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P05E.pdf
Nov.24,2011

Ceramic Filters (CERAFIL®)/ Ceramic Discriminators for Communications Equipment

muRata Innovator in Electronics

Murata Manufacturing Co., Ltd.

Cat.No.P05E-16

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/info/rohs.html).

CONTENTS

● Part Numbering

Ceramic Filters (CERAFIL®) for IF

(Part Number)

SF	P	KA	455K	D4A		-R0
SF	E	CF	10M7	DF00	S0	-R0
❶	❷	❸	❹	❺	❻	❼

❶Product ID

❷Oscillating/Element

Product ID		Oscillating/Element	
CF	Ceramic Filters	U	4 Elements Area Expansion mode
		W	6 Elements Area Expansion mode
SF		P	4 Elements Area Expansion mode
		E	2 Elements Thickness Expansion mode
		S	2 Elements Thickness Shear mode

❸Structure/Size

Code	Structure/Size
C□/K□	Chip Type
L□	Lead Type

□ is "**A**" or subsequent code, which indicates the size. It varies depending on vibration mode and number of elements.
Chip type is only applied for **SF** series.

❹Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is hertz (Hz). If the unit is "kHz", it is expressed by three figures plus "**K**." If the unit is "MHz", a decimal point is expressed by the capital letter "**M**."

❺Product Specification

Code	Product Specification
D4A	Three-digit alphanumerics express pass bandwidth, center frequency tolerance and design type.

SFE/S/J series are expressed by four-digit alphanumerics.

❻Individual Specification

Code	Individual Specification Code
001	Expressed by three-digit alphanumerics.

SFE/S/J series are expressed by two-digit alphanumerics.
With standard type, ❻ is omitted.

❼Packaging

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

Embossed taping is applied to chip type.

Ceramic Discriminators for IF (kHz)

(Part Number) CD B LB 450K C A X 16 -B0
❶ ❷ ❸ ❹ ❺ ❻ ❼ ❽ ❾

❶Product ID

Product ID	
CD	Ceramic Discriminators

❷Oscillating

Code	Oscillating
B	Area Expansion mode

❸Structure/Size

Code	Structure/Size
C□/K□	Chip Type
L□	Lead Type

□ is "**A**" or subsequent code, which indicates the size. It varies depending on vibration mode and number of elements.

❹Nominal Center Frequency

Expressed by four-digit alphanumerics. The unit is in hertz (Hz). Capital letter "**K**" following three figures expresses the unit of "kHz."

❺Detection

Code	Detection
C	Quadrature Detection

❻Application

Code	Application
A	Standard
L	Application with coil

❼Element Type

Code	Element Type
X	Low-capacitance
Y	High-capacitance

❽IC

Code	IC
16	Applicable IC Control code

❾Packaging

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

Embossed taping is applied to chip type. With non-standard products, one letter indicating "Individual Specification" is added between "❽Applicable IC" and "❾Package Specification code."

Ceramic Discriminators for IF (MHz)

(Part Number) CD S CB 10M7 GF 001 -R0
❶ ❷ ❸ ❹ ❺ ❻ ❼

❶Product ID

Product ID	
CD	Discriminators

❷Oscillation

Code	Oscillation
S	Thickness Shear mode

❸Structure/Size

Code	Structure/Size
C□	Chip Type

□ is expressed "**A**" or subsequent code, which indicates the size.

❹Nominal Center Frequency

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

❺Product Specification

Code	Product Specification
GF	Two-digit alphanumerics express type, center frequency, rank, others

❻IC

Code	IC
001	Applicable IC Control Code

❼Packaging

Code	Packaging
-R0	Embossed Taping ø=180mm

With non-standard products, an alphanumerics indicating "Individual Specification" is added between "❻IC" and "❼Packaging."

Products Guide

●SMD Type (kHz)

Type	Applications	General Use											Attenuation (dB) min.
	Series	6dB Bandwidth (kHz) min.											
		A	B	C	D	E	F	G	H	J	K	L	
		±17.5	±15	±12.5	±10	±7.5	±6	±4.5	±3	±2	±1.5	±1	Within 455±80 or ±100kHz
High Selectivity Series (Plastic Case Type)	**SFPKA455K□** (4 Elements)	–	–	–	●	●	●	●	●	–	–	–	27 (G to H; 25)
	CFUKG455K□ (4 Elements)	–	–	–	●	●	●	●	–	–	–	–	27 (G; 25)
Narrow Bandwidth GDT Flat Type Miniature Series (Plastic Case Type)	**CFUKG455K□X** (4 Elements)	–	–	–	–	●	●	●	●	–	–	–	27 (G to H; 25)
GDT Flat Type Miniature Series (Plastic Case Type)	**CFUKF455K□** (4 Elements)	●	●	●	●	●	–	–	–	–	–	–	25 (D to E; 23)
GDT Flat Type High Selectivity SMD Series (Plastic Case Type)	**CFWKA450KBFY** (6 Elements)	–	●	–	–	–	–	–	–	–	–	–	45
High Selectivity SMD Series (Plastic Case Type)	**CFWKA450K□** (6 Elements)	–	–	–	●	●	●	●	–	–	–	–	50

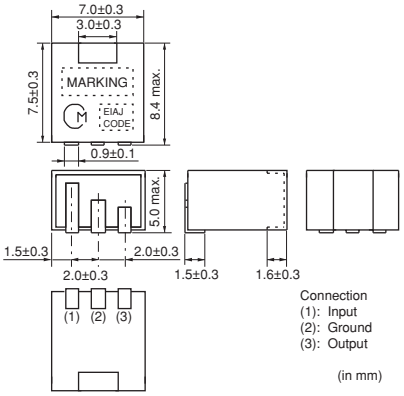
●Lead Type (kHz)

