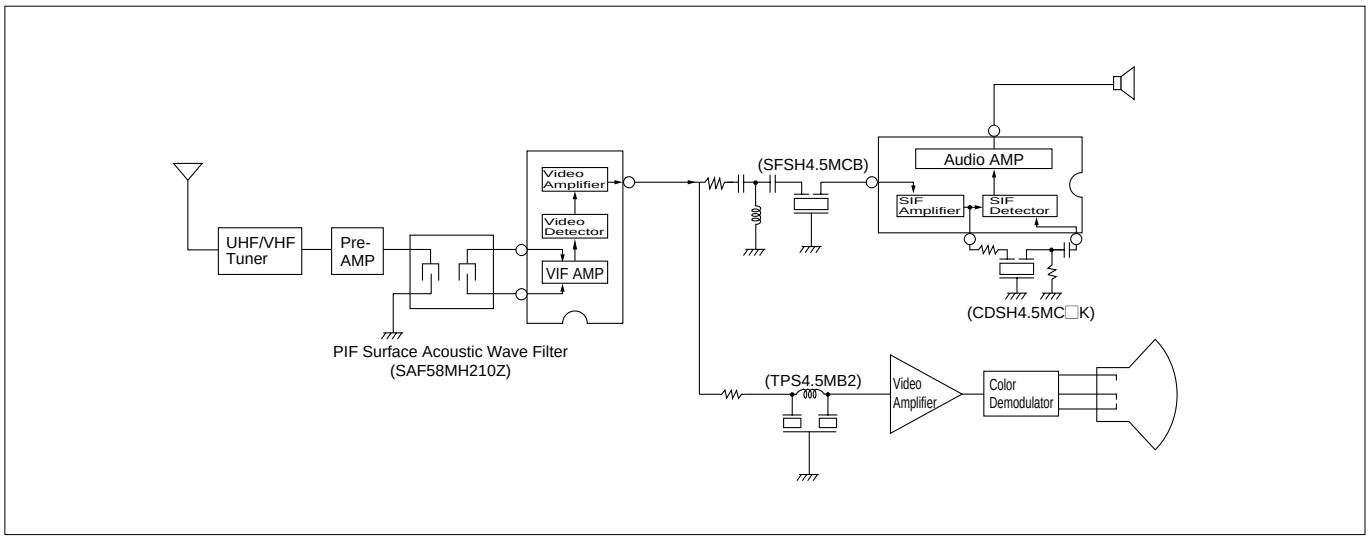
■INTRODUCTION

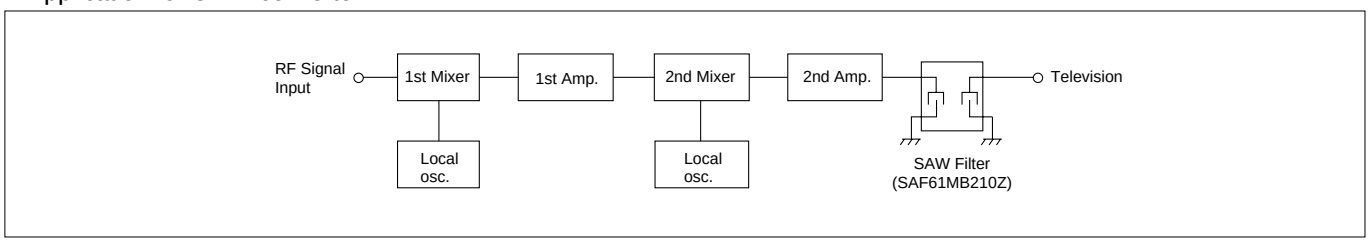
Murata has continued research on surface acoustic wave filters since 1970. In 1976 we offered for sale our first surface acoustic wave filter to be used in the IF of high-fidelity FM tuners. Then, we successfully developed and offered for sale the surface acoustic wave filter for the video IF of color television sets.

