

ASSP Mobile Communication Systems

Piezoelectric SAW Dual BPF (700 MHz to 2000 MHz)

G5/G6 Series (L2/D2 type)

■ DESCRIPTION

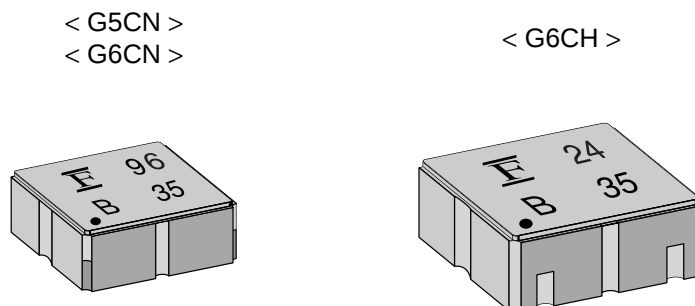
As the market for mobile phones continues to increase, so has demand for smaller size, lighter weight and lower cost. Dual band phones, such as GSM + PCN and AMPS + PCS, are rising in popularity. To support these requests, Fujitsu has developed a new series of SAW dual filter (G5/G6 series) incorporating two SAW filters in one package. For example, Fujitsu can offer a GSM Rx filter and a PCN Rx filter of combination in small 3.8 mm × 3.8 mm package.

The G5/G6 series of SAW dual filter applies to the 700 MHz to 2000 MHz, frequency range, and are available in two package types : 2 input/2 output type or 1 input/2 output (2 input/1 output) .

■ FEATURES

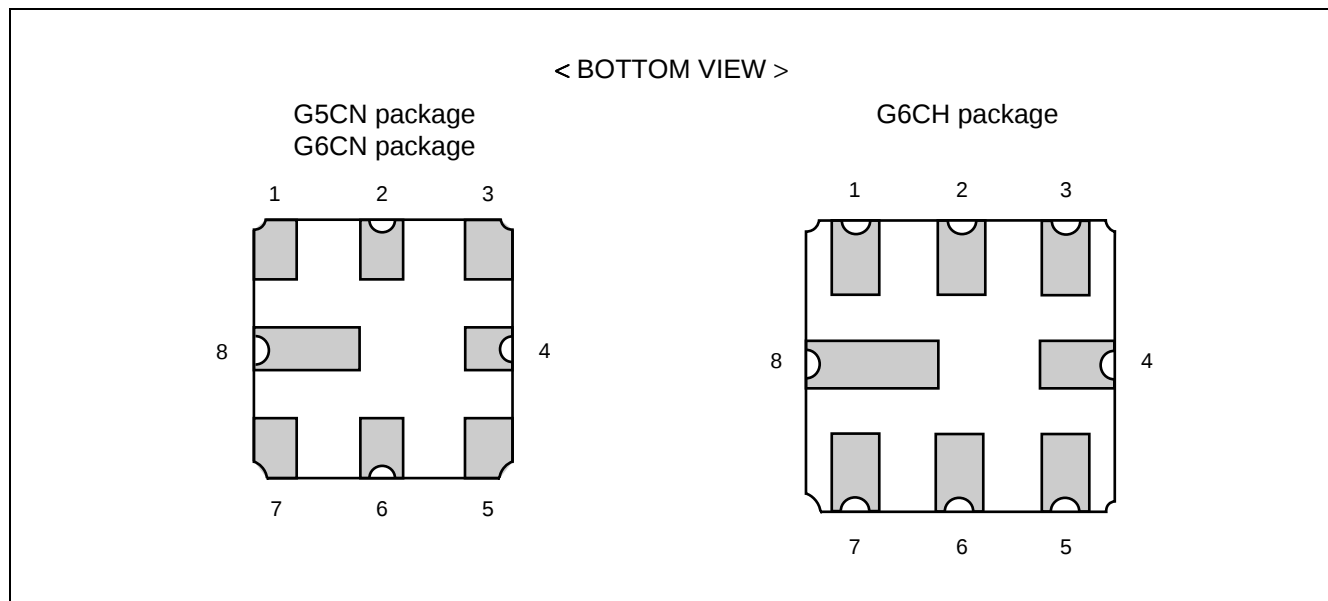
- Two functions are incorporated in one package
(Useful for multi-band phone and multi-mode phone)
- Ultra compact and light package (3.8 mm × 3.8 mm or 3.0 mm × 3.0 mm)
- 50 Ω of input/output impedance
- Low insertion
- 2 in/2 out and 1 in/2 out (2 in/1 out) of package types are available

■ PACKAGES



G5/G6 Series

PIN ASSIGNMENTS



PIN DESCRIPTIONS

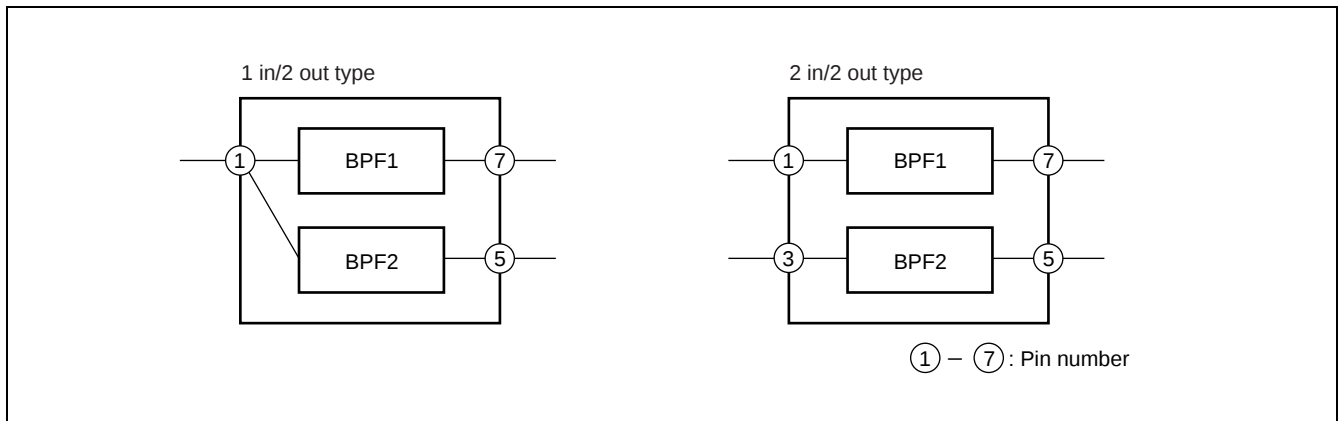
- 1 in/2 out type

Pin	Pin name	Description
1	IN	Input Pin (Common)
2	GND	Ground Pin
3	GND	Ground Pin
4	GND	Ground Pin
5	OUT	Filter 2 Output Pin
6	GND	Ground Pin
7	OUT	Filter 1 Output Pin
8	GND	Ground Pin

- 2 in/2 out type

Pin	Pin name	Description
1	IN	Filter 1 Input Pin
2	GND	Ground Pin
3	IN	Filter 2 Input Pin
4	GND	Ground Pin
5	OUT	Filter 2 Output Pin
6	GND	Ground Pin
7	OUT	Filter 1 Output Pin
8	GND	Ground Pin

■ INTERNAL BLOCK DIAGRAM



G5/G6 Series

■ 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}	Depends on each design. See “■ ELECTRICAL CHARACTERISTICS”.		
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 CONDITIONS

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 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 DEVICES

No.	Part number	System		Frequency (MHz)	Part symbol	Input/Output	Remarks
1	FAR-G5CN-877M50-D292	PDC800 Rx		810 MHz to 843 MHz	92	1 in/ 2 out	3.0 mm × 3.0 mm
				870 MHz to 885 MHz			
2	FAR-G6CH-1G8425-L218	EGSM + PCN Rx		925 MHz to 960 MHz	18	2 in/ 2 out	3.8 mm × 3.8 mm Low insertion loss type
				1805 MHz to 1880 MHz			
3	FAR-G6CH-1G8425-L227B	EGSM + PCN Rx		925 MHz to 960 MHz	27	2 in/ 2 out	3.8 mm × 3.8 mm
				1805 MHz to 1880 MHz			
4	FAR-G6CH-1G9600-L228A	EGSM + PCS Rx		925 MHz to 960 MHz	28	2 in/ 2 out	3.8 mm × 3.8 mm
				1930 MHz to 1990 MHz			
5	FAR-G6CN-1G8950-L233	PCS Tx Split	Low	1850 MHz to 1880 MHz	33	2 in/ 2 out	3.0 mm × 3.0 mm
			High	1880 MHz to 1910 MHz			

