

ASSP

# TIMING EXTRACTION BANDPASS FILTER (1.5 to 100MHz)

## F1/F2/F3 SERIES

### ■ DESCRIPTION

The F1, F2 and F3 Series were developed as timing extraction filters for primary, secondary, and tertiary digital communication devices.

This new all-solid-state bandpass filter (BPF) uses a piezoelectric with a large electromechanical coefficient (lithium tantalate:  $\text{LiTaO}_3$ ). The filter has a wide bandwidth, and is very stable.

### ■ FEATURES

- Wide frequency range 1.5 to 100MHz
- Wide fractional bandwidth (%): 0.1 to 2.5
- Low insertion loss: 6dB or less
- Excellent temperature characteristics: 1.5 to 35MHz:  $\pm 400\text{ppm}$  or less (0 to 60°C)  
36 to 100MHz:  $-30\text{ppm}/^\circ\text{C}$  (0 to 60°C)
- Small frequency deviation  $\Delta f_o < \pm 500\text{ppm}$  eliminating the need for adjustment
- Highly reliable hermetically sealed package
- Compatible with small 14-pin DIP IC

### ■ PACKAGE

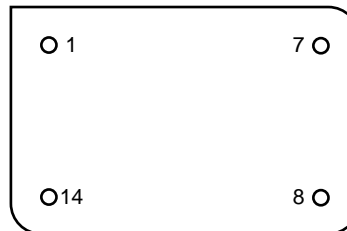
14-PIN DIP SIZE METAL CASE



# F1/F2/F3 SERIES

## ■ PIN ASSIGNMENT

(BOTTOM VIEW)



Pin No.	Pin name	Description
1	IN	Input pin
7	GND	Ground pin
8	NC	No connection
14	OUT	Output pin

## ■ MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Operating temperature	$T_a$	-20 to 80	°C
Storage temperature	$T_{stg}$	-40 to 80	°C
Insulation resistance	IR	100 (100V DC)	MΩ
Frequency range	—	1.5 to 100	MHz

## ■ RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Rating	Unit
Operating temperature	$T_a$	0 to 70	°C

# F1/F2/F3 SERIES

## ■ STANDARD FREQUENCY

Series	Standard frequency	Application	Remarks
F1	1.544MHz	For the U.S. and Japan (primary group)	
	2.048MHz	For Europe (primary group)	
	3.088MHz	For the U.S. and Japan (primary group)	$1.544 \times 2$
	3.152MHz	For the U.S. and Japan (primary group)	
	4.096MHz	For Europe (primary group)	$2.048 \times 2$
	6.312MHz	For the U.S. and Japan (secondary group)	
	8.192MHz	For the U.S. and Japan (secondary group)	
	8.448MHz	For Europe (secondary group)	
	12.624MHz	For the U.S. and Japan (secondary group)	$6.312 \times 2$
	16.384MHz	For the U.S. and Japan (secondary group)	$8.192 \times 2$
F2	16.896MHz	For Europe (secondary group)	$8.448 \times 2$
	32.064MHz	For Japan (tertiary group)	
	34.368MHz	For Europe (tertiary group)	
F3	44.736MHz	For the U.S. (tertiary group)	

# F1/F2/F3 SERIES

## ■ ELECTRICAL CHARACTERISTICS

### F1 Series

Item	Symbol	Condition	Rating			Unit	Remarks
			Min.	Typical	Max.		
Frequency deviation	$\Delta f_o$	—	−500	—	+500	ppm	$f_o$ standard
Load Q	Q	—	1000	—	40	—	
Insertion loss	IL	—	—	—	6	dB	
Stop band attenuation	$A_{OUT}$	$f_o \pm 10\text{MHz}$	20	—	—	dB	
Frequency stability with temperature	$\Delta f (T_a)$	—	−400	—	+400	ppm	25°C standard, $T_a = 0$ to 70°C