Type	Applications	General Use											Attenuation (dB) min.
	Series	6dB Bandwidth (kHz) min.											
		A	B	C	D	E	F	G	H	J	K	L	
		±17.5	±15	±12.5	±10	±7.5	±6	±4.5	±3	±2	±1.5	±1	Within 455±80 or ±100kHz
High Selectivity Low Profile Series	**CFULA455K□** (4 Elements)	–	●	●	●	●	●	●	●	–	–	–	27 (G; 25) (H; 35)
	CFWLA455K□ (6 Elements)	–	●	●	●	●	●	●	●	●	–	–	35 (H, J; 60)
High Selectivity Miniature Series	**CFULB455K□** (4 Elements)	–	●	●	●	●	●	●	●	●	–	–	27 (G; 25) (H, J; 35)
	CFWLB455K□ (6 Elements)	–	●	●	●	●	●	●	●	●	–	–	35 (H, J; 55)
GDT Flat Type Series	**CFULA455K□Y** (4 Elements)	–	●	●	●	●	●	●	–	–	–	–	25 (D to G; 23)
	CFWLA455K□Y (6 Elements)	●	●	●	●	●	●	●	–	–	–	–	40
GDT Flat Type Miniature Series	**CFULB455K□Y** (4 Elements)	–	●	●	●	●	●	●	–	–	–	–	25 (D to G; 23)
	CFWLB455K□Y (6 Elements)	●	●	●	●	●	●	●	–	–	–	–	40 (F; 35)

Ceramic Filters (CERAFIL®) for Communications Equipment

CERAFIL® kHz SMD Type SFPKA Series

The SFPKA series is comprised of small, high-performance, economical, thin (5.0mm) filters consisting of 4 ceramic elements. Their innovative construction is perfect for shrinking mobile communication products such as cordless phones, pagers and transceivers.



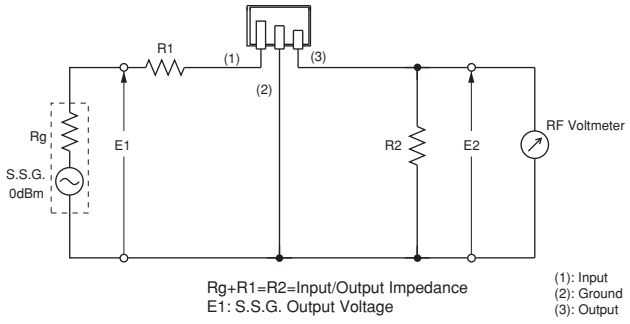
■ Features

1. The filters are mountable by automatic placers.
2. The filters can be reflow soldered and withstand washing.
3. They are slim, at only 5.0mm maximum thickness.
4. The bandwidth ranges from D to H.
5. Operating temperature range: -20 to +80 (°C)
   Storage temperature range: -40 to +85 (°C)

Part Number	Center Frequency (fo) (kHz)	6dB Bandwidth (kHz)	Stop Bandwidth (kHz)	Stop Band Attenuation (dB)	Insertion Loss (dB)	Ripple (dB)	Input/Output Impedance (ohm)
SFPKA455KD4A-R1	455 ±1.5kHz	fn±10.0 min.	fn±20.0 max. [within 40dB]	27 min. [within fn±100kHz]	4.0 max. [at minimum loss point]	2.0 max. [within fn±7kHz]	1500
SFPKA455KE4A-R1	455 ±1.5kHz	fn±7.5 min.	fn±15.0 max. [within 40dB]	27 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.5 max. [within fn±5kHz]	1500
SFPKA455KF4A-R1	455 ±1.5kHz	fn±6.0 min.	fn±12.5 max. [within 40dB]	27 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.5 max. [within fn±4kHz]	1500
SFPKA455KG1A-R1	455 ±1.0kHz	fn±4.5 min.	fn±10.0 max. [within 40dB]	25 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.5 max. [within fn±3kHz]	1500
SFPKA455KH1A-R1	455 ±1.0kHz	fn±3.0 min.	fn±9.0 max. [within 40dB]	35 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.5 max. [within fn±2kHz]	2000

Center frequency (fo) defined by the center of 6dB bandwidth.
(fn) means nominal center frequency 455kHz.
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 package page in this catalog.

■ Test Circuit

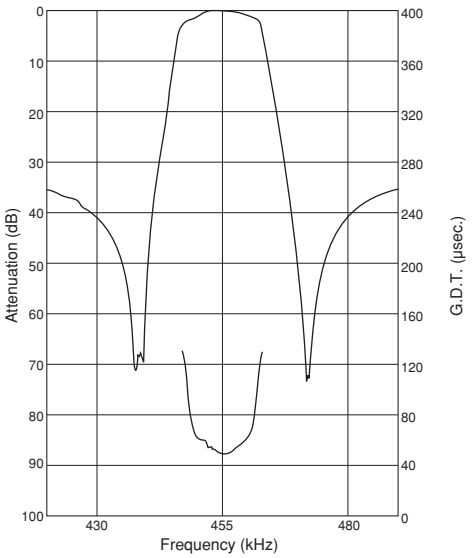


Rg+R1=R2=Input/Output Impedance
E1: S.S.G. Output Voltage

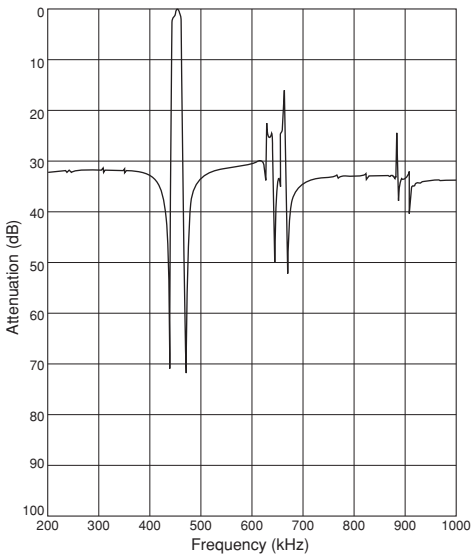
(1): Input
(2): Ground
(3): Output

■ Frequency Characteristics

SFPKA455KE4A-R1



SFPKA455KE4A-R1

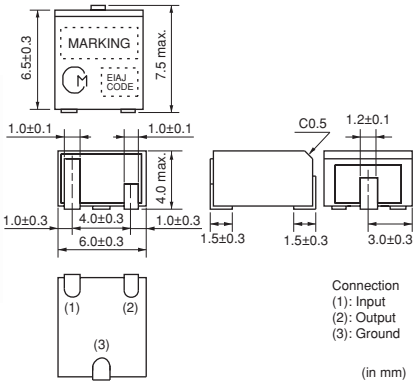


Ceramic Filters (CERAFIL®) for Communications Equipment

muRata

CERAFIL® kHz SMD Type CFUKG Series

The CFUKG series is comprised of small, high-performance, thin (4.0mm) filters consisting of 4 ceramic elements. Their innovative construction is perfect for shrinking mobile communication products such as pocket pagers and cellular phones.



