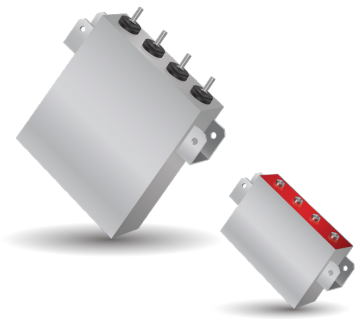
DC FILTERING

FFHV/FTHV 1600Vdc to 3000Vdc



The FFHV and FTHV series are specifically designed for DC filtering applications such as DC link or resonant filters for voltages up to 3000V.

These capacitors are proposed in 2 different versions: resin top for the FFHV series and hermetic case for the FTHV.

Large case sizes up to 36 liters and high specific energy up to 455J/l* together with safe and reliable ***Controlled Self Healing Technology*** make this series particularly suitable for power converters in traction, drives, renewable energy and power transmission areas.
*for 100,000 hours and 70°C hot spot temperature

FFHV and FTHV use a wet solution with polypropylene metallized film and oil (without free oil).

Standard designs proposed in this catalogue are covering a wide range of voltage and capacitance values.

In case of specific requirements about shape and performances, feel free to contact your local KYOCERA AVX representative.

PACKAGING MATERIAL

FFHV	FTHV
Non-painted rectangular resin filled aluminium case Mounting brackets M8/17 female connections or M12/30 male connections 2 or 4 connections	Non-painted rectangular aluminium hermetic case Mounting brackets M8/17 female terminals or M12/30 male terminals 2 or 4 terminals

STANDARDS

FFHV	FTHV
IEC 61071: Power electronic capacitors **IEC 61881:** Railway applications, rolling stock equipment, capacitors for power electronics **IEC 61373:** Railways application, rolling stock equipment, shock and vibrations tests **IEC 60068-2:** Environmental testing. Part2: Tests **UL 94:** Test for flammability of Plastic Materials for Parts in Devices and Appliances **EN 45545-2:** Railways applications – Fire protection on railway vehicles. **Part 2 :** Requirements for fire behaviour of materials and components	**IEC 61071:** Power electronic capacitors **IEC 61881:** Railway applications, rolling stock equipment, capacitors for power electronics IEC61373: Railways application, rolling stock equipment, shock and vibrations tests **IEC 60068-2:** Environmental testing. Part 2: Tests EN 45545-2: Railways applications – Fire protection on railway vehicles. **Part 2:** Requirements for fire behaviour of materials and components

HOW TO ORDER

D	FFHV	1	1	M	R	2637
	Series FFHV: resin top	**Section and Option** 1 = 340x125 2 connexions 2 = 340x125 4 connexions 3 = 340x175 2 connexions 4 = 340x175 4 connexions	**Height** 1 = 230mm 2 = 295mm 3 = 370mm 4 = 450mm 5 = 530mm 6 = 610mm	**Terminal Code** F = Female M = Male	**Voltage** A = 1600V B = 1900V C = 2000V D = 2150V E = 2450V F = 2750V G = 3000V	**Capacitance EIA Code**

D	FTHV	1	1	M	R	2637
	Series FTHV: hermetic case	**Section and Option** 1 = 340x125 2 connexions 2 = 340x125 4 connexions 3 = 340x175 2 connexions 4 = 340x175 4 connexions	**Height** 1 = 240mm 2 = 305mm 3 = 380mm 4 = 460mm 5 = 540mm 6 = 620mm	**Terminal Code** F = Female M = Male	**Voltage** A = 1600V B = 1900V C = 2000V D = 2150V E = 2450V F = 2750V G = 3000V	**Capacitance EIA Code**

FFHV/FTHV 1600Vdc to 3000Vdc

DEFINITIONS

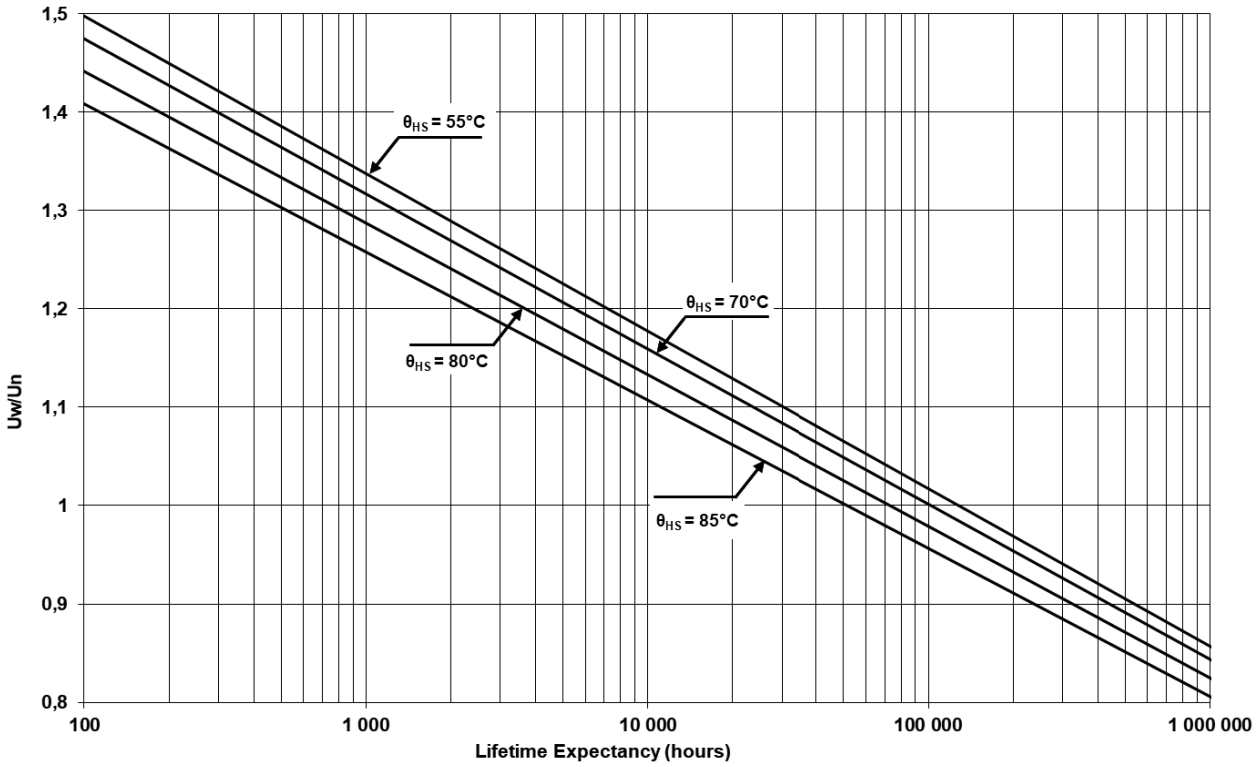
C_n (µF)	capacitance	nominal value of the capacitance measured at θ_{amb} = 25 ± 10°C
U_n (V)	rated DC voltage	maximum operating peak voltage of either polarity (non-reversing type waveform), for which the capacitor has been designed for continuous operation
U_w (V)	working voltage	value of the maximum operating recurrent voltage for a given hot spot temperature and an expected lifetime
U_r (V)	ripple voltage	peak-to-peak alternating component of the unidirectional voltage
L_s (nH)	parasitic inductance	capacitor series self-inductance
R_s (mΩ)	series resistance	capacitor series resistance due to galvanic circuit @ ambient temperature
I_{rms} thermal 1 (A)	RMS current	rms current value @ 100Hz for continuous operation under natural convection generating 20°C overheating (255Arms maximum for 2 connexions or terminals and 400Arms maximum for 4 connexions or terminals)
I_{rms} thermal 2 (A)	RMS current	rms current value @ 100Hz for continuous operation under forced air generating 20°C overheating (255A_{rms} maximum for 2 connexions or terminals and 400Arms maximum for 4 connexions or terminals)
θ_{amb} (°C)	cooling air temperature	temperature of the cooling air measured at the hottest position of the capacitor, under steady-state conditions, midway between two units NOTE If only one unit is involved, it is the temperature measured at a point approximately 0,1 m away from the capacitor container and at two-thirds of the height from its base
θ_{HS} (°C)	hot spot temperature	highest temperature obtained inside the case of the capacitor in thermal equilibrium