### F2 Series

Item	Symbol	Condition	Rating			Unit	Remarks
			Min.	Typical	Max.		
Frequency deviation	$\Delta f_o$	—	−500	—	+500	ppm	$f_o$ standard
Load Q	Q	—	1000	—	40	—	
Insertion loss	IL	—	—	—	6	dB	
Stop band attenuation	$A_{OUT}$	$f_o \pm 10\text{MHz}$	20	—	—	dB	
Frequency stability with temperature	$\Delta f (T_a)$	—	−400	—	+400	ppm	25°C standard, $T_a = 0$ to 70°C

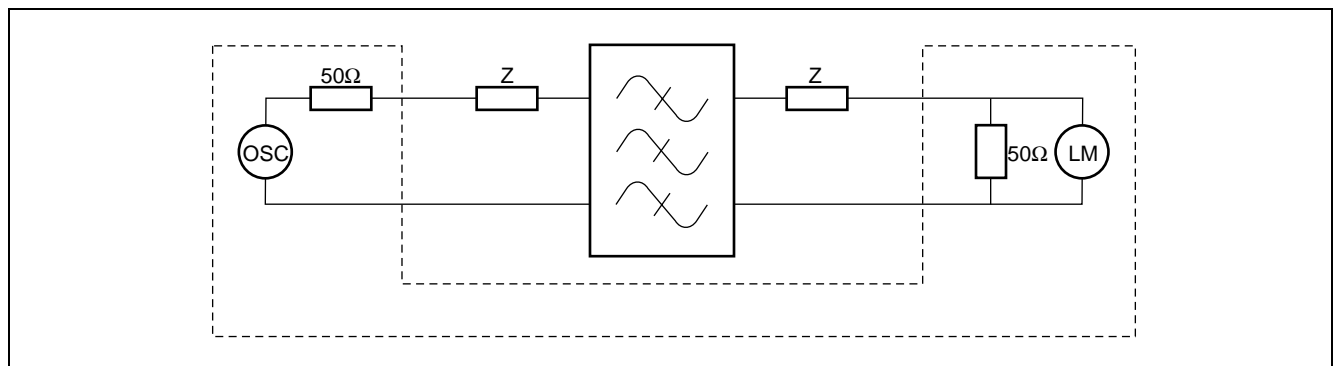
### F3 Series

Item	Symbol	Condition	Rating			Unit	Remarks
			Min.	Typical	Max.		
Frequency deviation	$\Delta f_o$	—	−500	—	+500	ppm	$f_o$ standard
Load Q	Q	—	200	—	50	—	
Insertion loss	IL	—	—	—	6	dB	
Stop band attenuation	$A_{OUT}$	$f_o \pm 10\text{MHz}$	20	—	—	dB	
Frequency stability with temperature	$\Delta f (T_a)$	—	−1350	—	750	ppm	25°C standard, $T_a = 0$ to 70°C

## ■ ELECTRICAL CHARACTERISTICS

No.	Standard frequency (MHz)	Part number	Specification			
			Load Q	Insertion loss, IL (dB)	Phase rotation $\theta$ (degree)	Terminating impedance Z ( $\Omega$ )
1	1.544	FAR-F1DA-1M5440-G201	110 $\pm$ 20	3 or less	-90 $\pm$ 20	790
2	1.544	FAR-F1DA-1M5440-G202	110 $\pm$ 20	3 or less	-90 $\pm$ 20	1000
3	1.544	FAR-F1DA-1M5440-G203	60 $\pm$ 10	3 or less	-95 $\pm$ 10	2035/20pF
4	1.544	FAR-F1DA-1M5440-G205	110 $\pm$ 20	3 or less	-90 $\pm$ 20	2000
5	2.048	FAR-F1DA-2M0480-G201	40 $\pm$ 10	3 or less	-90 $\pm$ 10	2035
6	2.048	FAR-F1DA-2M0480-G202	100 $\pm$ 20	3 or less	-90 $\pm$ 20	1000
7	3.088	FAR-F1DA-3M0880-G201	150 $\pm$ 20	3 or less	-90 $\pm$ 20	640
8	3.152	FAR-F1DA-3M1520-G201	85 $\pm$ 15	3 or less	-90 $\pm$ 15	1285
9	4.096	FAR-F1DA-4M0960-G201	110 $\pm$ 20	3 or less	-90 $\pm$ 20	750
10	6.312	FAR-F1DA-6M3120-G201	110 $\pm$ 20	3 or less	-90 $\pm$ 20	985
11	6.312	FAR-F1DA-6M3120-G202	110 $\pm$ 20	3 or less	-90 $\pm$ 20	1000
12	8.192	FAR-F1DA-8M1920-G201	100 $\pm$ 20	3 or less	-90 $\pm$ 20	980
13	8.448	FAR-F1DA-8M4480-G201	110 $\pm$ 20	3 or less	-90 $\pm$ 20	980
14	12.624	FAR-F1DA-12M624-G201	100 $\pm$ 20	3 or less	-90 $\pm$ 20	590
15	16.384	FAR-F1DA-16M384-G201	100 $\pm$ 20	3 or less	-90 $\pm$ 20	410
16	16.896	FAR-F1DA-16M896-G201	100 $\pm$ 20	3 or less	-90 $\pm$ 20	390
17	32.064	FAR-F2DA-32M064-G201	100 $\pm$ 10	3 or less	-90 $\pm$ 15	100
18	34.368	FAR-F2DA-34M368-G201	100 $\pm$ 10	3 or less	-90 $\pm$ 15	100
19	44.736	FAR-F3DA-44M736-G201	65 $\pm$ 15	6 or less	38 $\pm$ 10	105

