

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 devices, such as balun is not required.

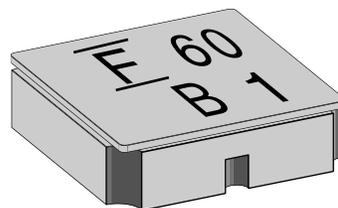
The F5CM series filters apply to the frequency range 700 MHz to 1000 MHz. High performance has been realized with high reliability and small size by using original materials and original design.

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

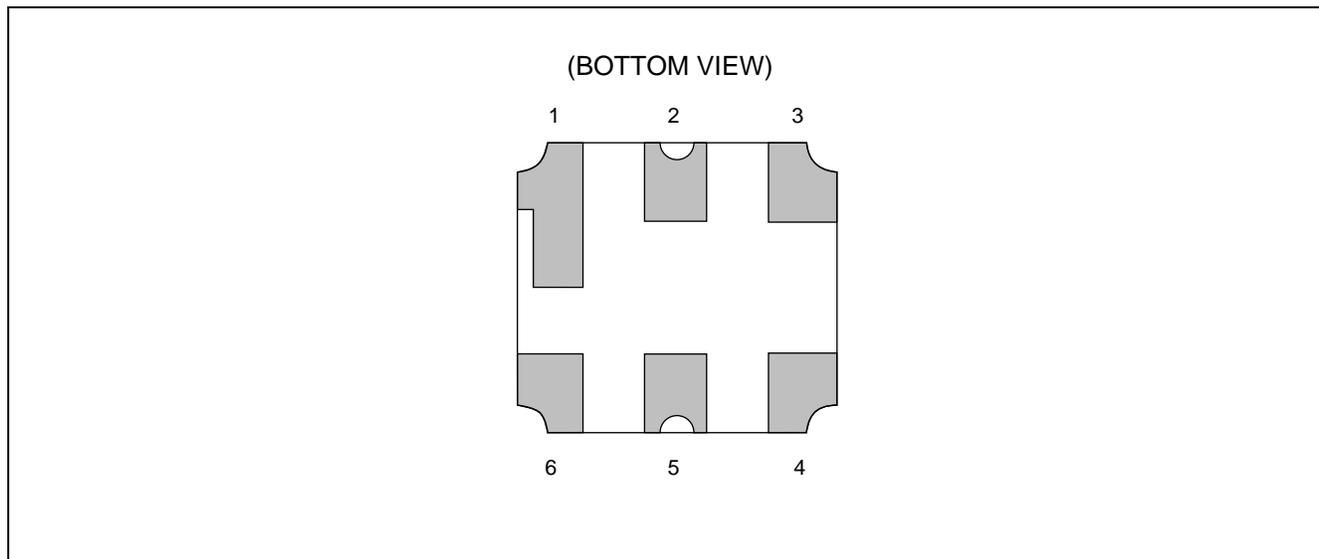
- Balanced/unbalanced I/O ports
- Ultra compact and light package (3.0 mm × 3.0 mm package)
- Any external matching network is not required
- Excellent stop-band attenuation
- Small pass-band ripple
- Surface mount package (SMT)

■ PACKAGE



F5CM Series (B2)

■ 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

F5CM Series (B2)

■ ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating		Unit
		Min.	Max.	
Operating temperature	Ta	-30	+85	°C
Storage temperature	Tstg	-40	+100	°C
Input power	P _{IN}	—	+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	Value		Unit
		Min.	Max.	
Operating temperature	Ta	-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 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 DEVICES

System		Frequency (MHz)	Band width (MHz)	Input type/ Impedance	Output type/ Impedance	Part number	Part symbol
GSM	Tx	902.5	25	Balance 50 Ω	Unbalance 50 Ω	FAR-F5CM-902M50-B263	63
	Rx	947.5	25	Unbalance 50 Ω	Balance 50 Ω	FAR-F5CM-947M50-B260	60
Balance 150 Ω					FAR-F5CM-947M50-B262	62	
EGSM	Rx	942.5	25	Unbalance 50 Ω	Balance 50 Ω	FAR-F5CM-942M50-B270	70
AMPS/ TDMA/ CDMA	Tx	836.5	25	Balance 50 Ω	Unbalance 50 Ω	FAR-F5CM-836M50-B268	68
	Rx	881.5	25	Unbalance 50 Ω	Balance 50 Ω	FAR-F5CM-881M50-B266	66

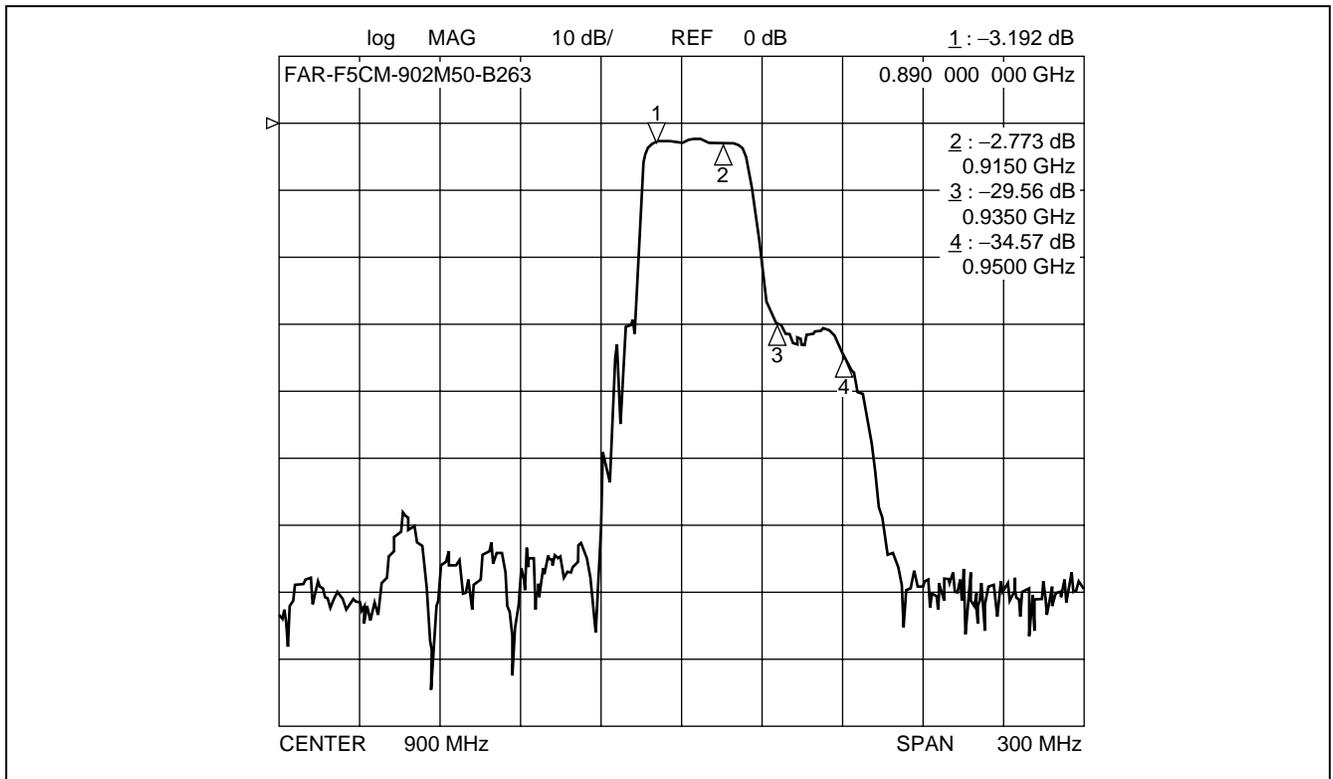
F5CM Series (B2)