CHARACTERISTICS

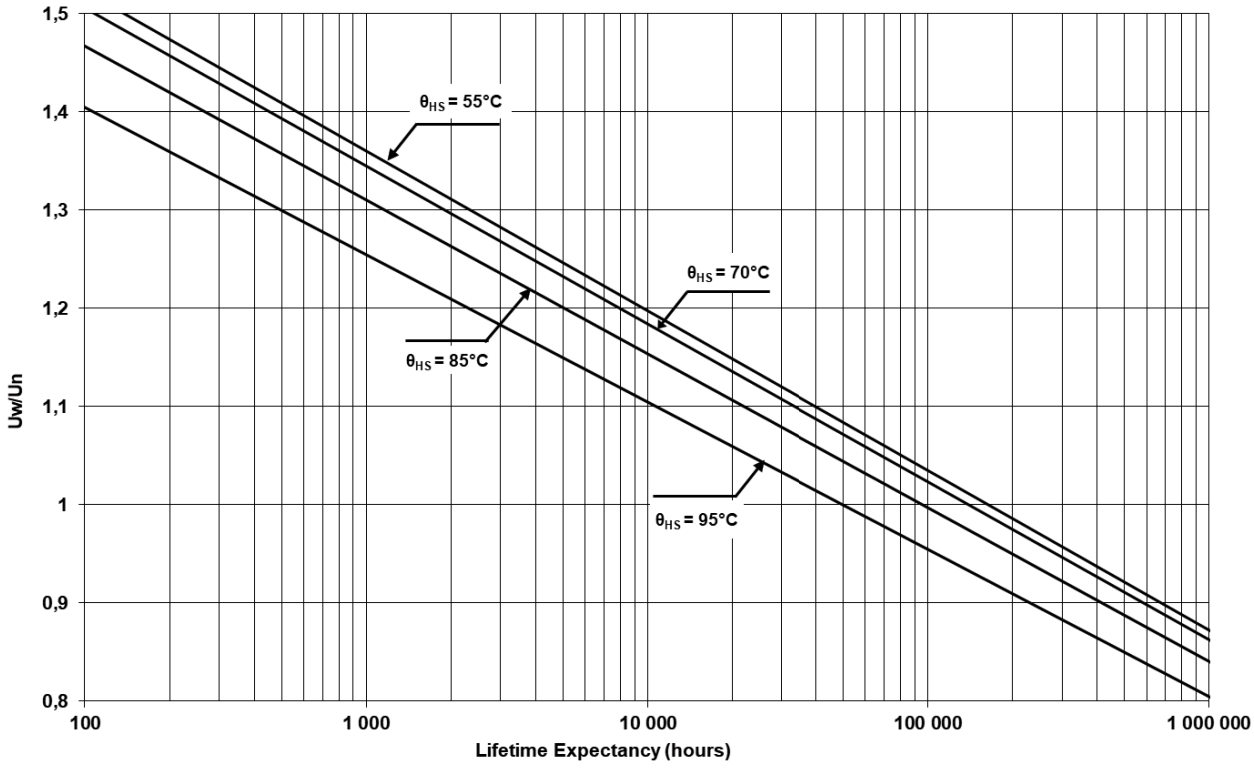
Capacitance range C_n	590µF to 12600µF
Tolerance on C_n	±10%
Rated DC voltage U_n	1600 to 3000V
Lifetime at U_n and ΔC / C < 2%	FFHV: 100,000h @ 70°C hot spot temperature FTHV: 100,000h @ 85°C hot spot temperature
Parasitic inductance L_s	27nH to 88nH
Maximum rms current I_{rms}	up to 400A_{rms}
Test voltage between terminals @ 25°C	1.5 x U_n for 10s
Test voltage between terminals and Case @ 25°C	7kV_{rms} @ 50Hz for 10s
Dielectric	polypropylene
Climatic Category	FFHV: 40 / 85 / 56 (IEC 60068) FTHV: 40 / 95 / 56 (IEC 60068)
Working temperature	FFHV: -40°C / +85°C (according to the power dissipated) FTHV: -40°C / +95°C (according to the power dissipated)
Storage temperature	-40°C / +85°C
Calorific value	34 MJ/kg

FFHV/FTHV 1600Vdc to 3000Vdc

FFHV LIFETIME EXPECTANCY VS HOT SPOT TEMPERATURE AND VOLTAGE



FTHV LIFETIME EXPECTANCY VS HOT SPOT TEMPERATURE AND VOLTAGE



FFHV/FTHV 1600Vdc to 3000Vdc

HOW TO CHOSE THE RIGHT CAPACITOR

The capacitor lifetime depends on the working voltage and the hot spot temperature.

Our caps are designed to meet 100000 hours lifetime at rated voltage and 70°C (for FFHV) or 85°C (for FTHV) hot spot temperature. In accordance with operating conditions, please calculate the hot spot temperature and deduce from this calculation if the obtained lifetime can suit the application.

