### ASSP Mobile Communication Systems

# Piezoelectric SAW BPF (700 MHz to 1000 MHz)

# F5CM Series (B2)

#### DESCRIPTION

The F5CM series of SAW filters have balanced in/unbalanced out or unbalanced in/balanced out of I/O ports. Therefore these filters are suitable for the design using balanced type of IC. By using these filters, any transforming devises, such as balun is not required.

The F5CM series filters apply to the frequency range 700 MHz to 1000 MHz. High performance has been realized with high reliability and small size by using original materials and original design.

The F5CM series filters are suitable for RF interstage filter in mobile communication systems and standard parts are available for GSM and AMPS/TDMA/CDMA standards.

#### ■ FEATURES

- Balanced/unbalanced I/O ports
- Ultra compact and light package (3.0 mm × 3.0 mm package)
- · Any external matching circuit is not required
- Excellent stop-band attenuation
- Small pass-band ripple
- Surface mount package (SMT)

#### PACKAGE





#### ■ PIN ASSIGNMENT



#### ■ PIN DESCRIPTIONS

• BALANCED IN/UNBALANCED OUT type (Tx filter)

Pin no.	Pin name	Description			
1	GND	Ground Pin			
2	OUT	Unbalanced output Pin			
3	GND	Ground Pin			
4	IN	Balanced Input Pin			
5	GND	Ground Pin			
6	IN	Balanced Input Pin			

#### • UNBALANCED IN/BALANCED OUT type (Rx filter)

Pin no.	Pin name	Description
1	GND	Ground Pin
2	IN	Unbalanced Input Pin
3	GND	Ground Pin
4	OUT	Balanced Output Pin
5	GND	Ground Pin
6	OUT	Balanced Output Pin

#### ABSOLUTE MAXIMUM RATINGS

Paramotor	Symbol	Rat	Unit		
Falameter	Symbol	Min	Мах	Onit	
Operating temperature	Та	-30	+85	°C	
Storage temperature	Tstg	-40	+100	°C	
Input power	Pin	—	+15	dBm	
Input DC Voltage		-5	+5	V	

WARNING: Piezoelectric devices can be permanently damaged by application of stress (voltage, current, temperature, etc.) in excess of absolute maximum ratings. Do not exceed these ratings.

#### ■ RECOMMENDED OPERATING CONDITION

Parameter	Symbol	Va	Unit	
Farameter	Symbol	Min	Мах	Onit
Operating temperature	Та	-30	+85	°C

WARNING: The recommended operating conditions are required in order to ensure the normal operation of the piezoelectric device. All of the device's electrical characteristics are warranted when the device is operated within this range.

Always use piezoelectric devices within their recommended operating conditionranges. Operation outside these ranges may adversely affect reliability and could result in device failure.

No warranty is made with respect to uses, operating conditions, or combinations not represented on the data sheet. Users considering application outside the listed conditions are advised to contact their FUJITSU representatives beforehand.

#### ■ STANDARD DEVICES

System	า	Frequency (MHz)	Band width (MHz)	Input type/ Impedance	Output type/ Impedance	Part number	Part symbol
GSM	Рv	947.5	25	Unbalance	Balance 50 Ω	FAR-F5CM-947M50-B260	60
0.51		947.5	25	50 Ω	Balance 150 Ω	FAR-F5CM-947M50-B262	62
EGSM	Rx	942.5	35	Unbalance 50 Ω	Balance 50 Ω	FAR-F5CM-942M50-B270	70
AMPS/	Тх	836.5	25	Balance 50 Ω	Unbalance 50 Ω	FAR-F5CM-836M50-B268	68
CDMA	Rx	881.5	25	Unbalance 50 Ω	Balance 50 Ω	FAR-F5CM-881M50-B266	66

#### ■ ELECTRICAL CHARACTERISTICS AND TYPICAL FREQUENCY RESPONSE

#### 1. GSM (Rx) 50 ohms Unbalanced IN/50 ohms Balanced OUT Part number : FAR-F5CM-947M50-B260

 $(Ta = -30 \circ C \text{ to } +85 \circ C)$ 

Paramotor	Conditions		Value		Unit	Pomarka
Farameter	Conditions	Min	Тур	Max	Onic	itemarks
Insertion loss	935 MHz to 960 MHz	—	3.0	3.3	dB	
Pass-band ripple	935 MHz to 960 MHz		0.9	1.2	dB	
Absolute stop-band attenuation	DC to 890 MHz	45	56		dB	
	890 MHz to 915 MHz	25	31		dB	
	980 MHz to 1025 MHz	25	30		dB	
	1025 MHz to 2000 MHz	40	50		dB	
	2000 MHz to 3000 MHz	35	45		dB	



