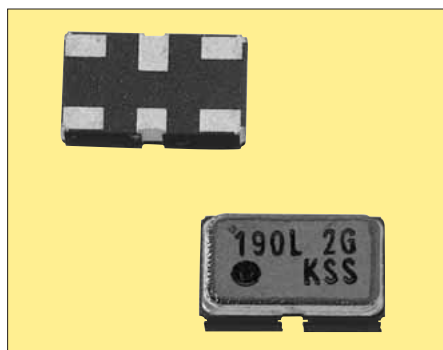




Pb Free

RoHS Conforming

Features

- Wide-Band IF filter for W-CDMA.
- Because it is leadless type, automatic mounting is possible.
- Excellent phase characteristics.
- Balance connection type of input and output is available.

Standard Frequencies

- 190.0MHz.

How to Order

LSF B 54 - 190 - 004M 2

① ② ③ ④ ⑤ ⑥

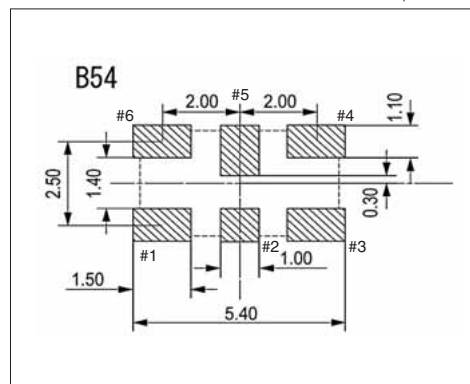
- ① LSF..... Li₂B₄O₇ SAW Filter
- ② B..... Seam weld type
- ③ 54..... Package Number (01, 02.....)
- ④ 190..... Nominal Frequency
- ⑤ 004M..... Pass Bandwidth 4MHz
- ⑥ 2..... Sub-Number

Specifications

Item	Unit	Conditions	Specifications
Nominal Frequency	MHz	—	190.0
Operating Temperature Range	°C	-20~+75	—
Storage Temperature Range	°C	-40~+80	—
Pass Bandwidth	MHz	-3dB	±2.3 * ±1.92 MIN.
Ripple	dB	±1.92MHz	0.8 * 1.5 MAX.
Insertion Loss	dB	Minimum Loss	6.5 * 9.0 MAX.
Guaranteed Attenuation	dB	Fo±5MHz	38 * 20 MIN.
		Fo±10MHz	45 * 40 MIN.
Group Delay Deviation	ns	Fo±1.92MHz	88 * 140 MAX.

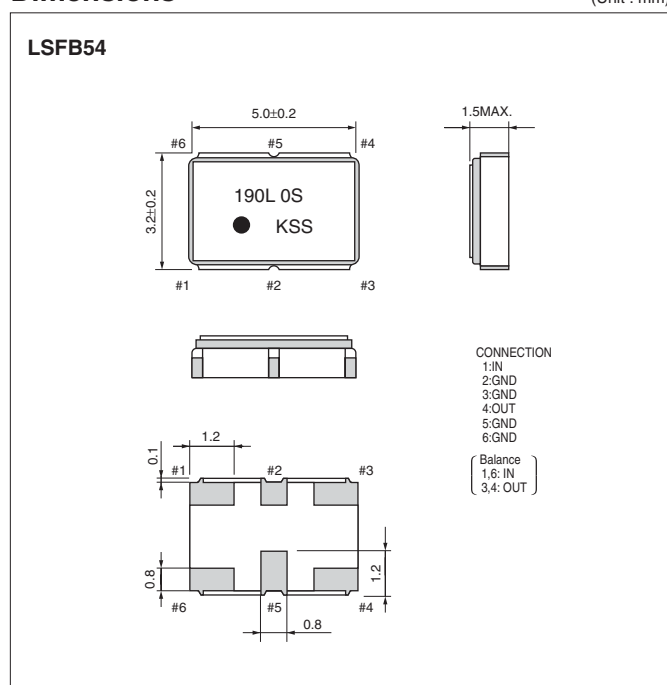
*:Typ.

Recommended Land Pattern (Unit : mm)

