

## ASSP for Mobile Communication Systems

# Piezoelectric SAW BPF (1000 to 2500 MHz)

## F6 Series (L2 Type)

### ■ DESCRIPTION

The F6 series of SAW bandpass filters apply to the frequency range 1000 to 2500 MHz.

The SAW filters are fabricated on a lithium tantalate ( $\text{LiTaO}_3$ ) substrate, producing filters with a wide frequency bandwidth, low insertion loss in passband and superior stability due to the high electromechanical coupling coefficient of the material.

Fujitsu's leading techniques for making filter pattern designs realized this high frequency filter.

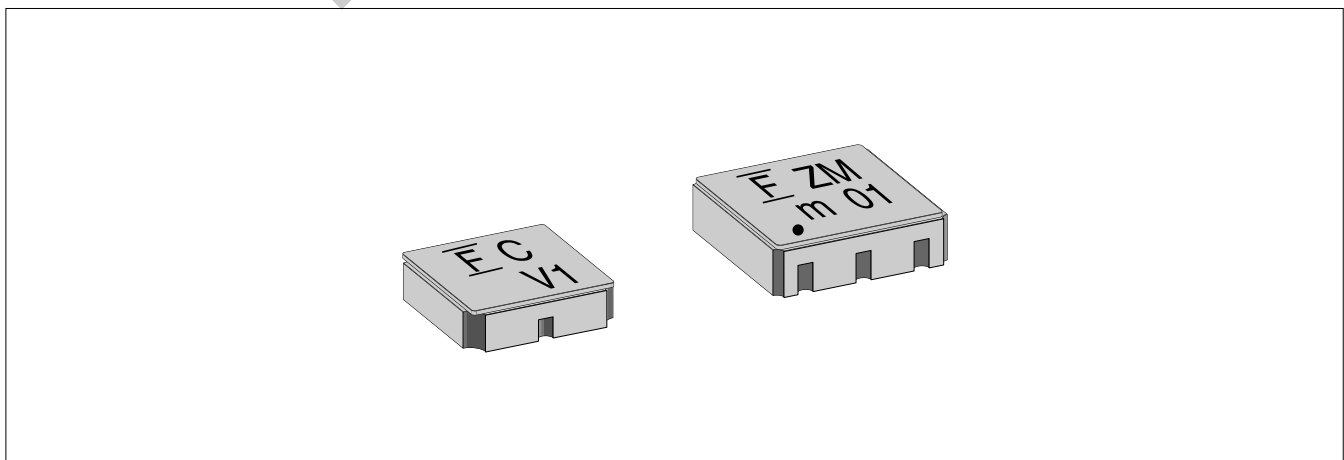
The F6 series filters are housed in a small surface mount package. Moreover, the impedance in the passband is 50 ohms, and so applications require no external matching circuits.

The F6 series SAW filters are suitable for interstage RF filter in mobile communications systems in the submicrowave frequency band. Standard devices are available for PDC1.5 G, PCS, DCS1800 and 2.4 GHz Wireless LAN systems.

### ■ FEATURES

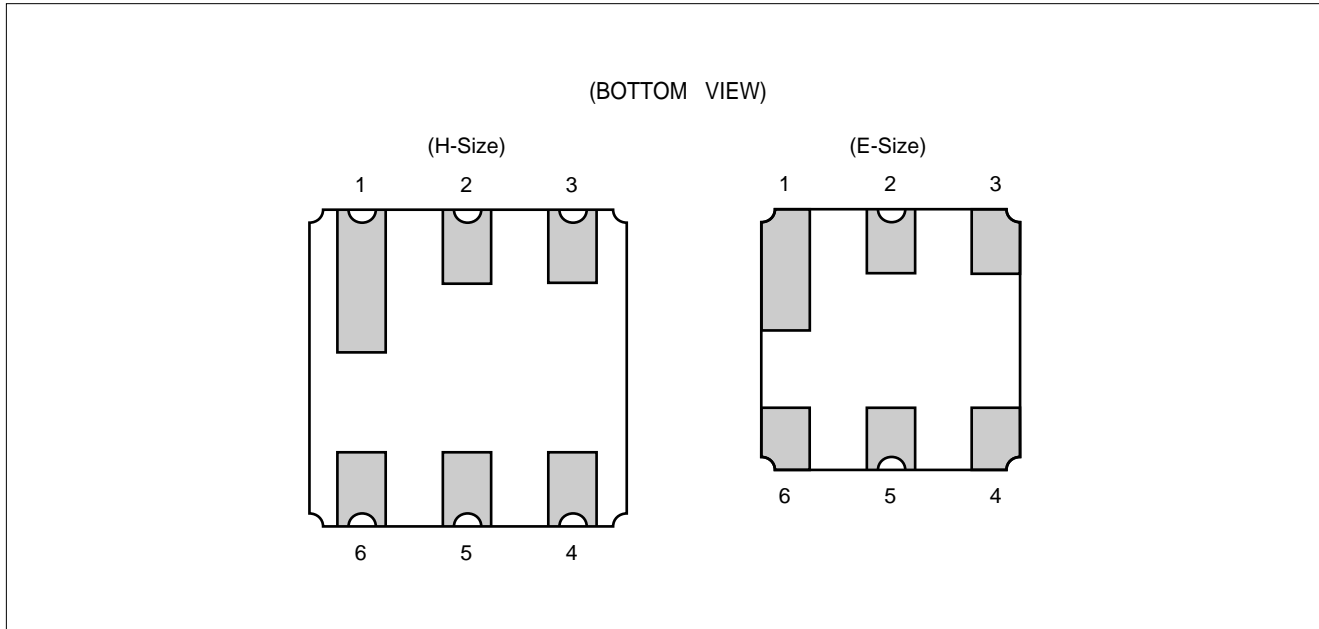
- Ultra compact and light package (3.8 mm<sup>□</sup>, 3.0 mm<sup>□</sup>)
- External matching circuits are not required.
- Surface mount package (SMT)
- Wide variety of standard devices for worldwide mobile communication systems
- Low insertion loss

### ■ PACKAGES



# F6 Series (L2)

## ■ PIN ASSIGNMENTS



## ■ PIN DESCRIPTIONS

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

# F6 Series (L2)

## ■ ABSOLUTE MAXIMUM RATINGS (See WARNING)

Parameter	Symbol	Rating	Unit
Operating temperature	T <sub>a</sub>	-30 to +85	°C
Storage temperature	T <sub>stg</sub>	-40 to +100	°C
Frequency range	—	1000 to 2500	MHz
Maximum input level	P <sub>IN</sub>	Refer to electrical characteristics	mW

**WARNING:** Permanent device damage may occur if the above **Absolute Maximum Ratings** are exceeded. Functional operation should be restricted to the conditions as detailed in the operational sections of this data sheet. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

## ■ RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Value	Unit
Operating temperature	T <sub>a</sub>	-30 to +85*	°C

\* : Standard Rating for Wireless LAN Systems is 0 to +60 °C.

## ■ STANDARD FREQUENCIES

Center freq. (MHz)	BW (MHz)	System	Part Symbol	Part number	Package size	
1441.0	24	PDC1.5G	Tx	ZL	FAR-F6CH-1G4410-L2ZL	H
1489.0	24		Rx	ZM	FAR-F6CH-1G4890-L2ZM	H
1619.0	24		Lo	ZV	FAR-F6CH-1G6190-L2ZN	H
1747.5	75	DCS1800	Tx	A	FAR-F6CE-1G7475-L2YA	E
1842.5	75		Rx	B	FAR-F6CE-1G8425-L2YB	E
1880.0	60	PCS	Tx	C	FAR-F6CE-1G8800-L2XA	E
1960.0	60		Rx	D	FAR-F6CE-1G9600-L2XB	E
2448.5	97	Wireless LAN		E	FAR-F6CE-2G4500-L2WA	E
2484.0	26			P	FAR-F6CE-2G4840-L2WC	E
2441.8	83			L	FAR-F6CE-2G4418-L2WD	E

# F6 Series (L2)

## ■ ELECTRICAL CHARACTERISTICS (STANDARD VERSION)

### 1. PDC 1.5 G system (Tx)

Part number : FAR-F6CH-1G4410-L2ZL

Ta = -30 to +85 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	1429 to 1453 MHz	—	2.2	3.2	dB	
Inband ripple	—	1429 to 1453 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 1380 MHz	25	27	—	dB	
	—	1477 to 1501 MHz	15	22	—	dB	
	—	1501 to 1607 MHz	33	38	—	dB	
	—	1631 to 1900 MHz	35	38	—	dB	
	—	1900 to 2906 MHz	18	23	—	dB	
Inband VSWR	—	1429 to 1453 MHz	—	1.7	2.0	—	
Input power	P <sub>IN</sub>	1429 to 1453 MHz	—	—	200	mW	

### 2. PDC 1.5 G system (Rx)

Part number : FAR-F6CH-1G4890-L2ZM

Ta = -30 to +85 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	1477 to 1501 MHz	—	2.2	3.0	dB	
Inband ripple	—	1477 to 1501 MHz	—	1.0	2.0	dB	
Absolute attenuation	—	DC to 1200 MHz	25	27	—	dB	
	—	1200 to 1370 MHz	30	33	—	dB	
	—	1370 to 1429 MHz	25	27	—	dB	
	—	1429 to 1453 MHz	10	18	—	dB	
	—	1542 to 1566 MHz	20	35	—	dB	
	—	1566 to 1607 MHz	30	39	—	dB	
	—	1607 to 1761 MHz	35	40	—	dB	
	—	1761 to 1900 MHz	30	36	—	dB	
—	1900 to 3000 MHz	20	22	—	dB		
Inband VSWR	—	1477 to 1501 MHz	—	1.5	2.0	—	
Input power	P <sub>IN</sub>	1477 to 1501 MHz	—	—	200	mW	

