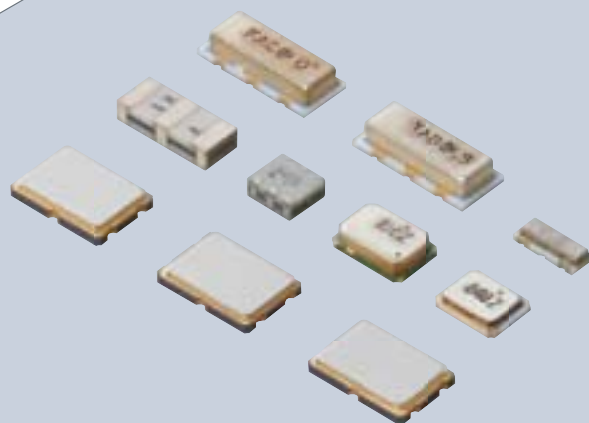


# Ceramic Filters (CERAFIL<sup>®</sup>)/ Crystal Filters





### **EU RoHS Compliant**

- All the products in this catalog comply with EU RoHS.
- EU RoHS is "the European Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment."
- For more details, please refer to our website 'Murata's Approach for EU RoHS' (<http://www.murata.com/en-eu/support/compliance/rohs>).

# Contents

Product specifications are as of December 2015.

Selection Guide .....	p2
Part Numbering .....	p3

<b>1 Ceramic Filters (CERAFIL®)</b>	
<b>Chip Type SFECF Series</b>	
Features/Appearance/Dimensions .....	p6
Part Number List .....	p6
Standard Center Frequency Rank Code .....	p7
Standard Land Pattern Dimensions .....	p7
Test Circuit .....	p7
Frequency Characteristics .....	p8
Spurious .....	p10
Notice .....	p12
Packaging .....	p14

<b>2 Ceramic Filters (CERAFIL®)</b>	
<b>Chip Type SFECV/SFECK Series</b>	
Features/Applications/Appearance/Dimensions .....	p15
Part Number List .....	p15
Standard Center Frequency Rank Code .....	p16
Standard Land Pattern Dimensions .....	p16
Test Circuit .....	p16
Frequency Characteristics .....	p16
Spurious .....	p17
Notice .....	p18
Packaging .....	p20

<b>3 Ceramic Filters (CERAFIL®)</b>	
<b>Chip Type SFSCE Series</b>	
Features/Applications/Appearance/Dimensions .....	p21
Part Number List .....	p21
Standard Land Pattern Dimensions .....	p21
Test Circuit .....	p21
Frequency Characteristics .....	p22
Notice .....	p23
Packaging .....	p27

<b>4 Ceramic Filters (CERAFIL®)</b>	
<b>Chip Type SFSKA Series</b>	
Features/Appearance/Dimensions .....	p28
Part Number List .....	p28
Standard Land Pattern Dimensions .....	p28
Test Circuit .....	p28
Frequency Characteristics .....	p29
Spurious .....	p30
Notice .....	p31
Packaging .....	p33

<b>5 Ceramic Filters (CERAFIL®)</b>	
<b>Chip Type SFSKB Series</b>	
Features/Applications/Appearance/Dimensions .....	p34
Part Number List .....	p34
Standard Land Pattern Dimensions .....	p35
Test Circuit .....	p35
Frequency Characteristics .....	p36
Spurious .....	p37
Notice .....	p38
Packaging .....	p40

<b>6 Ceramic Trap (CERAFIL®)</b>	
<b>Chip Type TPSKA Series</b>	
Features/Appearance/Dimensions .....	p41
Part Number List .....	p41
Standard Land Pattern Dimensions .....	p41
Test Circuit .....	p41
Frequency Characteristics .....	p41
Spurious .....	p42
Notice .....	p43
Packaging .....	p45

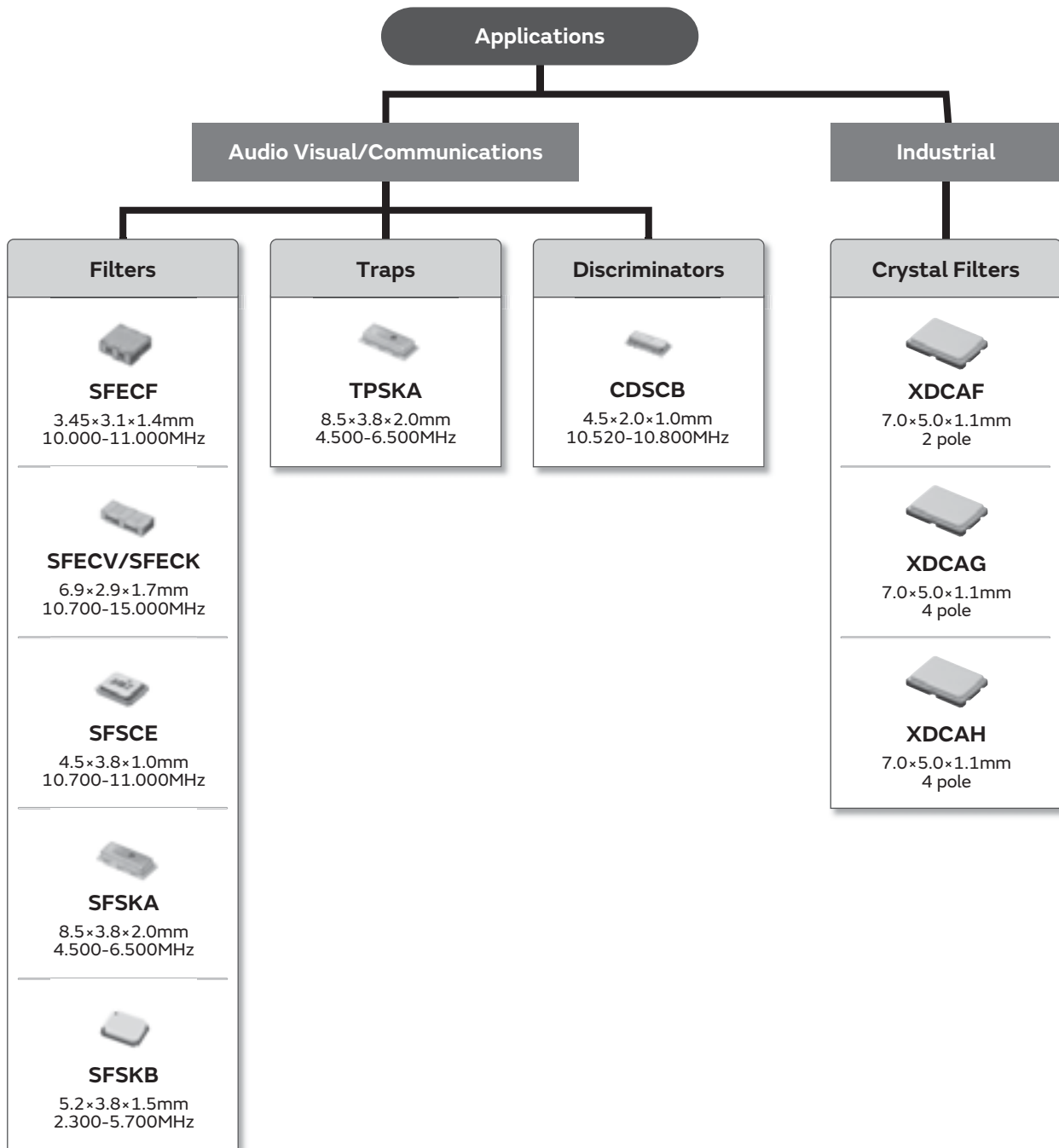
<b>7 Ceramic Discriminator (CERAFIL®)</b>	
<b>Chip Type CDSCB Series</b>	
Features/Appearance/Dimensions .....	p46
Part Number List .....	p46
Standard Center Frequency Rank Code .....	p46
Standard Land Pattern Dimensions .....	p47
Test Circuit .....	p47
Recovered Audio Curve .....	p49
S Curve .....	p50
Notice .....	p51
Packaging .....	p53

<b>8 Crystal Filters</b>	
<b>Chip Type XDCAF/XDCAG/XDCAH Series</b>	
Features/Applications/Appearance/Dimensions .....	p54
Series/Part Number List .....	p54
Test Circuit .....	p55
Frequency Characteristics .....	p56
Spurious .....	p57
Notice .....	p58
Packaging .....	p60

Please check the MURATA website (<http://www.murata.com/>) if you cannot find the part number in the catalog.



## Selection Guides



● Part Numbering

CERAFIL® for FM

(Part Number)



① Product ID

Product ID	
SF	Ceramic Filters

② Oscillation/Number of Elements

Code	Oscillation/Number of Elements
E	2 Elements Thickness Expander Mode
T	3 Elements Thickness Expander Mode
V	2 Elements Thickness Expander Mode (2nd Harmonic)
K	2 Elements Thickness Expander Mode (3rd Overtone)

③ Structure/Size

Code	Structure/Size
C□	Chip Type

□ is "A" or subsequent code, which indicates the structure/size.

④ Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is in hertz (Hz).  
 Decimal point is expressed by capital letter "M" in case of MHz.

⑤ 3dB Bandwidth

Code	3dB Bandwidth
C	450kHz min
D	350kHz min
E	330kHz
F	280kHz
G	230kHz
H	180kHz
J	150kHz
K	110kHz
L	80kHz
M	50kHz
N	35kHz

⑥ Center Frequency/Tolerance

Code	Center Frequency	Tolerance
A	Center Frequency Mentioned by Specification	±30kHz
F	Nominal Center Frequency	—

3dB bandwidth of "F" signifies the frequency difference (both + and -) from reference frequency, which is nominal center frequency.

⑦ Series

Code	Series
A0	Two-digit Alphanumerics Express Series

⑧ Packaging

Code	Packaging
-B0	Bulk
-R0	Embossed Taping ø180mm
-R1	Embossed Taping ø330mm

Radial taping is applied to lead type and embossed taping to chip type.  
 With non-standard products, two-digit alphanumerics indicating "Individual Specification" are added between "⑦ Series" and "⑧ Packaging."

### CERAFIL®

(Part Number)

SF	S	KA	4M50	CF	00	-R1
①	②	③	④	⑤	⑥	⑦

#### ① Product ID

Product ID	
SF	Ceramic Filters

#### ② Oscillation/Numbers of Element

Code	Oscillation/Numbers of Element
S	2 Elements Thickness Shear Mode

#### ③ Structure/Size

Code	Structure/Size
K□	Chip Type

□ is "A" or subsequent code, which indicates the structure/size.

#### ④ Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is in hertz (Hz).  
 Decimal point is expressed by capital letter "M" in case of MHz.

#### ⑤ Product Specification Code (1)

Code	Product Specification Code (1)
BF	Tight Bandwidth Type
CF	Standard Bandwidth Type
DF	Broad Bandwidth Type
EF	Ultra-broad Bandwidth Type

#### ⑥ Product Specification Code (2)

Code	Product Specification Code (2)
00	Standard Type

#### ⑦ Packaging

Code	Packaging
-B0	Bulk
-R1	Embossed Taping $\phi=330\text{mm}$

With non-standard products, two-digit alphanumerics indicating "Individual Specification" is added between "⑥ Product Specification Code (2)" and "⑦ Packaging."

### Ceramic Traps

(Part Number)

TP	S	KA	4M00	B	00	-R0
①	②	③	④	⑤	⑥	⑦

#### ① Product ID

Product ID	
TP	Ceramic Traps

#### ② Function

Code	Function
S	Single Traps

#### ③ Structure/Size

Code	Structure/Size
K□	Chip Type

□ is "A" or subsequent code, which indicates the structure/size.

#### ④ Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is in hertz (Hz).  
 Decimal point is expressed by capital letter "M" in case of MHz.

#### ⑤ Product Specification Code (1)

Code	Product Specification (1)
B	Broad Bandwidth Type
C	Low Capacitance Type

#### ⑥ Product Specification Code (2)

Code	Product Specification (2)
00	Standard Type

#### ⑦ Packaging

Code	Packaging
-B0	Bulk
-R1	Embossed Taping $\phi=330\text{mm}$

With non-standard products, three-digit alphanumerics indicating "Individual Specification" is added between "⑥ Product Specification Code (2)" and "⑦ Packaging."

### Discriminators for FM

(Part Number) 

CD	S	CB	10M7	G	A	001	-R0
①	②	③	④	⑤	⑥	⑦	⑧

#### ① Product ID

Product ID	
CD	Discriminators

#### ② Oscillation

Code	Oscillation
S	Thickness Shear Mode

#### ③ Structure/Size

Code	Structure/Size
C□	Chip Type

□ is "A" or subsequent code, which indicates the structure/size.

#### ④ Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is in hertz (Hz).  
 Decimal point is expressed by capital letter "M" in case of MHz.

#### ⑤ Series

Code	Series
G	Two-digit Alphanumerics Express Series

#### ⑥ Center Frequency/Tolerance

Code	Center Frequency	Tolerance
A	Center Frequency Mentioned by Specification	±30kHz
F	Nominal Center Frequency	—

3dB bandwidth of "F" signifies the frequency difference (both + and -) from reference frequency, which is nominal center frequency.

#### ⑦ IC

Code	IC
001	Applicable IC Control Code

#### ⑧ Packaging

Code	Packaging
-B0	Bulk
-R0	Embossed Taping ø=180mm
-R1	Embossed Taping ø=330mm

Radial taping is applied to lead type and embossed taping to chip type.  
 With non-standard products, an alphanumerics indicating "Individual Specification" is added between "⑦ IC" and "⑧ Packaging."

### Crystal Filter

(Part Number) 

XD	C	A	F	21M400	R	A	A00	P0
①	②	③	④	⑤	⑥	⑦	⑧	⑨

#### ① Product ID

Product ID	
XD	Crystal Filter

#### ② Type · Lead Style

Code	Type · Lead Style
C	Monolithic SMD

#### ③ Size

Code	Size
A	7050

#### ④ Structure

Expressed by one-digit alphabet.

#### ⑤ Nominal Center Frequency

Expressed by six-digit alphanumeric. The unit is in hertz (Hz).  
 Decimal point is expressed by capital letter "M".

#### ⑥ Bandwidth

Code	Bandwidth (3dB)
M	6.800 to 8.199kHz
P	10.000 to 11.999kHz
Q	12.000 to 14.999kHz
R	15.000 to 17.999kHz

#### ⑦ Number of Pole

Code	Number of Pole
A	2 (1 Element)
G	4 (1 Element)
H	4 (2 Elements)

#### ⑧ Individual Specification

Code	
***	Three-digit Alphanumeric Express Individual Specification.

#### ⑨ Packaging (Packging quantity is expressed by one-digit number in "\*\*")

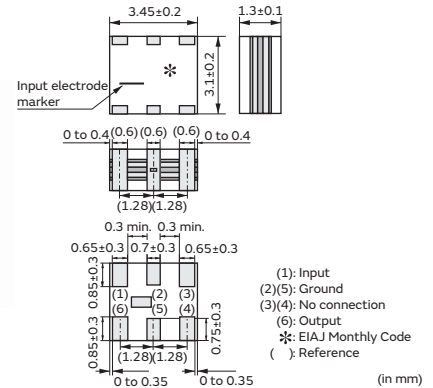
Code	Packaging
P*/L*	Plastic Taping ø330mm

# Ceramic Filters (CERAFIL®)

RoHS

## Chip Type SFECF Series

The SFECF10M7 series for FM receivers are small, high-performance and super thin (1.4mm max.) filters. The piezoelectric element is sandwiched by ceramic substrate. They have 1.4mm max. thickness and a small mounting area (3.45x3.1mm). The SFECF series and CDSCB series (MHz Discriminator) enable customers to make VICS/RKE/TPMS sets very thin and small.



### Features

1. The filters are mountable by automatic placers.
2. They are slim, at only 1.4mm max. thickness, and have a small mounting area (3.45x3.1mm) enabling flexible PCB design.
3. Various bandwidths are available. Select a suitable type in accordance with the desired characteristics.
4. Operating Temperature Range:
  - 20 to +80°C (Standard Type)
  - 40 to +85°C (High-reliability Type)
 Storage Temperature Range:
  - 40 to +85°C (Standard Type)
  - 55 to +85°C (High-reliability Type)

### Standard Type

Part Number	Center Frequency (fo) (MHz)	Nominal Center Frequency (fn) (MHz)	3dB Bandwidth (kHz)	Attenuation (kHz)	Insertion Loss (dB)	Ripple (dB)	Spurious Attenuation (1) (dB)	Spurious Attenuation (2) (dB)	Input/Output Impedance (ohm)
SFECF10M7HA00-R0	10.700 ±30kHz	-	180 ±40kHz	470 max.	4.0±2.0dB	1.0 max.	30 min. [within 9MHz to fo]	30 min. [within fo to 12MHz]	330
SFECF10M7HF00-R0	-	10.700	fn±25 min.	510 max.	8.0max. [at fn]	1.0 max.	30 min. [within 9MHz to fn]	25 min. [within fn to 12MHz]	330
SFECF10M7GA00-R0	10.700 ±30kHz	-	230 ±50kHz	510 max.	3.5±2.0dB	1.0 max.	30 min. [within 9MHz to fo]	30 min. [within fo to 12MHz]	330
SFECF10M7GF00-R0	-	10.700	fn±45 min.	560 max.	8.0max. [at fn]	1.0 max.	30 min. [within 9MHz to fn]	25 min. [within fn to 12MHz]	330
SFECF10M7FA00-R0	10.700 ±30kHz	-	280 ±50kHz	590 max.	3.0±2.0dB	1.0 max.	30 min. [within 9MHz to fo]	30 min. [within fo to 12MHz]	330
SFECF10M7FF00-R0	-	10.700	fn±65 min.	620 max.	7.0max. [at fn]	1.0 max.	30 min. [within 9MHz to fn]	25 min. [within fn to 12MHz]	330
SFECF10M7EA00-R0	10.700 ±30kHz	-	330 ±50kHz	700 max.	3.0±2.0dB	1.0 max.	30 min. [within 9MHz to fo]	30 min. [within fo to 12MHz]	330
SFECF10M7DA0001-R0	10.700 ±30kHz	-	420 min.	950 max.	3.0±2.0dB	3.0 max.	35 min. [within 9MHz to fo]	25 min. [within fo to 12MHz]	330
SFECF10M7DF00-R0	-	10.700	fn±150 min.	990 max.	6.0max. [at fn]	3.0 max.	20 min. [within 9MHz to fn]	20 min. [within fn to 12MHz]	330

Area of Attenuation: [within 20dB]

Area of Insertion Loss: at minimum loss point      Area of Ripple: within 3dB B.W.

Center frequency (fo) defined by the center of 3dB bandwidth.

For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of ceramic filters.

The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.



## High-reliability Type

Part Number	Center Frequency (fo) (MHz)	Nominal Center Frequency (fn) (MHz)	3dB Bandwidth (kHz)	Attenuation (kHz)	Insertion Loss (dB)	Ripple (dB)	Spurious Attenuation (1) (dB)	Spurious Attenuation (2) (dB)	Input/Output Impedance (ohm)
SFECF10M7HA00S0-RO	10.700 ±30kHz	-	180 ±40kHz	470 max.	4.0±2.0dB	1.0 max.	30 min. [within 9MHz to fo]	30 min. [within fo to 12MHz]	330
SFECF10M7HF00S0-RO	-	10.700	fn±25 min.	510 max.	8.0max. [at fn]	1.0 max.	30 min. [within 9MHz to fn]	25 min. [within fn to 12MHz]	330
SFECF10M7GA00S0-RO	10.700 ±30kHz	-	230 ±50kHz	510 max.	3.5±2.0dB	1.0 max.	30 min. [within 9MHz to fo]	30 min. [within fo to 12MHz]	330
SFECF10M7GF00S0-RO	-	10.700	fn±45 min.	560 max.	8.0max. [at fn]	1.0 max.	30 min. [within 9MHz to fn]	25 min. [within fn to 12MHz]	330
SFECF10M7FA00S0-RO	10.700 ±30kHz	-	280 ±50kHz	590 max.	3.0±2.0dB	1.0 max.	30 min. [within 9MHz to fo]	30 min. [within fo to 12MHz]	330
SFECF10M7FF00S0-RO	-	10.700	fn±65 min.	630 max.	7.0max. [at fn]	1.0 max.	30 min. [within 9MHz to fn]	25 min. [within fn to 12MHz]	330
SFECF10M7EA00S0-RO	10.700 ±30kHz	-	330 ±50kHz	700 max.	3.0±2.0dB	1.0 max.	30 min. [within 9MHz to fo]	30 min. [within fo to 12MHz]	330
SFECF10M7DF00S0-RO	-	10.700	fn±145 min.	990 max.	6.0max. [at fn]	3.0 max.	20 min. [within 9MHz to fn]	20 min. [within fn to 12MHz]	330

Area of Attenuation: [within 20dB]

Area of Insertion Loss: at minimum loss point      Area of Ripple: within 3dB B.W.

Center frequency (fo) defined by the center of 3dB bandwidth.

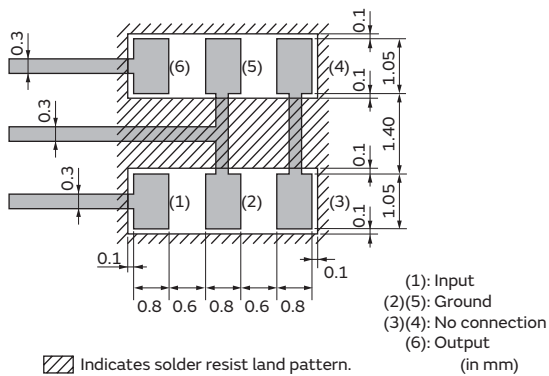
For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of ceramic filters.

