

# AVX KYOCERA

## FILTERS

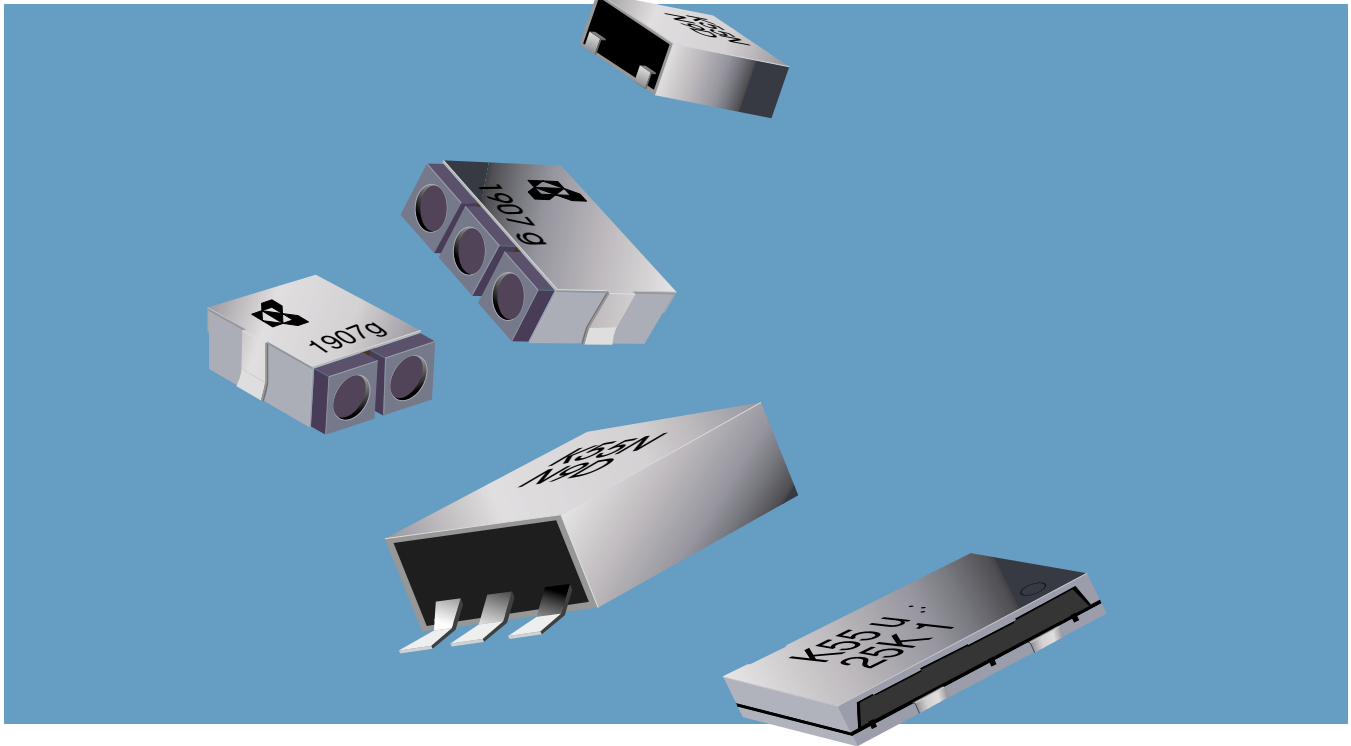
ceramic • saw • dielectric



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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.

