

# FH SERIES ■ HIGH RIPPLE CURRENT 105°C TYPE

## KEY FEATURES



- **ALUMINUM ELECTROLYTIC CAPACITOR** • THT type
- Endurance: 105°C ■ 4 000 hours up to 10 000 hours
- Low impedance and high ripple current
- Wide capacitance range, up to 18000μF
- Low voltage version



## SPECIFICATIONS

Items		Performance Characteristics								
Operating Temperature Range		-40 ~ +105°C								
Rated Voltage Range	$V_R$	6.3 ~ 100V DC								
Surge Voltage	$V_S$	$V_S = 1.15 \cdot V_R$								
Capacitance Range	$C_R$	6.8 ~ 18000μF								
Cap. Tolerance	$\Delta C$	±20% (120Hz ■ 20°C)								
Leakage Current (20°C ■ $V_R$ applied)	$I_{LEAK}$	$\leq 0.01 \cdot C_R \cdot V_R$ or 3μA, whichever is greater ■ After 2 minutes [ $I_{LEAK}$ (μA) ; $C_R$ (μF) ; $V_R$ (V) ]								
Dissipation Factor % (20°C ■ 120Hz)	tanδ	$V_R$ (V DC)	6.3	10	16	25	35	50	63	100
		tanδ (%)	22	19	16	14	12	10	9	8
For $C_R > 1000\mu F$ , add 2% per every multiple 1000μF of rated capacitance value										
Low Temperature Characteristics at 120Hz	Z ratio max.	$V_R$ (V DC)	6.3	10	16	25	35	50	63	100
		Z-25°C/Z+20°C	4	3	2	2	2	2	2	2
		Z-40°C/Z+20°C	8	6	4	3	3	3	3	3
		For capacitance > 1000μF								
		Z-25°C/Z+20°C	Add 0.5 for every multiple 1000μF of rated capacitance value							
Z-40°C/Z+20°C	Add 1 for every multiple 1000μF of rated capacitance value									

Lifetime Test			
Endurance 105°C ( $V_R$ & $I_R$ applied)	Test	4 000 hours	$\phi D \leq 6.3$ mm ■ 6.3 ~ 10V
		5 000 hours	$\phi D \leq 6.3$ mm ■ 16 ~ 100V
		6 000 hours	$\phi D = 8$ & 10 mm ■ 6.3 ~ 10V
		7 000 hours	$\phi D = 8$ & 10 mm ■ 16 ~ 100V
		8 000 hours	$\phi D \geq 13$ mm ■ 6.3 ~ 10V
		10 000 hours	$\phi D \geq 13$ mm ■ 16 ~ 100V
		$\Delta C/C_R$	$\leq \pm 25\%$ of initial measured value
	tanδ	$\leq 200\%$ of initial specified value	
	$I_{Leak}$	$\leq$ the initial specified value	
Shelf Life 105°C ( $V_R = 0$ )	Test	1 000 hours	
	$\Delta C/C_R$	$\leq \pm 25\%$ of initial measured value	
	tanδ	$\leq 200\%$ of initial specified value	
	$I_{Leak}$	$\leq$ the initial specified value	
Before measurement: Restore capacitor to 20°C, apply $V_R$ for 30 min according JIS-C-5101-4			

