

# ALS20/21 SERIES

## Screw Terminals - Plain and Stud Mountings

This range of professional grade components offers high levels of reliability and performance with outstanding high frequency characteristics. Their low levels of e.s.r. and impedance are ideally suited to high efficiency power supply and inverter applications.

**Capacitance range** ..... 68 $\mu$ F to 330,000 $\mu$ F

**Capacitance tolerance** ..... -10% +50%

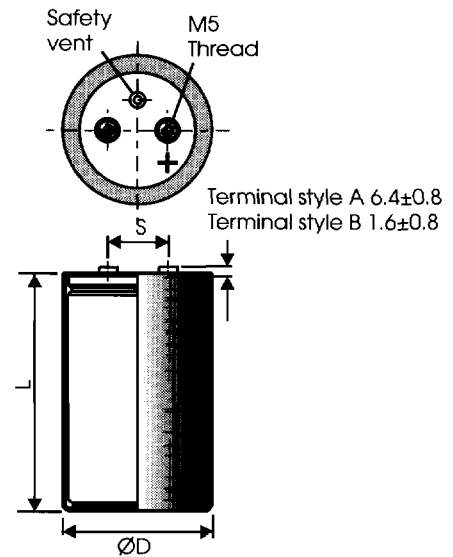
**Voltage range**..... 6.3V to 450V d.c.

**Temperature range** ..... -55°C to +85°C

**Case sizes**..... 35 x 52mm to 76 x 140mm

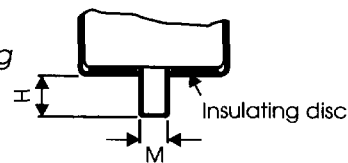


### ALS20



### ALS21

#### Stud Mounting



### DIMENSIONS (sleeved) mm

CASE CODE	D +2-1	L ±2	S ±0.5	M THREAD	H ±1	MOUNTING CLIP
DA	35	52	12.7	M8	12	V3/H2/UTE2736
DB	35	62	12.7	M8	12	V3/H2/UTE2736
DD	35	75	12.7	M8	12	V3/H2/UTE2736
DF	35	105	12.7	M8	12	V3/H2/UTE2736
KB	50	62	22.2	M12	16	V4/UTE2737
KD	50	75	22.2	M12	16	V4/UTE2737
KF	50	105	22.2	M12	16	V4/UTE2737
KJ	50	115	22.2	M12	16	V4/UTE2737
MF	65	105	28.5	M12	16	V10/UTE2738
MJ	65	115	28.5	M12	16	V10/UTE2738
NF	76	105	31.7	M12	16	V11
NJ	76	115	31.7	M12	16	V11
NN	76	140 (±3)	31.7	M12	16	V11

### Terminations

Aluminium inserts with M5 threads as standard, max torque 2NM. Max torque for stud M8:4NM/M12:8NM.

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## TECHNICAL DATA

### Related documents

CECC 30301-026  
DIN 41240 & 41248  
IEC 384-4

### Temperature range

Storage -65°C to +85°C  
Operating -55°C to +85°C  
Environmental classification 55/085/56

### Surge voltage

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

### 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  $(0.003 C_R U_R + 4) \mu\text{A}$  where  $C_R$  is the rated capacitance in  $\mu\text{F}$  and  $U_R$  is the rated d.c. voltage.

### Vibration

10Hz to 55Hz at 0.75mm or 10g for 3x2hrs duration.

### Insulation resistance

> 100M $\Omega$  at 100V d.c., across insulating sleeve.

### Voltage proof

$\geq 2500\text{V}$  d.c., across insulating sleeve.  
See technical data.

### 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:

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

A = 100Hz ripple current

B = 10kHz ripple current

F = Required frequency (Hz)

### TEMPERATURE CORRECTION

For ambient temperature other than 85°C the following correction factors should be employed.

