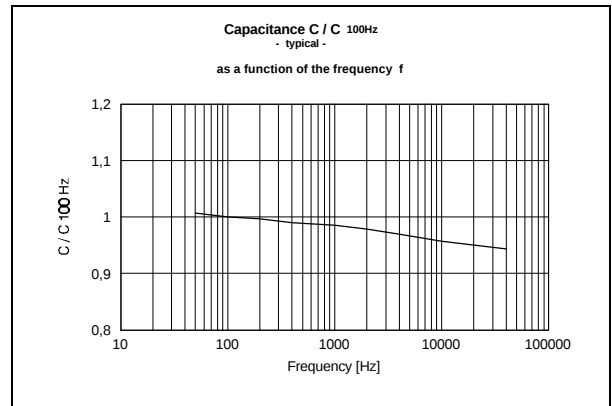
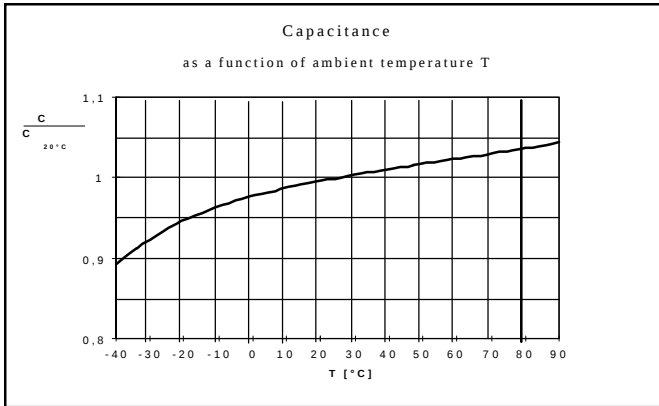




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The following diagrams exhibit typical courses of these dependences.



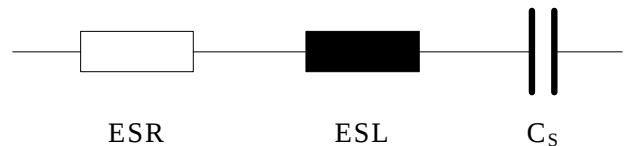
1.3.8 ESR

The equivalent series resistance represents the ohmic part (losses) of a capacitor (the resistance of the foil, electrolyt, terminals) . The ESR depends on frequency and temperature.

Equivalent circuit of an electrolytic capacitor - simplified -

1.3.9 ESL

The equivalent series inductance represents the inductive part of the capacitor (leads, foil) . The ESL depends mainly on the frequency.



1.3.10 Dissipation factor $\tan \delta$ (DF)

The dissipation factor is defined as the power loss of the capacitor divided by the reactive power of the capacitor.

$$\tan \delta = \text{ESR} \cdot \omega \cdot C_S$$

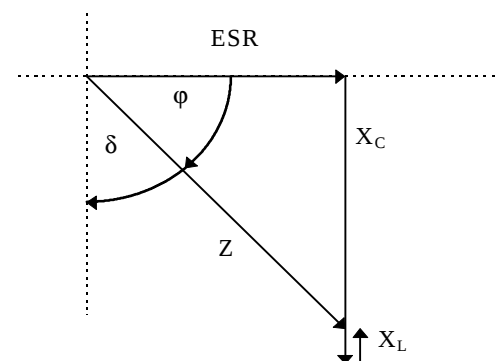
In general the DF is measured at 100 Hz and 20 °C..

As shown in the pointer diagram beside, the angle δ is the difference between the 90 ° phase shift of an ideal capacitor and the real lossy capacitor.

1.3.11 Impedance Z

The Impedance of the capacitor is given by the ESR,ESL and the capacitance.