■ ELECTRICAL CHARACTERISTICS AND TYPICAL FREQUENCY RESPONSE

1. PDC800 (Rx) 1 in/2 out

Part number : FAR-G5CN-877M50-D292

(Ta = -30 °C to +85 °C)

Parameter		Condition	Value			Unit	Remarks
			Min	Typ	Max		
Filter 1	Insertion loss	810 MHz to 843 MHz	—	2.6	4.0	dB	
	Pass-band ripple	810 MHz to 843 MHz	—	0.8	2.2	dB	
	Absolute stop-band attenuation	550 MHz to 585 MHz	40	47	—	dB	
		585 MHz to 650 MHz	28	32	—	dB	
		650 MHz to 780 MHz	20	24	—	dB	
		865 MHz to 889 MHz	16	19	—	dB	
		889 MHz to 900 MHz	19	23	—	dB	
		900 MHz to 1070 MHz	20	27	—	dB	
		1070 MHz to 1110 MHz	30	33	—	dB	
	Pass-band VSWR (Return loss)	810 MHz to 828 MHz	— (6.5)	2.1 (9.0)	2.8 —	— (dB)	
	Input power	810 MHz to 828 MHz	—	—	15	dBm	
Filter 2	Insertion loss	870 MHz to 885 MHz	—	2.7	3.5	dB	
	Pass-band ripple	870 MHz to 885 MHz	—	0.2	1.0	dB	
	Absolute stop-band attenuation	610 MHz to 630 MHz	40	46	—	dB	
		630 MHz to 700 MHz	35	40	—	dB	
		700 MHz to 840 MHz	20	27	—	dB	
		925 MHz to 960 MHz	15	19	—	dB	
		960 MHz to 1130 MHz	30	37	—	dB	
		1130 MHz to 1145 MHz	32	35	—	dB	
	Pass-band VSWR (Return loss)	870 MHz to 885 MHz	— (7.4)	1.9 (10.2)	2.5 —	— (dB)	
	Input power	870 MHz to 885 MHz	—	—	15	dBm	

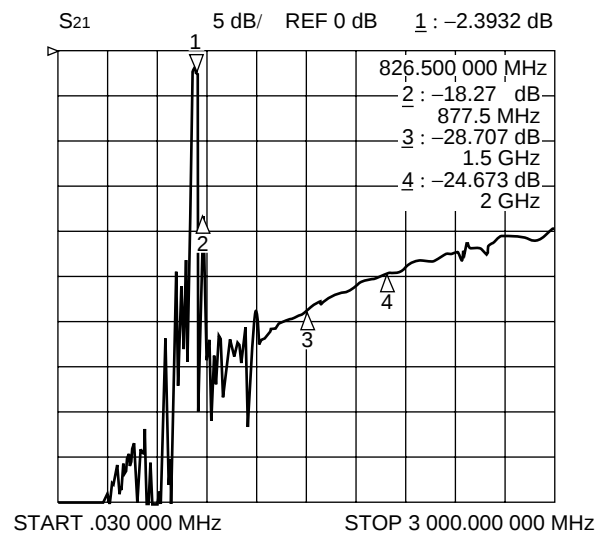
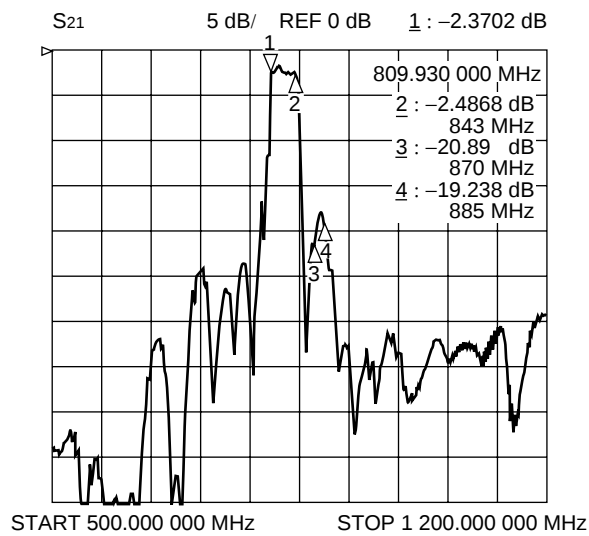
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G5/G6 Series

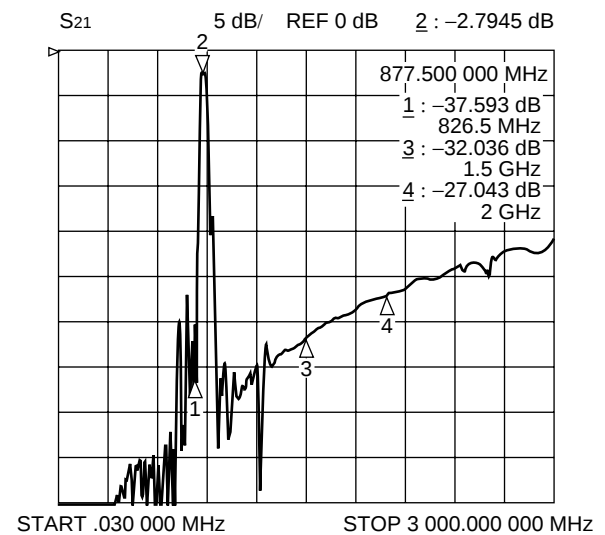
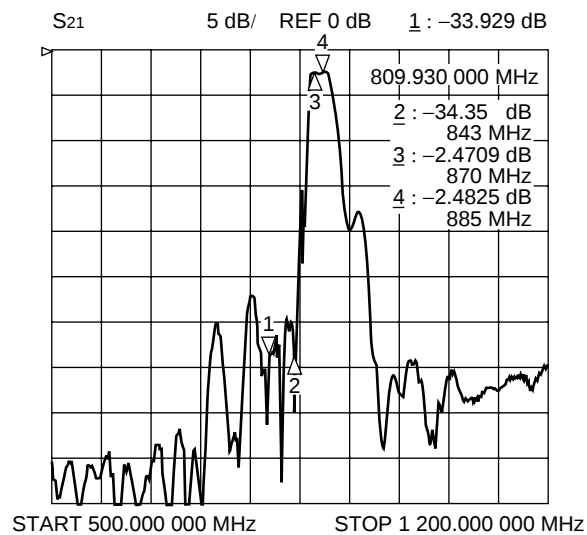
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Part number : FAR-G5CN-877M50-D292

Filter 1 (Pass-band : 810 MHz to 843 MHz)



Filter 2 (Pass-band : 870 MHz to 885 MHz)



2. EGSM Rx + PCN Rx (2 in/2 out) Part number : FAR-G6CH-1G8425-L218

(Ta = -30 °C to +85 °C)

Parameter		Condition	Value			Unit	Remarks
			Min	Typ	Max		
Filter 1	Insertion loss	925 MHz to 960 MHz	—	—	2.5	dB	Ta = +20 °C to +30 °C
			—	2.2	3.0	dB	Ta = -30 °C to +85 °C
	Pass-band ripple	925 MHz to 960 MHz	—	0.8	1.6	dB	
	Absolute stop-band attenuation	DC to 880 MHz	16	18	—	dB	
		880 MHz to 915 MHz	10	—	—	dB	Ta = +20 °C to +30 °C
			5	17	—	dB	Ta = -30 °C to +85 °C
		980 MHz to 1200 MHz	13	22	—	dB	
		1375 MHz to 1410 MHz	20	24	—	dB	
		1850 MHz to 1920 MHz	25	32	—	dB	
		2775 MHz to 2880 MHz	15	18	—	dB	
	Pass-band VSWR (Return loss)	925 MHz to 960 MHz	— (7.4)	2.1 (9.0)	2.5 —	— (dB)	
	Input power	925 MHz to 960 MHz	—	—	23	dBm	
Filter 2	Insertion loss	1805 MHz to 1880 MHz	—	—	3.2	dB	Ta = +20 °C to +30 °C
			—	2.7	3.7	dB	Ta = -30 °C to +85 °C
	Pass-band ripple	1805 MHz to 1880 MHz	—	1.1	2.1	dB	
	Absolute stop-band attenuation	DC to 1300 MHz	17	18	—	dB	
		1355 MHz to 1430 MHz	18	20	—	dB	
		1500 MHz to 1710 MHz	20	22	—	dB	
		1710 MHz to 1785 MHz	17	—	—	dB	Ta = +20 °C to +30 °C
			8	25	—	dB	Ta = -30 °C to +85 °C
		1920 MHz to 1980 MHz	15	29	—	dB	
		3610 MHz to 3760 MHz	15	17	—	dB	
		5415 MHz to 5640 MHz	12	17	—	dB	
	Pass-band VSWR (Return loss)	1805 MHz to 1880 MHz	— (7.7)	2.0 (9.5)	2.4 —	— (dB)	
	Input power	1805 MHz to 1880 MHz	—	—	13	dBm	