AMBIENT TEMPERATURE	FACTOR
30°C	2.5
50°C	2.1
70°C	1.6
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)
35	10000
50	23000
65	27000
76	28000

### 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  $\mu\text{F}$
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 $\mu$ F	Case Size	ESR $m\Omega$ at 20°C		Impedance $m\Omega$ at 20 °C, 10 KHz	Ripple current A at 85°C		Type number (Excluding style ref)
			100Hz	10KHz		100 Hz	10 KHz	
6.3V d.c. (7.2V surge)	10000	35x52	34.0	33.0	34.0	5.9	6.4	ALS2--103DA6R3
	15000	35x52	33.0	32.0	32.0	6.1	6.6	ALS2--153DA6R3
	22000	35x62	26.0	22.0	22.0	7.5	8.1	ALS2--223DB6R3
	33000	35x75	16.0	14.0	14.0	9.4	10.1	ALS2--333DD6R3
	47000	35x105	12.0	14.0	10.0	14.0	15.1	ALS2--473DF6R3
	47000	50x62	13.0	12.0	12.0	12.1	13.0	ALS2--473KB6R3
	68000	50x75	11.0	9.5	9.5	14.7	16.0	ALS2--683KD6R3
	100000	50x105	8.0	7.5	8.0	21.5	23.3	ALS2--104KF6R3
	100000	50x115	8.0	7.0	7.0	23.7	25.8	ALS2--104KJ6R3
	150000	65x105	7.5	7.0	7.0	25.4	27.4	ALS2--154MF6R3
	150000	65x115	7.5	7.0	7.0	27.6	30.1	ALS2--154MJ6R3
	220000	65x105	8.0	7.5	7.5	25.4	27.4	ALS2--224MF6R3
	220000	76x115	7.5	7.5	7.0	30.3	33.1	ALS2--224NJ6R3
	330000	76x140	7.5	6.5	6.5	37.0	40.0	ALS2--334NN6R3
	10V d.c. (11.5V surge)	6800	35x52	38.0	31.0	32	5.7	6.3
10000		35x52	34.0	26.5	27	6.0	6.5	ALS2--103DA010
15000		35x62	24.0	19.0	20	7.4	8.1	ALS2--153DB010
22000		35x75	20.0	17.5	18	9.3	10.0	ALS2--223DD010
33000		35x105	15.0	12.0	13	13.8	15.0	ALS2--333DF010
33000		50x62	15.0	12.0	13	12.0	12.9	ALS2--333KB010
47000		50x75	11.0	10.0	10	14.6	15.8	ALS2--473KD010
68000		50x105	9.0	8.0	8	21.2	22.8	ALS2--683KF010
68000		50x115	8.5	7.5	8	23.2	25.2	ALS2--683KJ010