**STANDARD RATINGS**

Part number shows bulk version with straight leads

V <sub>R</sub> (V)	C <sub>R</sub> (μF)	∅ D (mm)	L (mm)	Z - Max. Impedance +20°C - 100kHz (mΩ)	I <sub>R</sub> - Max. Ripple Current +105°C - 100kHz (mA rms)	CapXon Part Number
6.3	150	5	11	550	220	FH151M6R3C110A
	220	6.3	11	260	300	FH221M6R3E110A
	330	6.3	11	210	350	FH331M6R3E110A
	470	8	11.5	140	440	FH471M6R3F115A
	680	8	11.5	130	650	FH681M6R3F115A
	820	10	12.5	90	870	FH821M6R3G125A
	1000	8	16	80	850	FH102M6R3F160A
	1200	8	20	75	1060	FH122M6R3F200A
	1200	10	16	64	1220	FH122M6R3G160A
	1500	10	20	50	1410	FH152M6R3G200A
	1800	13	16	49	1460	FH182M6R3I160A
	2200	10	25	46	1660	FH222M6R3G250A
	2700	16	16	42	1950	FH272M6R3J160A
	3300	13	20	38	1910	FH332M6R3I200A
	3900	13	25	29	2240	FH392M6R3I250A
	3900	18	16	40	2220	FH392M6R3K160A
	4700	13	30	27	2660	FH472M6R3I300A
	5600	13	35	24	2890	FH562M6R3I350A
	5600	16	20	27	2540	FH562M6R3J200A
	6800	13	40	17	3360	FH682M6R3I400A
	6800	16	25	21	2940	FH682M6R3J250A
	6800	18	20	26	2870	FH682M6R3K200A
	8200	16	31.5	17	3460	FH822M6R3J315A
	10000	16	35.5	15	3620	FH103M6R3J355A
	10000	18	25	19	3150	FH103M6R3K250A
	12000	16	40	13	4090	FH123M6R3J400A
12000	18	31.5	15	4180	FH123M6R3K315A	
15000	18	35.5	14	4230	FH153M6R3K355A	
18000	18	40	12	4290	FH183M6R3K400A	
10	100	5	11	580	220	FH101M010C110A
	220	6.3	11	230	350	FH221M010E110A
	330	6.3	11	220	450	FH331M010E110A
	470	8	11.5	130	650	FH471M010F115A
	680	8	16	96	850	FH681M010F160A
	680	10	12.5	85	870	FH681M010G125A
	820	10	16	75	950	FH821M010G160A
	1000	8	20	72	1060	FH102M010F200A
	1000	10	16	64	1220	FH102M010G160A
	1200	10	20	45	1410	FH122M010G200A
	1500	10	25	43	1560	FH152M010G250A
	1500	13	16	49	1460	FH152M010I160A
	2200	10	30	30	1920	FH222M010G300A
	2200	13	20	35	1910	FH222M010I200A

See "PACKAGING INFORMATION" to taped or formed products.

**STANDARD RATINGS**

Part number shows bulk version with straight leads

$V_R$ (V)	$C_R$ ( $\mu F$ )	$\phi D$ (mm)	L (mm)	Z - Max. Impedance +20°C - 100kHz (m $\Omega$ )	$I_R$ - Max. Ripple Current +105°C - 100kHz (mA rms)	CapXon Part Number
10	2200	16	16	42	1950	FH222M010J160A
	2700	18	16	43	2220	FH272M010K160A
	3300	13	25	29	2240	FH332M010I250A
	3900	13	30	25	2660	FH392M010I300A
	3900	16	20	27	2540	FH392M010J200A
	4700	13	35	20	2890	FH472M010I350A
	5600	13	40	17	3360	FH562M010I400A
	5600	16	25	21	2940	FH562M010J250A
	5600	18	20	26	2870	FH562M010K200A
	6800	16	31.5	17	3460	FH682M010J315A
	6800	18	25	19	3150	FH682M010K250A
	8200	16	35.5	15	3620	FH822M010J355A
	8200	18	31.5	15	4180	FH822M010K315A
	10000	16	40	13	4090	FH103M010J400A
	10000	18	35.5	14	4230	FH103M010K355A
12000	18	40	12	4290	FH123M010K400A	
16	56	5	11	560	220	FH560M016C110A
	100	6.3	11	220	300	FH101M016E110A
	120	6.3	11	215	350	FH121M016E110A
	220	8	11.5	180	500	FH221M016F115A
	330	8	11.5	140	650	FH331M016F115A
	470	8	11.5	100	740	FH471M016F115A
	470	8	16	95	850	FH471M016F160A
	470	10	12.5	85	870	FH471M016G125A
	680	8	20	80	1060	FH681M016F200A
	680	10	16	60	1220	FH681M016G160A
	820	10	20	52	1300	FH821M016G200A
	1000	10	20	46	1410	FH102M016G200A
	1000	13	16	50	1460	FH102M016I160A
	1200	10	25	44	1660	FH122M016G250A
	1500	10	25	36	1770	FH152M016G250A
	1500	10	30	31	1920	FH152M016G300A
	1500	13	20	37	1910	FH152M016I200A
	1500	16	16	42	1950	FH152M016J160A
	1800	10	25	36	1800	FH182M016G250A
	1800	13	25	30	2080	FH182M016I250A
	2200	13	25	26	2240	FH222M016I250A
	2200	18	16	43	2220	FH222M016K160A
	2700	13	30	23	2660	FH272M016I300A
	2700	16	20	27	2540	FH272M016J200A
	3300	13	35	22	2890	FH332M016I350A
	3900	13	40	17	3360	FH392M016I400A
	3900	16	25	21	2940	FH392M016J250A

