



FILTERS

ceramic • saw • dielectric

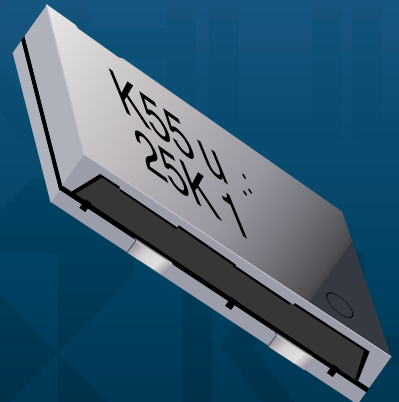
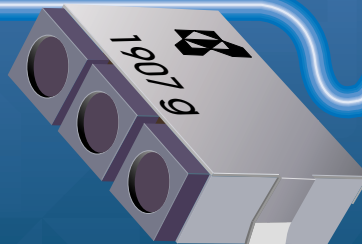
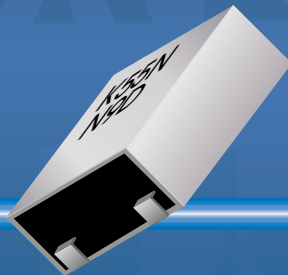
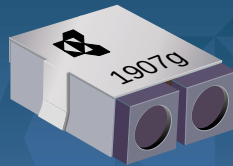
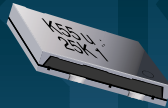
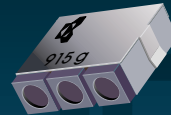
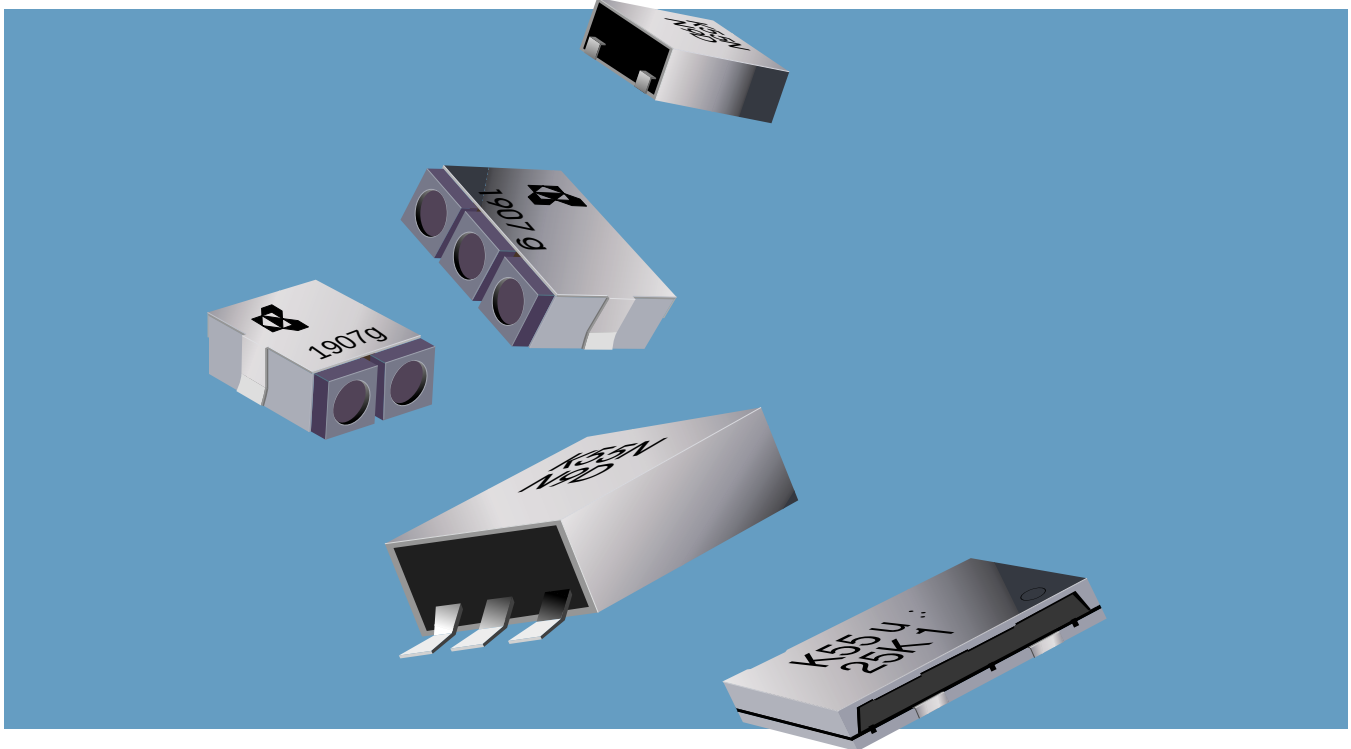


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AVX/KYOCERA Ceramic Filters



General Description

AVX/KYOCERA's sophisticated ceramics technology has greatly increased selectivity and wide-band characteristics, and has stabilized the characteristics of ceramic filters. The series covers a wide range of attenuation and bandwidths to allow selection of the most optimum filter characteristics for each application.

AVX/KYOCERA filters are bandpass filters consisting of one or more ceramic resonators connected in a ladder network configuration. Passband characteristics are determined by the relative resonant and anti-resonant frequencies of the resonators. Both narrow and wide passband configurations are manufactured by adjusting the resonator frequency characteristics.

This is illustrated in figure 2 for a single ladder. The difference between the resonance frequency of the series resonator and the anti-resonance frequency of the parallel resonator determines the bandwidth of the ceramic filter (figure 3). Attenuation is determined by the ratio of the equivalent circuit parallel capacitors (C_p/C_s) for the resonators. The higher capacitance value for the parallel resonator can be obtained by using a thinner dielectric than for the series resonator. This maintains relative tracking of capacitance values over the operating temperature range and assures excellent temperature characteristics for the ceramic filter.

Input and output impedance should be matched closely to the values listed for each ceramic filter. Incorrect impedance matching could result in shifts of the center frequency and increase ripple over those specified.

The terminology used to describe the performance of ceramic filters is illustrated in figure 1. All attenuation measurements are referenced to the insertion loss ratio of input and output. This will be between 4 and 6dB maximum. The passband width is measured at 6dB below the reference insertion loss level. For larger ladders, it is also defined at 40 or 50dB for 4- or 6-element filters respectively.

The frequency at the center of the passband width is called the center frequency. It may not be the frequency of minimum loss. Variations in the passband region below the insertion loss level is called ripple and is expressed in dB's. The points of detuning (maximum attenuation) around the center frequency are called the stop band attenuation or selectivity. Spurious response is an expression relating to the minimum attenuation of unwanted frequencies in the stop band region referenced to the insertion loss or minimum attenuation in the passband range.

Group delay time is an expression for the distortion of linearity in the phase angle over the frequencies in the passband region. It is determined by the slope of the phase shift between input and output differentiated by the passband frequencies. Ceramic filters exhibit Gaussian filter type characteristics and special Group Delay control is available in 4-element AVX/KYOCERA filters.

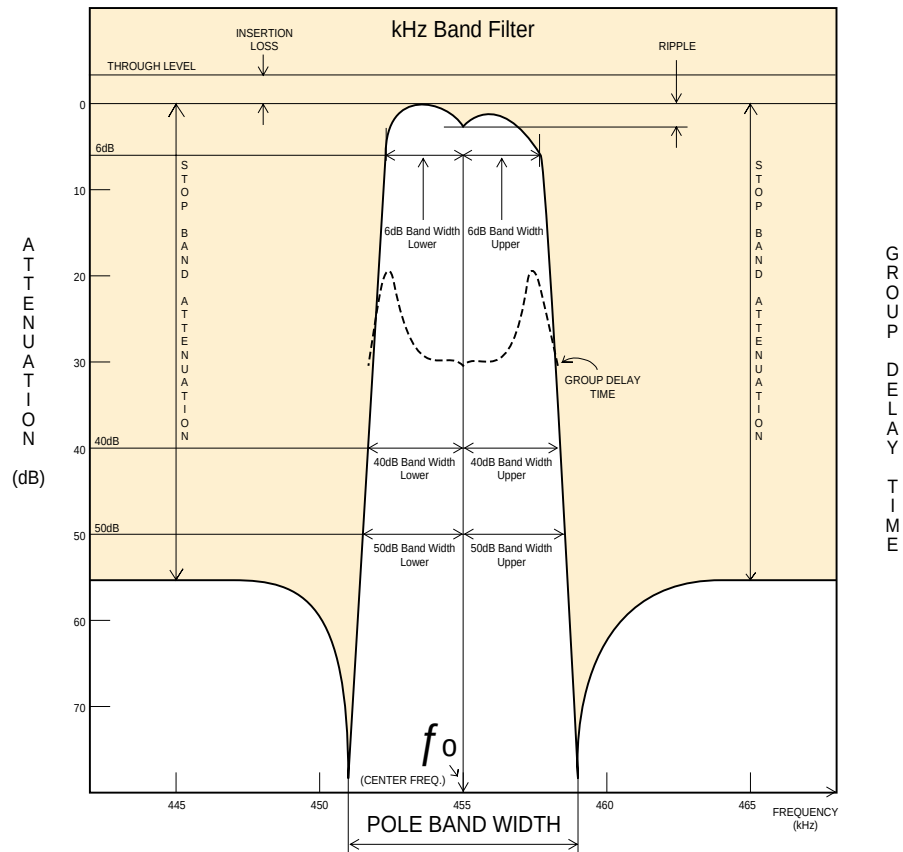


Fig. 1

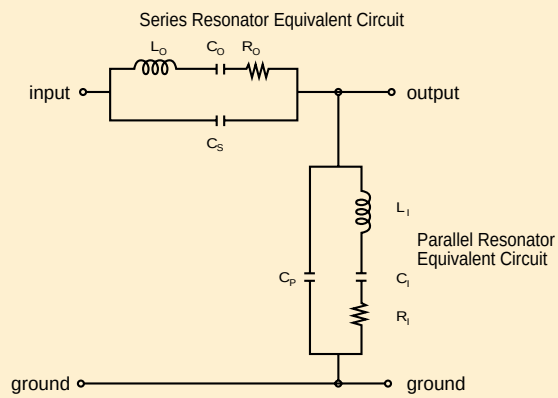


Fig. 2

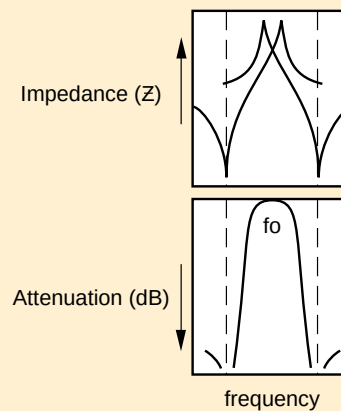


Fig. 3

kHz Band Ceramic Filters

KBF Series

Features

- 1) Compact, with high selectivity
- 2) Low insertion loss
- 3) Adjustment-free
- 4) Wide choice of passbands

How To Order

KBF - 455 R - 20 A

- ① ② ③ ④ ⑤

- ① Model (Kyocera Bulk Filter)
- ② Center frequency

450	450kHz
455	455kHz

- ③ Number of ceramic elements

R	6-element
P	4-element

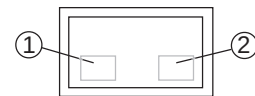
- ④ Passband width (at 6dB)

# Elements	Total Bandwidth, kHz
6-element	20, 15, 12, 10, 9, 7, 6, 4
4-element	25, 20, 15, 12, 10, 9, 7, 6, 4

- ⑤

A	High selectivity type
AS	Ultra high selectivity type

Marking

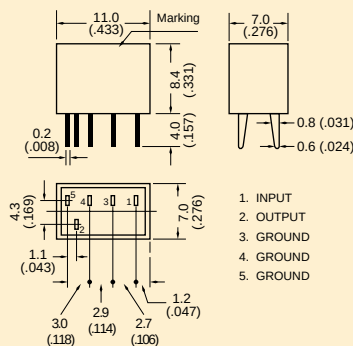


- ① Passband width (at 6dB)
- ② Manufacturing monthly code
- ③ Case color

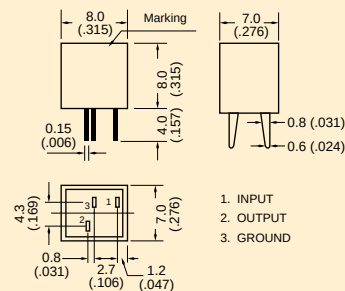
Blue	KBF-455P/R Series
Green	KBF-450P/R Series