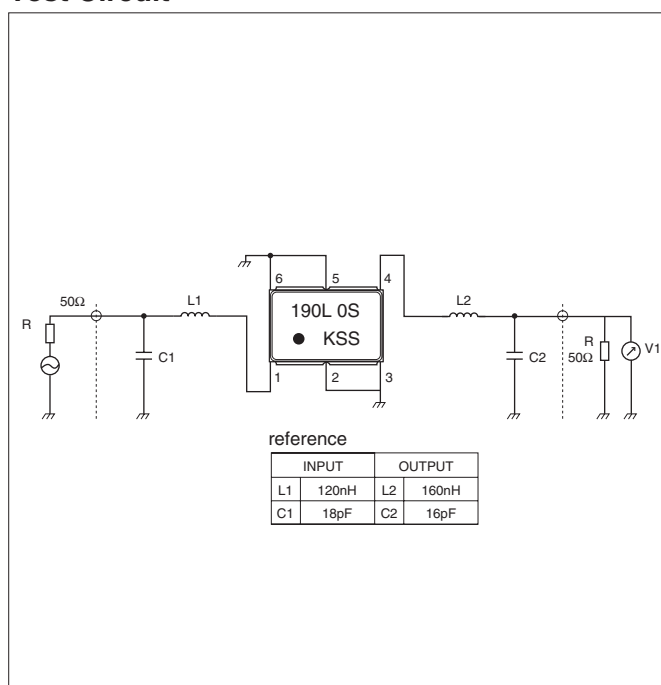


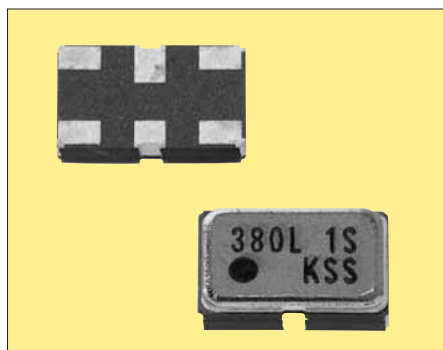
Dimensions

(Unit : mm)



Test Circuit





Pb Free

RoHS Conforming

Features

- Wide-Band IF filter for W-CDMA.
- Because it is leadless type, automatic mounting is possible.
- Excellent phase characteristics.
- Balance connection type of input and output is available.

Standard Frequencies

- 380MHz.

How to Order

LSF B 54 - 380 - 004M 0

① ② ③ ④ ⑤ ⑥

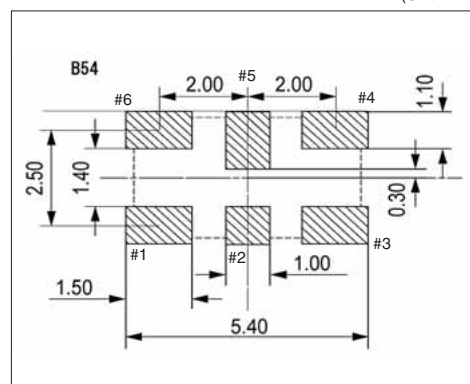
- ① LSF.....Li₂B₄O₇ SAW Filter
- ② B..... Seam weld type
- ③ 54..... Package Number (01, 02.....)
- ④ 380.....Nominal Frequency
- ⑤ 004M....Pass Bandwidth 4MHz
- ⑥ 0.....Sub-Number

Specifications

Item	Unit	Conditions	Specifications
Nominal Frequency	MHz	—	380.0
Operating Temperature Range	°C	-20~+75	—
Storage Temperature Range	°C	-40~+80	—
Pass Bandwidth	MHz	-3dB	-2.5/+2.8MHz *; ±1.92 MIN.
Ripple	dB	±1.92MHz	1.0 * 2.0 MAX.
Insertion Loss	dB	Maximum Loss(±1.92MHz)	7.0 * 10.0 MAX.
Guaranteed Attenuation	dB	Fo±5MHz	-5/35dB * 25 MIN.
			+5/33dB * 30 MIN.
		Fo±10MHz	-10/39dB * 30 MIN.
			+10/55dB * 300 MAX.
Group Delay Deviation	ns	Fo±1.92MHz	140 * 300 MAX.

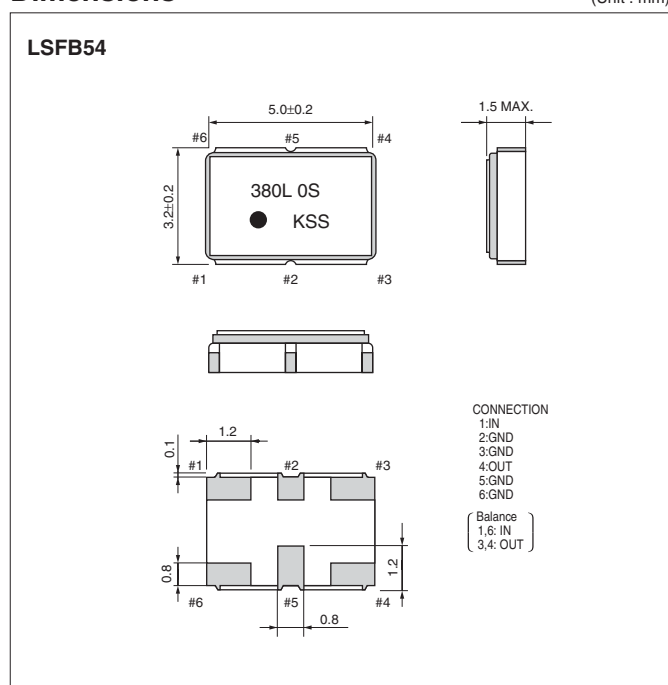
* : Typ.