See "PACKAGING INFORMATION" to taped or formed products.

**STANDARD RATINGS**

Part number shows bulk version with straight leads

V <sub>R</sub> (V)	C <sub>R</sub> (μF)	∅ D (mm)	L (mm)	Z - Max. Impedance +20°C - 100kHz (mΩ)	I <sub>R</sub> - Max. Ripple Current +105°C - 100kHz (mA rms)	CapXon Part Number
16	3900	18	20	26	2870	FH392M016K200A
	4700	16	31.5	17	3460	FH472M016J315A
	4700	18	25	20	3150	FH472M016K250A
	5600	16	35.5	15	3620	FH562M016J355A
	5600	18	31.5	15	4180	FH562M016K315A
	6800	16	40	13	4090	FH682M016J400A
	8200	18	35.5	14	4230	FH822M016K355A
	10000	18	40	12	4290	FH103M016K400A
25	47	5	11	560	220	FH470M025C110A
	56	5	11	560	260	FH560M025C110A
	100	6.3	11	250	350	FH101M025E110A
	220	8	11.5	150	650	FH221M025F115A
	330	8	16	92	850	FH331M025F160A
	330	10	12.5	82	870	FH331M025G125A
	470	8	20	74	1060	FH471M025F200A
	470	10	12.5	74	1100	FH471M025G125A
	470	10	16	68	1220	FH471M025G160A
	680	10	20	50	1410	FH681M025G200A
	680	13	16	49	1460	FH681M025I160A
	820	10	25	41	1660	FH821M025G250A
	1000	10	30	32	1920	FH102M025G300A
	1000	13	20	36	1910	FH102M025I200A
	1000	16	16	42	1950	FH102M025J160A
	1200	18	16	43	2220	FH122M025K160A
	1500	13	25	28	2240	FH152M025I250A
	1800	13	30	24	2660	FH182M025I300A
	1800	16	20	27	2540	FH182M025J200A
	2200	13	30	25	2695	FH222M025I300A
	2200	13	35	23	2890	FH222M025I350A
	2200	18	20	26	2870	FH222M025K200A
	2700	13	40	17	3360	FH272M025I400A
	2700	16	25	22	2940	FH272M025J250A
	3300	16	31.5	17	3460	FH332M025J315A
	3300	18	25	19	3150	FH332M025K250A
	3900	16	35.5	15	3620	FH392M025J355A
	3900	18	31.5	15	4180	FH392M025K315A
	4700	16	40	13	4090	FH472M025J400A
	4700	18	35.5	14	4230	FH472M025K355A
	5600	18	40	12	4290	FH562M025K400A
	35	33	5	11	550	230
47		5	11	450	300	FH470M035C110A
56		6.3	11	210	360	FH560M035E110A
100		6.3	11	180	480	FH101M035E110A

See "PACKAGING INFORMATION" to taped or formed products.

