.7	13.3	ALS3--223DE040
	33000	51x82	12	11	14.2	16.7	ALS3--333KE040
	47000	51x82	12	11	14.2	16.7	ALS3--473KE040
	68000	51x105	10	9	18.0	20.6	ALS3--683KF040
	100000	77x75	13	12	16.4	16.5	ALS3--104ND040
	100000	66x105	7	6	26.3	26.6	ALS3--104MF040
	100000	91x75	10	10	20.3	20.4	ALS3--104RD040
	150000	77x105	8	8	26.8	30.2	ALS3--154NF040
	150000	91x98	7	7	28.6	28.9	ALS3--154RH040
	220000	77x146	6	5	35.4	39.6	ALS3--224NP040
	220000	91x146	4	4	46.5	47.0	ALS3--224RP040
	330000	77x220	4	4	54.4	54.8	ALS3--334NT040

Note: Values of E.S.R. and Impedance quoted above are maximum

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Rated voltage	Cap $\mu\text{F}$	Case Size	ESR $\text{m}\Omega$ at 20°C 100Hz	Impedance $\text{m}\Omega$ at 20 °C, 10 KHz	Ripple current A at 85°C 100 Hz	Ripple current A at 85°C 10 KHz	Type number (Excluding style ref)
63V d.c. (72.5V surge)	4700	36x52	36	28	6.7	7.4	ALS3--472DA063
	6800	36x62	26	20	8.2	9.0	ALS3--682DB063
	10000	36x82	17	14	10.8	11.9	ALS3--103DE063
	15000	51x82	12	11	13.9	14.4	ALS3--153KE063
	22000	51x82	12	11	13.9	14.4	ALS3--223KE063
	33000	51x105	10	9	17.4	18.0	ALS3--333KF063
	47000	77x75	13	13	16.6	16.8	ALS3--473ND063
	47000	66x105	8	7	26.7	26.5	ALS3--473MF063
	47000	91x75	11	10	20.3	20.7	ALS3--473RD063
	68000	77x105	8	8	24.7	26.4	ALS3--683NF063
	68000	91x98	8	7	28.9	29.6	ALS3--683RH063
	100000	77x146	6	6	34.8	35.4	ALS3--104NP063
	150000	91x146	5	5	40.2	40.7	ALS3--154RP063
	150000	77x220	4	4	55.2	56.3	ALS3--154NT063
100V d.c. (115V surge)	2200	36x52	69	55	4.9	5.4	ALS3--222DA100
	3300	36x62	49	39	6.0	6.6	ALS3--332DB100
	4700	36x82	33	27	7.9	8.8	ALS3--472DE100
	6800	36x105	23	19	10.0	11.1	ALS3--682DF100
	10000	51x82	28	24	10.1	10.5	ALS3--103KE100
	15000	51x105	20	18	12.6	13.1	ALS3--153KF100
	22000	77x75	25	24	12.0	12.2	ALS3--223ND100
	22000	66x105	13	12	18.4	19.1	ALS3--223MF100
	22000	91x75	21	20	14.7	15.0	ALS3--223RD100
	33000	77x105	15	14	17.6	19.0	ALS3--333NF100
	33000	91x98	13	12	20.8	21.2	ALS3--333RH100
	47000	77x146	10	9	25.2	25.7	ALS3--473NP100
	68000	91x146	9	8	29.4	29.8	ALS3--683RP100
	68000	77x220	7	6	40.6	41.5	ALS3--683NT100
200V d.c. (230V surge)	470	36x52	286	227	3.1	4.3	ALS3--471DA200
	680	36x62	199	158	3.9	5.4	ALS3--681DB200
	1000	36x82	135	107	5.1	7.1	ALS3--102DE200
	1500	36x105	90	72	6.7	9.1	ALS3--152DF200
	2200	51x82	73	60	8.2	9.7	ALS3--222KE200
	3300	51x105	48	40	11.0	13.1	ALS3--332KF200
	4700	77x75	48	42	10.6	11.5	ALS3--472ND200
	4700	66x105	33	27	15.9	19.1	ALS3--472MF200
	6800	66x105	27	23	15.7	17.7	ALS3--682MF200
	6800	91x75	35	31	13.3	14.3	ALS3--682RD200
	10000	77x105	28	25	14.9	15.9	ALS3--103NF200
	10000	91x98	23	20	18.8	20.3	ALS3--103RH200
	15000	77x146	18	16	21.4	22.7	ALS3--153NP200
	22000	91x146	13	12	26.7	28.0	ALS3--223RP200
22000	77x220	11	9	36.1	38.7	ALS3--223NT200	
250V d.c. (287V surge)	470	36x52	247	187	3.0	4.5	ALS3--471DA250
	680	36x62	172	131	3.8	5.6	ALS3--681DB250
	1000	36x82	117	89	5.0	7.4	ALS3--102DE250
	1500	51x82	86	67	7.5	9.8	ALS3--152KE250
	2200	51x82	69	55	7.7	9.1	ALS3--222KE250
	3300	51x105	45	36	10.4	12.4	ALS3--332KF250
	3300	77x75	52	43	10.4	11.9	ALS3--332ND250
	4700	66x105	31	24	15.0	18.2	ALS3--472MF250
	4700	91x75	38	32	13.2	14.9	ALS3--472RD250
	6800	77x105	29	25	15.0	16.5	ALS3--682NF250
	10000	91x98	24	21	17.1	18.4	ALS3--103RH250
	10000	77x146	19	16	21.6	24.0	ALS3--103NP250
	15000	91x146	14	12	27.0	29.5	ALS3--153RP250
	15000	77x220	12	10	32.4	36.5	ALS3--153NT250