100000		50x105	8.5	7.5	8	21.2	23.3	ALS2--104KF010
100000		65x115	8.0	7.0	8	27.6	29.4	ALS2--104MJ010
150000		65x105	8.0	8.0	8	25.4	27.4	ALS2--154MF010
150000		76x115	9.0	8.0	9	30.3	32.3	ALS2--154NJ010
220000		76x140	7.5	6.5	7	36.7	39.9	ALS2--224NN010
16V d.c. (18.4V surge)		4700	35x52	43.0	34.0	34	5.3	5.9
	6800	35x52	43.0	32.0	34	5.5	6.0	ALS2--682DA016
	10000	35x62	30.0	22.5	25	6.8	7.4	ALS2--103DB016
	15000	35x75	19.0	14.0	15	8.4	9.2	ALS2--153DD016
	22000	35x105	14.0	10.0	11	12.5	13.7	ALS2--223DF016
	22000	50x62	15.0	12.0	12	10.9	11.9	ALS2--223KB016
	33000	50x75	12.0	9.5	10	13.4	14.6	ALS2--333KD016
	47000	50x105	9.0	7.2	8	19.3	21.2	ALS2--473KF016
	47000	50x115	9.0	7.0	8	21.3	23.2	ALS2--473KJ016
	68000	65x105	8.0	7.0	8	22.7	24.9	ALS2--683MF016
	68000	65x115	8.0	7.0	8	24.8	27.0	ALS2--683MJ016
	100000	76x105	8.5	7.5	8	25.1	27.5	ALS2--104NF016
	100000	76x115	8.0	7.0	8	27.7	29.7	ALS2--104NJ016
	150000	76x140	7.5	6.5	7	33.5	35.9	ALS2--154NN016
	25V d.c. (28.5V surge)	3300	35x52	47.0	34.0	40	5.1	5.8
4700		35x52	46.0	32.0	35	5.3	5.9	ALS2--472DA025
6800		35x62	32.0	22.5	25	6.6	7.3	ALS2--682DB025
10000		35x75	21.0	14.5	15	8.2	9.1	ALS2--103DD025
15000		35x105	15.0	10.5	12	12.3	13.5	ALS2--153DF025
15000		50x62	17.0	12.0	12	10.7	11.8	ALS2--153KB025
22000		50x75	13.0	9.5	11	13.0	14.4	ALS2--223KD025
33000		50x105	10.0	7.5	8	19.0	20.8	ALS2--333KF025
33000		50x115	9.0	7.0	8	20.9	23.2	ALS2--333KJ025
47000		65x105	8.5	7.0	8	22.4	24.5	ALS2--473MF025
47000		65x115	8.5	7.0	8	24.4	27.0	ALS2--473MJ025
68000		76x105	8.5	7.5	8	24.7	27.1	ALS2--683NF025
68000		76x115	8.0	7.0	8	26.8	29.7	ALS2--683NJ025
100000		76x140	7.5	6.0	7	32.9	35.9	ALS2--104NN025