■ ELECTRICAL CHARACTERISTICS AND TYPICAL FREQUENCY RESPONSE

1. GSM (Tx) 50 ohms Balanced IN/50 ohms Unbalanced OUT Part number : FAR-F5CM-902M50-B263

(Ta = -30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min.	Typ.	Max.		
Insertion loss	890 MHz to 915 MHz	—	3.2	3.5	dB	
Pass-band ripple	890 MHz to 915 MHz	—	1.2	1.5	dB	
Absolute stop-band attenuation	DC to 845 MHz	45	58	—	dB	
	845 MHz to 870 MHz	25	50	—	dB	
	935 MHz to 980 MHz	25	30	—	dB	
	980 MHz to 2000 MHz	40	58	—	dB	
	2000 MHz to 3000 MHz	30	37	—	dB	

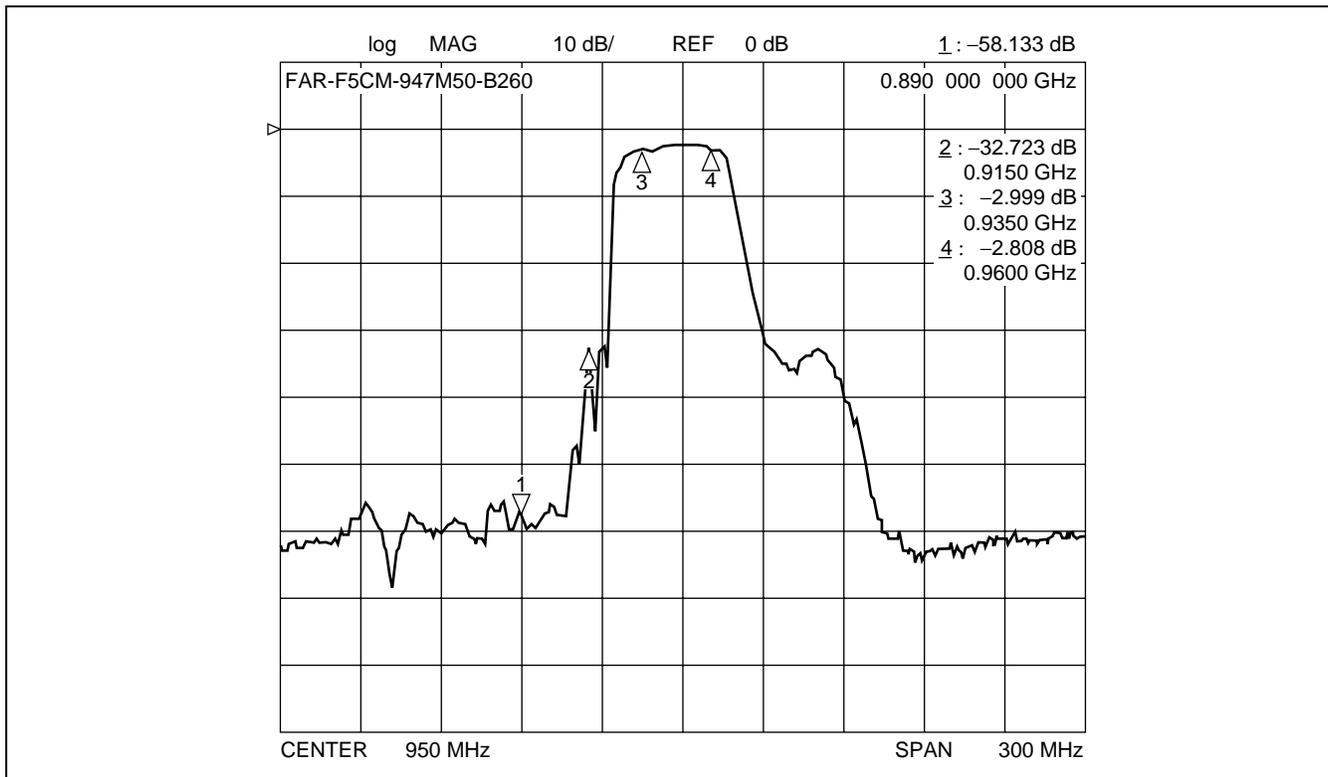


F5CM Series (B2)

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

(Ta = -30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min.	Typ.	Max.		
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	

