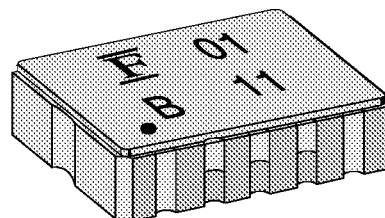
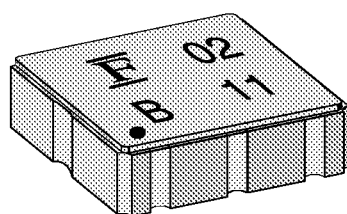


*ASSP Mobile Communication Systems***SAW Filter
(200 to 400 MHz)****F4C series (T1 type)****■ DESCRIPTION**

The F4C-T1 series of SAW filters apply to the frequency range of 200 to 400 MHz. These SAW filters are fabricated on a quartz substrate, producing narrow band width, small size and high reliability by original design and patterning technology. The filters having balanced Input/Output ports are also available. They make it easy to connect to the balanced type circuit. Especially, this series is suitable for GSM IF filter application.

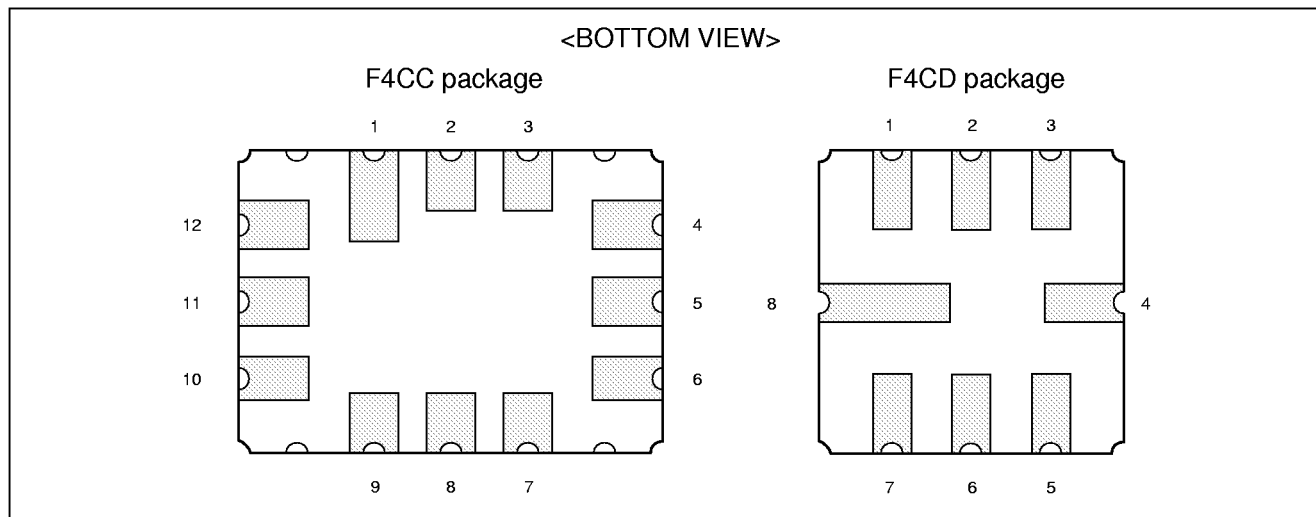
■ FEATURES

- Ultra compact and light package
- Both types are available, balanced port and single-ended port
- Surface mount package (SMT)
- Low insertion loss and high attenuation

■ PACKAGES

F4C Series (T1)

■ PIN ASSIGNMENTS



■ PIN DESCRIPTION

- F4CC package

Pin no.	Pin Description	
	Balanced in/ Balanced out type	Single in/ Single out type
1	Balanced Input	Single Input
2	Ground	Ground
3	Balanced Input	Ground
4	Ground	Ground
5	Ground	Ground
6	Ground	Ground
7	Balanced Output	Single Output
8	Ground	Ground
9	Balanced Output	Ground
10	Ground	Ground
11	Ground	Ground
12	Ground	Ground

- F4CD package

Pin no.	Pin Description	
	Balanced in/ Balanced out type	Single in/ Single out type
1	Balanced Input	Single Input
2	Ground	Ground
3	Balanced Input	Ground
4	Ground	Ground
5	Balanced Output	Single Output
6	Ground	Ground
7	Balanced Output	Ground
8	Ground	Ground

F4C Series (T1)

■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Operating temperature	Ta	-30	+85	°C
Storage temperature	Tstg	-40	+100	°C

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 CONDITIONS

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Operating temperature	Ta	-10	+60	°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 these ranges.