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		Impedance $m\Omega$ at 20 °C, 10 KHz	Ripple current A at 85°C		Type number (Excluding style ref)
			100Hz	10KHz		100 Hz	10 KHz	
40V d.c. (46V surge)	2200	35x52	55.0	38.0	40	4.9	5.7	ALS2--222DA040
	3300	35x52	48.0	31.0	32	5.2	5.9	ALS2--332DA040
	4700	35x62	31.0	19.5	20	6.4	7.3	ALS2--472DB040
	6800	35x75	26.0	15.5	17	8.0	9.0	ALS2--682DD040
	10000	35x105	16.0	11.0	12	11.9	13.4	ALS2--103DF040
	10000	50x62	18.0	12.5	13	10.3	11.6	ALS2--103KB040
	15000	50x75	15.0	10.0	11	12.6	14.1	ALS2--153KD040
	22000	50x105	11.0	7.5	9	18.3	20.8	ALS2--223KF040
	22000	50x115	10.0	7.0	8	20.0	22.8	ALS2--223KJ040
	33000	65x105	9.5	7.5	8	21.8	24.5	ALS2--333MF040
	33000	65x115	9.0	7.5	8	23.6	26.5	ALS2--333MJ040
	47000	76x105	10.0	9.0	9	24.1	27.1	ALS2--473NF040
	47000	76x115	9.5	8.0	9	26.0	29.2	ALS2--473NJ040
	68000	76x140	9.0	7.0	8	31.6	35.9	ALS2--683NN040
	63V d.c. (72V surge)	1500	35x52	76	40.0	50	4.7	5.7
2200		35x52	74	42.0	45	4.8	5.8	ALS2--222DA063
3300		35x62	42	19.5	20	6.0	7.1	ALS2--332DB063
3300		35x75	32	15.5	16	7.5	8.8	ALS2--332DD063
4700		35x75	32	15.5	16	7.5	8.9	ALS2--472DD063
4700		35x105	22	11.0	12	10.9	13.1	ALS2--472DF063
6800		50x62	23	12.5	13	9.6	11.4	ALS2--682KB063
6800		50x75	18	10.0	11	11.6	13.9	ALS2--682KD063
10000		50x105	13	7.5	9	16.8	20.2	ALS2--103KF063
15000		50x115	12	7.5	8	19.0	22.4	ALS2--153KJ063
15000		65x105	12	7.5	8	20.2	24.1	ALS2--153MF063
22000		65x115	11	8.0	9	22.1	26.1	ALS2--223MJ063
22000		76x105	11	8.5	9	22.4	26.6	ALS2--223NF063
33000		76x105	11	9.0	10	22.4	26.6	ALS2--333NF063
33000		76x115	9	8.5	9	24.3	28.7	ALS2--333NJ063
33000	76x140	11	7.0	8	29.5	35.0	ALS2--333NN063	
47000	76x140	9	7.5	8	29.5	35.0	ALS2--473NN063	
100V d.c. (115V surge)	680	35x52	168	78.0	90	3.2	4.3	ALS2--681DA100
	1000	35x52	163	76.0	80	3.5	4.5	ALS2--102DA100
	1500	35x62	107	49.0	50	4.5	5.6	ALS2--152DB100
	1500	35x75	103	45.0	50	5.2	6.8	ALS2--152DD100
	2200	35x75	75	36.0	40	5.6	7.0	ALS2--222DD100
	2200	35x105	71	32.0	35	7.6	10.0	ALS2--222DF100
	3300	50x62	51	25.0	28	7.2	9.0	ALS2--332KB100
	3300	50x75	49	23.0	23	8.4	10.9	ALS2--332KD100
	4700	50x75	37	19.0	20	8.9	11.0	ALS2--472KD100
	4700	50x105	27	14.0	15	11.9	15.5	ALS2--472KF100
	6800	50x115	26	13.5	14	13.8	17.6	ALS2--682KJ100
	6800	65x105	21	12.0	13	15.0	18.8	ALS2--682MF100
	10000	65x105	21	12.0	12	15.5	19.0	ALS2--103MF100
	10000	65x115	20	11.5	12	16.8	20.8	ALS2--103MJ100
	15000	76x105	17	11.5	12	17.2	21.0	ALS2--153NF100
15000	76x115	17	11.0	11	18.7	22.9	ALS2--153NJ100	
15000	76x140	13	9.0	10	22.6	27.8	ALS2--153NN100	
22000	76x140	13	9.0	9	22.8	27.8	ALS2--223NN100	