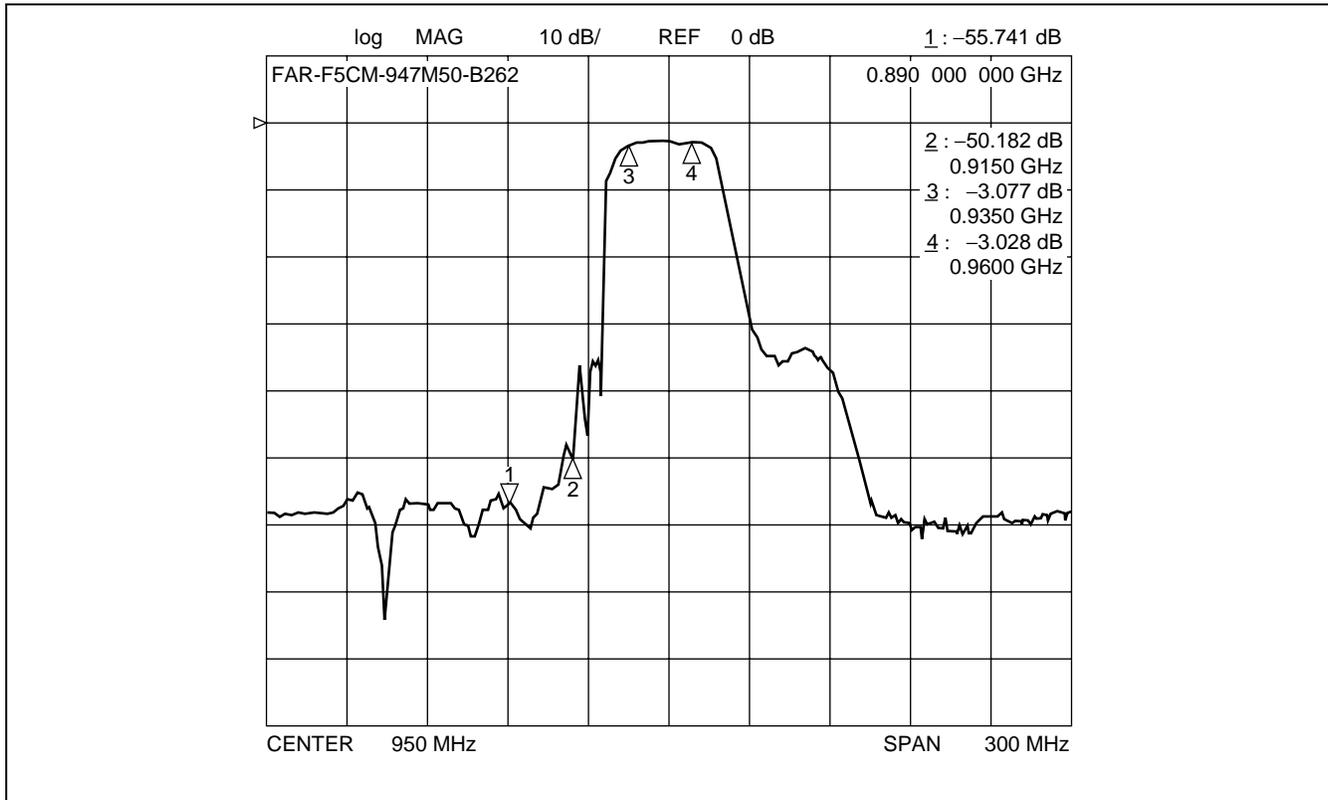


F5CM Series (B2)

3. 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	Remarks
		Min.	Typ.	Max.		
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	

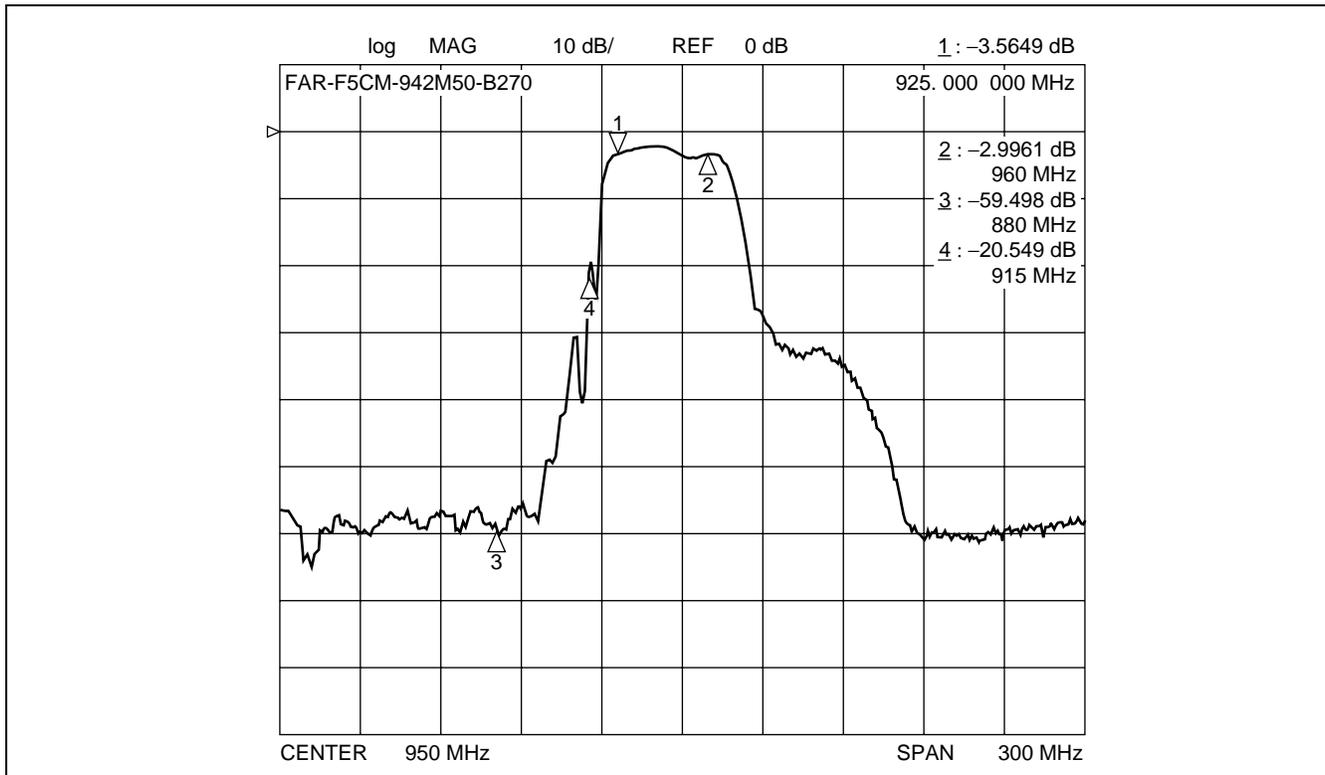


F5CM Series (B2)

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

(Ta = -30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min.	Typ.	Max.		
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	
Absolute stop-band attenuation	DC to 880 MHz	50	55	—	dB	
	880 MHz to 915 MHz	15	22	—	dB	
	980 MHz to 1025 MHz	23	27	—	dB	
	1025 MHz to 2000 MHz	40	44	—	dB	
	2000 MHz to 3000 MHz	25	39	—	dB	

