

PG - LL9 Long Life Grade

-40°C +85°C



Specifications

- **Voltage range :** 315 VDC to 450 VDC
- **Can size :** 50φ x 80mm to 90φ x 220mm
- **Operating Temperature range :** -40°C to +85°C
- **Capacitance :** 1000 MFD to 20000 MFD
Tolerance ± 20%
- **Leakage current:** The max. leakage current (Ir) is given by the formula:

$$I_r = 0.003 CV \text{ (microamps)}$$
 C = capacitance in microfarads
 V = DC rated voltage
 Pre-conditioning of the capacitors prior to testing for leakage current is essential.
- **Ripple Current:** All capacitors withstand rms ripple current at 100 Hz at 85°C. When capacitors operate at temperatures other than 85°C, the permissible rms ripple current at 85°C should be multiplied by the factors given below :

+40°C	+45°C	+50°C	+65°C
2.2	2.1	1.9	1.6

Where capacitors are required to operate at frequencies other than 100 Hz, the multiplying factors given below, may be used to determine the ripple current capacity, at that frequency.

Frequency Hz	100	250	500	1k to10k	>10K
Multiplying Factor	1.0	1.05	1.20	1.32	1.35

- **Useful Life :** Useful life is the period of time which the capacitor takes to reach “end-of-life”.
For PG-LL9 capacitors the useful life is estimated as 15000 hours at maximum rated temperature, ripple current and voltage.

“End-of-life” is defined as follows :

- Catastrophic failure : capacitors show short or open circuit
- Mechanical failure : operation of safety vent or sleeve damage
- Parametric failure :
 - Capacitance change ± 30%
 - ESR exceed three times specified value
 - Leakage current exceed specified value

Notes :

1. Can is negative, However, it is isolated with a PVC insulating sleeve and polypropylene end-disc.
2. Maximum ripple current for each capacitor diameter .

Capacitor Diameter	35mm	50mm	63mm	76mm	90mm
Max. Ripple Current (Amps)	20	20	40	40	72

Capacitor mounting

Capacitors are available in screw terminals in three mounting styles

AEST - Screw terminals with plain insulated base. *see page 5*

AEST-D - Screw terminals with stud mounting. *see page 5*

AEST-AL- Capacitor with aluminium bottom disc. *see page 6*

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Calculation of useful life

The useful life for a known ripple current load and ambient temperatures is determined on the basis of the below "useful life" table shown below :

Useful life (in khrs) at Different Ambient Temperature °C

Ripple Current Multiplier	40°C	45°C	50°C	55°C	60°C	65°C	70°C	75°C	80°C	85°C
0	250	250	241	170	120	85	60	43	30	21
0.1	250	250	240	169	120	85	60	42	30	21
0.2	250	250	237	168	119	84	59	42	30	21
0.3	250	250	233	165	117	82	58	41	29	21
0.4	250	250	228	161	114	80	57	40	28	20
0.5	250	250	221	156	110	78	55	39	28	19
0.6	250	250	212	150	106	75	53	38	27	19
0.7	250	250	203	144	101	72	51	36	25	18
0.8	250	250	193	136	96	68	48	34	24	17
0.9	250	250	182	128	91	64	45	32	23	16
1	250	241	170	120	85	60	43	30	21	15
1.1	250	224	158	112	79	56	40	28	20	
1.2	250	207	146	103	73	52	37	26	18	
1.3	250	189	134	95	67	47	33	24	17	
1.4	244	172	122	86	61	43	30	22	15	
1.5	221	156	110	78	55	39	28	19		
1.6	198	140	99	70	50	35	25	18		
1.7	177	125	88	62	44	31	22	16		
1.8	156	111	78	55	39	28	20			
1.9	138	97	69	49	34	24	17			
2	120	85	60	43	30	21	15			
2.1	104	74	52	37	26	18				
2.2	90	64	45	32	22	16				
2.3	77	54	38	27	19					
2.4	65	46	33	23	16					
2.5	55	39	28	19						
2.6	46	33	23	16						
2.7	38	27	19							
2.8	32	22	16							
2.9	26	18								

Example:

10000 MFD, 350 VDC, Size : 76 x 220

Specified Ripple Current (I_{85C}) at 100Hz, 85°C = 22.9A

If working conditions are as follows :

Applied Ripple Current (I_R) : 29.9A

Frequency = 100 Hz


Ambient temperature (close to the capacitor) : 55°C

Calculations :

- $I_R / I_{85C} = 29.9 / 22.9 = 1.30$
- From the above table it will be seen that the useful life works out to be 95,000 hours or about 11 years. If the ripple current applied is lower, say 20 amps then the useful life will be 1,36,000 hours or approximately 18 years.