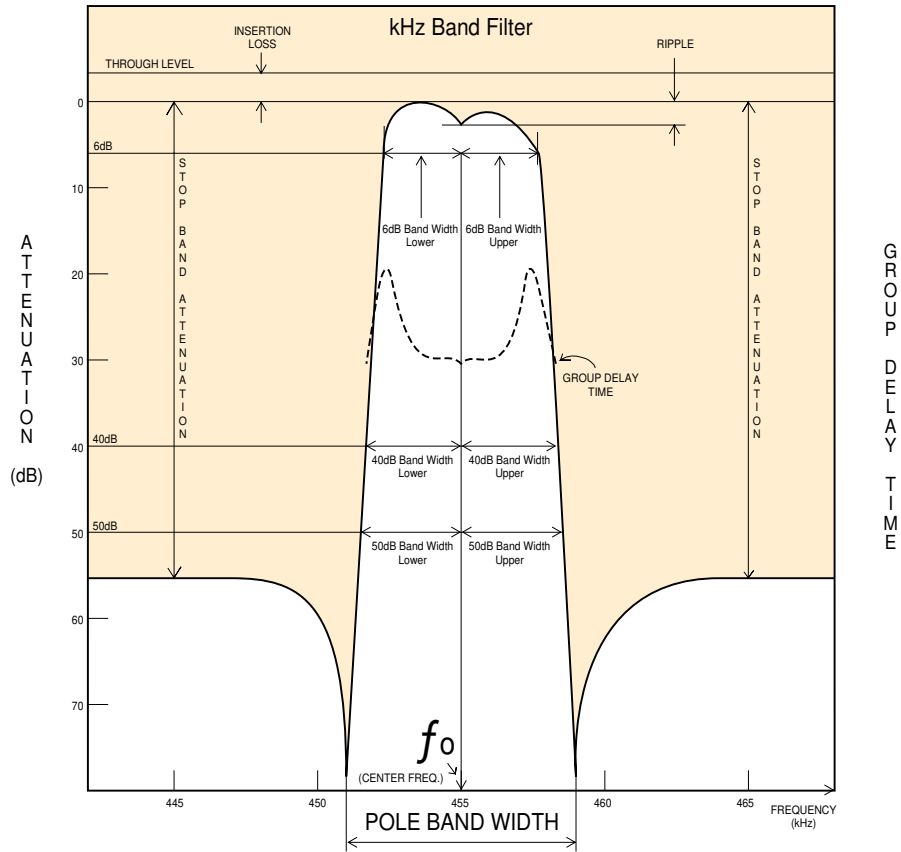


Fig. 1

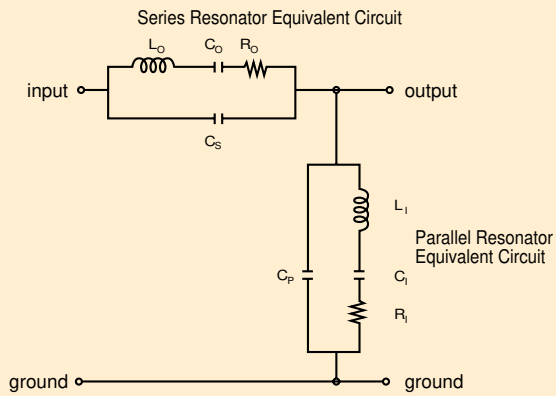


Fig. 2

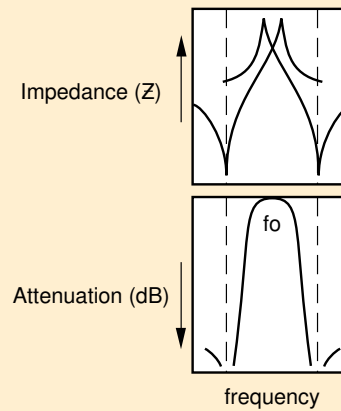


Fig. 3

# 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

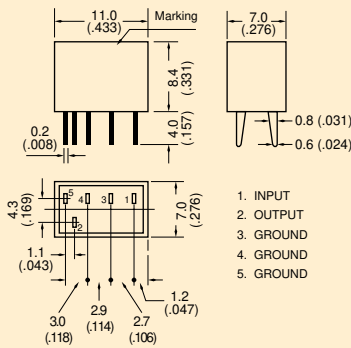


- ① Passband width (at 6dB)  
 ② Manufacturing monthly code  
 ③ Case color

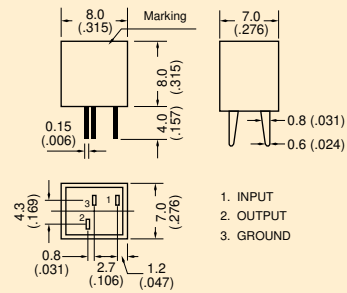
|       |                   |
|-------|-------------------|
| Blue  | KBF-455P/R Series |
| Green | KBF-450P/R Series |