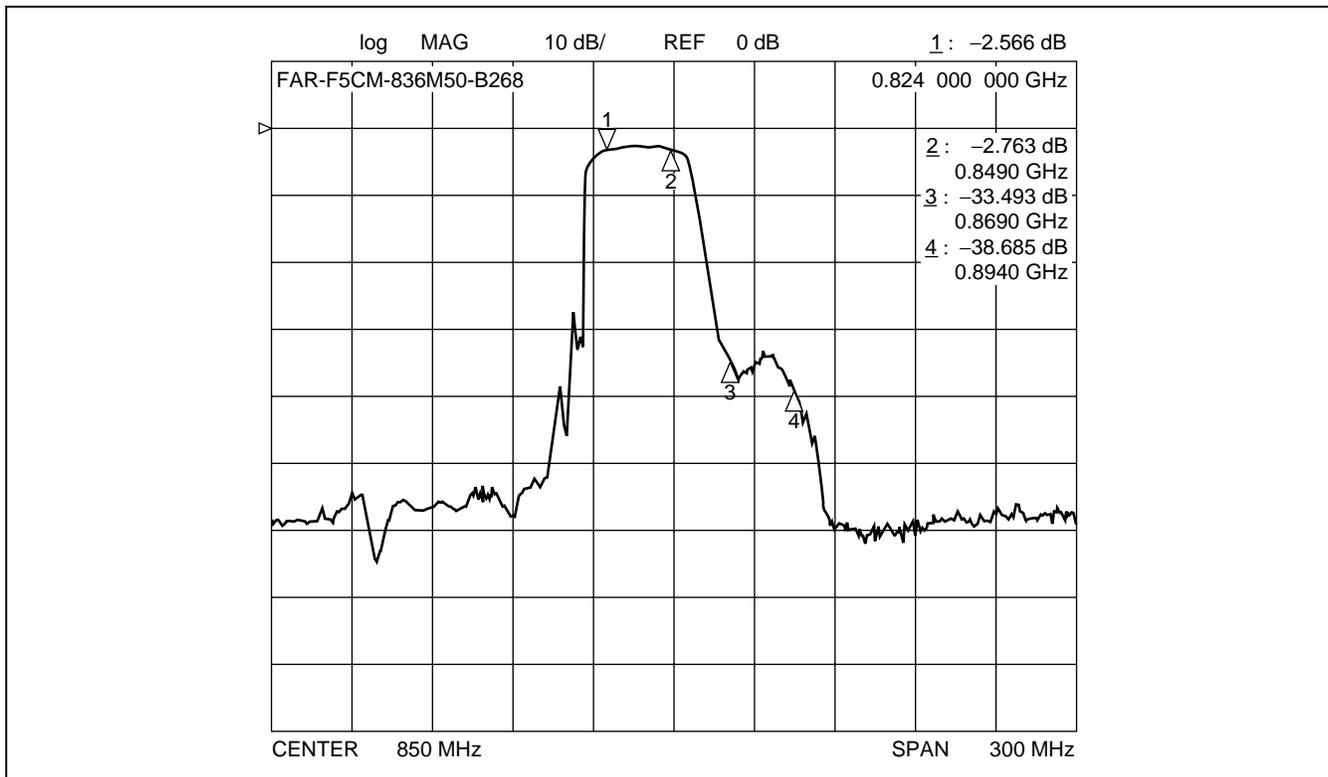


F5CM Series (B2)

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

(Ta = -30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min.	Typ.	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	

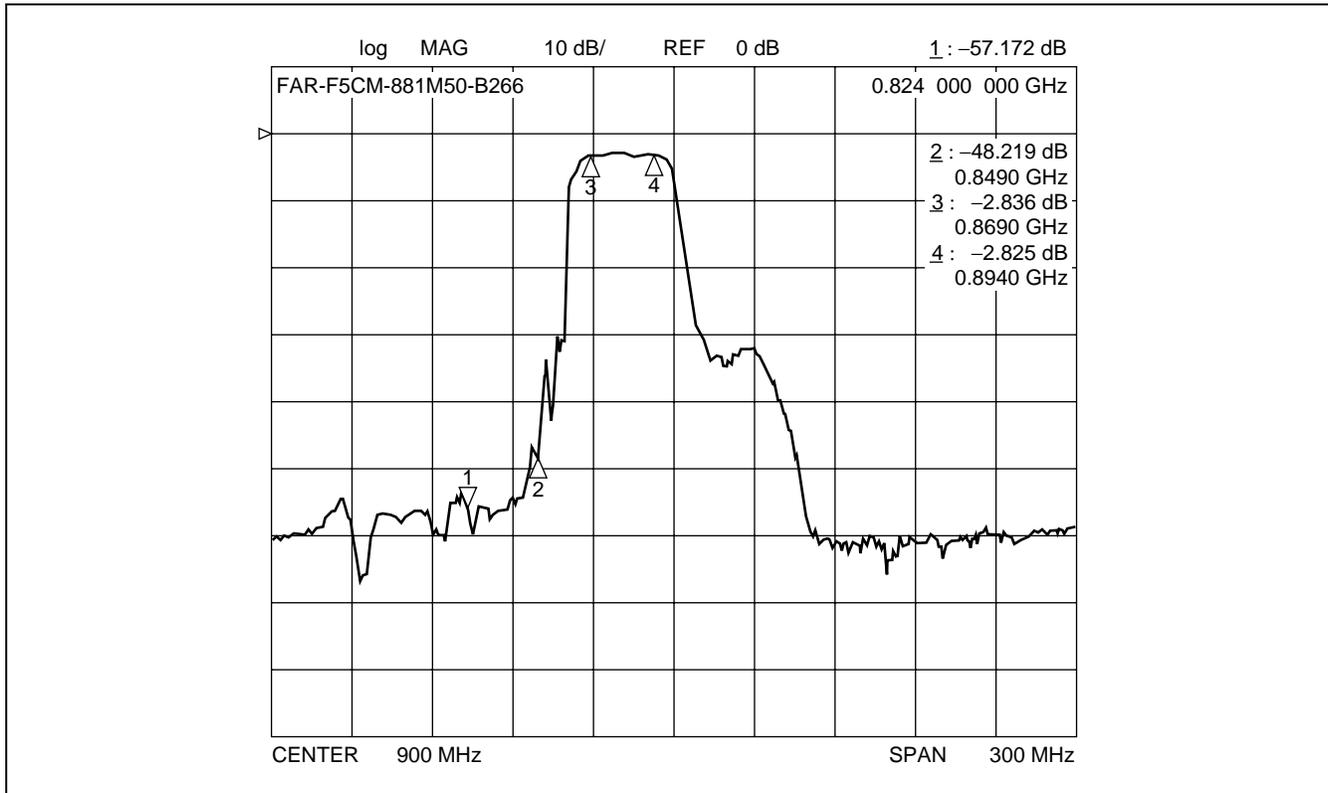


F5CM Series (B2)