Now surface acoustic wave filters have been parts indispensable to electronic circuits of video equipments and telecommunication equipments such as TV/VCR.
Murata has successfully put surface wave filters incorporating ZnO thin film into series. It is realized to be in resin molded small package (SIP), and stable temperature characteristics.

● Application for VIF/SIF circuit of TV/VCR.



● Application for CATV convertor.



■BASIC STRUCTURE

The basic configuration of a SAW filter is two IDTs (comb type electrode) on the piezoelectric substrate.
The first IDT connected to the signal source generates a surface acoustic wave, which propagates along a substrate surface to the second IDT, which transforms SAW energy into electrical voltage on a load connected to the IDT.
This is shown in the Fig.-1.

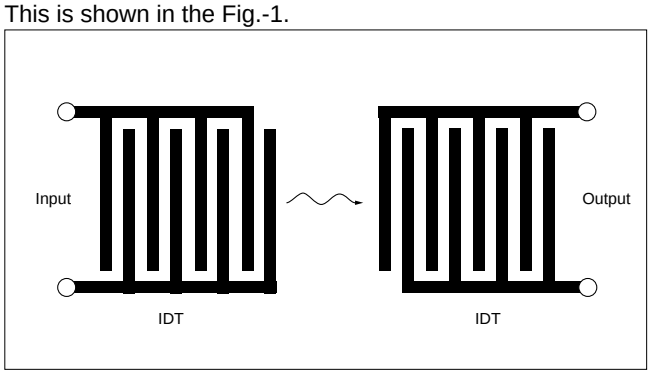


Fig.−1 Transversal filter

Frequency characteristics of the IDTs can be calculated by means of impulse model. In case of Normal IDT which has a constant pitch and a constant overlap, the IDT and the corresponding impulse is shown in Fig.-2 below.

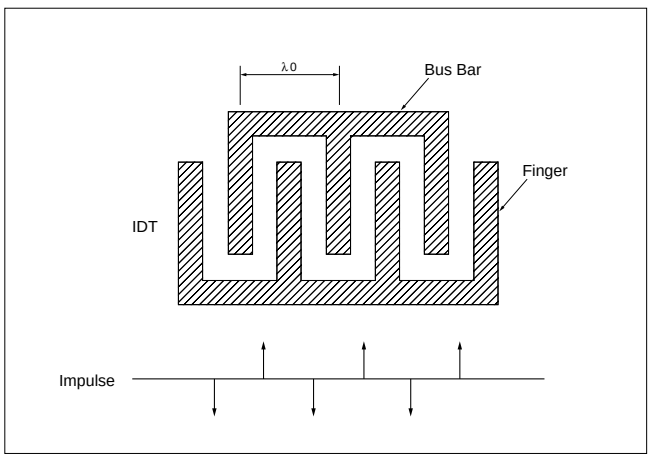


Fig.−2 IDT and the corresponding impulse

When a voltage is fed to the IDT, the direction of the voltage is the positive-negative-positive-negative at $\lambda_0/2$ interval. The voltage is then subjected to expansion and shrinkage of substrate by the piezoelectric effect. One impulse pair of adjacent positive and negative polarities is corresponding to one electrode pair.
When the wavelength of the surface acoustic waves generated by each impulse is equal to the electrode pitch λ_0, we get maximum SAW energy.
When wave velocity is V, electrode pitch is λ_0, number of electrode pair is N, then frequency characteristics of normal IDT can be calculated by the equations shown below.

$$A(f) = \frac{\sin N\pi X}{N\pi X} \left[X = \frac{f-f_0}{f_0},\ f_0 = \frac{V}{\lambda_0} \right]$$