Always use piezoelectric devices within their recommended operating condition ranges. 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 FREQUENCIES

Frequency (MHz)	Band Width (kHz)	Part symbol	I/O ports	Part number
246.0	160	01	Balanced IN/ Balanced OUT	FAR-F4CC-246M00-T101
			Single-ended IN/ Single-ended OUT	FAR-F4CC-246M00-T101A
400.0	200	02	Balanced IN/ Balanced OUT	FAR-F4CD-400M00-T102
			Single-ended IN/ Single-ended OUT	FAR-F4CD-400M00-T102A

F4C Series (T1)

■ ELECTRICAL CHARACTERISTICS

1. 246 MHz Filter Balanced IN/Balanced OUT Part number: FAR-F4CC-246M00-T101

(Ta = -10 to + 60°C)

Parameter	Symbol	Conditions	Value			Unit	Remarks
			Min.	Typ.	Max.		
Center frequency	f_0	—	—	246.0	—	MHz	
3dB Band Width	BW	—	160	220	—	kHz	
Insertion Loss	IL	—	—	6.0	7.0	dB	
Relative Attenuation to minimum insertion loss	—	$f_0 \pm 400$ kHz	25	38	—	dB	
	—	$f_0 \pm 600$ kHz	40	51	—	dB	
	—	$f_0 \pm 800$ kHz	40	58	—	dB	
	—	$f_0 - 3$ MHz to $f_0 - 1$ MHz	45	57	—	dB	
	—	$f_0 + 1$ MHz to $f_0 + 3$ MHz	40	45	—	dB	
Group Delay Ripple	—	$f_0 \pm 80$ kHz	—	1.4	1.8	μ sec	

2. 246 MHz Filter Single-ended IN/Single-ended OUT Part number: FAR-F4CC-246M00-T101A

(Ta = -10 to + 60°C)

Parameter	Symbol	Conditions	Value			Unit	Remarks
			Min.	Typ.	Max.		
Center frequency	f_0	—	—	246.0	—	MHz	
3dB Band Width	BW	—	160	220	—	kHz	
Insertion Loss	IL	—	—	6.0	7.0	dB	
Relative Attenuation to minimum insertion loss	—	$f_0 \pm 400$ kHz	25	43	—	dB	
	—	$f_0 \pm 600$ kHz	40	57	—	dB	
	—	$f_0 \pm 800$ kHz	40	62	—	dB	
	—	$f_0 - 3$ MHz to $f_0 - 1$ MHz	45	56	—	dB	
	—	$f_0 + 1$ MHz to $f_0 + 3$ MHz	35	41	—	dB	
Group Delay Ripple	—	$f_0 \pm 80$ kHz	—	1.3	1.8	μ sec	

F4C Series (T1)

3. 400 MHz Filter Balanced IN/Balanced OUT Part number: FAR-F4CD-400M00-T102

(Ta = -10 to + 60°C)

Parameter	Symbol	Conditions	Value			Unit	Remarks
			Min.	Typ.	Max.		
Center frequency	f_0	—	—	400.0	—	MHz	
3dB Band Width	BW	—	200	360	—	kHz	
Insertion Loss	IL	—	—	4.5	6.0	dB	
Relative Attenuation to minimum loss position	—	$f_0 \pm 400$ kHz	10	23	—	dB	
	—	$f_0 \pm 600$ kHz	30	37	—	dB	
	—	$f_0 \pm 800$ kHz	35	45	—	dB	
	—	$f_0 - 3$ MHz to $f_0 - 1$ MHz	45	51	—	dB	
	—	$f_0 + 1$ MHz to $f_0 + 3$ MHz	40	49	—	dB	
Group Delay Ripple	—	$f_0 \pm 100$ kHz	—	0.6	1.0	μ sec	

4. 400 MHz Filter Single-ended IN/Single-ended OUT Part number: FAR-F4CD-400M00-T102A