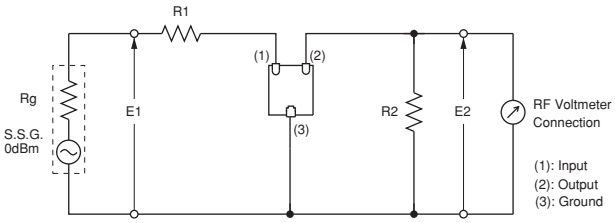
■ Features

1. The filters are mountable by automatic placers.
2. The filters can be reflow soldered and withstand washing.
3. They are slim, at only 4.0mm maximum thickness, and have a small mounting area (7.5x6.0mm) enabling flexible PCB design.
4. The bandwidth ranges from D to G.
5. Operating temperature range: -20 to +80 (°C)
   Storage temperature range: -40 to +85 (°C)

Part Number	Center Frequency (fo) (kHz)	6dB Bandwidth (kHz)	Stop Bandwidth (kHz)	Stop Band Attenuation (dB)	Insertion Loss (dB)	Ripple (dB)	Input/Output Impedance (ohm)
CFUKG455KD4A-R0	455 ±1.5kHz	fn±10.0 min.	fn±20.0 max. [within 40dB]	27 min. [within fn±100kHz]	4.0 max. [at minimum loss point]	2.0 max. [within fn±7kHz]	1500
CFUKG455KE4A-R0	455 ±1.5kHz	fn±7.5 min.	fn±15.0 max. [within 40dB]	27 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.5 max. [within fn±5kHz]	1500
CFUKG455KF4A-R0	455 ±1.5kHz	fn±6.0 min.	fn±12.5 max. [within 40dB]	27 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.5 max. [within fn±4kHz]	1500
CFUKG455KG1A-R0	455 ±1.0kHz	fn±4.5 min.	fn±10.0 max. [within 40dB]	25 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.5 max. [within fn±3kHz]	1500

Center frequency (fo) defined by the center of 6dB bandwidth.
(fn) means nominal center frequency 455kHz.
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 package page in this catalog.

■ Test Circuit

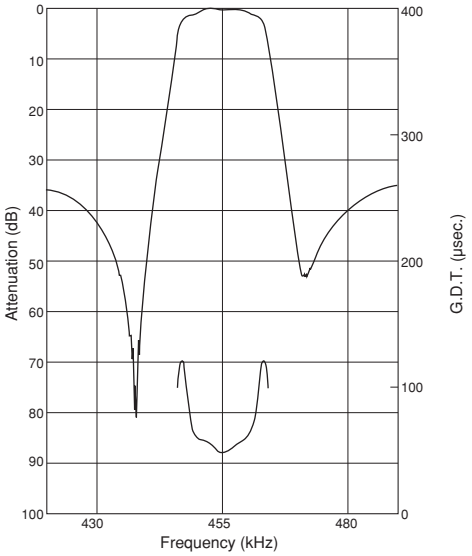


Rg+R1=R2=Input/Output Impedance

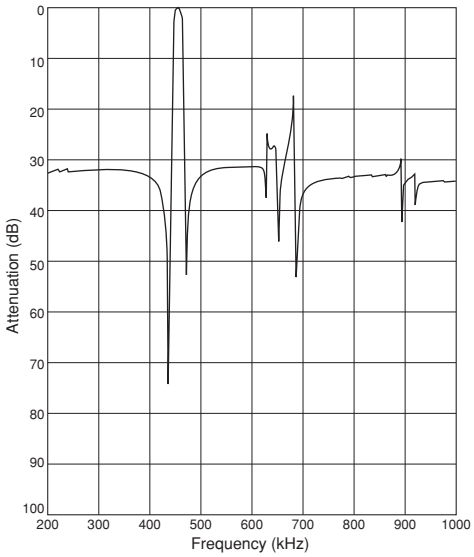
2

■ Frequency Characteristics

CFUKG455KE4A-R0



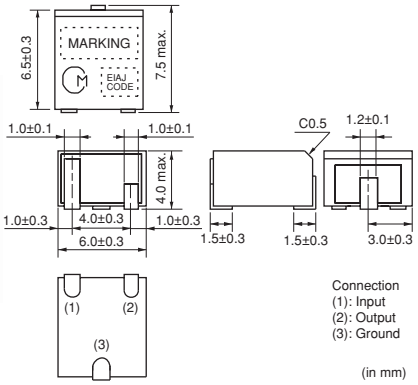
CFUKG455KE4A-R0



Ceramic Filters (CERAFIL®) for Communications Equipment

CERAFIL® kHz SMD Type CFUKG_X Series

The CFUKG_X series is comprised of small, high-performance, thin (4.0mm) filters consisting of 4 ceramic elements.
The filters exhibit an extremely flat GDT characteristic combined with a narrow bandwidth.
The filters are recommended for narrow band digital communication applications.