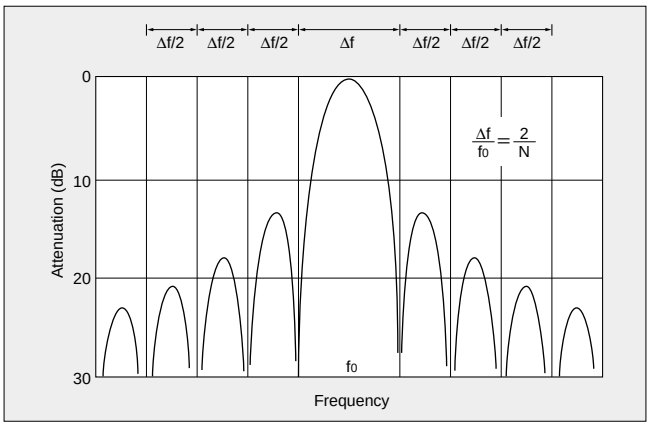


Fig.−3 Frequency characteristics of the normal IDT

■PART NUMBERING

(Please specify the part number when ordering)

(Ex.)	SAF	58M	H	7	0	Z
	❶	❷	❸	❹	❺	❻

❶Kind
- SAF−SAW filter
- SAFW−Dual type SAW filter
- SAFCC−Chip SAW filter
- MKT−High frequency trap

❷Nominal Center Frequency, fp or fs
❸Type
❹Package
❺Individual Specification
❻Element Substrate
- Z−−−−−−ZnO
- P−−−−−−PZT

When Taping type, −TF □ is added

■NOTICE

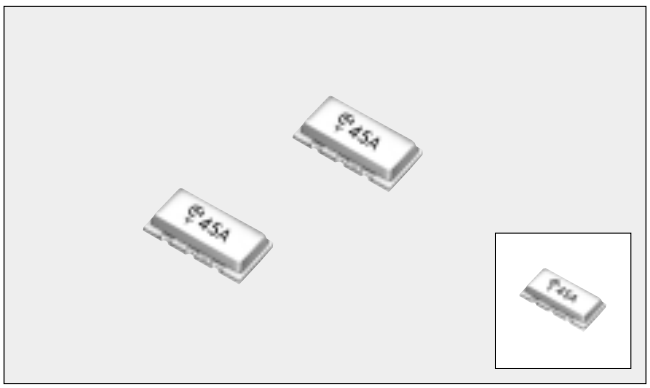
- Do not apply DC voltage between the each terminal.
- Washing filter is not acceptable due to unsealed construction.
- Filter might be damaged when an excessive stress was applied.
- Matching condition should be evaluated well to perform stable electrical characteristics which are specified.
- We can not warrant against defects caused by any use of the filter which deviates from the intended use as described in this catalog. Please contact us for any other characteristics, using conditions or application to the device which need to be extremely reliable.

SURFACE ACOUSTIC WAVE FILTERS

Chip Type Surface Acoustic Wave Filter **SAFCC** Series

Chip SAW Filter with Metal Cap Structure for Downsizing of TV Tuner

Our company employs a SAW filter element manufactured with our original zinc oxide thin-film forming technology, and a shielded structure using a metal cap. This allows the filters to provide stable temperature characteristics, high reliability, high shielding ability, and a compact package with, low-profile shape. This new product is the optimal IF filter for even smaller and lower-profiled tuners, including TV tuners installed as part of car equipment and personal computers.



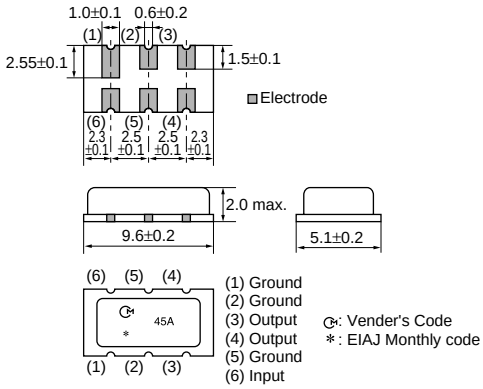
■FEATURES

1. Low-profiled component 2.0mm or less in thickness.
2. Superd stability of characteristics against temperature.
3. Provides high shielding ability using a metal.
4. The series can be reflow soldering.

■APPLICATIONS

- LCD-TV
- Small, thin tuner
- ETC
- DAB
- Wireless LAN
- GPS etc.