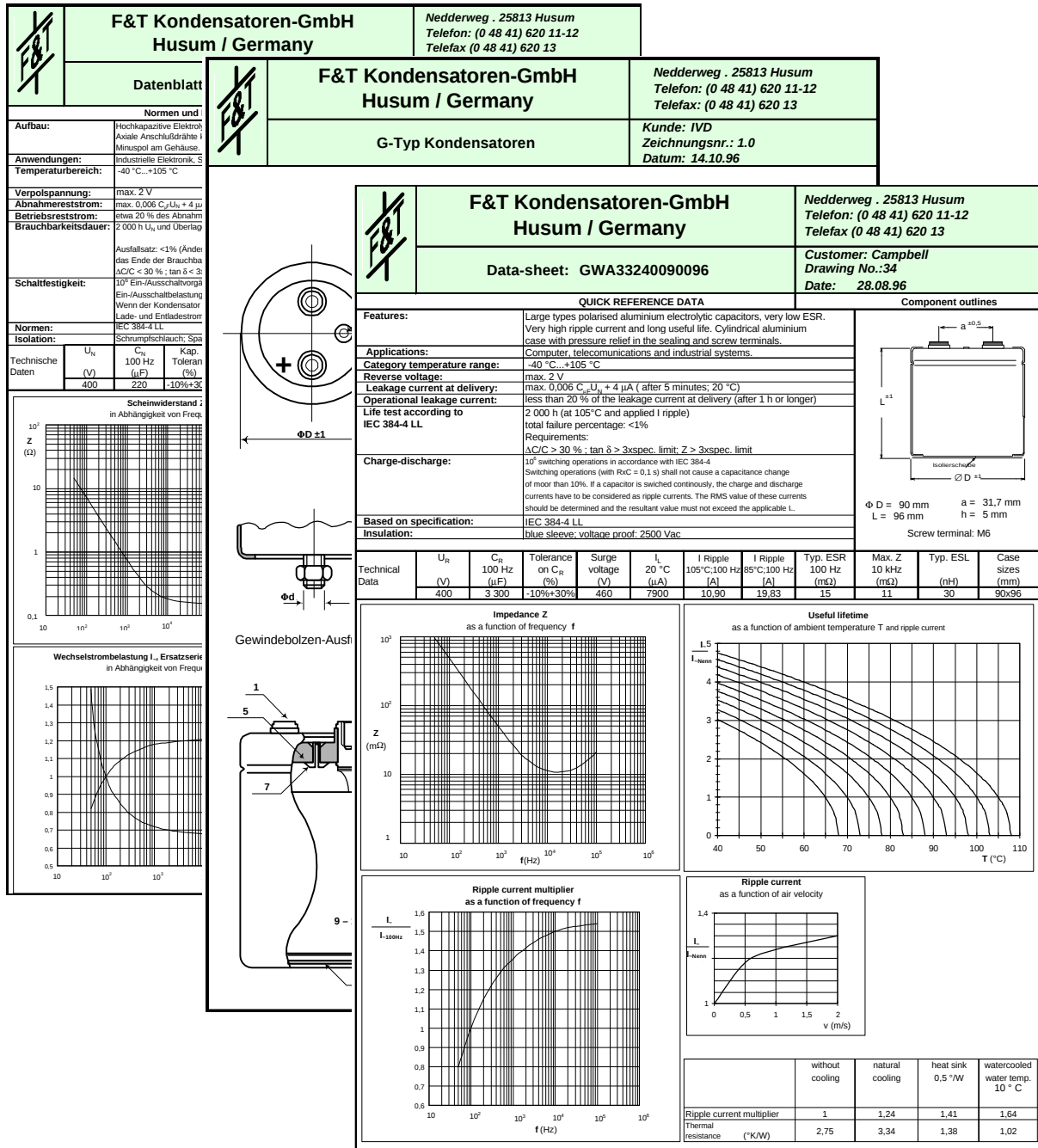
The Impedance depends on the temperature and of course the frequency. The Impedance is normally measured at 10 KHz .

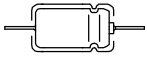


Pointer diagram

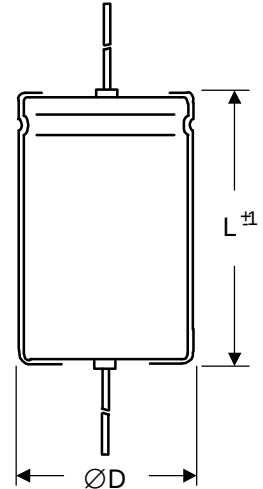
1.4 Datasheets

On demand please call for detailed data sheets.





2 Axial Capacitors Type A



Features

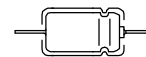
- polarized
- switch proofed
- welded axial leads
- high reliability
- high ripple current
- all contacts welded

Applications

- standard- and switch mode power supplies
- computer
- telecommunications
- general industrial
- consumer - electronic

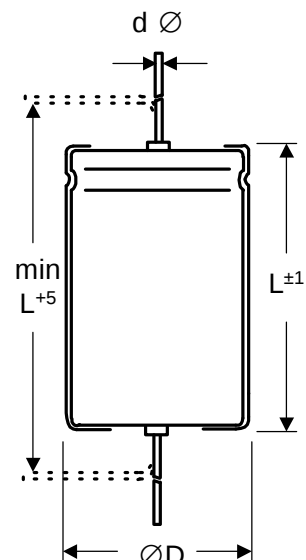
Quick reference

	$U_R \leq 100 \text{ V}$	$U_R > 100 \text{ V}$
Temperature range	- 40°C ... + 105°C	- 40°C ... + 85°C
Tolerance	$\pm 20 \%$	
Max. reverse voltage	2V	
Useful life	see diagram useful life S. 16	
Leakage current 5 min @ U_R	$0,008 * C [\mu\text{F}] * U [\text{V}] + 4\mu\text{A} [\mu\text{A}]$	
Leakage current 1 h @ U_R	0,15 * leakage current 5 min @ U_R	
Specs	DIN 41332 IEC 384 - 4	
Insulation Ø up to 25 mm	polyesterfilm : voltage proof $\geq 1000 \text{ V AC}$	
Insulation Ø more than 25 mm	shrink - on sleeve : voltage proof $\geq 2500 \text{ V AC}$	
Ø leads	up to 25 mm Ø : 0.8mm ; more than 25 mm Ø : 1.0 mm	