Recommended Land Pattern (Unit : mm)

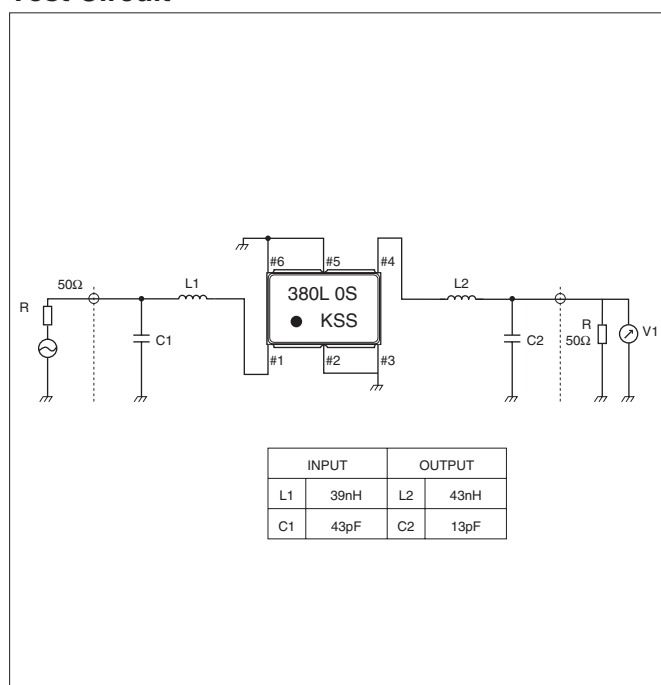


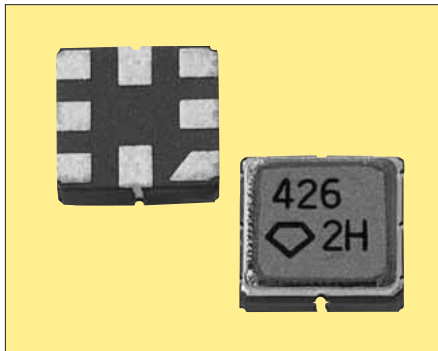
Dimensions

(Unit : mm)



Test Circuit





Pb Free

RoHS Comforming

Features

- RF filter for transmission and reception.
- Low power consumption.
- Miniature size and light weight

Applications

- For engine-starter.
- For transceiver.
- For pager.
- For radio phone.

How to Order

LSF B 44 - 426 - 800K 0
① ② ③ ④ ⑤ ⑥

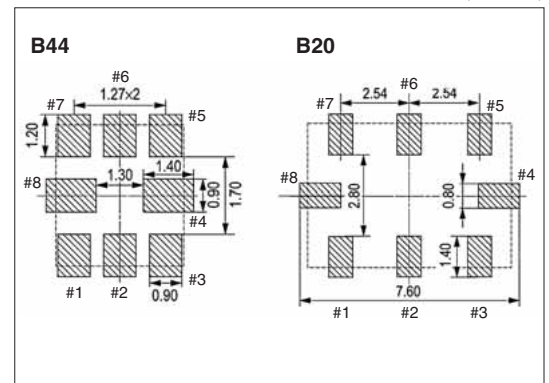
- ① LSF..... Li₂ B₄ O₇ SAW Filter
- ② B..... Seam weld type
- ③ 44..... Package Number (01, 02.....)
- ④ 426..... Nominal Frequency
- ⑤ 800..... Pass Bandwidth 800kHz
- ⑥ 0..... Sub-Number

Standard Frequency

Nominal Frequency(MHz)	Type
421.90000	LSFA02-422-800K0
426.08125 426.54	LSFA02-426-400K0 LSFB44-426-800K0
429.5500	LSFA02-429-800K0 LSFB44-429-800K0
433.9200	LSFA02-434-002M0
440.2000	LSFA02-440-400K0 LSFB44-440-400K0
469.1875	LSFB20-469-001M0

Recommended Land Pattern

(Unit : mm)