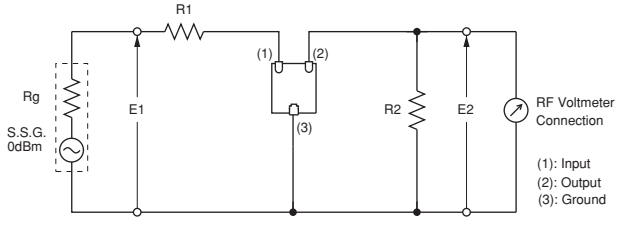
■ Features

1. The filters are mountable by automatic placers.
2. The filters can be reflow soldered and withstand washing.
3. They are slim, at only 4.0mm maximum thickness, and have a small mounting area (7.5x6.0mm) enabling flexible PCB design.
4. The bandwidth ranges from E to H.
5. Operating temperature range: -20 to +80 (°C)
   Storage temperature range: -40 to +85 (°C)

Part Number	Center Frequency (fo) (kHz)	6dB Bandwidth (kHz)	Stop Bandwidth (kHz)	Stop Band Attenuation (dB)	Insertion Loss (dB)	Ripple (dB)	GDT Deviation (μs)	Input/Output Impedance (ohm)
CFUKG455KE4X-R0	455 ±1.5kHz	fn±7.5 min.	fn±17.5 max. [within 40dB]	27 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.0 max. [within fn±5kHz]	25.0 max. [within fn±5kHz]	1500
CFUKG455KF4X-R0	455 ±1.5kHz	fn±6.0 min.	fn±15.0 max. [within 40dB]	27 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.0 max. [within fn±4kHz]	25.0 max. [within fn±4kHz]	1500
CFUKG455KG1X-R0	455 ±1.0kHz	fn±4.5 min.	fn±12.5 max. [within 40dB]	25 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.0 max. [within fn±3kHz]	25.0 max. [within fn±3kHz]	1500
CFUKG455KH1X-R0	455 ±1.0kHz	fn±3.0 min.	fn±10.0 max. [within 40dB]	25 min. [within fn±100kHz]	7.0 max. [at minimum loss point]	1.0 max. [within fn±2kHz]	25.0 max. [within fn±2kHz]	1500

Center frequency (fo) defined by the center of 6dB bandwidth.
(fn) means nominal center frequency 455kHz.
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 package page in this catalog.

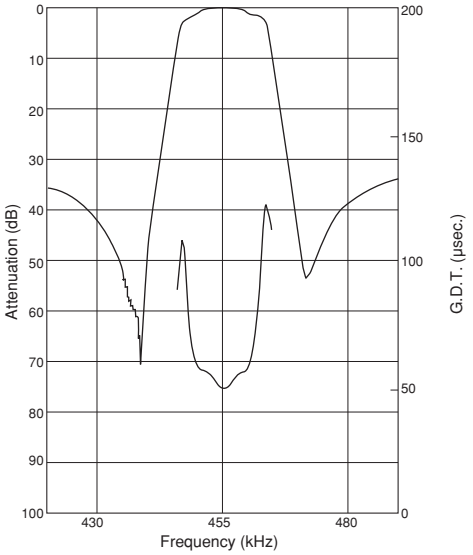
■ Test Circuit



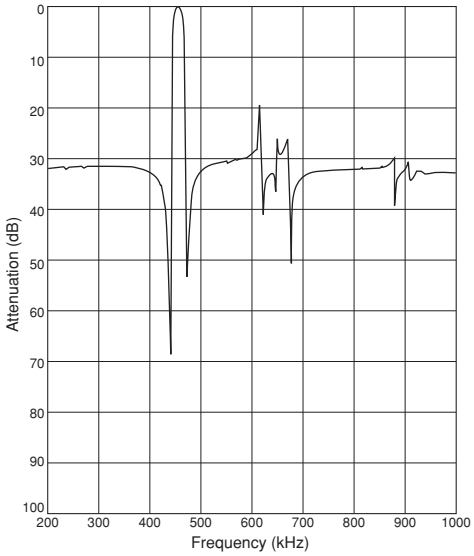
Rg+R1=R2=Input/Output Impedance

■ Frequency Characteristics

CFUKG455KE4X-R0



CFUKG455KE4X-R0



Ceramic Filters (CERAFIL®) for Communications Equipment

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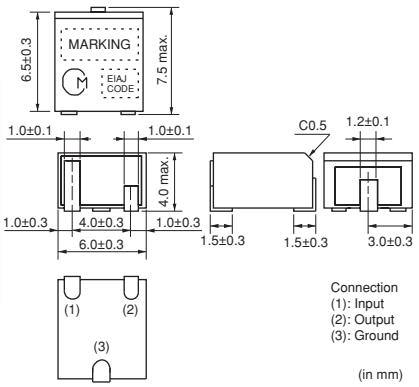
CERAFIL® kHz SMD Type CFUKF Series

The CFUKF series is comprised of small, high-performance, thin (4.0mm) filters consisting of 4 ceramic elements.
The filters exhibit an extremely flat GDT characteristic.
The filters are recommended for digital communication applications and are perfect in hand-held cellular phones, etc.



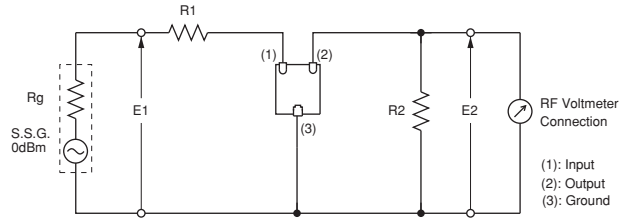
■ Features

1. The filters are mountable by automatic placers.
2. The filters can be reflow soldered and withstand washing.
3. They are slim, at only 4.0mm maximum thickness, and have a small mounting area (7.5x6.0mm) enabling flexible PCB design.
4. The bandwidth ranges from A to E.
5. Operating temperature range: -20 to +80 (°C)
   Storage temperature range: -40 to +85 (°C)