The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

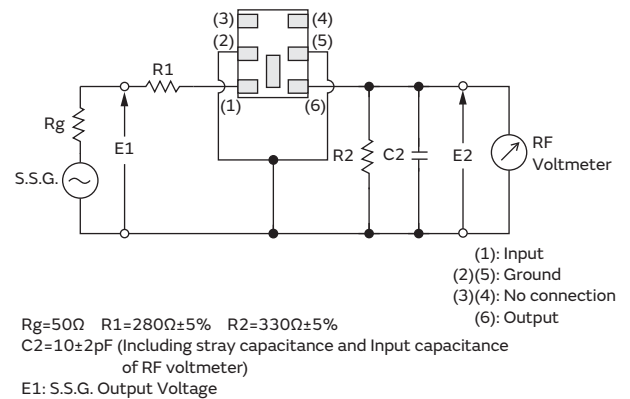
## Standard Center Frequency Rank Code

CODE	30kHz Step	25kHz Step
A	10.700MHz±30kHz	10.700MHz±25kHz

## Standard Land Pattern Dimensions



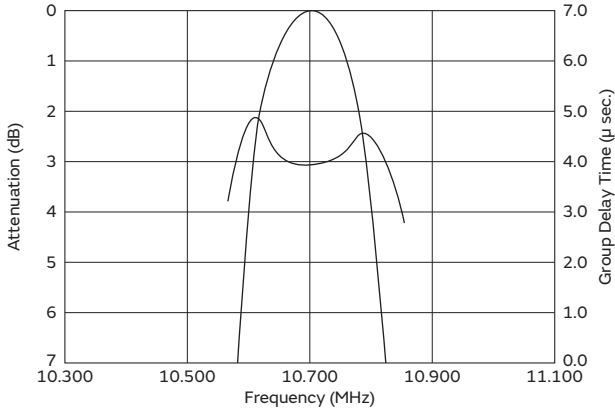
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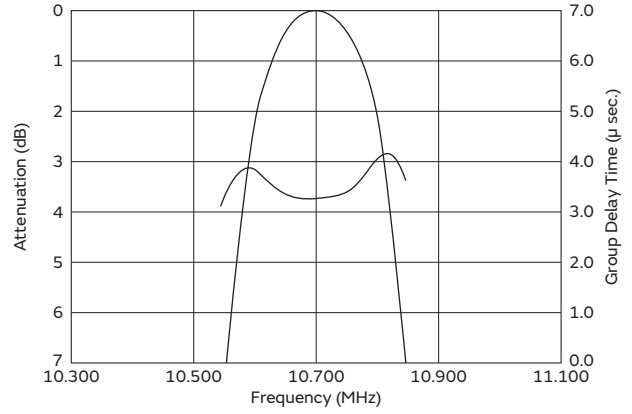
## Frequency Characteristics Standard Type

1

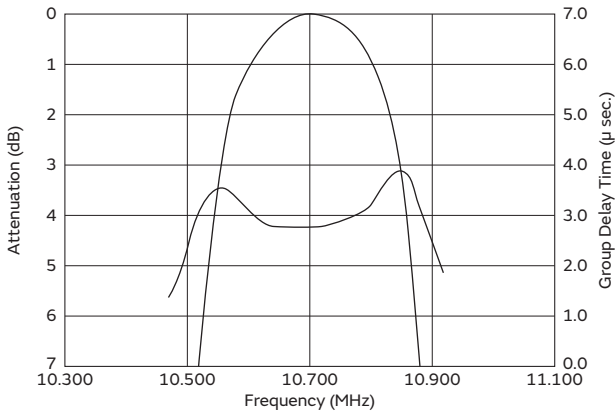
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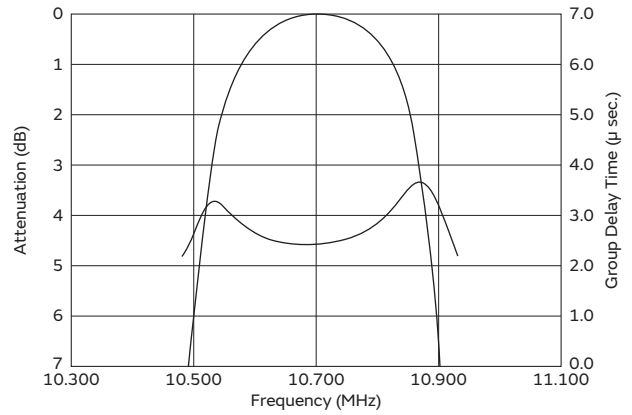
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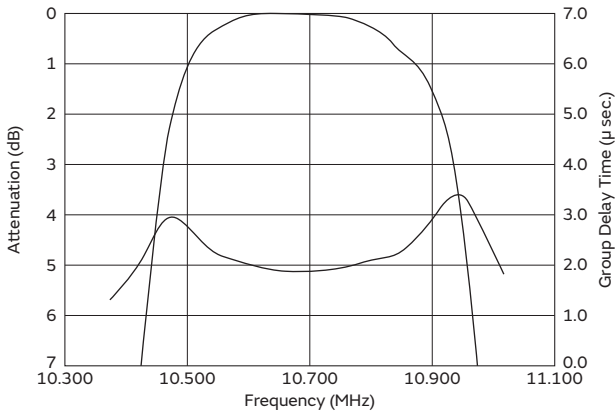
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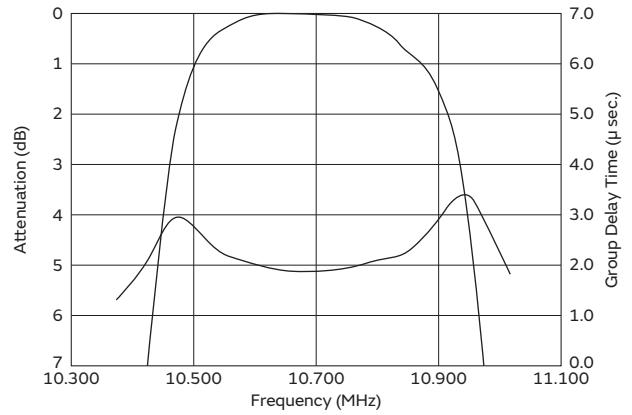
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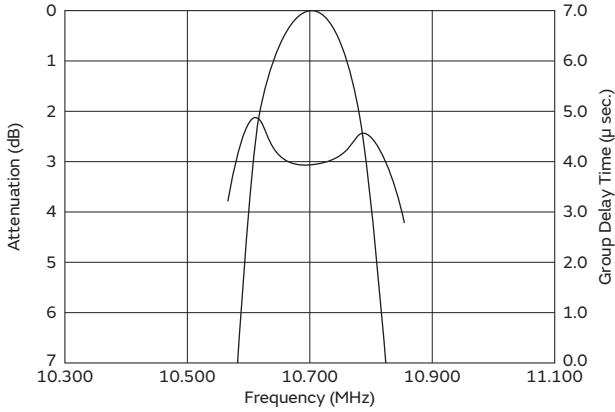


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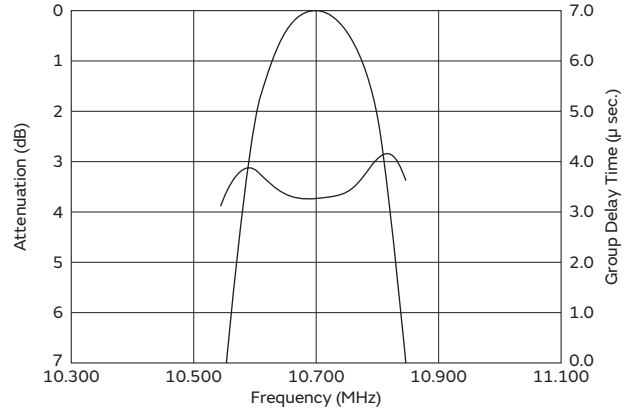
## Frequency Characteristics High-reliability Type

1

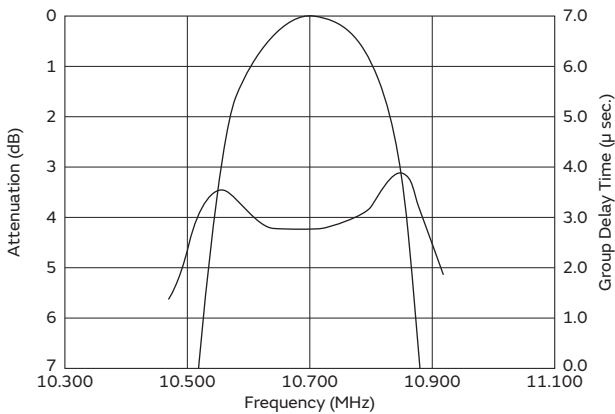
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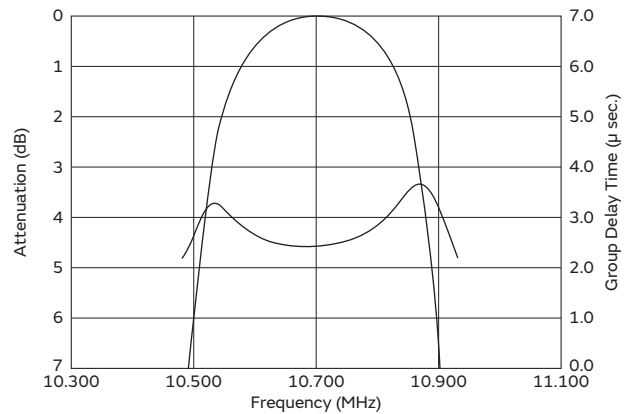
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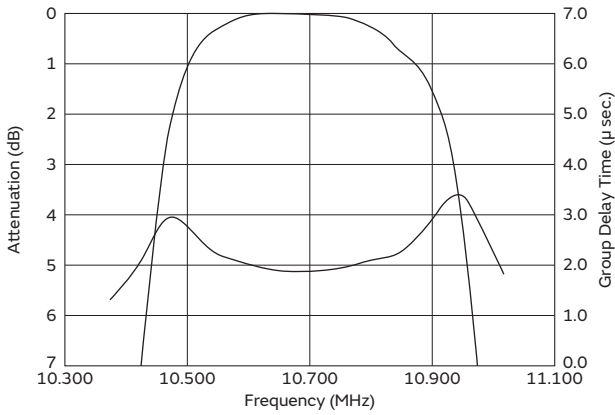
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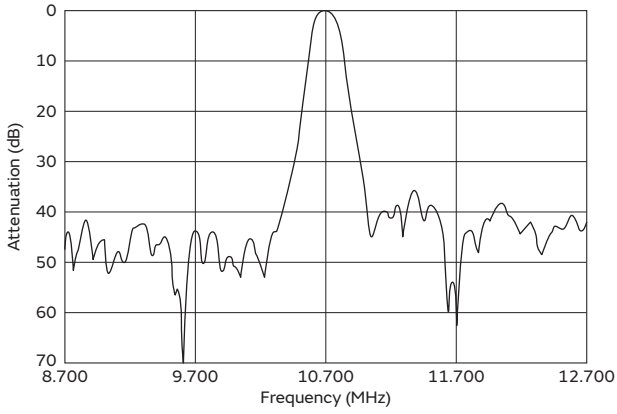
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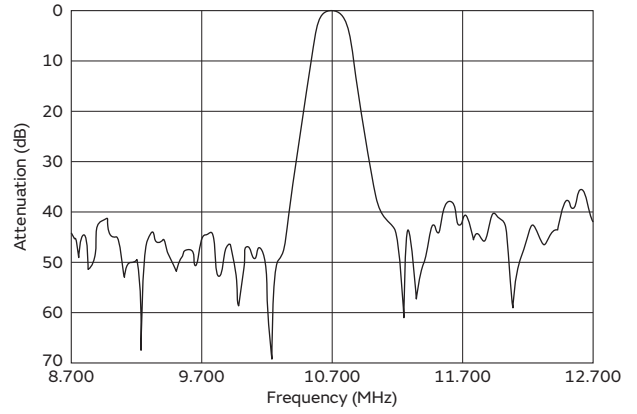
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## Frequency Characteristics (Spurious) Standard Type

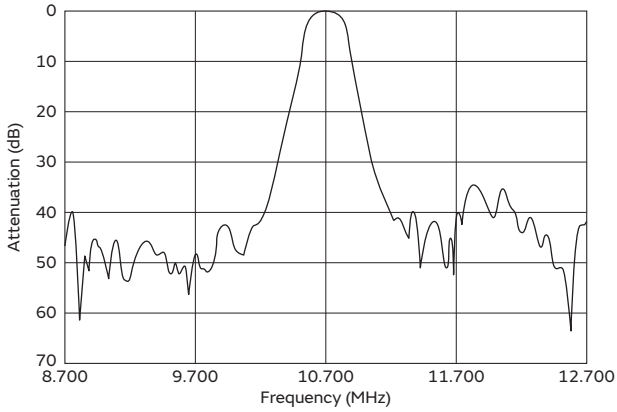
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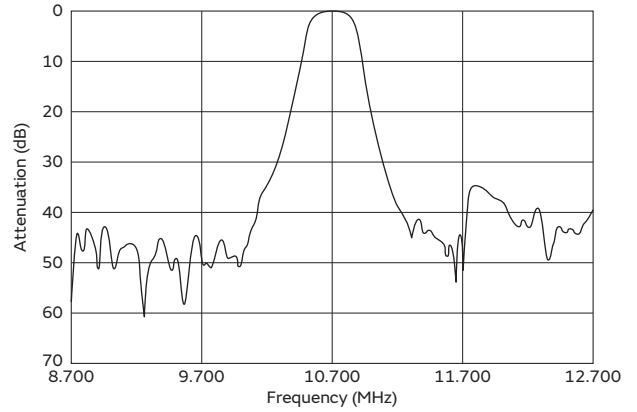
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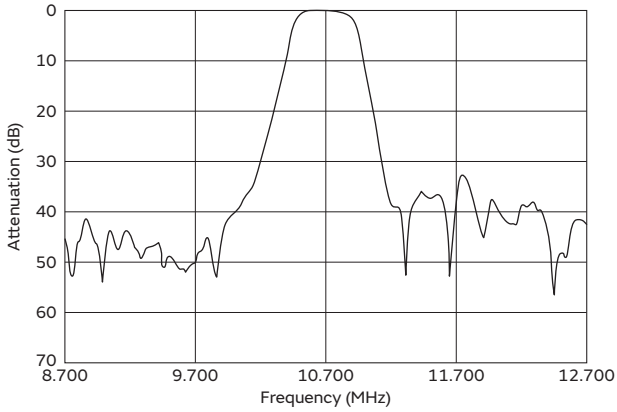
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SFECF10M7EA00-R0



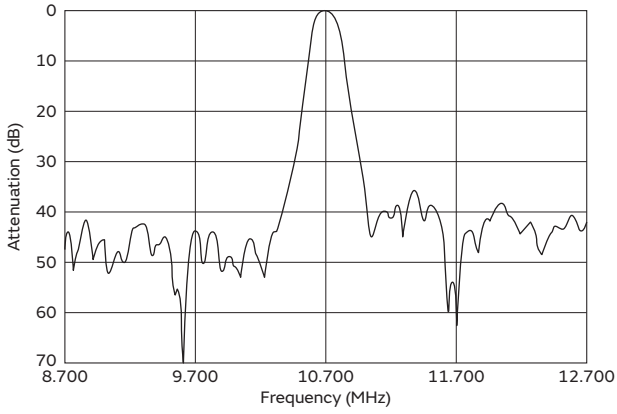
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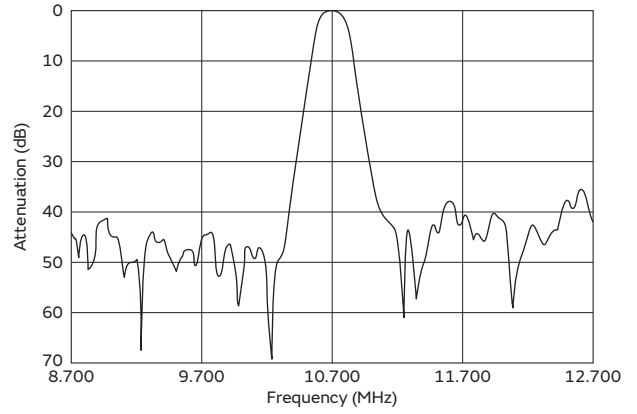
## Frequency Characteristics (Spurious) High-reliability Type

1

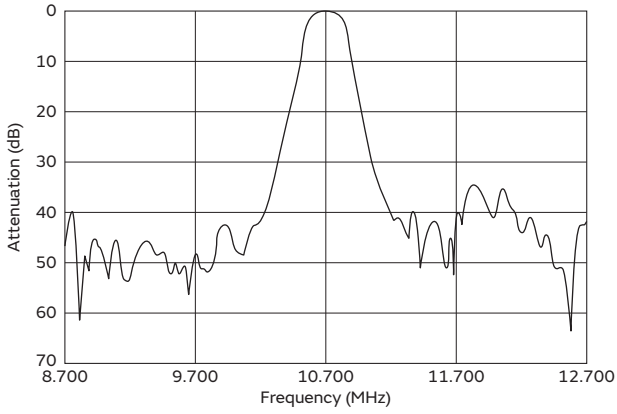
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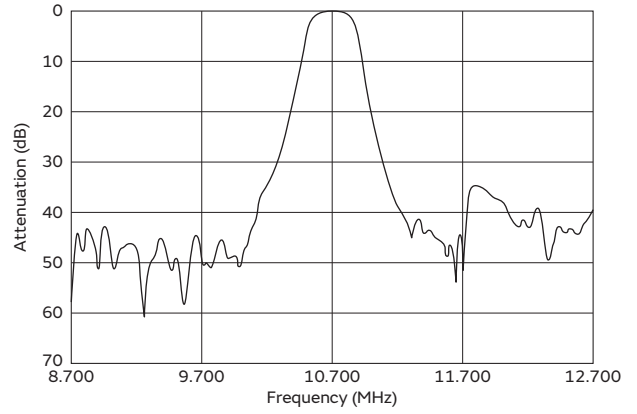
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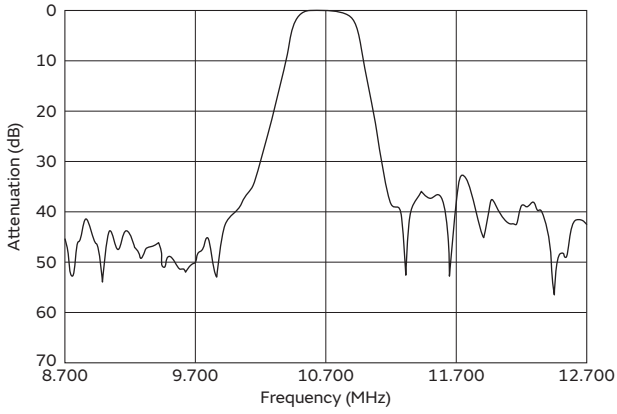
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SFECF10M7EA00S0-R0



SFECF10M7DF00S0-R0



## Notice

1

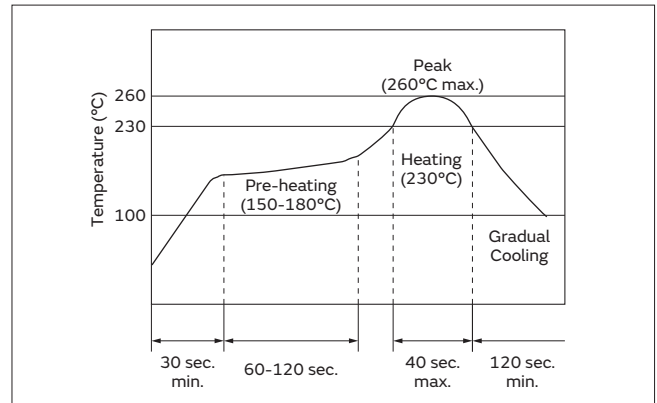
### Ceramic Filters (CERAFIL®) Chip Type SFECF Series

#### — Soldering and Mounting —

##### 1. Standard Reflow Soldering Conditions

###### (1) Reflow

Filter is soldered twice within the following temperature conditions.



###### (2) Soldering Iron

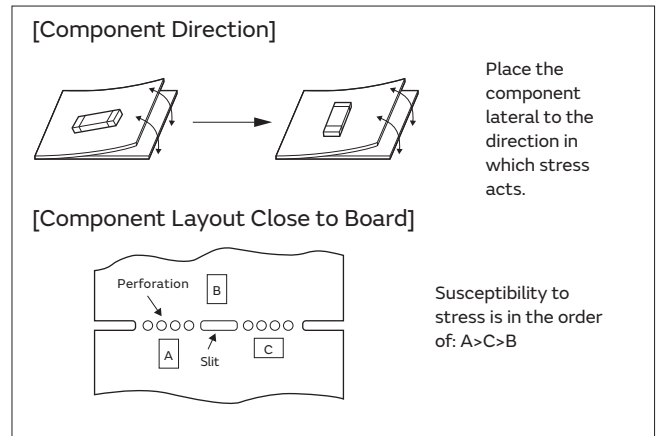
Filter is soldered at  $+350\pm 5^{\circ}\text{C}$  for  $3.0\pm 0.5$  seconds. The soldering iron should not touch the filter while soldering.

###### (3) Conditions for Placement Machines

The component is recommended for use with placement machines that employ optical placement capabilities. The component might be damaged by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines that utilize mechanical positioning. Please contact Murata for details beforehand.

###### (4) Other

- The component may be damaged if excess mechanical stress is applied to it mounted on the printed circuit board.
- Design layout of components on the PC board to minimize the stress imposed on the warp or flexure of the board.
- After installing components, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to degrade. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.
- When the positioning claws and pick-up nozzle are worn, the load is applied to the components while positioning is concentrated on positioning accuracy, etc. Careful checking and maintenance are necessary to prevent unexpected trouble.
- When correcting components with a soldering iron, the tip of the soldering iron should not directly touch the component. Depending on the soldering conditions, the effective area of terminations may be reduced. Solder containing Ag should be used to prevent electrode erosion.
- Do not use strong acidity flux, more than 0.2wt% chlorine content, in reflow soldering.



Continued on the following page. ↗

## Notice

Continued from the preceding page. ↘

### 2. Wash

Do not clean or wash the component as it is not hermetically sealed.

### 3. Coating

In case of overcoating the component, conditions such as material of resin, cure temperature, and so on should be evaluated well.

### — Storage and Operating Conditions —

#### 1. Product Storage Conditions

Please store the products in a room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to +40°C

Humidity: 15 to 85% R.H.

#### 2. Expiration Date on Storage

Expiration date (shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because solderability may be degraded due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

#### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because quality and solderability may be degraded due to storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after package is opened, because quality and solderability may be degraded due to storage under poor conditions.

(5) To avoid cracking of the ceramic element, please do not drop the products.

#### 4. Other

Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

### — Handling —

1. Accurate test circuit values are required to measure electrical characteristics. Miscorrelation may be caused if there is any deviation, especially stray capacitance, from the test circuit in the specification.

2. The components, packed in a moisture proof bag (dry pack), are sensitive to moisture. The following treatment is required before applying reflow soldering, to avoid reliability degradation caused by thermal stress. When unpacked, store the component in an atmosphere of reflow 30°C and below 60%R.H., and solder within 1 week.

# Packaging

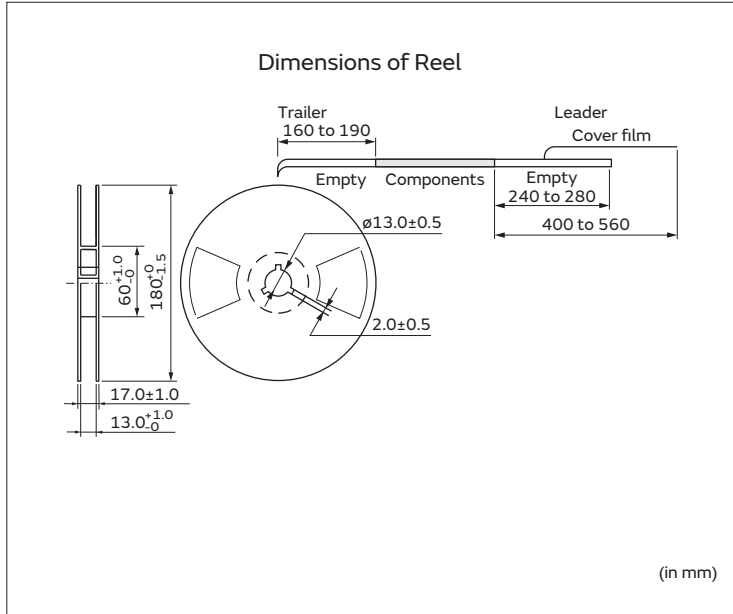
1

## Minimum Quantity/Dimensions of Reel

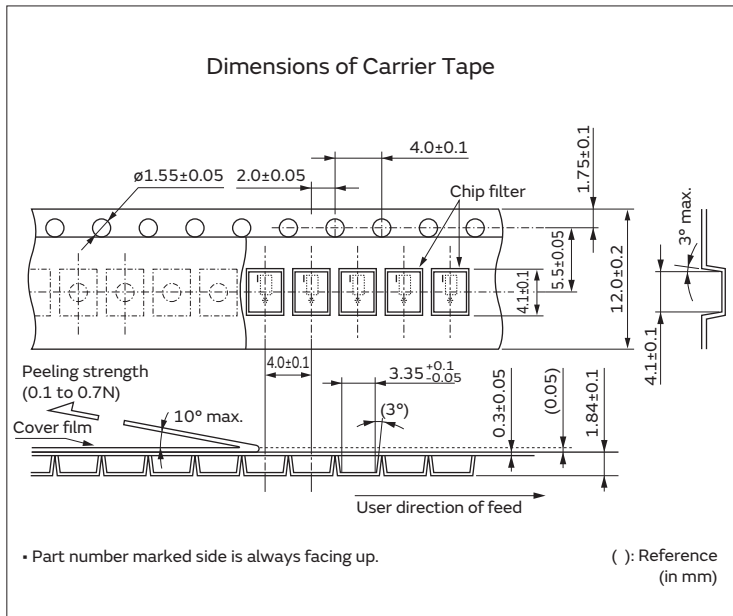
Embossed Tape  $\phi 180\text{mm}$

2,000

(pcs.)



## Dimensions of Carrier Tape





# Ceramic Filters (CERAFIL<sup>®</sup>)

RoHS

## Chip Type SFECV/SFECK Series

The SFECV/SFECK10M7 series for FM receivers are monolithic type ceramic filters that utilize the thickness expander mode of piezoelectric ceramics. The SFECV series enable customers to make an AM/FM set very thin, and it can be useful to the total chip circuit.

### Features

1. The piezoelectric element is sandwiched by heat resistant substrate, thus it has excellent mechanical strength, and it is suitable for automatic mounting.
2. Various bandwidths are available. Select a suitable type in accordance with the desired characteristics.
3. Operating Temperature Range:
  - 20 to +80°C (Standard Type)
  - 40 to +85°C (High-reliability Type)
 Storage Temperature Range:
  - 40 to +85°C (Standard Type)
  - 55 to +85°C (High-reliability Type)

### Applications

1. Small, thin radios
2. Automotive radios
3. Headphone stereos

### Standard Type

Part Number	Center Frequency (fo) (MHz)	3dB Bandwidth (kHz)	Attenuation (kHz)	Insertion Loss (dB)	Ripple (dB)	Spurious Attenuation (1) (dB)	Spurious Attenuation (2) (dB)	Input/Output Impedance (ohm)
SFECV15M0EQ0001-R0	15.000 ±50kHz	300 min.	750 max.	7.0max.	1.0 max.	30 min. [within 14MHz to fo]	30 min. [within fo to 16MHz]	330
SFECV10M7KA00-R0	10.700 ±30kHz	110 ±30kHz	320 max.	6.0±2.0dB	1.0 max.	35 min. [within 9MHz to fo]	35 min. [within fo to 12MHz]	330
SFECV10M7JA00-R0	10.700 ±30kHz	150 ±40kHz	380 max.	5.5±2.0dB	1.0 max.	35 min. [within 9MHz to fo]	35 min. [within fo to 12MHz]	330

Area of Attenuation: [within 20dB]

Area of Insertion Loss: at minimum loss point

Center frequency (fo) defined by the center of 3dB bandwidth.