### Dimensions

#### KBF-R series (6-element)



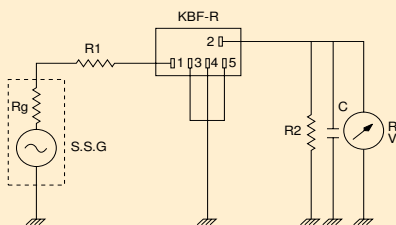
#### KBF-P series (4-element)



Unit: mm (inch)

### Test Circuits

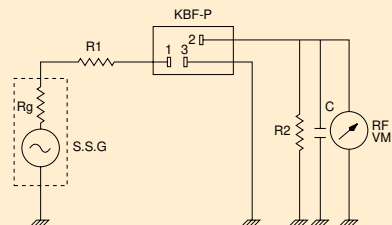
#### KBF-R series (6-element)



$R1 + Rg = R2 =$  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)



$R1 + Rg = R2 =$  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. |                       |                |                        |                       | 30 μsec. max. (455±8kHz)  |
| KBF-455R-20A |                       |               | ±10.0kHz min. | ±20.0kHz max. | 37dB min.             | 6dB max.       | 2.0kΩ                  |                       |                           |
| 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  | ±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 | 455kHz±1.0kHz         |               | ±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. |                       |                |                        |                       | 30 μsec. max. (455±8kHz)  |
| KBF-455P-25A |                       |               | ±12.5kHz min. | ±24.0kHz max. | 6dB max.              | 2.0kΩ          |                        |                       |                           |
| KBF-455P-20A |                       |               | ±10.0kHz min. | ±20.0kHz max. |                       |                |                        |                       |                           |
| KBF-455P-15A |                       |               | ±7.5kHz min.  | ±15.0kHz max. |                       |                |                        |                       |                           |
| KBF-455P-12A |                       |               | ±6.0kHz min.  | ±12.5kHz max. |                       |                |                        |                       |                           |
| KBF-455P-10A | ±5.0kHz min.          | ±11.0kHz max. | 35dB min.     |               |                       |                |                        |                       |                           |
| KBF-455P-9A  | ±4.5kHz min.          | ±10.0kHz max. |               |               |                       |                |                        |                       |                           |
| KBF-455P-7A  | ±3.5kHz min.          | ±9.0kHz max.  |               |               |                       |                |                        |                       |                           |
| KBF-455P-6AS | 455kHz±1.0kHz         |               | ±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. |                       |                |                        |                       | 30 μsec. max. (455±8kHz)  |
| KBF-450R-20A |                       |               | ±10.0kHz min. | ±20.0kHz max. | 37dB min.             | 6dB max.       | 2.0kΩ                  |                       |                           |
| 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  | ±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 | 450kHz±1.0kHz         |               | ±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. |                       |                |                        |                       | 30 μsec. max. (455±8kHz)  |
| KBF-450P-25A |                       |               | ±12.5kHz min. | ±24.0kHz max. | 6dB max.              | 2.0kΩ          |                        |                       |                           |
| 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 | ±5.0kHz min.          | ±11.0kHz max. | 35dB min.     |               |                       |                |                        |                       |                           |
| KBF-450P-9A  | ±4.5kHz min.          | ±10.0kHz max. |               |               |                       |                |                        |                       |                           |
| KBF-450P-7A  | ±3.5kHz min.          | ±9.0kHz max.  |               |               |                       |                |                        |                       |                           |
| KBF-450P-6AS | 450kHz±1.0kHz         |               | ±3.0kHz min.  | ±9.0kHz max.  |                       |                |                        |                       |                           |
| KBF-450P-4AS |                       |               | ±2.0kHz min.  | ±7.5kHz max.  |                       |                |                        |                       |                           |

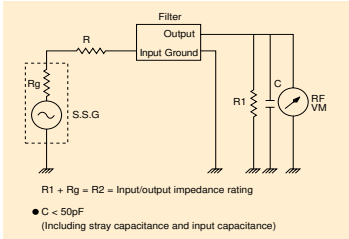
# Low Profile kHz Band Ceramic Filters

## 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
- |     |        |
|-----|--------|
| 450 | 450kHz |
| 455 | 455kHz |
- |    |           |
|----|-----------|
| RS | 6-element |
| PS | 4-element |