Part Number	Center Frequency (fo) (kHz)	6dB Bandwidth (kHz)	Stop Bandwidth (kHz)	Stop Band Attenuation (dB)	Insertion Loss (dB)	Ripple (dB)	GDT Deviation (μs)	Input/Output Impedance (ohm)
CFUKF455KA2X-R0	455 ±2.0kHz	fn±17.5 min.	fn±40.0 max. [within 40dB]	25 min. [within fn±100kHz]	4.0 max. [at minimum loss point]	1.0 max. [within fn±12kHz]	15.0 max. [within fn±12kHz]	1000
CFUKF455KB4X-R0	455 ±1.5kHz	fn±15.0 min.	fn±35.0 max. [within 40dB]	25 min. [within fn±100kHz]	5.0 max. [at minimum loss point]	1.0 max. [within fn±10kHz]	15.0 max. [within fn±10kHz]	1000
CFUKF455KC4X-R0	455 ±1.5kHz	fn±12.5 min.	fn±30.0 max. [within 40dB]	25 min. [within fn±100kHz]	6.0 max. [at minimum loss point]	1.0 max. [within fn±8kHz]	15.0 max. [within fn±8kHz]	1000
CFUKF455KD1X-R0	455 ±1.0kHz	fn±10.0 min.	fn±25.0 max. [within 40dB]	23 min. [within fn±100kHz]	7.0 max. [at minimum loss point]	1.0 max. [within fn±7kHz]	20.0 max. [within fn±7kHz]	1500
CFUKF455KE1X-R0	455 ±1.0kHz	fn±7.5 min.	fn±20.0 max. [within 40dB]	23 min. [within fn±100kHz]	8.0 max. [at minimum loss point]	1.0 max. [within fn±5kHz]	20.0 max. [within fn±5kHz]	1500

Center frequency (fo) defined by the center of 6dB bandwidth.
(fn) means nominal center frequency 455kHz.
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 package page in this catalog.

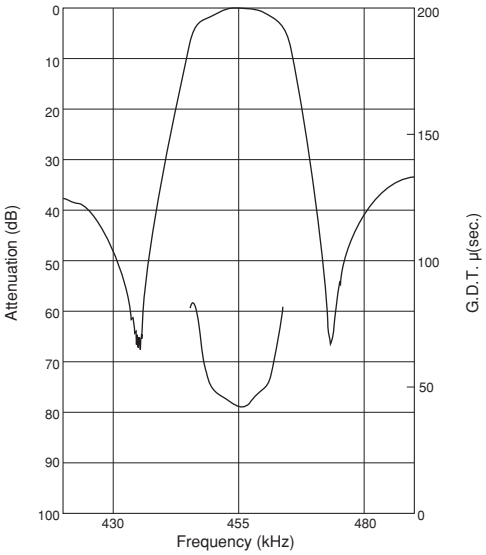
■ Test Circuit



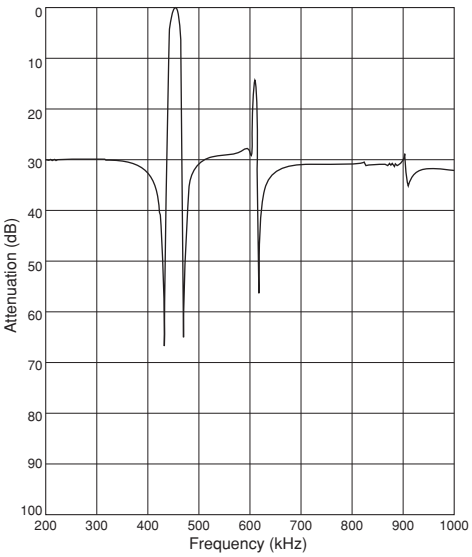
Rg+R1=R2=Input/Output Impedance

■ Frequency Characteristics

CFUKF455KE1X-R0



CFUKF455KE1X-R0

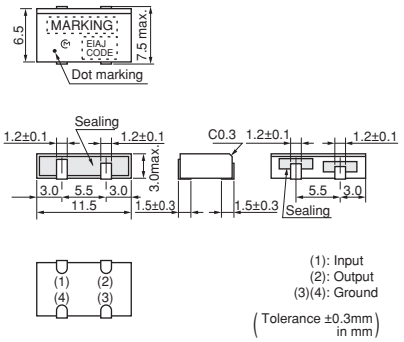


Ceramic Filters (CERAFIL®) for Communications Equipment

muRata

CERAFIL® kHz SMD Type CFWKA Series

The CFWKA series is comprised of small, high-performance, thin (3.0mm) filters consisting of 6 ceramic elements. The filters are recommend for pager or hand-held cellular phones.



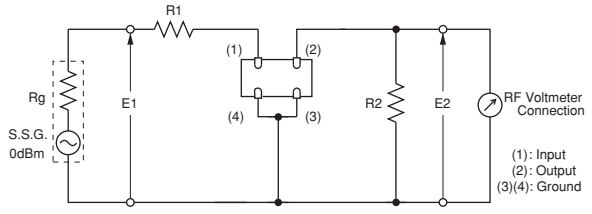
■ Features

1. The filters are mountable by automatic placers.
2. The filters can be reflow soldered.
3. They are slim, at only 3.0mm maximum thickness.
4. The filters are wide bandwidth, flat GDT within pass band.
5. Operating temperature range: -20 to +80 (°C)
   Storage temperature range: -40 to +85 (°C)

Part Number	Nominal Center Frequency (fn) (kHz)	3dB Bandwidth (kHz)	6dB Bandwidth (kHz)	Stop Bandwidth (kHz)	Stop Band Attenuation (dB)	Stop Band Att.(2) (dB)	Insertion Loss (dB)	Ripple (dB)	Input/Output Impedance (ohm)
CFWKA450KDFA-R0	450.0	-	fn±10.0 min.	fn±20.0 max. [within 50dB]	50 min. [within fn±100kHz]	-	4.0 max. [at minimum loss point]	3.0 max. [within fn±7kHz]	1500
CFWKA450KEFA-R0	450.0	-	fn±7.5 min.	fn±15.0 max. [within 50dB]	50 min. [within fn±100kHz]	-	6.0 max. [at minimum loss point]	3.0 max. [within fn±5kHz]	1500
CFWKA450KEFA001-R0	450.0	fn±6.5 min.	-	fn±15.0 max. [within 50dB]	55 min. [fn±18 to ±33kHz]	50 min. [within fn±100kHz]	4.0 max. [at fn]	3.0 max. [within fn±6.5kHz]	1500
CFWKA450KFFA-R0	450.0	-	fn±6.0 min.	fn±12.5 min. [within 50dB]	50 min. [within fn±100kHz]	-	6.0 max. [at minimum loss point]	3.0 max. [within fn±4kHz]	1500
CFWKA450KGFA-R0	450.0	-	fn±4.5 min.	fn±11.0 max. [within 50dB]	50 min. [within fn±100kHz]	-	6.0 max. [at minimum loss point]	2.0 max. [within fn±3kHz]	1500

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 package page in this catalog.