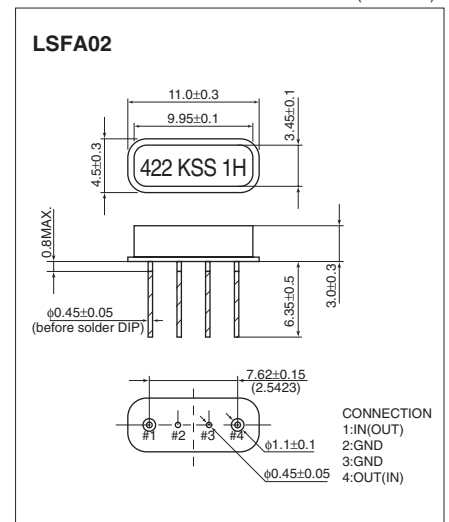
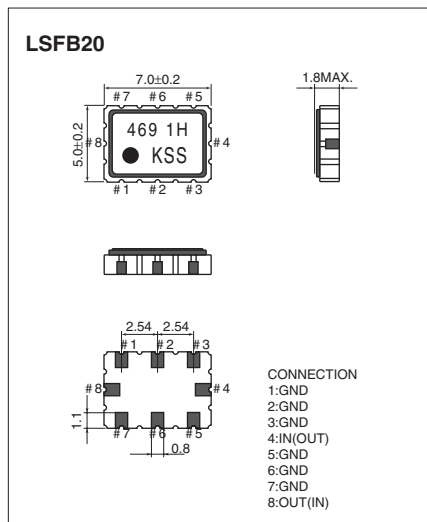
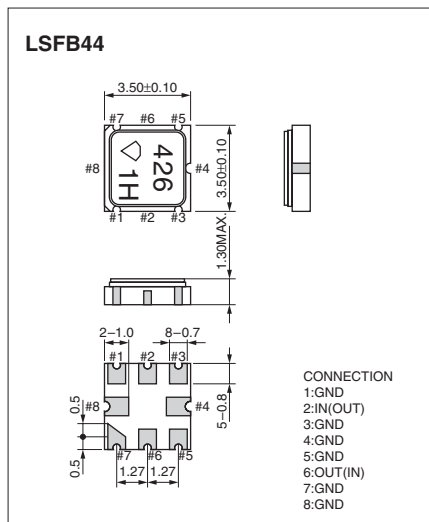
Specifications

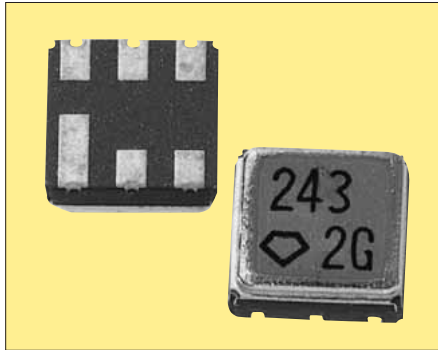
Item	Unit	Conditions	LSFB44-426-800K0 Specifications	
Nominal Frequency	MHz	—	426.54	
Operating Temperature Range	°C	-10~+60	—	
Storage Temperature Range	°C	-30~+70	—	
Ripple	dB	Fo ± 400kHz	0.4 *	1.5 MAX.
Insertion Loss	dB	Fo ± 400kHz	2.8 *	3.5 MAX.
Guaranteed Attenuation	dB	(F-21.4)±400kHz	60 *	50 MIN.
Terminating Impedance	Ω	—	50 Typical	

* : Typ.

Dimensions

(Unit : mm)





Pb Free

RoHS Conforming

Features

- SAW IF filter for PHS.
- Miniature size and light weight.
- Because it is leadless type, automatic mounting is possible.

Standard Frequencies

- 243.95MHz.
- 248.45MHz.

How to Order

LSF B 19 - 243 - 220K 0
① ② ③ ④ ⑤ ⑥

- ① LSF..... L₁₂ B₄ O₇ SAW Filter
- ② B..... Seam weld type
- ③ 19..... Package Number (01, 02.....)
- ④ 243..... Nominal Frequency
- ⑤ 220..... Pass Bandwidth 220kHz
- ⑥ 0..... Sub-Number

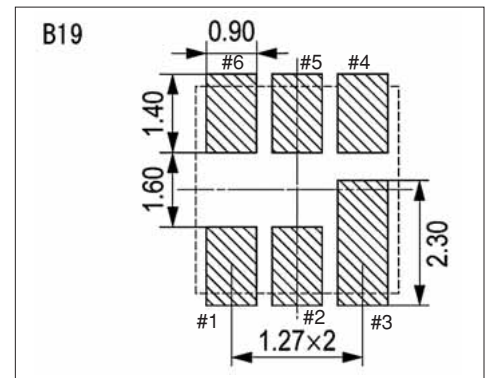
Specifications

Item	Unit	Conditions	LSFB19-243-220K0 Specifications	LSFB44-243-220K0 Specifications
Nominal Frequency	MHz	—	243.95	248.45
Operating Temperature Range	°C	-10~+60	—	—
Storage Temperature Range	°C	-35~+85	—	—
Insertion Loss	dB	Minimum Loss	2.6 * 5.0 MAX.	2.6 * 5.0 MAX.
Guaranteed Attenuation	dB	Fo±0.6MHz	-0.6/52 * 25 MIN. +0.6/34 *	-0.6/55 * 25 MIN. +0.6/36 *
		Fo±1.2MHz	-1.2/47 * 40 MIN. +1.2/43 *	-1.2/55 * 35 MIN. +1.2/43 *
		Fo-21.6MHz	70 * 60 MIN.	65 * 60 MIN.
Group Delay Deviation	μsec	Fo±110kHz	0.5 * 1.2 MAX.	0.3 * 1.2 MAX.