### ④ Passband width (at 6dB)

| # 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 |

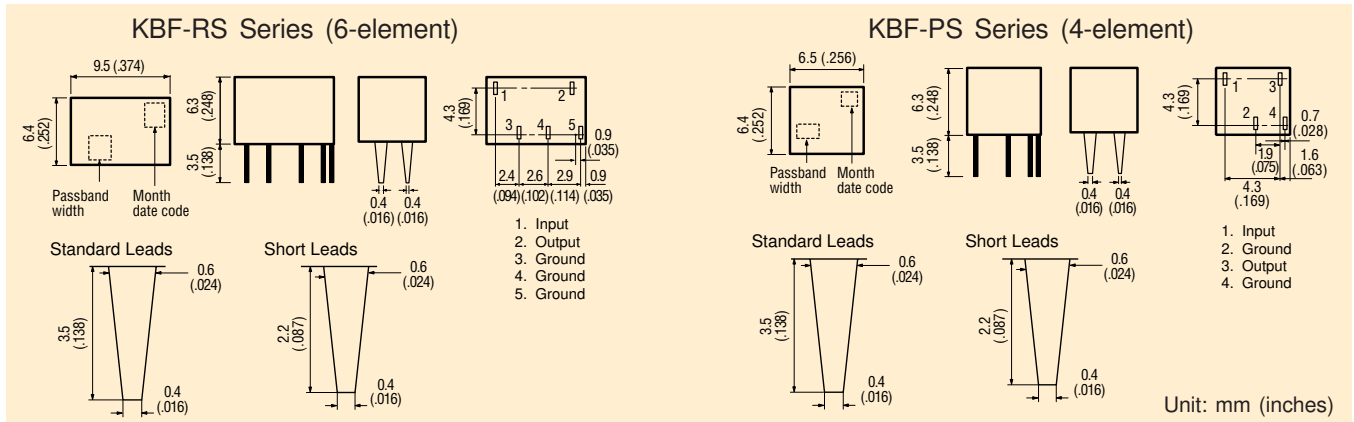
### ⑤

|    |                             |
|----|-----------------------------|
| A  | High selectivity type       |
| AS | Ultra high selectivity type |

### ⑥

|       |                            |
|-------|----------------------------|
| 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  |                       |            | ±4.5kHz min.   | ±10.0kHz max. |                       |                |                                 |                       |                           |          |       |
| KBF-455RS-7A  | 455kHz±1.0kHz         | 2.0dB max. | ±3.5kHz min.   | ±9.0kHz max.  | 55dB min.             | 6dB max.       | 2.0kΩ                           | -20°C to +80°C        |                           |          |       |
| 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 |                       |            | ±5.0kHz min.   | ±12.0kHz max. |                       |                |                                 |                       |                           |       |
| KBF-455PS-7A  | 455kHz±1.0kHz         | 2.0dB max. | ±3.5kHz min.   | ±9.0kHz max.  | 35dB min.             | 6dB max.       | 2.0kΩ                           | -20°C to +80°C        |                           |       |
| 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 |
|---|-----------|

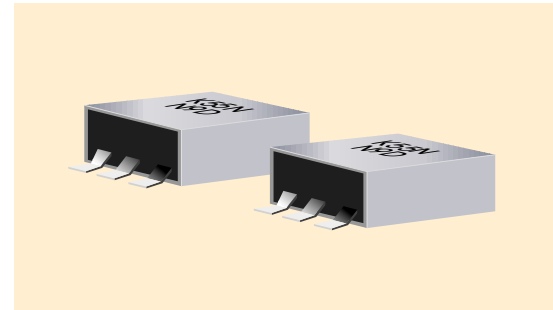
④ Passband width (at 6dB)