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

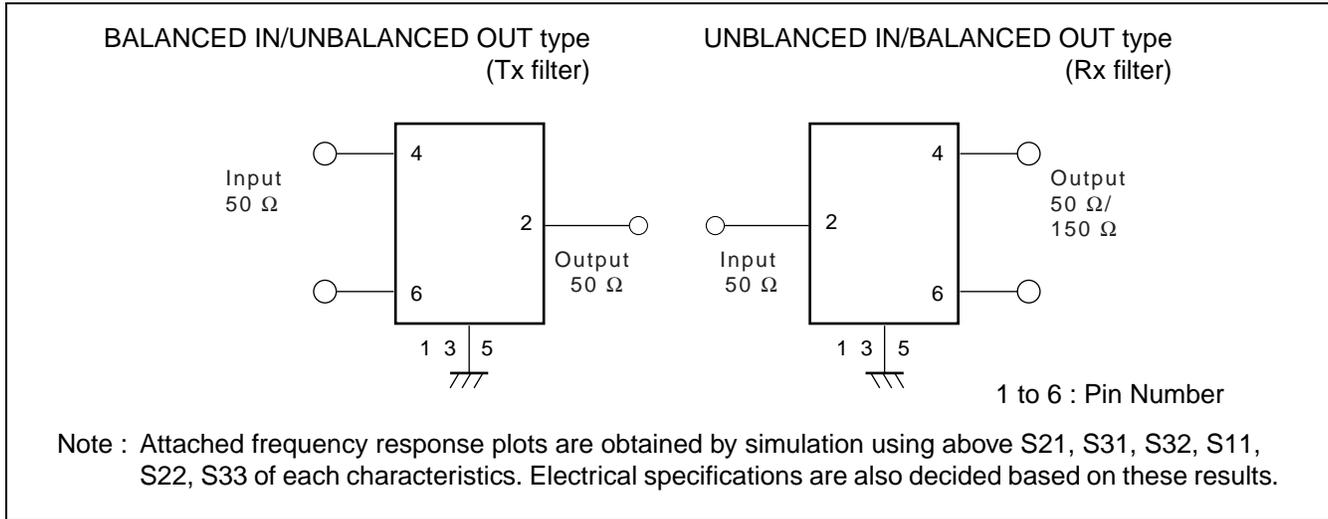
(Ta = -30 °C to +85 °C)

Parameter	Conditions	Value			Unit	Remarks
		Min.	Typ.	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	
Absolute stop-band attenuation	DC to 800 MHz	45	55	—	dB	
	800 MHz to 849 MHz	30	47	—	dB	
	940 MHz to 1000 MHz	30	38	—	dB	
	1000 MHz to 2000 MHz	35	47	—	dB	
	2000 MHz to 3000 MHz	25	32	—	dB	



F5CM Series (B2)

MEASUREMENT CIRCUIT



PART NUMBER DESIGNATION

[Designation example]

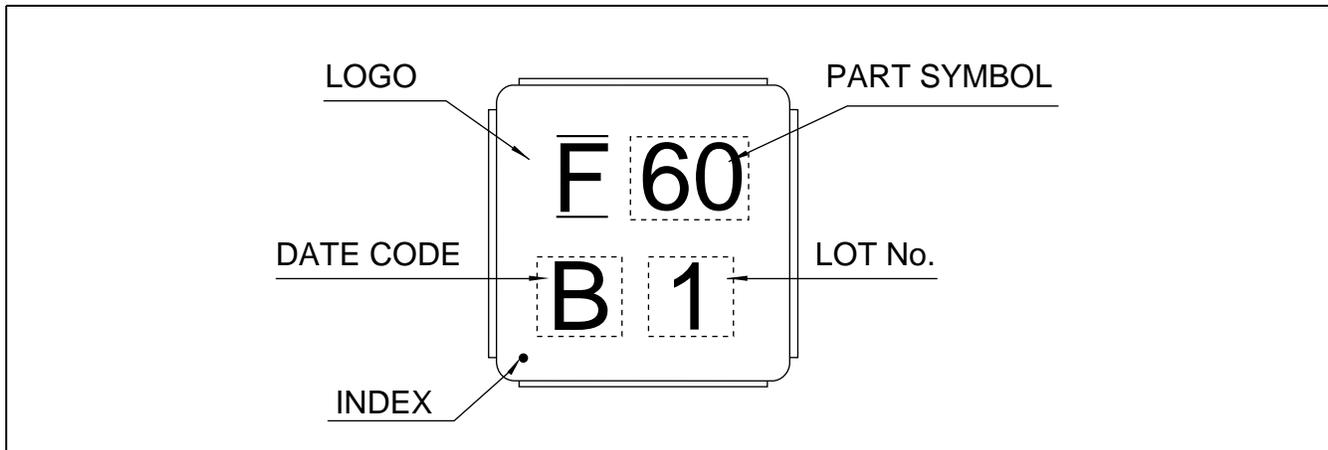
FAR-F5CM- -B2 -
 (1) (2) (3)