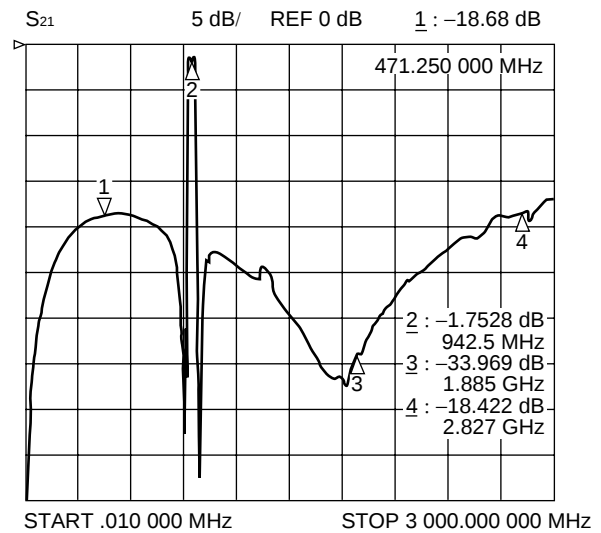
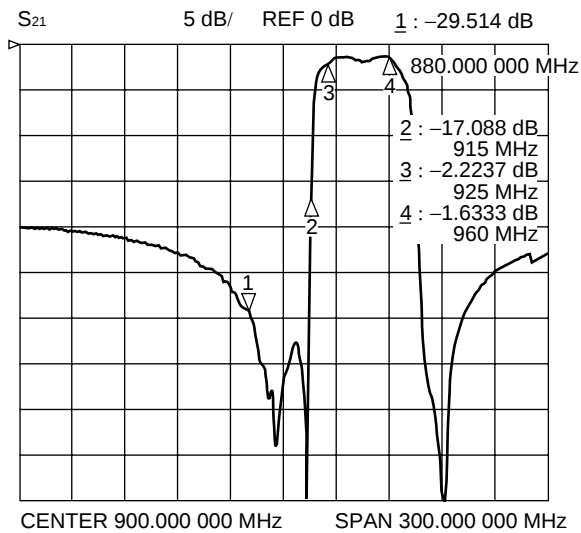
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G5/G6 Series

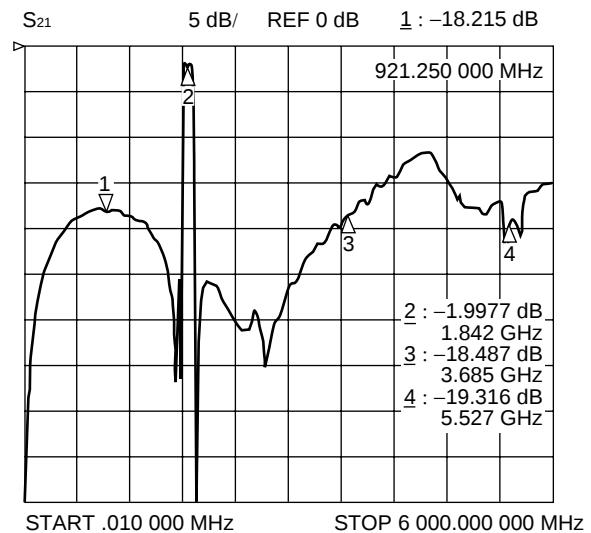
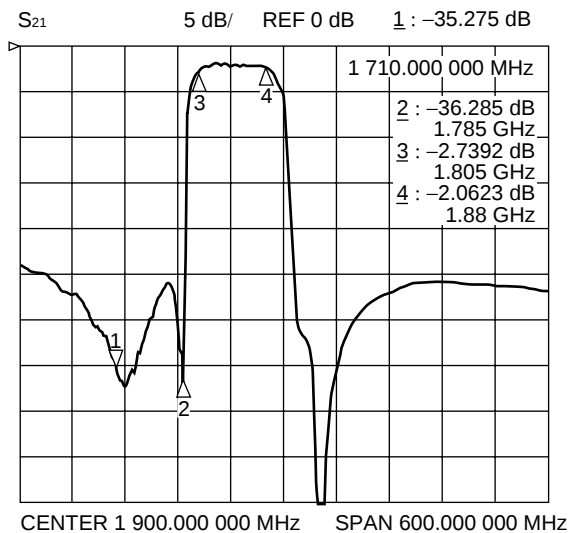
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Part number : FAR-G6CH-1G8425-L218

Filter 1 (Pass-band : 925 MHz to 960 MHz)



Filter 2 (Pass-band : 1805 MHz to 1880 MHz)



3. EGSM Rx + PCN Rx (2 in/2 out) Part number : FAR-G6CH-1G8425-L227B

(Ta = -30 °C to +85 °C)

Parameter		Condition	Value			Unit	Remarks
			Min	Typ	Max		
Filter 1	Insertion loss	925 MHz to 960 MHz	—	—	3.0	dB	Ta = +20 °C to +30 °C
			—	2.7	3.7	dB	Ta = -30 °C to +85 °C
	Pass-band ripple	925 MHz to 960 MHz	—	1.1	2.1	dB	
	Absolute stop-band attenuation	DC to 880 MHz	22	23	—	dB	
		880 MHz to 905 MHz	28	32	—	dB	
		905 MHz to 915 MHz	11	32	—	dB	Ta = -30 °C to +30 °C
			7	—	—	dB	Ta = +30 °C to +85 °C
		980 MHz to 1200 MHz	20	30	—	dB	
		1375 MHz to 1410 MHz	30	38	—	dB	
		1850 MHz to 1920 MHz	20	26	—	dB	
	Pass-band VSWR (Return loss)	925 MHz to 960 MHz	— (7.7)	1.9 (10.2)	2.4 —	— (dB)	
	Input power	925 MHz to 960 MHz	—	—	23	dBm	
Filter 2	Insertion loss	1805 MHz to 1880 MHz	—	—	3.5	dB	Ta = +20 °C to +30 °C
			—	2.8	3.9	dB	Ta = -30 °C to +85 °C
	Pass-band ripple	1805 MHz to 1880 MHz	—	1.3	2.4	dB	
	Absolute stop-band attenuation	DC to 1300 MHz	17	18	—	dB	
		1355 MHz to 1430 MHz	17	19	—	dB	
		1600 MHz to 1710 MHz	20	22	—	dB	
		1710 MHz to 1785 MHz	20	25	—	dB	Ta = -30 °C to +30 °C
			10	—	—	dB	Ta = +30 °C to +85 °C
		1920 MHz to 1980 MHz	20	29	—	dB	
		3610 MHz to 3760 MHz	15	19	—	dB	
	Pass-band VSWR (Return loss)	1805 MHz to 1880 MHz	— (7.7)	1.9 (10.2)	2.4 —	— (dB)	
	Input power	1805 MHz to 1880 MHz	—	—	13	dBm	