* : Typ.

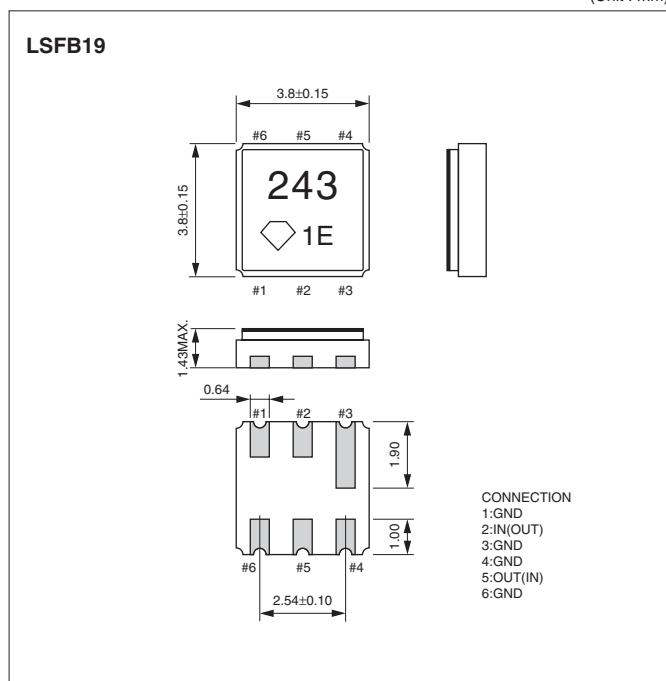
* : Typ.

Recommended Land Pattern (Unit : mm)

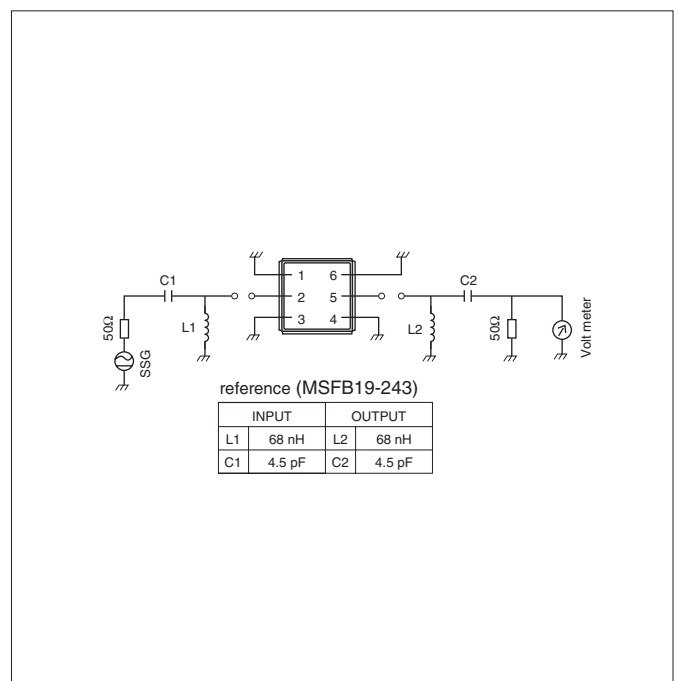


Dimensions

(Unit : mm)



Test Circuit





Pb Free

RoHS Conforming

Features

- SAW IF filter for PHS.
- Miniature size and light weight.
- Because it is leadless type, automatic mounting is possible.

Standard Frequencies

- 243.95MHz.
- 248.45MHz.

How to Order

LSF B 44 - 243 - 220K 0
① ② ③ ④ ⑤ ⑥

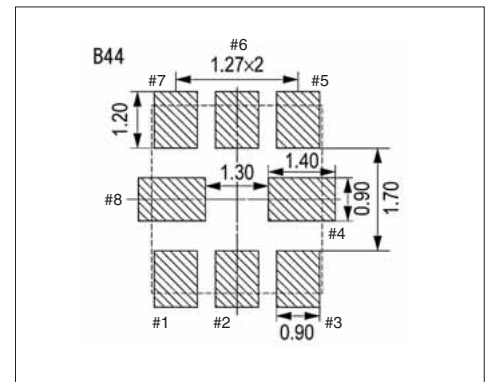
- ① LSF..... Li₂ B₄ O₇ SAW Filter
- ② B..... Seam weld type
- ③ 44..... Package Number (01, 02.....)
- ④ 243..... Nominal Frequency
- ⑤ 220..... Pass Bandwidth 220kHz
- ⑥ 0..... Sub-Number

Specifications

Item	Unit	Conditions	LSFB44-243-220K0 Specifications	
Nominal Frequency	MHz	—	243.95	
Operating Temperature Range	°C	-10~+60	—	
Storage Temperature Range	°C	-35~+85	—	
Insertion Loss	dB	Minimum Loss	2.7 *	5.0 MAX.
Guaranteed Attenuation	dB	Fo±0.6MHz	-0.6/40 *	25 MIN.
			+0.6/35 *	
		Fo±1.2MHz	-1.2/45 *	40 MIN.
			+1.2/42 *	
Group Delay Deviation	μsec	Fo-21.6MHz	70 *	60 MIN.
		Fo±110kHz	0.4 *	1.2 MAX.