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

[Example] 902.5 MHz ⇒ 902M50

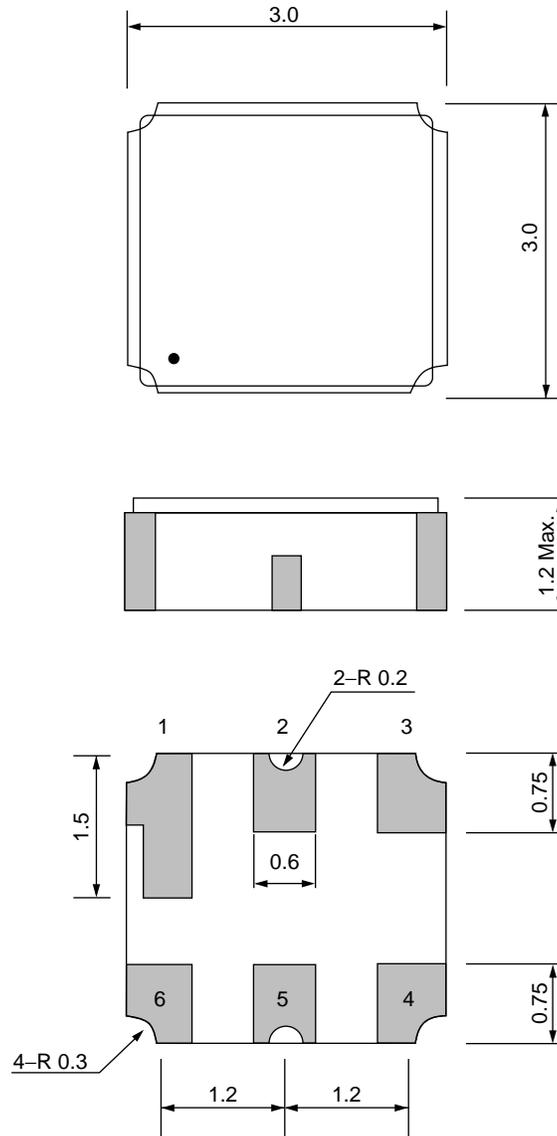
- (2) Part symbol : Specified characters from 60 to 79.
- (3) Packing : Y : 1 k pcs/reel
 (Reeled tape) X : 5 k pcs/reel

MARKING



F5CM Series (B2)

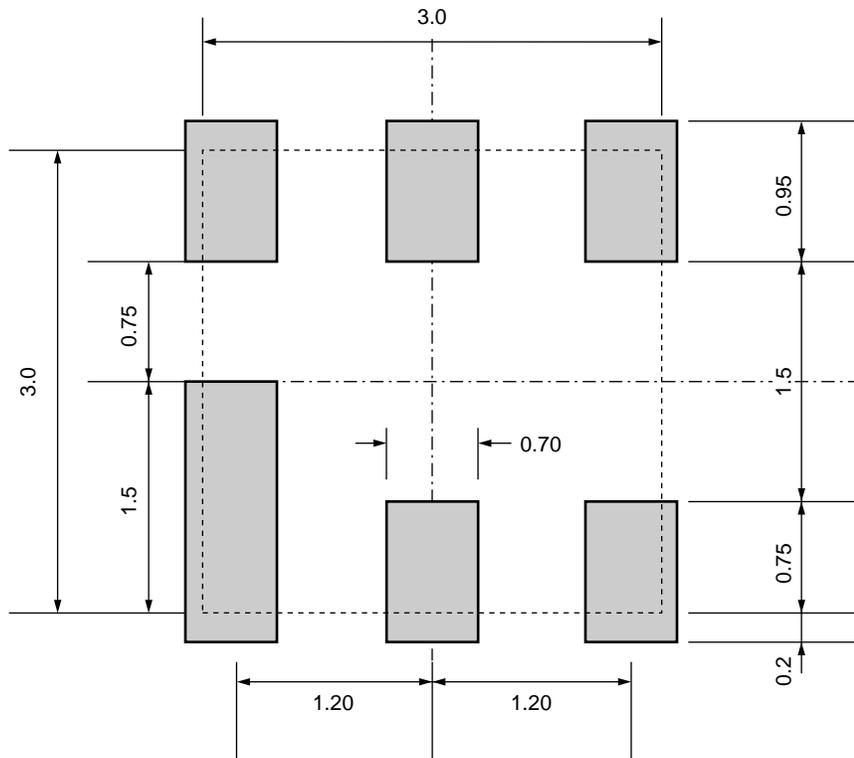
■ PACKAGE DIMENSION



Dimensions in mm.

F5CM Series (B2)

RECOMMENDED LAND PATTERN

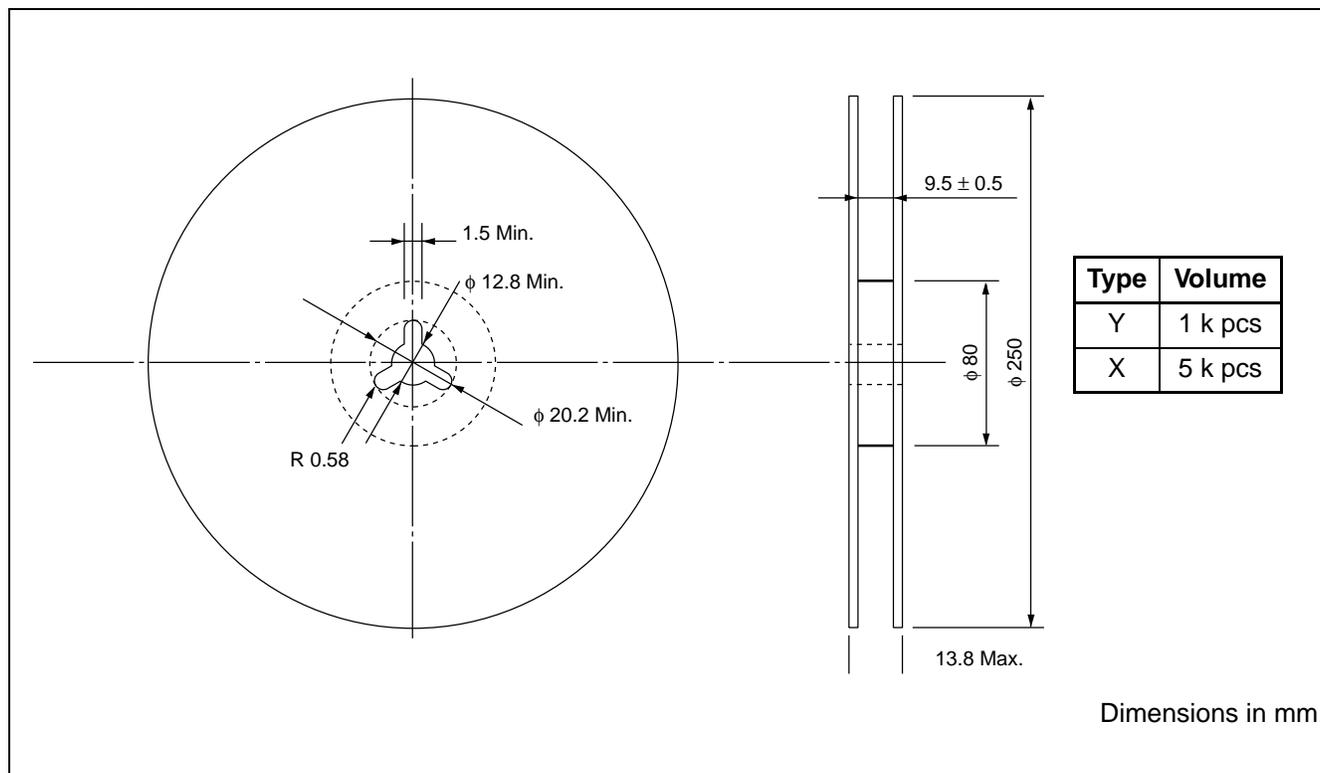


Dimensions in mm.