Marking on capacitors

Each capacitor will have the following information printed on it, sequentially:

- The Company's symbol  followed by the words ALCON ELECTROLYTIC
- The capacitor grade viz. PG-LL9
- The capacitance value __ MFD, rated voltage __VDC
- The surge voltage
- Capacity tolerance
- Climatic category
- Part number on non-standard capacitors

Manufacturing Date Code Chart

The manufacturing code shall consists of four digits (alphanumeric). The first two shall denote the date (numeric). The third stands for the month (alphanumeric). The fourth stands for the year (alphabet)

First two spaces DATE	Third space MONTH	Fourth space YEAR
01	1 = JANUARY	A = 2012
02	2 = FEBRUARY	B = 2013
03	3 = MARCH	C = 2014
.	4 = APRIL	D = 2015
.	5 = MAY	E = 2016
.	6 = JUNE	F = 2017
10	7 = JULY	G = 2018
11	8 = AUGUST	H = 2019
.	9 = SEPTEMBER	J = 2020
.	X = OCTOBER	K = 2021
.	Y = NOVEMBER	L = 2022
31	Z = DECEMBER	M = 2023

For example :

- Manufacturing code 023A will mean 2nd March, 2012
- Manufacturing code 10XA will mean 10th October, 2012

Standard Capacitor Values

Rated Voltage (VDC)	Surge Voltage (VDC)	Capacitance Nominal (MFD)	MAX ESR at 100 Hz, 25°C (Ohms)	Impedance at 100 Hz, 25°C (Ohms)	Ripple at 100 Hz, 85°C (Amps)	Can size Nominal D x L mm
315	362	2200	0.077	0.726	7.0	50x105
		3300	0.062	0.484	8.9	63x105
		3900	0.045	0.409	10.5	63x105
		4700	0.043	0.340	11.8	63x146
		4700	0.042	0.340	12.1	76x105
		5600	0.036	0.285	13.1	76x105
		6800	0.032	0.235	15.4	76x146
		8200	0.030	0.195	18.0	76x220
		10000	0.024	0.160	20.1	76x220
		12000	0.019	0.133	23.0	76x220
		15000	0.015	0.107	25.2	76x220
		20000	0.012	0.080	31.0	90x220
350	385	1500	0.093	1.063	5.8	50x80
		2200	0.073	0.725	7.2	50x105
		3300	0.058	0.484	9.2	63x105
		3900	0.048	0.410	10.1	63x105
		4700	0.038	0.340	12.7	63x146
		4700	0.038	0.340	12.8	76x105
		5600	0.033	0.285	13.6	76x105
		6800	0.029	0.235	16.0	76x146
		8200	0.027	0.195	19.0	76x220
		10000	0.019	0.160	22.9	76x220
		12000	0.017	0.133	24.1	76x220
		15000	0.014	0.107	29.2	90x220
400	440	1500	0.090	1.063	5.9	50x80
		2200	0.071	0.725	7.3	50x105
		3300	0.055	0.484	9.5	63x105
		3900	0.044	0.409	11.8	76x105
		4700	0.035	0.340	13.2	76x105
		5600	0.033	0.285	15.0	76x146
		6800	0.026	0.235	17.1	76x146
		8200	0.021	0.195	19.0	90x146
		10000	0.018	0.160	23.5	76x220
		12000	0.015	0.133	27.6	90x220