Note: Values of E.S.R. and Impedance quoted above are maximum

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Rated voltage	Cap $\mu$ F	Case Size	ESR $m\Omega$ at 20°C 100Hz	Impedance $m\Omega$ at 20 °C, 10 KHz	Ripple current A at 85°C 100 Hz	Ripple current A at 85°C 10 KHz	Type number (Excluding style ref)
350V d.c. (385V surge)	330	36x52	325	226	2.4	4.2	ALS3--331DA350
	470	36x82	223	154	3.4	6.2	ALS3--471DE350
	680	36x105	154	107	4.4	8.0	ALS3--681DF350
	1000	51x82	116	82	6.1	9.3	ALS3--102KE350
	1500	51x105	77	55	8.2	12.5	ALS3--152KF350
	2200	77x75	66	50	9.1	11.5	ALS3--222ND350
	2200	66x105	52	37	11.9	18.2	ALS3--222MF350
	3300	66x105	39	29	12.8	17.2	ALS3--332MF350
	3300	91x75	47	36	11.7	14.2	ALS3--332RD350
	4700	77x105	35	27	13.4	15.8	ALS3--472NF350
	4700	91x98	31	24	16.3	20.3	ALS3--472RH350
	6800	77x146	23	18	19.3	23.2	ALS3--682NP350
	6800	91x146	20	15	24.9	32.5	ALS3--682RP350
	10000	77x220	15	11	31.7	39.3	ALS3--103NT350
400V d.c. (440V surge)	220	36x52	570	387	1.9	3.8	ALS3--221DA400
	330	36x62	382	260	2.5	4.7	ALS3--331DB400
	470	36x82	267	182	3.2	6.2	ALS3--471DE400
	680	36x105	185	126	4.1	7.9	ALS3--681DF400
	1000	51x82	139	98	5.8	8.9	ALS3--102KE400
	1500	51x105	92	65	7.8	12.0	ALS3--152KF400
	1500	77x75	97	70	8.3	11.9	ALS3--152ND400
	2200	66x105	62	44	11.2	17.4	ALS3--222MF400
	2200	91x75	69	50	10.7	14.9	ALS3--222RD400
	3300	77x105	49	36	12.7	16.5	ALS3--332NF400
	3300	91x98	45	32	14.9	20.9	ALS3--332RH400
	4700	77x146	33	24	18.0	24.2	ALS3--472NP400
	6800	91x146	24	17	23.2	30.3	ALS3--682RP400
	6800	77x220	22	15	29.0	40.7	ALS3--682NT400
415V d.c. (456V surge)	220	36x52	555	368	1.9	3.8	ALS3--221DA415
	330	36x62	372	247	2.4	4.8	ALS3--331DB415
	470	36x82	261	173	3.2	6.3	ALS3--471DE415
	680	36x105	180	120	4.1	8.0	ALS3--681DF415
	1000	51x82	136	94	5.7	8.8	ALS3--102KE415
	1500	51x105	90	62	7.6	11.9	ALS3--152KF415
	1500	77x75	96	68	8.1	11.7	ALS3--152ND415
	2200	66x105	61	42	11.0	17.2	ALS3--222MF415
	2200	91x75	68	49	10.5	14.6	ALS3--222RD415
	3300	77x105	48	36	12.4	16.2	ALS3--332NF415
	3300	91x98	45	32	14.6	20.5	ALS3--332RH415
	4700	77x146	33	24	17.6	23.7	ALS3--472NP415
	6800	91x146	23	17	22.7	29.7	ALS3--682RP415
	6800	77x220	21	15	28.5	40.1	ALS3--682NT415
450V d.c. (495V surge)	150	36x52	735	485	1.6	3.5	ALS3--151DA450
	220	36x62	502	332	2.0	4.4	ALS3--221DB450
	330	36x82	335	221	2.6	5.8	ALS3--331DE450
	470	36x105	235	155	3.4	7.4	ALS3--471DF450
	680	51x82	175	117	4.9	8.9	ALS3--681KE450
	1000	51x105	118	79	6.5	12.0	ALS3--102KF450
	1500	77x75	95	65	7.8	11.3	ALS3--152ND450
	1500	66x105	81	52	9.5	17.4	ALS3--152MF450
	2200	91x75	67	47	10.1	14.1	ALS3--222RD450
	2200	77x105	59	41	11.4	17.5	ALS3--222NF450
	3300	91x98	44	30	14.1	19.9	ALS3--332RH450
	3300	77x146	39	27	16.1	25.1	ALS3--332NP450
	4700	91x146	29	19	21.0	31.8	ALS3--472RP450
	6800	77x220	21	14	27.4	38.8	ALS3--682NT450