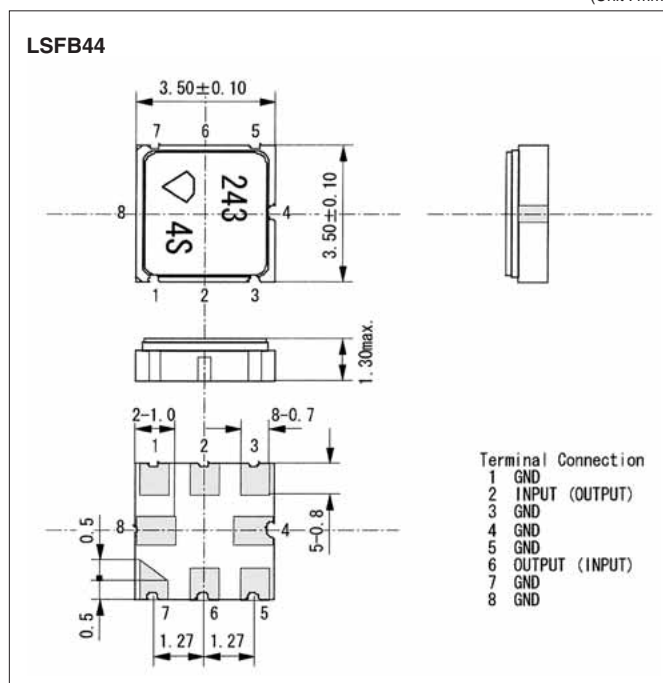
* : Typ.

Recommended Land Pattern (Unit : mm)

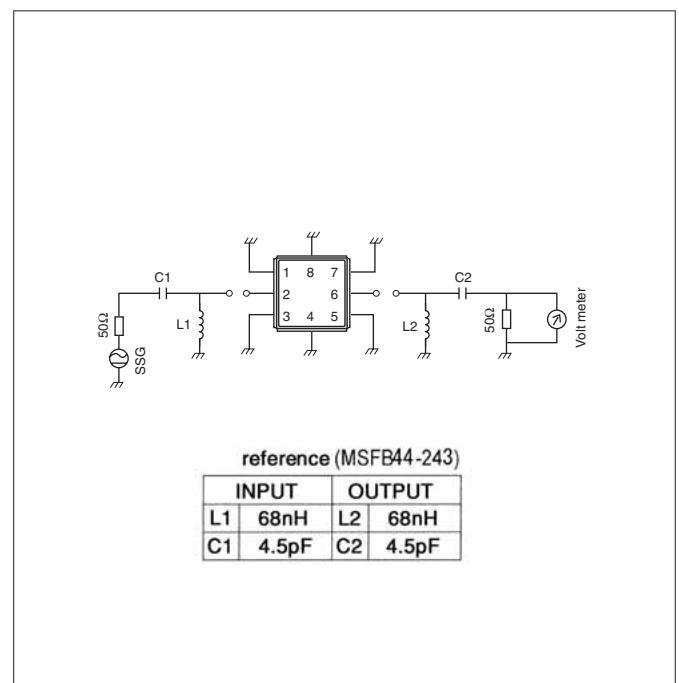


Dimensions

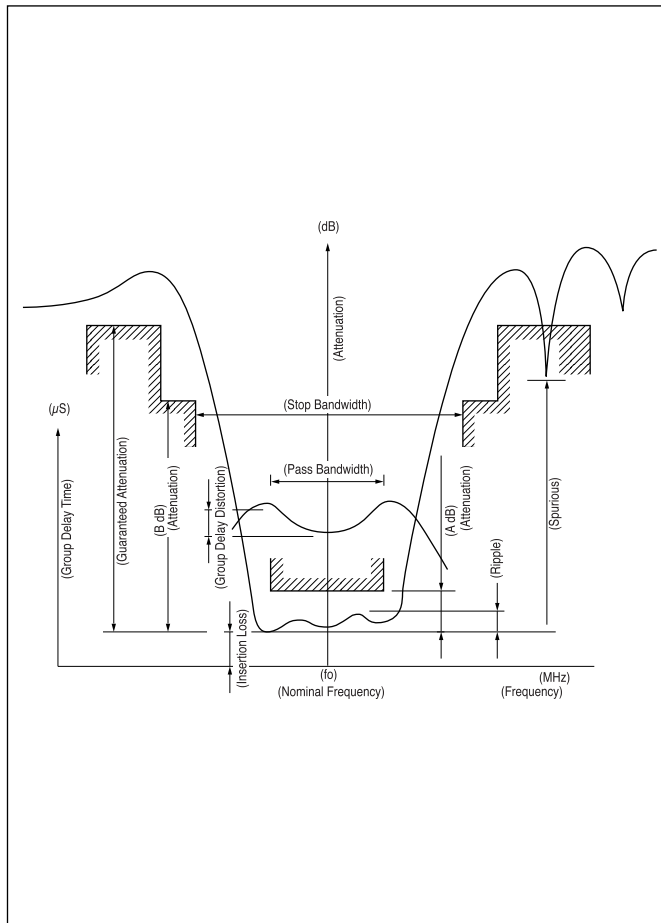
(Unit : mm)