■DIMENSIONS



(in mm)

■SPECIFICATIONS

1. PIF FILTER

Part Number	Insertion Loss (dB) max.	fp Attenuation (dB)	fc Attenuation (dB)	fs Attenuation (dB)	fas Attenuation (dB) min.	fap Attenuation (dB) min.	Spurious Response (dB) min.	Temperature Coefficient (ppm/℃)	Frequency Char.	System
SAFCC38.9MVB00Z*	24.0	4.5±1.2	4.5±1.5	20.0 min.	35.0	35.0	30.0	−10±20	Fig.-1	B/G
SAFCC45MA00Z	22.5	4.5±1.2	4.8±1.5	19.0±3.0	35.0	40.0	30.0	−28±20	Fig.-2	M/N
SAFCC45MVB00Z*	22.0	4.5±1.2	4.7±1.5	25.0 min.	40.0	40.0	30.0		Fig.-3	
SAFCC58MH00Z	17.5	4.2±1.2	4.2±1.5	21.0±3.0	40.0	40.0	30.0		Fig.-4	M
SAFCC58MBP00Z	21.0	4.0±1.2	1.8±1.0	19.5±3.0	40.0	43.0	30.0 (0−52.75) 25.0 (60.25−70.0)		Fig.-5	
SAFCC58MVB00Z*	20.5	4.0±1.2	5.0±1.5	25.0 min.	40.0	40.0	30.0		Fig.-6	

*SAFCC38.9MVB00Z, SAFCC45MVB00Z, SAFCC58MVB00Z are for picture IF filter in Quasi-paralleor and split carrier system.

2. SIF FILTER

● FOR TV/VCR SOUND IF

Part Number	Insertion Loss (dB) max.	fp Attenuation (dB)	fc Attenuation (dB)	Attenuation (dB) max. at fs−0.3MHz	Attenuation (dB) max. at fs+0.3MHz	fas Attenuation (dB) min.	fap Attenuation (dB) min.	Spurious Response (dB) min.	Spurious Response (dB) min.	Temperature Coefficient (ppm/℃)	Frequency Char.	System
SAFCC41MC00Z	17.0	40.0 min.	17.0	3.0	3.0	40.0	37.0	28.0 (0−39.75MHz)	30.0 (43.75−56MHz)	−28±20	Fig.-7	M/N
SAFCC41MD00Z	18.0	Within ±3.0	18.0	fs−0.2MHz 3.0	fs+0.2MHz 3.0	35.0	35.0	30.0 (0−55MHz)	15.0 (42.5−44.5MHz)		Fig.-8	
SAFCC54MC00Z	16.0	40.0 min.	17.0	3.0	3.0	40.0	37.0	28.0 (0−52.75MHz)	30.0 (56.75−70MHz)		Fig.-9	M
SAFCC54MD00Z	21.0	Within ±3.0	18.0	fs−0.2MHz 3.0	fs+0.2MHz 3.0	33.0	33.0	28.0 (0−70MHz)	15.0 (55.5−57.5MHz)		Fig.-10	

● FOR MULTI SYSTEM TV/VCR SOUND IF

Part Number	Insertion Loss (dB) max.	fp Attenuation (dB) min.	fc Attenuation (dB) min.	Attenuation (dB) max. at fs^1−0.3MHz	fs^1 Attenuation (dB) max.	fs^2 Attenuation dB) max.	Attenuation (dB) max. at fs^2+0.3MHz	fas Attenuation (dB) min.	fap Attenuation (dB) min.	Spurious Response (dB) min.	Spurious Response (dB) min.	Temperature Coefficient (ppm/℃)	Frequency Char.	System
SAFCC33.4MCB00Z	30.0	30.0	14.0	6.0	3.0	3.0	6.0	30.0	35.0	25.0 (0−30.9MHz)	25.0 (40.4−46MHz)	−10±20	Fig.-11	PAL MULTI