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		Impedance $m\Omega$ at 20 °C, 10 KHz	Ripple current A at 85°C		Type number (Excluding style ref)	
			100Hz	10KHz		100 Hz	10 KHz		
160V d.c. (184V surge)	330	35x52	259	95	100	2.7	3.5	ALS2--331DA160	
	470	35x52	231	72	80	3.0	3.7	ALS2--471DA160	
	680	35x62	158	48	50	3.7	4.6	ALS2--681DB160	
	680	35x75	152	42	45	4.4	6.1	ALS2--681DD160	
	1000	35x75	132	57	58	4.7	5.7	ALS2--102DD160	
	1000	35x105	105	29	32	6.3	8.4	ALS2--102DF160	
	1500	50x62	74	24	25	6.1	8.3	ALS2--152KB160	
	1500	50x75	71	21	22	7.0	10.0	ALS2--152KD160	
	2200	50x75	63	28	28	7.5	9.1	ALS2--222KD160	
	2200	50x105	49	15	17	10.0	12.8	ALS2--222KF160	
	3300	50x115	36	13	14	11.7	14.7	ALS2--332KJ160	
	3300	65x105	27	12	13	12.6	15.4	ALS2--332MF160	
	4700	65x115	27	11	12	14.1	17.0	ALS2--472MJ160	
	4700	76x105	28	12	13	14.3	17.1	ALS2--472NF160	
	6800	76x105	23	12	13	14.5	17.2	ALS2--682NF160	
	6800	76x115	22	11	12	15.7	18.7	ALS2--682NJ160	
	6800	76x140	20	9	10	19.0	22.8	ALS2--682NN160	
	10000	76x140	17	10	10	19.1	22.8	ALS2--103NN160	
	200V d.c. (230V surge)	220	35x52	530	180	185	2.2	2.9	ALS2--221DA200
		330	35x62	356	121	125	2.8	3.7	ALS2--331DB200
470		35x75	246	82	85	3.6	4.8	ALS2--471DD200	
680		50x62	115	41	45	4.6	7.1	ALS2--681KB200	
680		50x75	113	48	42	5.0	8.2	ALS2--681KD200	
1000		50x75	117	40	41	5.7	8.1	ALS2--102KD200	
1500		50x105	79	28	30	8.1	10.7	ALS2--152KF200	
1500		50x115	54	20	22	8.6	12.8	ALS2--152KJ200	
2200		65x105	40	17	18	10.7	14.3	ALS2--222MF200	
2200		65x115	39	16	17	11.3	14.5	ALS2--222MJ200	
3300		65x105	40	17	17	11.4	14.3	ALS2--332MF200	
3300		76x105	40	17	17	12.6	15.6	ALS2--332NF200	
3300		76x115	30	14	15	13.5	16.7	ALS2--332NJ200	
4700		76x105	32	15	16	12.9	15.5	ALS2--472NF200	
4700		76x140	29	13	14	16.7	23.6	ALS2--472NN200	
6800	76x140	23	12	12	17.0	20.4	ALS2--682NN200		
250V d.c. (287V surge)	150	35x52	870	337	400	1.7	2.2	ALS2--151DA250	
	220	35x52	680	271	280	1.9	2.6	ALS2--221DA250	
	330	35x62	405	181	200	2.5	3.3	ALS2--331DB250	
	470	35x75	237	80	85	3.2	4.7	ALS2--471DD250	
	680	50x62	195	86	90	4.1	5.3	ALS2--681KB250	
	680	50x75	194	84	86	4.5	6.0	ALS2--681KD250	
	1000	50x75	140	83	85	5.1	6.6	ALS2--102KD250	
	1500	50x105	90	41	45	7.3	9.4	ALS2--152KF250	
	1500	50x115	90	41	45	7.6	10.1	ALS2--152KJ250	
	2200	65x105	64	30	32	9.5	12.0	ALS2--222MF250	
	2200	65x115	64	30	32	10.1	12.8	ALS2--222MJ250	
	3300	65x105	40	17	18	10.2	13.6	ALS2--332MF250	
	3300	76x105	46	24	24	11.3	13.6	ALS2--332NF250	
	3300	76x115	46	23	24	12.1	14.7	ALS2--332NJ250	
	4700	76x105	33	16	17	11.5	14.1	ALS2--472NF250	
4700	76x140	32	17	18	14.9	18.0	ALS2--472NN250		
6800	76x140	23	12	13	15.3	18.3	ALS2--682NN250		