Dimensions

KBF-R series (6-element)



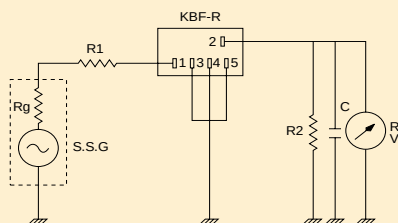
KBF-P series (4-element)



Unit: mm (inch)

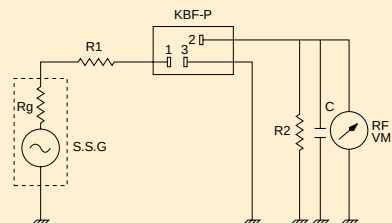
Test Circuits

KBF-R series (6-element)


$$R_1 + R_g = R_2 = \text{Input/output impedance rating}$$

- $C \leq 50\text{pF}$
(Including tool strays, wiring capacitance and RF V. M. input capacitance)

KBF-P series (4-element)


$$R_1 + R_g = R_2 = \text{Input/output impedance rating}$$

- $C \leq 50\text{pF}$
(Including tool strays, wiring capacitance and RF V. M. input capacitance)

kHz Band Ceramic Filters

KBF Series

Specifications (KBF-455 Series)

R (6-element) type

Part No.	Center Frequency (fo)	Ripple	Bandwidth		Stop Band Attenuation	Insertion Loss	Input/output Impedance	Operating Temp. Range	Group Delay Time			
			6dB	50dB								
KBF-455R-30K	455kHz±1.5kHz	2.0dB min.	±15.0kHz min.	±30.0kHz max.	40dB min.	4dB max.	1.5kΩ	-20°C to +80°C	30 μsec. max. (455±10kHz)			
KBF-455R-25K			±12.5kHz min.	±25.0kHz max.	37dB min				6dB max.	2.0kΩ	30 μsec. max. (455±8kHz)	
KBF-455R-20A			±10.0kHz min.	±20.0kHz max.								
KBF-455R-15A			±7.5kHz min.	±15.0kHz max.								
KBF-455R-12A			±6.0kHz min.	±12.5kHz max.								
KBF-455R-10A			±5.0kHz min.	±12.0kHz max.								
KBF-455R-9A	455kHz±1.0kHz		±4.5kHz min.	±10.0kHz max.	55dB min.							
KBF-455R-7A			±3.5kHz min.	±9.0kHz max.								
KBF-455R- 6AS			±3.0kHz min.	±9.0kHz max.								
KBF-455R- 4AS			±2.0kHz min.	±7.5kHz max.								

P (4-element) type

Part No.	Center Frequency (fo)	Ripple	Bandwidth		Stop Band Attenuation	Insertion Loss	Input/output Impedance	Operating Temp. Range	Group Delay Time				
			6dB	40dB									
KBF-455P-30K	455kHz±1.5kHz	2.0dB max.	±15.0kHz min.	±35.0kHz max.	27dB min.	4dB max.	1.5kΩ	-20°C to +80°C	30 μsec. max. (455±10kHz)				
KBF-455P-25K			±12.5kHz min.	±30.0kHz max.					6dB max.	2.0kΩ	30 μsec. max. (455±8kHz)		
KBF-455P-25A			±12.5kHz min.	±24.0kHz max.									
KBF-455P-20A			±10.0kHz min.	±20.0kHz max.									
KBF-455P-15A			±7.5kHz min.	±15.0kHz max.	35dB min.								
KBF-455P-12A			±6.0kHz min.	±12.5kHz max.									
KBF-455P-10A	455kHz±1.0kHz		±5.0kHz min.	±11.0kHz max.									
KBF-455P-9A			±4.5kHz min.	±10.0kHz max.									
KBF-455P-7A			±3.5kHz min.	±9.0kHz max.									
KBF-455P-6AS			±3.0kHz min.	±9.0kHz max.									
KBF-455P-4AS			±2.0kHz min.	±7.5kHz max.									

Specifications (KBF-450 Series)

R (6-element) type

Part No.	Center Frequency (fo)	Ripple	Bandwidth		Stop Band Attenuation	Insertion Loss	Input/output Impedance	Operating Temp. Range	Group Delay Time		
			6dB	50dB							
KBF-450R-30K	450kHz±1.5kHz	2.0dB min.	±15.0kHz min.	±30.0kHz max.	40dB min.	4dB max.	1.5kΩ	-20°C to +80°C	30 μsec. max. (455±10kHz)		
KBF-450R-25K			±12.5kHz min.	±25.0kHz max.	37dB min.				6dB max.	2.0kΩ	30 μsec. max. (455±8kHz)
KBF-450R-20A			±10.0kHz min.	±20.0kHz max.							
KBF-450R-15A			±7.5kHz min.	±15.0kHz max.							
KBF-450R-12A			±6.0kHz min.	±12.5kHz max.							
KBF-450R-10A			±5.0kHz min.	±12.0kHz max.							
KBF-450R-9A	450kHz±1.0kHz		±4.5kHz min.	±10.0kHz max.	55dB min.						
KBF-450R-7A			±3.5kHz min.	±9.0kHz max.							
KBF-450R- 6AS			±3.0kHz min.	±9.0kHz max.							
KBF-450R- 4AS			±2.0kHz min.	±7.5kHz max.							

P (4-element) type

Part No.	Center Frequency (fo)	Ripple	Bandwidth		Stop Band Attenuation	Insertion Loss	Input/output Impedance	Operating Temp. Range	Group Delay Time		
			6dB	40dB							
KBF-450P-30K	450kHz±1.5kHz	2.0dB max.	±15.0kHz min.	±35.0kHz max.	27dB min.	4dB max.	1.5kΩ	-20°C to +80°C	30 μsec. max. (455±10kHz)		
KBF-450P-25K			±12.5kHz min.	±30.0kHz max.					6dB max.	2.0kΩ	30 μsec. max. (455±8kHz)
KBF-450P-25A			±12.5kHz min.	±24.0kHz max.							
KBF-450P-20A			±10.0kHz min.	±20.0kHz max.							
KBF-450P-15A			±7.5kHz min.	±15.0kHz max.							
KBF-450P-12A			±6.0kHz min.	±12.5kHz max.							
KBF-450P-10A	450kHz±1.0kHz		±5.0kHz min.	±11.0kHz max.							
KBF-450P-9A			±4.5kHz min.	±10.0kHz max.							
KBF-450P-7A			±3.5kHz min.	±9.0kHz max.							
KBF-450P-6AS			±3.0kHz min.	±9.0kHz max.							
KBF-450P-4AS			±2.0kHz min.	±7.5kHz max.	35dB min.						

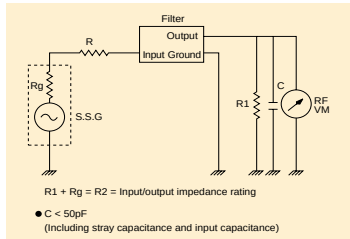
Low Profile kHz Band Ceramic Filters

KBF Series

Features

- 1) Low profile package
- 2) Compact, high selectivity
- 3) Low insertion loss
- 4) Adjustment free
- 5) Wide choice of passbands

Test Circuit



How to Order

KBF - 455 RS - 20 A

- ① Model (Kyocera Bulk Filter)
- ② Center frequency
- ③ Number of ceramic elements
- ④ Passband width (at 6dB)
- ⑤ High selectivity type
- ⑥ Standard lead length 3.5mm

450	450kHz
455	455kHz

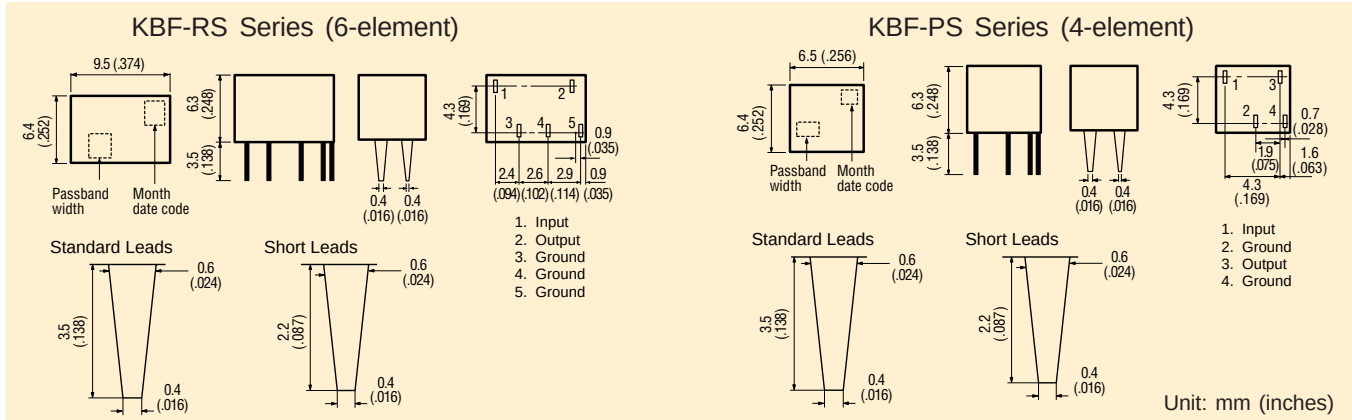
RS	6-element
PS	4-element

# Elements	Total Bandwidth, kHz
6-element	30, 25, 20, 15, 12, 10, 9, 7, 6, 4
4-element	30, 25, 20, 15, 12, 10, 9, 7, 6, 4

A	High selectivity type
AS	Ultra high selectivity type

Blank	Standard lead length 3.5mm
C	Short lead 2.2mm

Dimensions



Specifications 455kHz (450kHz available with same specifications)

KBF-RS Series (6 elements)

Part No.	Center Frequency (fo)	Ripple	Passband Width		Stop Band Attenuation	Insertion Loss	Input/Output Matching Impedance	Operating Temperature	Group Delay Time
			6dB	50dB					
KBF-455RS-30K	455kHz±1.5kHz	2.0dB max.	±15.0kHz min.	±30.0kHz max.	40dB min.	4dB max.	1.5kΩ	-20°C to +80°C	30 μsec. max. (455±10kHz)
KBF-455RS-25K			±12.5kHz min.	±25.0kHz max.					30 μsec. max. (455±8kHz)
KBF-455RS-20A			±10.0kHz min.	±20.0kHz max.	37dB min.	6dB max.	2.0kΩ		
KBF-455RS-15A			±7.5kHz min.	±15.0kHz max.					
KBF-455RS-12A			±6.0kHz min.	±12.5kHz max.					
KBF-455RS-10A			±5.0kHz min.	±12.0kHz max.					
KBF-455RS-9A	455kHz±1.0kHz		±4.5kHz min.	±10.0kHz max.	55dB min.				
KBF-455RS-7A			±3.5kHz min.	±9.0kHz max.					
KBF-455RS-6AS			±3.0kHz min.	±9.0kHz max.					
KBF-455RS-4AS			±2.0kHz min.	±7.5kHz max.					

KBF-PS Series (4 elements)

Part No.	Center Frequency (fo)	Ripple	Passband Width		Stop Band Attenuation	Insertion Loss	Input/Output Matching Impedance	Operating Temperature	Group Delay Time
			6dB	50dB					
KBF-455PS-30K	455kHz±1.5kHz	2.0dB max.	±15.0kHz min.	±35.0kHz max.	27dB min.	4dB max.	1.5kΩ	-20°C to +80°C	30 μsec. max. (455±10kHz)
KBF-455PS-25K			±12.5kHz min.	±30.0kHz max.					30 μsec. max. (455±8kHz)
KBF-455PS-25A			±12.5kHz min.	±24.0kHz max.		6dB max.	2.0kΩ		
KBF-455PS-20A			±10.0kHz min.	±20.0kHz max.					
KBF-455PS-15A			±7.5kHz min.	±15.0kHz max.					
KBF-455PS-12A			±6.0kHz min.	±12.5kHz max.					
KBF-455PS-10A	455kHz±1.0kHz		±5.0kHz min.	±12.0kHz max.	35dB min.				
KBF-455PS-7A			±3.5kHz min.	±9.0kHz max.					
KBF-455PS-6AS			±3.0kHz min.	±9.0kHz max.					
KBF-455PS-4AS			±2.0kHz min.	±7.5kHz max.					