3. FOR WIRELESS LAN

Part Number	Center Frequency (MHz)	Insertion Loss (dB) max.	3dB Bandwidth (MHz) min.	30dB Bandwidth (MHz) max.	Spurious Response [dB]min.	Spurious Response [dB]min.	Temperature Coefficient [ppm/℃]	Frequency Char.	System
SAFCC43.00MC00Z	43.00±0.10	21.0	1.25	3.50	30.0 (30.0−40.5MHz)	30.0 (45.5−50.0MHz)	−28±20	Fig.−12	W-LAN

■FREQUENCY CHARACTERISTICS

1. PIF FILTER

● SAFCC38.9MVB00Z

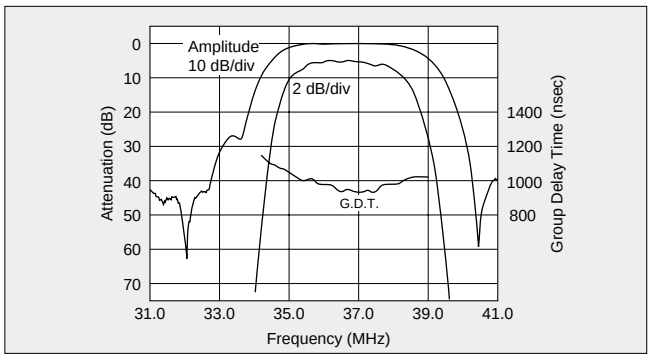


Fig.−1

● SAFCC45MA00Z