1. From the tables, select a capacitor with required capacitance C_n and voltage U_n.

Calculate the maximum ripple voltage allowed for the selected cap:
$U_{rmax} = 0.2U_n$

If $U_r > U_{rmax}$, select a capacitor with higher rated voltage

Make sure I_{rms} application < I_{rms} table

Copy out:

- serial resistance (R_s): see table of values
- thermal resistances R_{th1} and R_{th2} (depending on cooling conditions)

2. Hot spot temperature calculation

Total losses are calculated as follow: $P_t = P_j + P_d$

Joule losses: $P_j = R_s \times I_{rms^2}$

Dielectric losses: $P_d = Q \times tg\delta_0$ with

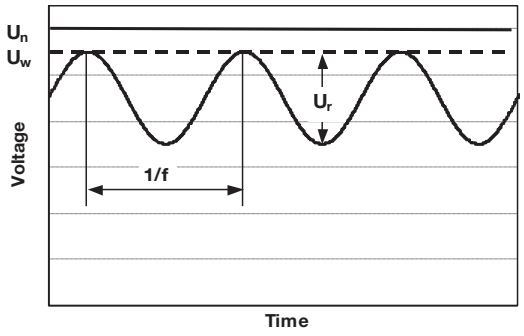
- Q(reactive power) = $\frac{I_{rms}^2}{C\omega}$ for a sinusoidal waveform
- $tg\delta 0 = 3 \times 10^{-4}$ (dielectric losses of polypropylene)

Hot spot temperature will be:
$\theta_{HS} = \theta_{amb} + (P_j + P_d) \times (R_{th1} + R_{th2})$

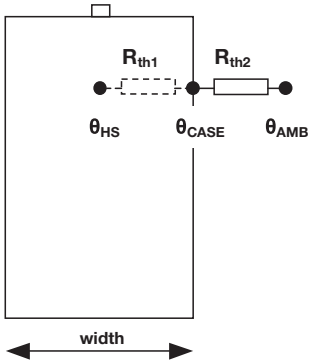
θ_{HS} ***absolute maximum is:***

85°C for FFHV
or 95°C for FTHV

If temperature is higher than 85°C, come back to #1 and start again with another selection.

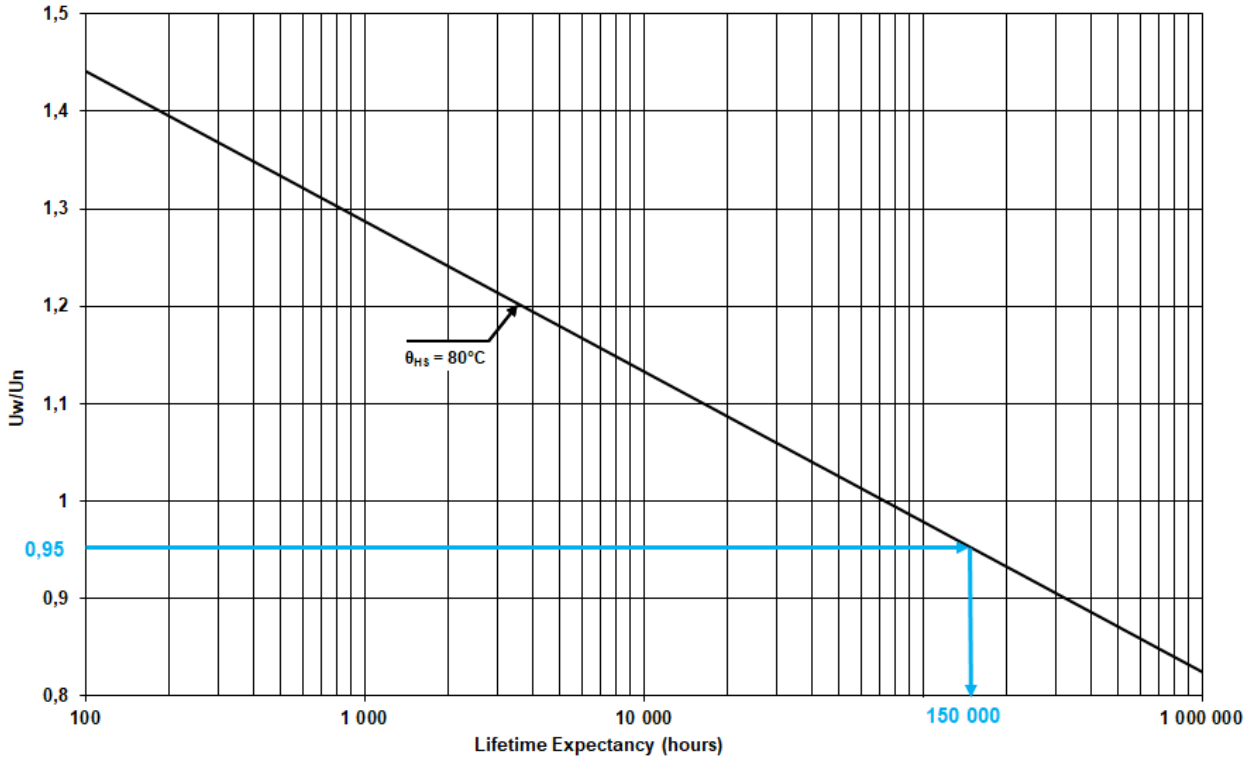


R_{th1}: Thermal resistance between hot spot and case
R_{th2}: Thermal resistance between case and ambient air



3. Refer to the curve and deduce the lifetime vs U_w/U_n ratio

FFHV LIFETIME EXPECTANCY VS HOT SPOT TEMPERATURE AND VOLTAGE



eg: rated voltage 2000V
working voltage 1900V
ρ = 0.95 ⇒ lifetime 150,000 hours @ 80°C hot spot temperature

Please, find a calculation form at the end of the catalog

FFHV/FTHV 1600Vdc to 3000Vdc

THERMAL RESISTANCES

R_{th1} (°C/W): Thermal resistance between hot spot and case

Rth1 (°C/W)		
Height (mm)	Width (mm)	
	125	175
230/240	0.40	0.41
295/305	0.33	0.36
370/380	0.27	0.30
450/460	0.22	0.26
530/540	0.19	0.22
610/620	0.17	0.19

Rth_2 (°C/W): Thermal resistance between case and ambient air under natural convection and forced air

	Rth2 (°C/W)			
	Natural air cooling		Forced air cooling >2m/s	
Height (mm)	Width (mm)		Width (mm)	
	125	175	125	175
230/240	0.3	0.26	0.15	0.13
295/305	0.25	0.21	0.13	0.11
370/380	0.2	0.18	0.1	0.09
450/460	0.17	0.15	0.09	0.08
530/540	0.15	0.13	0.08	0.07
610/620	0.13	0.11	0.07	0.06

For confined area, capacitor working in a closed cabinet, a thermal test under real conditions is necessary to evaluate the thermal resistance.