For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of ceramic filters.

The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

### High-reliability Type

Part Number	Center Frequency (fo) (MHz)	3dB Bandwidth (kHz)	Attenuation (kHz)	Insertion Loss (dB)	Ripple (dB)	Spurious Attenuation (1) (dB)	Spurious Attenuation (2) (dB)	Input/Output Impedance (ohm)
SFECK10M7KA00S0-R0	10.700 ±30kHz	110 ±30kHz	320 max.	6.0±2.0dB	1.0 max.	35 min. [within 9MHz to fo]	35 min. [within fo to 12MHz]	330
SFECK10M7JA00S0-R0	10.700 ±30kHz	150 ±40kHz	380 max.	5.5±2.0dB	1.0 max.	35 min. [within 9MHz to fo]	35 min. [within fo to 12MHz]	330

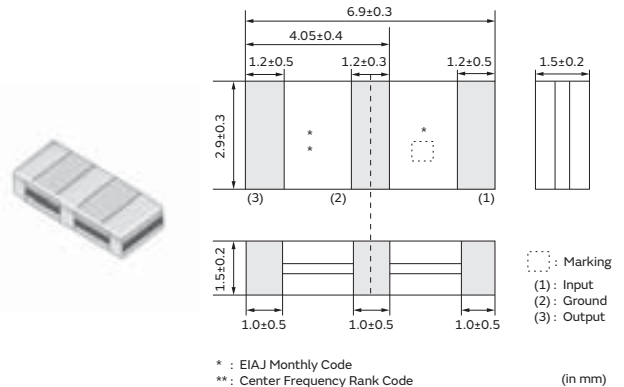
Area of Attenuation: [within 20dB]

Area of Insertion Loss: at minimum loss point

Center frequency (fo) defined by the center of 3dB bandwidth.

For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of ceramic filters.

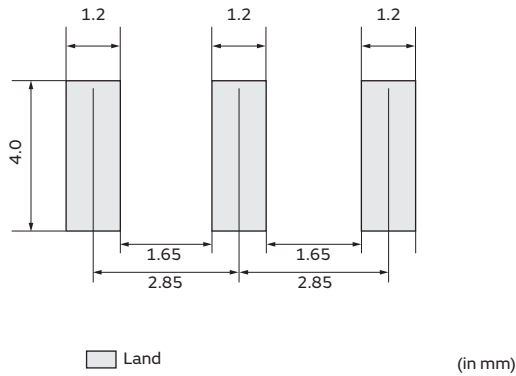
The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.



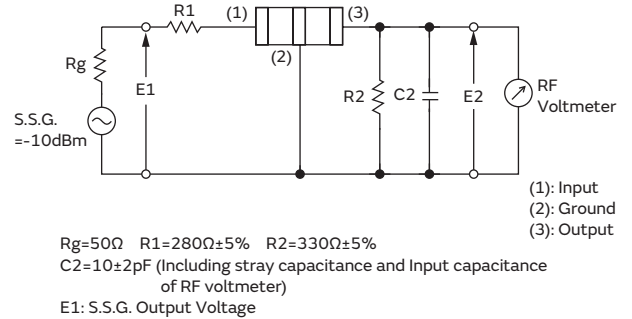
### Standard Center Frequency Rank Code

CODE	30kHz Step	25kHz Step
A	10.700MHz±30kHz	10.700MHz±25kHz

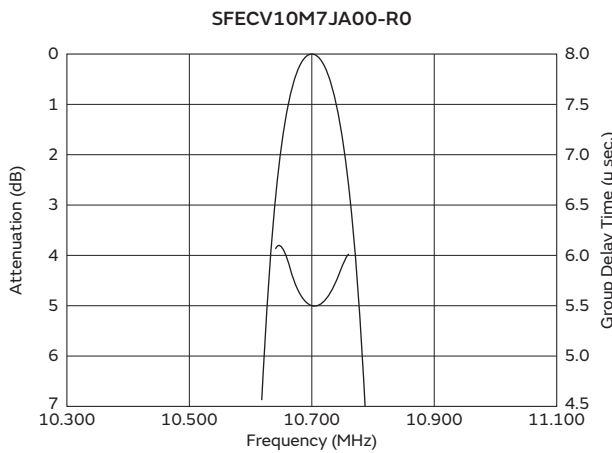
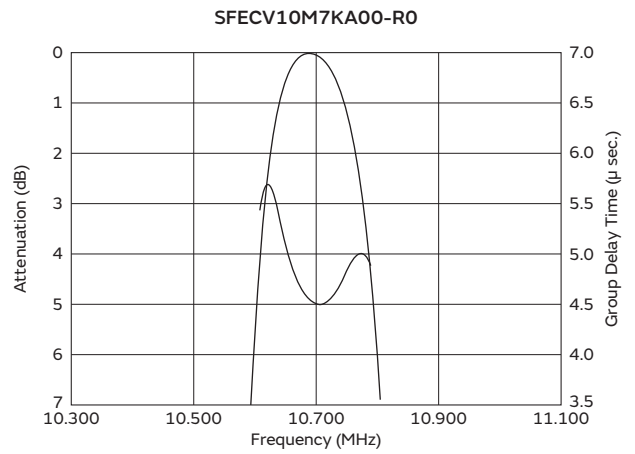
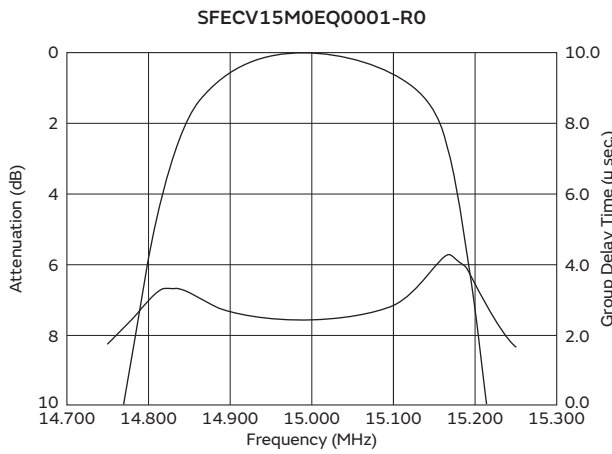
### Standard Land Pattern Dimensions



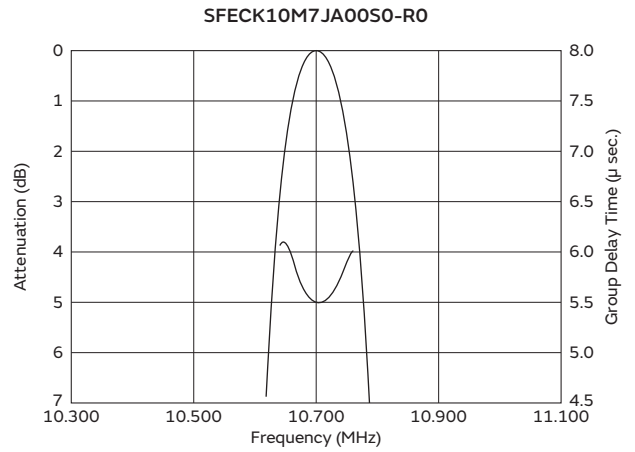
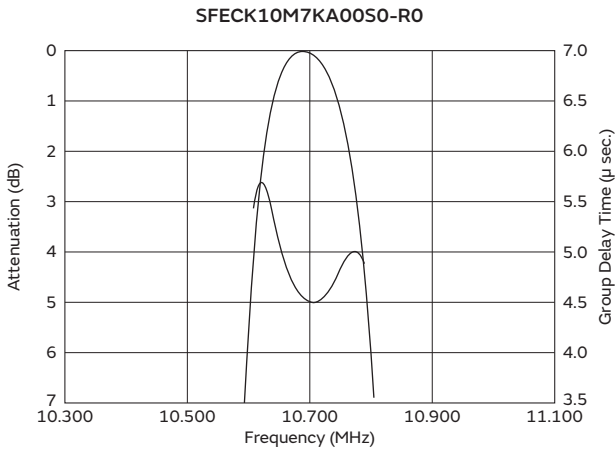
### Test Circuit



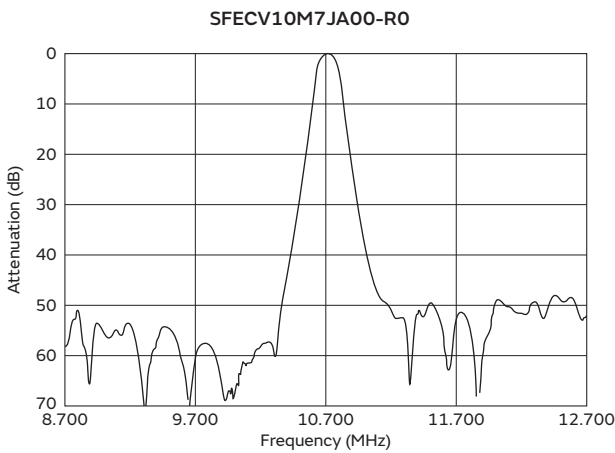
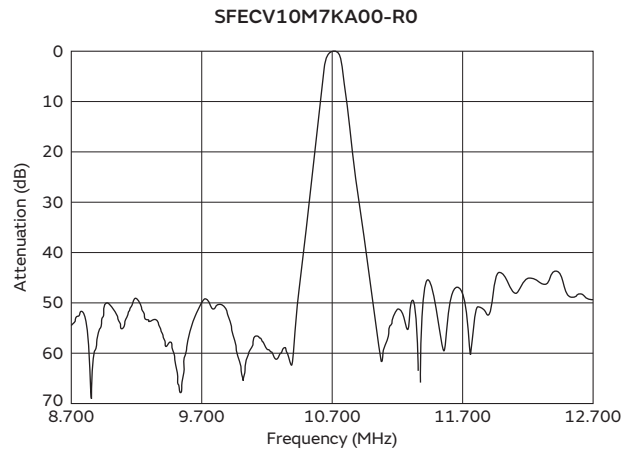
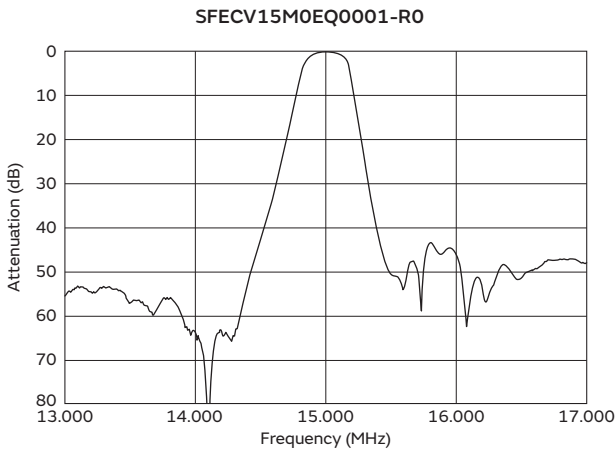
### Frequency Characteristics Standard Type



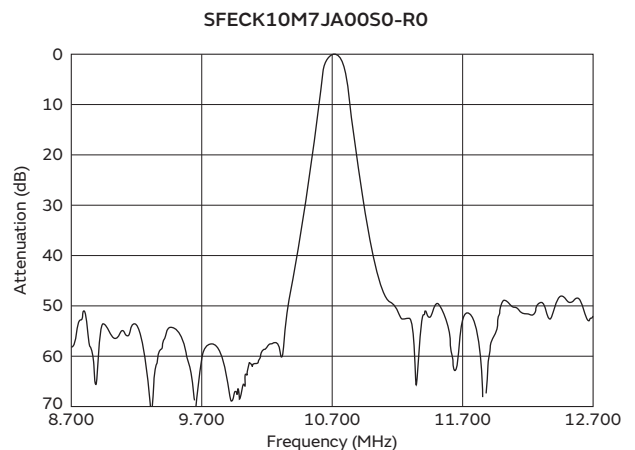
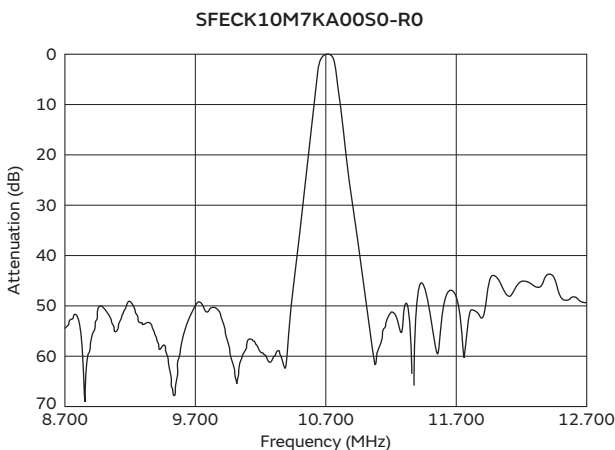
### Frequency Characteristics High-reliability Type



### Frequency Characteristics (Spurious) Standard Type



### Frequency Characteristics (Spurious) High-reliability Type



## Notice

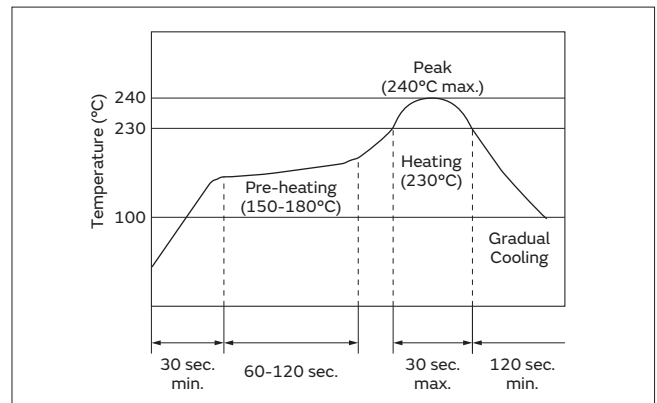
### Ceramic Filters (CERAFIL®) Chip Type SFECV/SFECK Series

#### — Soldering and Mounting —

##### 1. Standard Reflow Soldering Conditions

###### (1) Reflow

Filter is soldered twice within the following temperature conditions.



###### (2) Soldering Iron

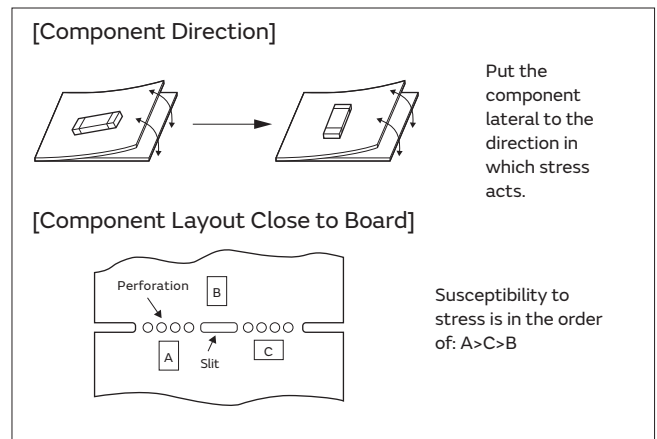
Filter is soldered at  $+350\pm 5^{\circ}\text{C}$  for  $3.0\pm 0.5$  seconds. The soldering iron should not touch the filter while soldering.

###### (3) Conditions for Placement Machines

The component is recommended for use with placement machines that employ optical placement capabilities. Damage may result from excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines that utilize mechanical positioning. Please contact Murata for details beforehand.

###### (4) Other

- The component may be damaged if excess mechanical stress is applied to it mounted on the printed circuit board.
- Design layout of components on the PC board to minimize the stress imposed on the warp or flexure of the board.
- After installing components, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to degrade. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.
- When the positioning claws and pick-up nozzle are worn, the load is applied to the components while positioning is concentrated to one positioning accuracy, etc. Careful checking and maintenance are necessary to prevent unexpected trouble.
- When correcting components with a soldering iron, the tip of the soldering iron should not directly touch the component. Depending on the soldering conditions, the effective area of terminations may be reduced. Solder containing Ag should be used to prevent electrode erosion.
- Do not use strong acidity flux, more than 0.2wt% chlorine content, in reflow soldering.



Continued on the following page. ↗

## Notice

Continued from the preceding page. ↘

### 2. Wash

Do not clean or wash the component as it is not hermetically sealed.

### 3. Coating

In case of overcoating the component, conditions such as material of resin, cure temperature, and so on should be evaluated well.

### — Storage and Operating Conditions —

#### 1. Product Storage Conditions

Please store the products in room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to +40°C

Humidity: 15 to 85% R.H.

#### 2. Expiration Date on Storage

Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

#### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because quality and solderability may be degraded due to the storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in the places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after package is opened, because quality and solderability may be degraded due to storage under the poor conditions.

(5) To avoid cracking of the ceramic element, please do not drop the products.

#### 4. Other

Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

### — Handling —

Accurate test circuit values are required to measure electrical characteristics.

Miscorrelation may be caused if there is any deviation, especially stray capacitance, from the test circuit in the specification.

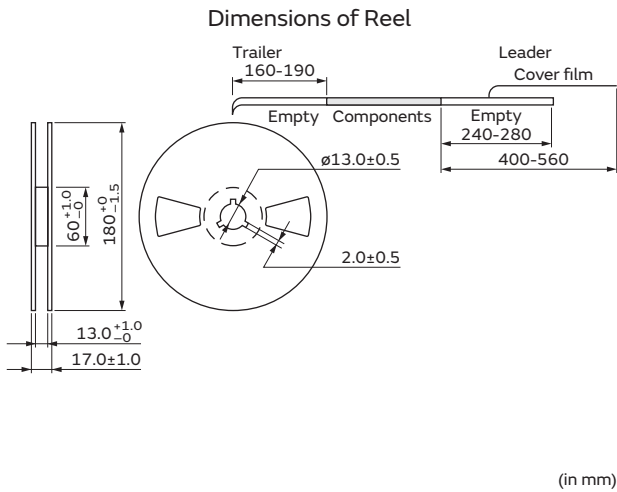
## Packaging

### Minimum Quantity/Dimensions of Reel

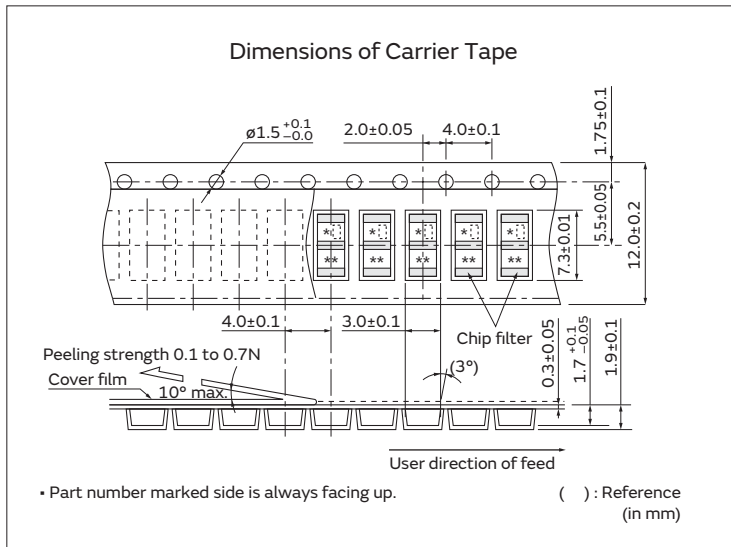
Embossed Tape  $\phi$ 180mm

2,000

(pcs.)



### Dimensions of Carrier Tape



# Ceramic Filters (CERAFIL®)

## Chip Type SFSCE Series



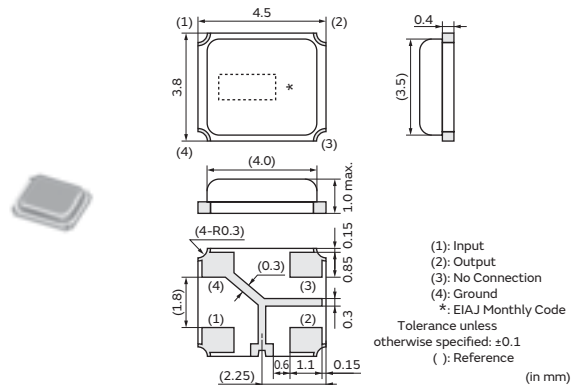
The SFSCE series are chip surface mount filters available for 3dB bandwidth at 700kHz to 1.3MHz (more than twice the width compared with current types). They have 1.0mm max. thickness and small mounting area (4.5x3.8mm).

### Features

1. The filters are mountable by automatic placers.
2. They are slim, at only 1.0mm max. thickness, and have a small mounting area (4.5x3.8mm) enabling flexible PCB design.
3. Available lead (Pb) free solder reflow.
4. Operating temperature range:  
 -20 to +80°C  
 Storage temperature range:  
 -40 to +85°C

### Applications

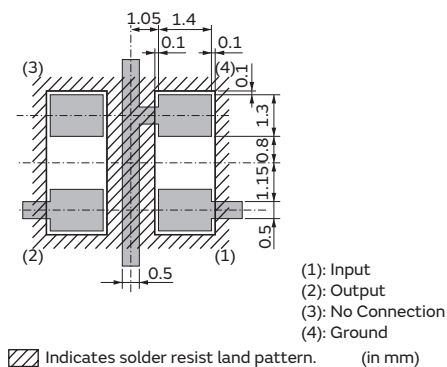
1. SS digital communication system
2. Digital wireless audio
3. PHS Evolution system
4. RFID Reader Writer
5. RKE



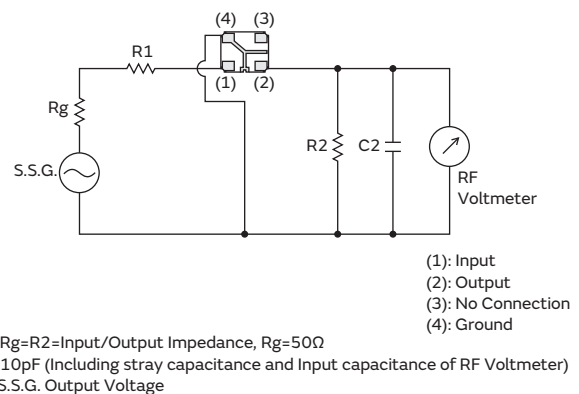
Part Number	Nominal Center Frequency (fn) (MHz)	3dB Bandwidth (kHz)	Stop Bandwidth (MHz)	Insertion Loss (dB)	Ripple (dB)	Spurious Response (dB)	GDT Deviation (µs)	Input/Output Impedance (ohm)
SFSCE10M7WF03-RO	10.700	fn±500.0 min.	2.2 max. (Total) [within 20dB]	6.0 max. [at minimum loss point]	2.0 max. [within 3dB Bandwidth]	30/25 min. [within 5.7MHz to fn / fn to 15.7MHz]	0.6 max. [within fn±400kHz]	470
SFSCE10M7WF04-RO	10.700	fn±400.0 min.	1.8 max. (Total) [within 20dB]	6.0 max. [at minimum loss point]	1.5 max. [within 3dB Bandwidth]	35/25 min. [within 5.7MHz to fn / fn to 15.7MHz]	0.6 max. [within fn±325kHz]	470
SFSCE10M7WF05-RO	10.700	fn±325.0 min.	1.7 max. (Total) [within 20dB]	6.0 max. [at minimum loss point]	1.5 max. [within 3dB Bandwidth]	40/30 min. [within 5.7MHz to fn / fn to 15.7MHz]	0.6 max. [within fn±250kHz]	470

For safety purposes, connect the output of filters to the IF amplifier through a DC blocking capacitor. Avoid applying a direct current to the output of ceramic filters. The order quantity should be an integral multiple of the "Minimum Quantity" shown in packaging page in this catalog.