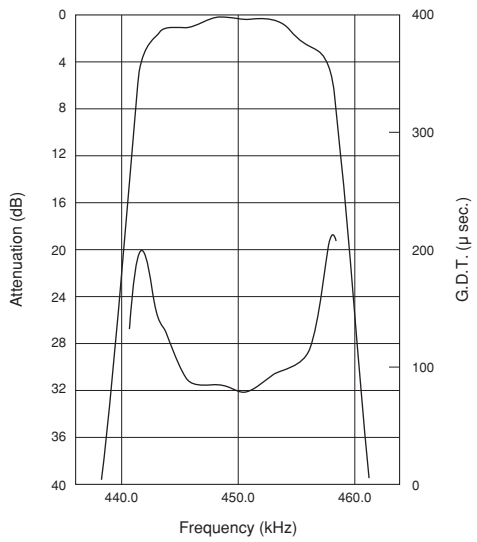
■ Test Circuit



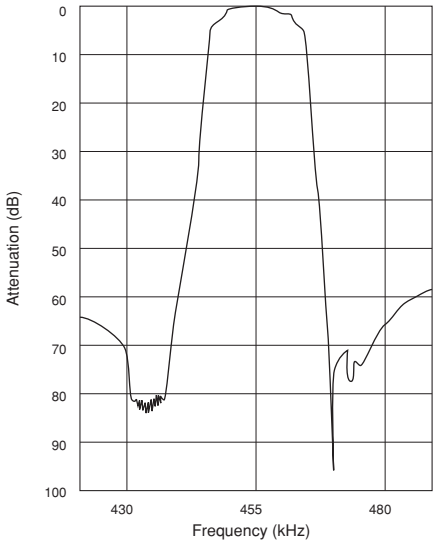
Rg+R1=R2=Input/Output Impedance

■ Frequency Characteristics

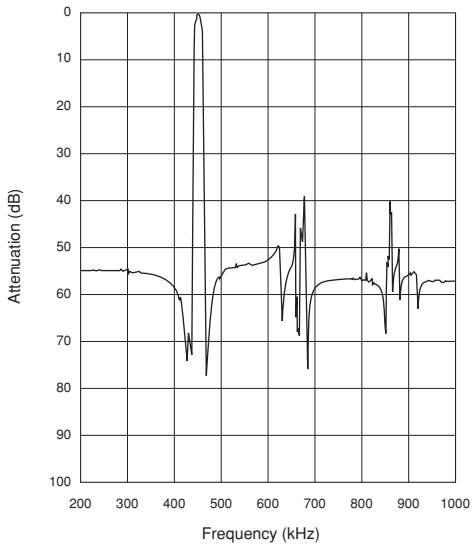
CFWKA450KEFA001-R0



CFWKA450KEFA001-R0



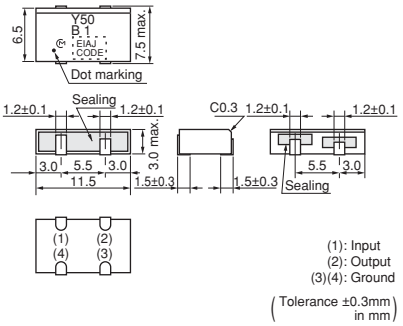
CFWKA450KEFA001-R0



Ceramic Filters (CERAFIL®) for Communications Equipment

CERAFIL® kHz SMD Type CFWKA_Y Series

The CFWKA_Y series is comprised of small, high-performance, thin (3.0mm) filters consisting of 6 ceramic elements. The filters are recommend for digital communication applications and are perfect in hand-held cellular phones.



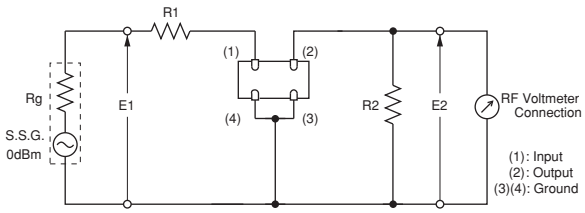
■ Features

1. The filters are mountable by automatic placers, and can be reflow soldered.
2. They are slim, at only 3.0mm maximum thickness.
3. The filters are wide bandwidth, flat GDT within pass band.
4. Operating temperature range: -20 to +80 (°C)
   Storage temperature range: -40 to +85 (°C)

Part Number	Nominal Center Frequency (fn) (kHz)	3dB Bandwidth (kHz)	6dB Bandwidth (kHz)	Stop Bandwidth (kHz)	Stop Band Attenuation (dB)	Insertion Loss (dB)	Spurious Response (dB)	GDT Deviation (μs)	Input/Output Impedance (ohm)
CFWKA450KBFY001-R0	450.0	fn±11.5 min.	fn±13.0 min.	fn±30.0 max. [within 50dB]	45 min. [within fn±100kHz]	4.0 max. [at minimum loss point]	20 min. [within 0.1 to 1.0MHz]	30.0 max. [within fn±10kHz]	1000

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 package page in this catalog.