#### 2. GSM (Rx) 50 ohms Unbalanced IN/150 ohms Balanced OUT Part number : FAR-F5CM-947M50-B262

	(Ta	= -30 °C to +85 °C)				
Parameter	Conditions		Value		Unit	Domorko
		Min	Тур	Max		Remarks
Insertion loss	935 MHz to 960 MHz	—	3.3	3.8	dB	
Pass-band ripple	935 MHz to 960 MHz	—	0.8	1.3	dB	
Absolute stop-band attenuation	DC to 890 MHz	45	55		dB	
	890 MHz to 915 MHz	25	48		dB	
	980 MHz to 1025 MHz	23	29		dB	
	1025 MHz to 2000 MHz	40	50		dB	
	2000 MHz to 3000 MHz	35	39	—	dB	



#### 3. EGSM (Rx) 50 ohms Unbalanced IN/50 ohms Balanced OUT Part number : FAR-F5CM-942M50-B270

(Ta =  $-30 \degree C$  to  $+85 \degree C$ )

Paramotor	Conditions		Value		Unit	Remarks
Faiailletei	Conditions	Min	Тур	Max	Onic	
Insertion loss	925 MHz to 960 MHz		3.8	4.5	dB	
Pass-band ripple	925 MHz to 960 MHz		1.8	2.5	dB	
	DC to 880 MHz	50	55		dB	
Absolute	880 MHz to 915 MHz	15	22		dB	
stop-band	980 MHz to 1025 MHz	23	27		dB	
attenuation	1025 MHz to 2000 MHz	40	44		dB	
	2000 MHz to 3000 MHz	25	39		dB	



#### 4. AMPS/TDMA/CDMA (Tx) 50 ohms Balanced IN/50 ohms Unbalanced OUT Part number : FAR-F5CM-836M50-B268

	(Ta	= −30 °C to +85 °C)				
Paramotor	Conditions		Value		Unit	Remarks
Parameter		Min	Тур	Max		
Insertion loss	824 MHz to 849 MHz	—	2.8	3.5	dB	
Pass-band ripple	824 MHz to 849 MHz	—	0.9	1.6	dB	
Absolute stop-band attenuation	DC to 800 MHz	45	52		dB	
	869 MHz to 920 MHz	25	33		dB	
	920 MHz to 2000 MHz	35	46		dB	
	2000 MHz to 3000 MHz	25	33		dB	



#### 5. AMPS/TDMA/CDMA (Rx) 50 ohms Unbalanced IN/50 ohms Balanced OUT Part number : FAR-F5CM-881M50-B266

 $(Ta = -30 \degree C \text{ to } +85 \degree C)$ Value Parameter Conditions Unit Remarks Min Тур Max Insertion loss 869 MHz to 894 MHz 2.8 3.5 dB Pass-band ripple 869 MHz to 894 MHz 0.8 1.5 dB \_\_\_\_ DC to 800 MHz 45 55 dB \_\_\_\_\_ 47 800 MHz to 849 MHz 30 dB \_\_\_\_\_ Absolute 940 MHz to 1000 MHz 30 stop-band 38 dB \_\_\_\_ attenuation 1000 MHz to 2000 MHz 35 47 dB \_\_\_\_ 2000 MHz to 3000 MHz 25 32 dB



#### MEASUREMENT CIRCUIT



#### PART NUMBER DESIGNATION

[Designation example]

FAR-F5CM-<u></u>B2<u></u>-<u></u>(1) (2) (3)

 Frequency : Center frequency is specified in six alphanumeric. Enter M (for MHz) at the decimal point. Refer to below example.

 $[Example]902.5 \text{ MHz} \Rightarrow 902\text{M50}$ 

(2) Part symbol : Specified characters from 60 to 79.

(3) Packing : Y : 1 k pcs/reel

(Reeled tape) X:5 k pcs/reel

#### MARKING



#### ■ PACKAGE DIMENSION





#### ■ PACKING

#### 1. Reel Dimensions



#### 2. Packing Style



#### 3. Tape Dimensions



#### 4. Peel Strength of Top Cover Tapes



#### ■ RECOMMENDED REFLOW PROFILE



#### ■ NOTE

Mass-produced product order is accepted by a unit of 1000.

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