### Standard Land Pattern Dimensions

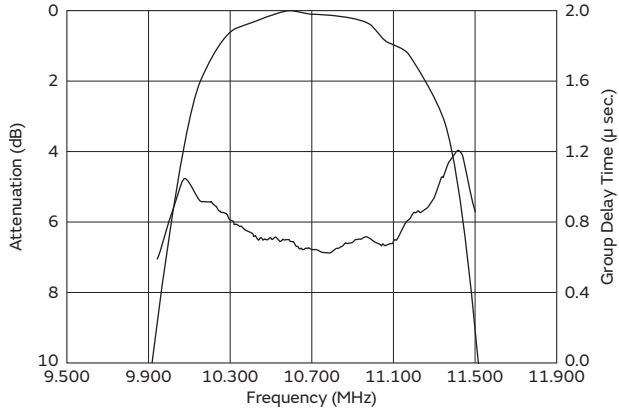


### Test Circuit

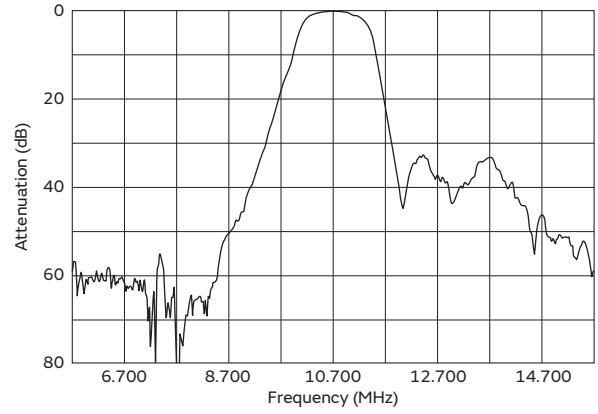


## Frequency Characteristics

SFSCE10M7WF03-R0



SFSCE10M7WF03-R0





## Notice

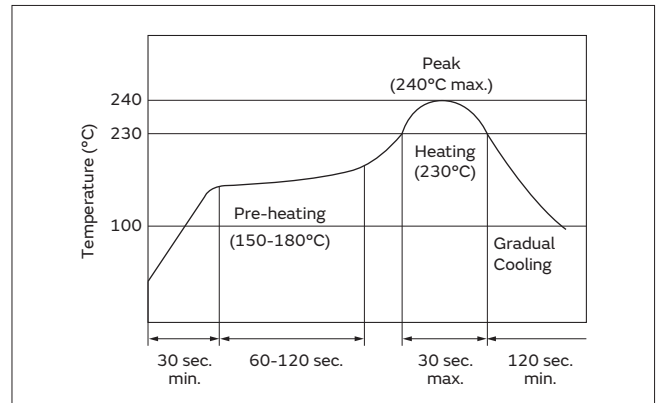
### SFSCE10M7WF03-R0 Notice

#### — Soldering and Mounting —

##### 1. Standard Reflow Soldering Conditions

###### (1) Reflow

Filter is soldered twice within the following temperature conditions.



###### (2) Soldering Iron

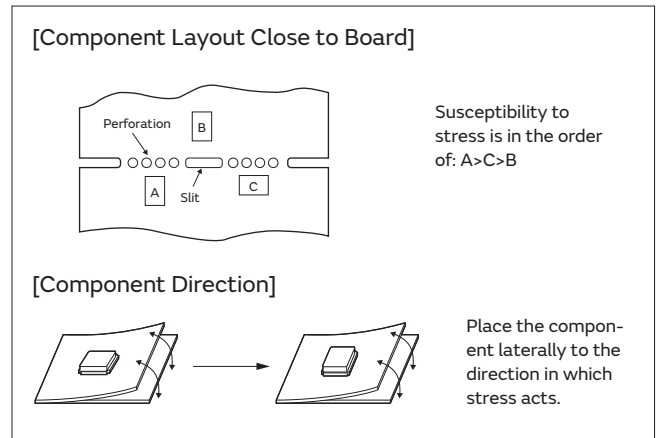
Filter is soldered at  $+280 \pm 5^\circ\text{C}$  for  $3.0 \pm 0.5$  seconds. The soldering iron should not touch the filter while soldering.

###### (3) Condition for Placement Machines

The component is recommended for placement machines that employ optical placement capabilities. The component might be damaged by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines that utilize mechanical positioning. Please contact Murata for details beforehand.

###### (4) Other

- The component may be damaged if excess mechanical stress is applied to it mounted on the printed circuit board.
- Design layout of components on the PC board to minimize the stress imposed on the warp or flexure of the board.
- After installing components, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to degrade. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.
- When the positioning claws and pick-up nozzle are worn, the load is applied to the components while positioning is concentrated on positioning accuracy, etc. Careful checking and maintenance are necessary to prevent unexpected trouble.
- When correcting components with a soldering iron, the tip of the soldering iron should not directly touch the component.
- Do not use strong acidity flux, more than 0.2wt% chlorine content, in reflow soldering.



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## Notice

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### 2. Wash

Do not clean or wash the component as it is not hermetically sealed.

### 3. Coating

In case of overcoating the component, conditions such as material of resin, cure temperature, and so on should be evaluated well.

### — Storage and Operating Conditions —

#### 1. Product Storage Condition

Please store the products in a room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to + 40°C

Humidity: 15 to 85% R.H.

#### 2. Expiration Date on Storage

Expiration date (shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because solderability may be degraded due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

#### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality and may be degraded in solderability due to storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality and/or be degraded in solderability due to storage under poor condition.

(5) Please do not drop the products to avoid cracking of the ceramic element.

#### 4. Other

Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

### — Handling —

Accurate test circuit values are required to measure electrical characteristics. Miscorrelation may be caused if there is any deviation, especially stray capacitance, from the test circuit in the specification.

# Notice

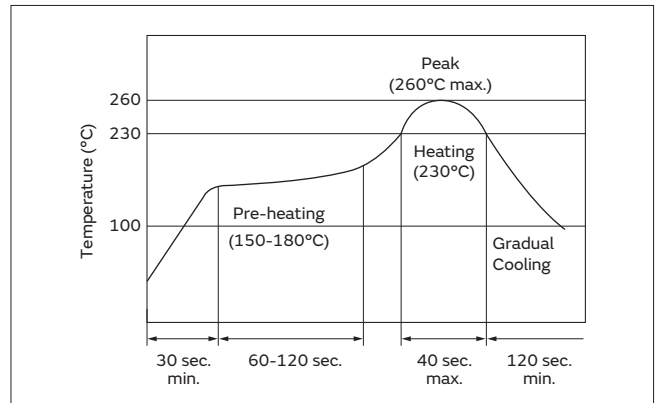
## SFSCE10M7WF04/05-R0 Notice

### — Soldering and Mounting —

#### 1. Standard Reflow Soldering Conditions

##### (1) Reflow

Filter is soldered twice within the following temperature conditions.



##### (2) Soldering Iron

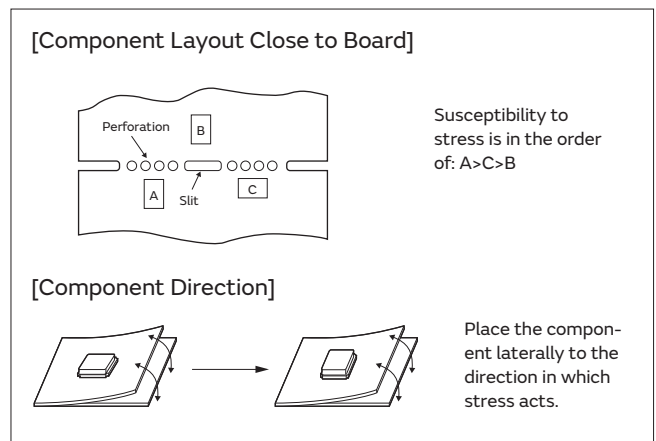
Filter is soldered at  $+280\pm 5^{\circ}\text{C}$  for  $3.0\pm 0.5$  seconds. The soldering iron should not touch the filter while soldering.

##### (3) Condition for Placement Machines

The component is recommended for placement machines that employ optical placement capabilities. The component might be damaged by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines that utilize mechanical positioning. Please contact Murata for details beforehand.

##### (4) Other

- (a) The component may be damaged if excess mechanical stress is applied to it mounted on the printed circuit board.
- (b) Design layout of components on the PC board to minimize the stress imposed on the warp or flexure of the board.
- (c) After installing components, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to degrade. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.
- (d) When the positioning claws and pick-up nozzle are worn, the load is applied to the components while positioning is concentrated on positioning accuracy, etc. Careful checking and maintenance are necessary to prevent unexpected trouble.
- (e) When correcting components with a soldering iron, the tip of the soldering iron should not directly touch the component.
- (f) Do not use strong acidity flux, more than 0.2wt% chlorine content, in reflow soldering.



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## Notice

Continued from the preceding page. ↘

### 2. Wash

Do not clean or wash the component as it is not hermetically sealed.

### 3. Coating

In case of overcoating the component, conditions such as material of resin, cure temperature, and so on should be evaluated well.

### — Storage and Operating Conditions —

#### 1. Product Storage Condition

Please store the products in a room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to + 40°C

Humidity: 15 to 85% R.H.

#### 2. Expiration Date on Storage

Expiration date (shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because solderability may be degraded due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

#### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality and may be degraded in solderability due to storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality and/or be degraded in solderability due to storage under poor condition.

(5) Please do not drop the products to avoid cracking of the ceramic element.

#### 4. Other

Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

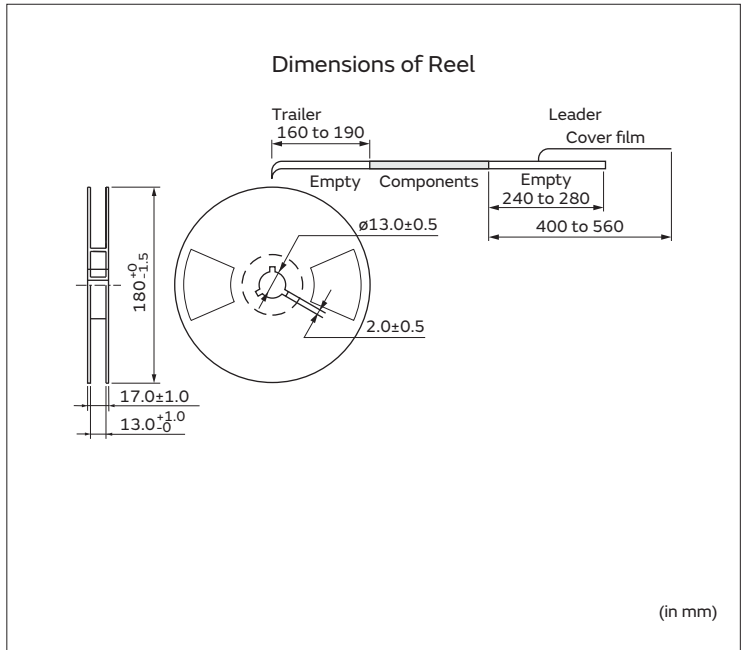
### — Handling —

Accurate test circuit values are required to measure electrical characteristics. Miscorrelation may be caused if there is any deviation, especially stray capacitance, from the test circuit in the specification.

# Packaging

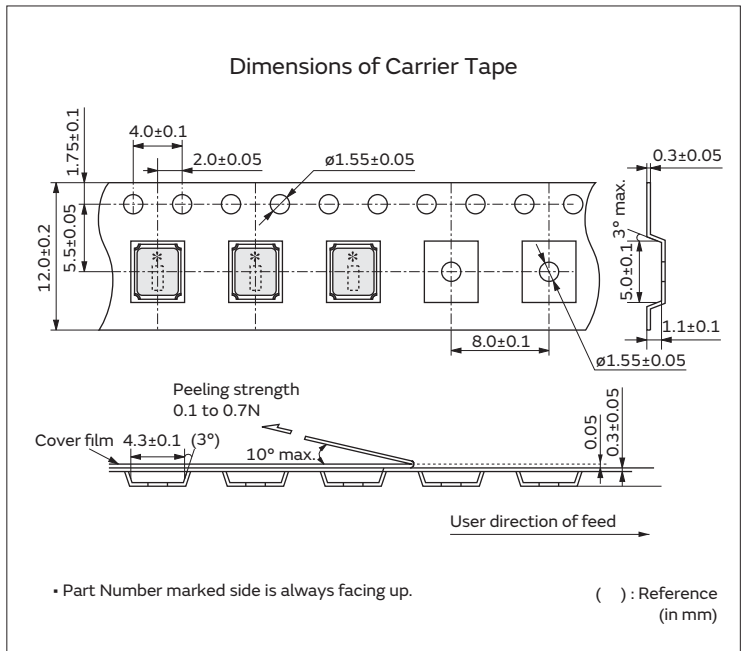
## Minimum Quantity/Dimensions of Reel

<b>Embossed Tape ø180mm</b>
1,500
(pcs.)



3

## Dimensions of Carrier Tape



# Ceramic Filters (CERAFIL®)

RoHS

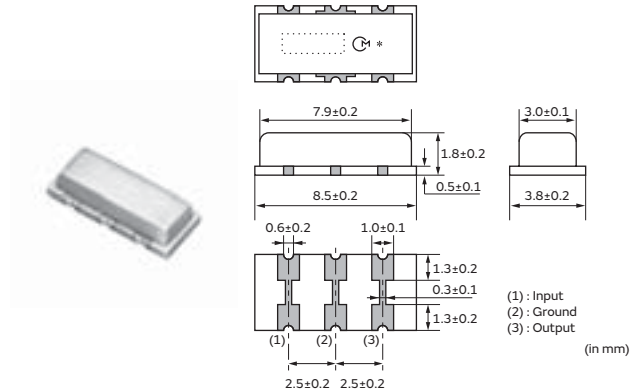
## Chip Type SFSKA Series

The SFSKA\_CF ceramic filter is a small and thin SMD filter sealed with a metal cap.

The SFSKA\_CF is recommended for LCD-TVs, and small and thin tuners.

### Features

1. High attenuation outside bandwidth
2. Small and thin package
3. Reflow-solderable

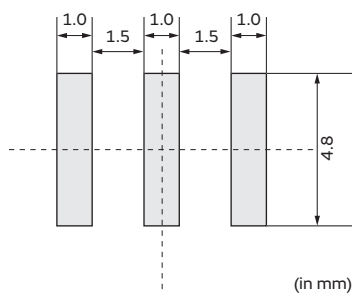


Part Number	Nominal Center Frequency (fn) (MHz)	3dB Bandwidth (kHz)	20dB Bandwidth (kHz)	Insertion Loss (dB)	Spurious Attenuation(1) (dB)	Spurious Attenuation(2) (dB)	Input/Output Impedance (ohm)
SFSKA4M50CF00-R3	4.500	fn±60 min.	600 max.	6.0 max.	20 min. [within 0 to fn]	15 min. [within fn to 7.0MHz]	1000
SFSKA5M50CF00-R3	5.500	fn±60 min.	600 max.	6.0 max.	25 min. [within 0 to fn]	15 min. [within fn to 7.0MHz]	600
SFSKA6M00CF00-R3	6.000	fn±60 min.	600 max.	6.0 max.	25 min. [within 0 to fn]	15 min. [within fn to 7.5MHz]	470
SFSKA6M50CF00-R3	6.500	fn±60 min.	600 max.	6.0 max.	25 min. [within 0 to fn]	15 min. [within fn to 8.5MHz]	470

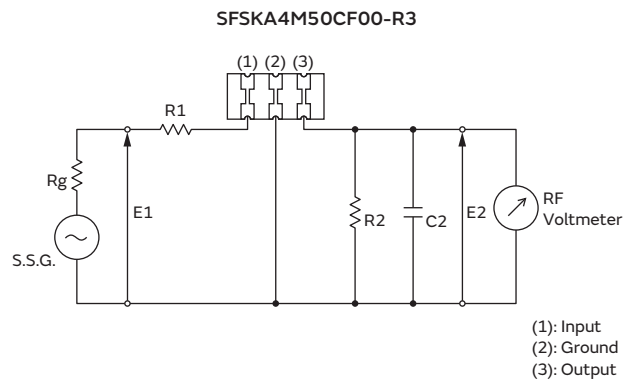
Area of Insertion Loss: at minimum loss point

For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of ceramic filters. The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

### Standard Land Pattern Dimensions



### Test Circuit



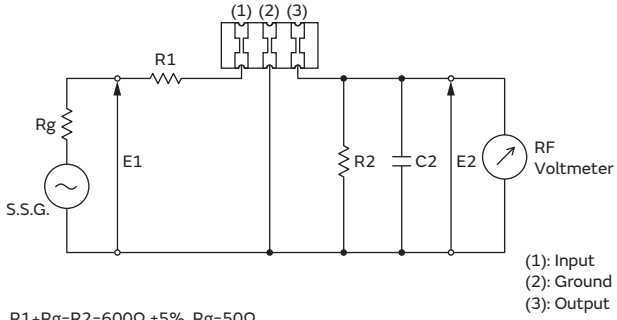
R1+Rg=R2=1000Ω ±5%, Rg=50Ω  
 C2=10pF (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output voltage

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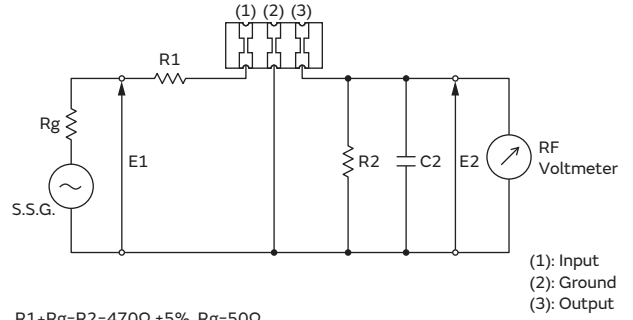
### Test Circuit

SFSKA5M50CF00-R3



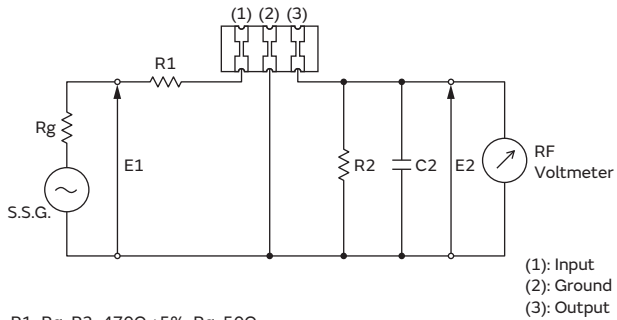
$R1+Rg=R2=600\Omega \pm 5\%$ ,  $Rg=50\Omega$   
 $C2=10\text{pF}$  (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output voltage

SFSKA6M00CF00-R3



$R1+Rg=R2=470\Omega \pm 5\%$ ,  $Rg=50\Omega$   
 $C2=10\text{pF}$  (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output voltage

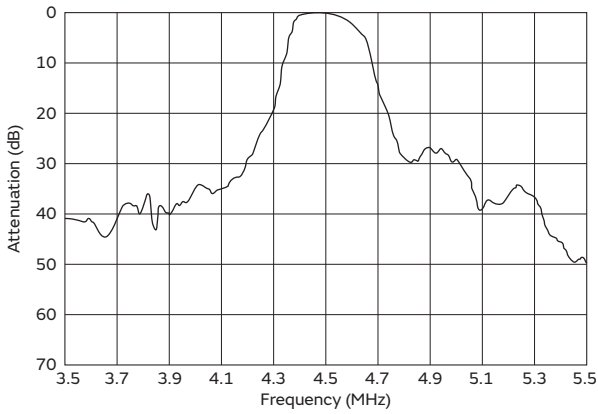
SFSKA6M50CF00-R3



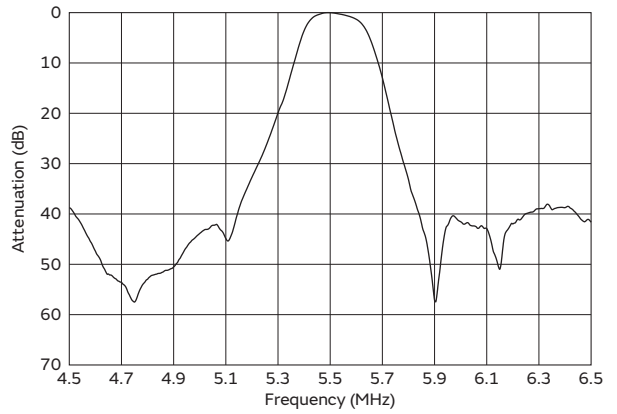
$R1+Rg=R2=470\Omega \pm 5\%$ ,  $Rg=50\Omega$   
 $C2=10\text{pF}$  (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output voltage

### Frequency Characteristics

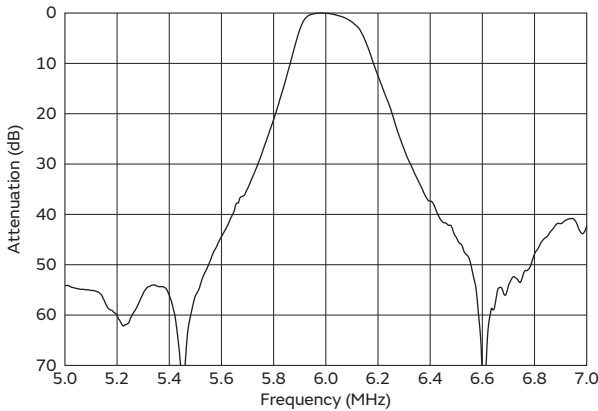
SFSKA4M50CF00-R3



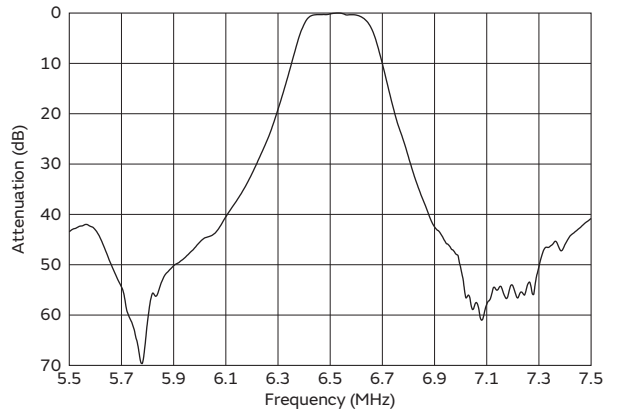
SFSKA5M50CF00-R3



SFSKA6M00CF00-R3

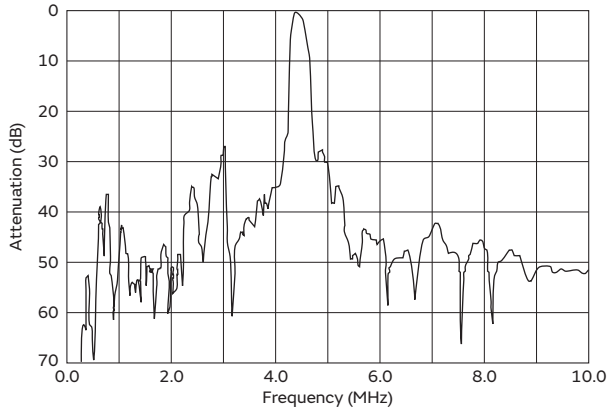


SFSKA6M50CF00-R3

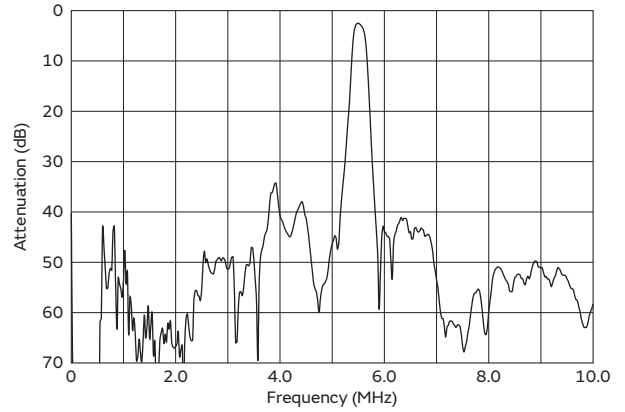


## Frequency Characteristics (Spurious)

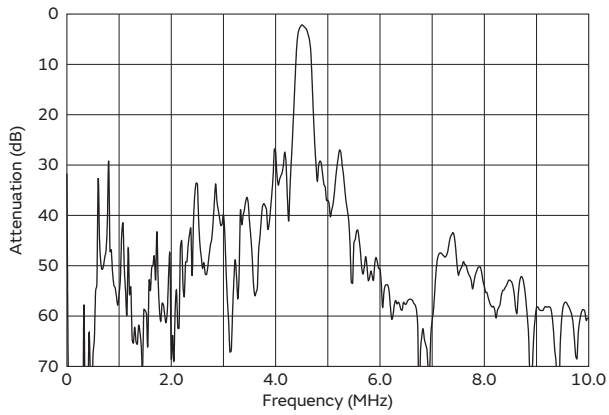
SFSKA4M50CF00-R3



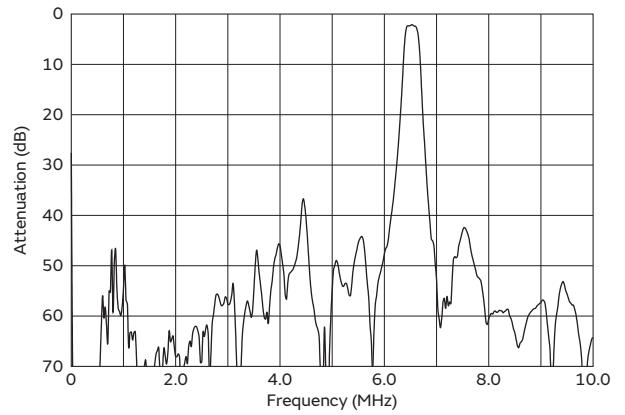
SFSKA5M50CF00-R3



SFSKA6M00CF00-R3



SFSKA6M50CF00-R3





# Notice

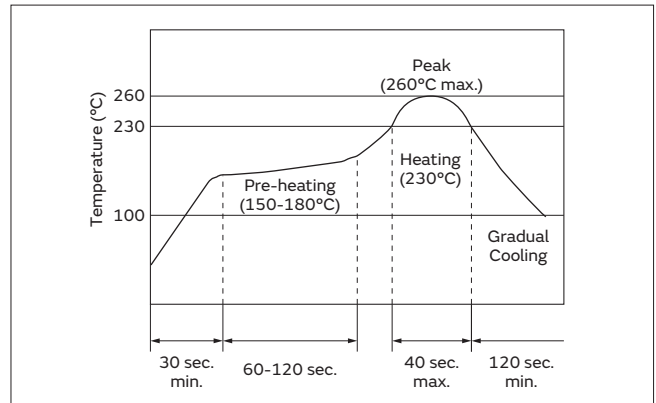
## Ceramic Filters (CERAFIL®) Chip Type SFSKA Series

### — Soldering and Mounting —

#### 1. Standard Reflow Soldering Conditions

##### (1) Reflow

Filter is soldered twice within the following temperature conditions.