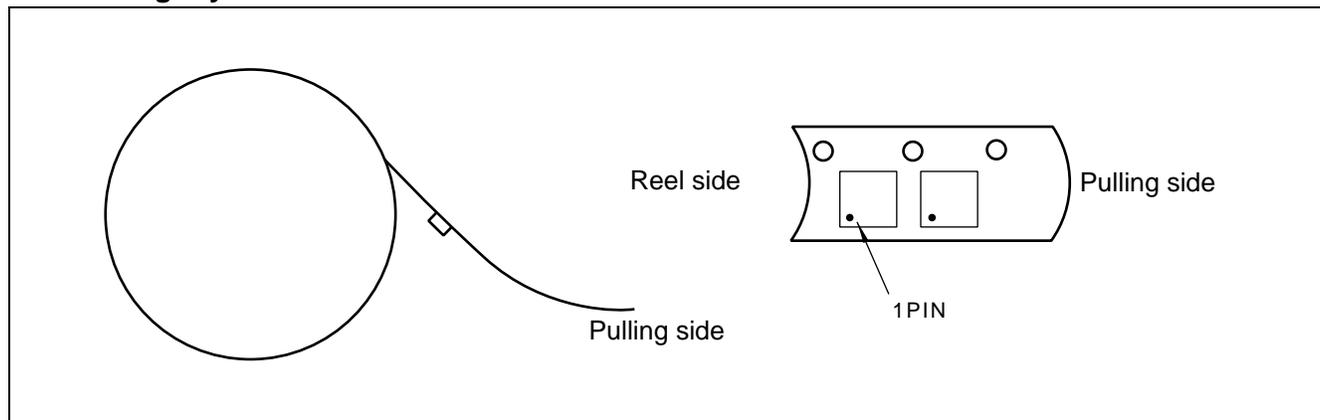
F5CM Series (B2)

■ PACKING

1. Reel Dimensions

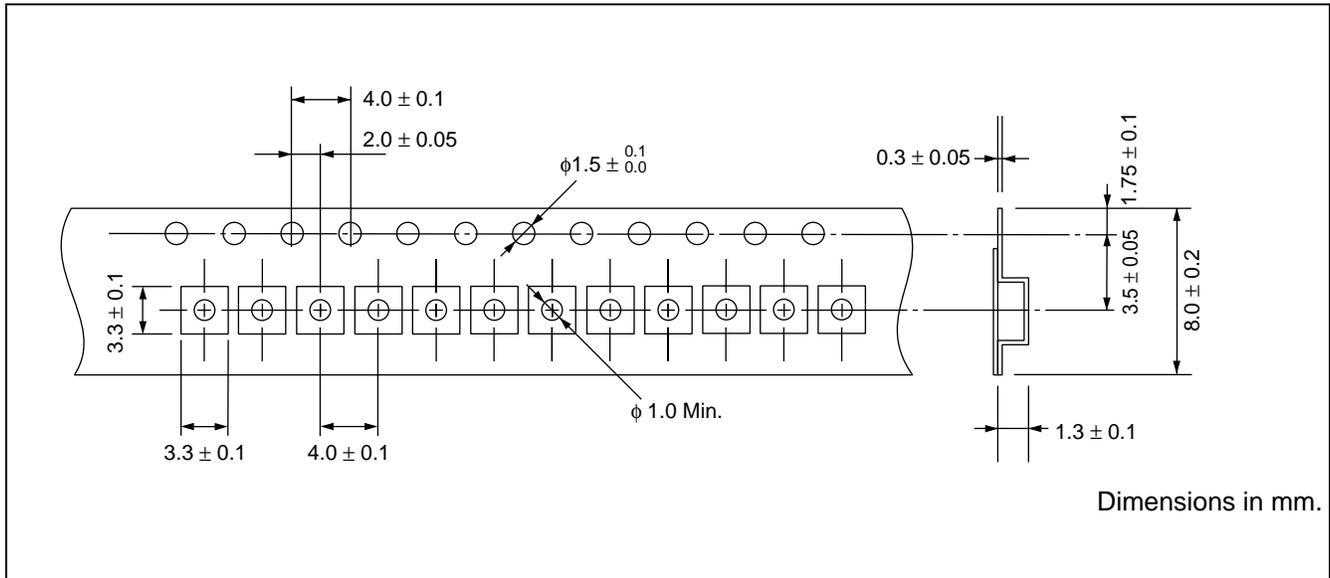


2. Packing Style



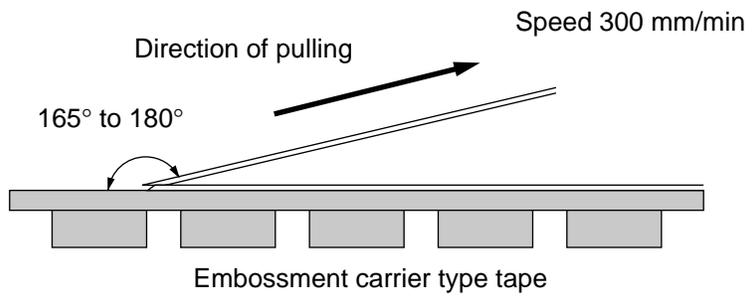
F5CM Series (B2)