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		Impedance m $\Omega$ at 20 °C, 10 KHz	Ripple current A at 85°C		Type number (Excluding style ref)
			100Hz	10KHz		100 Hz	10 KHz	
315V d.c. (362V surge)	150	35x52	770	229	310	1.5	2.2	ALS2--151DA315
	220	35x62	545	204	210	2.0	2.8	ALS2--221DB315
	220	35x75	520	198	200	2.2	3.2	ALS2--221DD315
	330	35x75	361	134	140	2.6	3.8	ALS2--331DD315
	330	35x105	350	130	135	3.1	4.6	ALS2--331DF315
	470	50x62	254	95	100	3.3	5.1	ALS2--471KB315
	470	50x75	252	93	100	3.5	5.7	ALS2--471KD315
	680	50x75	177	67	70	4.1	6.5	ALS2--681KD315
	680	50x105	175	65	68	4.9	6.7	ALS2--681KF315
	1000	50x105	120	46	50	5.7	8.5	ALS2--102KF315
	1000	50x115	120	46	50	6.0	9.5	ALS2--102KJ315
	1500	65x105	83	33	35	7.8	11.7	ALS2--152MF315
	1500	65x115	83	33	35	8.2	12.3	ALS2--152MJ315
	2200	76x105	60	26	27	9.6	13.5	ALS2--222NF315
	2200	76x115	59	25	27	10.2	14.3	ALS2--222NJ315
3300	76x140	41	18	19	12.8	17.6	ALS2--332NN315	
350V d.c. (385V surge)	100	35x52	1089	368	400	1.2	2.0	ALS2--101DA350
	150	35x52	710	247	300	1.5	2.4	ALS2--151DA350
	220	35x62	502	174	200	1.9	3.0	ALS2--221DB350
	220	35x75	480	167	200	2.1	3.5	ALS2--221DD350
	330	35x75	291	74	125	2.5	4.9	ALS2--331DD350
	330	35x105	320	112	120	3.0	4.9	ALS2--331DF350
	470	50x62	235	82	85	3.1	5.4	ALS2--471KB350
	470	50x75	158	56	60	3.4	7.0	ALS2--471KD350
	680	50x75	160	58	60	4.0	6.9	ALS2--681KD350
	680	50x105	110	39	40	4.7	9.1	ALS2--681KF350
	1000	50x105	110	40	41	5.5	9.0	ALS2--102KF350
	1000	50x115	110	40	41	5.8	10.0	ALS2--102KJ350
	1500	65x105	77	29	30	7.5	12.2	ALS2--152MF350
	1500	65x115	76	29	30	7.9	12.9	ALS2--152MJ350
	2200	76x105	55	23	24	9.1	14.1	ALS2--222NF350
2200	76x115	55	22	24	9.7	15.0	ALS2--222NJ350	
3300	76x140	38	16	18	12.1	18.2	ALS2--332NN350	
400V d.c. (440V surge)	100	35x52	1750	1199	1200	1.1	1.5	ALS2--101DA400
	150	35x62	1313	797	800	1.5	2.0	ALS2--151DB400
	220	35x75	896	543	550	1.9	2.6	ALS2--221DD400
	330	50x62	600	364	370	2.4	3.3	ALS2--331KB400
	470	50x75	380	256	260	3.1	4.3	ALS2--471KD400
	680	50x115	260	178	180	4.4	6.1	ALS2--681KJ400
	1000	65x115	130	81	90	6.1	9.8	ALS2--102MJ400
	1500	76x105	120	85	90	7.5	10.1	ALS2--152NF400
	1500	76x115	90	57	60	7.8	11.9	ALS2--152NJ400
	2200	76x105	96	61	62	8.3	11.1	ALS2--222NF400
2200	76x140	94	59	60	10.0	13.5	ALS2--222NN400	
3300	76x140	65	42	43	11.1	14.8	ALS2--332NN400	
450V d.c. (495V surge)	68	35x52	1856	1018	1100	0.8	1.5	ALS2--680DA450
	100	35x52	1915	1050	1100	1.0	1.5	ALS2--101DA450
	150	35x75	1100	694	800	1.4	2.1	ALS2--151DD450
	220	35x105	572	314	350	2.0	3.7	ALS2--221DF450
	330	50x75	382	211	230	2.4	4.6	ALS2--331KD450
	470	50x105	269	149	160	3.3	6.1	ALS2--471KF450
	680	50x115	260	152	160	4.0	6.6	ALS2--681KJ450
	1000	65x105	180	109	115	5.3	8.4	ALS2--102MF450
	1500	76x105	120	75	80	6.8	10.5	ALS2--152NF450
2200	76x140	80	52	55	9.1	13.9	ALS2--222NN450	

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