# F6 Series (L2)

## 3. PDC 1.5 G system (Lo)

Part number : FAR-F6CH-1G6190-L2ZN

Ta = -30 to +85 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	1607 to 1631 MHz	—	3.0	3.3	dB	
Inband ripple	—	1607 to 1631 MHz	—	1.5	2.0	dB	
Absolute attenuation	—	DC to 130 MHz	30	38	—	dB	
	—	130 to 1501 MHz	25	28	—	dB	
	—	1737 to 1809 MHz	30	35	—	dB	
	—	1809 to 2500 MHz	20	29	—	dB	
	—	3214 MHz	15	25	—	dB	
Inband VSWR	—	1607 to 1631 MHz	—	1.6	2.0	—	
Input power	P <sub>IN</sub>	1607 to 1631 MHz	—	—	200	mW	

## 4. DCS 1800 system (Tx)

Part number : FAR-F6CE-1G7475-L2YA

Ta = -30 to +85 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	1710 to 1785 MHz	—	3.0	4.2	dB	
Inband ripple	—	1710 to 1785 MHz	—	1.8	2.7	dB	
Absolute attenuation	—	DC to 1500 MHz	17	19	—	dB	
	—	1500 to 1670 MHz	20	22	—	dB	
	—	1805 to 1880 MHz	7	12	—	dB	
	—	1880 to 2200 MHz	20	23	—	dB	
	—	3420 to 3570 MHz	25	31	—	dB	
	—	5130 to 5355 MHz	15	25	—	dB	
Inband VSWR	—	1710 to 1785 MHz	—	2.5	3.0	—	
Input power	P <sub>IN</sub>	1710 to 1785 MHz	—	—	20	mW	

# F6 Series (L2)

## 5. DCS 1800 system (Rx)

Part number : FAR-F6CE-1G8425-L2YB

Ta = -30 to +85 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	1805 to 1880 MHz	—	3.3	4.5	dB	
Inband ripple	—	1805 to 1880 MHz	—	1.5	2.5	dB	
Absolute attenuation	—	DC to 1500 MHz	20	22	—	dB	
	—	1600 to 1710 MHz	22	24	—	dB	
	—	1710 to 1785 MHz	10	29	—	dB	
	—	1920 to 2400 MHz	25	27	—	dB	
	—	3610 to 3760 MHz	25	35	—	dB	
—	5415 to 5640 MHz	15	21	—	dB		
Inband VSWR	—	1805 to 1880 MHz	—	2.5	3.0	—	
Input power	P <sub>IN</sub>	1805 to 1880 MHz	—	—	20	mW	

## 6. PCS system (Tx)

Part number : FAR-F6CE-1G8800-L2XA

Ta = -30 to +85 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	1850 to 1910 MHz	—	3.2	4.2	dB	
Inband ripple	—	1850 to 1910 MHz	—	2.0	2.5	dB	
Absolute attenuation	—	DC to 1500 MHz	20	22	—	dB	
	—	1500 to 1800 MHz	23	25	—	dB	
	—	1930 to 1990 MHz	7	18	—	dB	
	—	3700 to 3820 MHz	25	32	—	dB	
	—	5550 to 5730 MHz	15	21	—	dB	
Inband VSWR	—	1850 to 1910 MHz	—	2.0	2.5	—	
Input power	P <sub>IN</sub>	1850 to 1910 MHz	—	—	20	mW	

# F6 Series (L2)

## 7. PCS system (Rx)

Part number : FAR-F6CE-1G9600-L2XB

Ta = -30 to +85 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	1930 to 1990 MHz	—	3.3	4.5	dB	
Inband ripple	—	1930 to 1990 MHz	—	2.0	2.8	dB	
Absolute attenuation	—	DC to 1500 MHz	21	23	—	dB	
	—	1500 to 1850 MHz	23	25	—	dB	
	—	1850 to 1910 MHz	10	30	—	dB	
	—	3860 to 3980 MHz	25	32	—	dB	
	—	5790 to 5970 MHz	15	23	—	dB	
Inband VSWR	—	1930 to 1990 MHz	—	1.8	2.5	—	
Input power	P <sub>IN</sub>	1930 to 1990 MHz	—	—	20	mW	

## 8. Wireless-LAN system (BW: 97 MHz)

Part number : FAR-F6CE-2G4500-L2WA

Ta = 0 to +60 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	2400 to 2497 MHz	—	4.0	5.0	dB	
Inband ripple	—	2400 to 2497 MHz	—	2.0	3.0	dB	
Absolute attenuation	—	DC to 1700 MHz	20	22	—	dB	
	—	1800 to 2200 MHz	25	27	—	dB	
	—	2700 to 3100 MHz	30	33	—	dB	
	—	4800 to 5000 MHz	10	16	—	dB	
Inband VSWR	—	2400 to 2497 MHz	—	2.2	2.6	—	
Input power	P <sub>IN</sub>	2400 to 2497 MHz	—	—	10	mW	

# F6 Series (L2)

## 9. Wireless-LAN system (BW:26 MHz, for Japan)

Part number : FAR-F6CE-2G4840-L2WC

Ta = 0 to +60 °C

Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	2471 to 2497 MHz	—	2.5	3.5	dB	
Inband ripple	—	2471 to 2497 MHz	—	1.0	1.5	dB	
Absolute attenuation	—	DC to 1700 MHz	20	23	—	dB	
	—	1800 to 2200 MHz	25	27	—	dB	
	—	2700 to 3100 MHz	30	33	—	dB	
	—	4800 to 5000 MHz	10	16	—	dB	
Inband VSWR	—	2471 to 2497 MHz	—	1.5	2.0	—	
Input power	P <sub>IN</sub>	2471 to 2497 MHz	—	—	10	mW	

## 10. Wireless-LAN system (BW:83.5 MHz, for Europe, USA)

Part number : FAR-F6CE-2G4418-L2WD

Ta = 0 to +60 °C

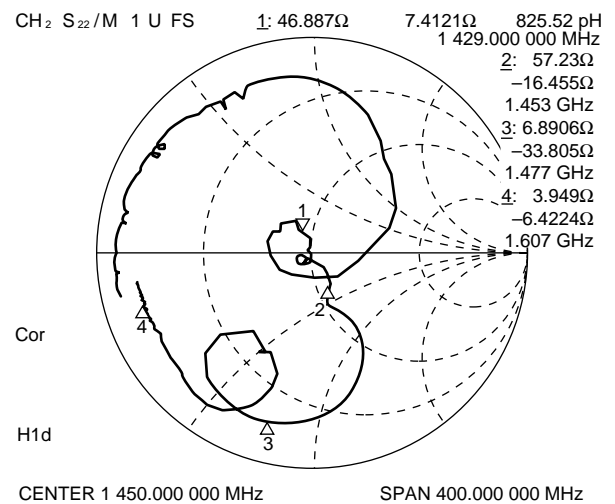
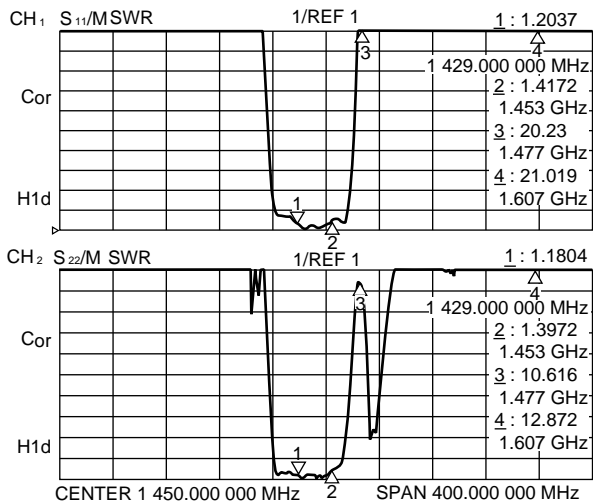
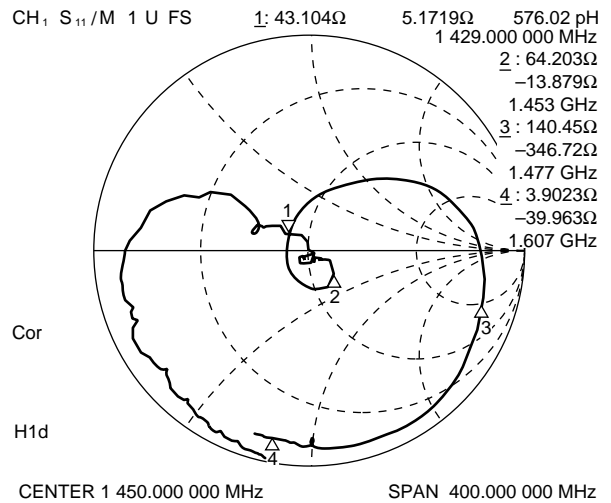
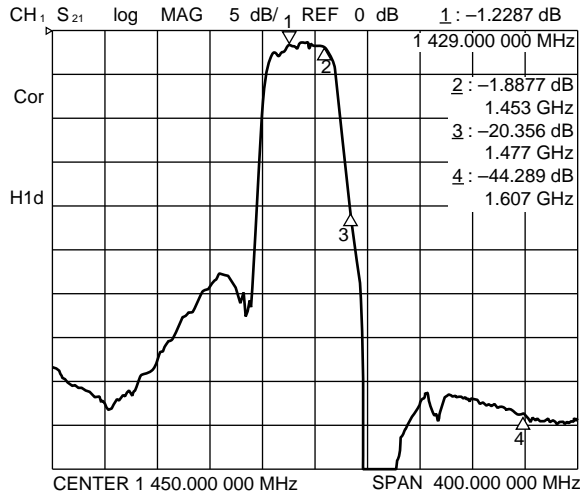
Parameter	Symbol	Condition	Value			Unit	Remarks
			Min.	Typ.	Max.		
Insertion loss	IL	2400 to 2483.5 MHz	—	3.2	4.5	dB	
Inband ripple	—	2400 to 2483.5 MHz	—	1.3	2.5	dB	
Absolute attenuation	—	DC to 1700 MHz	20	22	—	dB	
	—	1800 to 2200 MHz	25	27	—	dB	
	—	2700 to 3100 MHz	30	33	—	dB	
	—	4800 to 5000 MHz	10	16	—	dB	
Inband VSWR	—	2400 to 2483.5 MHz	—	2.2	2.6	—	
Input power	P <sub>IN</sub>	2400 to 2483.5 MHz	—	—	10	mW	