3. Tape Dimensions

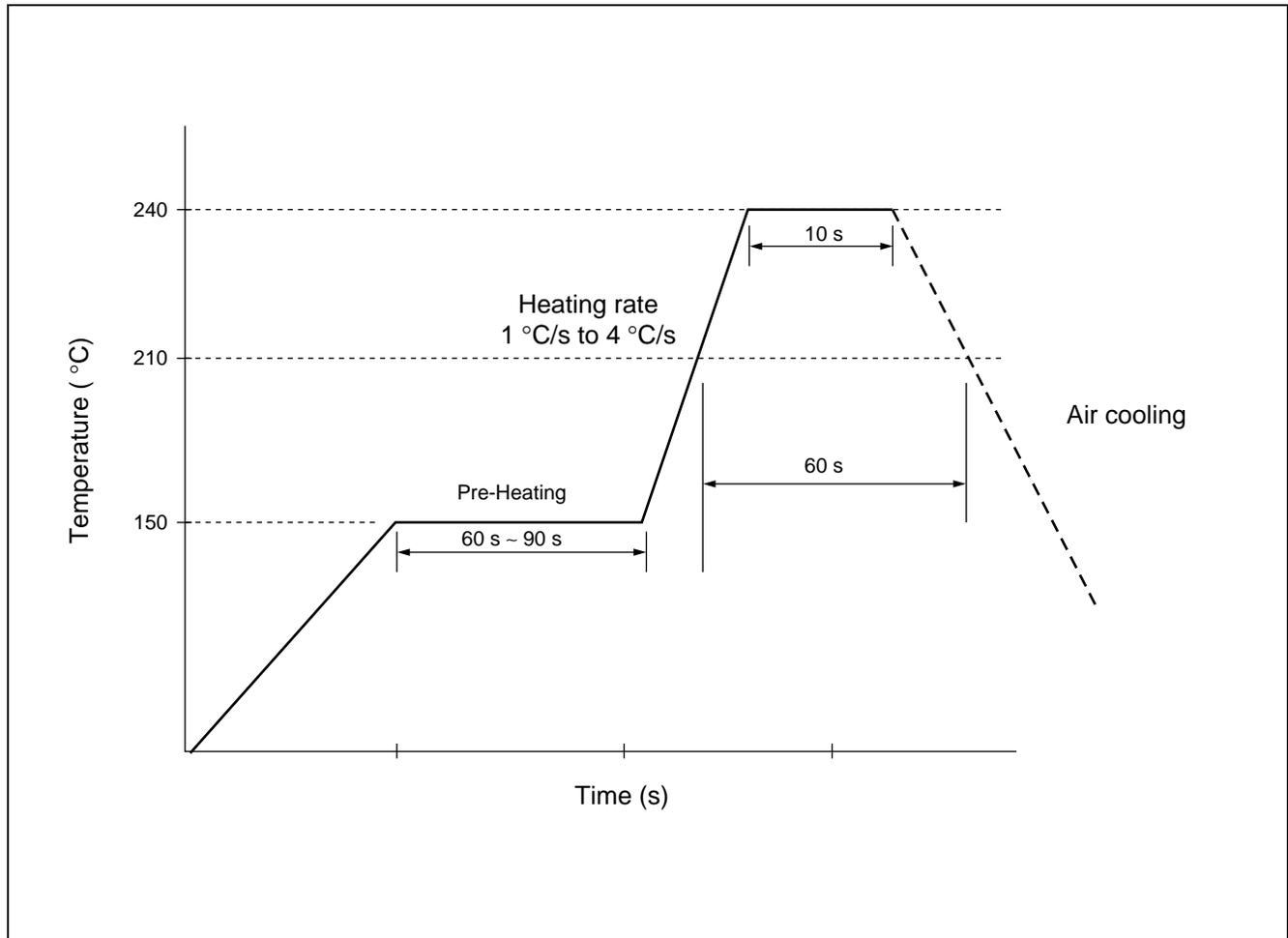


4. Peel Strength of Top Cover Tapes

Peel off by the force of 0.1 N to 1.0 N under the condition at the right.
(Conforms to EIA.)



RECOMMENDED REFLOW PROFILE



NOTE

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

F5CM Series (B2)

FUJITSU MEDIA DEVICES LIMITED

For further information please contact:

Japan

FUJITSU MEDIA DEVICE LIMITED
International Sales & Marketing DEPT.
Shin-Yokohama Square Bldg., 14F,
Shin-yokohama 2-3-12,
Kohoku-ku, Yokohama,
Kanagawa 222-0033, Japan
Tel: +81-45-471-0061
Fax: +81-45-471-0076

<http://edevice.fujitsu.com/fmd/>

North and South America

FUJITSU MEDIA DEVICES OF AMERICA, INC.
1731 Technology Drive, Suite 800,
San Jose, CA 95110 U.S.A.
Tel: (1)-408-437-8900
Fax: (1)-408-437-0700

<http://www.fujitsumedia.com/>

Europe

FUJITSU MICROELECTRONICS EUROPE GmbH
Am Siebenstein 6-10,
D-63303 Dreieich-Buchsschlag,
Germany
Tel: +49-6103-690-0
Fax: +49-6103-690-122

<http://www.fujitsu-fme.com/>

Asia Pacific

FUJITSU MICROELECTRONICS ASIA PTE. LTD.
#05-08, 151 Lorong Chuan,
New Tech Park,
Singapore 556741
Tel: +65-281-0770
Fax: +65-281-0220

<http://www.fmal.fujitsu.com/>

F0107

© FUJITSU LIMITED Printed in Japan

All Rights Reserved.

The contents of this document are subject to change without notice. Customers are advised to consult with FUJITSU MEDIA DEVICES sales representatives before ordering.

The information and circuit diagrams in this document are presented as examples of device applications, and are not intended to be incorporated in devices for actual use. Also, FUJITSU MEDIA DEVICES is unable to assume responsibility for infringement of any patent rights or other rights of third parties arising from the use of this information or circuit diagrams.

The products described in this document are designed, and manufactured as contemplated for general use, including without limitation, ordinary industrial use, general office use, personal use, and household use, but are not designed, developed and manufactured as contemplated (1) for use accompanying fatal risks or dangers that, unless extremely high safety is secured, could have a serious effect to the public, and could lead directly to death, personal injury, severe physical damage or other loss (i.e., nuclear reaction control in nuclear facility, aircraft flight control, air traffic control, mass transport control, medical life support system, missile launch control in weapon system), or (2) for use requiring extremely high reliability (i.e., submersible repeater and artificial satellite).

Please note that Fujitsu will not be liable against you and/or any third party for any claims or damages arising in connection with above-mentioned uses of the products.

Any electronic devices have inherently a certain rate of failure. You must protect against injury, damage or loss from such failures by incorporating safety design measures into your facility and equipment such as redundancy, fire protection, and prevention of over-current levels and other abnormal operating conditions.

If any products described in this document represent goods or technologies subject to certain restrictions on export under the Foreign Exchange and Foreign Trade Control Law of Japan, the prior authorization by Japanese government should be required for export of those products from Japan.