Note: Values of E.S.R. and Impedance quoted above are maximum

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Rated voltage	Cap $\mu$ F	Case Size	ESR $m\Omega$ at 20°C 100Hz	Impedance $m\Omega$ at 20 °C, 10 KHz	Ripple current A at 85°C 100 Hz	Ripple current A at 85°C 10 KHz	Type number (Excluding style ref)
500V d.c. (550V surge)	100	36x52	1231	847	1.1	2.3	ALS3--101DA500
	150	36x62	823	566	1.4	2.9	ALS3--151DB500
	220	36x82	560	386	1.8	3.9	ALS3--221DE500
	330	36x105	374	258	2.4	5.0	ALS3--331DF500
	470	51x82	276	194	3.5	6.7	ALS3--471KE500
	680	51x105	190	133	4.6	9.0	ALS3--681KF500
	1000	77x75	173	109	5.9	9.7	ALS3--102ND500
	1000	66x105	137	96	6.7	13.0	ALS3--102MF500
	1500	91x75	91	65	8.5	14.4	ALS3--152NF500
	1500	77x105	119	76	7.8	12.2	ALS3--152RD500
	2200	91x98	80	50	10.7	17.1	ALS3--222RH500
	2200	77x146	62	44	11.9	20.6	ALS3--222NP500
	3300	91x146	51	32	15.8	26.4	ALS3--332RP500
4700	77x220	37	24	21.0	33.3	ALS3--472NT500	
550V d.c. (605V surge)	68	36x52	2178	1176	0.9	1.3	ALS3--680DA550
	150	36x82	988	534	1.4	2.3	ALS3--151DE550
	220	36x105	674	364	2.0	2.9	ALS3--221DF550
	330	51x82	458	251	3.0	4.4	ALS3--331KE550
	470	51x105	321	175	3.9	5.8	ALS3--471KF550
	680	77x75	230	129	4.5	7.3	ALS3--681ND550
	680	66x105	221	121	5.4	8.3	ALS3--681MF550
	1000	66x105	154	86	5.8	9.6	ALS3--102MF550
	1200	77x105	130	73	7.7	11.1	ALS3--122NF550
	1500	77x146	103	57	9.0	14.8	ALS3--152NP550
	1800	77x146	87	49	11.0	15.6	ALS3--182NP550
	2200	77x220	70	39	13.9	23.1	ALS3--222NT550
	3300	77x220	48	27	16.5	25.8	ALS3--332NT550
600V d.c. (640V surge)	68	36x52	2772	1662	0.7	1.3	ALS3--680DA600
	100	36x62	1886	1131	0.9	1.6	ALS3--101DB600
	150	36x82	1257	754	1.3	2.1	ALS3--151DE600
	220	36x105	858	514	1.6	2.8	ALS3--221DF600
	220	51x82	862	519	2.1	3.5	ALS3--221KE600
	470	51x105	407	246	3.3	5.5	ALS3--471KF600
	680	66x105	281	170	4.7	7.8	ALS3--681MF600
	680	77x75	290	179	4.4	7.0	ALS3--681ND600
	1000	77x105	194	119	6.2	10.0	ALS3--102NF600
	1500	77x146	130	79	8.7	14.0	ALS3--152NP600
	2200	77x220	88	53	13.5	21.9	ALS3--222NT600

Note: Values of E.S.R. and Impedance quoted above are maximum