## TYPICAL CHARACTERISTICS (STANDARD VERSION)

### 1. PDC 1.5 G system (Tx)

Part number : FAR-F6CH-1G4410-L2ZL



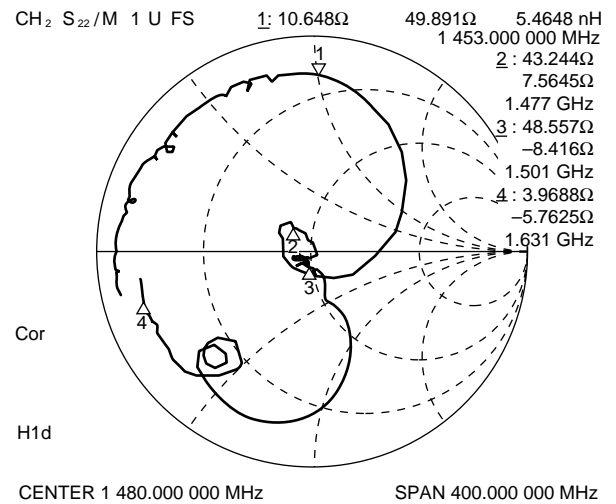
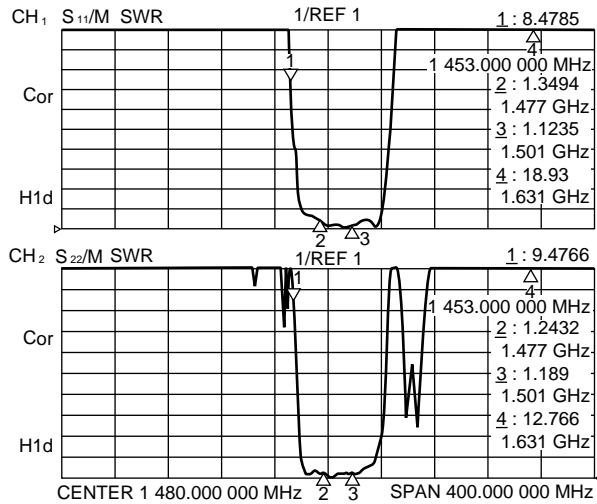
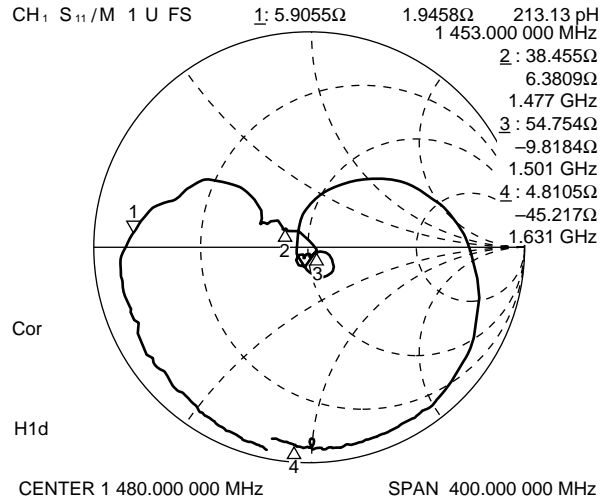
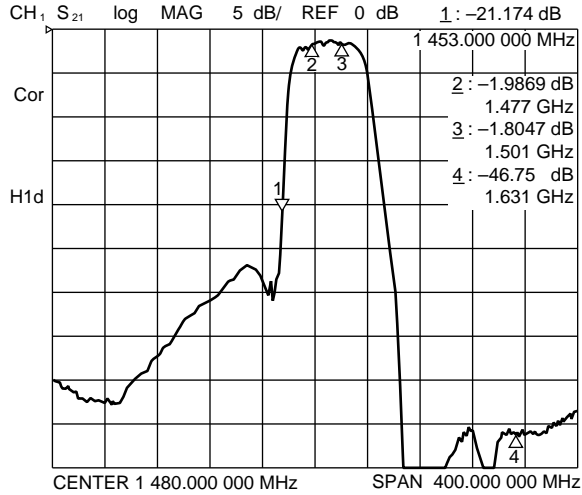
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# F6 Series (L2)

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## 2. PDC 1.5 G system (Rx)

Part number : FAR-F6CH-1G4890-L2ZM

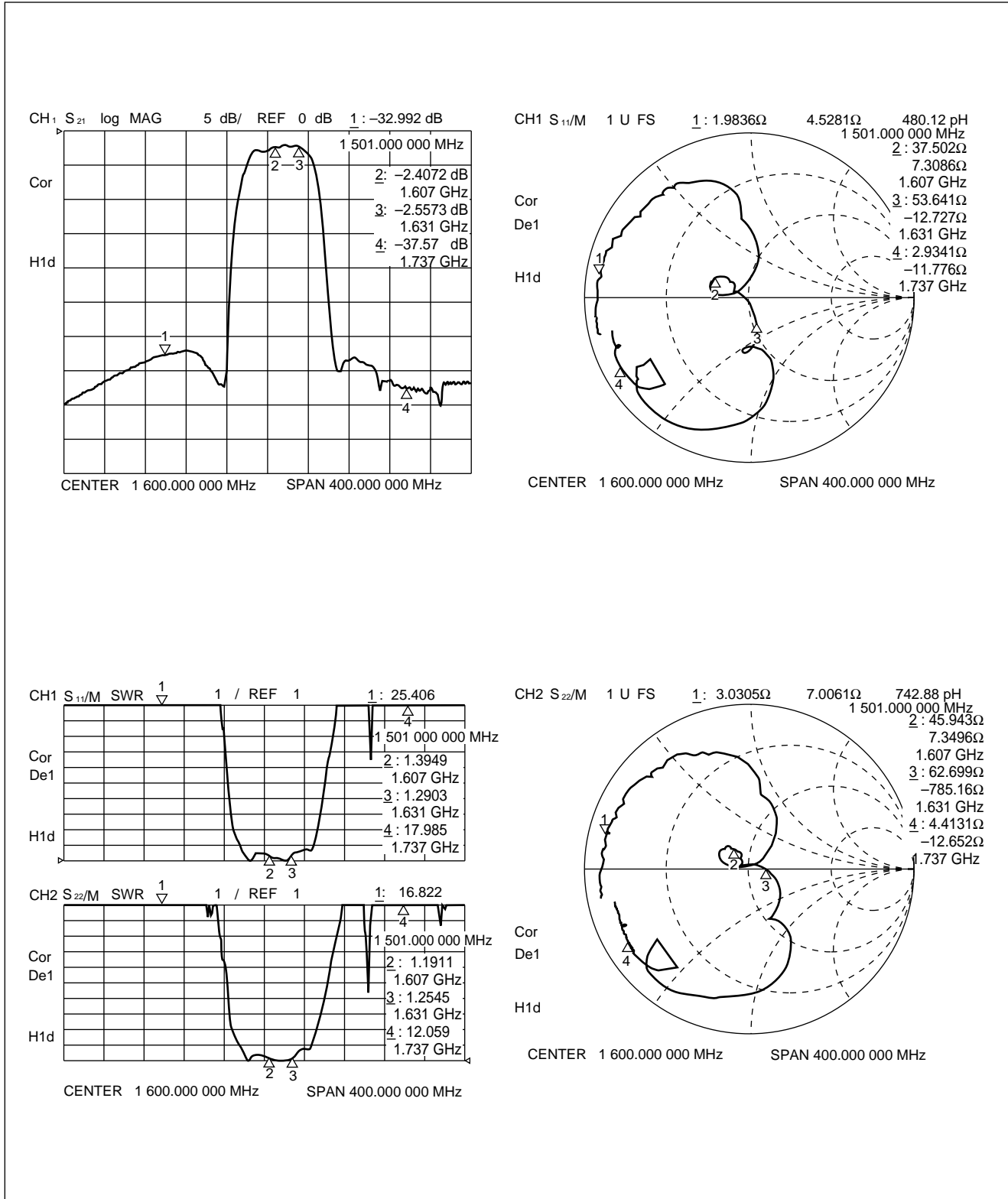


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### 3. PDC 1.5 G system (Lo)