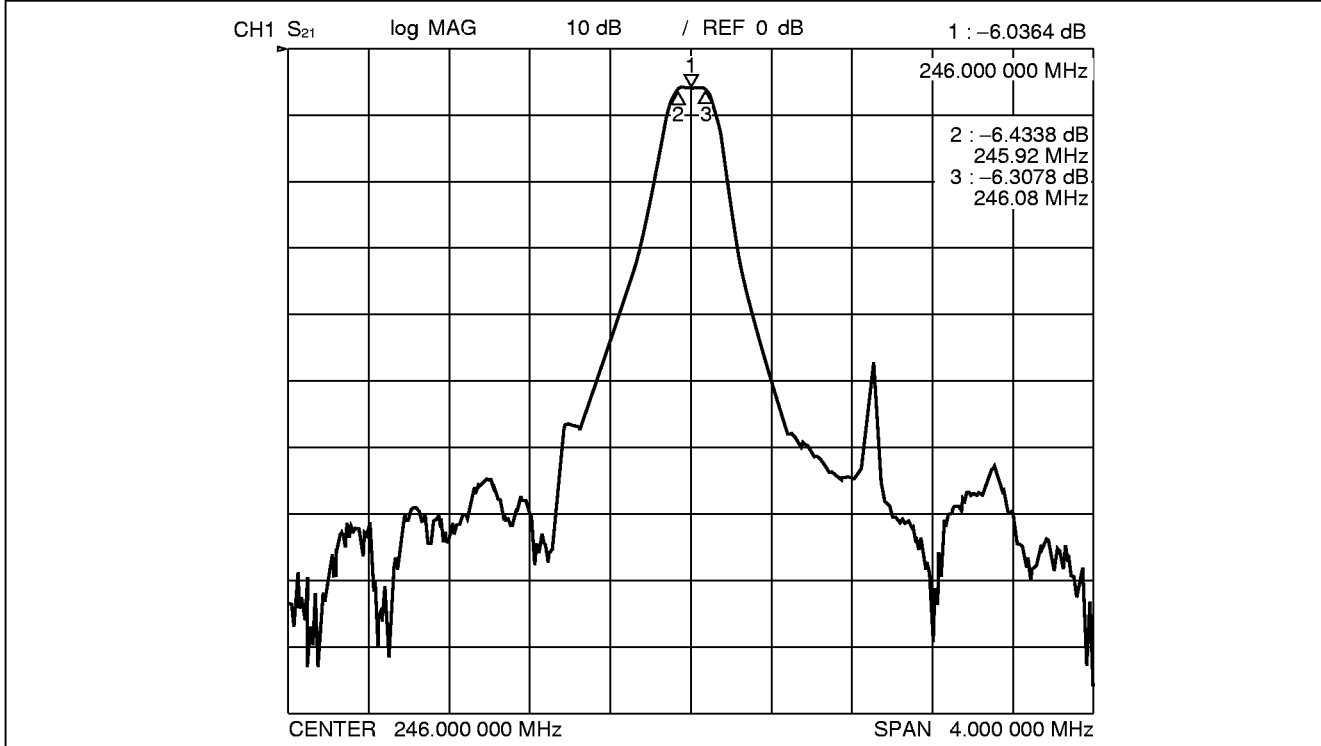
(Ta = -10 to + 60°C)

Parameter	Symbol	Conditions	Value			Unit	Remarks
			Min.	Typ.	Max.		
Center frequency	f_0	—	—	400.0	—	MHz	
3dB Band Width	BW	—	200	350	—	kHz	
Insertion Loss	IL	—	—	7.9	8.5	dB	
Relative Attenuation to minimum loss position	—	$f_0 \pm 400$ kHz	12	20	—	dB	
	—	$f_0 \pm 600$ kHz	25	32	—	dB	
	—	$f_0 \pm 800$ kHz	33	38	—	dB	
	—	$f_0 - 3$ MHz to $f_0 - 1$ MHz	40	48	—	dB	
	—	$f_0 + 1$ MHz to $f_0 + 3$ MHz	35	40	—	dB	
Group Delay Ripple	—	$f_0 \pm 100$ kHz	—	1.3	1.8	μ sec	

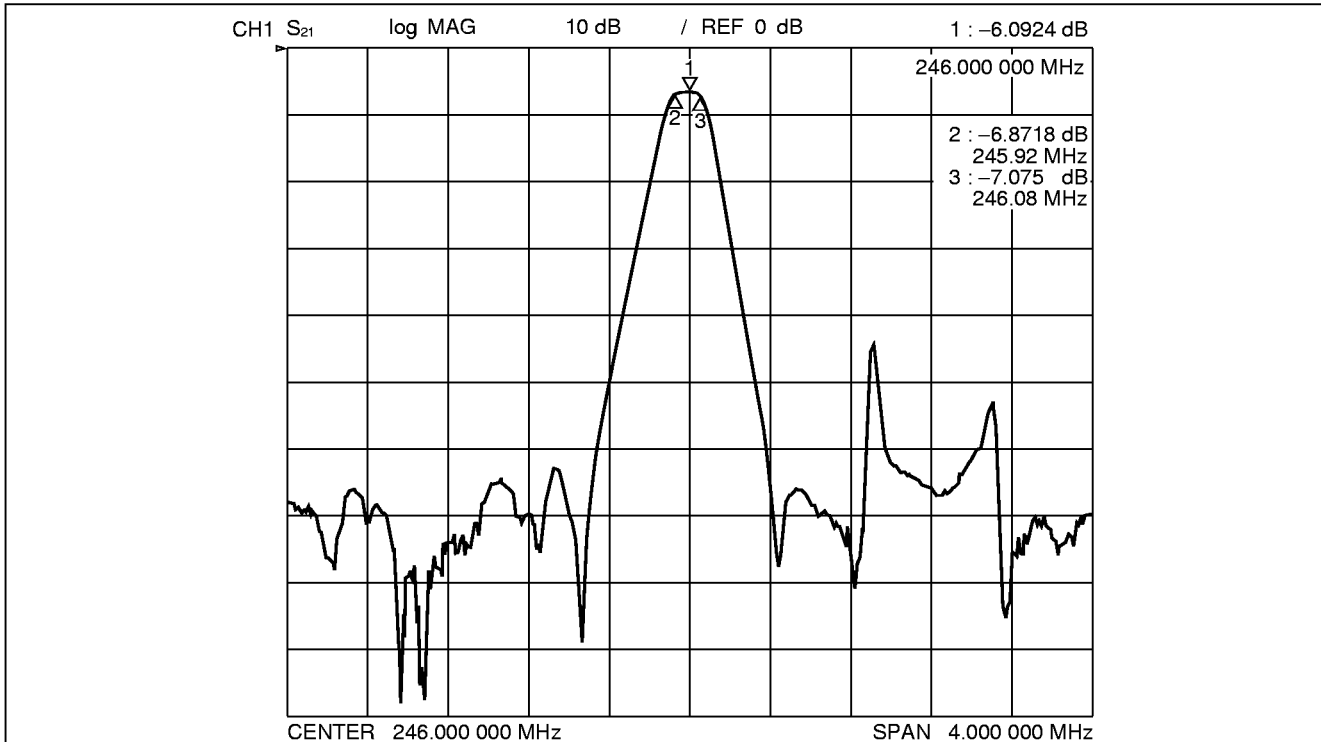
F4C Series (T1)