Surface Mount kHz Band Ceramic Filters

PBFS Series

Features

- 1) Small and low profile
- 2) Excellent anti-shock performance
- 3) Reflow solder compatible
- 4) Taped for automatic placement

How to Order

PBFS 455 P 15 D R

- ① ② ③ ④ ⑤ ⑥

① Model: PBFS

② Center frequency

450	450kHz
455	455kHz

③ Number of ceramic elements

P	4-element
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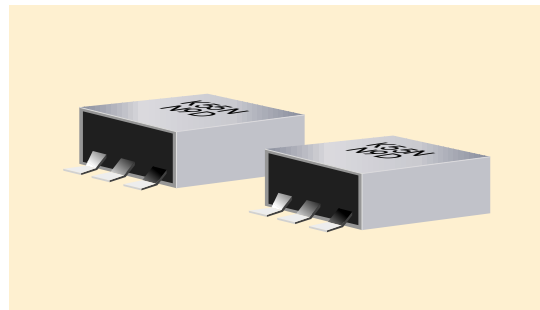
④ Passband width (at 6dB)

# Elements	Total Bandwidth, kHz
4-element	30, 25, 20, 15, 12, 9, 6, 4

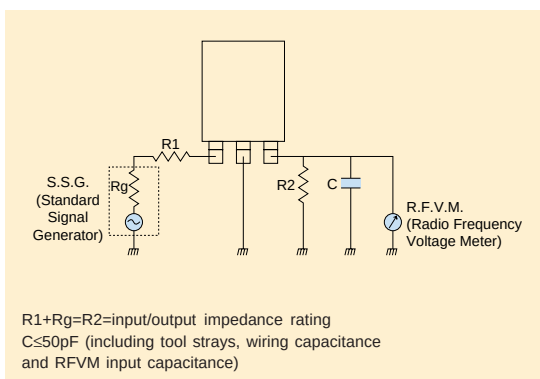
⑤

Group Delay Time		Available Bandwidth, kHz
D	Standard Group Delay	20, 15, 12, 9, 6, 4
K	Controlled Group Delay	30, 25, 20

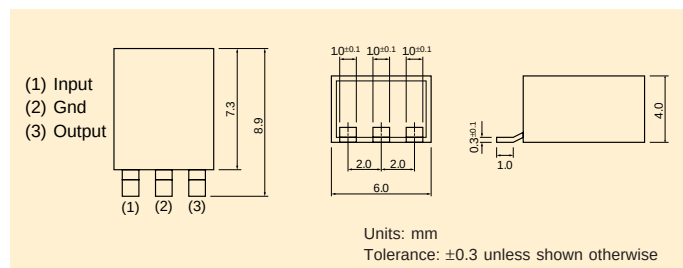
⑥ Packaging: R=Tape and reel (1,000 pcs. per reel)



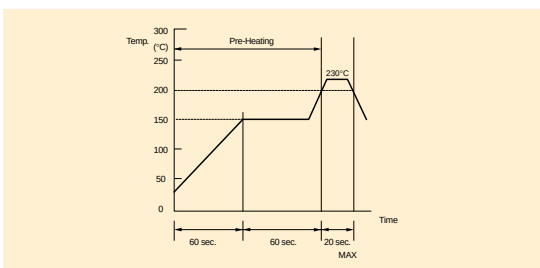
Test Circuit



Dimensions



Reflow Profile



Specifications (450kHz available with same characteristics)

Part No.	Center Frequency (fo)	Ripple	Group Delay Time	Passband Width		Attenuation	Insertion Loss	Input/Output Matching Impedance	Operating Temperature	
				6dB	40dB					
PBFS455P20D	455kHz ±1.5kHz	2dB max.	—	±10.0kHz min.	±20.0kHz max.	25dB min.	6dB max.	1.5kΩ	-20°C to +80°C	
PBFS455P15D				±7.5kHz min.	±15.0kHz max.					
PBFS455P12D				±6.0kHz min.	±12.5kHz max.					
PBFS455P9D				±4.5kHz min.	±11.0kHz max.					
PBFS455P6D	455kHz ±1.0kHz			±3.0kHz min.	±9.0kHz max.					
PBFS455P4D				±2.0kHz min.	±7.5kHz max.					
PBFS455P30K	455kHz ±1.5kHz	1dB max.	15μSec max. at 455kHz ±10kHz	±15.0kHz min.	±35.0kHz max.			1.0kΩ		
PBFS455P25K			15μSec max. at 455kHz ±8kHz	±12.5kHz min.	±30.0kHz max.					
PBFS455P20K			30μSec max. at 455kHz ±7kHz	±10.0kHz min.	±25.0kHz max.					

Surface Mount kHz Band Ceramic Filters

PBFC Series

Features

- 1) Small and low profile
- 2) Excellent anti-shock performance
- 3) Reflow solder compatible
- 4) Taped for automatic placement

How to Order

PBFC 455 P 15 D R

- ① ② ③ ④ ⑤ ⑥

① Model: PBFC

② Center frequency

450	450kHz
455	455kHz

③ Number of ceramic elements

P	4-element
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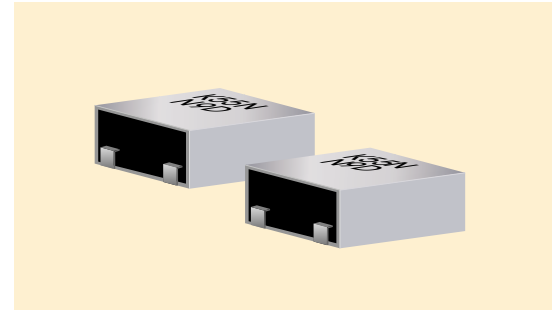
④ Passband width (at 6dB)

# Elements	Total Bandwidth, kHz
4-element	30, 25, 20, 15, 12, 9, 6, 4

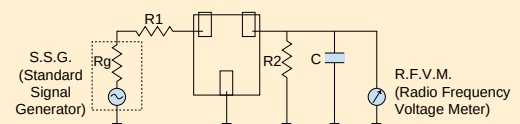
⑤

Group Delay Time		Available Bandwidth, kHz
D	Standard Group Delay	20, 15, 12, 9, 6, 4
K	Controlled Group Delay	30, 25, 20

⑥ Packaging: R=Tape and reel (1,000 pcs. per reel)

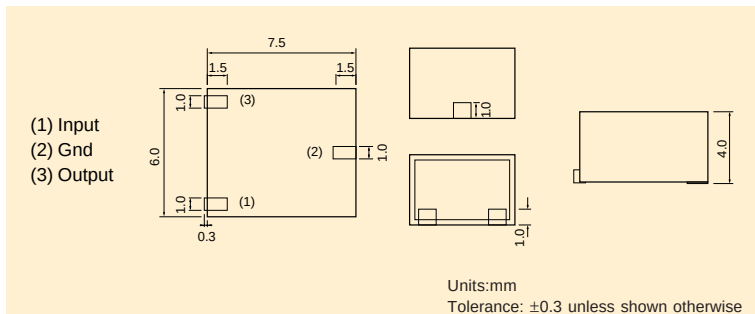


Test Circuit

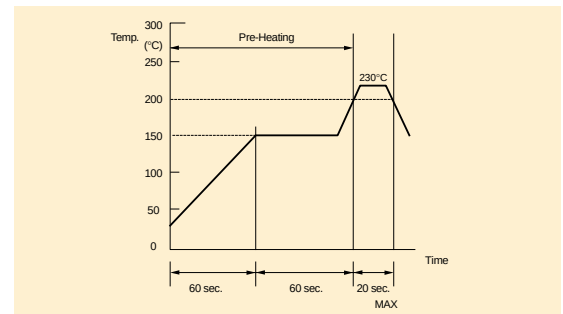


R1+Rg=R2=input/output impedance rating
C≤50pF (including tool strays, wiring capacitance and RFVM input capacitance)

Dimensions



Reflow Profile



Specifications (450kHz available with same characteristics)

Part No.	Center Frequency (fo)	Ripple	Group Delay Time	Passband Width		Attenuation	Insertion Loss	Input/Output Matching Impedance	Operating Temperature	
				6dB	40dB					
PBFC455P20D	455kHz ±1.5kHz	2dB max.	—	±10.0kHz min.	±20.0kHz max.	25dB min.	6dB max.	1.5kΩ	-20°C to +80°C	
PBFC455P15D				±7.5kHz min.	±15.0kHz max.					
PBFC455P12D				±6.0kHz min.	±12.5kHz max.					
PBFC455P9D				±4.5kHz min.	±11.0kHz max.					
PBFC455P6D	455kHz ±1.0kHz			±3.0kHz min.	±9.0kHz max.					
PBFC455P4D				±2.0kHz min.	±7.5kHz max.					
PBFC455P30K	455kHz ±1.5kHz	1dB max.	15μSec max. at 455kHz ±10kHz	±15.0kHz min.	±35.0kHz max.			1.0kΩ		
PBFC455P25K			15μSec max. at 455kHz ±8kHz	±12.5kHz min.	±30.0kHz max.					
PBFC455P20K			30μSec max. at 455kHz ±7kHz	±10.0kHz min.	±25.0kHz max.					

Surface Mount kHz Band Ceramic Filters

PBFC Series

Features

- 1) Small and low profile
- 2) Excellent anti-shock performance
- 3) High selectivity

How to Order

PBFC 455 R 25 K R

① ② ③ ④ ⑤ ⑥

① Model: PBFC

② Center frequency

450	450kHz
455	455kHz

③ Number of ceramic elements

R	6-element
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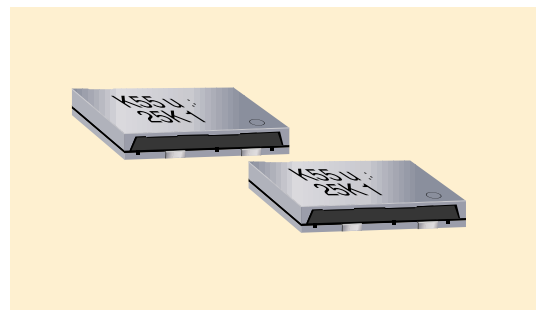
④ Passband width (at 6dB)

# Elements	Total Bandwidth, kHz
6-element	30, 25, 20, 15, 9

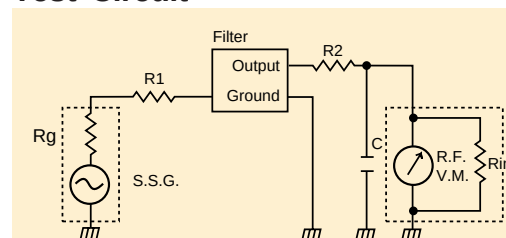
⑤

Group Delay Time		Available Bandwidth, kHz
D	Standard Group Delay	20, 15, 9
K	Controlled Group Delay	30, 25, 20

⑥ Packaging: R=Tape and reel (1,000 pcs. per reel)

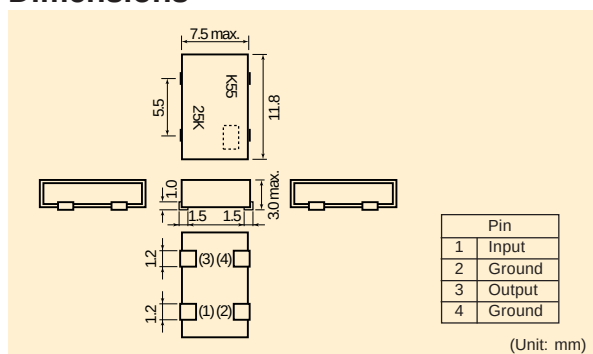


Test Circuit

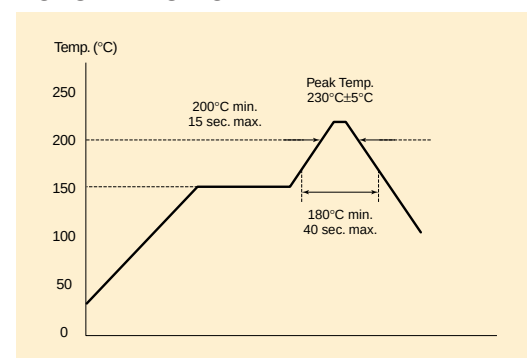


$R1+Rg=R2+Rin$ =Rating impedance input/output matching
 $C<50pF$ (including stray capacitance and input capacitance)

Dimensions



Reflow Profile



Specifications (450kHz available with same characteristics)