Part number : FAR-F6CH-1G6190-L2ZN



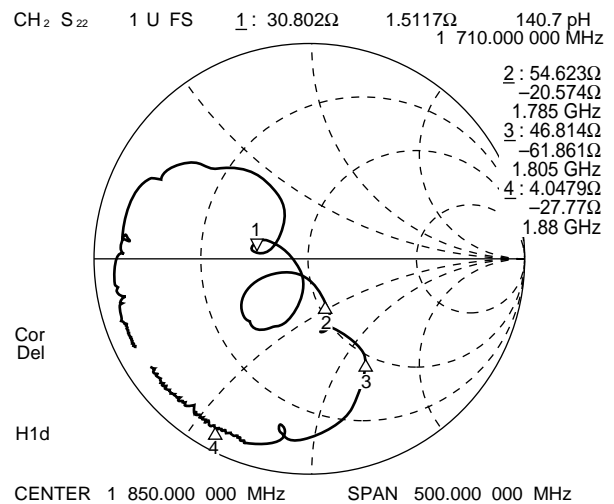
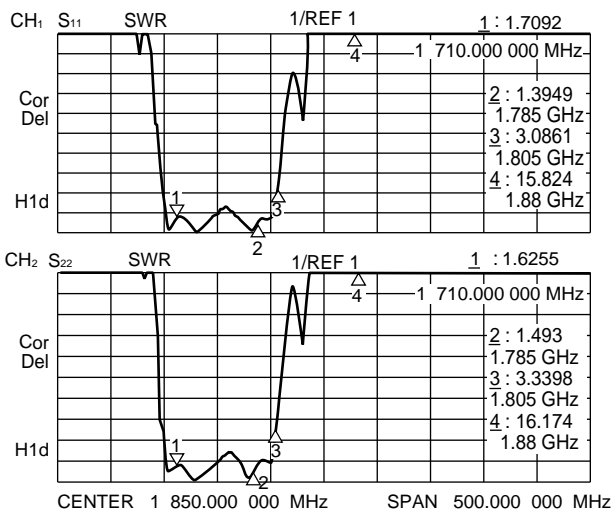
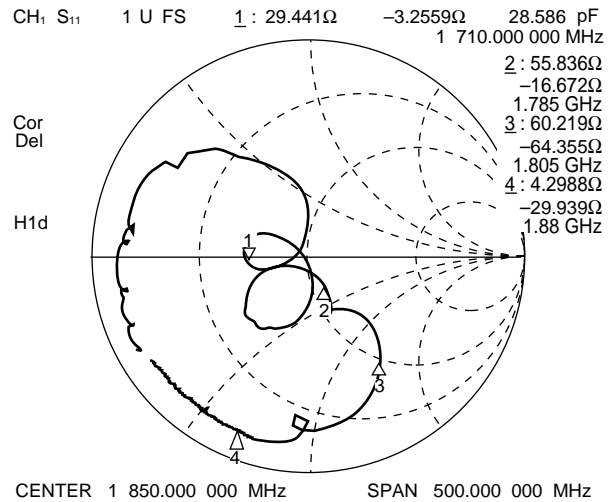
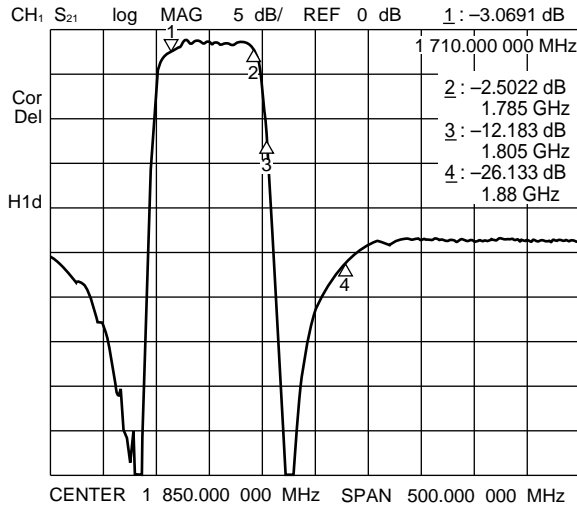
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# F6 Series (L2)

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## 4. DCS 1800 system (Tx)

Part number : FAR-F6CE-1G7475-L2YA

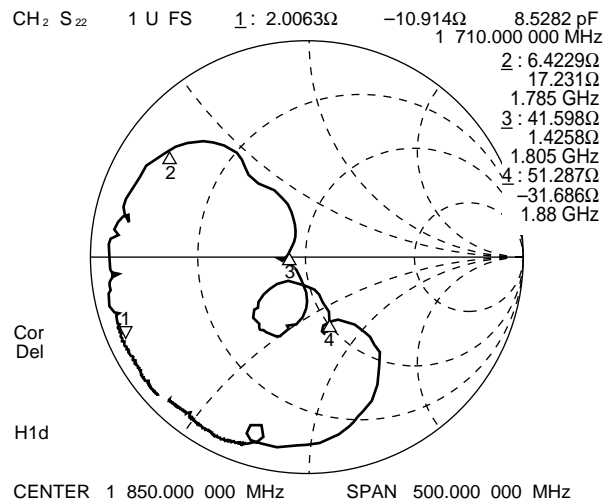
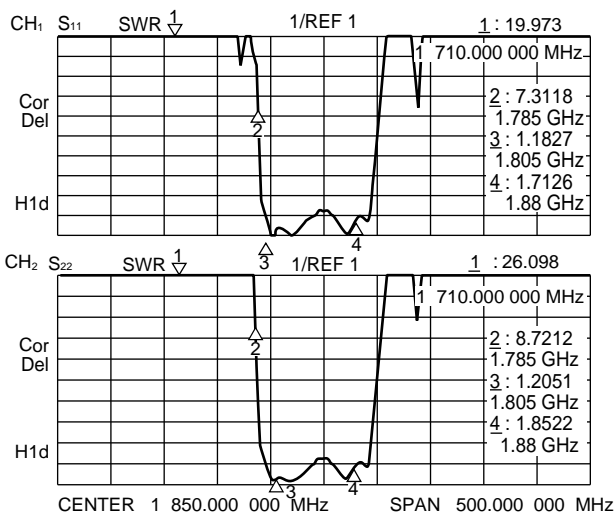
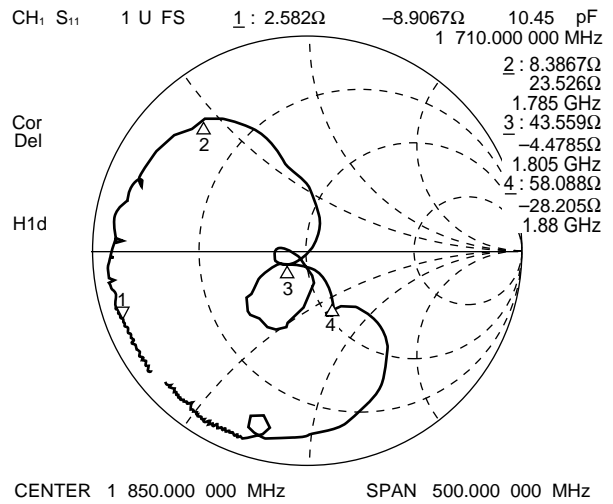
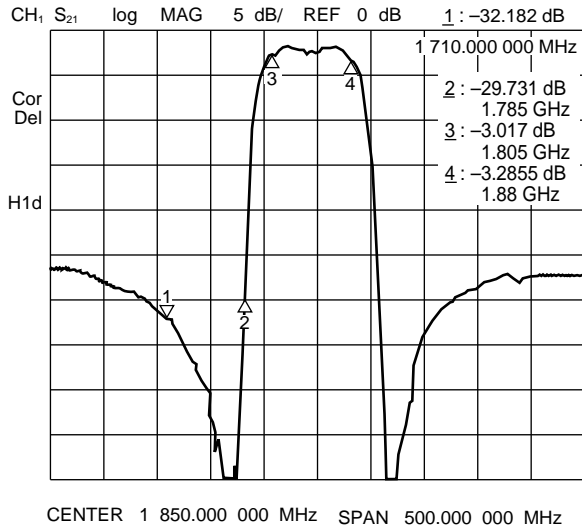


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## 5. DCS 1800 system (Rx)

Part number : FAR-F6CE-1G8425-L2YB



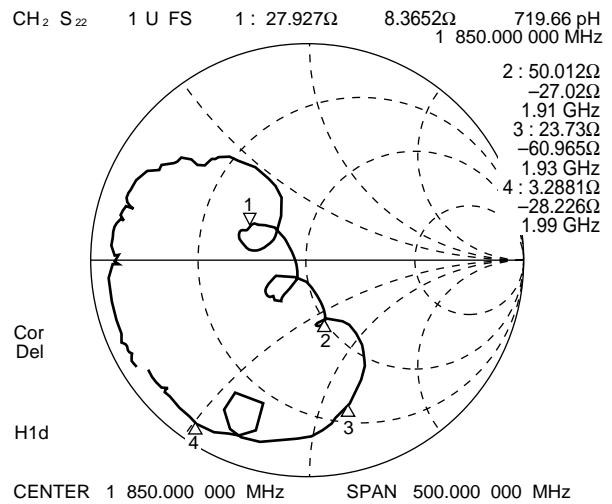
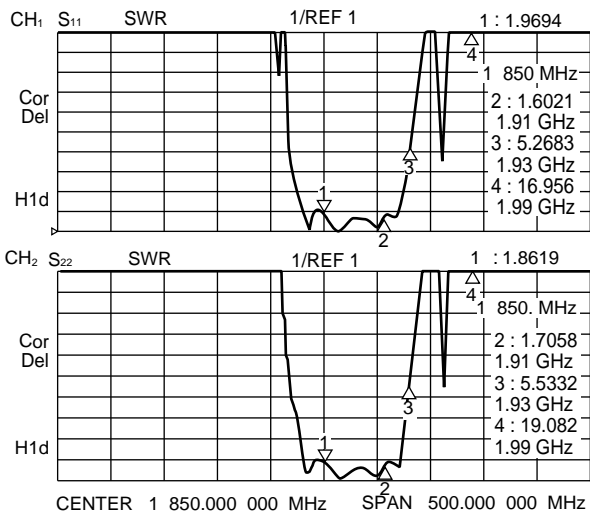
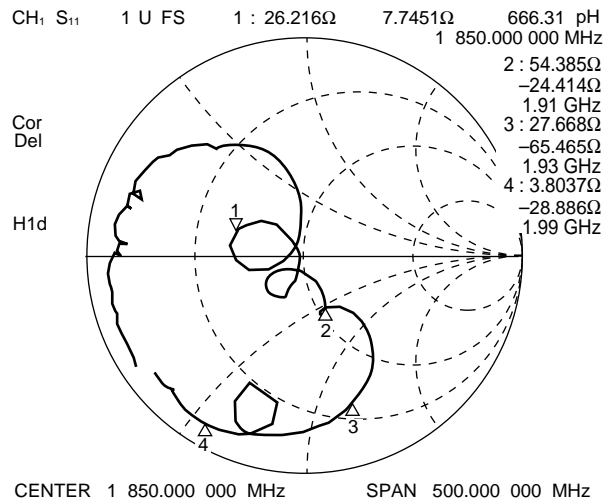
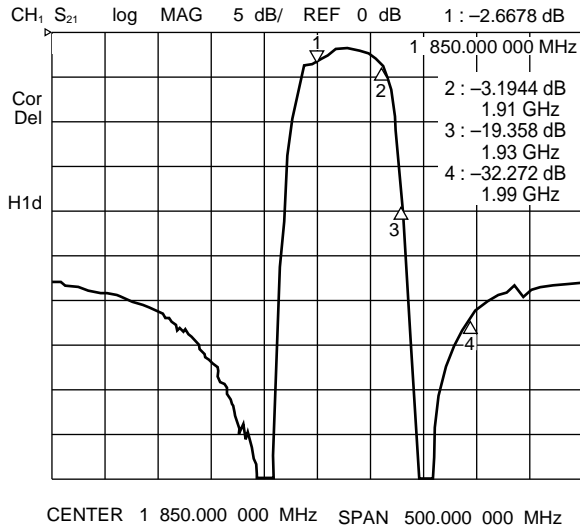
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# F6 Series (L2)