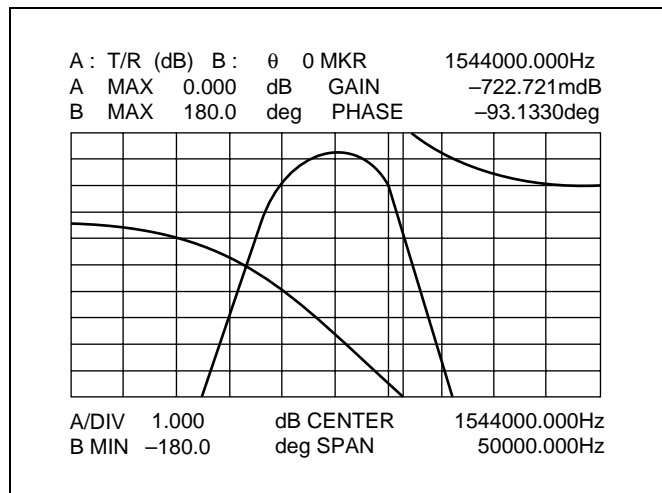
## ■ TEST CIRCUIT



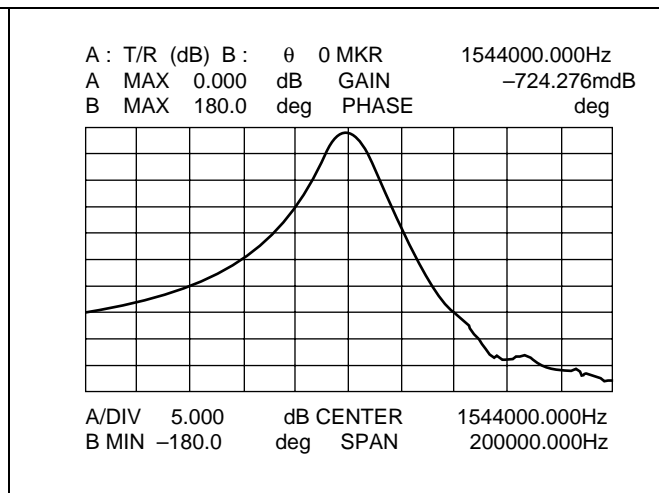
# F1/F2/F3 SERIES

## ■ CHARACTERISTICS SAMPLE

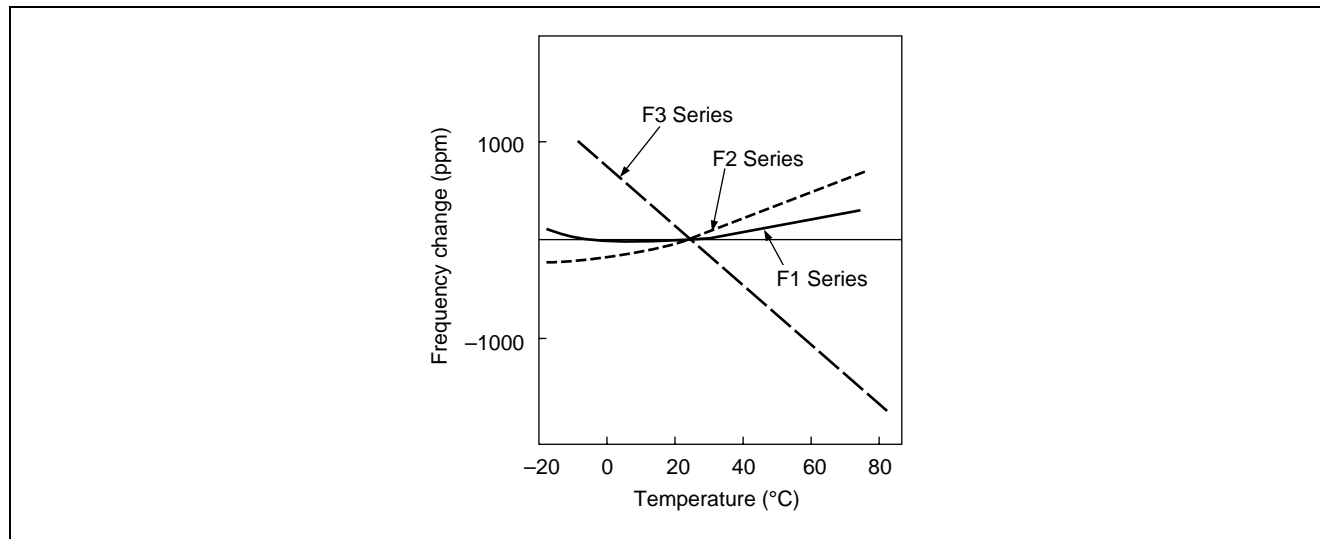
Pass band characteristic



Stop band characteristic



Temperature characteristic



## ■ PART NUMBERING SYSTEM

[Example]

FAR-F1DA-□□□□□□-G□□□

① ② ③

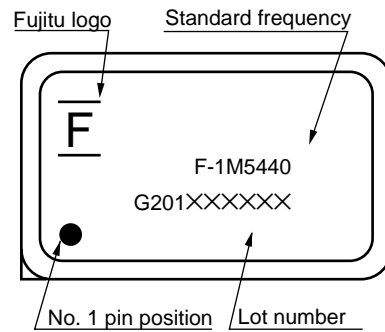
① Series designation

② Frequency designation: The standard frequency is designated in six alphanumeric characters. M is used to