■ TYPICAL CHARACTERISTICS

1. 246 MHz Filter
Balanced IN/Balanced OUT
Part number: FAR-F4CC-246M00-T101

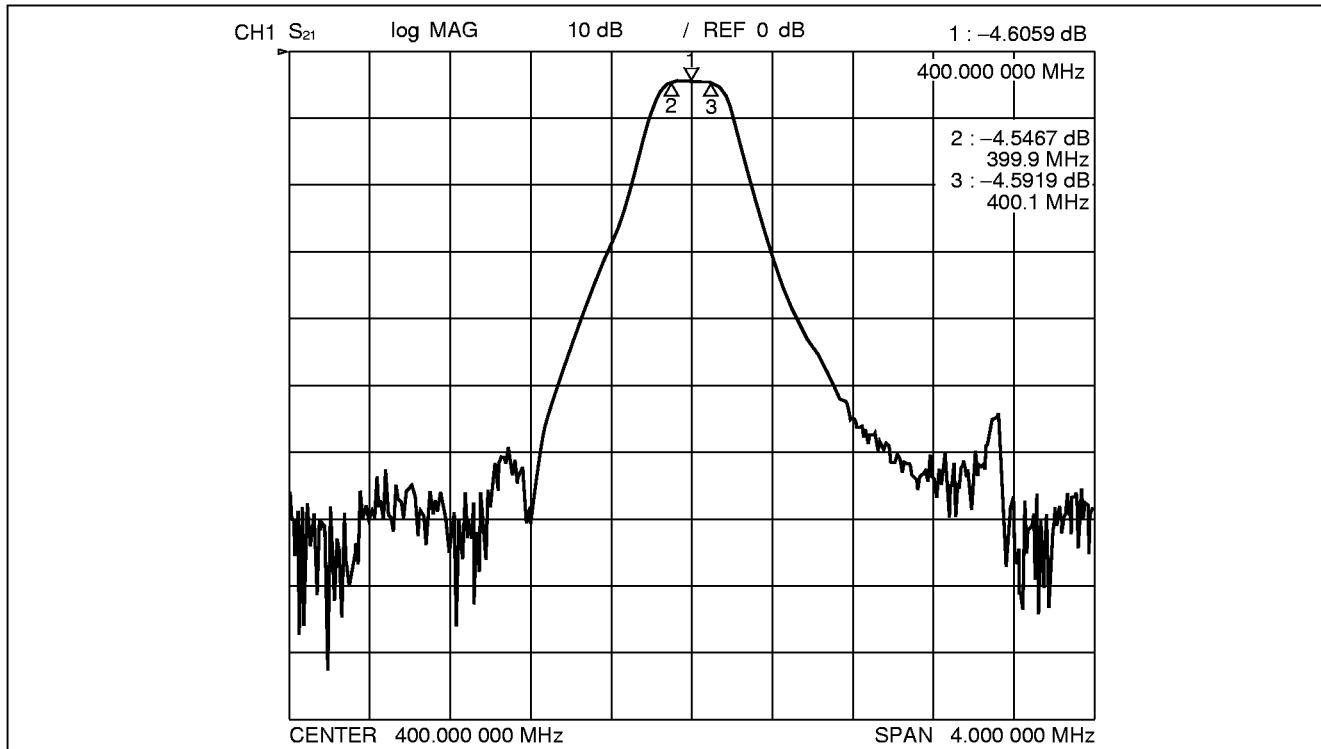


2. 246 MHz Filter
Single-ended IN/Single-ended OUT
Part number: FAR-F4CC-246M00-T101A