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

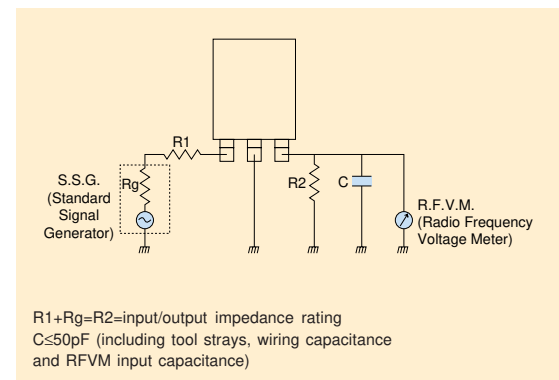
⑤

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

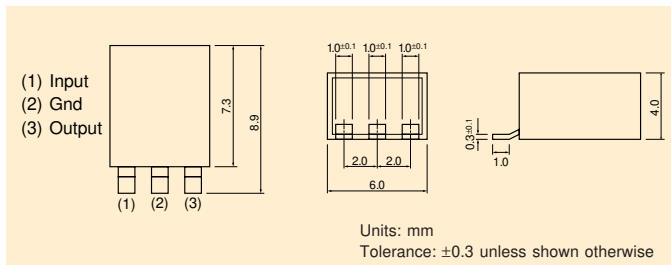
⑥ Packaging: R=Tape and reel (1,000 pcs. per reel)



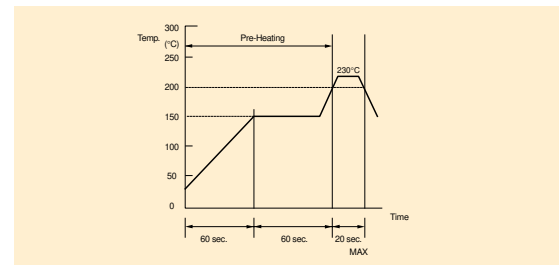
### Test Circuit



### 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<br>±1.5kHz     | 2dB max. | —                               | ±10.0kHz min.  | ±20.0kHz max. | 25dB min.   | 6dB max.       | 1.5kΩ                           | -20°C<br>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<br>±1.0kHz     | 1dB max. | 15µSec max. at 455kHz<br>±10kHz | ±3.0kHz min.   | ±9.0kHz max.  | 25dB min.   | 6dB max.       | 1.0kΩ                           | -20°C<br>to +80°C     |
| PBFS455P4D  |                       |          |                                 | ±2.0kHz min.   | ±7.5kHz max.  |             |                |                                 |                       |
| PBFS455P30K | 455kHz<br>±1.5kHz     | 1dB max. | 15µSec max. at 455kHz<br>±8kHz  | ±15.0kHz min.  | ±35.0kHz max. | 25dB min.   | 6dB max.       | 1.0kΩ                           | -20°C<br>to +80°C     |
| PBFS455P25K |                       |          |                                 | ±12.5kHz min.  | ±30.0kHz max. |             |                |                                 |                       |
| PBFS455P20K |                       |          |                                 | ±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 |
|---|-----------|

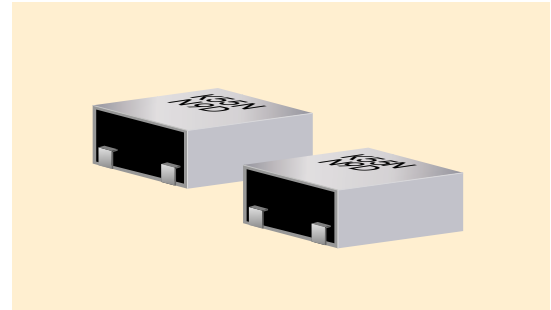
- ④ Passband width (at 6dB)

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

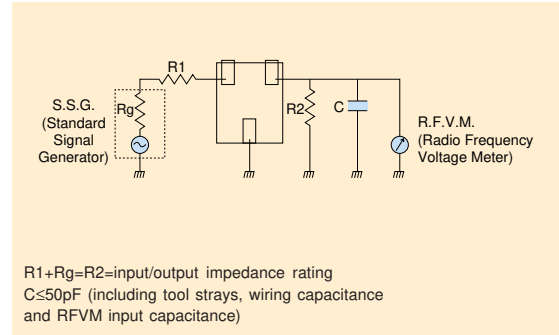
- ⑤

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

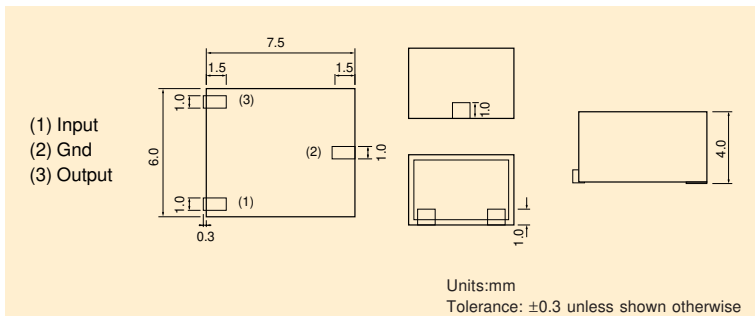
- ⑥ Packaging: R=Tape and reel (1,000 pcs. per reel)