PARASITIC INDUCTANCE VS SIZE

Measurement @ 1MHz

L_s (nH) FFHV resin top				
Height (mm)	Width (mm)			
	2 Connections		4 Connections	
	125	175	125	175
230	70	73	27	30
295	72	77	29	34
370	75	82	32	39
450	79	86	36	43
530	82	91	39	48
610	85	96	42	53

L_s (nH) FTHV hermetic case				
Height (mm)	Width (mm)			
	2 Connections		4 Connections	
	125	175	125	175
240	73	76	28	31
305	75	80	30	35
380	78	85	33	40
460	82	89	37	44
540	85	94	40	49
620	88	99	43	54

FFHV/FTHV 1600Vdc to 3000Vdc

MTBF CALCULATION

Based on Return Of Experience from the field of more than 30 years, we have established the following relation. The failure rate λ_B depends on hot spot temperature θ_{HS} and charge ratio ρ.

$\rho = U_w/U_n$

$$\lambda_B = 3.10^{\,3,66(\rho-1)} \times .e^{\,4,5\left(\frac{273+\theta_{HS}}{368}\right)^{25}} \times .10^{-9} \text{ in failures/hour}$$

GENERAL FAILURE RATE

$\lambda=\lambda_B$ x π_Q x π_B x π_E failures/hour • π_Q, π_B and π_E see following tables

Qualification	Qualification factor πQ
Product qualified on IEC61071 and internal qualification	1
Product qualified on IEC61071	2
Product answering on another norm	5
Product without qualification	15

Environment	Environment factor πE
On ground (good conditions)	1
On ground (fixed materials)	2
On ground (on board)	4
On ship	9
On plane	15

Environment	Environment factor πB
Favorable	1
Unfavourable	5

MEAN TIME BETWEEN FAILURE (MTBF)

MTBF = 1/λ hours

SURVIVAL FUNCTION

$N = N_0$ x exp (-λt)

N is the number of pieces still working after t hours.

N_0 is the number of pieces at the origin (t = 0)

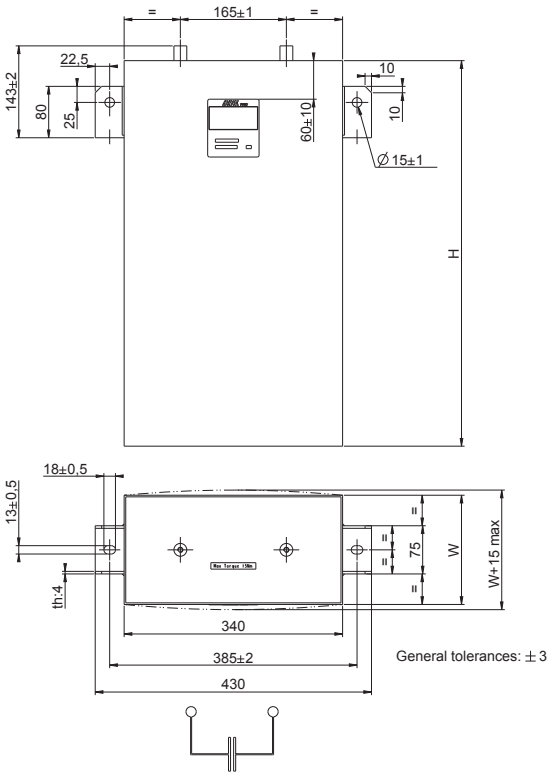
FAILURE MODE

Main failure mode due to KYOCERA AVX's **Controlled Self-Healing Technology** is only losses of capacitance. Thanks to **Controlled Self-Healing** solution to interrupt self-healing process in order to prevent avalanche effect due to polypropylene molecular cracking producing gas and potential explosion in confined box for none **Controlled Self-Healing capacitors.**