Part No.	Center Frequency (fo)	Ripple	Passband Width		Stop Band Attenuation	Insertion Loss	Input/Output Matching Impedance	Group Characteristics
			6dB	40dB				
PBFC455R9D	455kHz±1.5kHz	2.0dB max.	±4.5kHz min.	±11.0kHz max.	40dB min.	6.0dB max.	1.5kΩ	—
PBFC455R15D			±7.5kHz min.	±15.0kHz max.				
PBFC455R20D			±10.0kHz min.	±20.0kHz max.				
PBFC455R20K	455kHz	1.0dB max.	±10.0kHz min.	±25.0kHz max.	47dB min.		1.0kΩ (1.5kΩ)*	30.0 μsec. max. (455±7.0kHz)
PBFC455R25K			±12.5kHz min.	±30.0kHz max.	50dB min.			30.0 μsec. max. (455±8.0kHz)
PBFC455R30K			±14.0kHz min.	±35.0kHz max.				30.0 μsec. max. (455±10.0kHz)

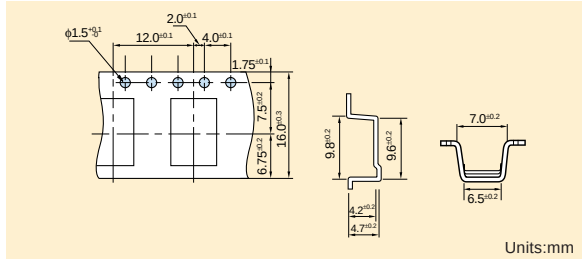
* Option

Surface Mount kHz Band Ceramic Filters

PBF Series

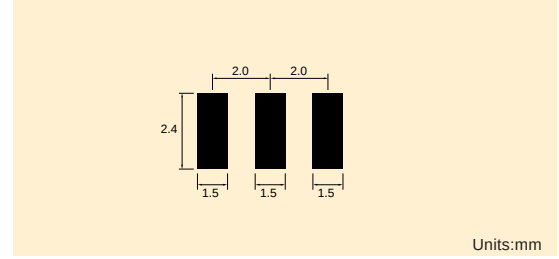
Tape and Reel Dimensions

PBFS-P Series (4-element)

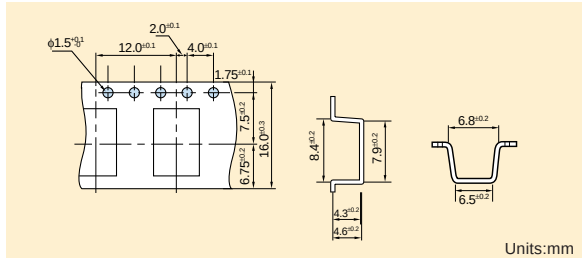


Suggested Solder Pad Layout

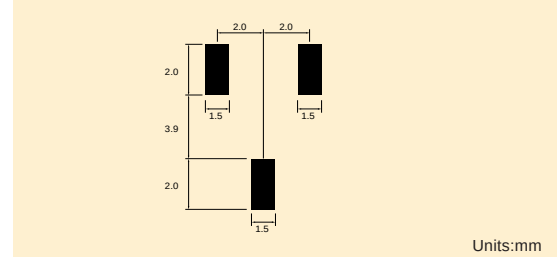
PBFS-P Series (4-element)



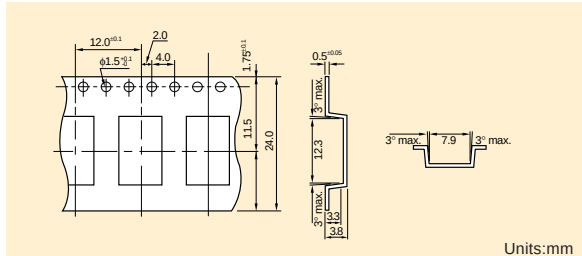
PBFC-P Series (4-element)



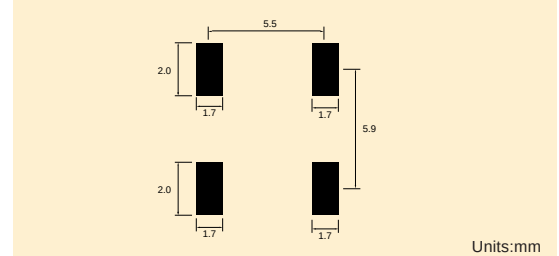
PBFC-P Series (4-element)



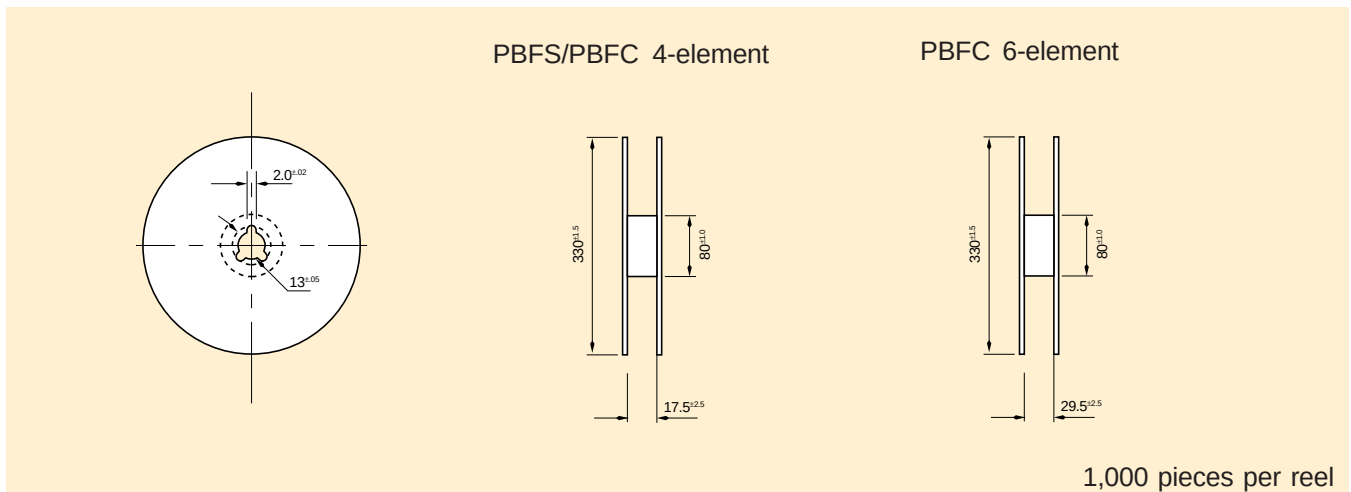
PBFC-R Series (6-element)



PBFC-R Series (6-element)



Reel Dimensions



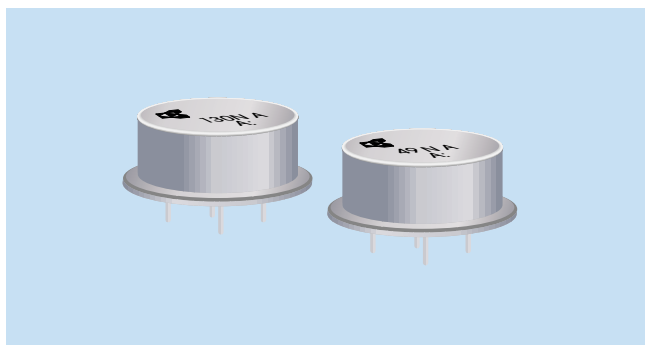
AVX/Kyocera Surface Acoustic Wave Filters

General Description

Surface acoustic wave (SAW) filters are electroacoustic bandpass filters which operate via delay paths that add (passband) and cancel (stopband) frequencies. Surface waves are generated when RF signals are applied to electrodes on a piezoelectric substrate such as PZT piezo material. The amplitude and phase can be controlled by the distance between and overlap of the electrodes.

A typical SAW filter is shown in figure 1. Input is through the interdigital electrode transducer which generates a surface acoustic wave in the piezoelectric substrate. This wave travels to the output interdigital electrode transducer where it is reconverted to a voltage output. The direction of the wave is controlled by damping material which absorbs and prevents scattering of the wave.

SAW filters exhibit higher insertion loss than LC filters, 20-30 dB. Their prime feature is their flat passband characteristics (low ripple) coupled with a constant Group Delay Time (low distortion). This is obtained by the independent design parameters for phase and amplitude characteristics. SAW filters are also small size, rugged, reliable and low cost.



AVX/KYOCERA SAW filters are available hermetically sealed in TO type cans to prevent moisture condensation on the surface of the device. They are available in the frequency range from 30 to 150 MHz and find wide application in TV, VCR, CATV, satellite receivers and cordless telephones.

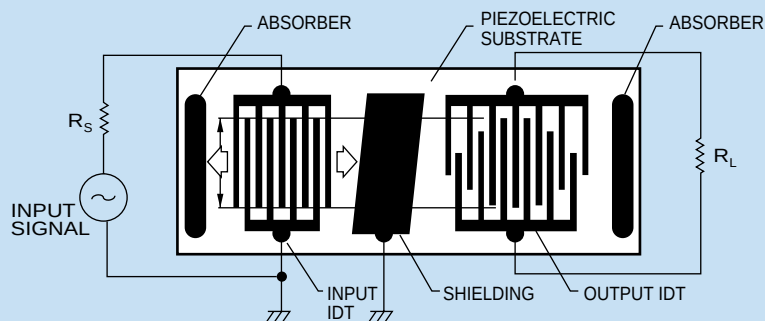


Figure 1

SAW Filters - Broadcast Satellite/CATV Converter

KAF Series

Features

- 1) Compact
- 2) Adjustment free
- 3) High reliability

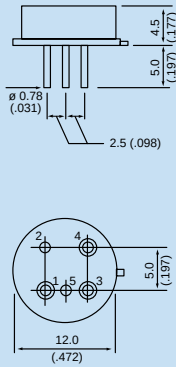
How To Order

KAF - 134 NR-MB

- ① ② ③

- ① Model (Kyocera Acoustic Filter)
 ② Frequency
 ③ Type

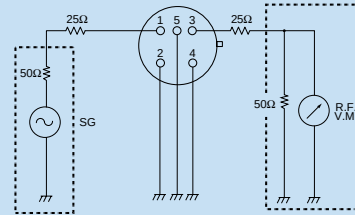
Dimensions



1. INPUT
 2. GROUND
 3. OUTPUT
 4. OUTPUT
 5. GROUND

Unit: mm (inch)
 (BOTTOM VIEW)

Test Circuit



Specifications

Part No.	Insertion Loss (dB)	Center Frequency (MHz)	Bandwidth at 3dB (MHz)	Bandwidth at 30dB (MHz)	Passband Ripple (dB)	Group Delay Ripple (nsec)	Spurious Response (dB)	Temp. Coef. of Frequency (ppm/°C)
KAF-134NR-MB	25 max.	134.26	26 min.	50 max.	1.0 max.	±10	35 min.	-80 max
KAF-130NR-MA	22 max.	130	22 min.	45 max.				
KAF-130NR-MB	21 max.		26 min.	50 max.				
KAF-70NR-WC	32 max.	70	23 min.	30 max.		±20	30 min. (10 to 100MHz)	
KAF-70NR-WD	33 max.	70	25 min.	34 max.		±30	25 min. (10 to 100MHz)	