##### (2) Soldering Iron

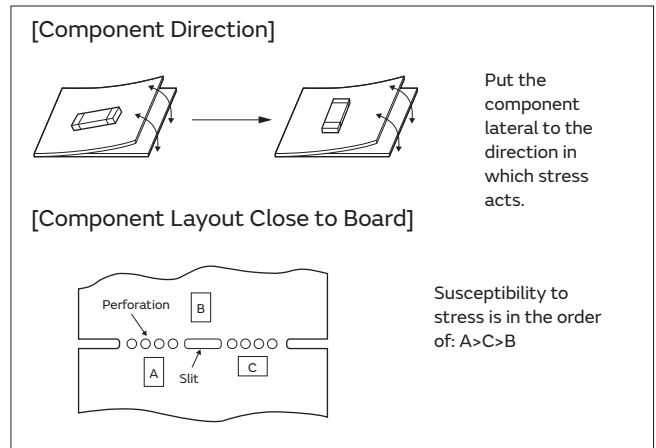
Filter is soldered at  $+350 \pm 5^\circ\text{C}$  for  $3.0 \pm 0.5$  seconds. The soldering iron should not touch the filter while soldering.

##### (3) Conditions for Placement Machines

The component is recommended for use with placement machines that employ optical placement capabilities. Damage may result from excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines that utilize mechanical positioning. Please contact Murata for details beforehand.

##### (4) Other

- (a) The component may be damaged if excess mechanical stress is applied to it mounted on the printed circuit board.
- (b) Design layout of components on the PC board to minimize the stress imposed on the warp or flexure of the board.
- (c) After installing chips, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to degrade. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.
- (d) When the positioning claws and pick-up nozzle are worn, the load is applied to the components while positioning is concentrated to one positioning accuracy, etc. Careful checking and maintenance are necessary to prevent unexpected trouble.
- (e) When correcting chips with a soldering iron, the tip of the soldering iron should not directly touch the chip component.



#### 2. Wash

Do not clean or wash the component as it is not hermetically sealed.

Continued on the following page. ↗

## Notice

Continued from the preceding page. ↘

### 3. Coating

In case of overcoating the component, conditions such as material of resin, cure temperature, and so on should be evaluated well.

### — Storage and Operating Conditions —

#### 1. Product Storage Conditions

Please store the products in room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to +40°C

Humidity: 15 to 85% R.H.

#### 2. Expiration Date on Storage

Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

#### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because quality and solderability may be degraded due to the storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in the places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after package is opened, because quality and solderability may be degraded due to storage under the poor conditions.

(5) To avoid cracking of the ceramic element, please do not drop the products.

#### 4. Other

Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

### — Handling —

Accurate test circuit values are required to measure electrical characteristics.

Miscorrelation may be caused if there is any deviation, especially stray capacitance, from the test circuit in the specification.

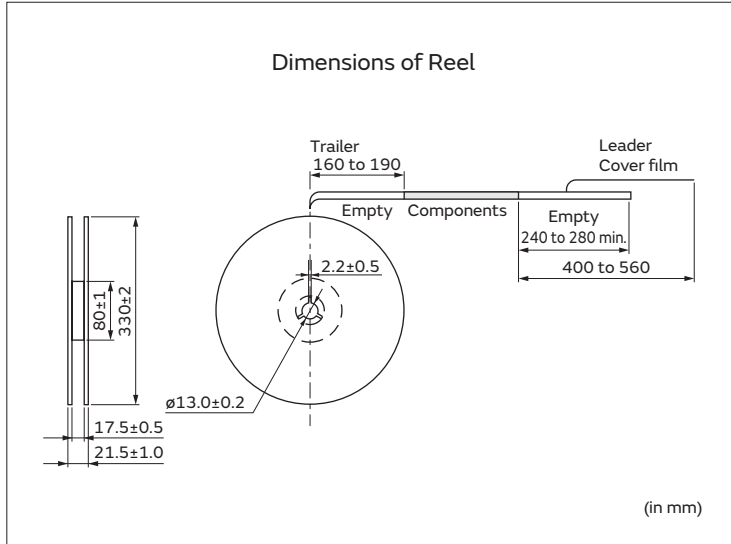
## Packaging

### Minimum Quantity/Dimensions of Reel

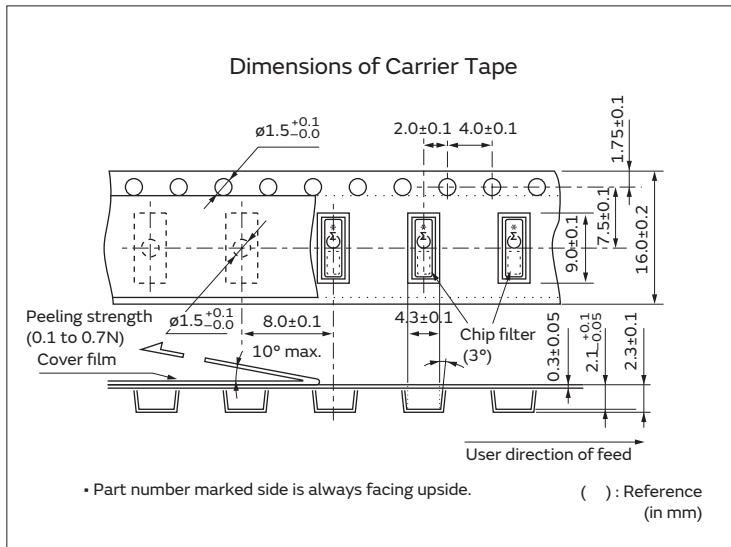
Embossed Tape  $\phi$ 330mm

3,000

(pcs.)



### Dimensions of Carrier Tape

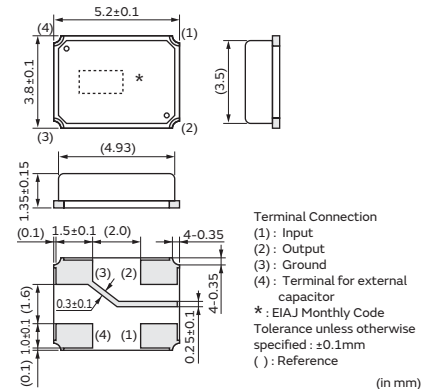


# Ceramic Filters (CERAFIL®)



## Chip Type SFSKB Series

The SFSKB series are SMD ceramic filters suitable for IR headphone applications. Center frequencies of 2.3, 2.8, 3.2, 3.8, 4.3, 4.8, 5.2, 5.7MHz are available. Realized small, thin and lightweight package, compared with conventional LC filters. It helps to compose multi-channel circuit on one PCB. No frequency adjustment is required on PCB and it contributes to the reduction of production cost.



### Features

1. SMD package in plastic emboss tape, available for automatic placing.
2. They are slim, at only 1.5mm max. thickness, and have a small mounting area (5.2x3.8mm) enabling flexible PCB design.
3. Available for lead (Pb) free reflow soldering process.
4. Operating temperature range: 0 to +70°C  
 Storage temperature range: -55 to +85°C
5. No frequency adjustment is required in production process.
6. Small, thin and lightweight package compared with conventional LC filters

### Applications

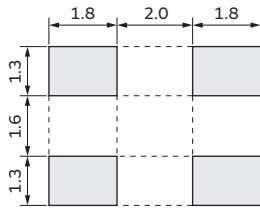
1. IR headphone
2. Set Top Box for satellite broadcasting

Part Number	Nominal Center Frequency (fn) (MHz)	3dB Bandwidth (kHz)	20dB Bandwidth (kHz)	Insertion Loss (dB)	Spurious Attenuation(1) (dB)	Spurious Attenuation(2) (dB)	Input/Output Impedance (ohm)
SFSKB2M30GF00-R1	2.300	fn±75 min.	650 max.	6.0 max.	25 min. [within 1.3 to 1.8MHz]	23 min. [within 2.8 to 3.3MHz]	1000
SFSKB2M80GF00-R1	2.800	fn±75 min.	650 max.	6.0 max.	25 min. [within 1.8 to 2.3MHz]	25 min. [within 3.3 to 3.8MHz]	1000
SFSKB3M20FF00-R1	3.200	fn±75 min.	650 max.	6.0 max.	30 min. [within 2.2 to 2.8MHz]	30 min. [within 3.8 to 4.2MHz]	1000
SFSKB3M80GF00-R1	3.800	fn±75 min.	650 max.	6.0 max.	30 min. [within 2.8 to 3.2MHz]	30 min. [within 4.3 to 4.8MHz]	1000
SFSKB4M30GF00-R1	4.300	fn±75 min.	650 max.	6.0 max.	30 min. [within 3.3 to 3.8MHz]	30 min. [within 4.8 to 5.3MHz]	1000
SFSKB4M80GF00-R1	4.800	fn±75 min.	650 max.	6.0 max.	30 min. [within 3.8 to 4.3MHz]	30 min. [within 5.2 to 5.8MHz]	1000
SFSKB5M20GF00-R1	5.200	fn±75 min.	650 max.	6.0 max.	30 min. [within 4.2 to 4.8MHz]	30 min. [within 5.7 to 6.2MHz]	1000
SFSKB5M70GF00-R1	5.700	fn±75 min.	650 max.	6.0 max.	30 min. [within 4.7 to 5.2MHz]	30 min. [within 6.2 to 6.7MHz]	1000

For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of ceramic filters.

The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

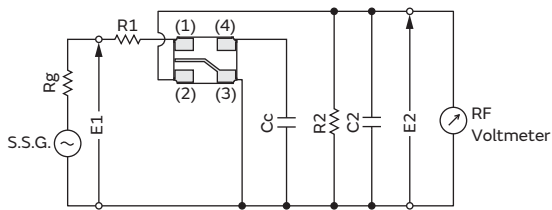
## Standard Land Pattern Dimensions



(in mm)

## Test Circuit

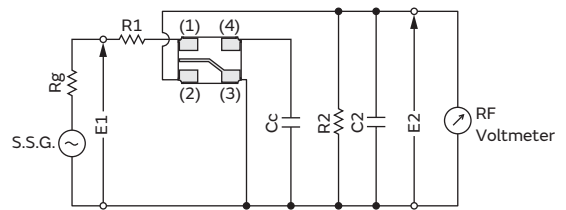
SFSKB2M30GF00-R1/SFSKB3M80GF00-R1



$R1+Rg=R2=1.0k\Omega$   
 $Cc=22pF\pm 5\%$   
 $C2=10pF$  (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output Voltage

(1): Input  
 (2): Output  
 (3): Ground  
 (4): Terminal for external capacitor

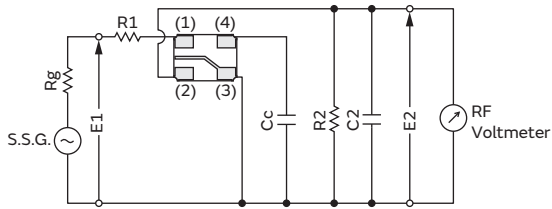
SFSKB2M80GF00-R1/SFSKB3M20FF00-R1



$R1+Rg=R2=1.0k\Omega$   
 $Cc=39pF\pm 5\%$   
 $C2=10pF$  (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output Voltage

(1): Input  
 (2): Output  
 (3): Ground  
 (4): Terminal for external capacitor

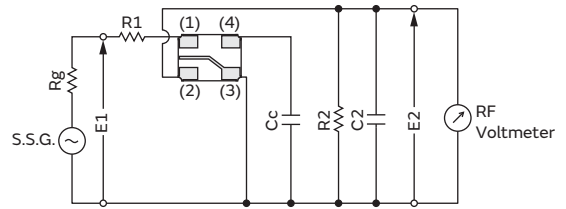
SFSKB4M30GF00-R1/SFSKB5M70GF00-R1



$R1+Rg=R2=1.0k\Omega$   
 $Cc=33pF\pm 5\%$   
 $C2=10pF$  (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output Voltage

(1): Input  
 (2): Output  
 (3): Ground  
 (4): Terminal for external capacitor

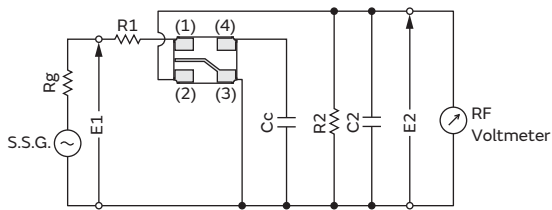
SFSKB4M80GF00-R1



$R1+Rg=R2=1.0k\Omega$   
 $Cc=15pF\pm 5\%$   
 $C2=10pF$  (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output Voltage

(1): Input  
 (2): Output  
 (3): Ground  
 (4): Terminal for external capacitor

SFSKB5M20GF00-R1

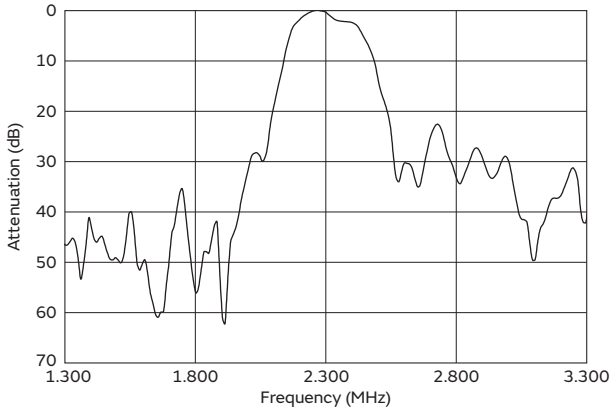


$R1+Rg=R2=1.0k\Omega$   
 $Cc=27pF\pm 5\%$   
 $C2=10pF$  (Including stray capacitance and Input capacitance of RF Voltmeter)  
 E1: S.S.G. Output Voltage

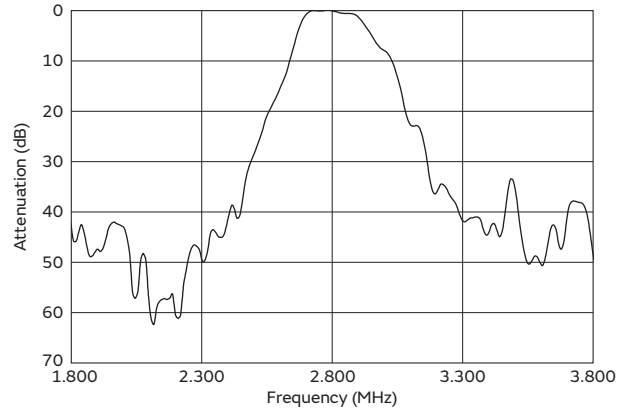
(1): Input  
 (2): Output  
 (3): Ground  
 (4): Terminal for external capacitor

## Frequency Characteristics

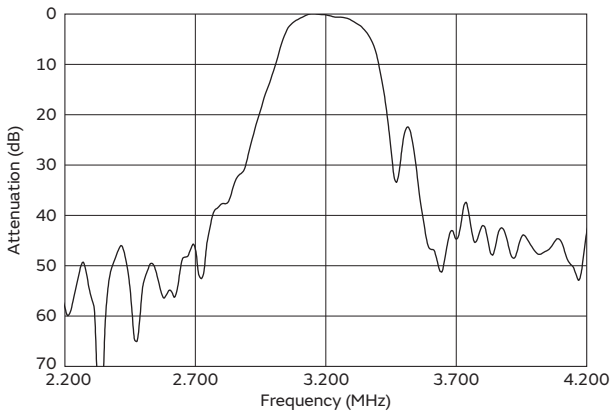
SFSKB2M30GF00-R1



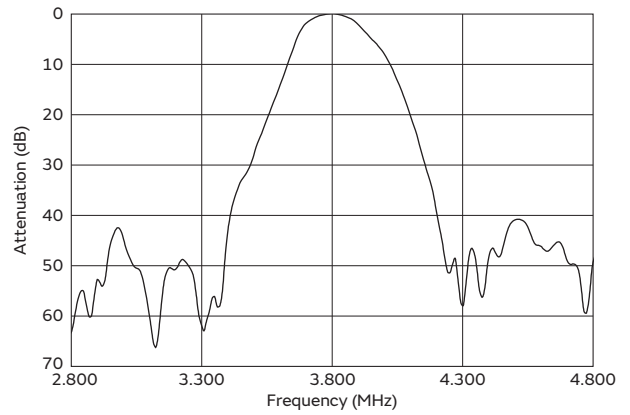
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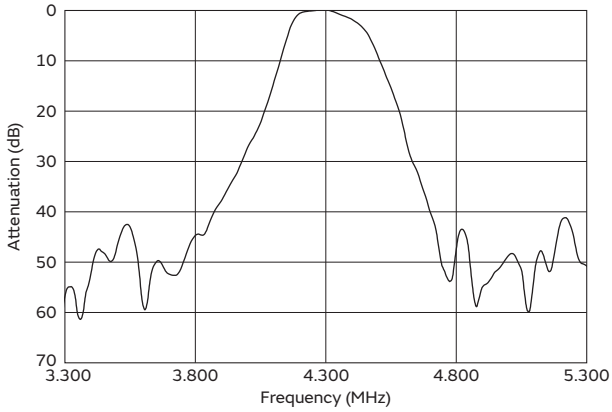
SFSKB3M20FF00-R1



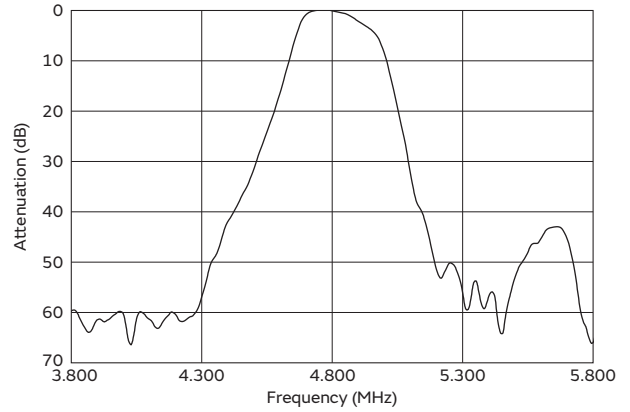
SFSKB3M80GF00-R1



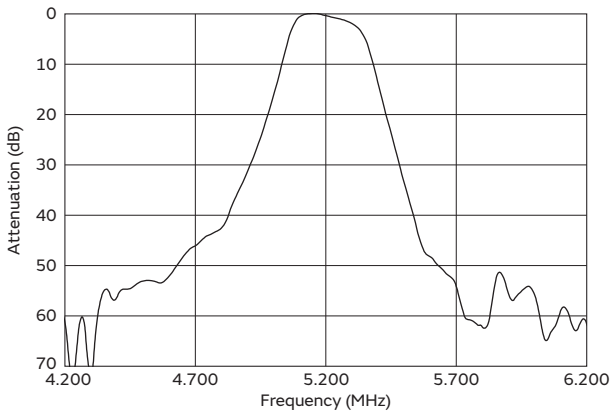
SFSKB4M30GF00-R1



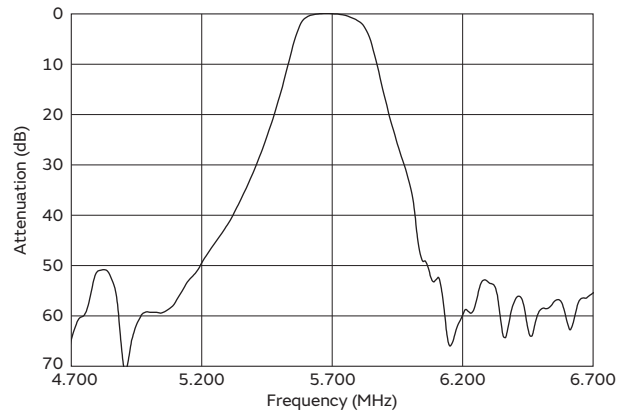
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SFSKB5M20GF00-R1

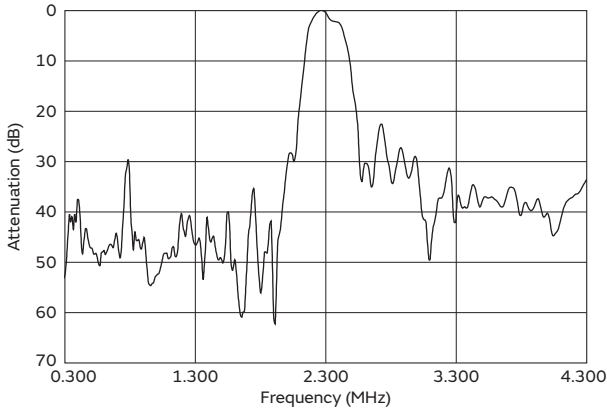


SFSKB5M70GF00-R1

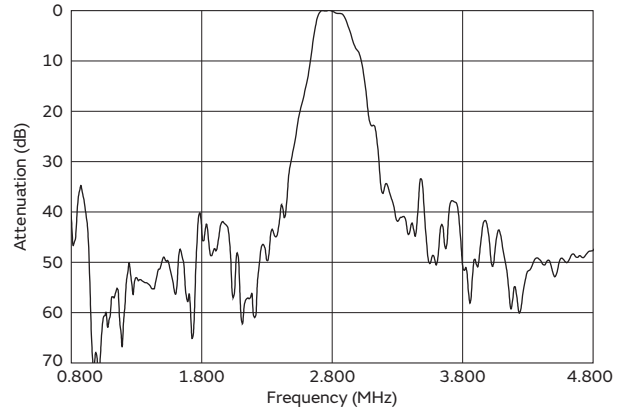


## Frequency Characteristics (Spurious)

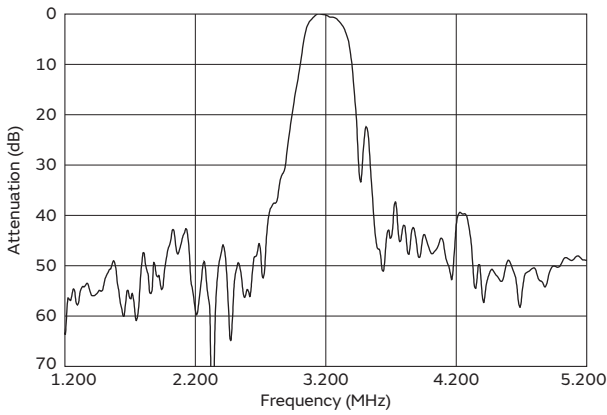
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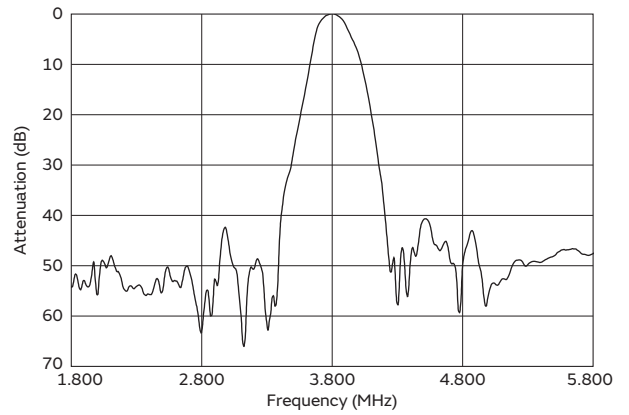
SFSKB2M80GF00-R1