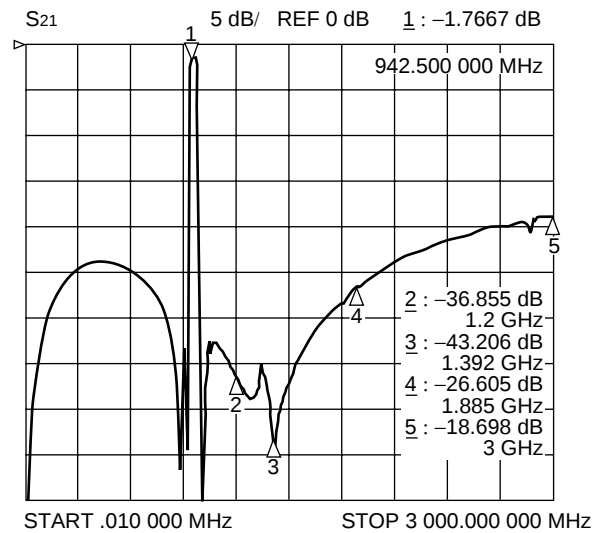
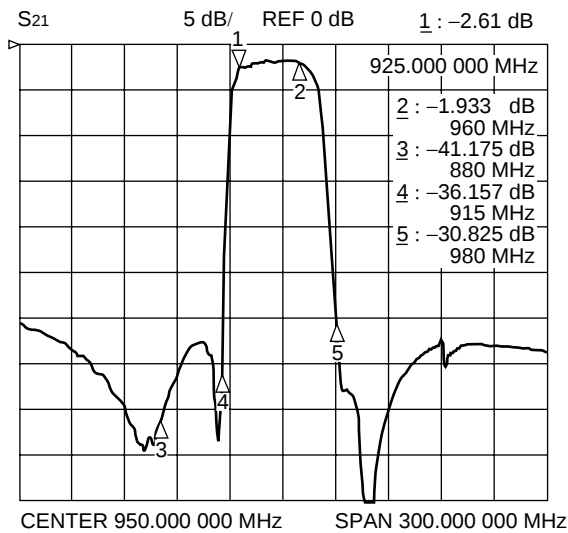
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G5/G6 Series

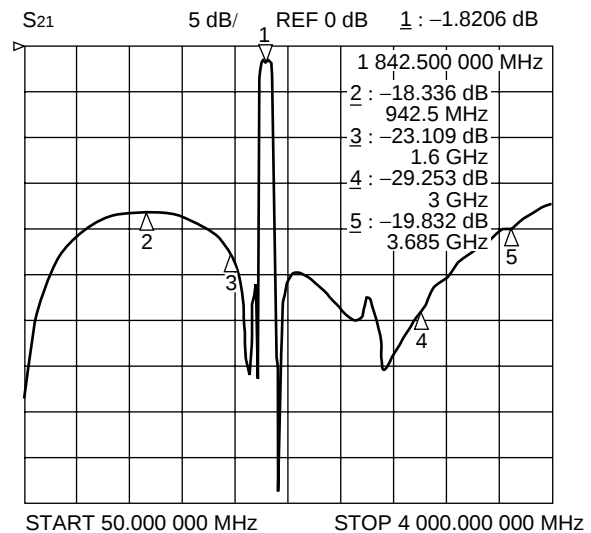
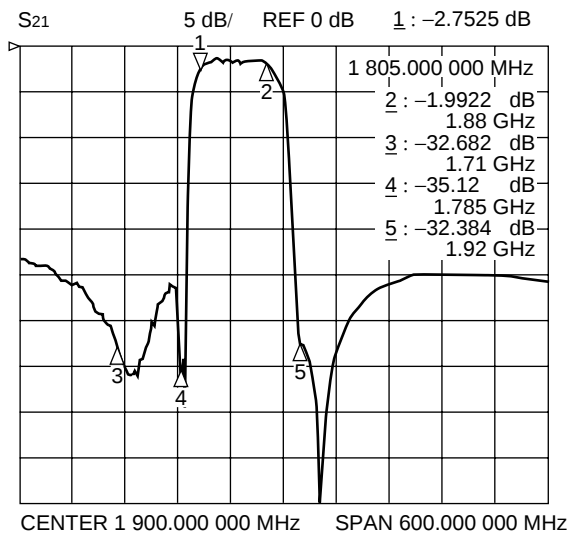
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Part number : FAR-G6CH-1G8425-L227B

Filter 1 (Pass-band : 925 MHz to 960 MHz)



Filter 2 (Pass-band : 1805 MHz to 1880 MHz)



4. EGSM Rx + PCN Rx (2 in/2 out) Part number : FAR-G6CH-1G9600-L228A

(Ta = -30 °C to +85 °C)

Parameter		Condition	Value			Unit	Remarks
			Min	Typ	Max		
Filter 1	Insertion loss	925 MHz to 960 MHz	—	—	3.0	dB	Ta = +20 °C to +30 °C
			—	2.7	3.7	dB	Ta = -30 °C to +85 °C
	Pass-band ripple	925 MHz to 960 MHz	—	1.1	2.1	dB	
	Absolute stop-band attenuation	DC to 880 MHz	22	23	—	dB	
		880 MHz to 905 MHz	28	32	—	dB	
		905 MHz to 915 MHz	11	32	—	dB	Ta = -30 °C to +30 °C
			7	—	—	dB	Ta = +30 °C to +85 °C
		980 MHz to 1200 MHz	20	—	—	dB	Ta = -30 °C to +20 °C
			25	32	—	dB	Ta = +20 °C to +85 °C
		1375 MHz to 1410 MHz	30	38	—	dB	
		1850 MHz to 1920 MHz	20	26	—	dB	
	Pass-band VSWR (Return loss)	925 MHz to 960 MHz	— (7.7)	1.9 (10.2)	2.4 —	— (dB)	
	Input power	925 MHz to 960 MHz	—	—	23	dBm	
Filter 2	Insertion loss	1930 MHz to 1990 MHz	—	—	3.9	dB	Ta = +20 °C to +30 °C
			—	3.5	4.2	dB	Ta = -30 °C to +85 °C
	Pass-band ripple	1930 MHz to 1990 MHz	—	1.9	2.6	dB	
	Absolute stop-band attenuation	DC to 1850 MHz	20	22	—	dB	
		1850 MHz to 1910 MHz	7	10	—	dB	Ta = -30 °C to +30 °C
			5	—	—	dB	Ta = +30 °C to +85 °C
		2010 MHz to 2100 MHz	5	—	—	dB	Ta = -30 °C to +20 °C
			6	10	—	dB	Ta = +20 °C to +85 °C
		2500 MHz to 2700 MHz	20	25	—	dB	
		3000 MHz to 4000 MHz	15	18	—	dB	
	Pass-band VSWR (Return loss)	1930 MHz to 1990 MHz	— (7.0)	2.1 (9.0)	2.6 —	— (dB)	
	Input power	1930 MHz to 1990 MHz	—	—	13	dBm	

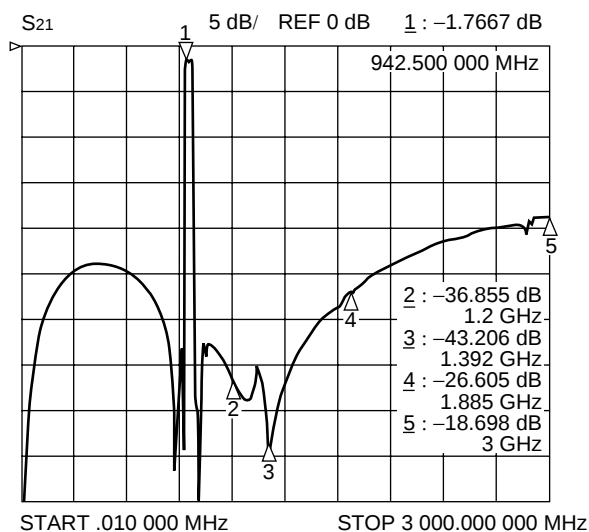
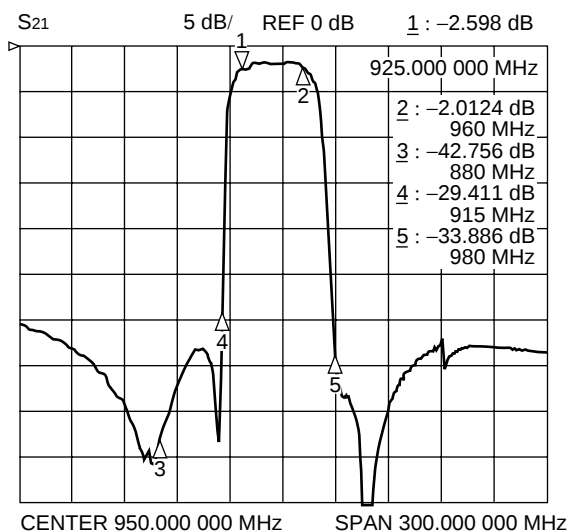
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G5/G6 Series