**STANDARD RATINGS**

Part number shows bulk version with straight leads

V <sub>R</sub> (V)	C <sub>R</sub> (μF)	∅ D (mm)	L (mm)	Z • Max. Impedance +20°C • 100kHz (mΩ)	I <sub>R</sub> • Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
35	150	8	11.5	140	680	FH151M035F115A
	220	8	11.5	95	870	FH221M035F115A
	220	8	16	90	1000	FH221M035F160A
	220	10	12.5	80	1060	FH221M035G125A
	270	8	20	70	1180	FH271M035F200A
	330	10	16	62	1380	FH331M035G160A
	470	10	20	48	1800	FH471M035G200A
	470	13	16	49	1560	FH471M035I160A
	560	10	25	42	1900	FH561M035G250A
	680	10	30	35	2000	FH681M035G300A
	680	13	20	34	2100	FH681M035I200A
	680	16	16	42	2050	FH681M035J160A
	1000	13	20	38	2180	FH102M035I200A
	1000	13	25	28	2400	FH102M035I250A
	1000	18	16	43	2220	FH102M035K160A
	1200	13	30	24	2800	FH122M035I300A
	1200	16	20	28	2800	FH122M035J200A
	1500	13	35	22	3000	FH152M035I350A
	1800	13	40	17	3360	FH182M035I400A
	1800	16	25	20	2940	FH182M035J250A
	1800	18	20	26	2870	FH182M035K200A
	2200	16	31.5	17	3460	FH222M035J315A
	2200	18	20	25	2930	FH222M035K200A
	2200	18	25	19	3150	FH222M035K250A
	2700	16	35.5	18	3620	FH272M035J355A
	2700	18	31.5	16	4180	FH272M035K315A
	3300	16	40	13	4090	FH332M035J400A
	3300	18	35.5	14	4230	FH332M035K355A
3900	18	40	12	4300	FH392M035K400A	
50	22	5	11	650	220	FH220M050C110A
	47	6.3	11	370	270	FH470M050E110A
	56	6.3	11	290	300	FH560M050E110A
	100	8	11.5	160	680	FH101M050F115A
	120	8	16	120	760	FH121M050F160A
	150	10	12.5	120	800	FH151M050G125A
	180	8	20	90	1000	FH181M050F200A
	220	10	16	82	1300	FH221M050G160A
	270	10	20	60	1350	FH271M050G200A
	270	13	16	61	1270	FH271M050I160A
	330	10	25	57	1600	FH331M050G250A
	470	10	30	48	1800	FH471M050G300A
470	13	20	45	1740	FH471M050I200A	
470	16	16	55	1710	FH471M050J160A	

See "PACKAGING INFORMATION" to taped or formed products.

**STANDARD RATINGS**

Part number shows bulk version with straight leads

$V_R$ (V)	$C_R$ ( $\mu$ F)	$\phi D$ (mm)	L (mm)	Z - Max. Impedance +20°C - 100kHz (m $\Omega$ )	$I_R$ - Max. Ripple Current +105°C - 100kHz (mA rms)	CapXon Part Number
50	560	13	25	42	1960	FH561M050I250A
	560	18	16	54	1940	FH561M050K160A
	680	13	30	30	2320	FH681M050I300A
	820	13	35	25	2520	FH821M050I350A
	820	16	20	34	2220	FH821M050J200A
	1000	13	35	24	2650	FH102M050I350A
	1000	13	40	21	2930	FH102M050I400A
	1000	16	25	25	2565	FH102M050J250A
	1000	18	20	36	2500	FH102M050K200A
	1200	16	31.5	30	3020	FH122M050J315A
	1200	18	25	26	2750	FH122M050K250A
	1500	16	35.5	19	3160	FH152M050J355A
	1800	16	40	16	3720	FH182M050J400A
	1800	18	31.5	21	3645	FH182M050K315A
	2200	18	35.5	17	3690	FH222M050K355A
	2700	18	40	14	3810	FH272M050K400A
3300	18	40	14	3810	FH332M050K400A	
63	15	5	11	1800	65	FH150M063C110A
	33	6.3	11	1200	260	FH330M063E110A
	47	8	11.5	660	360	FH470M063F115A
	56	8	11.5	600	380	FH560M063F115A
	82	8	16	440	460	FH820M063F160A
	82	10	12.5	430	500	FH820M063G125A
	100	10	12.5	340	640	FH101M063G125A
	120	8	20	320	700	FH121M063F200A
	120	10	16	300	760	FH121M063G160A
	180	10	20	190	880	FH181M063G200A
	180	13	16	180	800	FH181M063I160A
	220	10	20	188	995	FH221M063G200A
	220	10	25	185	1100	FH221M063G250A
	270	10	30	120	1200	FH271M063G300A
	270	13	20	160	1200	FH271M063I200A
	270	16	16	110	1200	FH271M063J160A
	330	13	25	120	1600	FH331M063I250A
	390	18	16	96	1610	FH391M063K160A
	470	13	30	100	1800	FH471M063I300A
	470	16	20	77	1500	FH471M063J200A
	560	13	35	70	2000	FH561M063I350A
	560	16	25	73	2000	FH561M063J250A
	680	13	40	70	2200	FH681M063I400A
	680	18	20	72	1600	FH681M063K200A
820	16	31.5	54	2400	FH821M063J315A	
820	18	25	52	1800	FH821M063K250A	