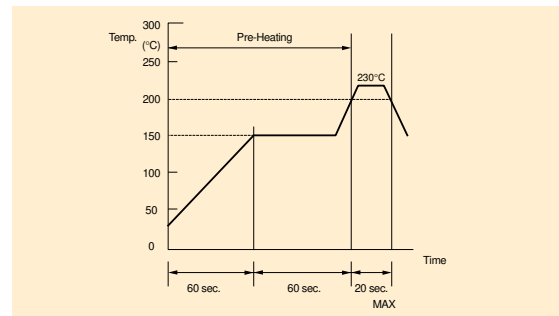
### Test Circuit



### 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          |                                 |                |                                 |                       |               |               |                                |               |               |
| PBFC455P20D | 455kHz<br>±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  |                       |               |                                | ±3.0kHz min.      | ±9.0kHz max.  |                                 |                |                                 |                       |               |               |                                |               |               |
| PBFC455P4D  | ±1.0kHz               | ±2.0kHz min.  | ±7.5kHz max.                   | 455kHz<br>±1.5kHz | 1dB max.      | 15µSec max. at 455kHz<br>±10kHz | ±15.0kHz min.  | ±35.0kHz max.                   | 1.0kΩ                 |               |               |                                |               |               |
| PBFC455P30K | ±10.0kHz min.         | ±30.0kHz max. | 15µSec max. at 455kHz<br>±5kHz |                   |               |                                 |                |                                 |                       | ±12.5kHz min. | ±30.0kHz max. |                                |               |               |
| PBFC455P25K | ±12.5kHz min.         | ±30.0kHz max. |                                |                   |               |                                 |                |                                 |                       |               |               | 30µSec max. at 455kHz<br>±7kHz | ±10.0kHz min. | ±25.0kHz max. |
| PBFC455P20K | ±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 |
|---|-----------|

④ Passband width (at 6dB)

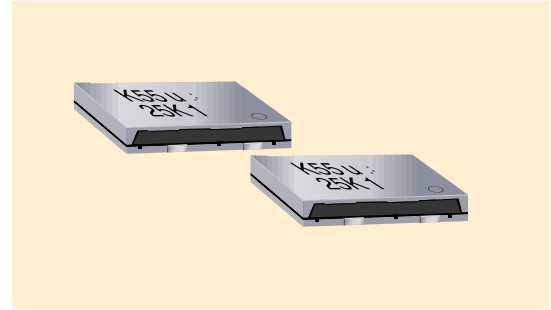
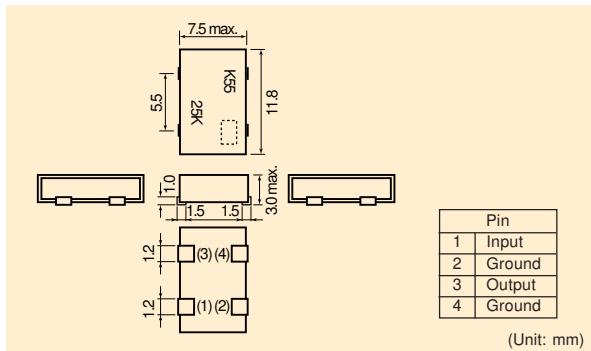
| # Elements | Total Bandwidth, kHz |
|------------|----------------------|
| 6-element  | 30, 25, 20, 15, 9    |