SAW Filters - 46/49 MHz Cordless Phone

KAF Series

Features

- 1) Adjustment free
- 2) High reliability
- 3) Low insertion loss

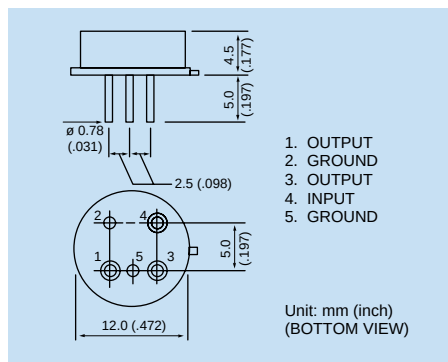
How To Order

KAF - 46 NR-ME

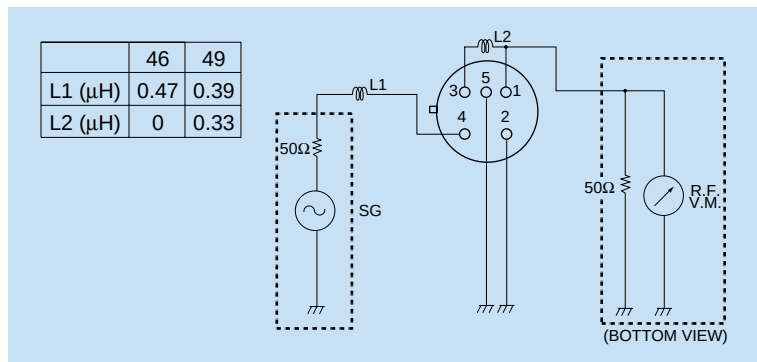
- ① ② ③

- ① Model (Kyocera Acoustic Filter)
- ② Frequency
- ③ Type number

Dimensions



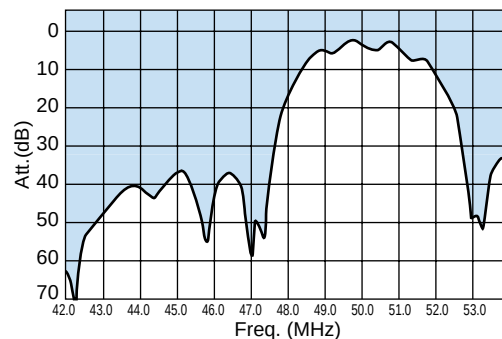
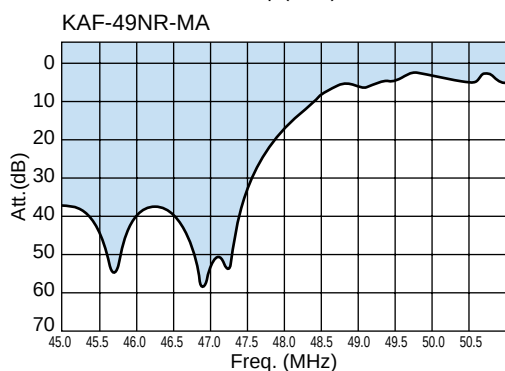
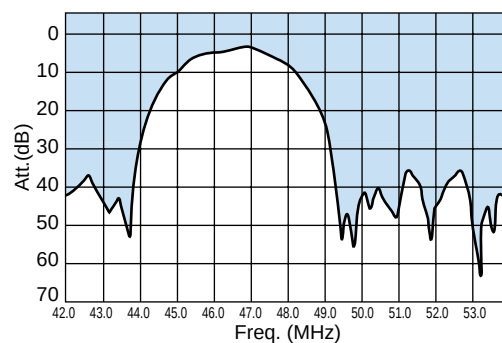
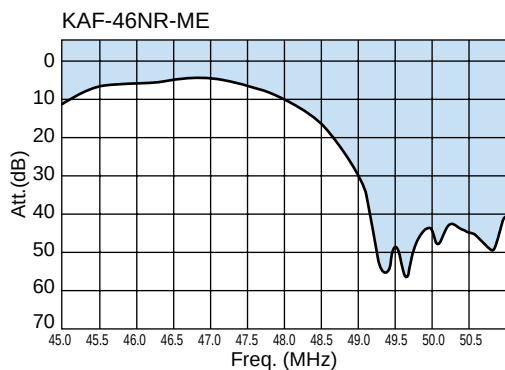
Test Circuit KAF-46 NR-ME/KAF-49NR-MA



Specifications

Part No.	Attenuation (46.61 ~ 46.97MHz)	Attenuation (49.67 ~ 49.99MHz)
KAF-46NR-ME	6.0 dB max.	30 dB min.
KAF-49NR-MA	30 dB min.	6.0 dB max.

Characteristics



Surface Mount SAW Filters - PHS

PAFC Series

Features

- 1) Small and low profile
- 2) Flat passband characteristics
- 3) Low insertion loss
- 4) Circuit simplification

Application

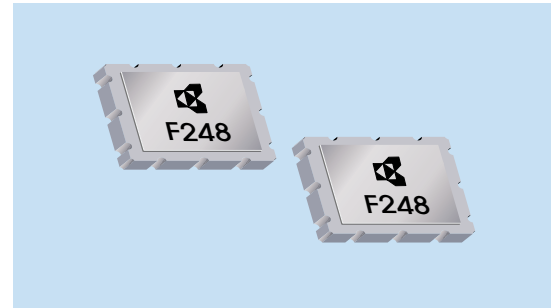
- 1) PHS

How To Order

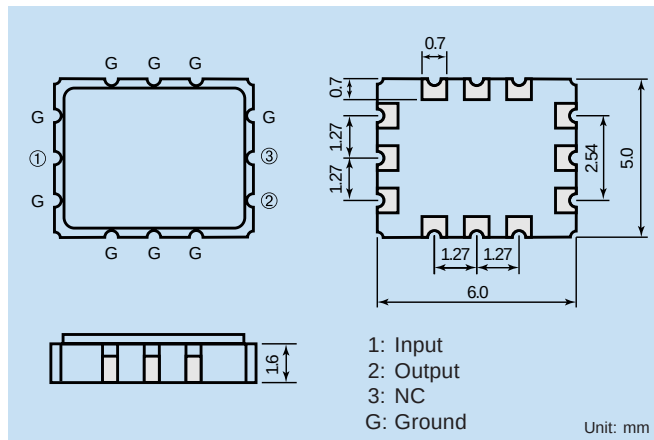
PAFC 248 A

- ① ② ③

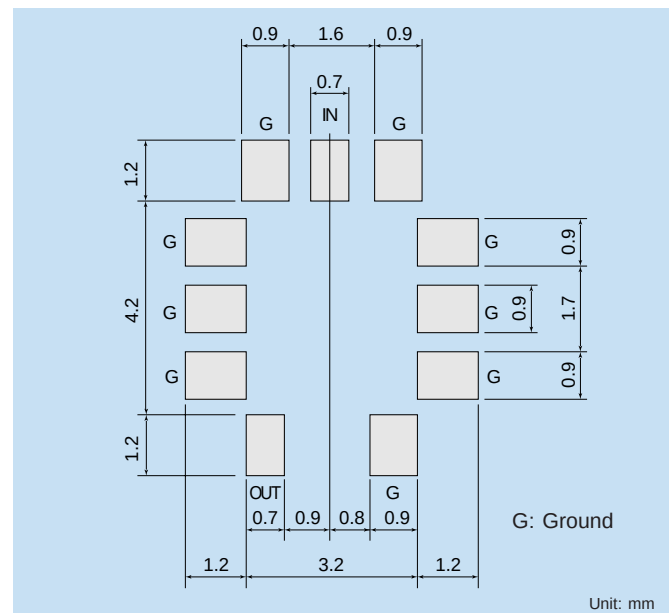
- ① Series
② Center frequency
③ Type



Shape and Dimension



Recommended Land Pattern

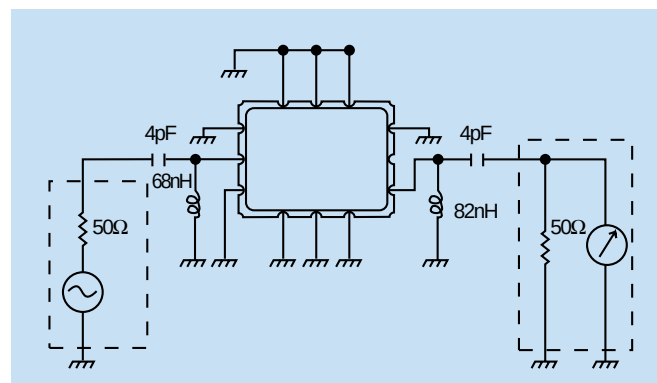


Specifications

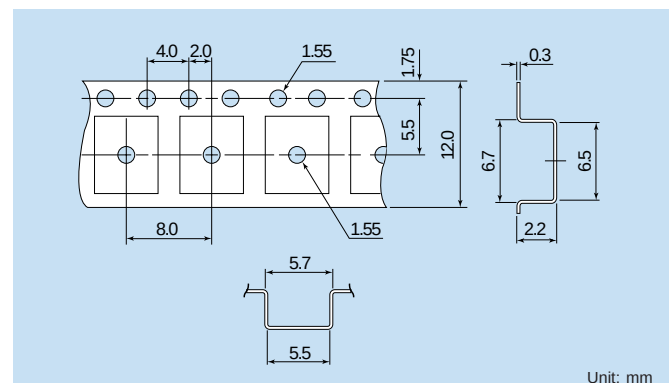
Part Number	PAFC248A	PAFC243A
Nominal Center Frequency	248.45MHz	243.95MHz
Insertion Loss	4.0dB max.	4.0dB max.
Passband Width (at 3dB)	$\pm 130\text{kHz}$ min.	$\pm 130\text{kHz}$ min.
Stop Band Attenuation	$f_n \pm 600\text{kHz}$	30dB min.
	$f_n \pm 1.2\text{MHz}$	40dB min.
	$f_n \pm 21.5\text{MHz}$	60dB min.
Ripple ($f_n \pm 110\text{kHz}$)	1.5dB max.	1.5dB max.
Group Delay Time ($f_n \pm 110\text{kHz}$)	1.2 μs max.	1.2 μs max.
Operating Temperature	-10~+60°C	-10~+60°C

(*) Note PAFC248A $f_a = 21.5\text{MHz}$
PAFC243A $f_a = 21.6\text{MHz}$

Test Circuit



Taping Dimension



Surface Mount Dielectric Filters

KDF Series

General Description

Dielectric Filters are high frequency bandpass filters in the range of 800 MHz to over 1 GHz. Their small size, surface mountability, low insertion loss and good temperature stability make them ideal for cordless or cellular telephones, wireless land security systems, etc.

Their construction consists of capacitive coupled "tuned" ceramic cavities using coaxial connections. This allows elements to be stacked together for different pass-band configurations. The ceramic material is a very high Q formulation for minimum loss characteristics.

Features

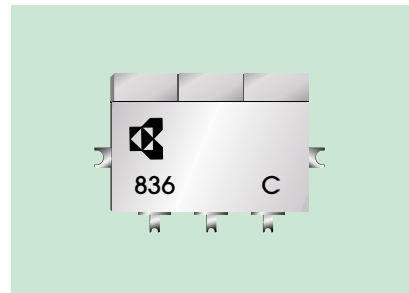
- 1) Surface mountable
- 2) Compact, with low insertion loss using high Q ceramics
- 3) Various passband widths available
- 4) High stability and reliability

How to Order

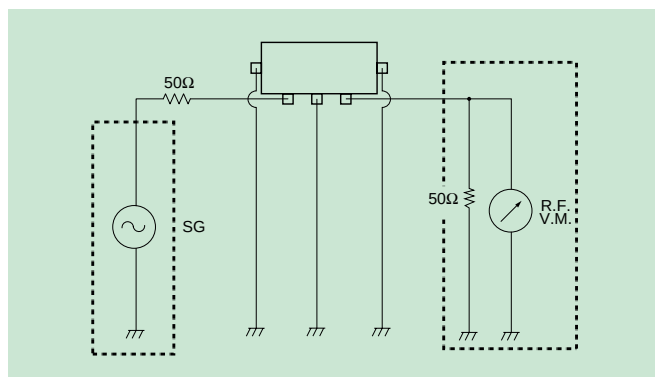
KDF - 914 PY 02 A

- ① ② ③ ④ ⑤

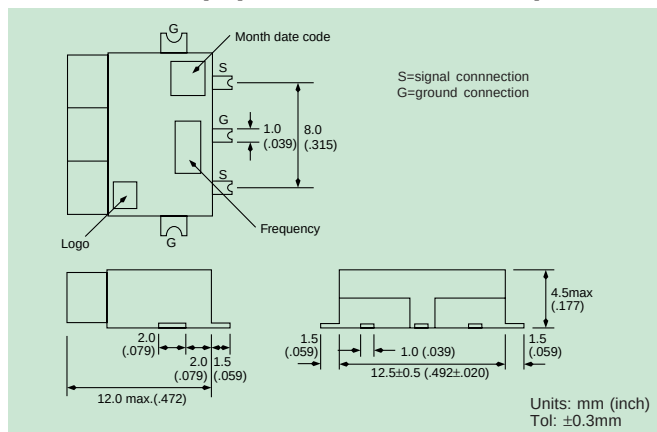
- ① Model (Kyocera Dielectric Filter)
- ② Center frequency
- ③ Number of poles (PY: 2-pole, RY: 3-pole)
- ④ Passband width
- ⑤ Type number