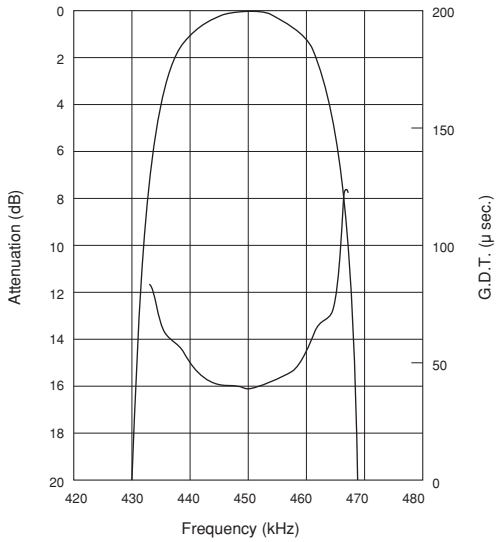
■ Test Circuit

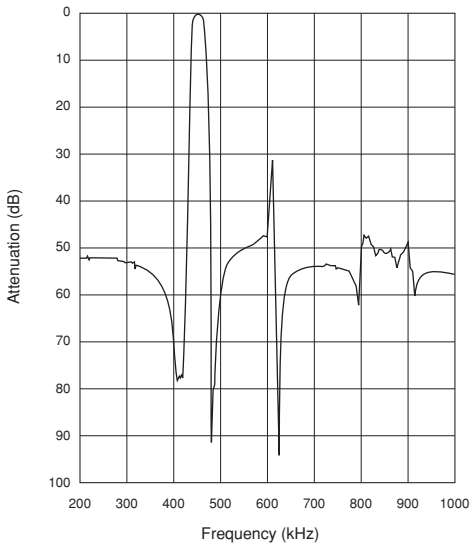


Rg+R1=R2=Input/Output Impedance

6

■ Frequency Characteristics





6

kHz SMD Type CERAFIL® Notice

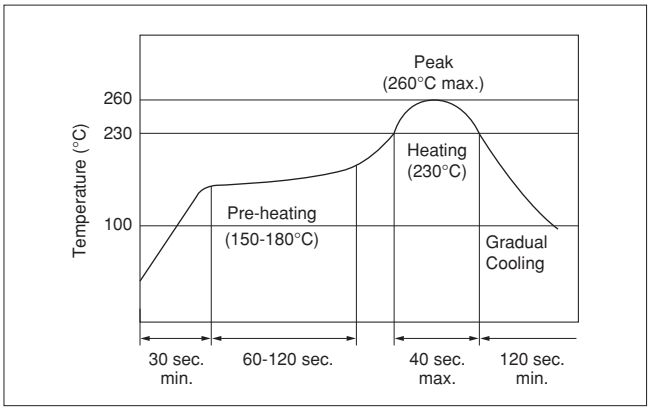
■ SFPKA/CFUKG/CFUKF Series Notice

● Soldering and Mounting

1. Standard Reflow Soldering Conditions

(1) Reflow

Filter is soldered twice within the following temperature conditions.



(2) Soldering Iron

Electrode is directly soldered with the tip of soldering iron at +350±5°C for 3.0±0.5 seconds.

(3) Other

Do not use strong acidity flux, more than 0.2wt% chlorine content, in reflow soldering.

2. Wash

(1) Cleaning Solvent

CFC alternatives (HCFC Series), Isopropyl Alcohol (IPA), Water (Demineralized Water), Cleaning Water Solution (Cleanthrough-750H, Pine Alpha 100S), Silicon (Technocare FRW)

(2) Cleaning Conditions

- Immersion Wash
  2 minutes max. in above solvent at +60°C max.
- Shower or Rinse Wash
  2 minutes max. in above solvent at +60°C max.

(3) Notice

- When components are immersed in solvent, be sure to maintain the temperature of components below the temperature of solvent.
- Please do not use ultrasonic cleaning.
- Total washing time should be 4 minutes maximum.
- Please ensure the component is thoroughly evaluated in your application circuit.
- Please do not use chlorine, petroleum or alkali cleaning solvent.
- If you plan to use any other types of solvents, please consult with Murata or Murata representative prior to using.

3. Coating

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

Continued on the following page.

kHz SMD Type CERAFIL® Notice

Continued from the preceding page.

● Storage and Operating Conditions

1. Product Storage Condition
   Please store the products in a room where the temperature/humidity is stable, and avoid such 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 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

1. If the component is cleaned, please confirm that the reliability has not been degraded.
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 package cracks or reliability degradation caused by thermal stress. When unpacked, store the component in an atmosphere of below 25°C and below 65%R.H., and solder within 48 hours.
3. 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.

kHz SMD Type CERAFIL® Notice

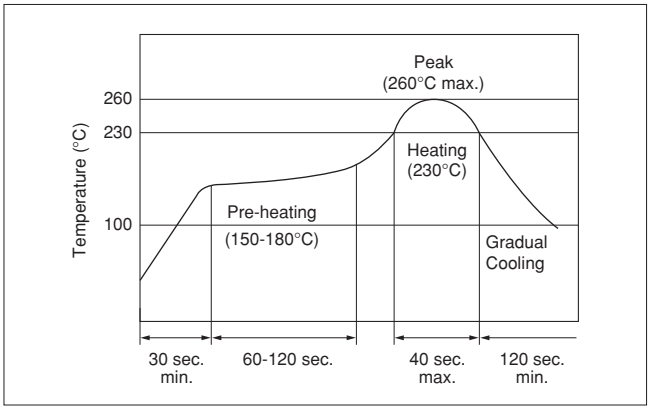
■ CFWKA Series Notice

● Soldering and Mounting

1. Standard Reflow Soldering Conditions

(1) Reflow

Filter is soldered twice within the following temperature conditions.



(2) Soldering Iron

Electrode is directly soldered with the tip of soldering iron at +350±5°C for 3.0±0.5 seconds.

(3) Other

Do not use strong acidity flux, more than 0.2wt% chlorine content, in reflow soldering.

2. Wash

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

3. Coating

Do not apply conformal coating onto the component as it's not hermetically sealed.

● 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 condition.
(5) Please do not drop the products to avoid cracking of 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.

Continued on the following page.

kHz SMD Type CERAFIL® Notice

Continued from the preceding page.