Test Circuit



Characteristic diagram and terms of crystal filters

**■Nominal Frequency**

This is the nominal value of the center frequency (f_0) and is used as the reference frequency of related standards.

■Pass Bandwidth

This is the frequency interval in which the relative attenuation (the attenuation from the minimum insertion loss) is equal to the specified value "A dB" (Usually 3dB).

■Insertion Loss

This is the difference of attenuation when a filter is and isn't inserted. The minimum insertion loss is the minimum value of insertion loss and becomes as the reference level of attenuation characteristics specification. The constant loss is the insertion loss at the nominal frequency.

■Ripple

This is the maximum value of the difference between the peak value of attenuation in the pass band and the minimum insertion loss.

■Stop Bandwidth

This is the frequency interval in which the relative attenuation is equal to the specified value "B dB".

■Guaranteed Attenuation

This is the relative attenuation guaranteed in the specified range within attenuation band scope.

■Spurious Response

This is the value of relative attenuation generated by the secondary vibration in the specified range within attenuation band scope.

■Group Delay Time

This is the difference between the maximum and the minimum value of the group delay in the specified range of the pass band.

■Terminating Impedance

This is the impedance value terminated to the input and the output side of filter and is indicated by the resistance portion and the parallel capacity portion including the floating capacity.

ORDERING FORMAT for CRYSTAL FILTERS

Please specify the following items when ordering crystal filters.

I. Standard product in catalog Indicate type name.

for example : MXF10.7-6A

II. Indicate following items in specification if you order special type.**1. Electrical Characteristics**

- | | |
|---------------------------|-------------------------------------|
| (1)Nominal Frequency | _____MHz |
| (2)Pass Bandwidth | at _____dB ± _____kHz MIN. |
| (3)Stop Bandwidth | at _____dB ± _____kHz MAX. |
| (4)Guaranteed Attenuation | _____dB MINn. ($f_0 \pm$ _____kHz) |
| (5)Spurious Response | _____dB MIN. |
| (6)Ripple | _____dB MAX. |
| (7)Insertion Loss | _____dB MAX. |
| (8)Terminating Impedance | _____Ω//_____pF |

2. Environmental Condition

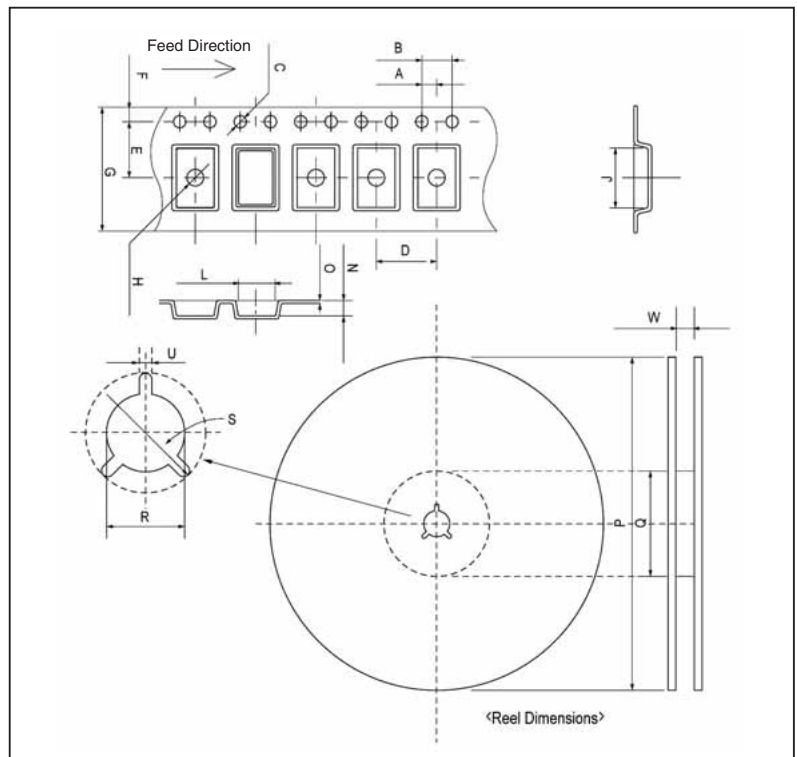
- (1)Operating Temperature Range _____°C ~ _____°C