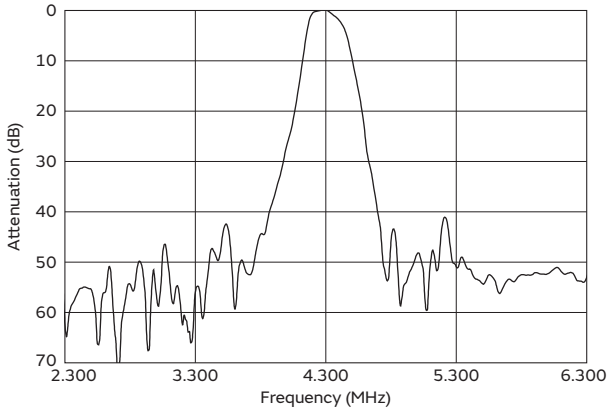
SFSKB3M20FF00-R1



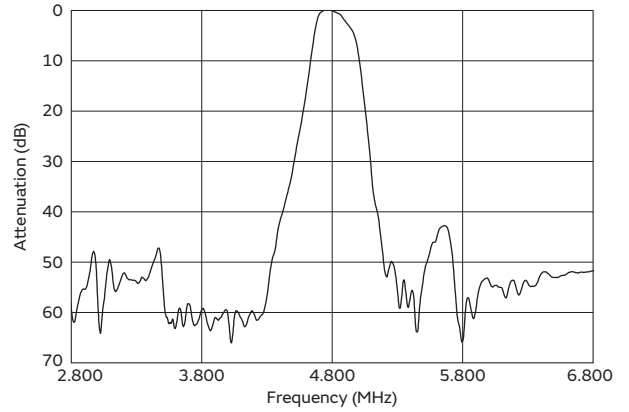
SFSKB3M80GF00-R1



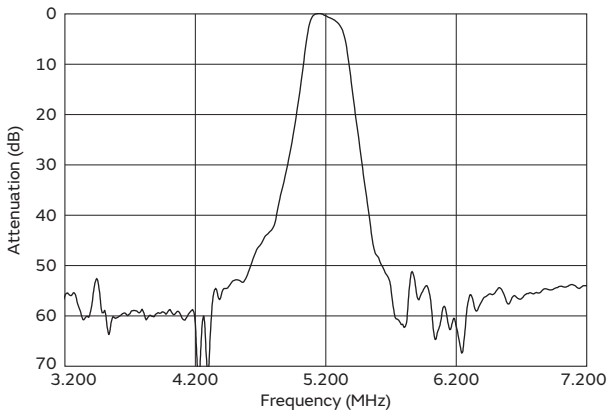
SFSKB4M30GF00-R1



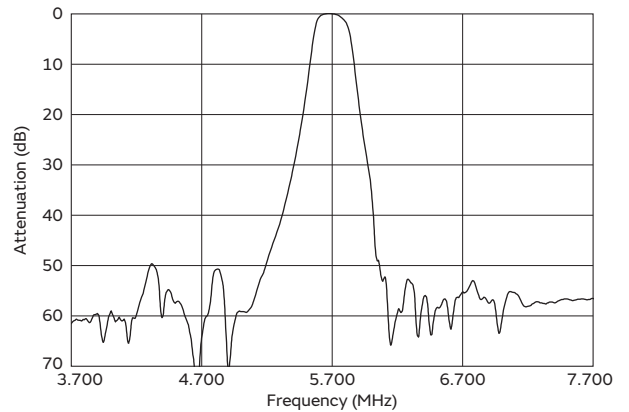
SFSKB4M80GF00-R1



SFSKB5M20GF00-R1



SFSKB5M70GF00-R1



5

## Notice

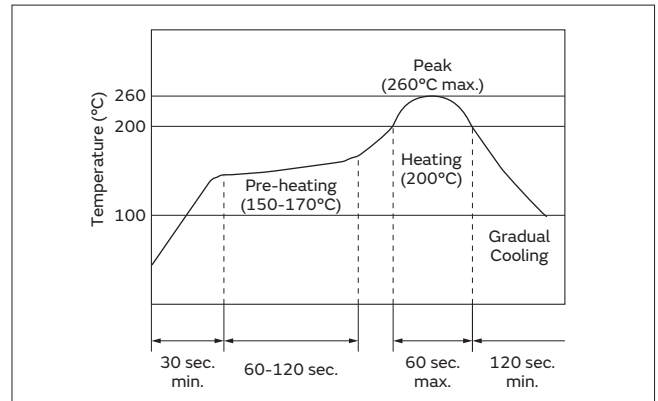
### Ceramic Filters (CERAFIL®) Chip Type SFSKB Series

#### — Soldering and Mounting —

##### 1. Standard Reflow Soldering Conditions

###### (1) Reflow

Filter is soldered twice within the following temperature conditions.



###### (2) Soldering Iron

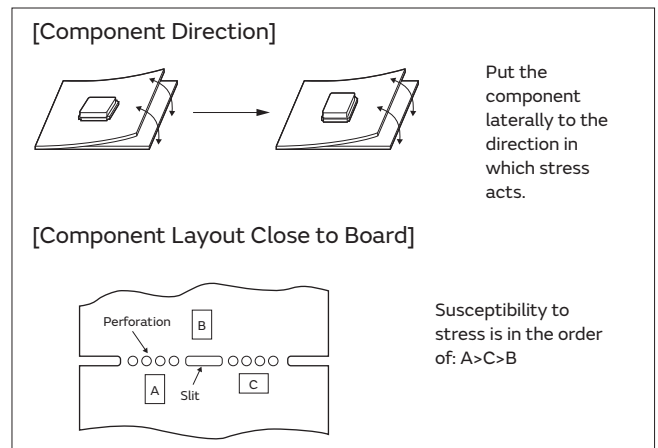
Filter is soldered at  $+350\pm 5^{\circ}\text{C}$  for  $3.0\pm 0.5$  seconds. The soldering iron should not touch the filter while soldering.

###### (3) Conditions for Placement Machines

The component is recommended for use with placement machines that employ optical placement capabilities. Damage may result from excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines that utilize mechanical positioning. Please contact Murata for details beforehand.

###### (4) Other

- The component may be damaged if excess mechanical stress is applied to it mounted on the printed circuit board.
- Design layout of components on the PC board to minimize the stress imposed on the warp or flexure of the board.
- After installing components, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to degrade. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.
- When the positioning claws and pick-up nozzle are worn, the load is applied to the components while positioning is concentrated to one positioning accuracy, etc. Careful checking and maintenance are necessary to prevent unexpected trouble.
- When correcting components with a soldering iron, the tip of the soldering iron should not directly touch the component. Depending on the soldering conditions, the effective area of terminations may be reduced. Solder containing Ag should be used to prevent the electrode erosion.
- Do not use strong acidity flux, more than 0.2wt% chlorine content, in reflow soldering.



Continued on the following page. ↗



## Notice

Continued from the preceding page. ↘

### 2. Wash

Do not clean or wash the component as it is not hermetically sealed.

### 3. Coating

In case of overcoating the component, conditions such as material of resin, cure temperature, and so on should be evaluated well.

### — Storage and Operating Conditions —

#### 1. Product Storage Conditions

Please store the products in room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to +40°C

Humidity: 15 to 85% R.H.

#### 2. Expiration Date on Storage

Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

#### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because quality and solderability may be degraded due to the storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in the places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after package is opened, because quality and solderability may be degraded due to storage under the poor conditions.

(5) To avoid cracking of the ceramic element, please do not drop the products.

#### 4. Other

Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

### — Handling —

Accurate test circuit values are required to measure electrical characteristics.

Miscorrelation may be caused if there is any deviation, especially stray capacitance, from the test circuit in the specification.

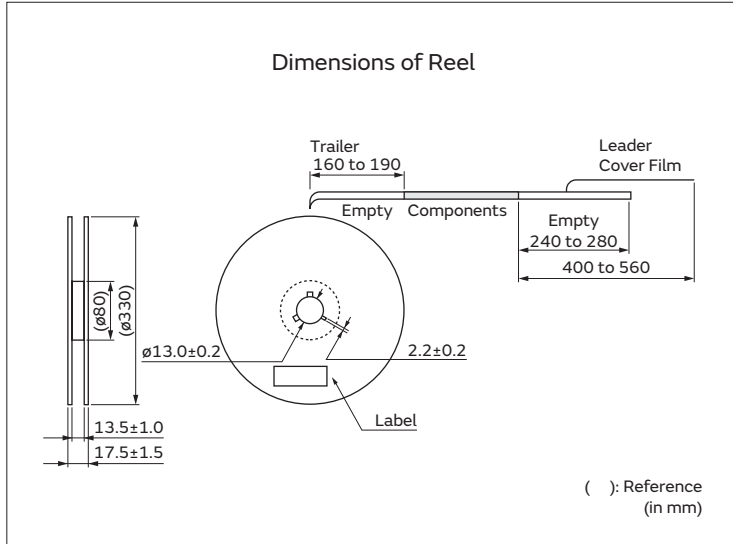
## Packaging

### Minimum Quantity/Dimensions of Reel

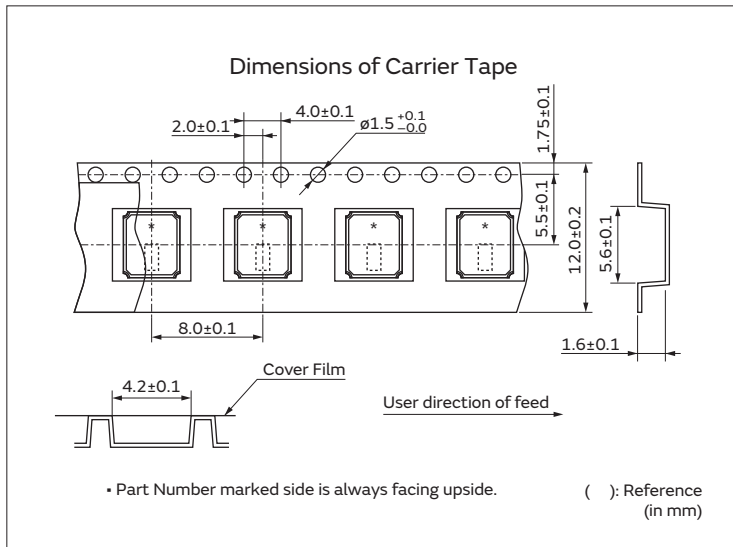
Embossed Tape  $\phi 330\text{mm}$

3,000

(pcs.)



### Dimensions of Carrier Tape



# Ceramic Trap (CERAFIL<sup>®</sup>)

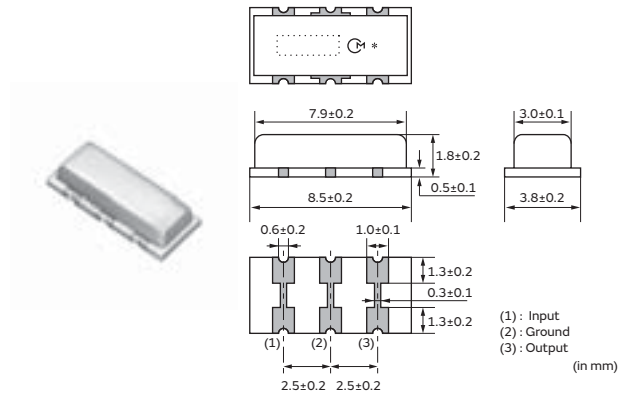


## Chip Type TPSKA Series

The TPSKA\_B ceramic trap is a small and thin SMD trap sealed with a metal cap recommended for LCD-TVs and small and thin tuners.

### Features

1. High attenuation and high performance group delay time
2. Small and thin package
3. Reflow-solderable

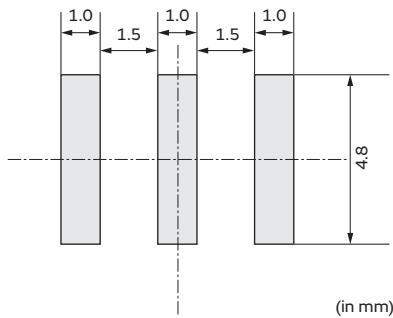


Part Number	Nominal Center Frequency (fn1) (MHz)	Attenuation (fn1) (dB)	30dB Attenuation BW (fn1) (kHz)
TPSKA4M50B00-R3	4.500	35 min.	50 min.
TPSKA5M50B00-R3	5.500	35 min.	70 min.
TPSKA6M00B00-R3	6.000	35 min.	70 min.
TPSKA6M50B00-R3	6.500	35 min.	70 min.

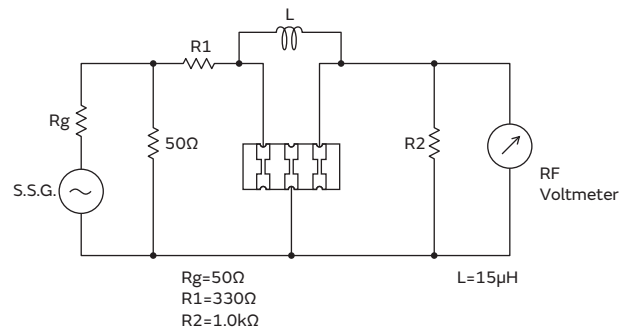
For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of ceramic filters.

The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

### Standard Land Pattern Dimensions

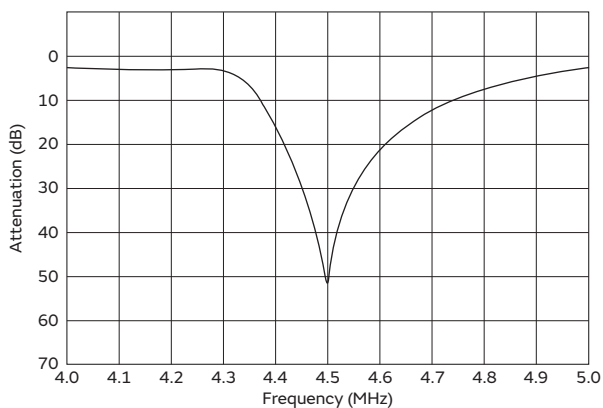


### Test Circuit

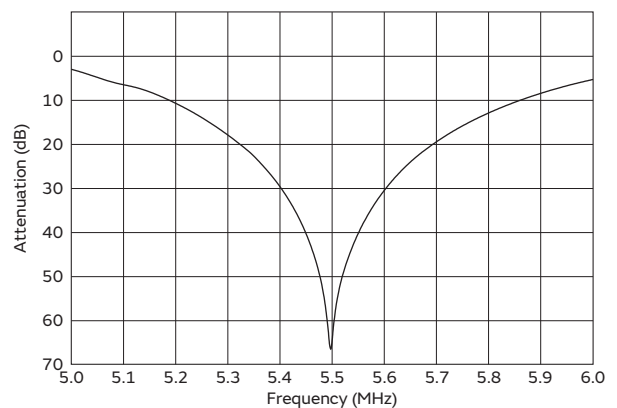


### Frequency Characteristics

TPSKA4M50B00-R3



TPSKA5M50B00-R3

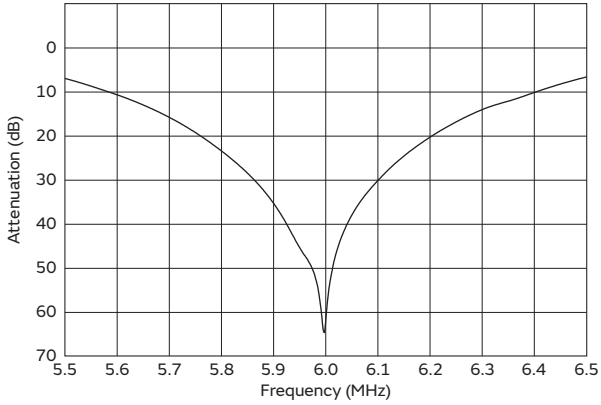


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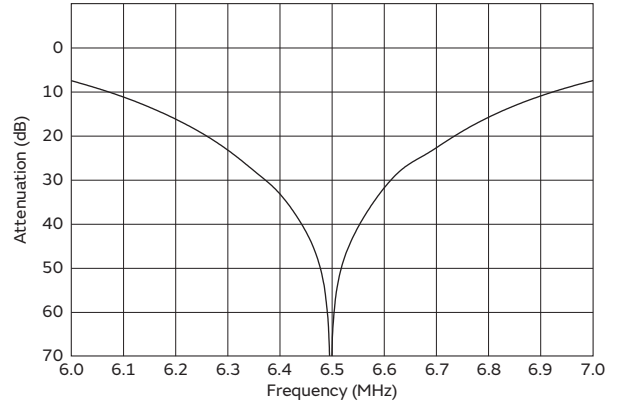
Continued from the preceding page. ↘

## Frequency Characteristics

TPSKA6M00B00-R3

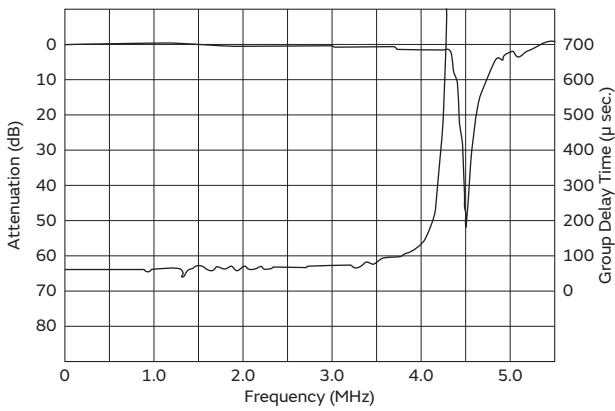


TPSKA6M50B00-R3

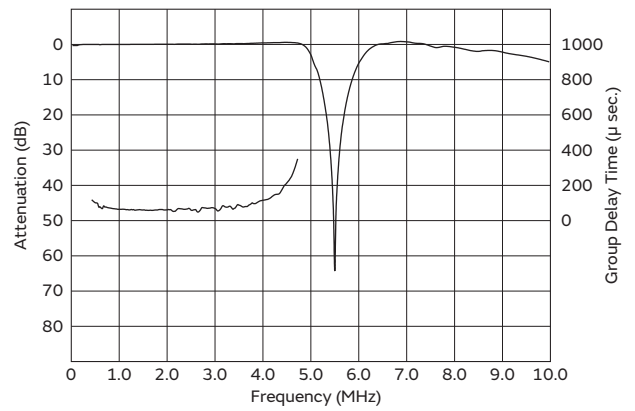


## Frequency Characteristics (Spurious)

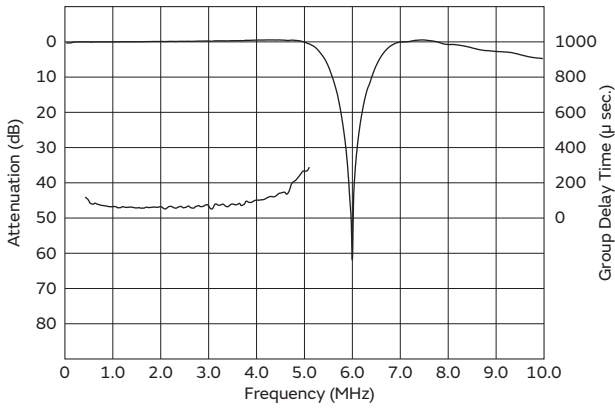
TPSKA4M50B00-R3



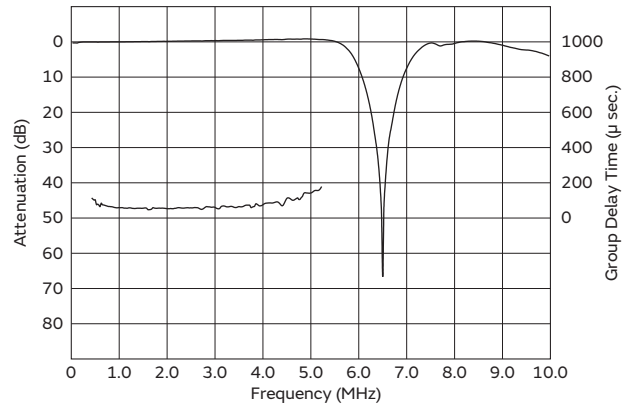
TPSKA5M50B00-R3



TPSKA6M00B00-R3



TPSKA6M50B00-R3



## Notice

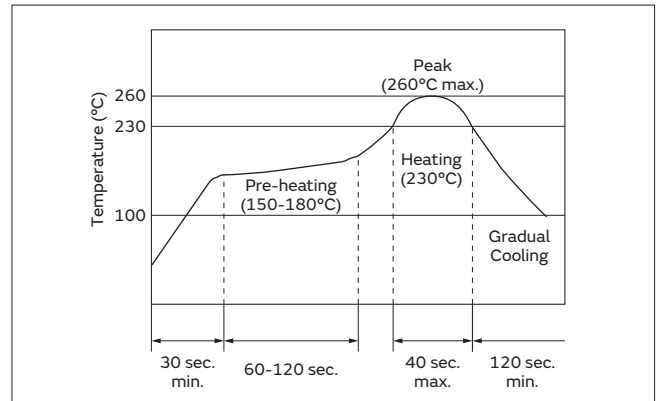
### Ceramic Trap (CERAFIL®) Chip Type TPSKA Series

#### — Soldering and Mounting —

#### 1. Standard Reflow Soldering Conditions

##### (1) Reflow

Filter is soldered twice within the following temperature conditions.



##### (2) Soldering Iron

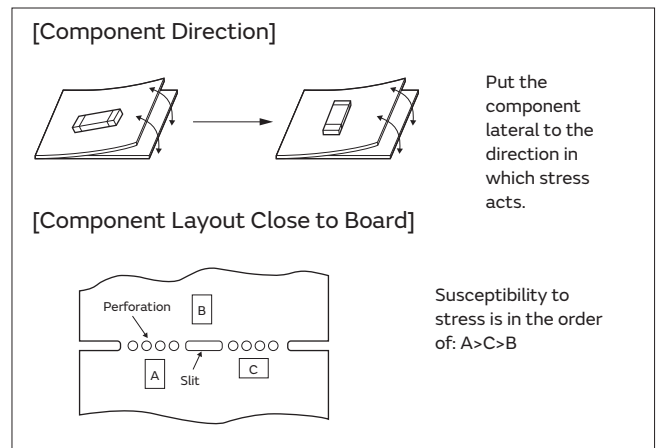
Filter is soldered at  $+350 \pm 5^\circ\text{C}$  for  $3.0 \pm 0.5$  seconds. The soldering iron should not touch the filter while soldering.

##### (3) Conditions for Placement Machines

The component is recommended for use with placement machines that employ optical placement capabilities. Damage may result from excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines that utilize mechanical positioning. Please contact Murata for details beforehand.

##### (4) Other

- The component may be damaged if excess mechanical stress is applied to it mounted on the printed circuit board.
- Design layout of components on the PC board to minimize the stress imposed on the warp or flexure of the board.
- After installing chips, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to degrade. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.
- When the positioning claws and pick-up nozzle are worn, the load is applied to the components while positioning is concentrated to one positioning accuracy, etc. Careful checking and maintenance are necessary to prevent unexpected trouble.
- When correcting chips with a soldering iron, the tip of the soldering iron should not directly touch the chip component.



#### 2. Wash

Do not clean or wash the component as it is not hermetically sealed.

Continued on the following page. ↗

## Notice

Continued from the preceding page. ↘

### 3. Coating

In case of overcoating the component, conditions such as material of resin, cure temperature, and so on should be evaluated well.

### — Storage and Operating Conditions —

#### 1. Product Storage Conditions

Please store the products in room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to +40°C

Humidity: 15 to 85% R.H.

#### 2. Expiration Date on Storage

Expiration date (Shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the products may be degraded in solderability due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

#### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because quality and solderability may be degraded due to the storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in the places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after package is opened, because quality and solderability may be degraded due to storage under the poor conditions.

(5) To avoid cracking of the ceramic element, please do not drop the products.

#### 4. Other

Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

### — Handling —

Accurate test circuit values are required to measure electrical characteristics.

Miscorrelation may be caused if there is any deviation, especially stray capacitance, from the test circuit in the specification.