● Rating

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

● Handling

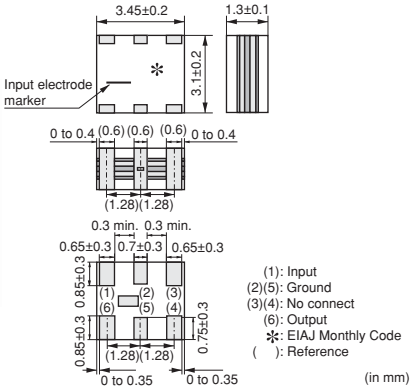
For safety purposes, connect the output of filters to the IF amplifier through a D.C. blocking capacitor. Avoid applying a direct current to the output of ceramic filters.

Ceramic Filters (CERAFIL®) for Communications Equipment

muRata

CERAFIL® MHz SMD Type SFECF10M7 Series

SFECF10M7 series for FM receivers are small, high-performance and super thin (1.4mm max.) filters. The piezoelectric element is sandwiched by the ceramics substrate.
They have 1.4mm max. thickness and a small mounting area (3.45x3.1mm).
SFECF series and CDSCB series (MHz Discriminator) enable customers to make VICS/RKE/TPMS set 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 selectivity.
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 center of 3dB bandwidth.
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 package page in this catalog.

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-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
SFECF10M7HF00S0-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
SFECF10M7GA00S0-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
SFECF10M7GF00S0-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
SFECF10M7FA00S0-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
SFECF10M7FF00S0-R0	-	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-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
SFECF10M7DF00S0-R0	-	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

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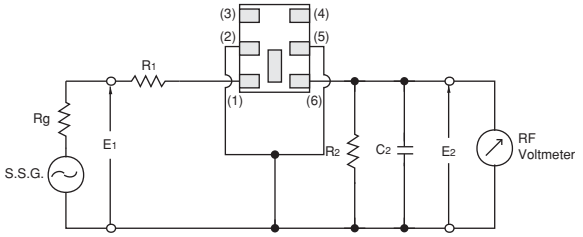
Area of Attenuation: [within 20dB]
Area of Insertion Loss: at minimum loss point Area of Ripple: within 3dB B.W.
Center frequency (fo) defined by center of 3dB bandwidth.
For safety purposes, connect the output of filters to the IF amplifier through a DC blocking capacitor. Avoid applying a direct current to the output of ceramic filters.
The order quantity should be an integral multiple of the "Minimum Quantity" shown in package page in this catalog.

■ Test Circuit

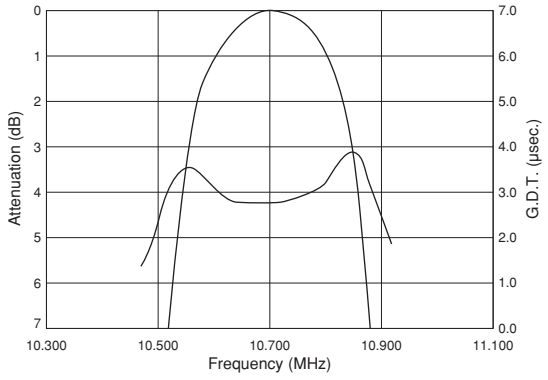


Rg = 50Ω R1 = 280Ω ±5% R2 = 330Ω ±5%
C2 = 10 ± 2 pF (Including stray capacitance and Input capacitance of RF Volt Meter)
E1: S.S.G. Output Voltage

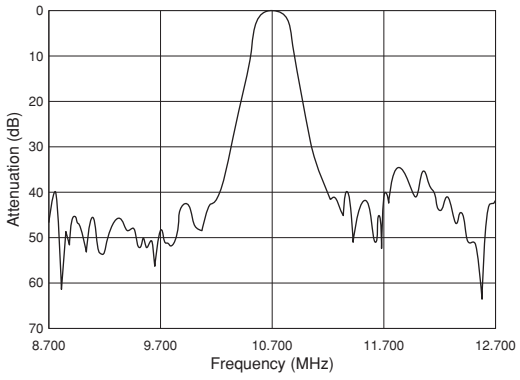
(1): Input
(2)(5): Ground
(3)(4): No connect
(6): Output

■ Frequency Characteristics

SFECF10M7FA00-R0



SFECF10M7FA00-R0

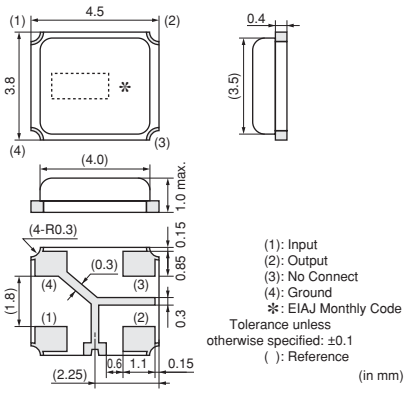


Ceramic Filters (CERAFIL®) for Communications Equipment

muRata

CERAFIL® MHz SMD Type SFSCE10M7 Series

SFSCE series are chip surface mount filters available for 3dB bandwidth at 700kHz to 1.3MHz. (more than twice 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)

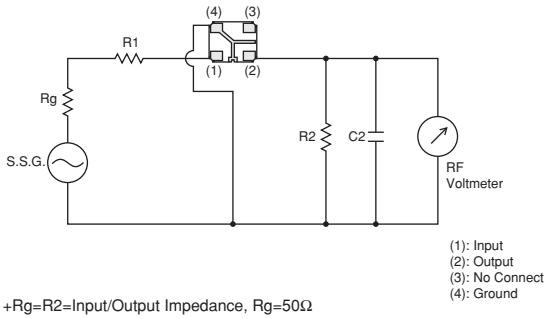
■ Applications

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-R0	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-R0	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-R0	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 package page in this catalog.

■ Test Circuit



R1+Rg=R2=Input/Output Impedance, Rg=50Ω
C2=10pF (Including stray capacitance and Input capacitance of RF Voltmeter)
E1: S.S.G. Output Voltage