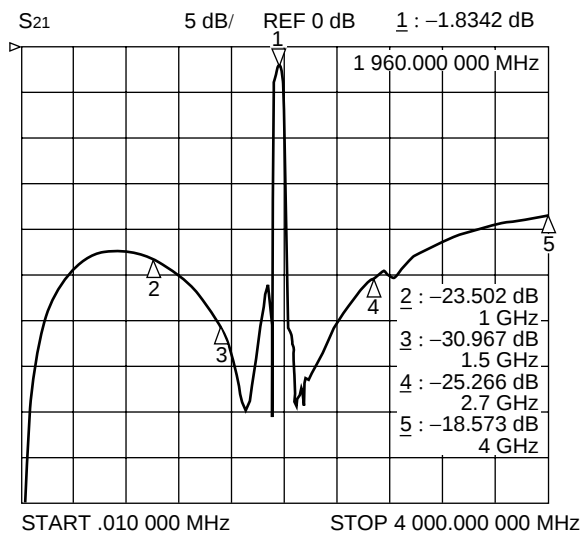
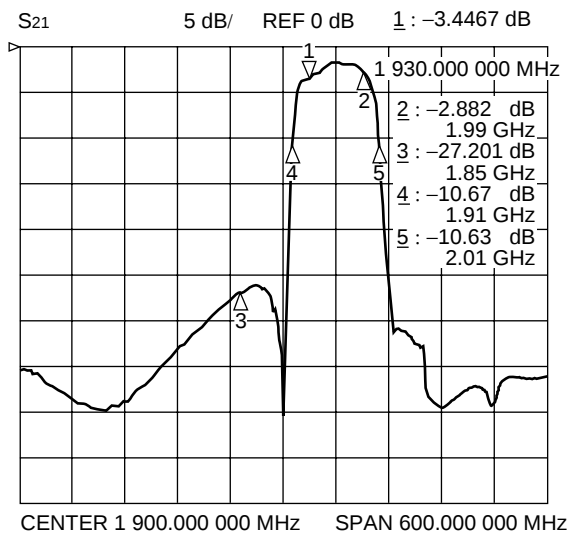
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Part number : FAR-G6CH-1G9600-L228A

Filter 1 (Pass-band : 925 MHz to 960 MHz)



Filter 2 (Pass-band : 1930 MHz to 1990 MHz)



5. PCS Tx split band (low band + high band dual) (2 in/2 out)

Part number : FAR-G6CN-1G8950-L233

(Ta = -30 °C to +85 °C)

Parameter		Condition	Value			Unit	Remarks
			Min	Typ	Max		
Filter 1	Insertion loss	1850 MHz to 1880 MHz	—	2.1	3.2	dB	
	Pass-band ripple	1850 MHz to 1880 MHz	—	0.4	1.5	dB	
	Absolute stop-band attenuation	DC to 1700 MHz	20	23	—	dB	
		1700 MHz to 1760 MHz	28	38	—	dB	
		1930 MHz to 1960 MHz	30	38	—	dB	
		2000 MHz to 2100 MHz	30	35	—	dB	
		2100 MHz to 3000 MHz	25	35	—	dB	
	Pass-band VSWR (Return loss)	1850 MHz to 1880 MHz	— (8.5)	1.4 (15.6)	2.2 —	— (dB)	
	Input power	1850 MHz to 1880 MHz	—	—	13	dBm	
Filter 2	Insertion loss	1880 MHz to 1910 MHz	—	2.4	3.2	dB	
	Pass-band ripple	1880 MHz to 1910 MHz	—	0.6	1.5	dB	
	Absolute stop-band attenuation	DC to 1700 MHz	21	24	—	dB	
		1700 MHz to 1760 MHz	28	37	—	dB	
		1800 MHz to 1830 MHz	15	26	—	dB	
		1960 MHz to 1990 MHz	30	37	—	dB	
		2000 MHz to 2100 MHz	30	38	—	dB	
		2100 MHz to 3000 MHz	25	32	—	dB	
	Pass-band VSWR (Return loss)	1880 MHz to 1910 MHz	— (8.5)	1.5 (14.0)	2.2 —	— (dB)	
	Input power	1880 MHz to 1910 MHz	—	—	13	dBm	

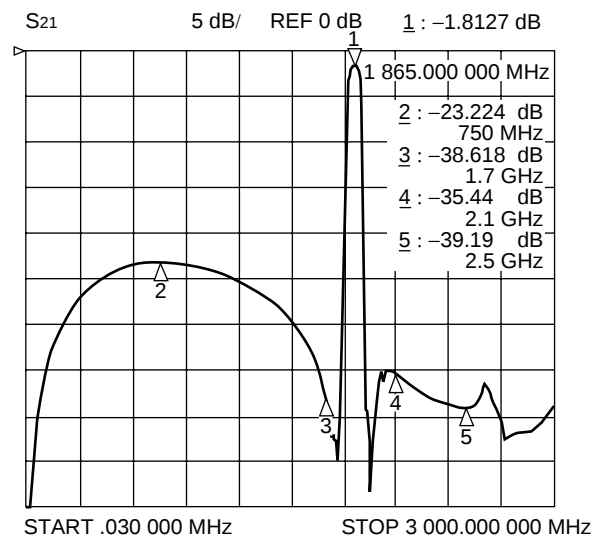
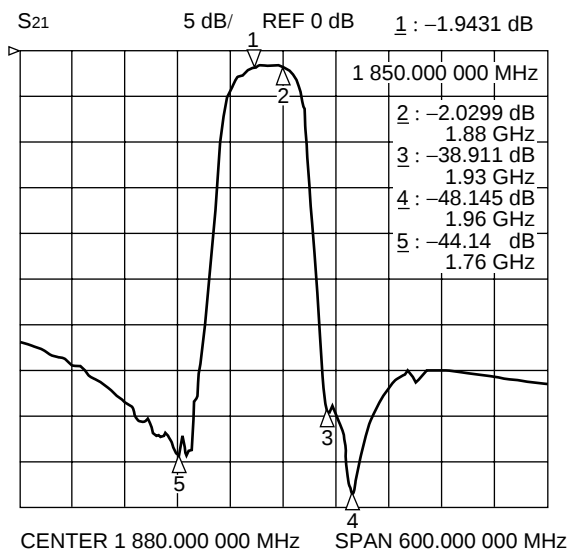
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G5/G6 Series

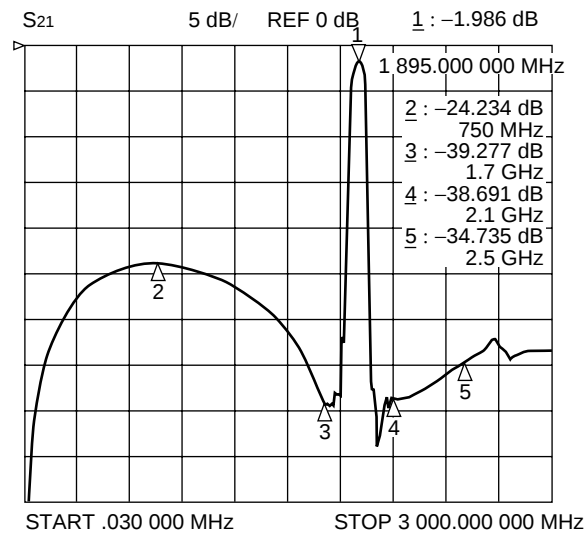
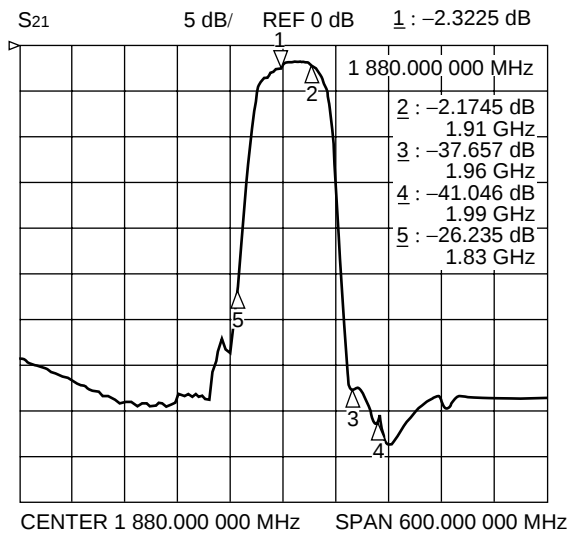
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Part number : FAR-G6CN-1G8950-L233

Filter 1 (Pass-band : 1850 MHz to 1880 MHz)