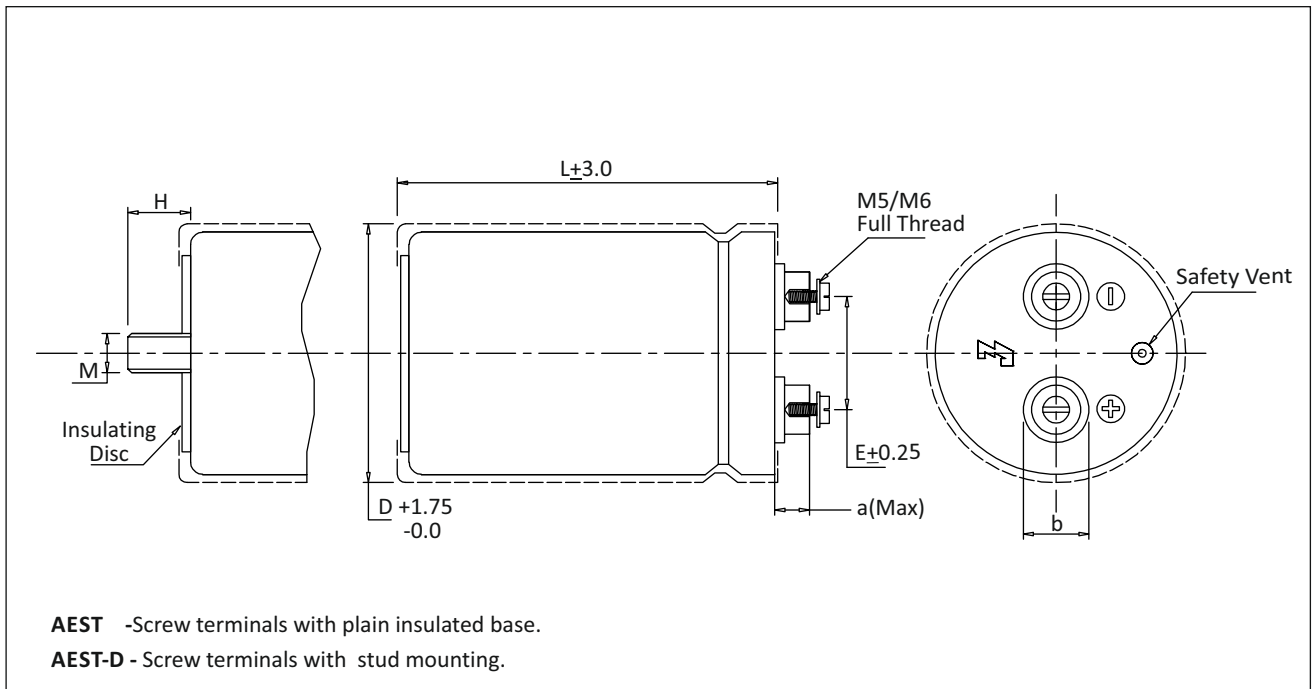
Custom designed capacitors available

Standard Capacitor Values

Rated Voltage (VDC)	Surge Voltage (VDC)	Capacitance Nominal (MFD)	MAX ESR at 100 Hz, 25°C (Ohms)	Impedance at 100 Hz, 25°C (Ohms)	Ripple at 100 Hz, 85°C (Amps)	Can size Nominal D x L mm
415	456	1500	0.089	1.063	6.5	50x105
		2200	0.070	0.725	8.4	63x105
		3300	0.053	0.484	10.8	76x105
		3900	0.043	0.409	12.0	76x105
		4700	0.031	0.339	14.0	76x105
		5600	0.030	0.285	15.7	76x146
		6800	0.023	0.235	18.0	76x146
		8200	0.019	0.195	22.5	76x220
		10000	0.016	0.160	25.0	76x220
		12000	0.014	0.133	28.5	90x220
450	495	1000	0.141	1.595	4.7	50x80
		1500	0.087	1.063	6.6	50x105
		2200	0.065	0.725	8.7	63x105
		3300	0.048	0.484	11.2	63x146
		3300	0.048	0.484	11.3	76x105
		4700	0.032	0.339	15.2	76x146
		5600	0.029	0.285	16.0	76x146
		6800	0.024	0.235	20.1	76x220
		8200	0.018	0.195	23.5	76x220
		10000	0.017	0.160	26.5	90x220