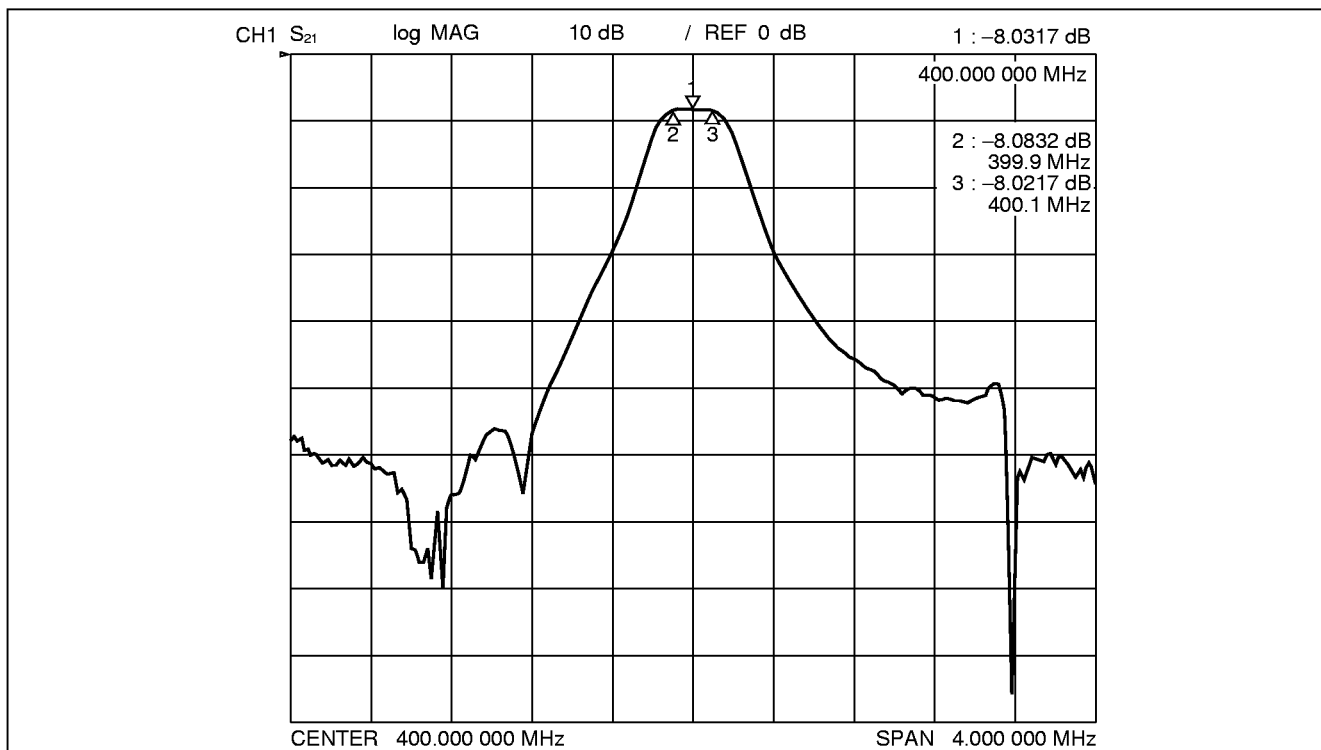


F4C Series (T1)

3. 400 MHz Filter Balanced IN/Balanced OUT Part number: FAR-F4CD-400M00-T102



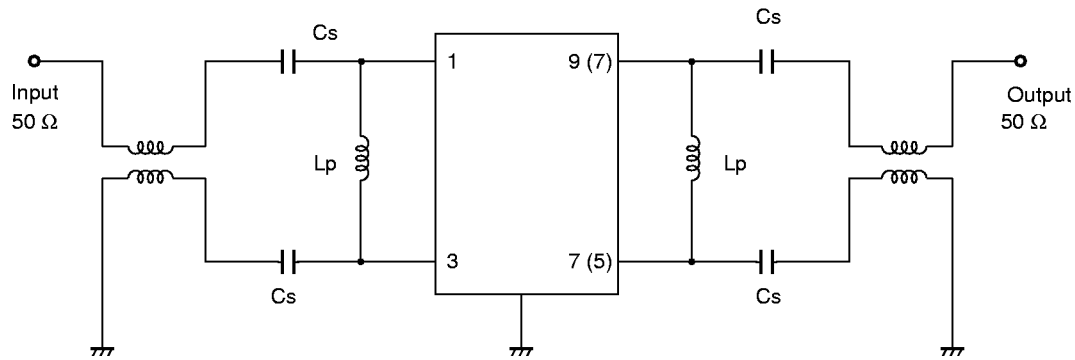
4. 400 MHz Filter Single-ended IN/Single-ended OUT Part number: FAR-F4CD-400M00-T102A



F4C Series (T1)