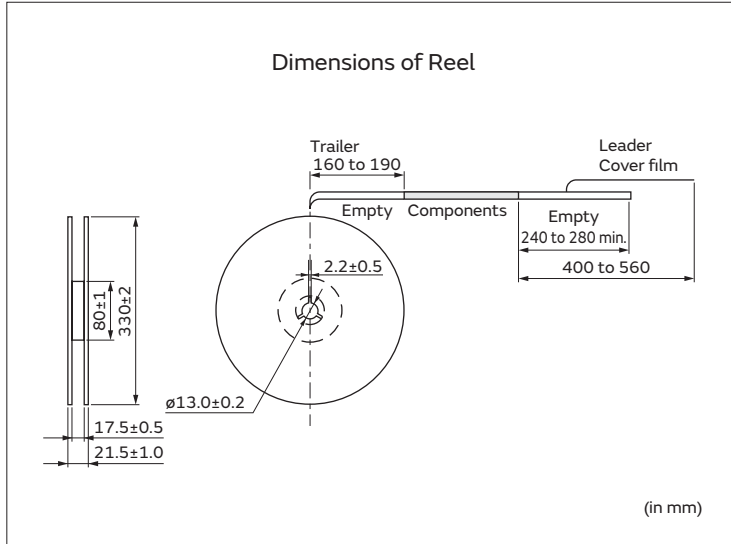
## Packaging

### Minimum Quantity/Dimensions of Reel

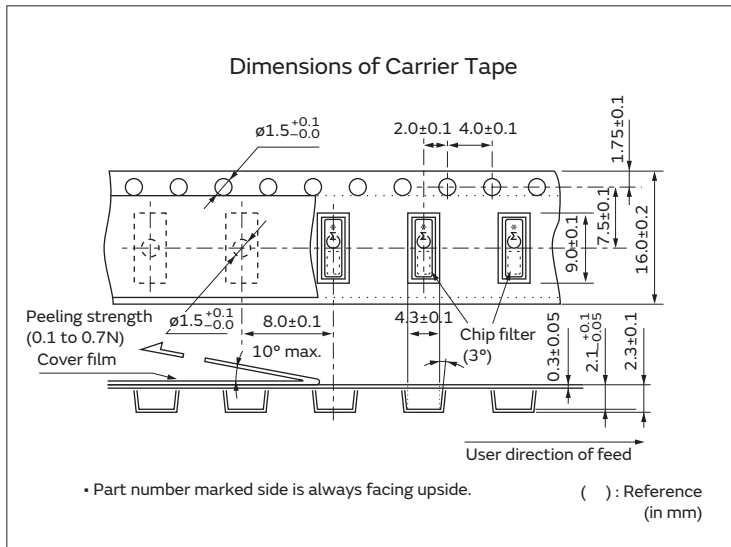
Embossed Tape  $\phi$ 330mm

3,000

(pcs.)



### Dimensions of Carrier Tape



# Ceramic Discriminator (CERAFIL<sup>®</sup>)



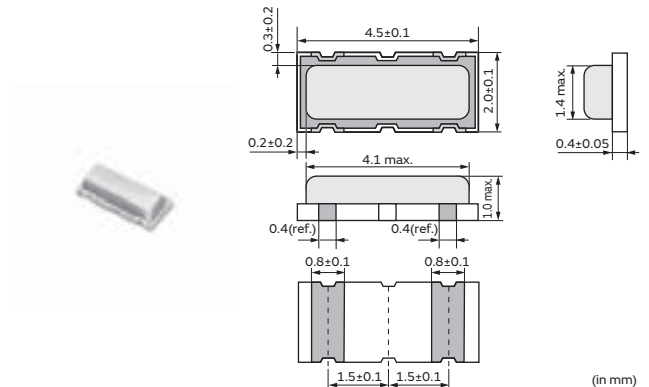
## Chip Type CDSCB Series

The CDSCB10M7 series forms a resonator on a piezoelectric ceramic substrate. In combination with ICs, this type obtains stable demodulation characteristics in a wide bandwidth.

They have 1.0mm max. thickness and small mounting area (4.5x2.0mm).

### Features

1. Compact and high reliability and recommended for automotive applications.
2. Can be combined with various ICs. The IC is determined by the last number in the part number.
3. Stable demodulation characteristics can be obtained without adjustment.
4. Stable temperature characteristics.
5. Available lead (Pb) free solder reflow.



Part Number	Center Frequency (fo) (MHz)	Recovered Audio 3dB BW (kHz)	Recovered Audio Output (mV)	Distortion (%)	S Curve (mV)	IC
CDSCB10M7GA105A-R0	10.700 ±30kHz	220 min.	110 min.	1.5 max.	-	TEA5757HL
CDSCB10M7GA113-R0	10.700 ±30kHz	300 min.	110 min.	1.0 max.	-	TA2154FN
CDSCB10M7GA119-R0	10.700 ±30kHz	500 min.	75 min.	1.0 max.	-	TRF6901
CDSCB10M7GA121-R0	10.700 ±30kHz	390 min.	80 min.	1.0 max.	-	LV23100V
CDSCB10M7GA135-R0	10.700 ±30kHz	155 min.	75 min.	-	-	TH71101
CDSCB10M7GA136-R0	10.700 ±30kHz	140 min.	120 min.	-	-	TH7122
CDSCB10M7GF072-R0	10.700 (fn)	fn±150 min.	130 min.	2.0 max.	-	TA31161
CDSCB10M7GF107S-R0	10.700 (fn)	fn±80 min.	52 min.	3.0 max.	-	TA31272FN
CDSCB10M7GF109-R0	10.700 (fn)	fn±100 min.	170 min.	3.0 max.	-	TK14588V
CDSCB10M7GF123-R0	10.700 (fn)	-	-	-	900 min.	TA31275FN
CDSCB10M7GF123S-R0	10.700 (fn)	-	-	-	900 min.	TA31275FN
CDSCB10M7GF126-R0	10.700 (fn)	-	-	-	400 min.	NJM2295AV

(fn) indicates nominal center frequency (10.700MHz).

For safety purposes, avoid applying a direct current between the terminals.

The order quantity should be an integral multiple of the "Minimum Quantity" shown in the packaging page.

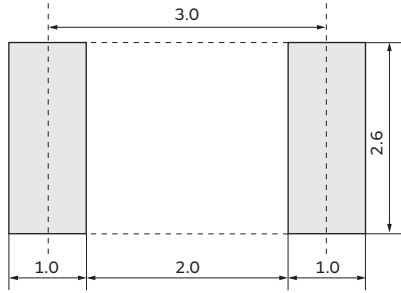
7

### Standard Center Frequency Rank Code

CODE	30kHz Step	25kHz Step
A	10.700MHz±30kHz	10.700MHz±25kHz



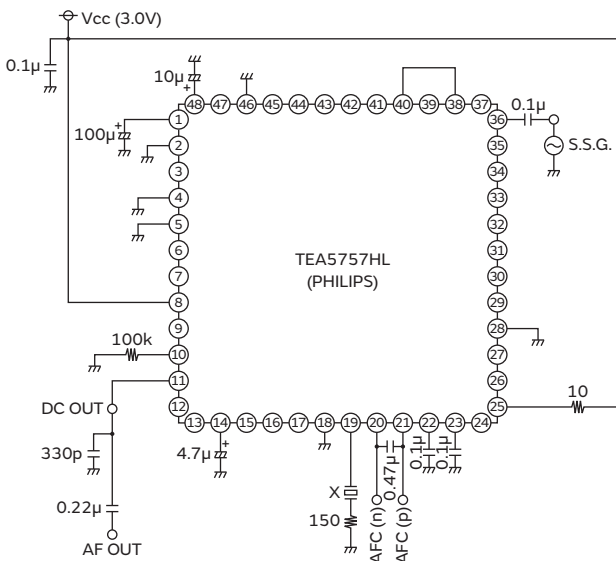
## Standard Land Pattern Dimensions



(in mm)

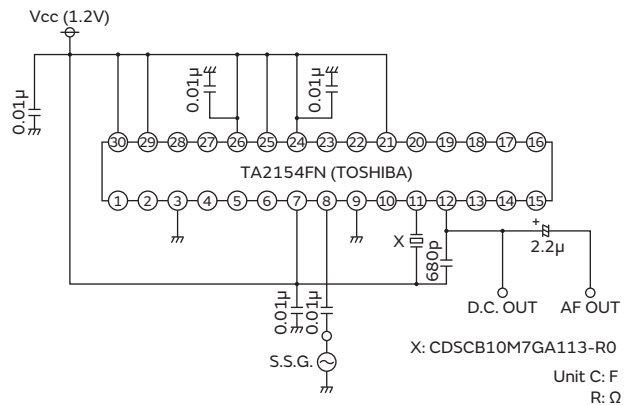
## Test Circuit

CDSCB10M7GA105A-R0



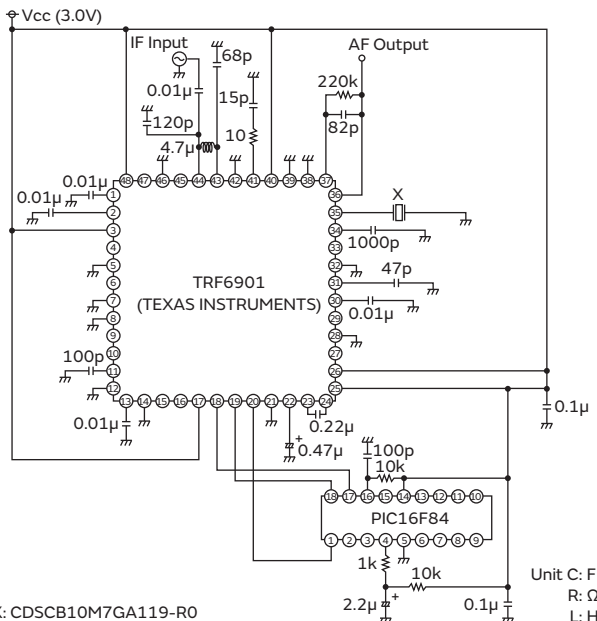
X: CDSCB10M7GA105A-R0  
 Unit C: F  
 R: Ω

CDSCB10M7GA113-R0



X: CDSCB10M7GA113-R0  
 Unit C: F  
 R: Ω

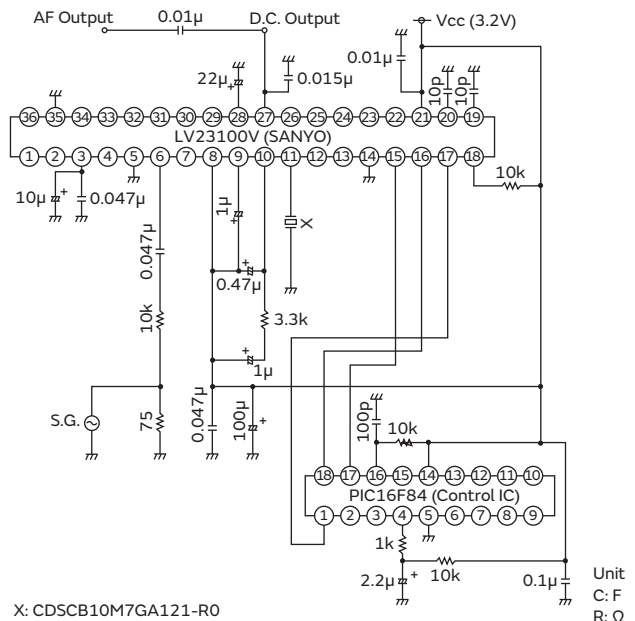
CDSCB10M7GA119-R0



X: CDSCB10M7GA119-R0

Unit C: F  
 R: Ω  
 L: H

CDSCB10M7GA121-R0



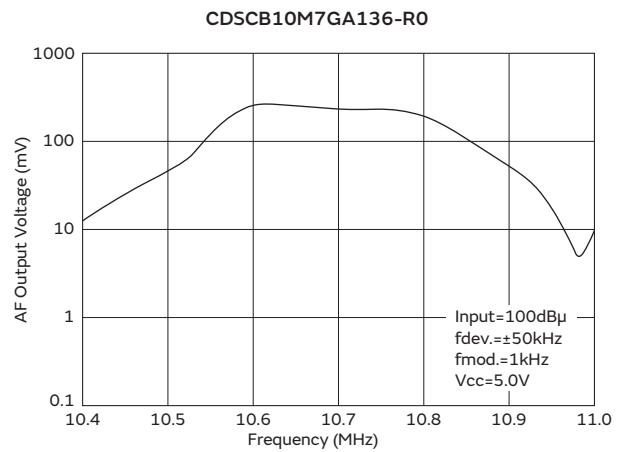
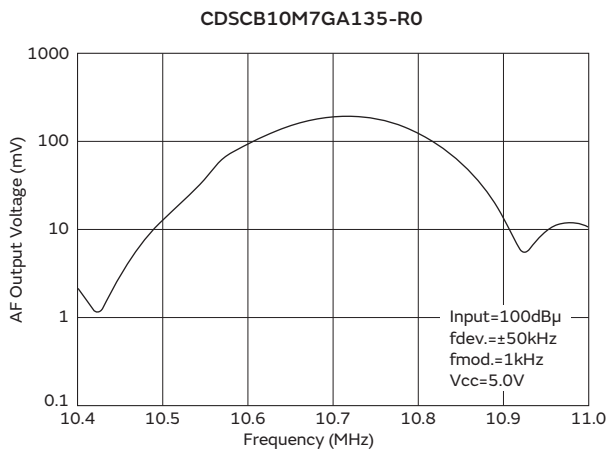
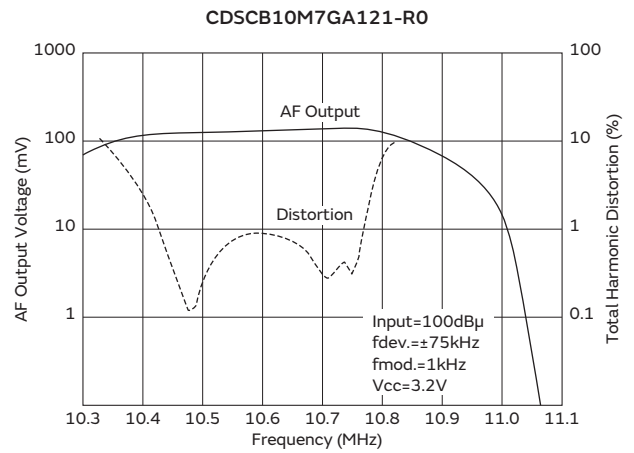
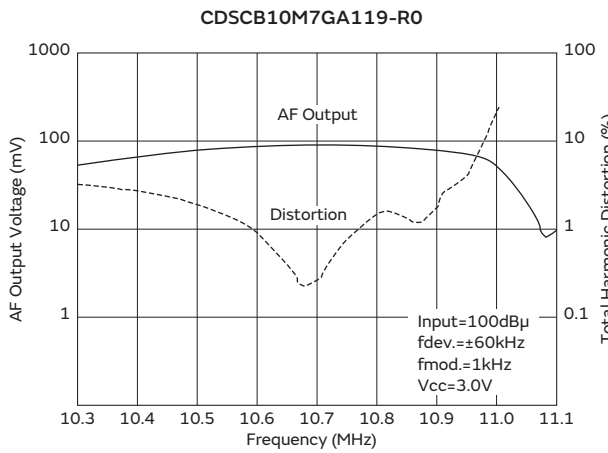
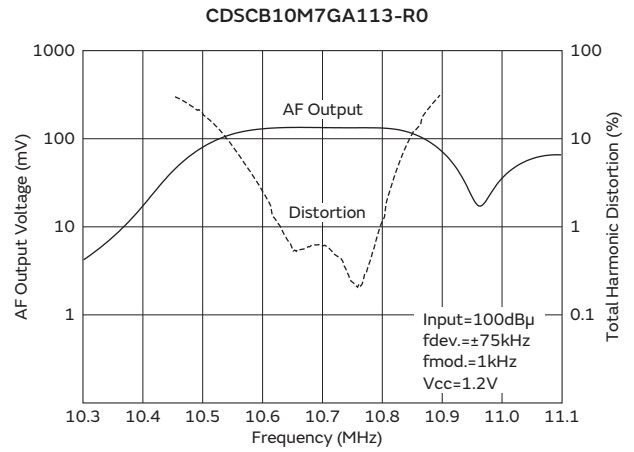
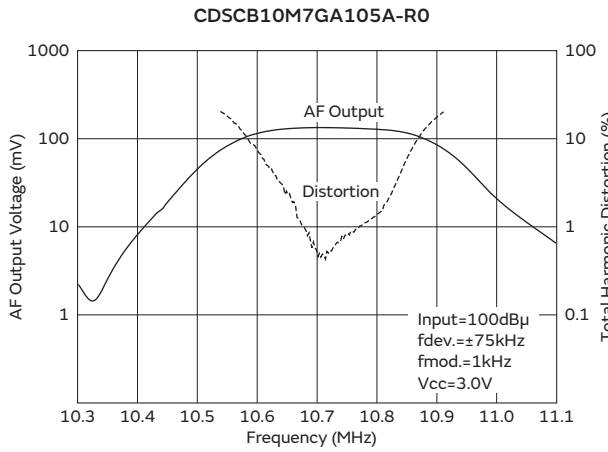
X: CDSCB10M7GA121-R0

Unit C: F  
 R: Ω

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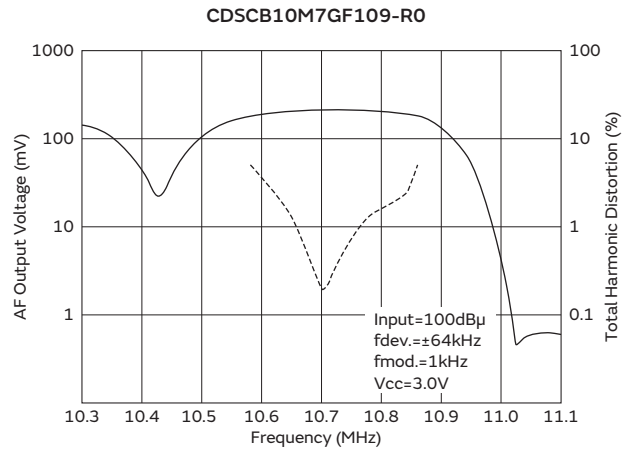
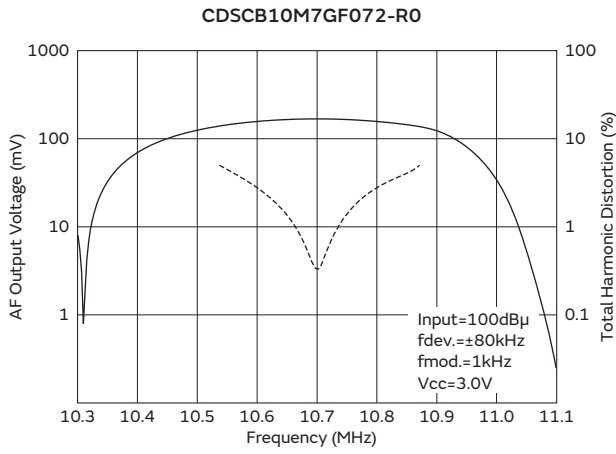
## Recovered Audio Curve



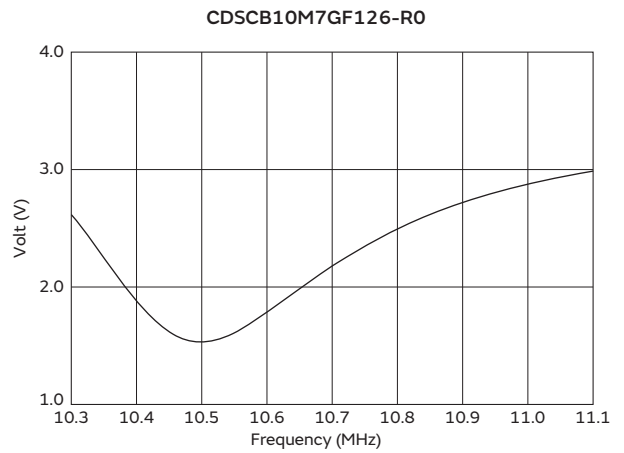
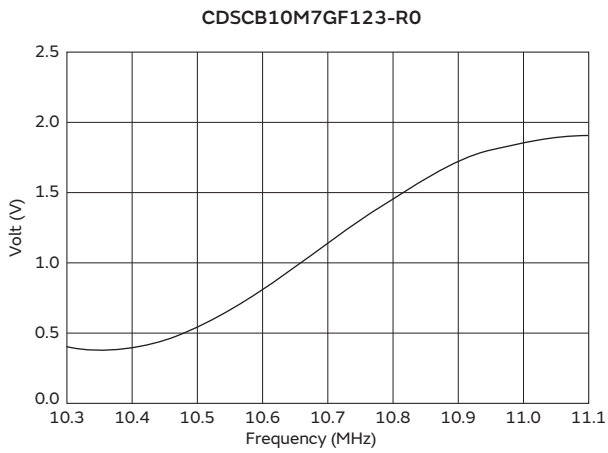
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**Recovered Audio Curve**



**S Curve**



## Notice

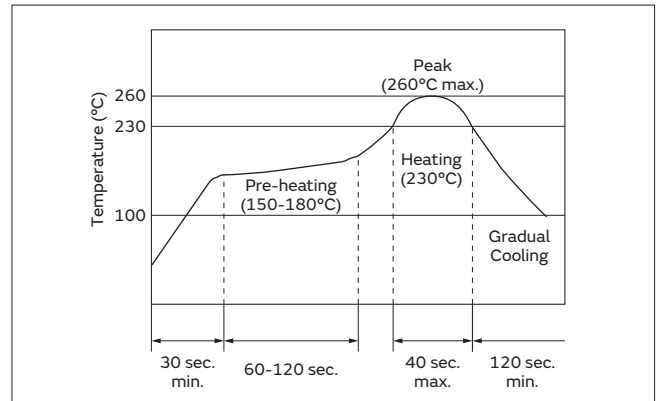
### Ceramic Discriminator (CERAFIL®) Chip Type CDSCB Series

#### — Soldering and Mounting —

##### 1. Standard Reflow Soldering Conditions

###### (1) Reflow

Filter is soldered twice within the following temperature conditions.



###### (2) Soldering Iron

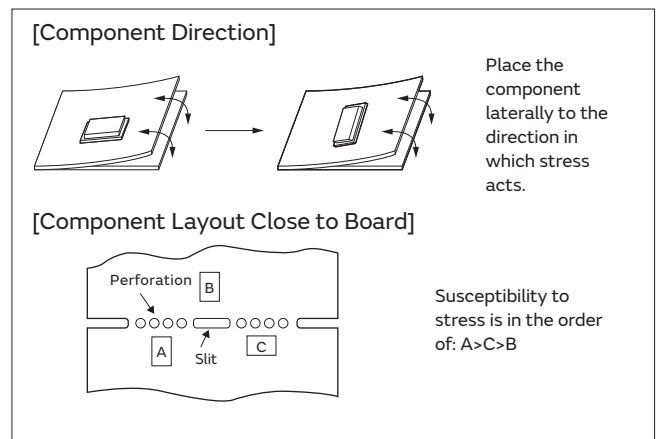
Filter is soldered at  $+300\pm 5^{\circ}\text{C}$  for  $3.0\pm 0.5$  seconds. The soldering iron should not touch the filter while soldering.

###### (3) Conditions for Placement Machines

The component is recommended for use with placement machines that employ optical placement capabilities. The component might be damaged by excessive mechanical force. Please make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines that utilize mechanical positioning. Please contact Murata for details beforehand.

###### (4) Other

- The component may be damaged if excess mechanical stress is applied to it mounted on the printed circuit board.
- Design layout of components on the PC board to minimize the stress imposed on the warp or flexure of the board.
- After installing components, if solder is excessively applied to the circuit board, mechanical stress will cause destruction resistance characteristics to degrade. To prevent this, be extremely careful in determining shape and dimension before designing the circuit board diagram.
- When the positioning claws and pick-up nozzle are worn, the load is applied to the components while positioning is concentrated on positioning accuracy, etc. Careful checking and maintenance are necessary to prevent unexpected trouble.
- When correcting components with a soldering iron, the tip of the soldering iron should not directly touch the component. Depending on the soldering conditions, the effective area of terminations may be reduced. Solder containing Ag should be used to prevent electrode erosion.



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## Notice

Continued from the preceding page. ↘

### 2. Wash

Do not clean or wash the component as it is not hermetically sealed.

### 3. Coating

In case of overcoating the component, conditions such as material of resin, cure temperature, and so on should be evaluated well.

### — Storage and Operating Conditions —

#### 1. Product Storage Conditions

Please store the products in a room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to +40°C

Humidity: 15 to 85% R.H.

#### 2. Expiration Date on Storage

Expiration date (shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because solderability may be degraded due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

#### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because quality and solderability may be degraded due to storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor

without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after package is opened, because quality and solderability may be degraded due to storage under poor conditions.

(5) To avoid cracking of the ceramic element, please do not drop the products.

#### 4. Other

Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

### — Handling —

Accurate test circuit values are required to measure electrical characteristics. Miscorrelation may be caused if there is any deviation, especially stray capacitance, from the test circuit in the specification.