Custom designed capacitors available

Screw Terminals type AEST/AEST-D

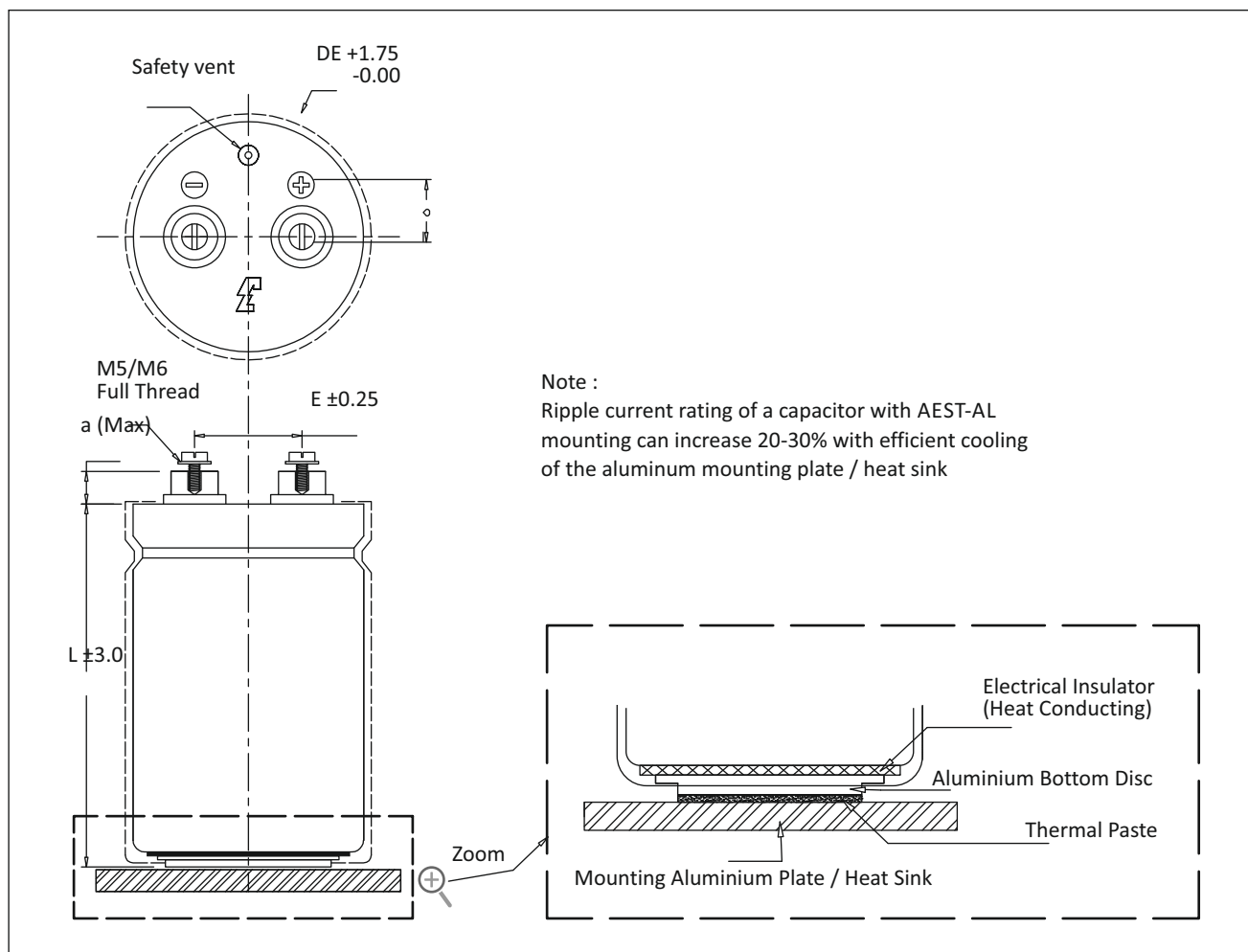


Dimension in mm.

Terminal	D	E	L	a (Max)	b±0.1	M	H±1.0
M5	35	12.6	62	7.8	9.5	—	—
M5	35	12.6	80	7.8	9.5	—	—
M5	35	12.6	105	7.8	9.5	—	—
M5	50	22.1	80	7.8	9.5	M 12	16.0
M5	50	22.1	105	7.8	9.5	M 12	16.0
M5	63	28.5	105	7.8	12.0	M 12	16.0
M5	63	28.5	120	7.8	12.0	M 12	16.0
M5	63	28.5	146	7.8	12.0	M 12	16.0
M5	76	31.6	105	7.8	12.0	M 12	16.0
M5	76	31.6	120	7.8	12.0	M 12	16.0
M5	76	31.6	146	7.8	12.0	M 12	16.0
M5	76	31.6	175	7.8	12.0	M 12	16.0
M5	76	31.6	220	7.8	12.0	M 12	16.0
M6	76	31.6	105	5.3 *	16.0	M 12	16.0
M6	76	31.6	120	5.3 *	16.0	M 12	16.0
M6	76	31.6	146	5.3 *	16.0	M 12	16.0
M6	76	31.6	175	5.3 *	16.0	M 12	16.0
M6	76	31.6	220	5.3 *	16.0	M 12	16.0
M6	90	32	105	5.3 *	16.0	M 12	16.0
M6	90	32	146	5.3 *	16.0	M 12	16.0
M6	90	32	220	5.3 *	16.0	M 12	16.0