⑤

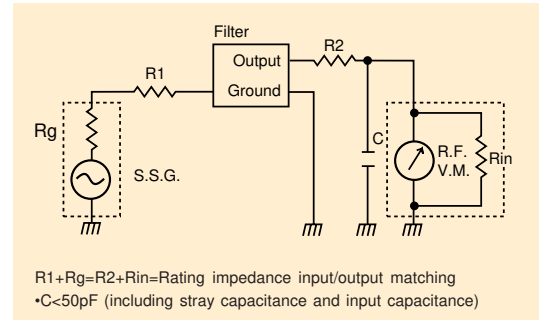
| Group Delay Time |                        | Available Bandwidth, kHz |
|------------------|------------------------|--------------------------|
| D                | Standard Group Delay   | 20, 15, 9                |
| K                | Controlled Group Delay | 30, 25, 20               |

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

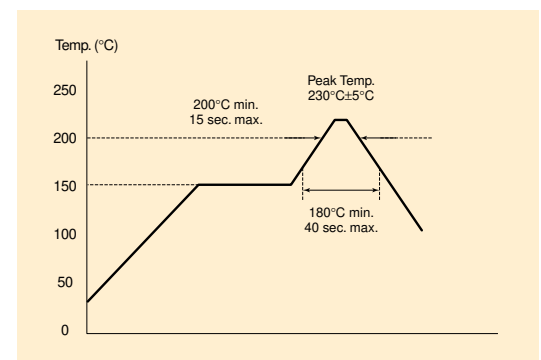
### Dimensions



### Test Circuit



### 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.             | 6.0dB max.     | 1.0kΩ (1.5kΩ)*                  | 30.0 μsec. max. (455±7.0kHz) |                              |
| PBFC455R25K |                       |            | ±12.5kHz min.  | ±30.0kHz max. |                       |                |                                 |                              | 30.0 μsec. max. (455±8.0kHz) |
| PBFC455R30K |                       |            | ±14.0kHz min.  | ±35.0kHz max. |                       |                |                                 |                              |                              |

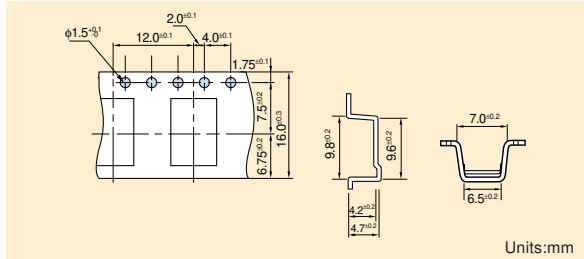
\* Option

# Surface Mount kHz Band Ceramic Filters

## PBF Series

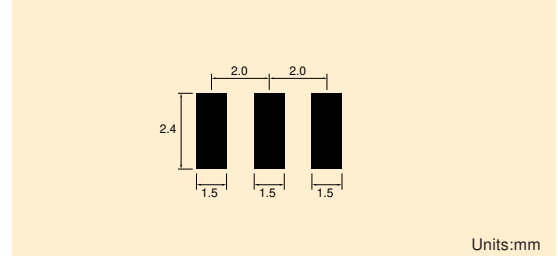
### Tape and Reel Dimensions

#### PBFS-P Series (4-element)

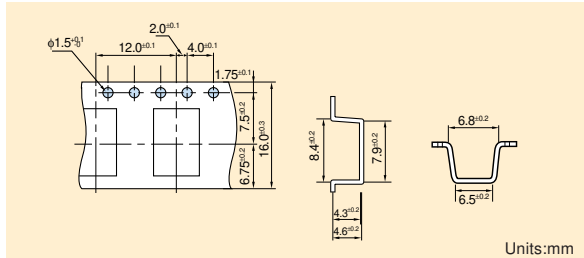


### Suggested Solder Pad Layout

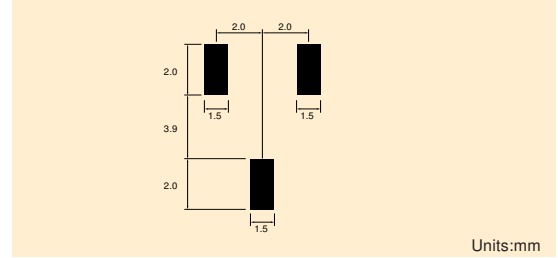
#### PBFS-P Series (4-element)