2.1 Mechanical Data

D	d
up to 25 mm	0,8 mm
more than 25 mm	1,0 mm



D x L

Capacitance [μF]	Rated voltage [V]									
	16	25	40	63	100	160	250	350	450	500
4,7									10 x 30	
10								10 x 30	12 x 30	14 x 30
15							10 x 30	10 x 30	14 x 30	16 x 39
22							10 x 30	12 x 30	16 x 30	18 x 39
33						10 x 30	12 x 30	14 x 37	18 x 39	21 x 36
47						10 x 30	14 x 30	16 x 39	21 x 36	25 x 38
100					10 x 30	16 x 30	18 x 39	25 x 38	25 x 49	30 x 49
220				10 x 30	14 x 30	18 x 39	25 x 38	25 x 49	30 x 49	
470			10 x 30	14 x 30	16 x 39	25 x 49	30 x 49	35 x 49		
1000	10 x 30	10 x 30	14 x 30	16 x 39	25 x 38	35 x 49				
2200	14 x 30	14 x 37	16 x 39	25 x 38	30 x 49					
3300	16 x 39	16 x 39	21 x 36	25 x 49	35 x 49					
4700	16 x 39	18 x 39	25 x 38	25 x 49	35 x 66					
6800	21 x 36	25 x 38	25 x 49	35 x 49						
10000	25 x 38	25 x 49	30 x 49	35 x 66						



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2.2 Standard Values Type A

U _R [V]	C _R [μF]	Case size Ø x L [mm]	ESR _{100 Hz} 20°C typ. [mΩ]	ESR _{100Hz} 20°C max. [mΩ]	tan δ _{100Hz} 20°C max. [%]	Z _{10KHz} 20°C max. [mΩ]	Rated ripple current 100Hz		Order code A...
							85°C [A]	105°C [A]	
16	1000	10 x 30	220	330	21	220		0,6	...10201610030
16	2200	14 x 30	130	195	27	130		1,0	...22201614030
16	3300	16 x 39	90	135	28	90		1,4	...33201616039
16	4700	16 x 39	60	90	29	60		1,7	...47201616039
16	6800	21 x 36	50	75	32	50		2,2	...68201621036
16	10000	25 x 38	40	60	38	40		2,6	...10301625038
25	1000	10 x 30	180	270	17	180		0,7	...10202510030
25	2200	14 x 37	120	180	25	120		1,1	...22202514037
25	3300	16 x 39	85	127	26	85		1,5	...33202516039
25	4700	18 x 39	60	90	27	60		1,9	...47202518039
25	6800	25 x 38	50	75	32	50		2,4	...68202525038
25	10000	25 x 49	35	52	33	35		3,2	...10302525049
40	470	10 x 30	220	330	10	220		0,6	...47104010030
40	1000	14 x 30	150	225	14	150		0,9	...10204014030
40	2200	16 x 39	100	150	21	100		1,3	...22204016039
40	3300	21 x 36	85	127	26	85		1,7	...33204021036
40	4700	25 x 38	60	90	27	60		2,2	...47204025038
40	6800	25 x 49	50	75	28	50		2,7	...68204025049
40	10000	30 x 49	30	45	28	30		3,7	...10304030049
63	220	10 x 30	400	600	8	400		0,5	...22106310030
63	470	14 x 30	200	300	9	200		0,8	...47106314030
63	1000	16 x 39	120	180	11	120		1,2	...10206316039
63	2200	25 x 38	95	142	22	95		1,7	...22206325038
63	3300	25 x 49	50	75	16	50		2,7	...33206325049
63	4700	25 x 49	40	60	18	40		3,0	...47206325049
63	6800	35 x 49	35	52	29	35		3,8	...68206335049
63	10000	35 x 66	30	45	20	30		4,6	...10306335066
100	100	10 x 30	750	1125	7	750		0,3	...10110010030
100	220	14 x 30	350	525	7	350		0,6	...22110014030
100	470	16 x 39	150	225	7	150		1,1	...47110016039
100	1000	25 x 38	110	165	8	110		1,6	...10210025038
100	2200	30 x 49	60	90	10	60		2,6	...22210030049
100	3300	35 x 49	50	75	12	50		3,2	...33210035049
100	4700	35 x 66	30	45	13	30		4,6	...47210035066
160	33	10 x 30	3100	4650	6	3100	0,2		...33016010030
160	47	10 x 30	1950	2925	6	1950	0,2		...47016010030
160	100	16 x 30	980	1470	6	980	0,4		...10116016030
160	220	18 x 39	470	705	6	470	0,7		...22116018039
160	470	25 x 49	150	225	6	150	1,5		...47116025049
160	1000	35 x 49	100	150	6	100	2,2		...10216035049
250	22	10 x 30	4300	6450	6	4300	0,1		...22025010030
250	33	12 x 30	2400	3600	7	2400	0,2		...33025012030
250	47	14 x 30	1600	2400	7	1600	0,3		...47025014030
250	100	18 x 39	750	1125	7	750	0,5		...10125018039
250	220	25 x 38	180	270	7	180	1,2		...22125025038
250	470	30 x 49	130	195	7	130	1,8		...47125030049