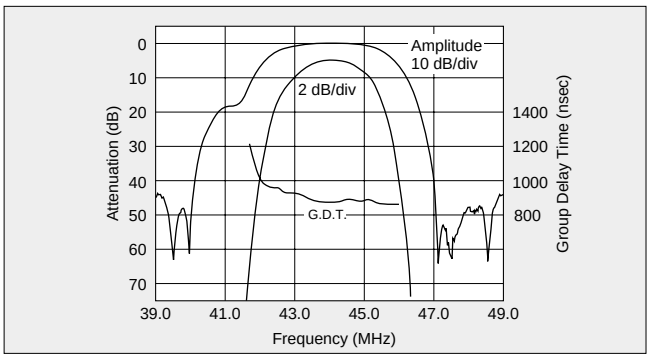


Fig.−2

● SAFCC45MVB00Z

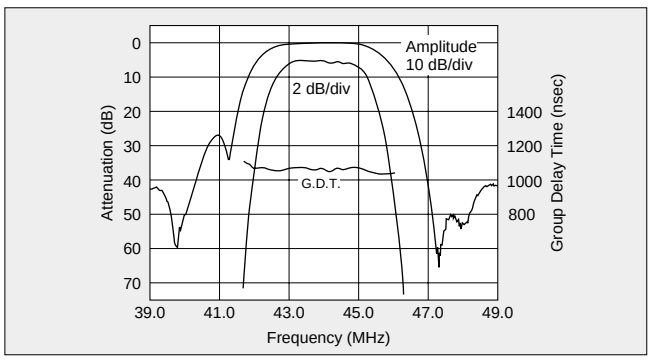


Fig.−3

● SAFCC58MH00Z

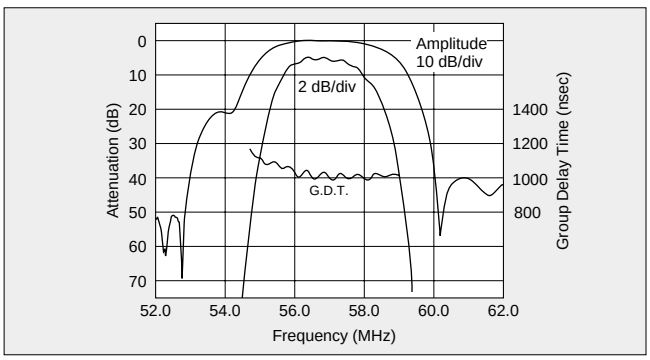


Fig.−4

● SAFCC58MBP00Z

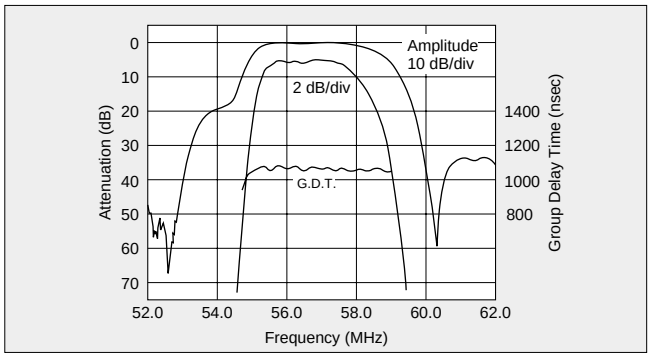


Fig.−5

● SAFCC58MVB00Z

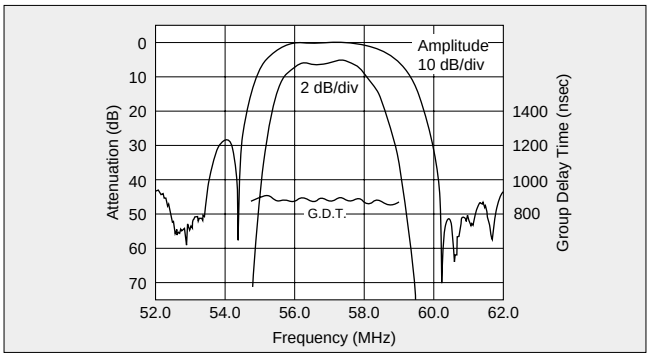


Fig.−6

2. SIF FILTER

● FOR TV/VCR SOUND IF

● SAFCC41MC00Z

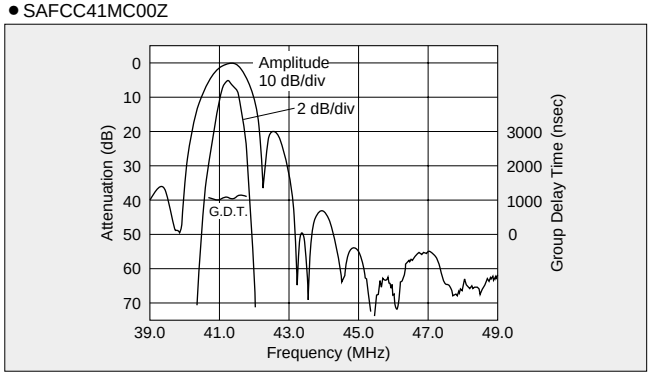


Fig.−7

● SAFCC41MD00Z

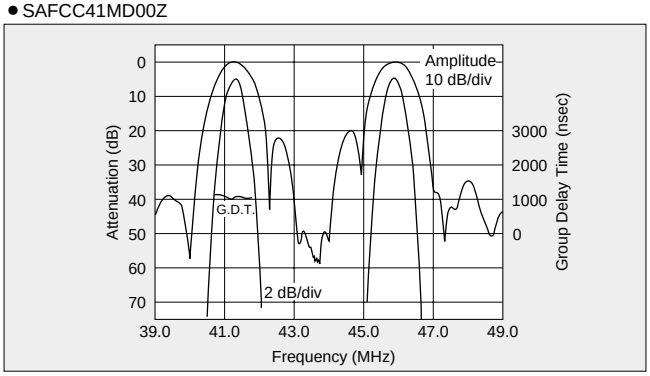


Fig.−8