* Low Post Design

Screw Terminals type AEST-AL



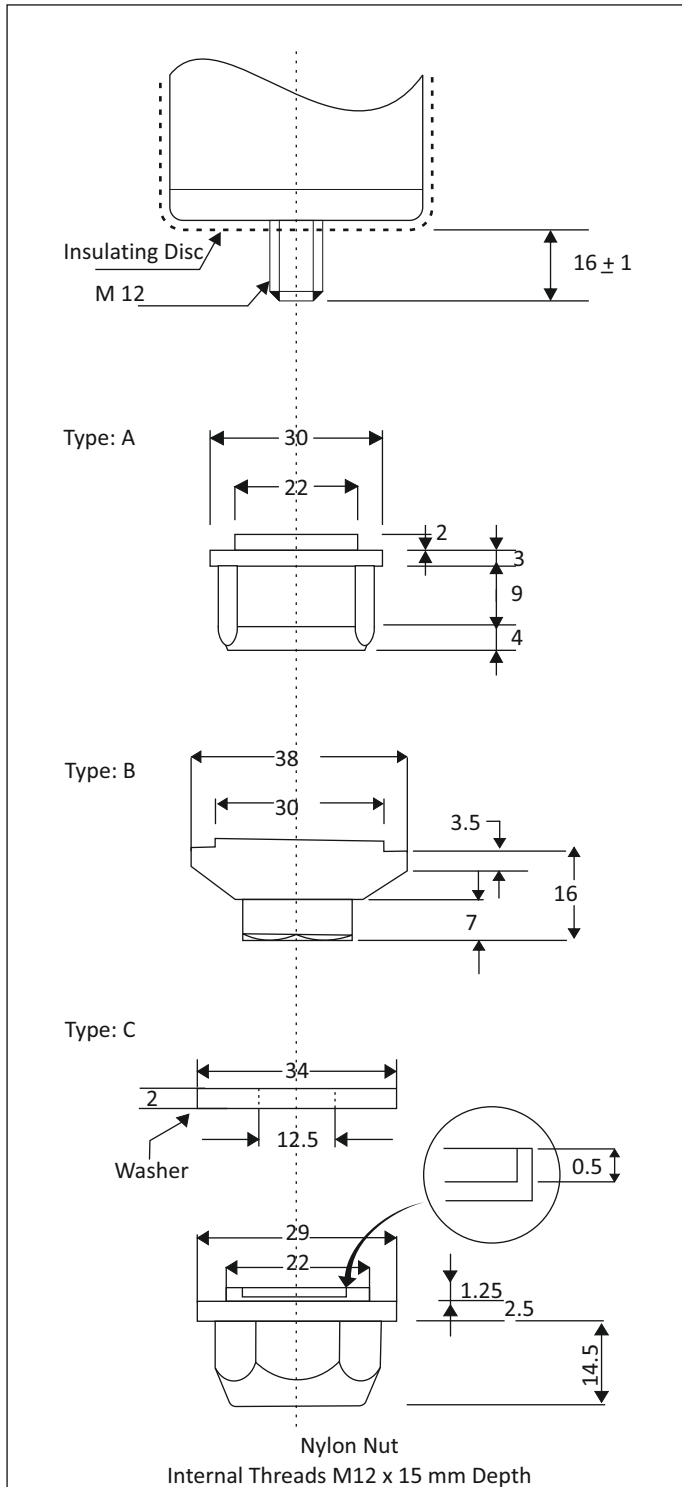
Dimension in mm.

Terminal	D	E	L	a (Max)	b±0.1
M 5	63	28.5	105	7.8	12.0
M 5	63	28.5	120	7.8	12.0
M 5	63	28.5	146	7.8	12.0
M 5	76	31.6	105	7.8	12.0
M 5	76	31.6	120	7.8	12.0
M 5	76	31.6	146	7.8	12.0
M 5	76	31.6	175	7.8	12.0
M 5	76	31.6	220	7.8	12.0
M 6	76	31.6	105	5.3 *	16.0
M 6	76	31.6	120	5.3 *	16.0
M 6	76	31.6	146	5.3 *	16.0
M 6	76	31.6	175	5.3 *	16.0
M 6	76	31.6	220	5.3 *	16.0
M 6	90	32	105	5.3 *	16.0
M 6	90	32	146	5.3 *	16.0
M 6	90	32	220	5.3 *	16.0

* Low Post Design

Mounting Accessories

Mounting Nut and Washers for Cans with



Dimension in mm.

Vertical Mounting Clamps