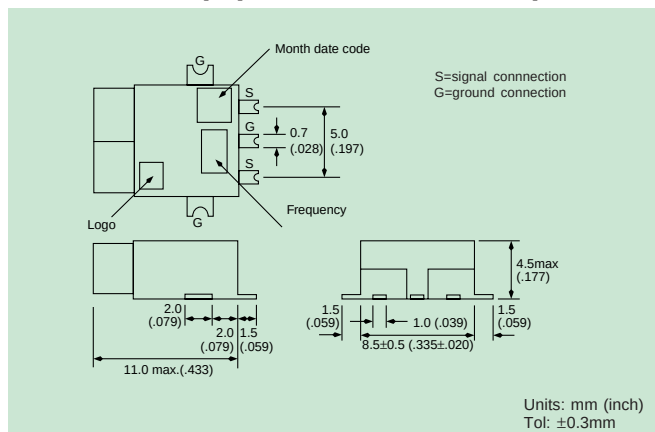
Test Circuit



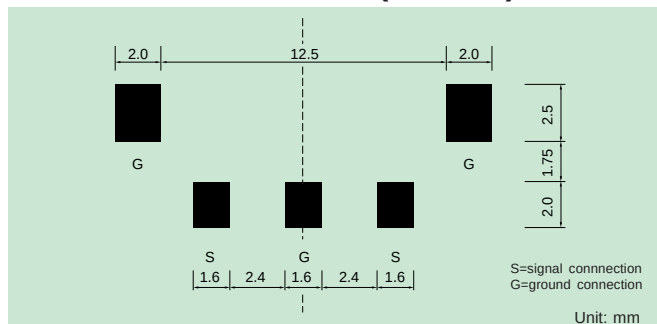
Dimensions (3-pole KDF-RY series)



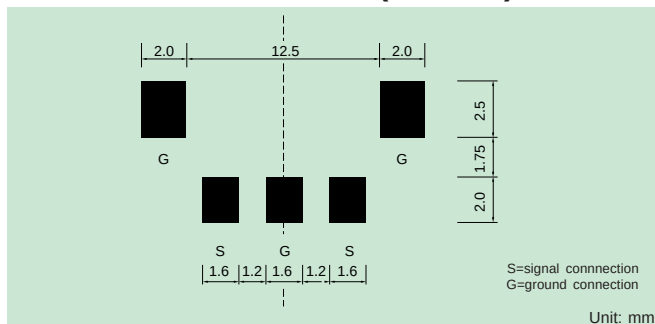
Dimensions (2-pole KDF-PY series)



Solder Pad Dimensions (KDF-RY)



Solder Pad Dimensions (KDF-PY)



Surface Mount Dielectric Filters

KDF Series

Specifications

KDF-PY Series (2-pole type)

Application	Parts No.	Nominal Center Frequency (fn)	Insertion Loss at Passband Width (dB)	Passband Width (MHz)	V.S.W.R at Passband Width	Attenuation (dB)
E-AMPS	KDF-836PY25A	836.5MHz	2.5 max.	±12.5 min.	2.5 max.	7 min. at fn±32.5MHz
	KDF-881PY25A	881.5MHz				
GSM/NMT900	KDF-902PY25A	902.5MHz	2.5 max.	±12.5 min.	2.5 max.	7 min. at fn±32.5MHz
	KDF-947PY25A	947.5MHz				
Europe Cordless Phone	KDF-959PY02A	959.5MHz	3.0 max.	±1.0 min.	2.0 max.	24 min. at fn±45MHz
	KDF-914PY02A	914.5MHz	3.0 max.	±1.0 min.	2.0 max.	24 min. at fn±45MHz
	KDF-931PY02A	931.0MHz				
	KDF-886PY02A	886.0MHz				
US Cordless Phone	KDF-903PY02A	903.0MHz	3.0 max.	±1.0 min.	2.0 max.	13 min. at fn±24MHz
	KDF-927PY02A	927.0MHz	2.5 max.	±13.0 min.	2.5 max.	20 min. at fn±77.5MHz
	KDF-915PY26A	915.0MHz				
Wireless Microphone	KDF-808PY08A	808.0MHz	2.5 max.	±4.0 min.	2.0 max.	13 min. at fn±27MHz
	KDF-804PY08A	804.0MHz				
MCA	KDF-847PY26A	847.0MHz	2.5 max.	±13.0 min.	2.5 max.	25 min. at fn±97MHz
GPS	KDF-1575PY04A	1575.4MHz	3.3 max.	±2.0 min.	2.2 max.	8 min. at fn±20MHz
DECT	KDF-1890PY20A	1890.0MHz	3.0 max.	±10.0 min.	2.0 max.	25 min. at fn±100 MHz 35 min. at fn±210MHz

KDF-RY Series (3-pole type)

Application	Parts No.	Nominal Center Frequency (fn)	Insertion Loss at Passband Width (dB)	Passband Width (MHz)	V.S.W.R at Passband Width	Attenuation (dB)
E-AMPS	KDF-836RY25A	836.5MHz	3.0 max.	±12.5 min.	2.0 max.	12 min. at fn±32.5MHz
	KDF-881RY25A	881.5MHz				
E-TACS	KDF-888RY33A	888.5MHz	3.0 max.	±16.5 min.	2.0 max.	5 min. at fn±28.5MHz
	KDF-933RY33A	933.5MHz				
GSM/NMT900	KDF-902RY25A	902.5MHz	3.0 max.	±12.5 min.	2.0 max.	12 min. at fn±32.5MHz
	KDF-947RY25A	947.5MHz				
Europe Cordless Phone	KDF-959RY02A	959.5MHz	5.0 max.	±1.0 min.	2.0 max.	40 min. at fn±45MHz
	KDF-914RY02A	914.5MHz				
	KDF-931RY02A	931.0MHz	5.0 max.	±1.0 min.	2.0 max.	40 min. at fn±45MHz
	KDF-886RY02A	886.0MHz				
US Cordless Phone	KDF-903RY02A	903.0MHz	5.0 max.	±1.0 min.	2.0 max.	25 min. at fn±24MHz
	KDF-927RY02A	927.0MHz				
	KDF-915RY26A	915.0MHz	3.0 max.	±13.0 min.	2.0 max.	12 min. at fn±32.5MHz
MCA	KDF-847RY26A	847.0MHz	3.0 max.	±13.0 min.	2.0 max.	47 min. at fn±97MHz
DECT	KDF-1890RY20A	1890.0MHz	4.5 max.	±10.0 min.	2.0 max.	35 min. at fn±100MHz 45 min. at fn±210MHz

Surface Mount Dielectric Filters

PDFB Series

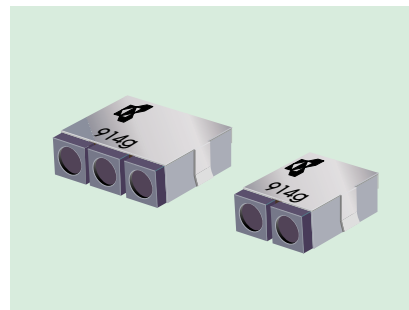
Features

- 1) Small and light weight
- 2) Simple leadless structure
- 3) Wide frequency range
from 800MHz to 2.2GHz

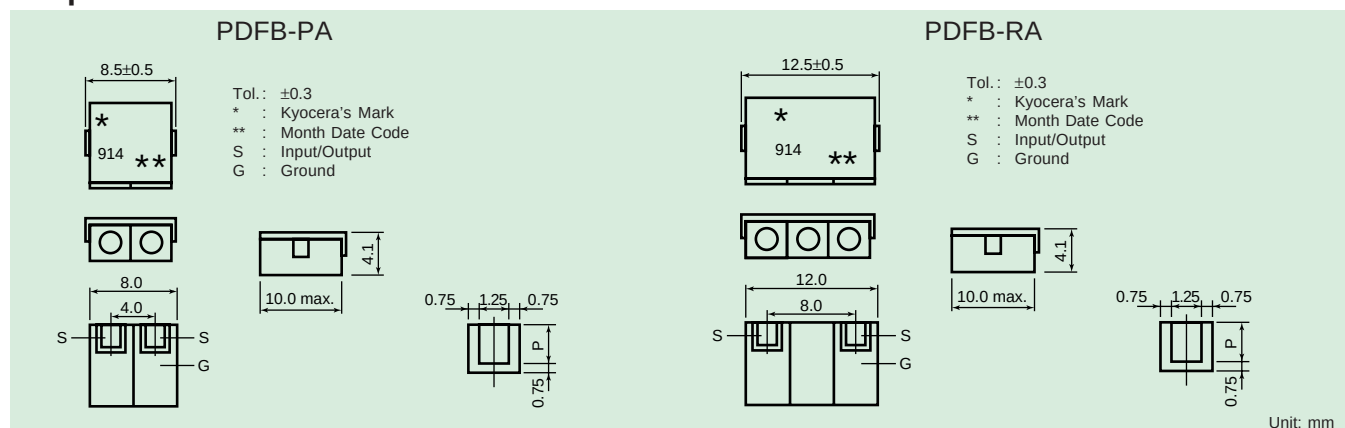
How To Order

PDFB 931 PA 002 R A

- ① Model
- ② Center frequency
- ③ Number of poles (PA: 2 poles, RA: 3 poles)
- ④ Passband width
- ⑤ Packaging (R: Taping)
- ⑥ Type (A: Standard)



Shape and Dimension



Specifications

PDFB-PA Series (2-pole type)

Application	Parts No.	Nominal Center Frequency (fn)	Insertion Loss at Passband Width (dB)	Passband Width (MHz)	V.S.W.R at Passband Width	Attenuation (dB)
E-AMPS	PDFB836PA025RA	836.5MHz	2.5 max.	±12.5 min.	2.5 max.	at fn±32.5MHz 7 min.
	PDFB881PA025RA	881.5MHz				
GSM/NMT900	PDFB902PA025RA	902.5MHz	2.5 max.	±12.5 min.	2.5 max.	at fn±32.5MHz 7 min.
	PDFB947PA025RA	947.5MHz				
Europe Cordless Phone	PDFB959PA002RA	959.5MHz	3.0 max.	±1.0 min.	2.0 max.	at fn±45MHz 24 min.
	PDFB914PA002RA	914.5MHz				
	PDFB931PA002RA	931.0MHz	3.0 max.	±1.0 min.	2.0 max.	at fn±45MHz 24 min.
	PDFB886PA002RA	886.0MHz				
US Cordless Phone	PDFB903PA002RA	903.0MHz	3.0 max.	±1.0 min.	2.0 max.	at fn±24MHz 13 min.
	PDFB927PA002RA	927.0MHz				
	PDFB915PA026RA	915.0MHz	2.5 max.	±13.0 min.	2.5 max.	at fn±77.5MHz 20 min.

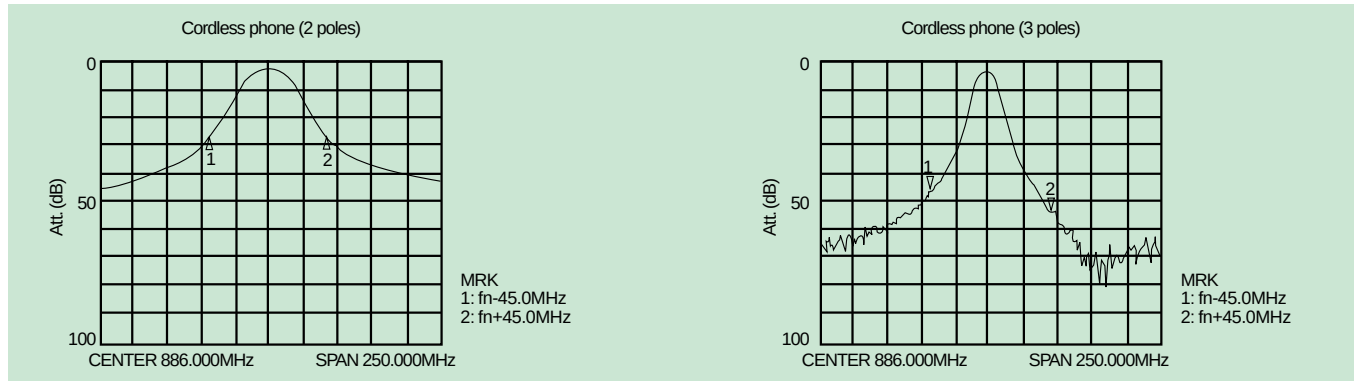
PDFB-RA Series (3-pole type)

Application	Parts No.	Nominal Center Frequency (fn)	Insertion Loss at Passband Width (dB)	Passband Width (MHz)	V.S.W.R at Passband Width	Attenuation (dB)
E-AMPS	PDFB836RA025RA	836.5MHz	3.0 max.	±12.5 min.	2.0 max.	at fn±32.5MHz 12 min.
	PDFB881RA025RA	881.5MHz				
E-TACS	PDFB888RA033RA	888.5MHz	3.0 max.	±16.5 min.	2.0 max.	at fn±28.5MHz 5 min.
	PDFB933RA033RA	933.5MHz				
GSM/NMT900	PDFB902RA025RA	902.5MHz	3.0 max.	±12.5 min.	2.0 max.	at fn±32.5MHz 12 min.
	PDFB947RA025RA	947.5MHz				
Europe Cordless Phone	PDFB959RA002RA	959.5MHz	5.0 max.	±1.0 in	2.0 max.	at fn±45MHz 40 min.
	PDFB914RA002RA	914.5MHz				
	PDFB931RA002RA	931.0MHz	5.0 max.	±1.0 min.	2.0 max.	at fn±45MHz 40 min.
	PDFB886RA002RA	886.0MHz				
US Cordless Phone	PDFB903RA002RA	903.0MHz	5.0 max.	±1.0 min.	2.0 max.	at fn±24MHz 25 min.
	PDFB927RA002RA	927.0MHz				
	PDFB915RA026RA	915.0MHz	3.0 max.	±13.0 min.	2.0 max.	at fn±32.5MHz 12 min.