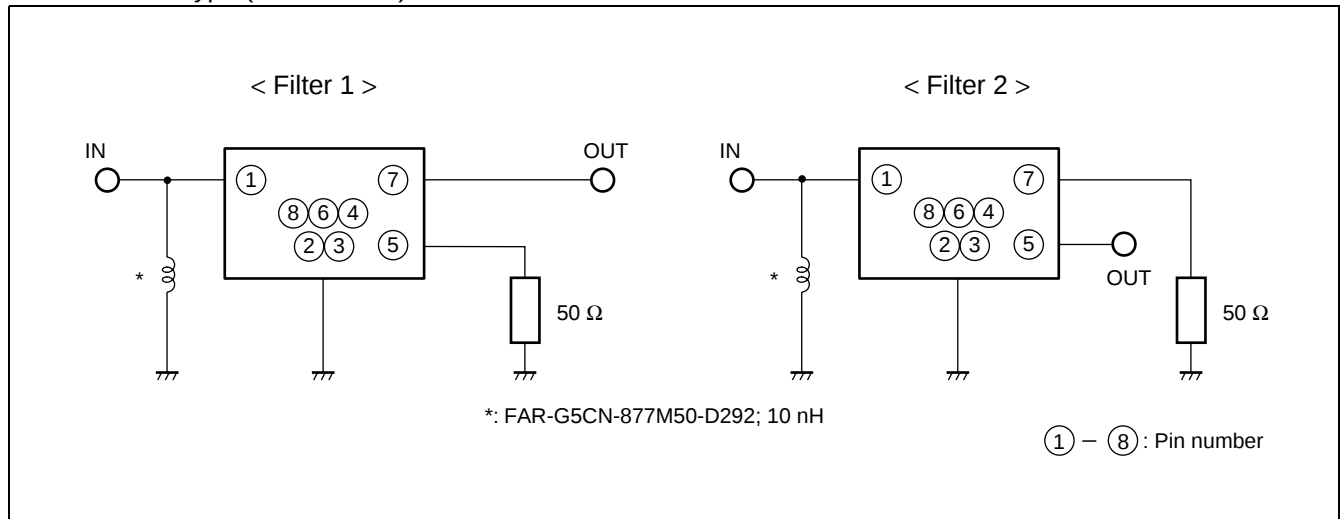


Filter 2 (Pass-band : 1880 MHz to 1910 MHz)

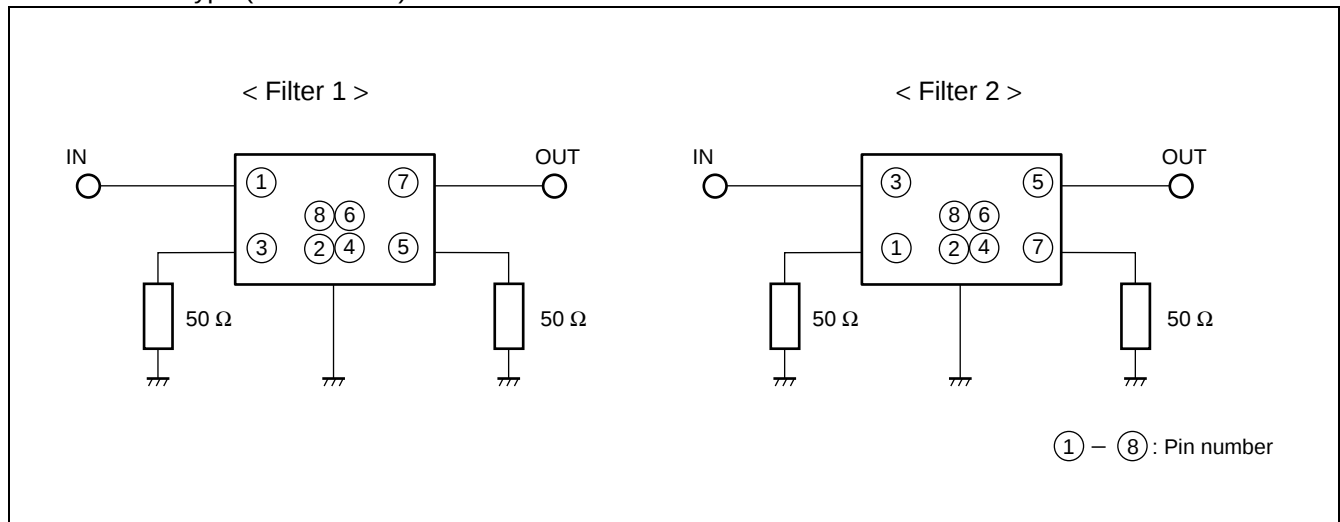


MEASUREMENT CIRCUIT

- 1 in/2 out type (G5CN filters)

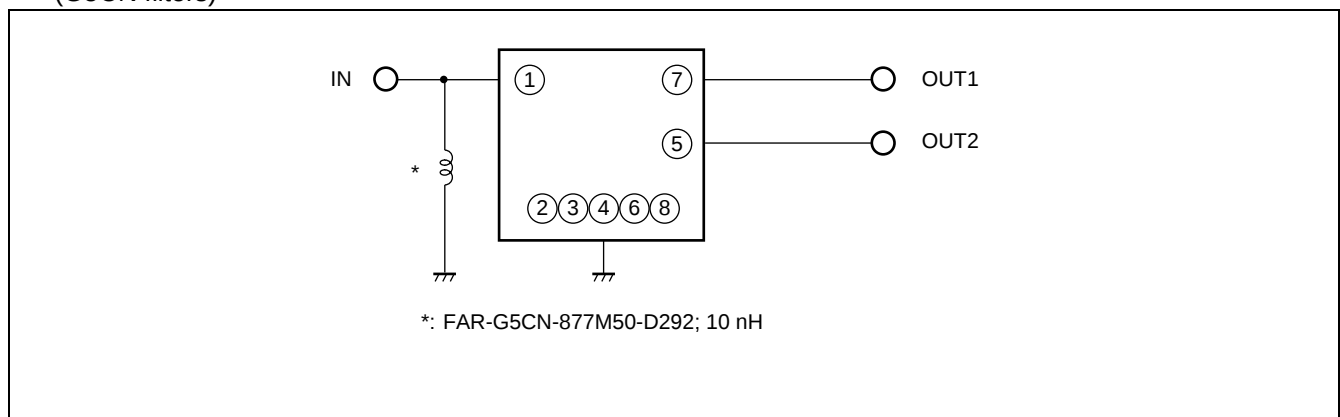


- 2 in/2 out type (G6CH filters)



RECOMMENDED EXTERNAL CIRCUIT OF 1 IN/2 OUT TYPE

(G5CN filters)



G5/G6 Series

■ PART NUMBER DESIGNATION

[Designation example]

< G5CN FILTER >

FAR-G5CN-□□□□□□ -D2 □□ - □
(1) (2) (3)

- (1) Frequency : This specifies the nominal center frequency of higher frequency side using six alphanumeric.
M (for MHz) indicates the decimal point.
[Example] 877M50 ⇒ 877.5 MHz
- (2) Part symbol : 01 to 99 (Numbers specified by Fujitsu)
- (3) Packing : Y; 1 k pcs/reel
X ; 5 k pcs/reel

< G6CH FILTER >

FAR-G6CH-□□□□□□ -L2 □□ - □
(1) (2) (3)

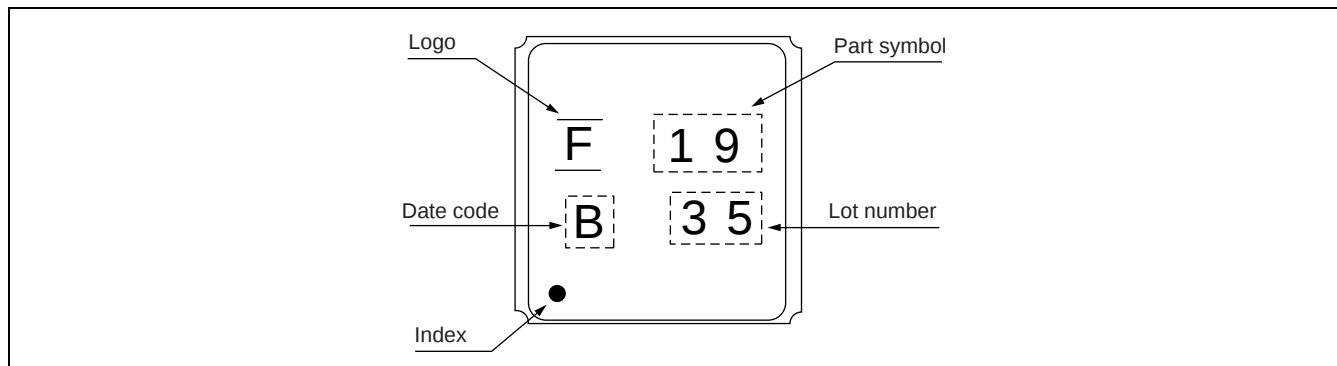
- (1) Frequency : This specifies the nominal center frequency of higher frequency side using six alphanumeric.
G (for GHz) indicates the decimal point.
[Example] 1G8800 ⇒ 1.88 GHz
- (2) Part symbol : 01 to 99 (Numbers specified by Fujitsu)
- (3) Packing : T; 1 k pcs/reel
R; 3 k pcs/reel