● SAFCC54MC00Z

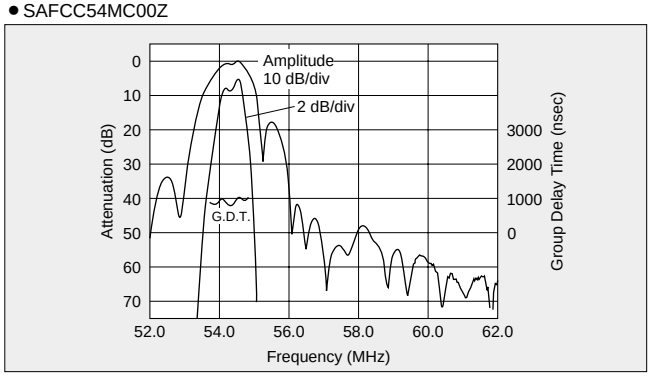


Fig.−9

● SAFCC54MD00Z

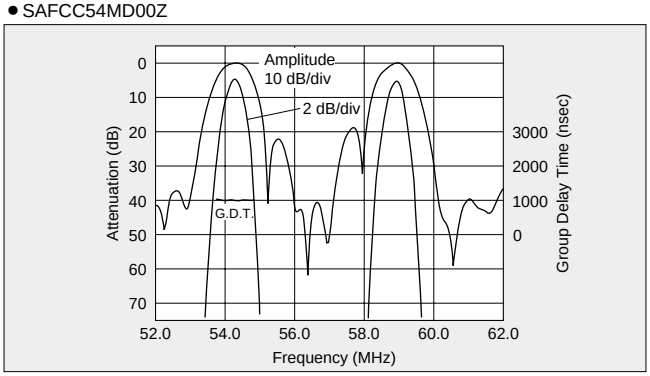


Fig.−10

● FOR MULTI SYSTEM TV/VCR SOUND IF

● SAFCC33.4MCB00Z

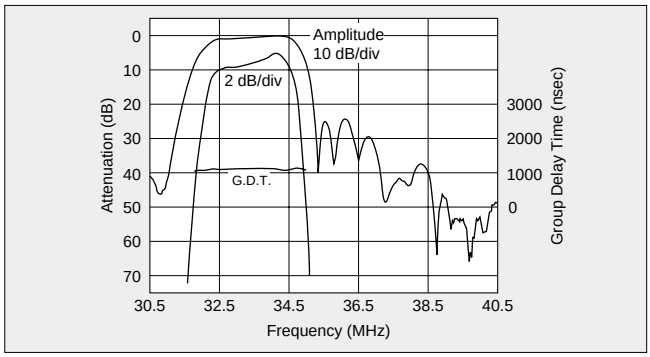


Fig.−11

3. FOR WIRELESS LAN

● SAFCC43.00MC00Z

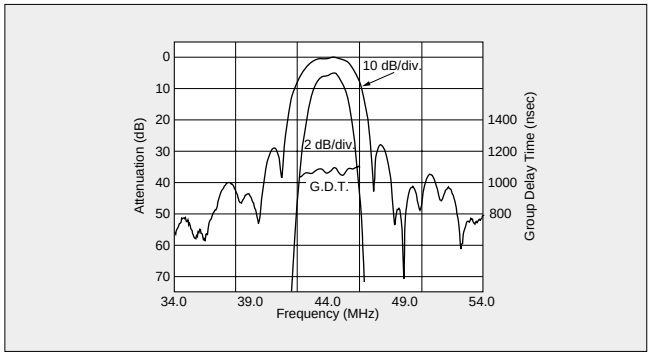
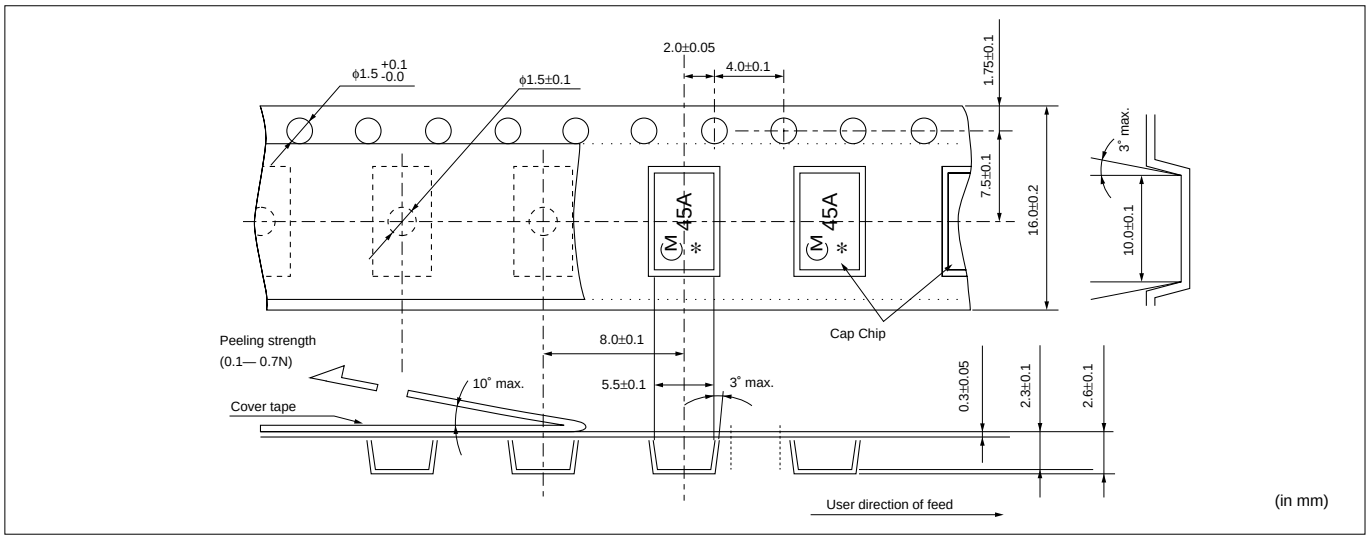


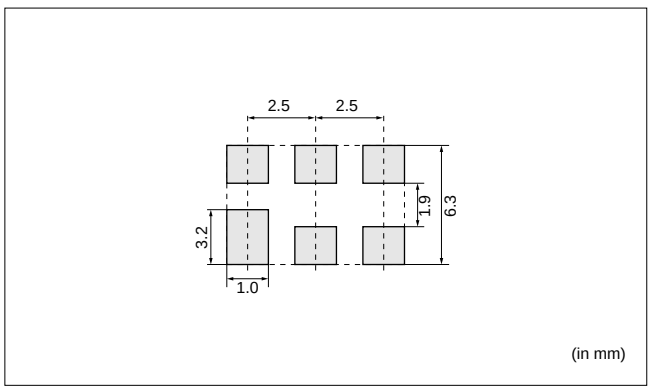
Fig.−12

■DIMENSION OF PLASTIC TAPE



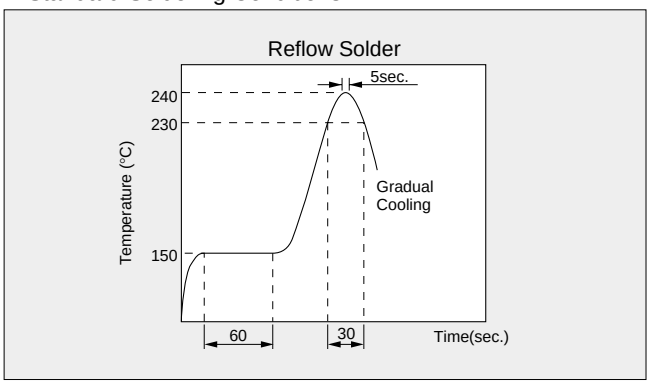
■APPLICATIONS

1. Standard Land Dimensions



2. Soldering Conditions

● Standard Soldering Conditions



● Soldering with Iron

Soldering conditions : Soldering iron temperature 280℃
Soldering time less than 3 seconds

When correcting chips with a soldering iron, the tip of the soldering iron should not directly touch the chip component.

3. Cleaning conditions

Please avoid cleaning this chip ceramic filter with vapor or immersion method because this type is not perfectly shielded.