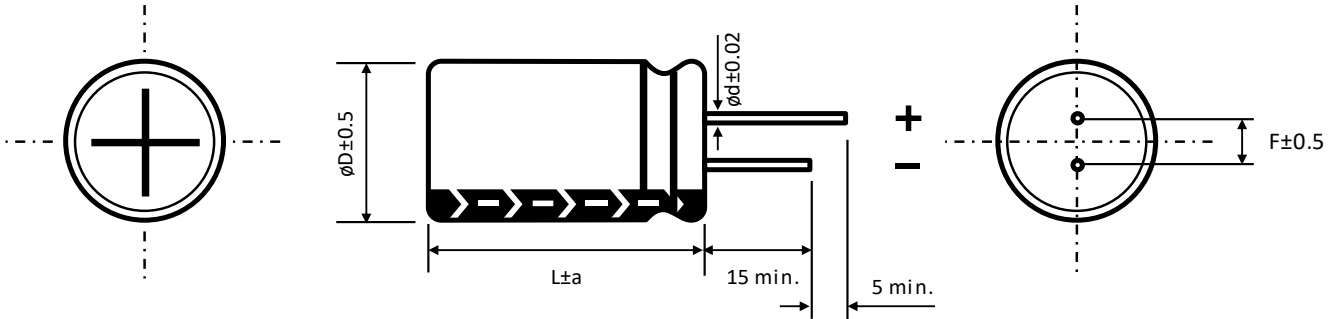
See "PACKAGING INFORMATION" to taped or formed products.