< G6CN FILTER >

FAR-G6CN-□□□□□□ -L2 □□ - □
(1) (2) (3)

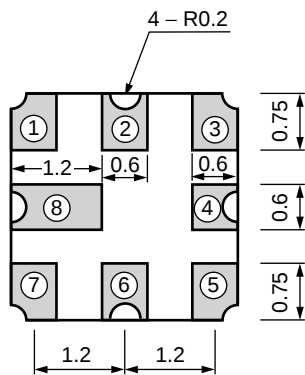
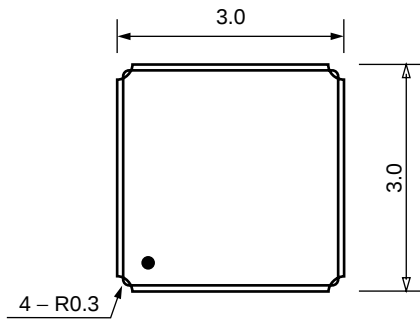
- (1) Frequency : This specifies the nominal center frequency of higher frequency side using six alphanumeric.
G (for GHz) indicates the decimal point.
[Example] 1G8950 ⇒ 1.895 GHz
- (2) Part symbol : 01 to 99 (Numbers specified by Fujitsu)
- (3) Packing : Y; 1 k pcs/reel
X ; 5 k pcs/reel

■ MARKING

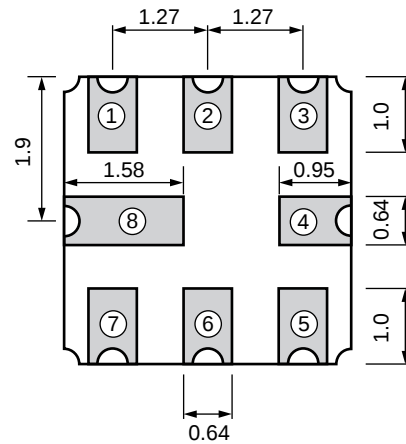
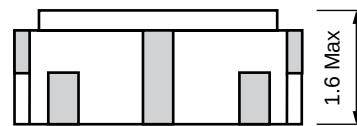
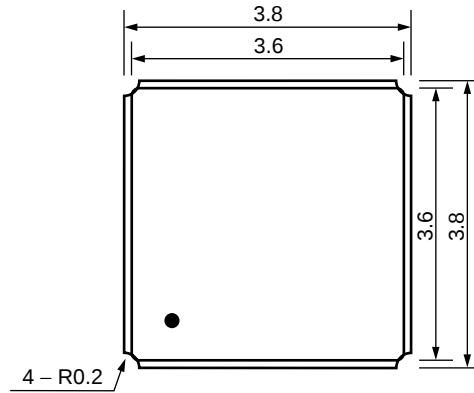


■ PACKAGE DIMENSIONS

< G5CN package >
< G6CN package >



< G6CH package >



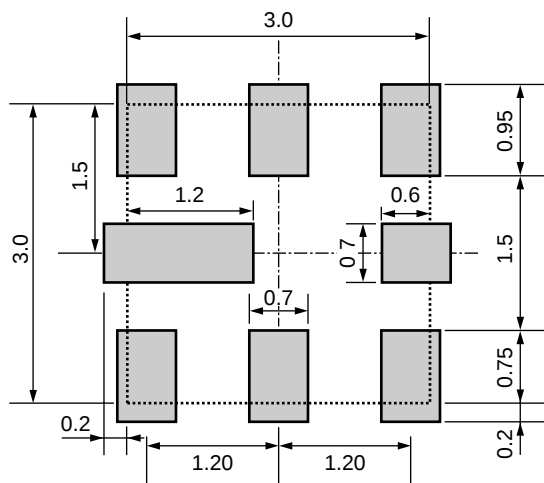
Dimensions in mm.

G5/G6 Series

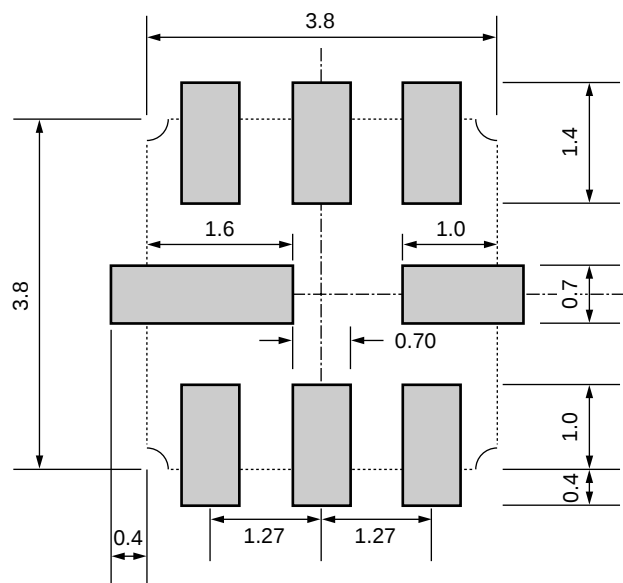
■ RECOMMENDED LAND PATTERN

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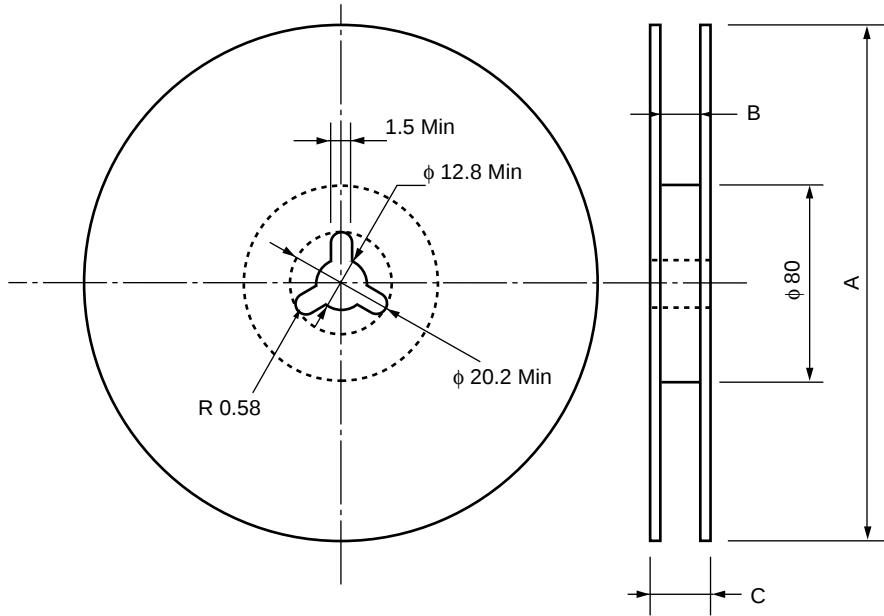
< G6CH package >



Dimensions in mm.