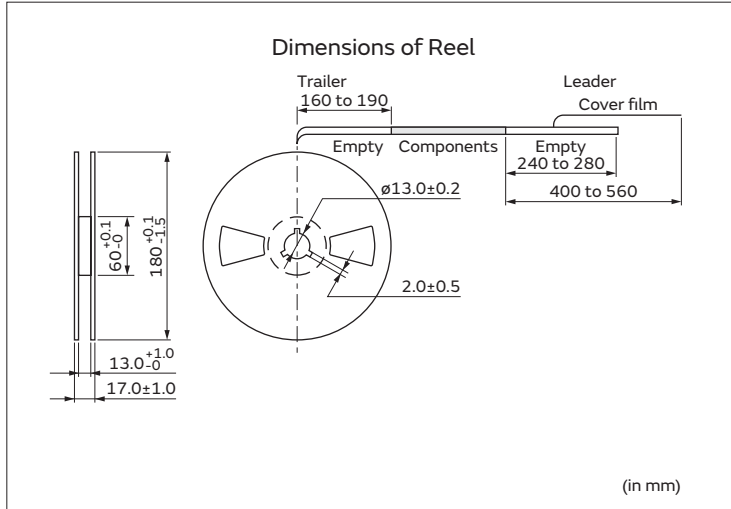
## Packaging

### Minimum Quantity/Dimensions of Reel

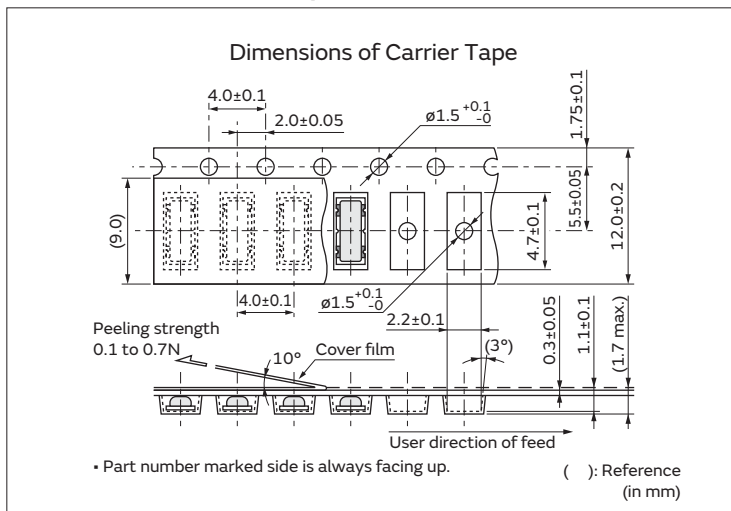
Embossed Tape  $\phi 180\text{mm}$

2,000

(pcs.)



### Dimensions of Carrier Tape



# Crystal Filters



## Chip Type XDCAF/XDCAG/XDCAH Series

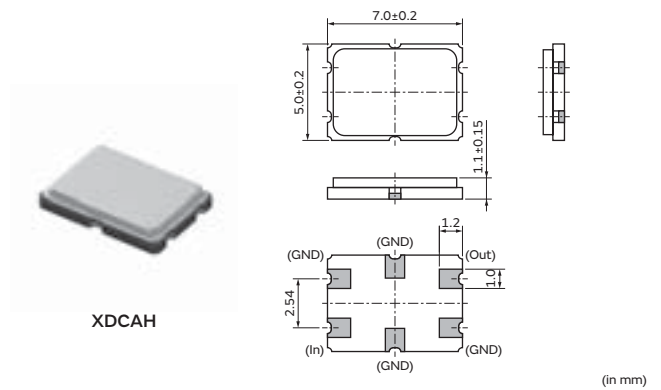
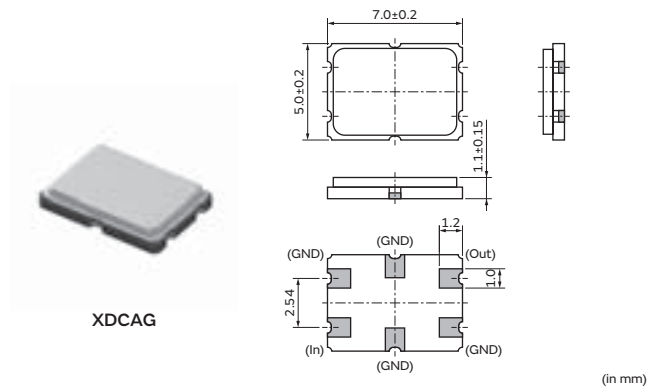
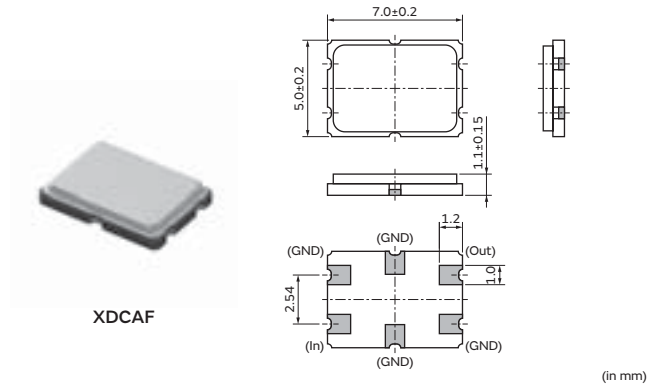
Murata's Crystal Filter with original thin wafer design technology based on long experience and activity realizes high reliability and is widely used in various applications such as business radios.

### Features

1. Low profile surface mount
2. Customized design and matching service
3. 4-Pole type is a small size in one package

### Applications

1. Radio communication
2. Base Station
3. Communication (IF) other



### Series

Series	Size	Center Frequency (MHz)	Number of Poles
XDCAF	7050	20 to 80 [Fundamental]	2
XDCAG		70 to 150 [3rd over tone]	4
XDCAH			4

### Part Number List

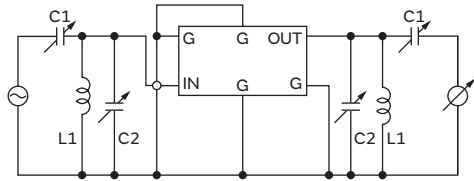
Series	Part Number	Center Frequency (MHz)	3dB Bandwidth (kHz min.)	Stopband Width (dB max.)	Insertion Loss (dB max.)	Ripple (dB max.)	Spurious Response (dB min.) [fo±1MHz]	Guarantee Attenuation (dB min.) [fo-900kHz]	Termination Impedance (Ω//pF)	Number of poles	Operating Temperature Range (°C)
XDCAF	XDCAF21M400RAA00P0	21.4000	±7.5	18 [fo±25kHz]	2.0	1.0	10	70	1500//2.5	2	-20 to +70
XDCAF	XDCAF21M700MAA00P0	21.7000	±3.75	18 [fo±20kHz]	2.0	1.0	18	70	850//8.0	2	-20 to +70
XDCAG	XDCAG38M850PGA00P0	38.8500	±5.0	45 [fo±25kHz]	5.0	1.0	40	70	610//3.0 [Cc=14.0pF]	4	-20 to +70
XDCAG	XDCAG58M050MGA00P0	58.0500	±4.0	38 [fo±20kHz]	5.0	1.0	40	70	250//5.5 [Cc=20.5pF]	4	-20 to +70
XDCAH	XDCAH50M850PHA00P0	50.8500	±5.0	45 [fo±25kHz]	5.0	1.0	60	80	560//4.0 [Cc=11.0pF]	4	-20 to +70
XDCAH	XDCAH73M350QHA03P0	73.3500	±6.0	40 [fo±25kHz]	4.0	1.0	60	80	450//4.0 [Cc=9.2pF]	4	-20 to +70

Please be sure to consult with our sales representative or engineer if you require other center frequencies.



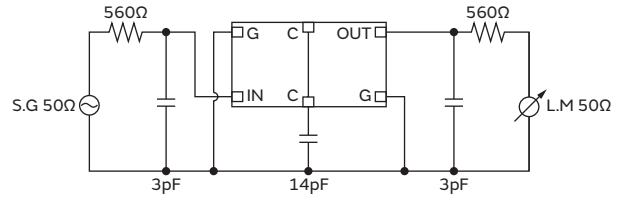
**Test circuit**

XDCAF21M400RAA00P0/XDCAF21M700MAA00P0

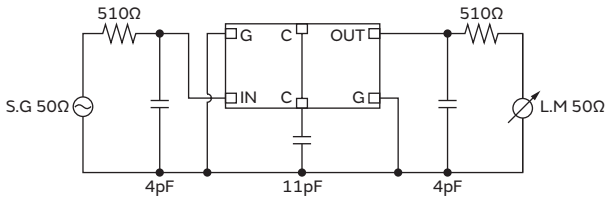


Terminating Impedance: 1500Ω//2.5pF

XDCAG38M850PGA00P0/XDCAG58M050MGA00P0



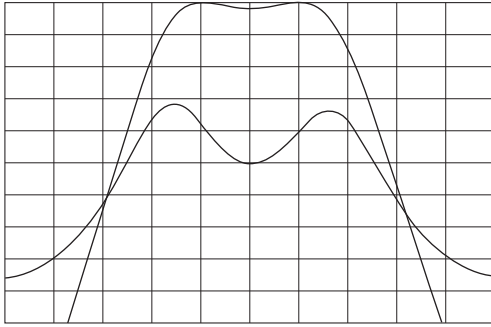
XDCAH50M850PHA00P0/XDCAH73M350QHA03P0



## Frequency Characteristics

**XDCAF21M400RAA00P0**

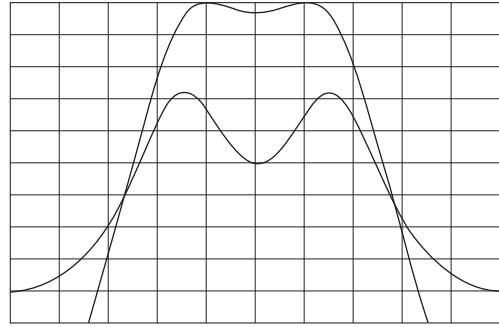
■1: LOG 1 dB/ REF -29.825 dB  
 ■2: LOG 10 dB/ REF -29.825 dB



■1: CNF 21.4 MHz SPF 40 kHz  
 ■2: CNF 21.4 MHz SPF 2 MHz

**XDCAF21M700MAA00P0**

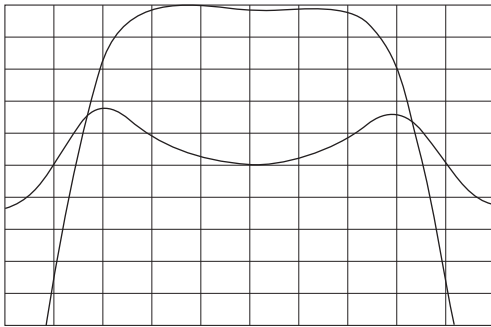
■1: LOG 1 dB/ REF -5.336 dB  
 ■2: LOG 10 dB/ REF -5.336 dB



■1: CNF 21.7 MHz SPF 20 kHz  
 ■2: CNF 21.7 MHz SPF 2 MHz

**XDCAG38M850PGA00P0**

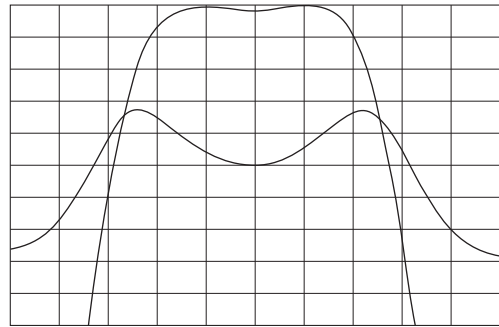
■1: LOG 1 dB/ REF -1.559 dB  
 ■2: LOG 10 dB/ REF -1.559 dB



■1: CNF 38.85 MHz SPF 20 kHz  
 ■2: CNF 38.85 MHz SPF 2 MHz

**XDCAG58M050MGA00P0**

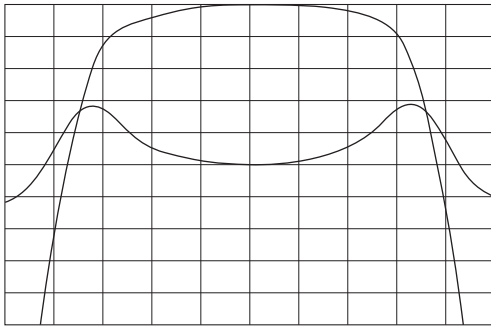
■1: LOG 1 dB/ REF -3.634 dB  
 ■2: LOG 10 dB/ REF -3.634 dB



■1: CNF 58.05 MHz SPF 20 kHz  
 ■2: CNF 58.05 MHz SPF 2 MHz

**XDCAH50M850PHA00P0**

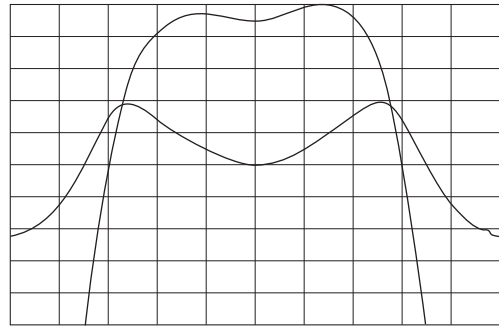
■1: LOG 1 dB/ REF -2.641 dB  
 ■2: LOG 10 dB/ REF -2.641 dB



■1: CNF 50.85 MHz SPF 20 kHz  
 ■2: CNF 50.85 MHz SPF 2 MHz

**XDCAH73M350QHA03P0**

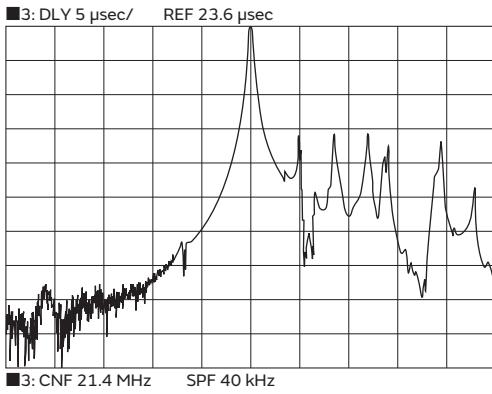
■1: LOG 1 dB/ REF -4.566 dB  
 ■2: LOG 10 dB/ REF -4.566 dB



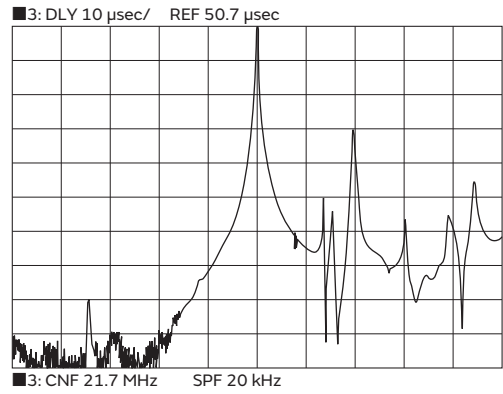
■1: CNF 73.35 MHz SPF 30 kHz  
 ■2: CNF 73.35 MHz SPF 2 MHz

**Spurious**

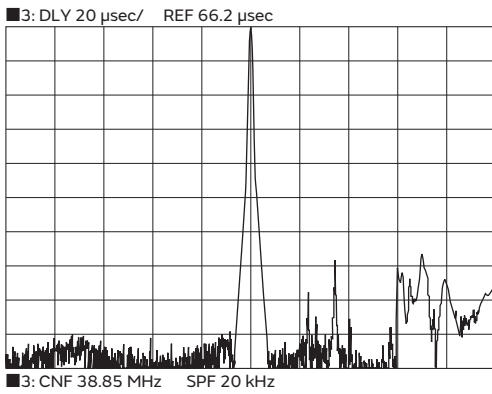
**XDCAF21M400RAA00P0**



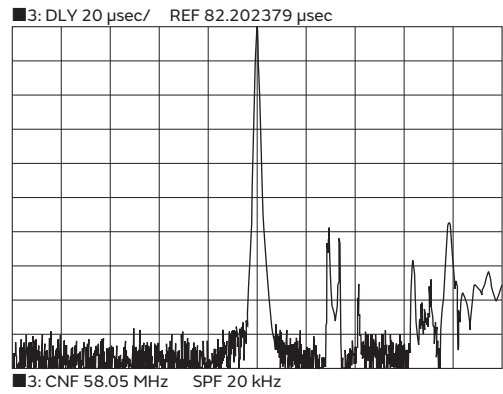
**XDCAF21M700MAA00P0**



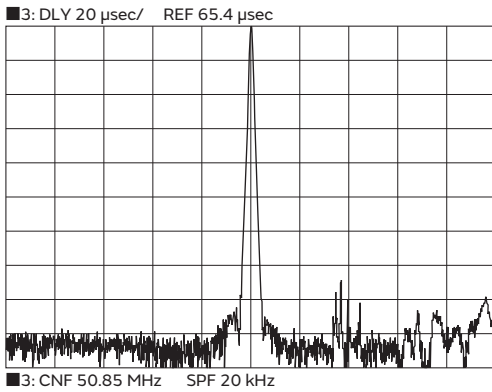
**XDCAG38M850PGA00P0**



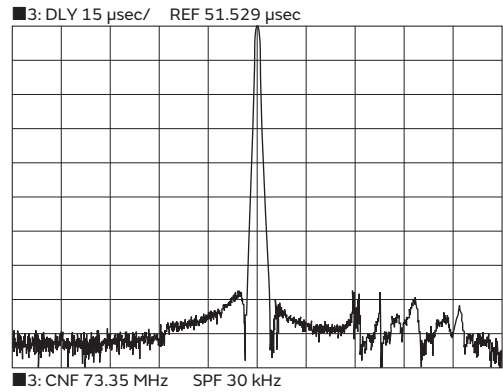
**XDCAG58M050MGA00P0**



**XDCAH50M850PHA00P0**



**XDCAH73M350QHA03P0**



## Notice

### Crystal Filters Chip Type XDCAF/XDCAG/XDCAH Series

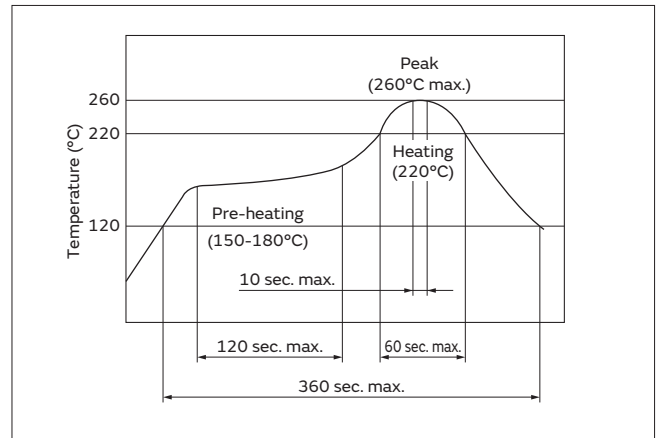
#### — Soldering and Mounting —

##### 1. Standard Reflow Soldering Conditions

###### (1) Reflow

Filter is soldered twice within the following temperature conditions.

Flux: Please use rosin based flux, but do not use water soluble flux.



###### (2) Soldering Iron

If compelled to mount the component by using a soldering iron, please do not directly touch the component with the soldering iron. The component terminals or electrical characteristics may be damaged if excessive thermal stress is applied.

	Condition
Heating of the Soldering Iron	350°C max.
Soldering Time	5 sec. max.

##### 2. Wash

Do not clean or wash the component.

#### — Storage and Operating Conditions —

##### 1. Product Storage Condition

Please store the products in a room where the temperature/humidity is stable, and avoid places where there are large temperature changes. Please store the products under the following conditions:

Temperature: -10 to + 40°C

Humidity: 15 to 85% R.H.

##### 2. Expiration Date on Storage

Expiration date (shelf life) of the products is six months after delivery under the conditions of a sealed and unopened package. Please use the products within six months after delivery. If you store the products for a long time (more than six months), use carefully because the solderability may be degraded due to storage under poor conditions.

Please confirm solderability and characteristics for the products regularly.

##### 3. Notice on Product Storage

(1) Please do not store the products in a chemical atmosphere (Acids, Alkali, Bases, Organic gas, Sulfides and so on), because the characteristics may be reduced in quality and may be degraded in solderability due to storage in a chemical atmosphere.

(2) Please do not put the products directly on the floor without anything under them to avoid damp places and/or dusty places.

(3) Please do not store the products in places such as a damp heated place or any place exposed to direct sunlight or excessive vibration.

(4) Please use the products immediately after the package is opened, because the characteristics may be reduced in quality and/or be degraded in solderability due to storage under poor conditions.

(5) Please do not drop the products to avoid cracking of the ceramic element.

##### 4. Other

(1) Please be sure to consult with our sales representative or engineer whenever the products are to be used in conditions not listed above.

Continued on the following page. ↗

## Notice

Continued from the preceding page. ↘

### — Rating —

The component may be damaged if excessive mechanical stress is applied.

### — Handling —

- (1) For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of filters.
- (2) The component is recommended for placement machines employing optical placement capabilities. The component might be damaged by mechanical force depending on placement machine and condition. Make sure that you have evaluated by using placement machines before going into mass production. Do not use placement machines employing mechanical positioning. Please contact Murata for details beforehand.
- (3) Do not reuse components once mounted onto a circuit board.
- (4) Crystal Filter  
You are requested to approve our data sheet and confirm the environment surrounding a crystal filter as well.  
In order to demonstrate sufficient performance, please read the following notes.
  - (4)-1 Necessity for LC Tuned Circuit  
When the stray capacitance of the PCB that mounts a crystal filter is large, a tuned circuit for offsetting the stray capacitance may be needed.
  - (4)-2 Termination Impedance  
The original characteristic in a pass band, insertion loss, ripple and bandwidth characteristic are no longer acquired when termination impedance differs from a rated value. The circuit impedance shall be measured accurately and it has consistency to match on termination conditions.  
Please keep in mind that a passage region will move in particular, if termination impedance does not match.

#### (4)-3 Maximum Level

An input level shall be less than a rated value.

If the input level beyond a rated value impressed, a crystal resonance characteristic will be deteriorated and the original characteristic will no longer be acquired as a crystal filter.

#### (4)-4 Separation between Input and Output

In order to prevent electromagnetic combination between input and output, please have shielded certainly. If it has the combination between input and output, the incoming signal may go to the output side directly in the attenuation domain. The amount of guarantee attenuation will less achievable and the original characteristic of crystal filter will no longer be acquired.

There is grounding as one of the method. It enables to have the crystal filter grounded with attachment screw or grounding terminal.

The internal part of crystal filter may be damaged, if it solders to a case directly. In addition the case of a crystal filter is grounded certainly because potential difference can be eliminated at the circuit side.

#### (4)-5 Direct-Current Superposition

When you charge direct-current, please do not have the current beyond a rated current value. Internal transformer will generate a heat and it will create a cause of bad insulation or disconnection, if excess direct current goes through filter than the rated value.



# Global Locations

For details please visit [www.murata.com](http://www.murata.com)



## ⚠ Note

### 1 Export Control

*For customers outside Japan:*

No Murata products should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to (1) any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or (2) goods or systems specially designed or intended for military end-use or utilization by military end-users.

*For customers in Japan:*

For products which are controlled items subject to the "Foreign Exchange and Foreign Trade Law" of Japan, the export license specified by the law is required for export.

2 Please contact our sales representatives or product engineers before using the products in this catalog for the applications listed below, which require especially high reliability for the prevention of defects which might directly damage a third party's life, body or property, or when one of our products is intended for use in applications other than those specified in this catalog.

- ① Aircraft equipment
- ② Aerospace equipment
- ③ Undersea equipment
- ④ Power plant equipment
- ⑤ Medical equipment
- ⑥ Transportation equipment (vehicles, trains, ships, etc.)
- ⑦ Traffic signal equipment
- ⑧ Disaster prevention / crime prevention equipment
- ⑨ Data-processing equipment
- ⑩ Application of similar complexity and/or reliability requirements to the applications listed above

3 Product specifications in this catalog are as of December 2015. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.

4 Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.

5 This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

6 Please note that unless otherwise specified, we shall assume no responsibility whatsoever for any conflict or dispute that may occur in connection with the effect of our and/or a third party's intellectual property rights and other related rights in consideration of your use of our products and/or information described or contained in our catalogs. In this connection, no representation shall be made to the effect that any third parties are authorized to use the rights mentioned above under licenses without our consent.

7 No ozone depleting substances (ODS) under the Montreal Protocol are used in our manufacturing process.

Murata Manufacturing Co., Ltd.

[www.murata.com](http://www.murata.com)

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INNOVATOR IN ELECTRONICS