MEASUREMENT CIRCUIT

- Balanced IN/Balanced OUT

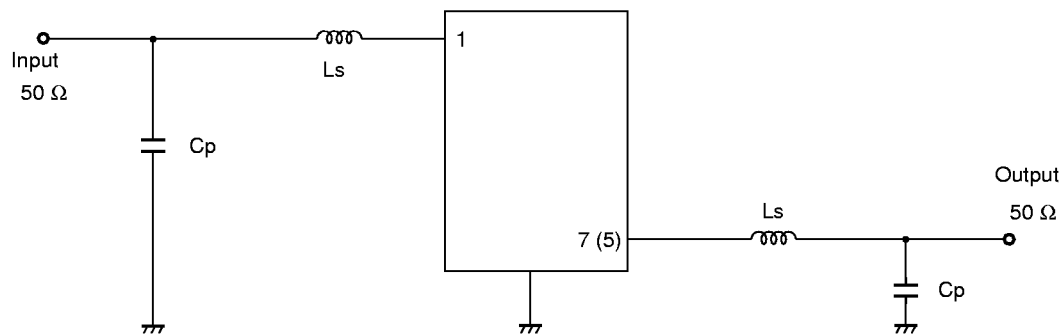


() : F4CD package

Matching Components

Part Number	L_P	C_S
FAR-F4CC-246M00-T101	82 nH	5.2 pF
FAR-F4CD-400M00-T102	41 nH	3.0 pF

- Single-ended IN/Single-ended OUT



() : F4CD package

Matching Components

Part Number	L_S	C_P
FAR-F4CC-246M00-T101A	147 nH	2.7 pF
FAR-F4CD-400M00-T102A	68 nH	8.2 pF

F4C Series (T1)

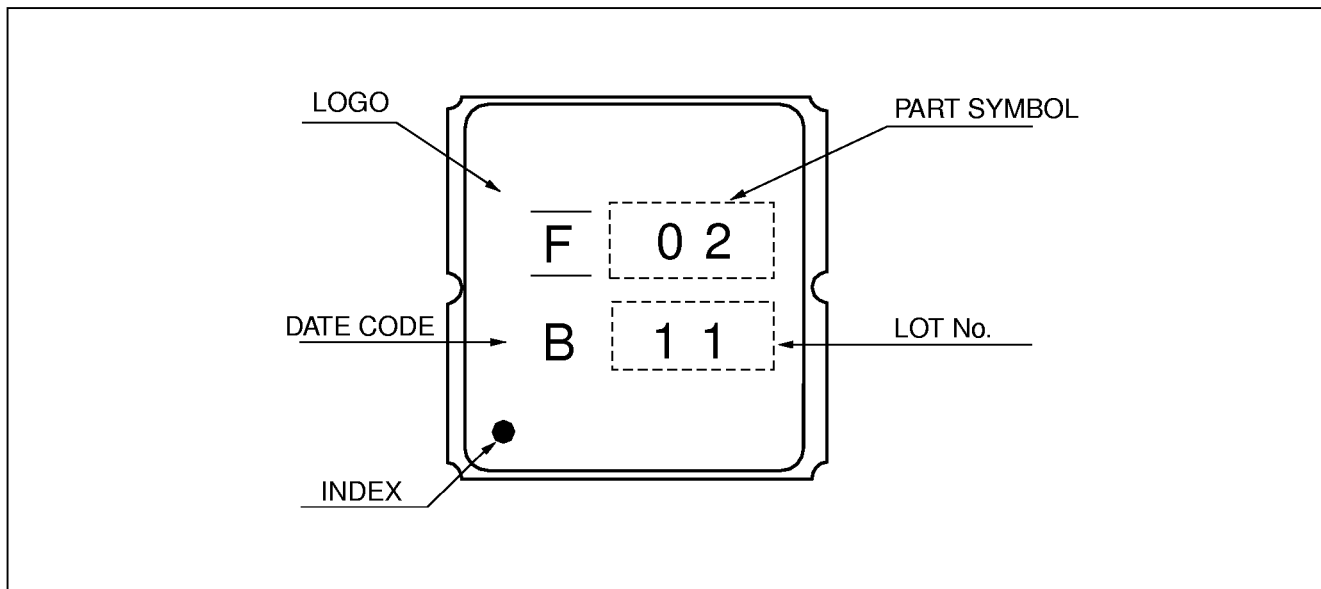
■ PART NUMBER DESIGNATION

[Designation example]

FAR-F4C□-□□□□□□-T1□□□ T
(1) (2) (3) (4) (5)

- (1) Package size: C, 7.0 × 5.0 mm
D, 5.0 × 5.0 mm
- (2) Frequency: Specify the nominal center frequency in six alphanumeric.
Enter M (for MHz) at the decimal point.
Refer to below example.
[Example] 400.0 MHz ⇒ 400M00
- (3) Part symbol: Specified characters from 01 to 99.
- (4) I/O type: -; Balanced IN/Balanced OUT
A; Single-ended IN/Single-ended OUT
- (5) Packing type: T; 1000 pcs/reel