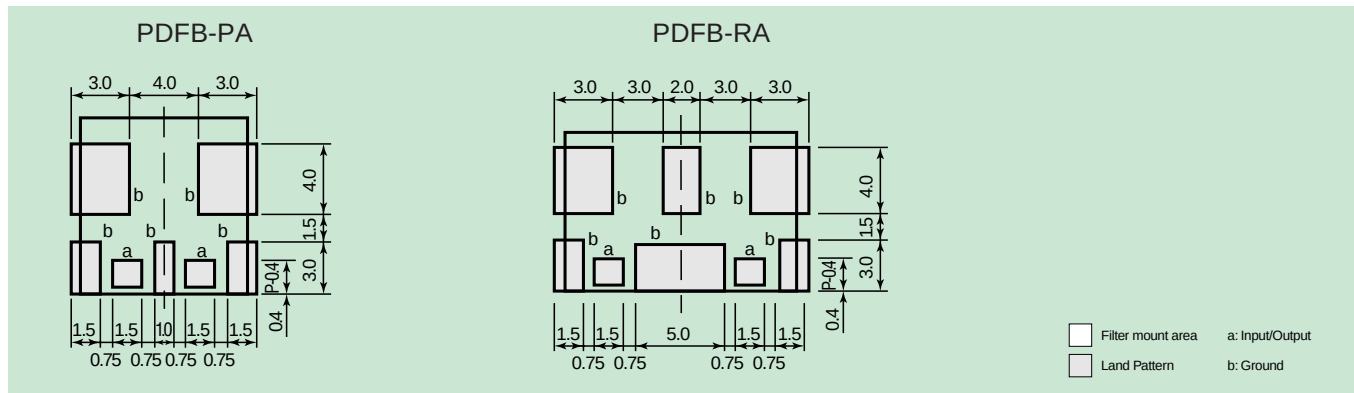
Surface Mount Dielectric Filters

PDFB Series

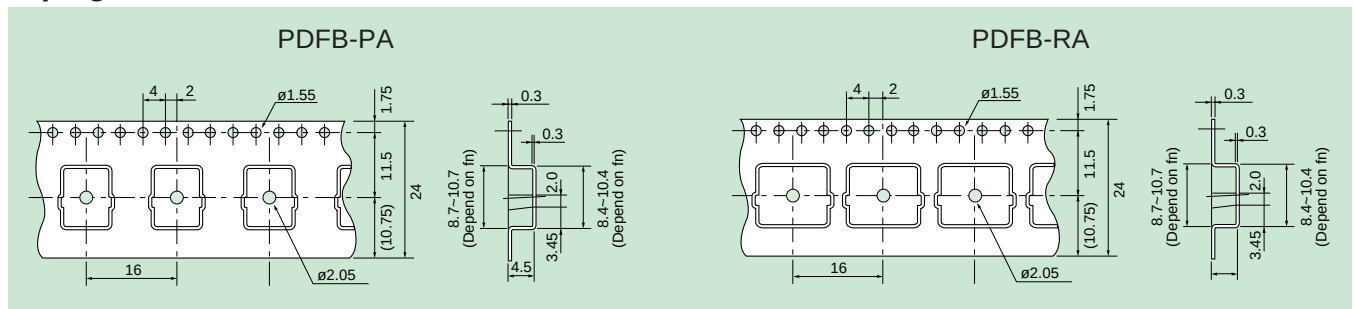
Frequency Characteristics



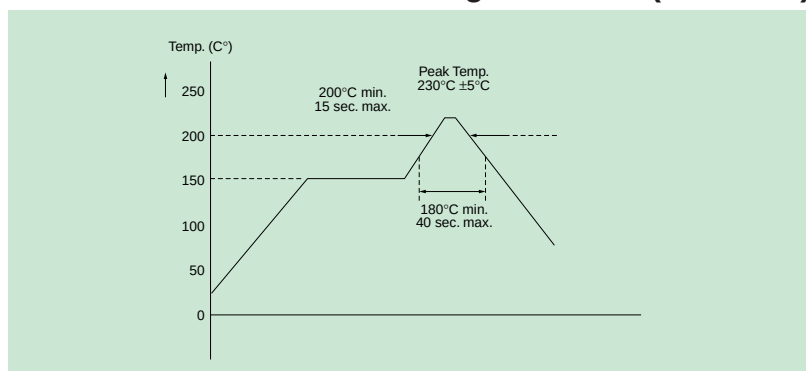
Recommended Land Pattern



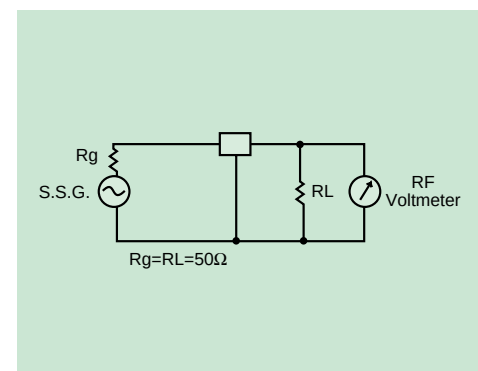
Taping Dimension



Recommended Reflow Soldering Condition (IR Reflow)



Test Circuit



Surface Mount Dielectric Filters - PHS/DECT

PDFB Series

Features

- 1) Ultra miniature
- 2) High selectivity

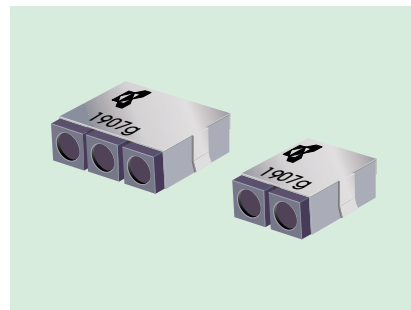
Applications

- 1) Japan digital cordless phone system (PHS)
- 2) European digital cordless phone (DECT)

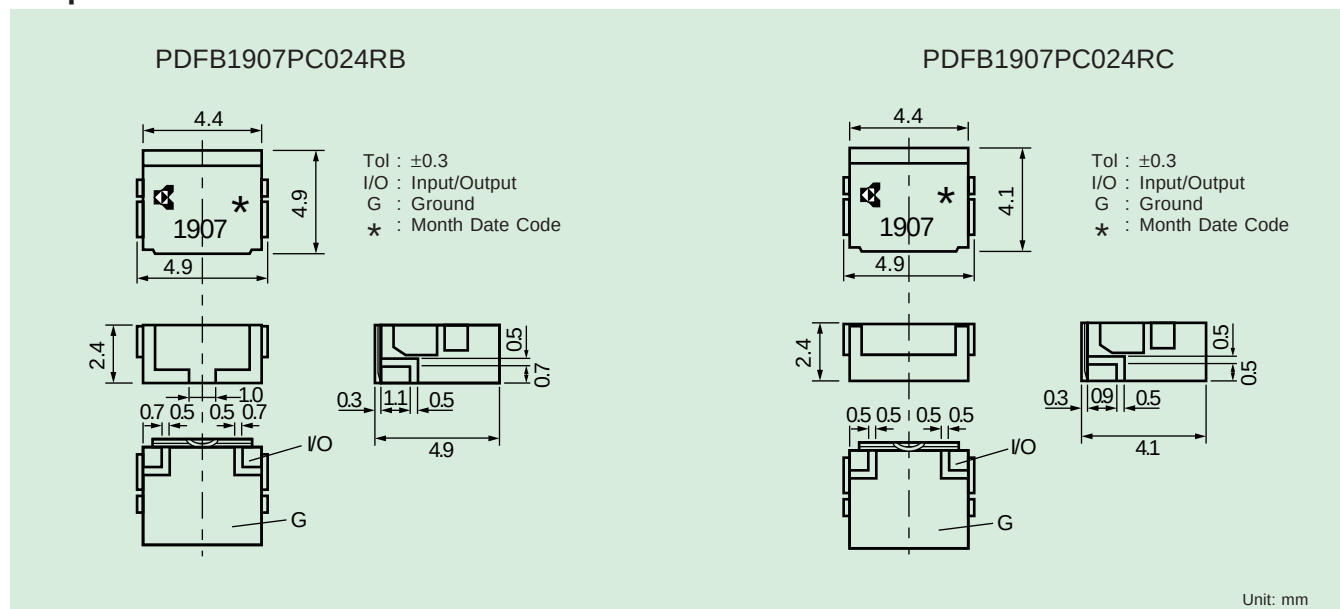
How To Order

PDFB 1907 P C 024 R B

- | | | | | | | |
|---------|--|--------------------------------|-------------------------------|------------------------|----------------------------|---|
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ |
| ① Model | ② Center frequency (1907: PHS, 1890: DECT) | ③ Number of poles (P: 2 poles) | ④ Element size (C: 2.2mm sq.) | ⑤ Passband width (MHz) | ⑥ Packing (R: Taping only) | ⑦ Type (B: Low I.L., C: High attenuation) |



Shape and Dimension



Specifications

PHS

Part Number		PDFB1907PC024RB	PDFB1907PC024RC
Nominal Center Frequency (fn)		1907MHz	1907MHz
Passband Width		fn±12MHz	fn±12MHz
Insertion Loss at Passband Width		1.0dB max.	2.0dB max.
V.S.W.R. Passband Width		1.7 max.	1.7 max.
Ripple Passband Width		0.5dB max.	0.5dB max.
Attenuation	fn—500MHz	38dB min.	30dB min.
	fn—250MHz	15dB min.	40dB min.
	fn—125MHz	—	15dB min.
	fn+250MHz	7dB min.	20dB min.
	2fn.3fn	20dB min.	—
Max. Input Power		1W	1W
I/O Impedance		50Ω	50Ω
Operating Temperature		-20~+60°C	-20~+60°C
Storage Temperature		-30~+85°C	-30~+85°C