■ PACKING

1. Reel Dimensions



< G5CN filter >

< G6CN filter >

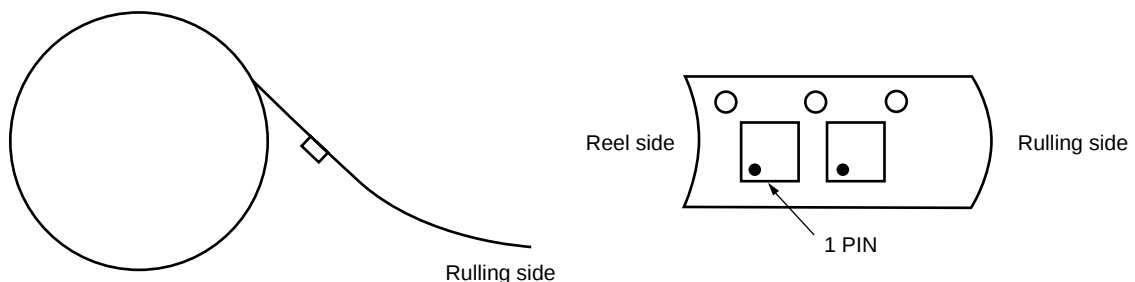
Type	A	B	C	Volume
Y	$\phi 250$	9.5 ± 0.5	13.8 Max	1 k pcs
X	$\phi 250$	9.5 ± 0.5	13.8 Max	5 k pcs

< G6CH filter >

Type	A	B	C	Volume
T	$\phi 250$	$12.4^{+2.0}_{-0.0}$	18.4 Max	1 k pcs
R	$\phi 330$	$12.4^{+2.0}_{-0.0}$	18.4 Max	3 k pcs

Dimensions in mm.

2. Packing Style

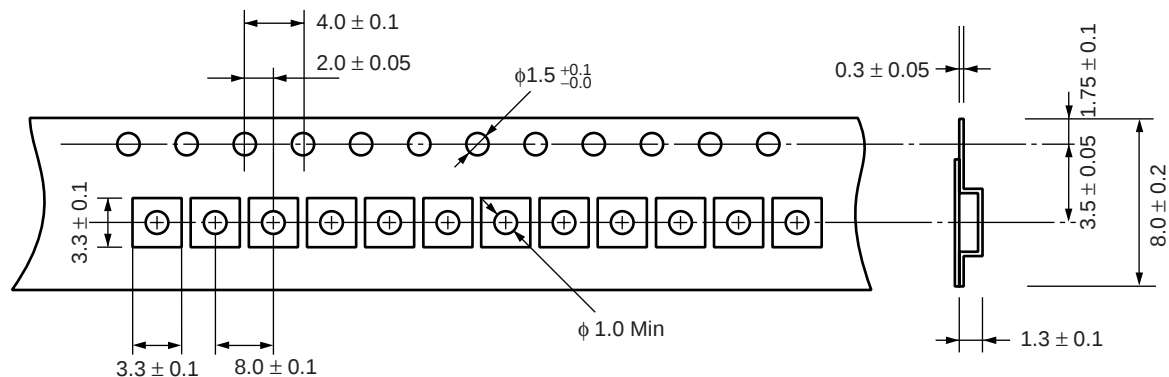


G5/G6 Series

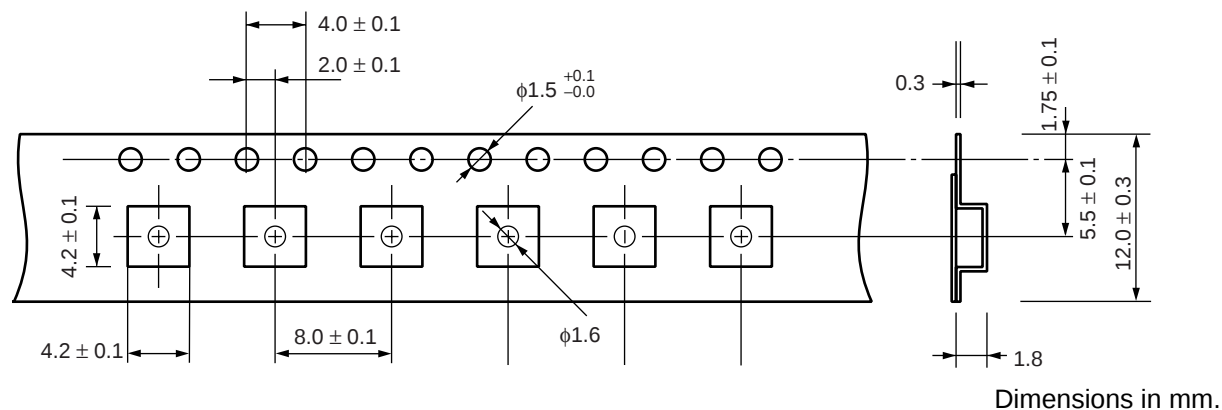
3. Tape Dimensions

< G5CN filters >

< G6CN filters >



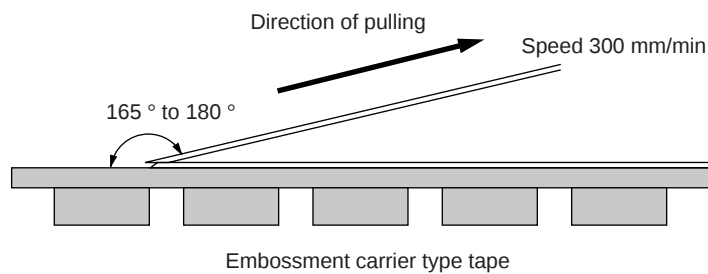
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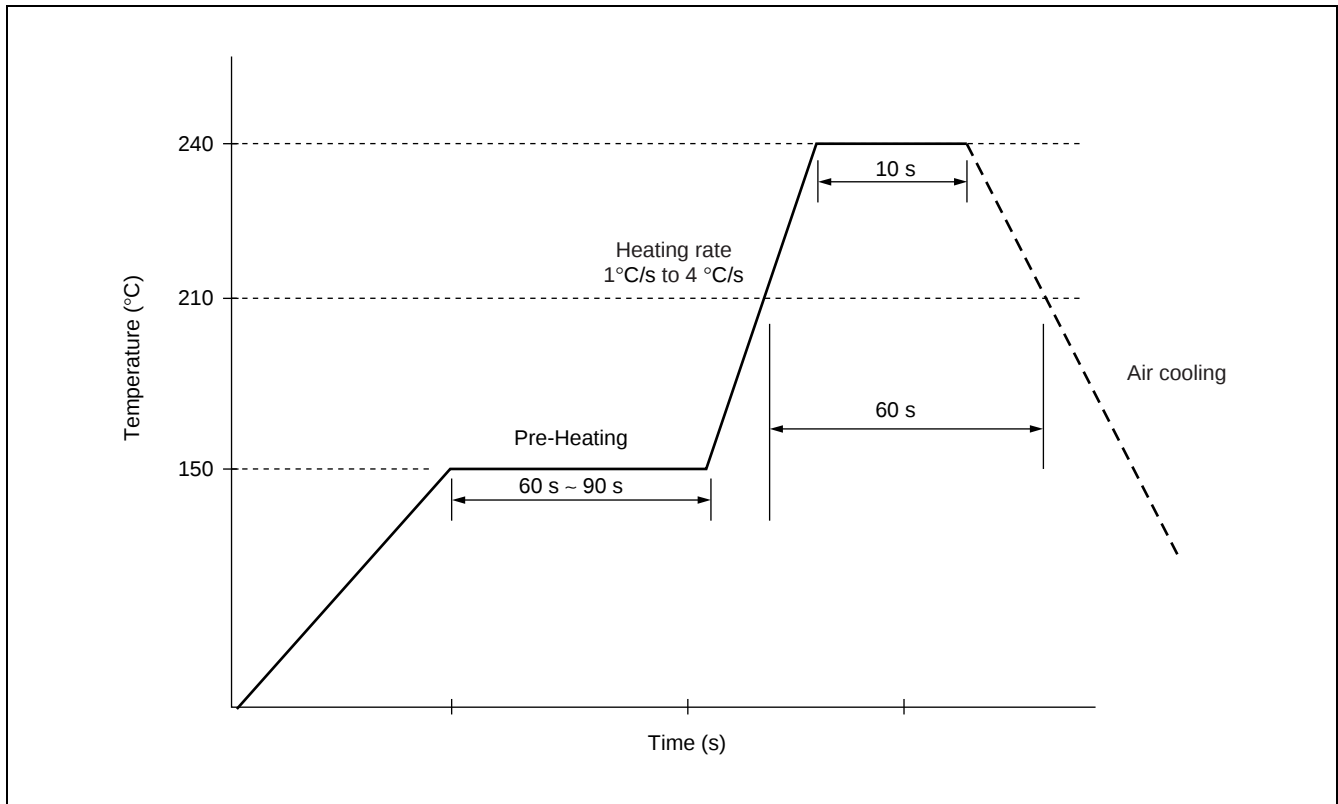
Dimensions in mm.

4. Peel strength of top cover tape

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.

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