3. Dimensions**4. Application**

Tape & Reel Specifications

SAW FILTERS / MCFs

SAW FILTERS				
		SF16	SF25	SF30
T A P E	A	2.0±0.05	2.0±0.05	2.0±0.05
	B	4.0±0.1	4.0±0.1	4.0±0.1
	C	φ1.5±0.1	φ1.55±0.1/-0	φ1.55±0.1/-0
	D	4.0±0.1	4.0±0.1	8.0±0.1
	E	3.5±0.05	5.5±0.05	5.5±0.05
	F	1.75±0.1	1.75±0.1	1.75±0.1
	G	8.0±0.2	12.0±0.2	12.0±0.2
	H	φ1.1±0.1	φ1.1±0.1	φ1.55±0.1
	J	1.9±0.1	2.9±0.1	3.3±0.1
	L	1.85±0.1	2.4±0.1	3.3±0.1
	N	0.95±0.1	1.2±0.1	1.85±0.1
R E E L	O	0.25±0.05	0.3±0.05	0.3±0.05
	P	φ178±2	φ330±2	φ330±2
	Q	φ80±2	φ100±2	φ100±2
	R	φ13±0.2	φ13±0.2	φ13±0.2
	S	φ21±0.8	φ21±0.8	φ21±0.8
	U	2±0.5	2±0.5	2±0.5
Qty		3000	3000	3000



SAW FILTERS										MCF
		PAFA	PAFC243B	PAFC433.92A	B54	B22 B43	B19 B25	C12 C30	B44	FP2 FP4
T A P E	A	2.0±0.05	2.0±0.05	2.0±0.05	2.0±0.10	2.0±0.10	2.0±0.05	2.0±0.10	2.0±0.10	2.0±0.1
	B	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1	4.0±0.1
	C	φ1.55±0.05	φ1.5±0.1/-0	φ1.5±0.1/-0	φ1.55±0.05	φ1.55±0.05	φ1.55±0.05	φ1.55±0.05	φ1.55±0.05	φ1.55±0.05
	D	8.0±0.1	8.0±0.1	8.0±0.1	8.0±0.1	8.0±0.1	8.0±0.1	8.0±0.1	8.0±0.1	8.0±0.1
	E	5.5±0.05	5.5±0.05	5.5±0.05	5.5±0.1	7.5±0.1	5.5±0.05	7.5±0.1	5.5±0.05	7.5±0.1
	F	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1	1.75±0.1
	G	12.0±0.2	12.0±0.2	12.0±0.3	12.0±0.3	16.0±0.3	12.0±0.15	16.0±0.3	12.0±0.2	16.0±0.3
	H	φ1.55±0.05	φ1.55±0.1	φ1.55±0.1	φ1.5±0.05/-0	φ1.55±0.05	φ1.55±0.05	φ1.55±0.05	φ1.55±0.05	φ1.55±0.05
	J	3.3±0.1	4.3±0.1	5.3±0.1	5.25±0.1	9.4±0.1	4.2±0.1	7.6±0.1	3.95±0.2	7.5±0.1
	L	3.3±0.1	4.3±0.1	5.3±0.1	3.45±0.1	5.1±0.1	4.2±0.1	5.6±0.1	3.95±0.2	5.5±0.1
	N	1.85±0.1	2.05±0.1	2.1±0.1	1.5±0.1/-0	2.0±0.1	1.8±0.1	1.94±0.1	1.35±0.1	1.8±0.1
R E E L	O	0.3±0.05	0.3±0.05	0.3±0.05	0.3±0.1	0.3±0.05	0.3±0.05	0.3±0.05	0.2±0.05	0.3±0.05
	P	φ255±2	φ255±2	φ255±2	φ330±1	φ330±1	φ178±2	φ330±1	φ178±2	φ178±2
	Q	φ100±2	φ80±2	φ80±2	φ100±1	φ100±1	φ80±1	φ100±1	φ80±1	φ80±2
	R	φ13±0.2	φ13±0.2	φ13±0.2	φ13±0.3	φ13±0.3	φ13±0.5	φ13±0.3	φ13±0.5	φ13±0.5
	S	φ21±0.8	φ21±0.8	φ21±0.8	φ21±0.5	φ21±0.5	φ21±0.5	φ21±0.5	φ21±0.5	φ21±0.8
	U	2±0.5	2±0.5	2±0.5	2±0.5	2±0.5	2±0.5	2±0.5	2±0.5	2±0.5
Qty		2000	2000	2000	3000	3000	1000	3000	1000	1000