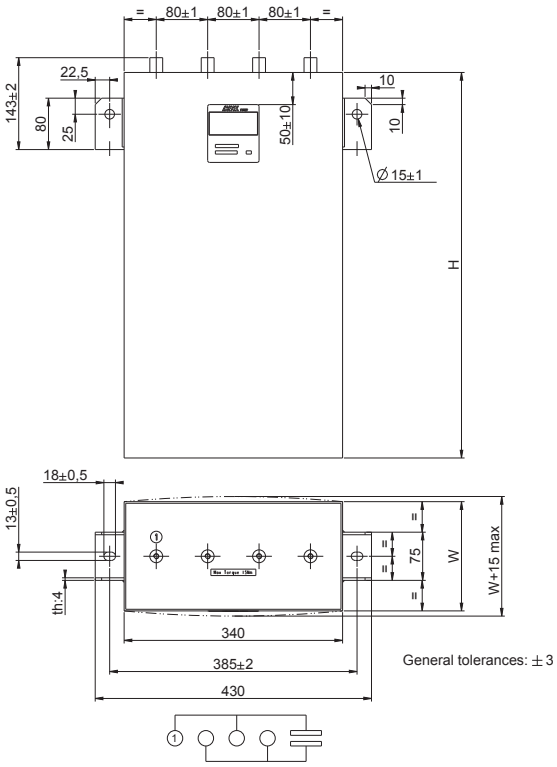
FFHV/FTHV 1600Vdc to 3000Vdc

DIMENSIONS

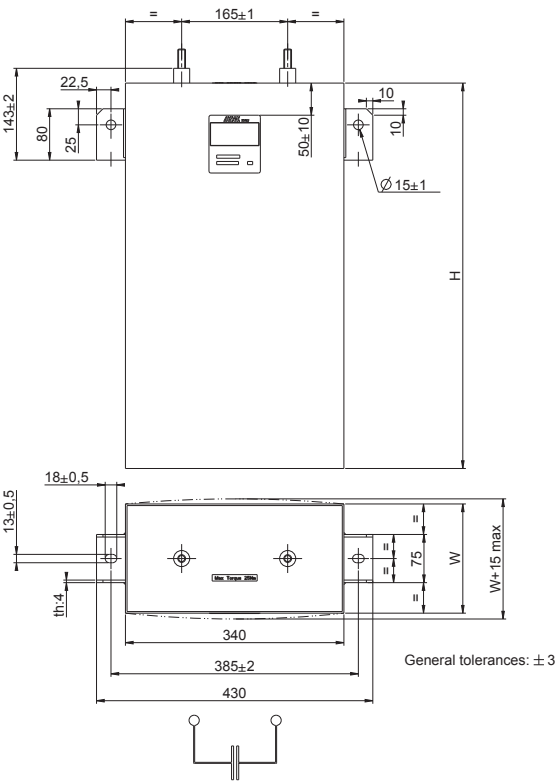
2 FEMALE CONNECTIONS



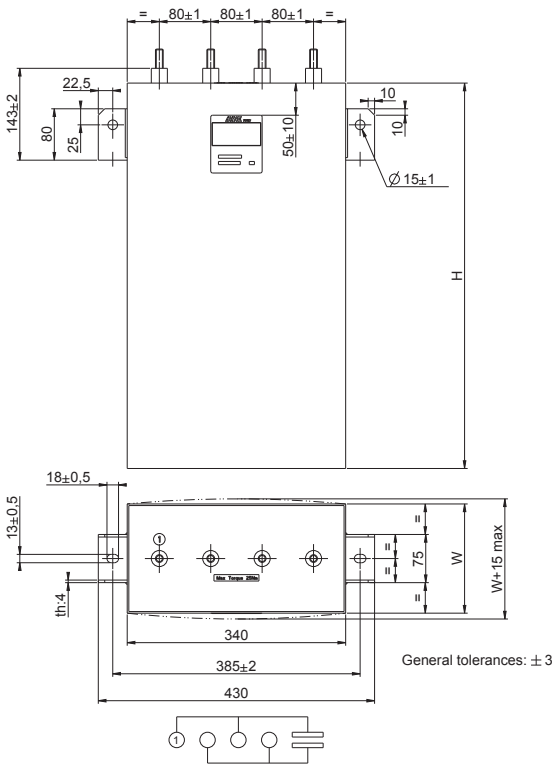
4 FEMALE CONNECTIONS



2 MALE CONNECTIONS



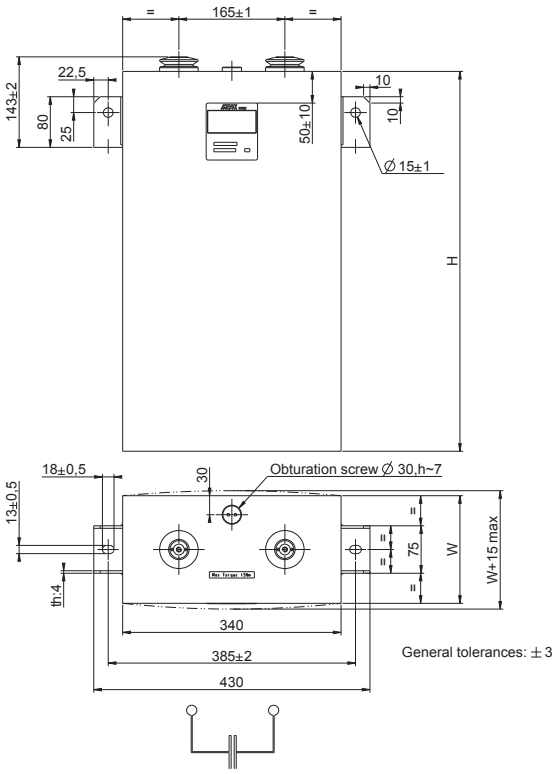
MALE CONNECTIONS



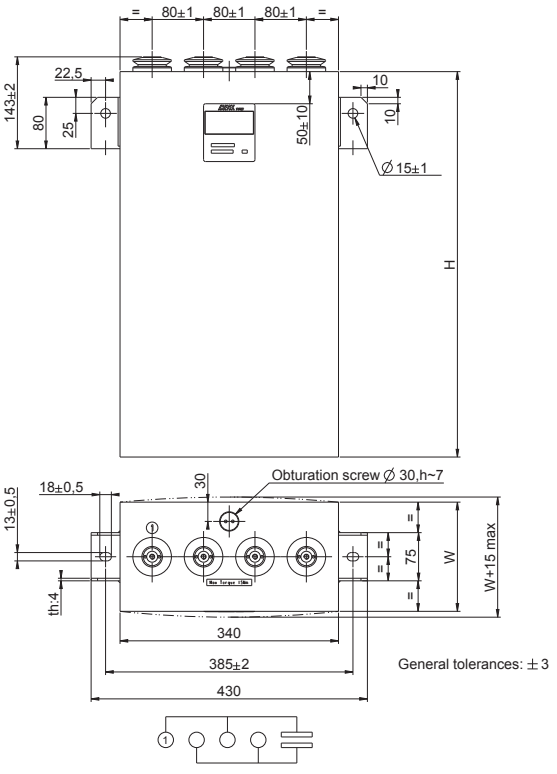
FFHV/FTHV 1600Vdc to 3000Vdc

DIMENSIONS

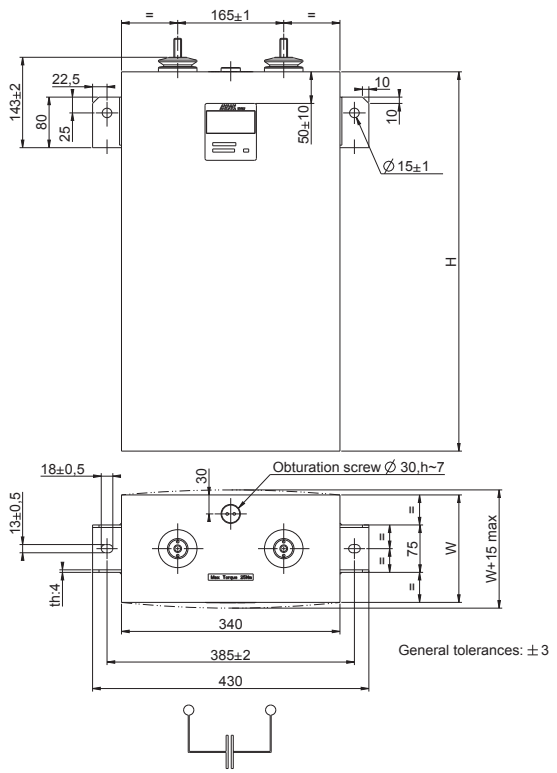
2 FEMALE TERMINALS



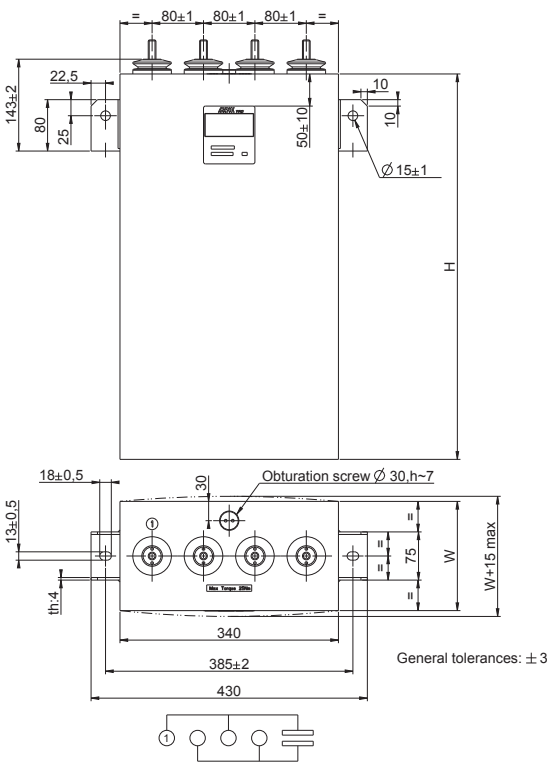
4 2 FEMALE TERMINALS



2 MALE TERMINALS



MALE TERMINALS

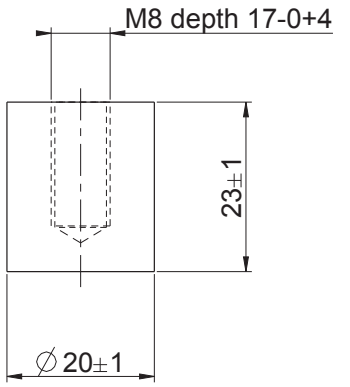


DC FILTERING

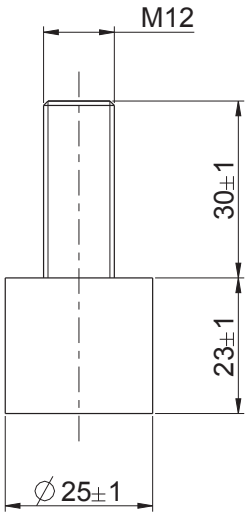
FFHV/FTHV 1600Vdc to 3000Vdc

DIMENSIONS

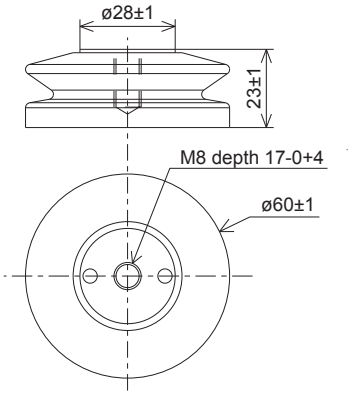
FEMALE CONNECTIONS (max torque 15Nm)



MALE CONNECTIONS (max torque 25Nm)

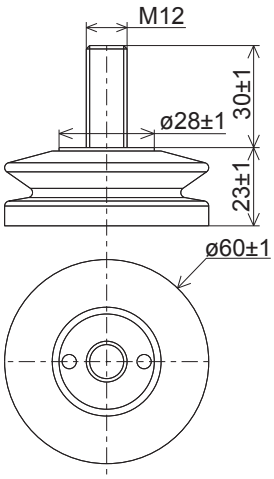


FEMALE TERMINAL (max torque 15Nm)



Creepage distance : 52mm
Air distance : 30mm

MALE TERMINAL (max torque 25Nm)



Creepage distance : 52mm
Air distance : 30mm

WEIGHT VS SIZE

Weight (kg) FFHV resin top				
Height (mm)	Width (mm)			
	2 Connections		4 Connections	
	125	175	125	175
230	13	17.5	13.5	18
295	17	22.5	17.5	23
370	21	27.5	21.5	28
450	25	33.5	25.5	34
530	29	39	29.5	39.5
610	33.5	44.5	34	45

Weight (kg) FTHV hermetic case				
Height (mm)	Width (mm)			
	2 Connections		4 Connections	
	125	175	125	175
240	14.5	19	15	19.5
305	18	24	18.5	24.5
380	22	29.5	22.5	30
460	26.5	35	27	35.5
540	30.5	40.5	31	41
620	34.5	46	35	46.5

DC FILTERING

FFHV/FTHV 1600Vdc to 3000Vdc

TABLE OF VALUES

Part Number	Capacitance (µF)	Width (mm)	Height (mm)		R_s (mΩ)	I_{rms} Thermal 1 (A)	I_{rms} Thermal 2 (A)
			FFHV	FTHV			
Un = 1600Vdc							
DF*HV11°A2637	2630	125	230	240	0,42	215	240
DF*HV21°A2637	2630	125	230	240	0,35	230	255
DF*HV12°A3447	3440	125	295	305	0,36	255	255
DF*HV22°A3447	3440	125	295	305	0,29	285	320
DF*HV31°A4127	4120	175	230	240	0,57	205	230