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## 6. PCS system (Tx)

Part number : FAR-F6CE-1G8800-L2XA

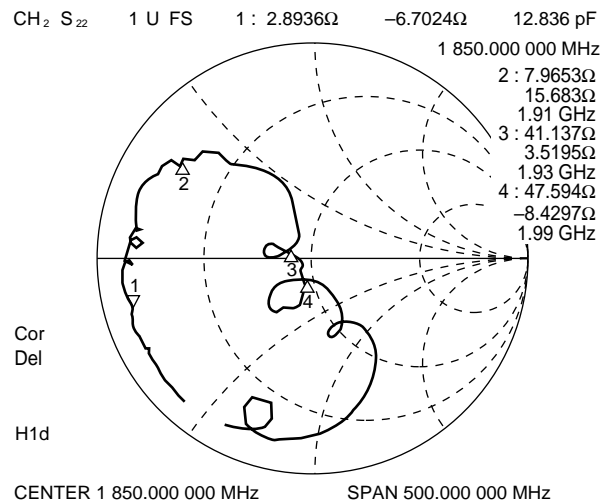
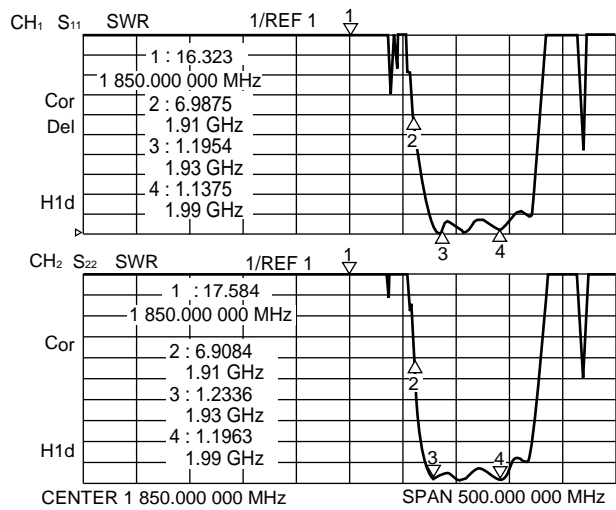
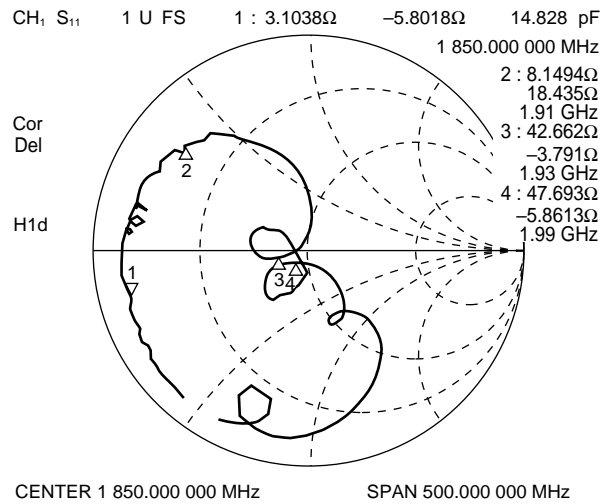
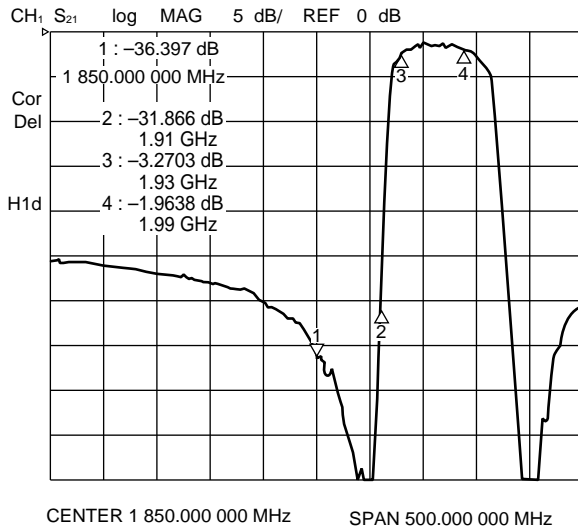


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## 7. PCS system (Rx)

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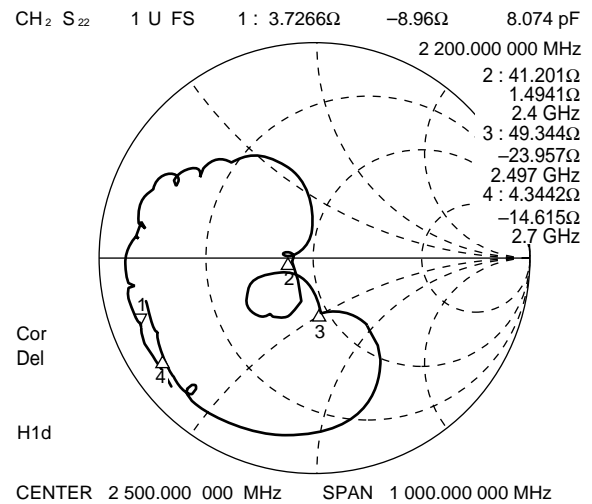
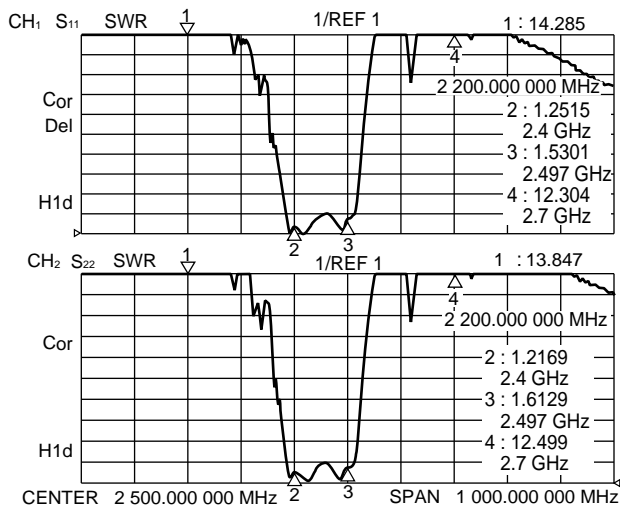
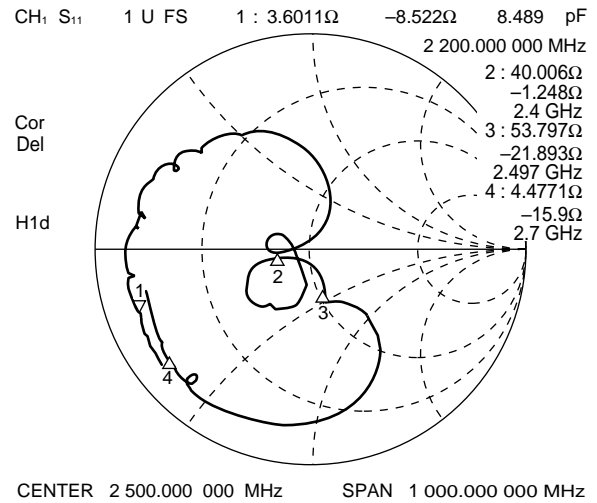
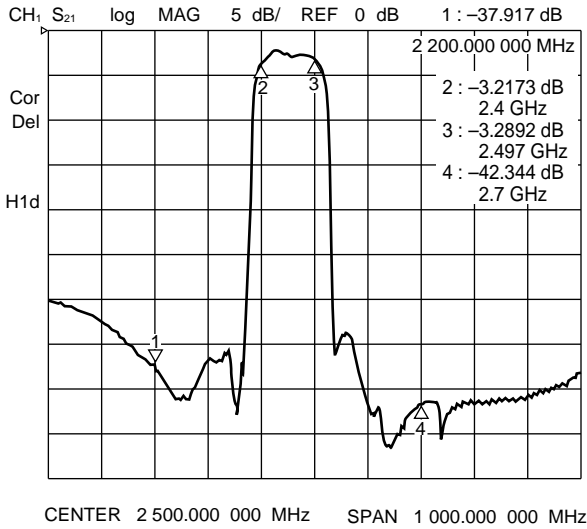


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# F6 Series (L2)

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## 8. Wireless-LAN system (BW: 97 MHz) Part number : FAR-F6CE-2G4500-L2WA