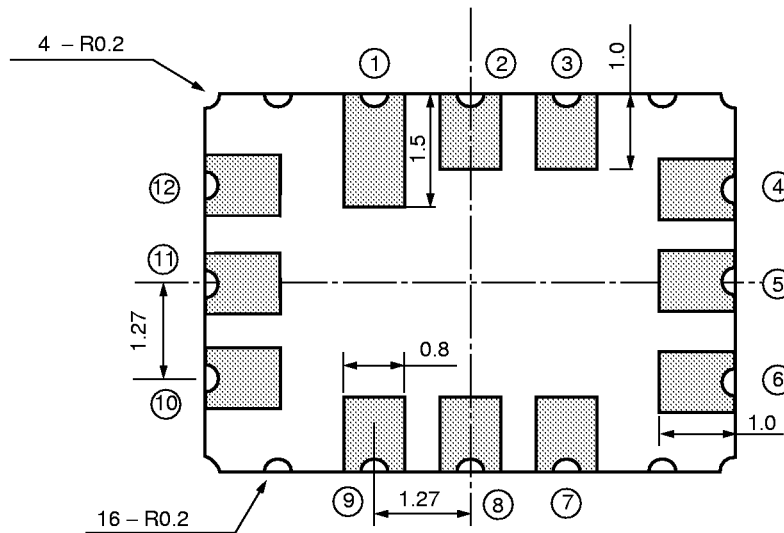
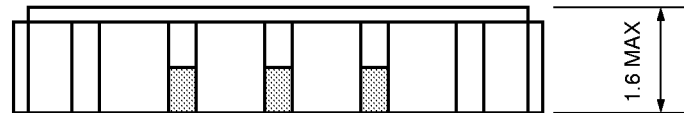
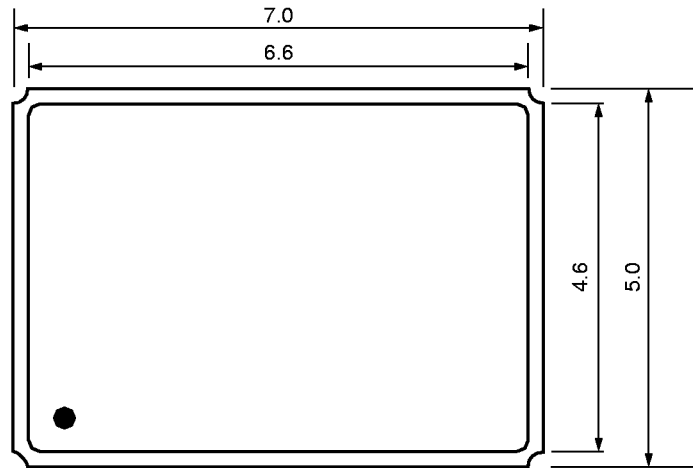
■ MARKING



F4C Series (T1)

■ DIMENSIONS

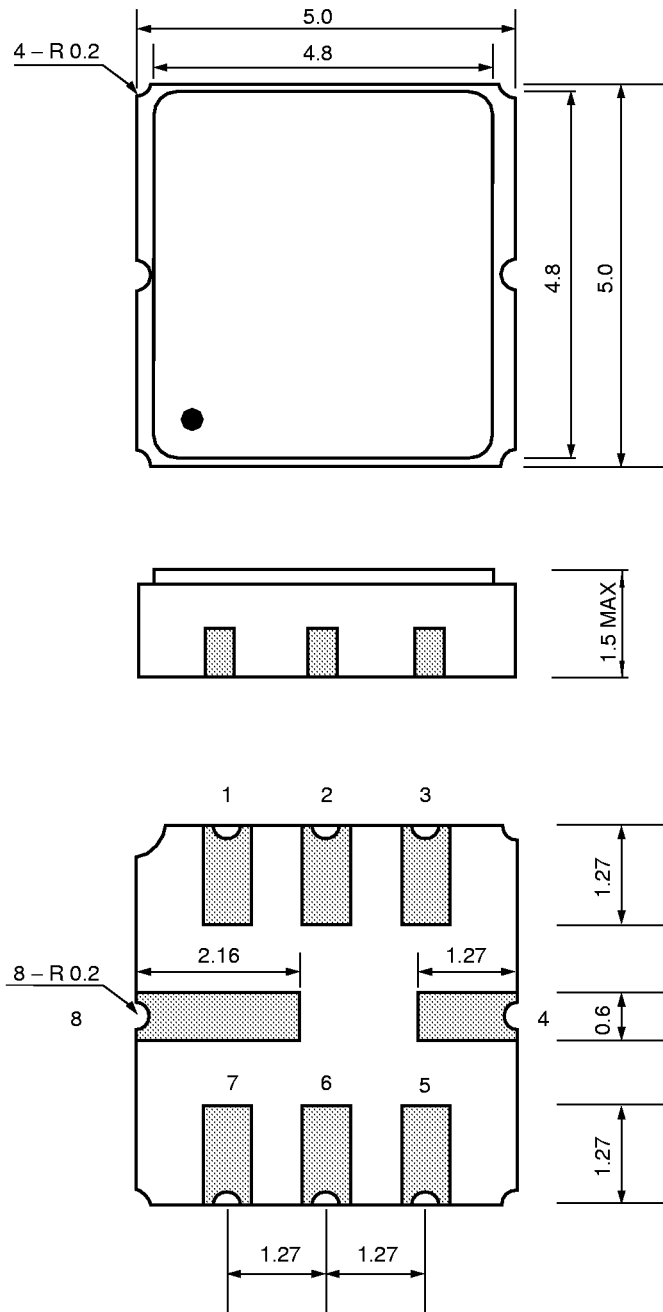
- F4CC Package



Dimensions in mm

F4C Series (T1)