DF*HV41°A4127	4120	175	230	240	0,48	220	245
DF*HV13°A4597	4590	125	370	380	0,32	255	255
DF*HV23°A4597	4590	125	370	380	0,25	345	390
DF*HV32°A5407	5400	175	295	305	0,48	245	255
DF*HV42°A5407	5400	175	295	305	0,39	270	300
DF*HV14°A5747	5740	125	450	460	0,30	255	255
DF*HV24°A5747	5740	125	450	460	0,23	400	400
DF*HV15°A6897	6890	125	530	540	0,29	255	255
DF*HV25°A6897	6890	125	530	540	0,22	400	400
DF*HV33°A7207	7200	175	370	380	0,42	255	255
DF*HV43°A7207	7200	175	370	380	0,33	325	360
DF*HV16°A8047	8040	125	610	620	0,28	255	255
DF*HV26°A8047	8040	125	610	620	0,21	400	400
DF*HV34°A9007	9000	175	450	460	0,39	255	255
DF*HV44°A9007	9000	175	450	460	0,30	375	400
DF*HV35°A1088	10800	175	530	540	0,37	255	255
DF*HV45°A1088	10800	175	530	540	0,28	400	400
DF*HV36°A1268	12600	175	610	620	0,36	255	255
DF*HV46°A1268	12600	175	610	620	0,27	400	400
Un = 1900Vdc							
DF*HV11°B1917	1910	125	230	240	0,46	200	225
DF*HV21°B1917	1910	125	230	240	0,39	210	235
DF*HV12°B2507	2500	125	295	305	0,39	245	255
DF*HV22°B2507	2500	125	295	305	0,32	260	295
DF*HV31°B3007	3000	175	230	240	0,63	195	215
DF*HV41°B3007	3000	175	230	240	0,54	205	225
DF*HV13°B3347	3340	125	370	380	0,34	255	255
DF*HV23°B3347	3340	125	370	380	0,27	320	360
DF*HV32°B3927	3920	175	295	305	0,53	230	255
DF*HV42°B3927	3920	175	295	305	0,44	250	275
DF*HV14°B4177	4170	125	450	460	0,32	255	255
DF*HV24°B4177	4170	125	450	460	0,25	375	400
DF*HV15°B5017	5010	125	530	540	0,31	255	255
DF*HV25°B5017	5010	125	530	540	0,24	400	400
DF*HV33°B5227	5220	175	370	380	0,46	255	255
DF*HV43°B5227	5220	175	370	380	0,37	300	335
DF*HV16°B5847	5840	125	610	620	0,30	255	255
DF*HV26°B5847	5840	125	610	620	0,23	400	400
DF*HV34°B6537	6530	175	450	460	0,42	255	255
DF*HV44°B6537	6530	175	450	460	0,33	350	390
DF*HV35°B7837	7830	175	530	540	0,39	255	255
DF*HV45°B7837	7830	175	530	540	0,30	395	400
DF*HV36°B9147	9140	175	610	620	0,38	255	255
DF*HV46°B9147	9140	175	610	620	0,29	400	400