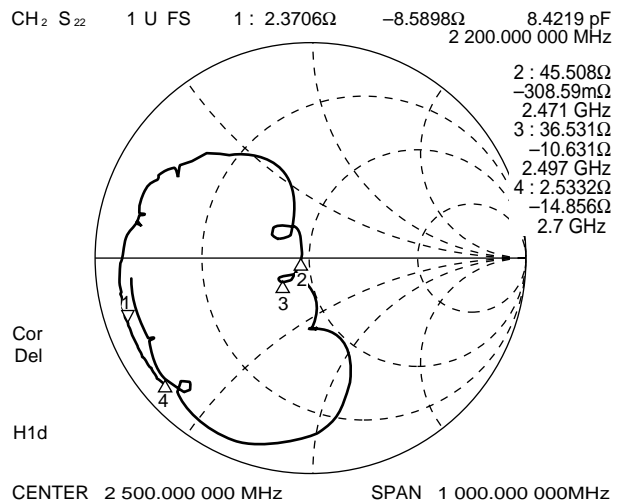
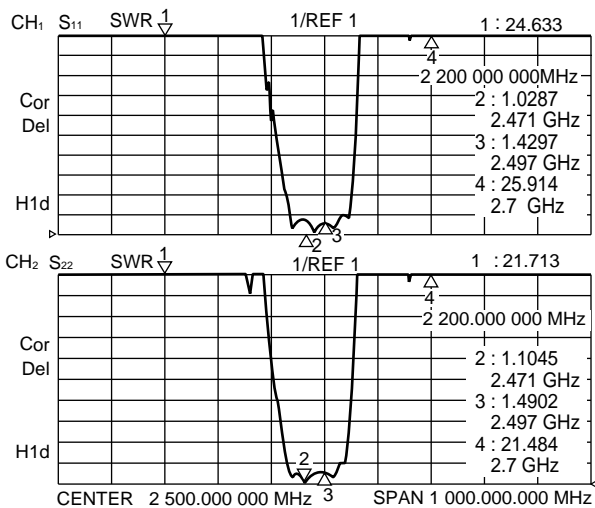
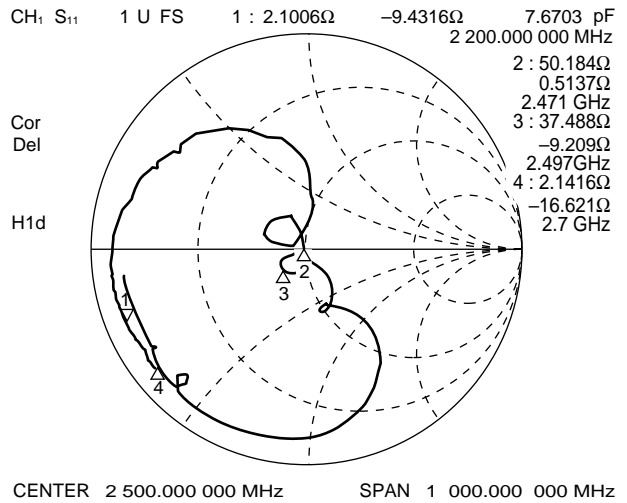
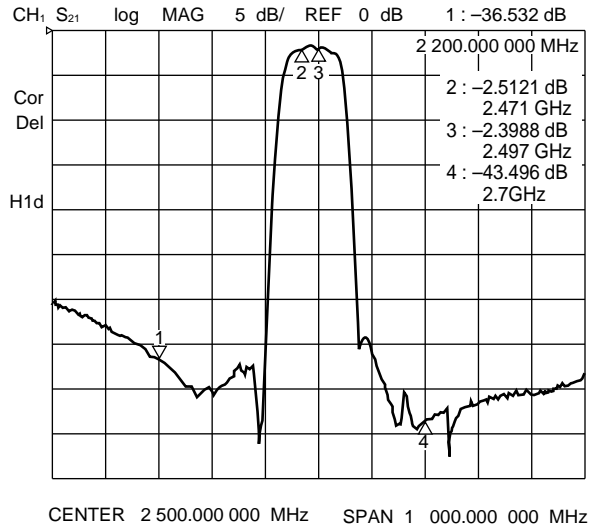
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## 9. Wireless-LAN system (BW:26 MHz, for Japan)

Part number : FAR-F6CE-2G4840-L2WC



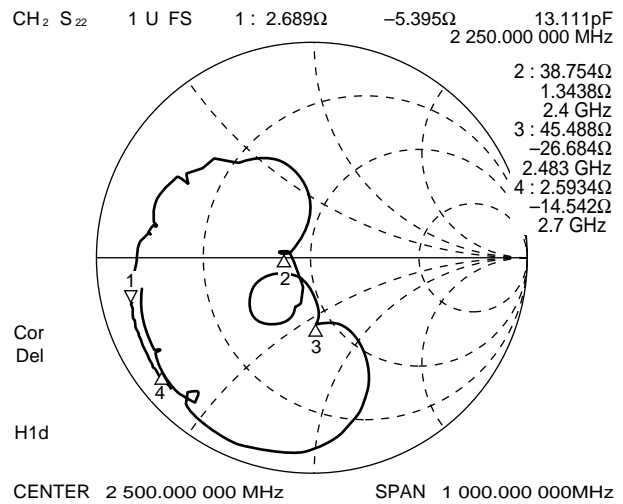
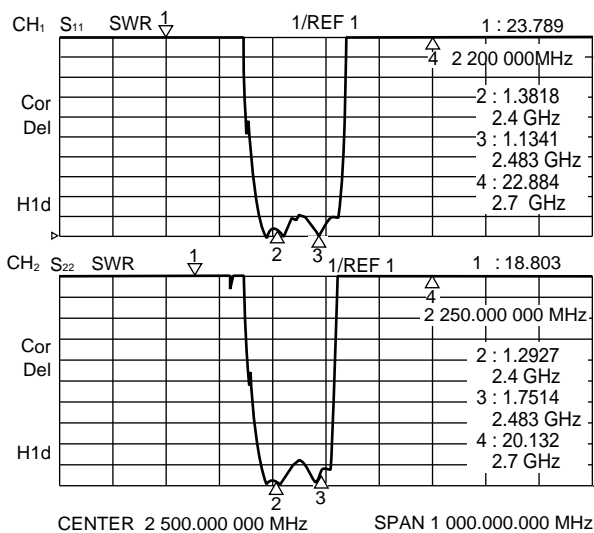
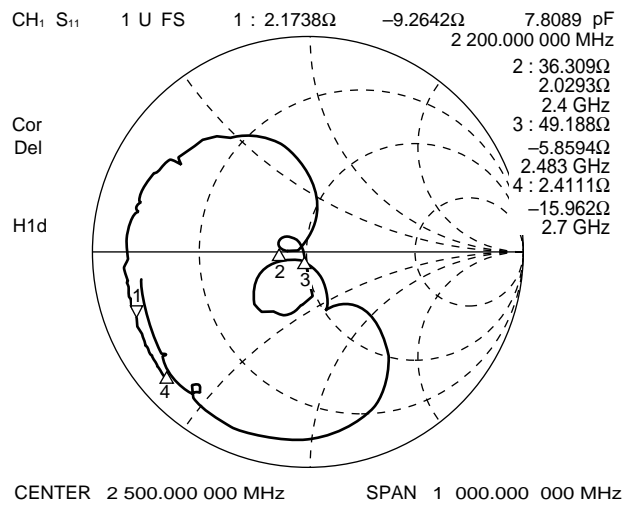
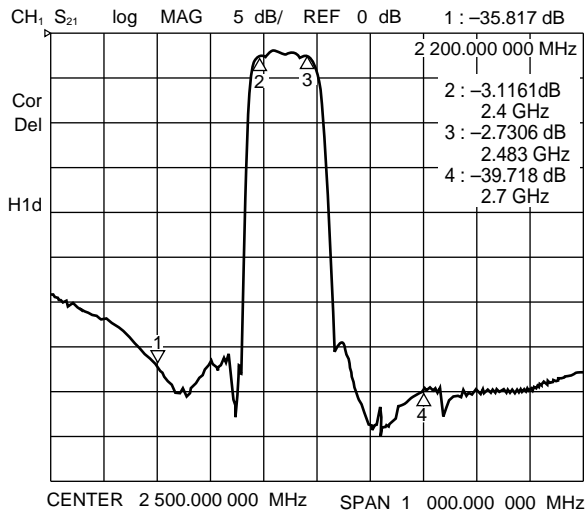
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# F6 Series (L2)

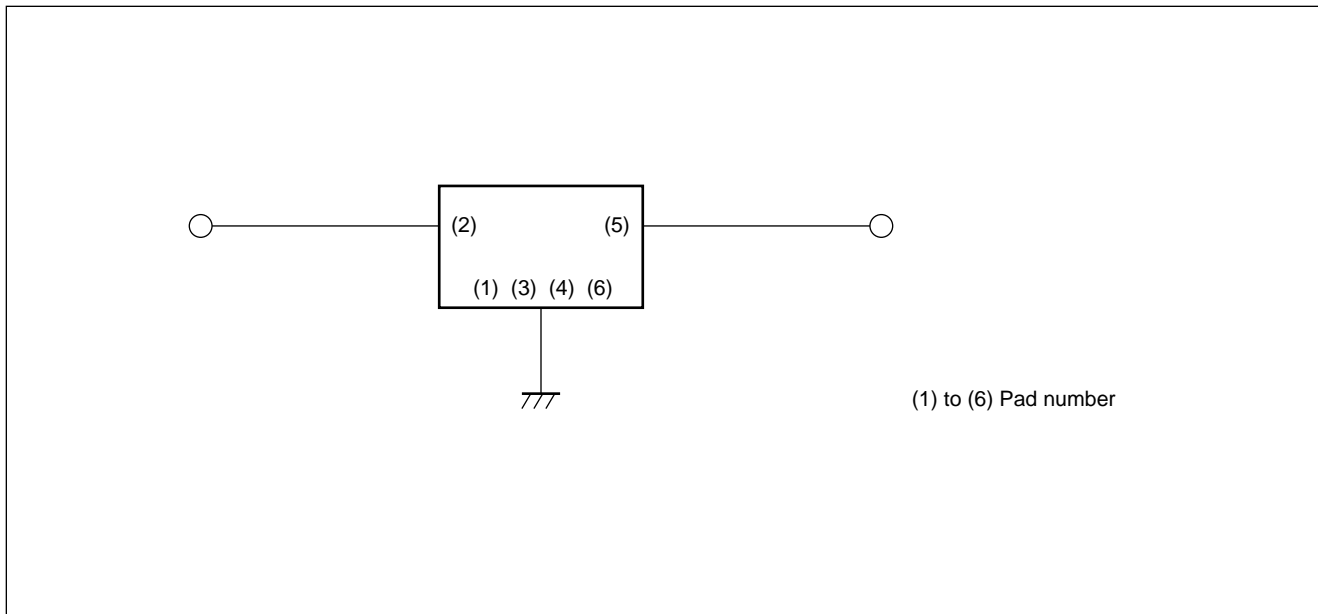
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## 10. Wireless-LAN system (BW:83.5 MHz, for Europe, USA)

Part number : FAR-F6CE-2G4418-L2WD



## ■ MEASURING CIRCUIT



## ■ PART NUMBER DESIGNATION

[Designation example]

FAR – F6C  –  – L2 –   
 (1) (2) (3) (4)

(1) Package designation: H: 3.8 mm<sup>□</sup> × 1.6 mm

E: 3.0 mm<sup>□</sup> × 1.2 mm

(Refer to "■ standard frequencies")

(2) Frequency designation: Specify the nominal frequency in six alphanumeric characters. Enter G(for GHz) at the decimal point. Refer to standard frequencies.