- F4CD Package

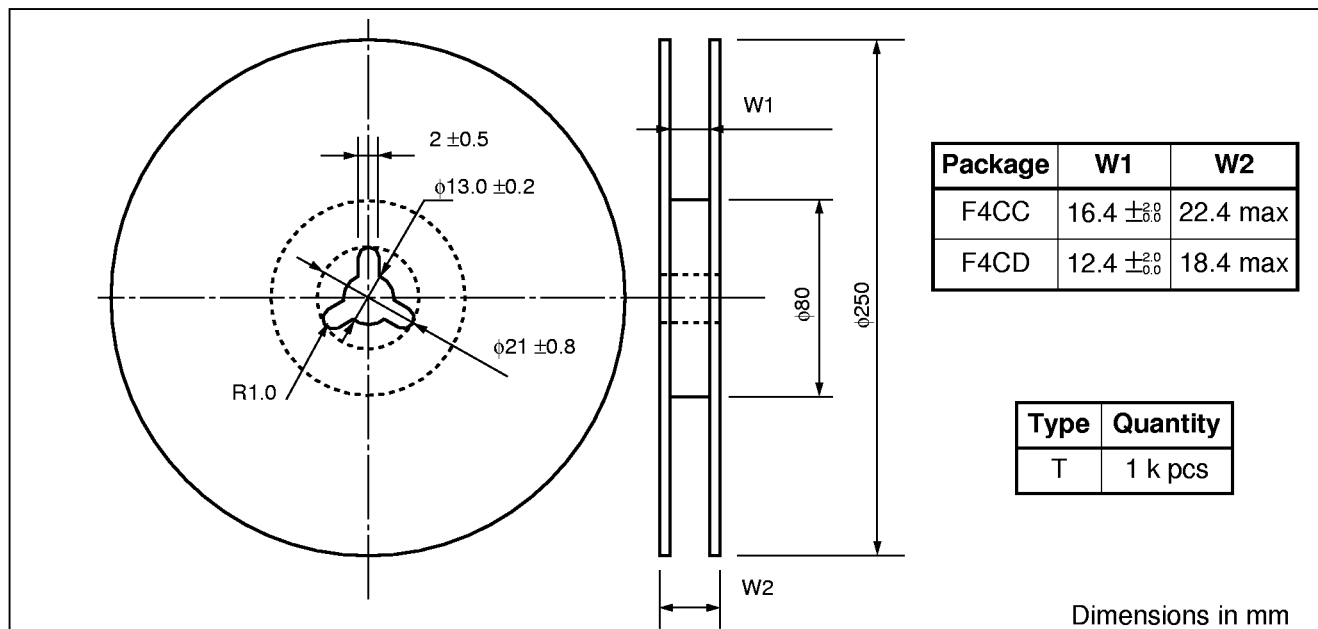


Dimensions in mm

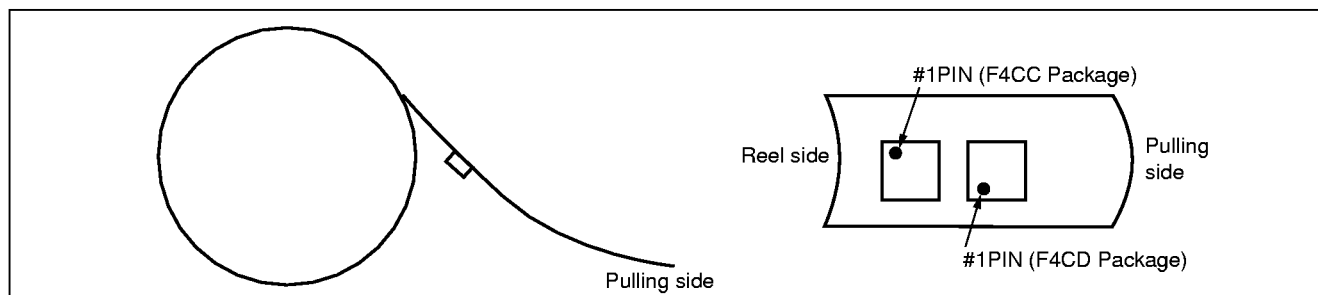
F4C Series (T1)

■ PACKING: Reel type

1. Reel dimensions



2. Packing Style



3. Tape Dimensions