* Insert F for resin top or T for hermetic case

° Insert F for female terminals or M for male terminals

DC FILTERING

FFHV/FTHV 1600Vdc to 3000Vdc

TABLE OF VALUES

Part Number	Capacitance (µF)	Width (mm)	Height (mm)		R_s (mΩ)	I_{rms} Thermal 1 (A)	I_{rms} Thermal 2 (A)
			FFHV	FTHV			
Un = 2000Vdc							
DF*HV11°C1627	1620	125	230	240	0.49	190	215
DF*HV21°C1627	1620	125	230	240	0.41	200	225
DF*HV12°C2137	2130	125	295	305	0.42	230	255
DF*HV22°C2137	2130	125	295	305	0.34	245	280
DF*HV31°C2547	2540	175	230	240	0.65	185	210
DF*HV41°C2547	2540	175	230	240	0.56	200	220
DF*HV13°C2847	2840	125	370	380	0.37	255	255
DF*HV23°C2847	2840	125	370	380	0.29	305	340
DF*HV32°C3337	3330	175	295	305	0.55	225	250
DF*HV42°C3337	3330	175	295	305	0.46	240	265
DF*HV14°C3547	3540	125	450	460	0.35	255	255
DF*HV24°C3547	3540	125	450	460	0.27	355	400
DF*HV15°C4257	4250	125	530	540	0.33	255	255
DF*HV25°C4257	4250	125	530	540	0.25	400	400
DF*HV33°C4447	4440	175	370	380	0.48	255	255
DF*HV43°C4447	4440	175	370	380	0.39	290	320
DF*HV16°C4967	4960	125	610	620	0.32	255	255
DF*HV26°C4967	4960	125	610	620	0.24	400	400
DF*HV34°C5557	5550	175	450	460	0.43	255	255
DF*HV44°C5557	5550	175	450	460	0.34	340	375
DF*HV35°C6657	6650	175	530	540	0.41	255	255
DF*HV45°C6657	6650	175	530	540	0.32	385	400
DF*HV36°C7767	7760	175	610	620	0.39	255	255
DF*HV46°C7767	7760	175	610	620	0.3	400	400
Un = 2150Vdc							
DF*HV11°D1447	1440	125	230	240	0,50	180	200
DF*HV21°D1447	1440	125	230	240	0,43	185	210
DF*HV12°D1887	1880	125	295	305	0,42	225	255
DF*HV22°D1887	1880	125	295	305	0,35	240	270
DF*HV31°D2257	2250	175	230	240	0,69	175	195
DF*HV41°D2257	2250	175	230	240	0,60	185	205
DF*HV13°D2517	2510	125	370	380	0,37	255	255
DF*HV23°D2517	2510	125	370	380	0,30	295	335
DF*HV32°D2957	2950	175	295	305	0,57	215	240
DF*HV42°D2957	2950	175	295	305	0,48	230	260
DF*HV14°D3147	3140	125	450	460	0,34	255	255
DF*HV24°D3147	3140	125	450	460	0,27	345	390
DF*HV15°D3777	3770	125	530	540	0,32	255	255
DF*HV25°D3777	3770	125	530	540	0,25	395	400
DF*HV33°D3937	3930	175	370	380	0,49	255	255
DF*HV43°D3937	3930	175	370	380	0,40	280	310
DF*HV16°D4407	4400	125	610	620	0,31	255	255
DF*HV26°D4407	4400	125	610	620	0,24	400	400
DF*HV34°D4917	4910	175	450	460	0,44	255	255
DF*HV44°D4917	4910	175	450	460	0,35	330	365
DF*HV35°D5907	5900	175	530	540	0,42	255	255
DF*HV45°D5907	5900	175	530	540	0,33	375	400
DF*HV36°D6887	6880	175	610	620	0,40	255	255
DF*HV46°D6887	6880	175	610	620	0,31	400	400

* Insert F for resin top or T for hermetic case

° Insert F for female terminals or M for male terminals

DC FILTERING

FFHV/FTHV 1600Vdc to 3000Vdc

TABLE OF VALUES

Part Number	Capacitance (µF)	Width (mm)	Height (mm)		R_s (mΩ)	I_{rms} Thermal 1 (A)	I_{rms} Thermal 2 (A)
			FFHV	FTHV			
Un = 2450Vdc							
DF*HV11°E1067	1060	125	230	240	0,56	165	190
DF*HV21°E1067	1060	125	230	240	0,48	175	195
DF*HV12°E1377	1370	125	295	305	0,47	205	230
DF*HV22°E1377	1370	125	295	305	0,40	215	240
DF*HV31°E1707	1700	175	230	240	0,75	165	185
DF*HV41°E1707	1700	175	230	240	0,66	175	195
DF*HV13°E1847	1840	125	370	380	0,41	250	255
DF*HV23°E1847	1840	125	370	380	0,33	265	300
DF*HV32°E2207	2200	175	295	305	0,63	200	225
DF*HV42°E2207	2200	175	295	305	0,54	215	240
DF*HV14°E2307	2300	125	450	460	0,38	255	255
DF*HV24°E2307	2300	125	450	460	0,30	315	355
DF*HV15°E2757	2750	125	530	540	0,36	255	255
DF*HV25°E2757	2750	125	530	540	0,28	360	400
DF*HV33°E2947	2940	175	370	380	0,53	245	255
DF*HV43°E2947	2940	175	370	380	0,44	260	290
DF*HV16°E3217	3210	125	610	620	0,34	255	255
DF*HV26°E3217	3210	125	610	620	0,26	400	400
DF*HV34°E3687	3680	175	450	460	0,48	255	255
DF*HV44°E3687	3680	175	450	460	0,39	310	340
DF*HV35°E4427	4420	175	530	540	0,44	255	255
DF*HV45°E4427	4420	175	530	540	0,35	350	390
DF*HV36°E5157	5150	175	610	620	0,42	255	255
DF*HV46°E5157	5150	175	610	620	0,33	390	400
Un = 2750Vdc							
DF*HV11°F0877	870	125	230	240	0,57	155	175
DF*HV21°F0877	870	125	230	240	0,50	160	185
DF*HV12°F1137	1130	125	295	305	0,48	200	225
DF*HV22°F1137	1130	125	295	305	0,41	205	235
DF*HV31°F1397	1390	175	230	240	0,80	160	175
DF*HV41°F1397	1390	175	230	240	0,71	165	185
DF*HV13°F1517	1510	125	370	380	0,41	245	255
DF*HV23°F1517	1510	125	370	380	0,34	260	290
DF*HV32°F1827	1820	175	295	305	0,65	195	215
DF*HV42°F1827	1820	175	295	305	0,56	205	230
DF*HV14°F1897	1890	125	450	460	0,37	255	255
DF*HV24°F1897	1890	125	450	460	0,30	305	345
DF*HV15°F2277	2270	125	530	540	0,35	255	255
DF*HV25°F2277	2270	125	530	540	0,28	350	400
DF*HV33°F2427	2420	175	370	380	0,55	235	255
DF*HV43°F2427	2420	175	370	380	0,46	250	280
DF*HV16°F2657	2650	125	610	620	0,33	255	255
DF*HV26°F2657	2650	125	610	620	0,26	400	400
DF*HV34°F3037	3030	175	450	460	0,49	255	255
DF*HV44°F3037	3030	175	450	460	0,40	295	330
DF*HV35°F3647	3640	175	530	540	0,46	255	255
DF*HV45°F3647	3640	175	530	540	0,37	340	375
DF*HV36°F4257	4250	175	610	620	0,43	255	255
DF*HV46°F4257	4250	175	610	620	0,34	380	400