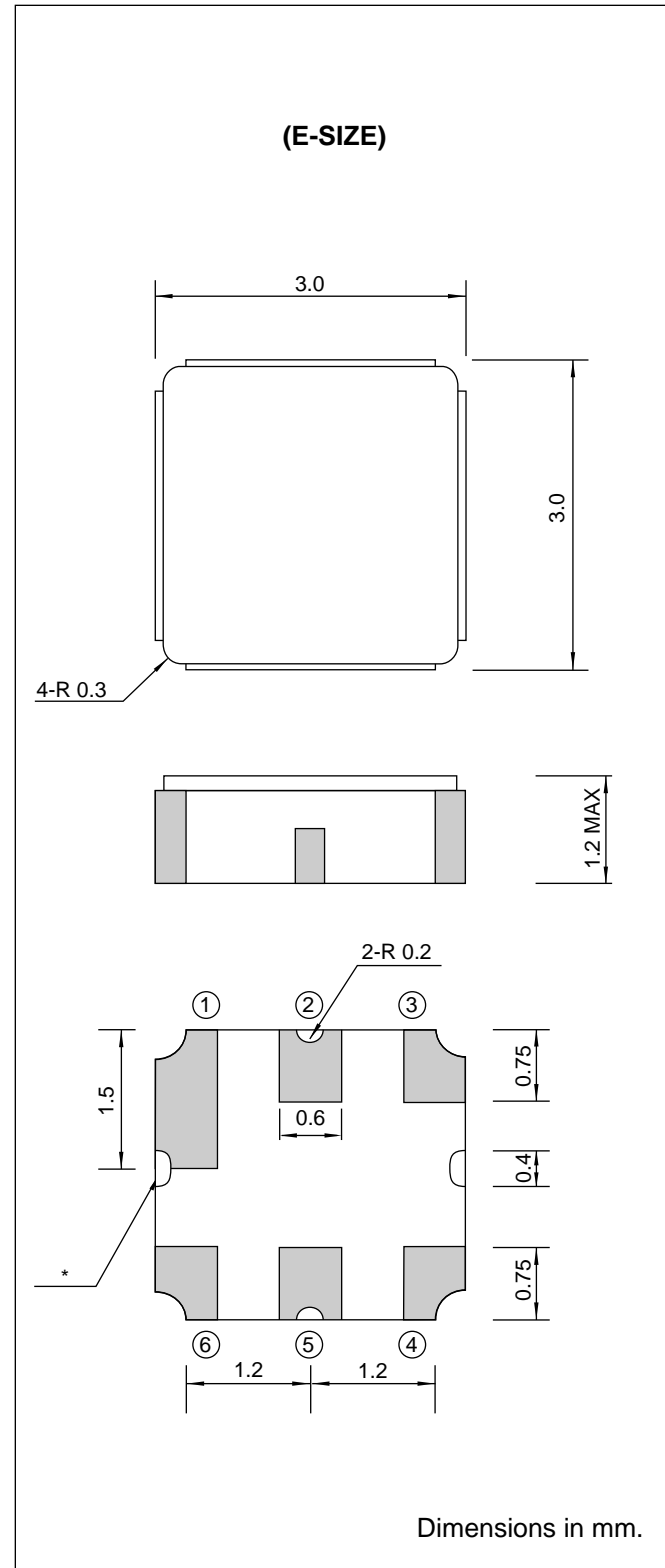
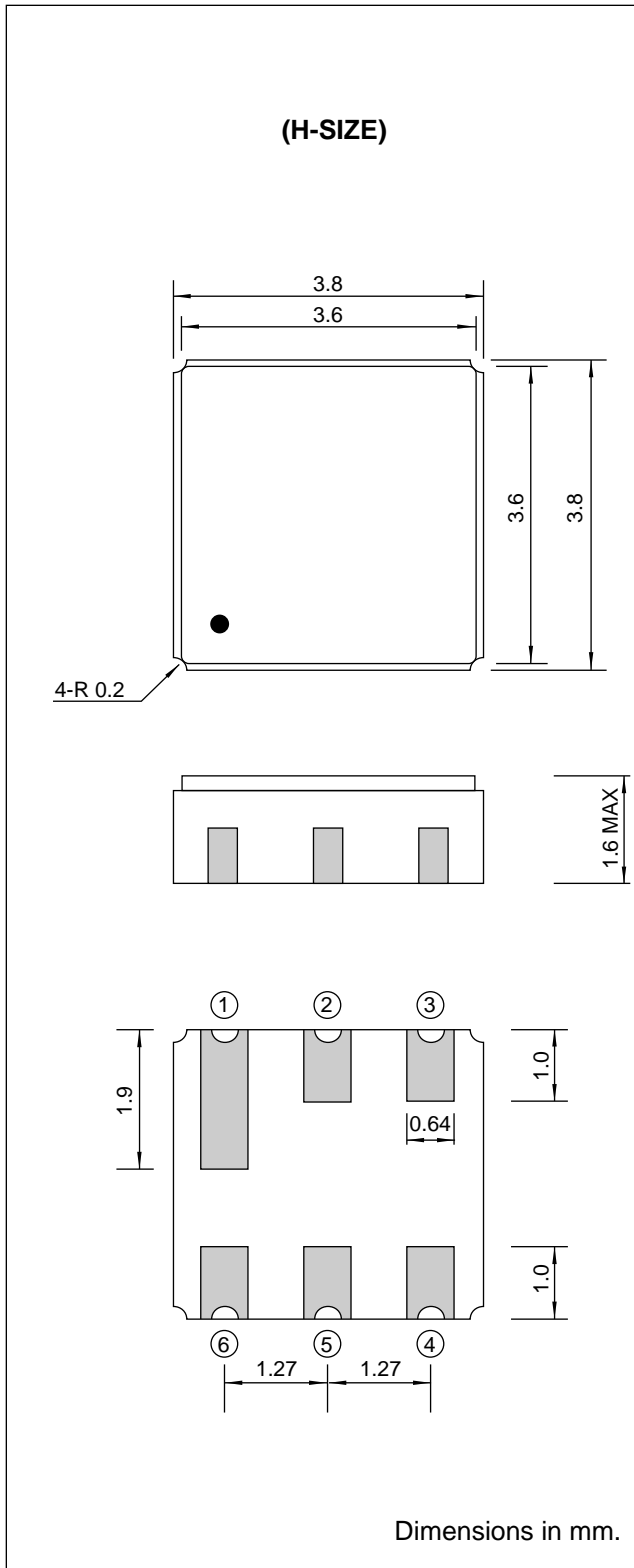
[Example] 1.4410 GHz → 1 G 4410

(3) Serial number: Specify a characters from WA to ZZ. Refer to standard frequencies.

(4) Packing: T : 1 K pcs/reel  
 (Reeled tape) R : 3 K pcs/reel

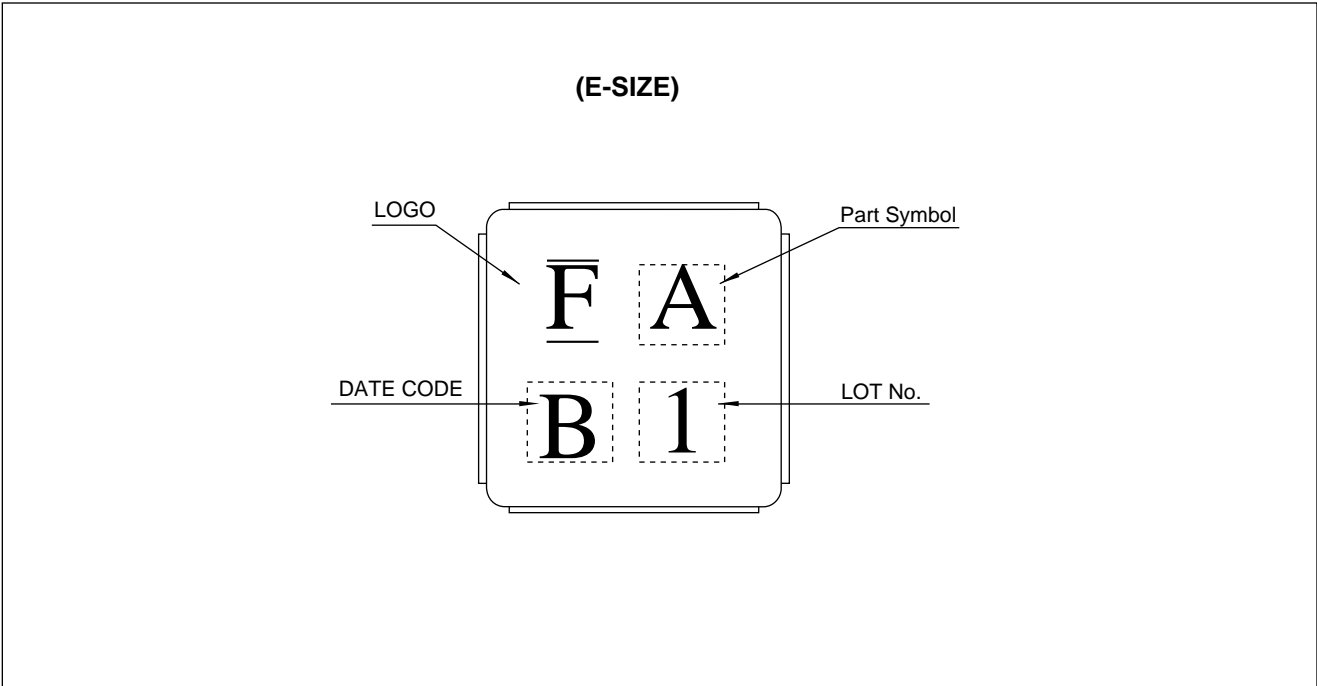
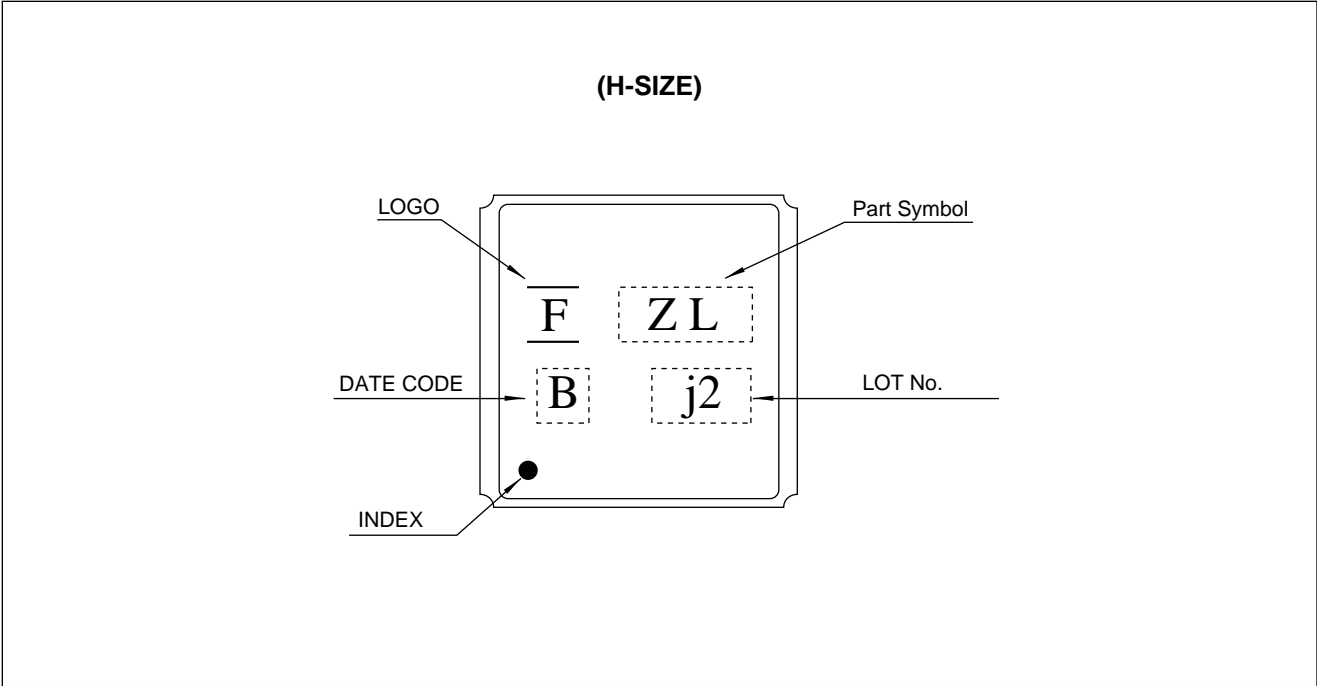
# F6 Series (L2)