designate the decimal point in MHz. Refer to "ELECTRIC CHARACTERISTICS" in detail  
 Example: 1.544MHz: 1M5440

③ Serial number: The serial number is assigned from 201 to 999 (201 is normal).

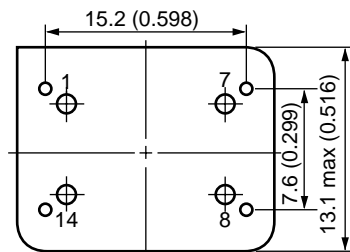
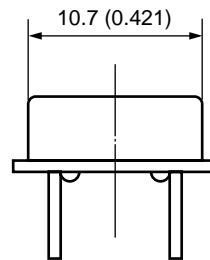
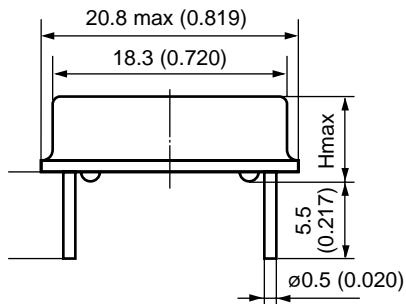
# F1/F2/F3 SERIES

## MARKING



## DIMENSIONS

Unit: mm (in.)



Series	H
F1 < 3 MHz	8.5 (0.335)
F1 ≥ 3 MHz	5.8 (0.228)
F2	5.8 (0.228)
F3	5.8 (0.228)

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