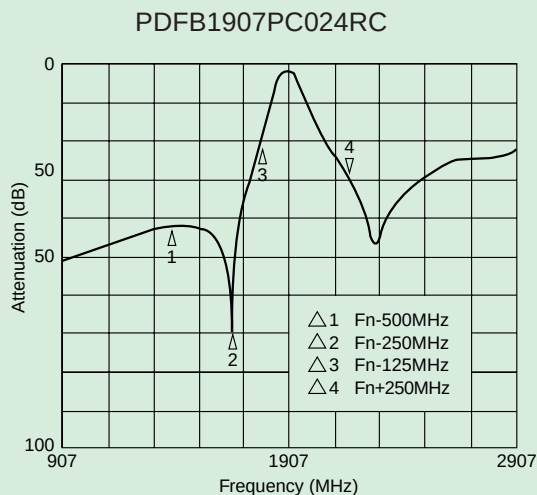
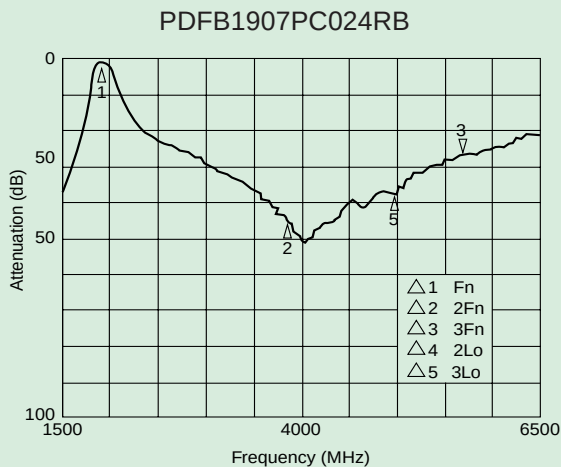
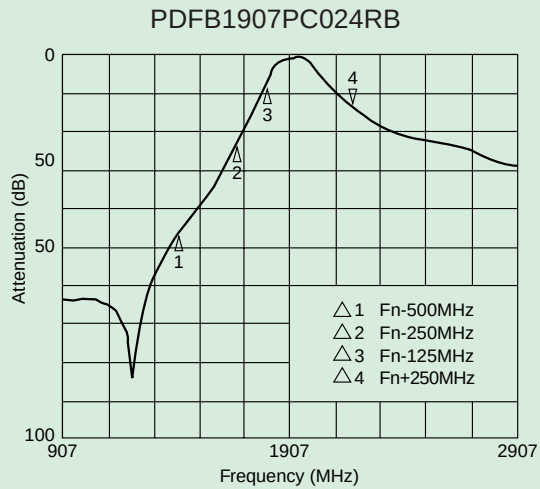
DECT

Part Number		PDFB1890PC020RC
Nominal Center Frequency (fn)		1890MHz
Passband Width		fn±10MHz
Insertion Loss at Passband Width		2.0dB max.
V.S.W.R. Passband Width		2.0 max.
Ripple Passband Width		0.5dB max.
Attenuation	fn—210MHz	35dB min.
	fn—100MHz	13dB min.
	2fn.3fn	—
Max. Input Power		1W
I/O Impedance		50Ω
Operating Temperature		-20~+60°C
Storage Temperature		-30~+85°C

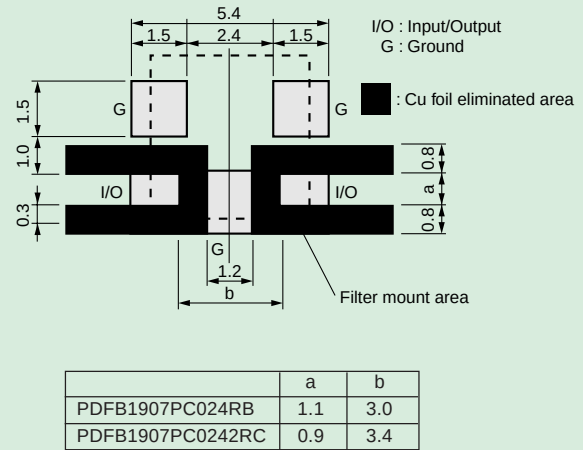
Surface Mount Dielectric Filters - PHS/DECT

PDFB Series

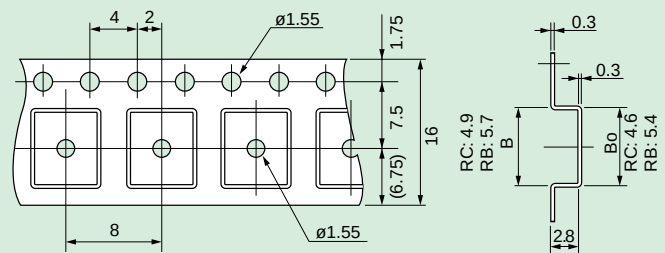
Frequency Characteristics



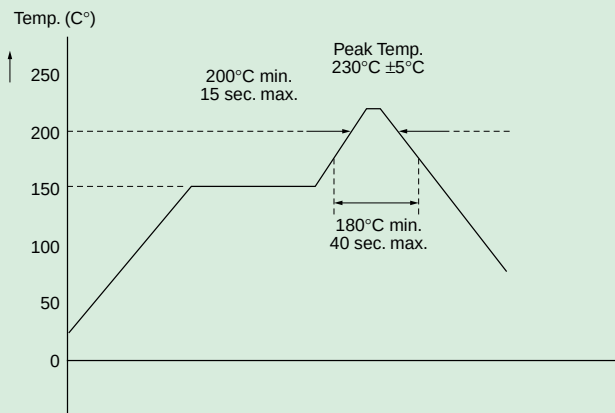
Recommended Land Pattern



Taping Dimension



Recommended Reflow Soldering Condition (IR Reflow)



EMI Noise Filters

KNF 32 Series

Features

- 1) Stable attenuation without ringing with distributed parameter circuit
- 2) Low profile (1mm, 0.04 in)
1206 type
- 3) Simple construction

Applications

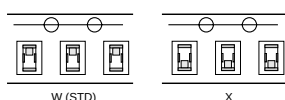
- 1) Personal computers, LBP
:Clock output (signal) line
:I/O line (ex. video signal line such as VGA, XGA)
- 2) Digital cellular phones
- 3) Other high speed digital circuits, for example digital TV, VTR

How To Order

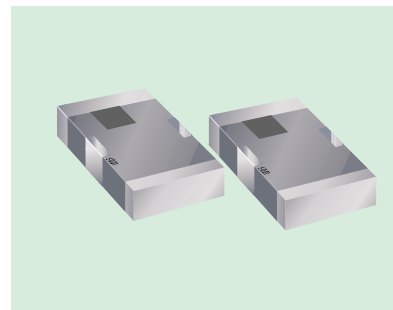
KNF 32 050 -W 2

- ① Series
- ② Size: 32=1206, 21=0805
- ③ Type (Freq.): 025=25MHz, 050=50MHz
100=100MHz, 200=200MHz
0805: 050=50MHz, 100=100MHz
200=200MHz, 400=400MHz

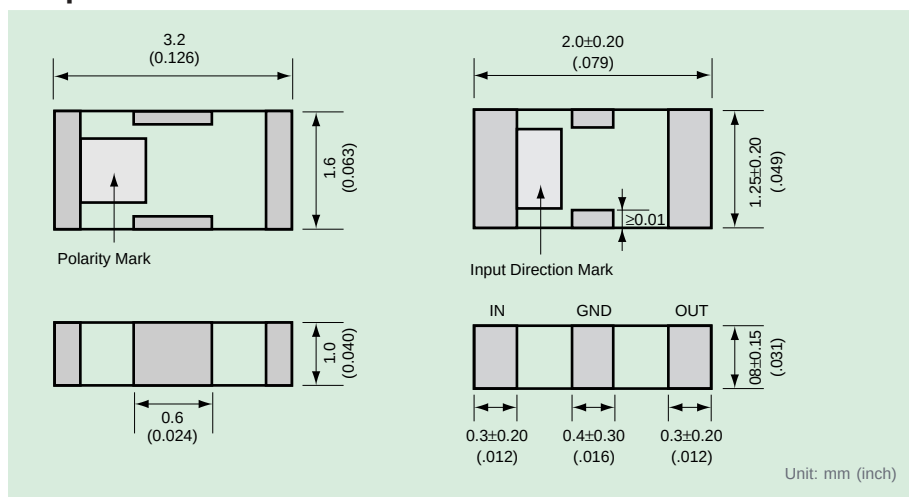
- ④ Taping direction (X, Y)



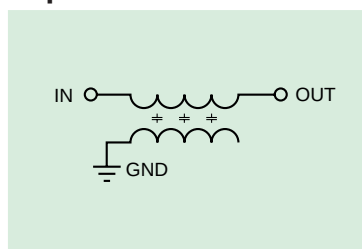
- ⑤ Quantity per reel:
2=2000p, 3=3000p



Shape and Dimensions



Equivalent Circuit

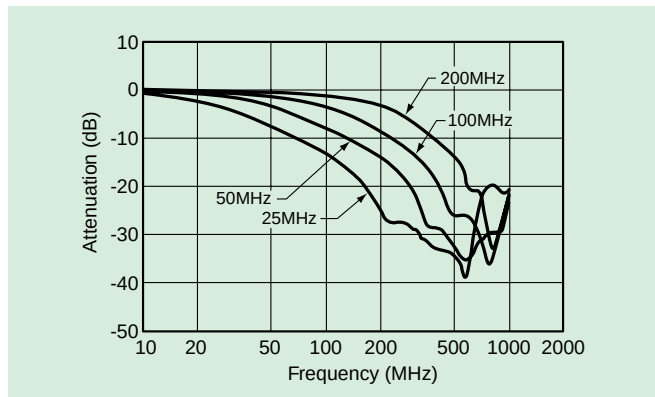


Specifications

Type	Cut off Freq.	Capacitance (+50/-20%)	Typical Attenuation (dB)
KNF32025	25MHz	235pF	20 (200-600MHz)
KNF32050	50MHz	130pF	20 (350-850MHz)
KNF32100	100MHz	65pF	20 (450-950MHz)
KNF32200	200MHz	33pF	20 (600-1100MHz)
KNF21050	50MHz	130pF	20 (350-850MHz)
KNF21100	100MHz	65pF	20 (450-950MHz)
KNF21200	200MHz	33pF	20 (700-1200MHz)
KNF21400	400MHz	17pF	20 (900-1400MHz)

Rated voltage: 25VDC
Rated current: 200mA
Attenuation of cut off frequency: max. -6dB
Attenuation characteristics should be standard characteristics of 50Ω (MIL-STD-220A)

Performance Characteristics

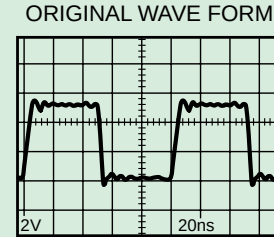
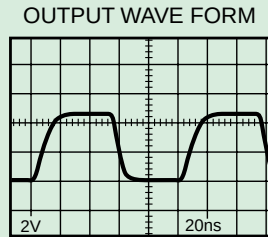
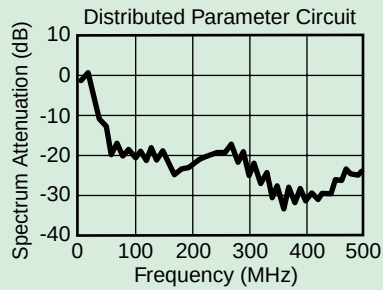


EMI Noise Filters

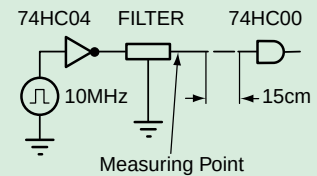
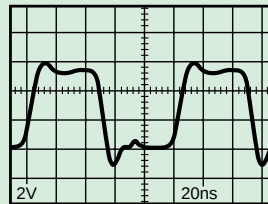
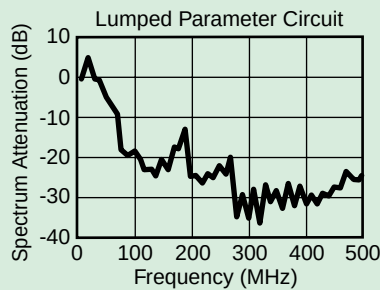
KNF 32 Series

Typical Example of Suppression

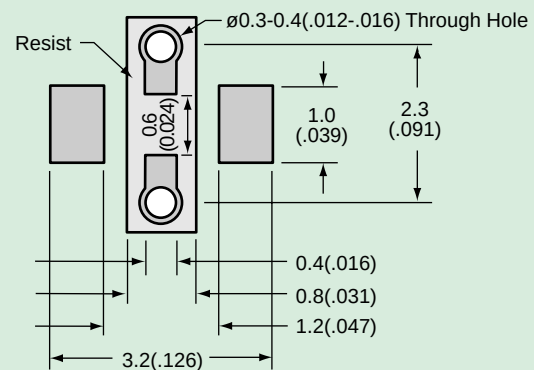
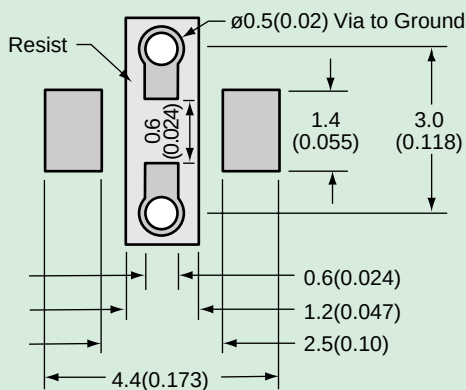
KC KNF32050



LC Filter



Land Pattern



Unit: mm (inch)



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