## ■ PACKAGE DIMENSIONS



\*There are some package types don't have castration.

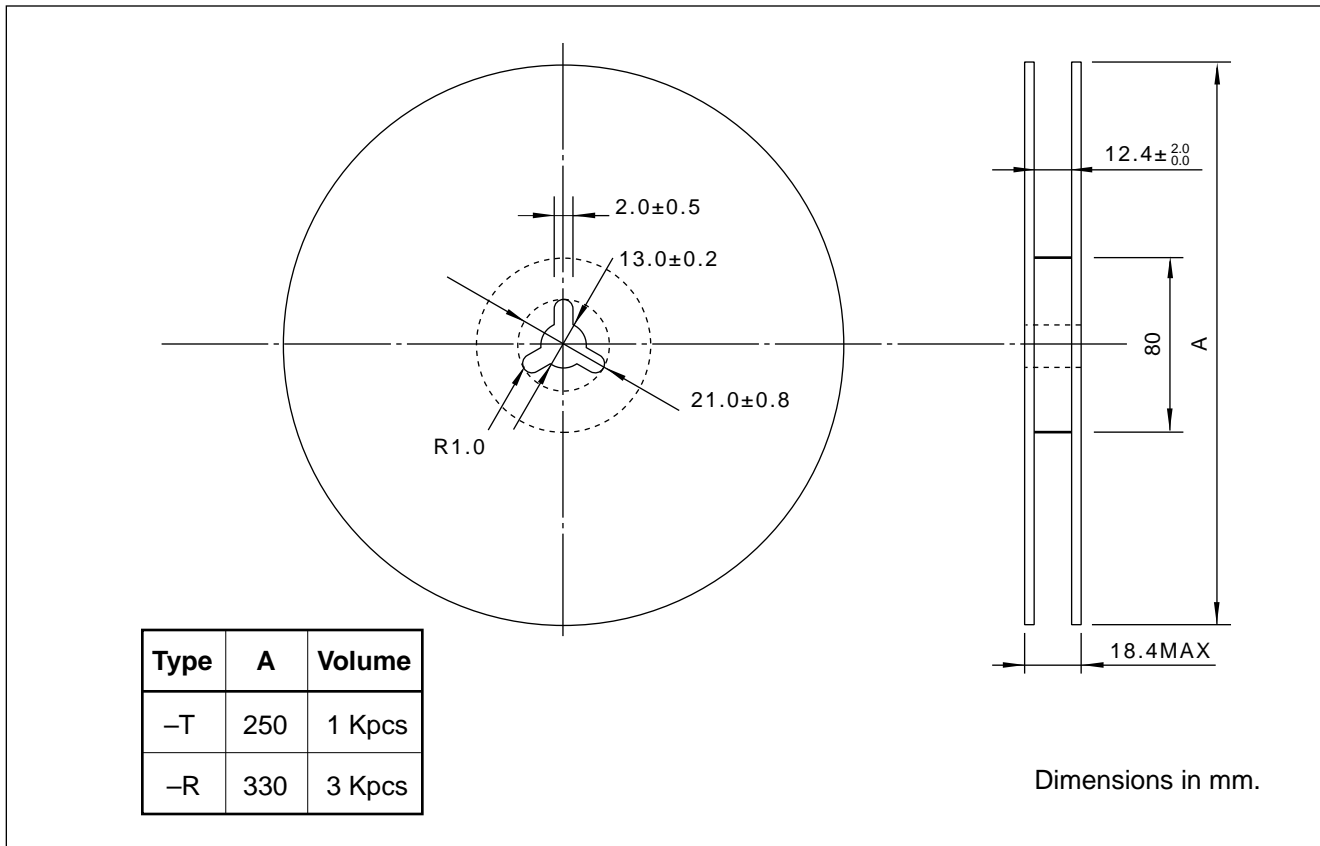
MARKING



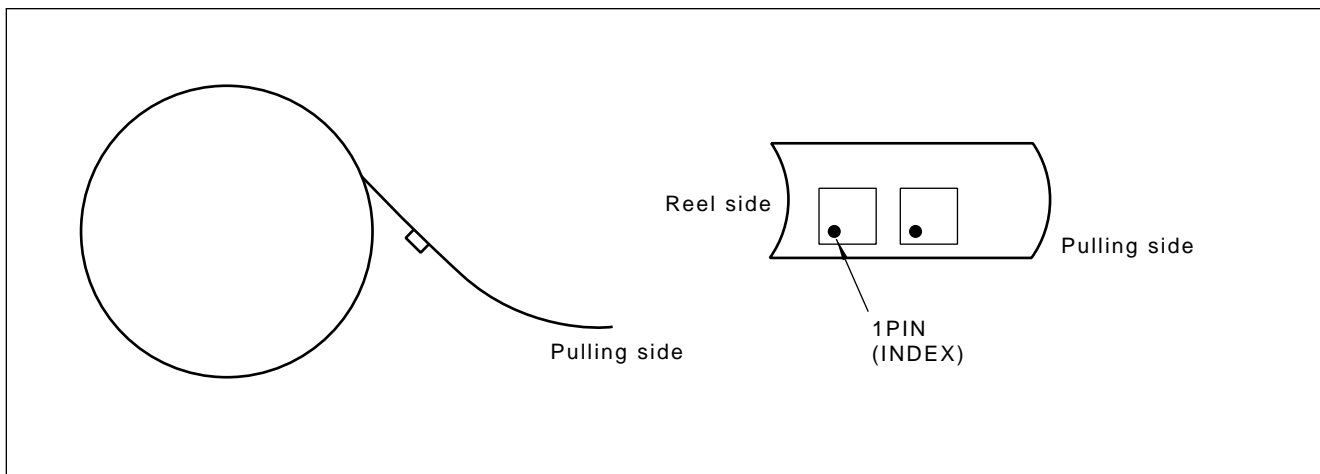
# F6 Series (L2)

## ■ PACKING : Reel Type

### (1) Reel Dimensions

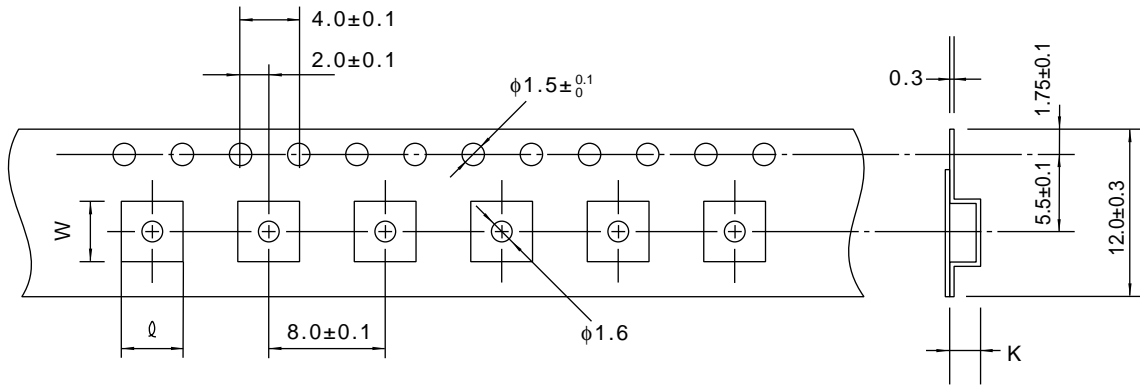


### (2) Packing Style



# F6 Series (L2)

## (3) Tape Dimensions



Package	$\varrho$	$W$	$K$
H	$4.2 \pm 0.1$	$4.2 \pm 0.1$	1.8
E	$3.4 \pm 0.1$	$3.4 \pm 0.1$	1.5

Dimensions in mm.

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