* Insert F for resin top or T for hermetic case

° Insert F for female terminals or M for male terminals

DC FILTERING

FFHV/FTHV 1600Vdc to 3000Vdc

TABLE OF VALUES

Part Number	Capacitance (µF)	Width (mm)	Height (mm)		R_s (mΩ)	I_{rms} Thermal 1 (A)	I_{rms} Thermal 2 (A)
			FFHV	FTHV			
Un = 3000Vdc							
DF*HV11°G0717	710	125	230	240	0,61	145	165
DF*HV21°G0717	710	125	230	240	0,54	150	170
DF*HV12°G0937	930	125	295	305	0,51	185	210
DF*HV22°G0937	930	125	295	305	0,44	195	220
DF*HV31°G1147	1140	175	230	240	0,85	150	165
DF*HV41°G1147	1140	175	230	240	0,76	155	175
DF*HV13°G1247	1240	125	370	380	0,43	230	255
DF*HV23°G1247	1240	125	370	380	0,36	240	275
DF*HV32°G1497	1490	175	295	305	0,70	185	205
DF*HV42°G1497	1490	175	295	305	0,61	195	215
DF*HV14°G1557	1550	125	450	460	0,39	255	255
DF*HV24°G1557	1550	125	450	460	0,32	285	325
DF*HV15°G1867	1860	125	530	540	0,36	255	255
DF*HV25°G1867	1860	125	530	540	0,29	330	375
DF*HV33°G1997	1990	175	370	380	0,58	225	250
DF*HV43°G1997	1990	175	370	380	0,48	240	265
DF*HV16°G2177	2170	125	610	620	0,35	255	255
DF*HV26°G2177	2170	125	610	620	0,28	375	400
DF*HV34°G2497	2490	175	450	460	0,52	255	255
DF*HV44°G2497	2490	175	450	460	0,43	280	310
DF*HV35°G2997	2990	175	530	540	0,48	255	255
DF*HV45°G2997	2990	175	530	540	0,39	320	360
DF*HV36°G3487	3480	175	610	620	0,45	255	255
DF*HV46°G3487	3480	175	610	620	0,36	360	400

* Insert F for resin top or T for hermetic case

° Insert F for female terminals or M for male terminals

DC FILTERING

FFHV/FTHV 1600Vdc to 3000Vdc

CALCULATION FORM

SPECIFICATION

Capacitance	C (µF)	
Working voltage	U_w (V)	
Rms current	I_{rms} (Arms)	
Frequency	f (Hz)	
Ripple voltage	Ur (V)	
Ambient temperature	θ_{amb} (°C)	
Lifetime @ U_w,I_{rms} and θ_{amb}	hours	
Parasitic inductance	L (nH)	
Cooling conditions		

Your choice

PN		
Capacitance	C (µF)	
Rated voltage	U_n (V)	
Serial resistance	R_s (mΩ)	
Thermal resistance between hot spot and case	R_{th1} (°C/W)	
Thermal resistance between case and ambiant air	R_{th2} (°C/W)	

CALCULATIONS

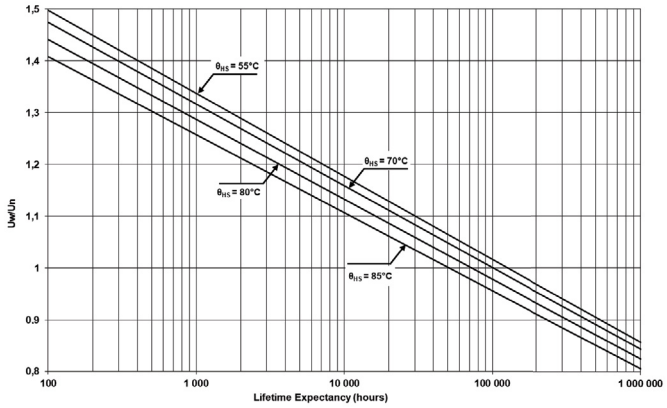
Maximum ripple voltage	$U_{rmax} = 0.2\ U_n$	U_{rmax} =	V

The maximum ripple voltage of the selected capacitor must be in any case higher than the ripple voltage of your application

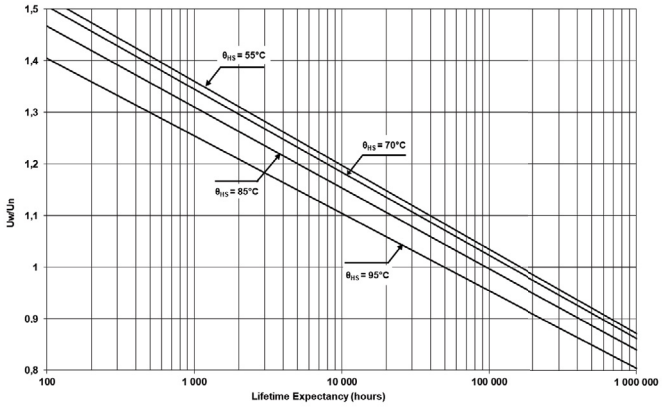
Ratio U_w/U_n	$\rho = U_w/U_n$	ρ =	
Joule losses	$P_j = R_s x I_{rms2}$	P_j =	W
Dielectric losses	$P_d = Qxtg\delta 0 = Qx\ 3.10^{-4}$	P_d =	W
Hot spot temperature	$\theta_{HS} = \theta_{amb} + (P_j + P_d) x R_{th}$	θ_{HS} =	°C

The hot spot temperature must be in any case lower than 85°C for FFHV and 95°C for FTHV

FFHV LIFETIME EXPECTANCY



FTHV LIFETIME EXPECTANCY



Expected lifetime at hot spot calculated and U = U_w	