**STANDARD RATINGS**

Part number shows bulk version with straight leads

V <sub>R</sub> (V)	C <sub>R</sub> (μF)	∅ D (mm)	L (mm)	Z • Max. Impedance +20°C • 100kHz (mΩ)	I <sub>R</sub> • Max. Ripple Current +105°C • 100kHz (mA rms)	CapXon Part Number
63	1000	16	35.5	48	2500	FH102M063J355A
	1000	18	25	52	2290	FH102M063K250A
	1000	18	31.5	47	2800	FH102M063K315A
	1200	16	40	40	2920	FH122M063J400A
	1200	18	31.5	45	2850	FH122M063K315A
	1200	18	35.5	39	3000	FH122M063K355A
	1500	18	40	36	3200	FH152M063K400A
100	6.8	5	11	1800	65	FH6R8M100C110A
	15	6.3	11	1000	130	FH150M100E110A
	27	8	11.5	610	300	FH270M100F115A
	39	8	16	360	340	FH390M100F160A
	47	10	12.5	420	400	FH470M100G125A
	56	8	20	260	410	FH560M100F200A
	68	10	16	300	460	FH680M100G160A
	82	10	20	210	600	FH820M100G200A
	82	13	16	180	540	FH820M100I160A
	100	10	25	200	800	FH101M100G250A
	120	10	30	120	830	FH121M100G300A
	120	13	20	160	900	FH121M100I200A
	150	13	20	110	1000	FH151M100I200A
	150	16	16	110	1000	FH151M100J160A
	180	13	25	96	1010	FH181M100I250A
	180	18	16	96	1180	FH181M100K160A
	220	13	30	80	1210	FH221M100I300A
	220	16	20	77	1140	FH221M100J200A
	270	13	35	70	1450	FH271M100I350A
	270	16	25	73	1480	FH271M100J250A
	330	13	40	71	1600	FH331M100I400A
	330	18	20	72	1400	FH331M100K200A
	390	16	31.5	55	1700	FH391M100J315A
	390	18	25	54	1740	FH391M100K250A
	470	16	35.5	47	1910	FH471M100J355A
	470	18	31.5	47	1730	FH471M100K315A
	560	16	40	36	2140	FH561M100J400A
	680	18	35.5	42	2000	FH681M100K355A
820	18	40	40	2480	FH821M100K400A	
1000	18	40	38	2580	FH102M100K400A	

See "PACKAGING INFORMATION" to taped or formed products.

**DIMENSIONS** ▪ All dimensions in mm


$\phi D$	5	6.3	8		10	13	16	18
F	2	2.5	3.5		5	5	7.5	7.5
$\phi d$	0.5		L < 20	L ≥ 20	0.6		0.8	
			0.5	0.6				

a	$\phi D < 16$	$\phi D = 16$		$\phi D = 18$	
	1.5	L = 25 to 35.5	L < 25 and L ≥ 40	L = 25 to 31.5	L < 25 and L ≥ 35.5
		1.5	2	1.5	2

**MULTIPLIER  $K_f$  for RIPPLE CURRENT vs. FREQUENCY**

$C_R$ ( $\mu F$ ) / Frequency (Hz)	50/60	100/120	400	1k	10k	100k
$C_R \leq 10$	0.47	0.59	0.76	0.85	0.97	1
$10 < C_R \leq 100$	0.52	0.62	0.8	0.89	0.97	1
$100 < C_R \leq 1000$	0.58	0.72	0.84	0.9	0.98	1
$1000 \leq C_R$	0.63	0.78	0.87	0.91	0.98	1

**PRECAUTIONS, GUIDELINES AND PACKAGING INFORMATION**

Unless otherwise agreed in individual specifications, all products are subject to our “General Precautions and Guidelines” as well as our “Packaging Information”. Please refer to the following links in the table.

<a href="#">General Precautions &amp; Guidelines</a>	<a href="#">Packaging Information</a>	<a href="#">3D Models</a>	<a href="#">Reliability Tests</a>





### DISCLAIMER

All product related data (e.g. specification, statements and general information) are subject to change without any notice. It is necessary that the customer observes all product related technical / application information and handling instructions.

CapXon products are designed and manufactured according to severe quality and safety standards. Under no circumstance, CapXon warrants that any CapXon product is suitable for the purposes intended for your application, even CapXon knows the application. It is customer's duty and obligation to check and make sure that CapXon products are suitable for the purposes intended and select the correct and proper CapXon product. Customers are requested to perform a sufficient validation and reliability evaluation to assure needed safety level and reliability performance by suitable designs and to apply proper safeguards (e.g. redundancies, protective circuits).

Particular operating conditions (ambient temperature, ripple current, voltage, thermal resistance, etc.) as well as storage, production or assembly may affect the performance and the lifetime of the capacitor. Please consult CapXon for lifetime estimation, failure mode considerations or worst-case scenarios according to the product technology, product tolerances / deviations or change of the characteristics of the capacitor due to shipment, storage, handling, production and usage.

For aerospace or military application, life-saving, life-sustaining, safety critical applications or any application where failure may cause severe personal injury or death, please consult us before design-in the capacitor in your application.

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