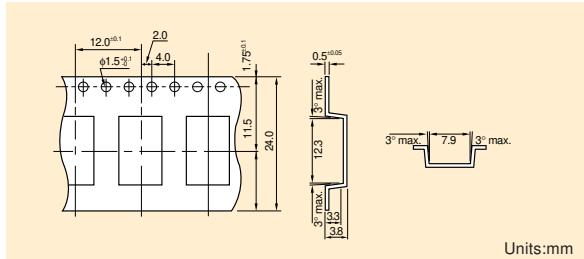
#### PBFC-P Series (4-element)



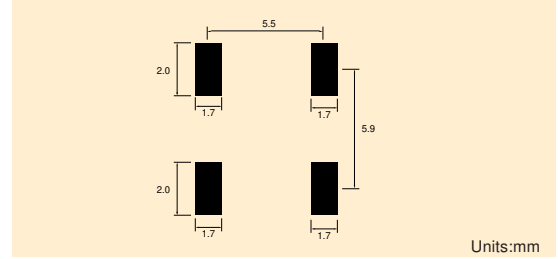
#### PBFC-P Series (4-element)



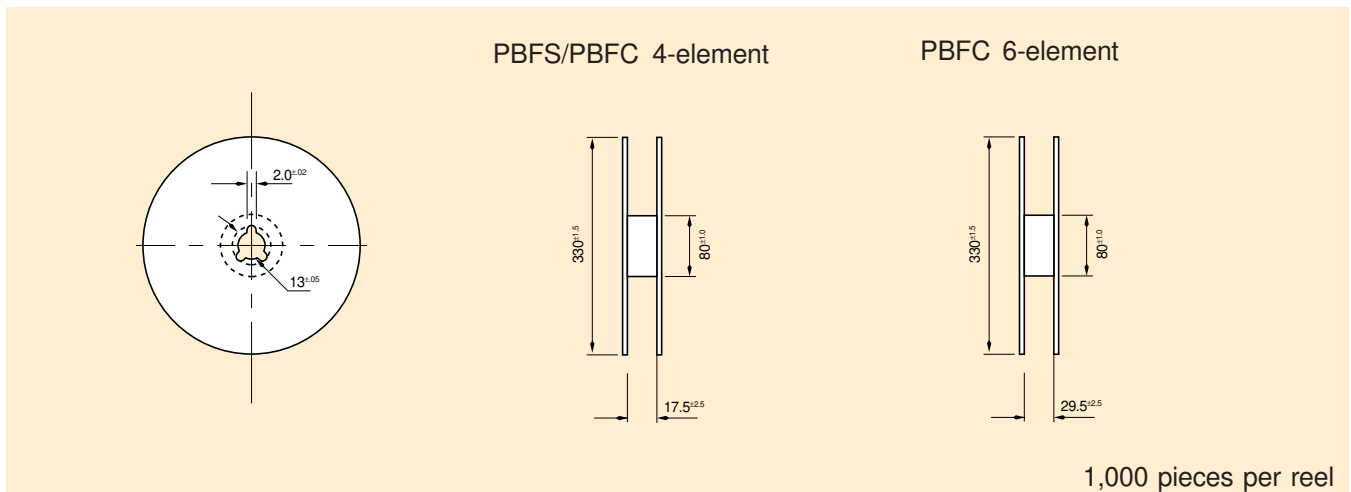
#### PBFC-R Series (6-element)



#### PBFC-R Series (6-element)



### Reel Dimensions



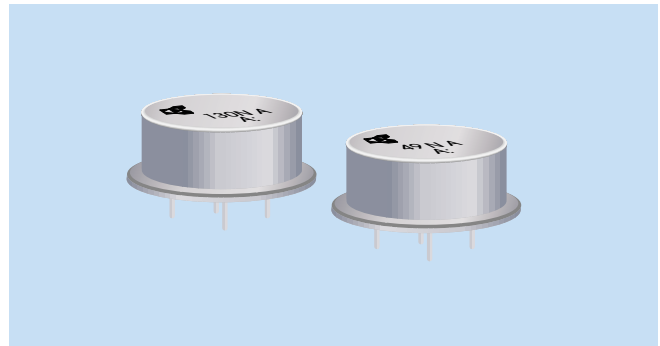
# AVX/Kyocera Surface Acoustic Wave Filters

## 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.

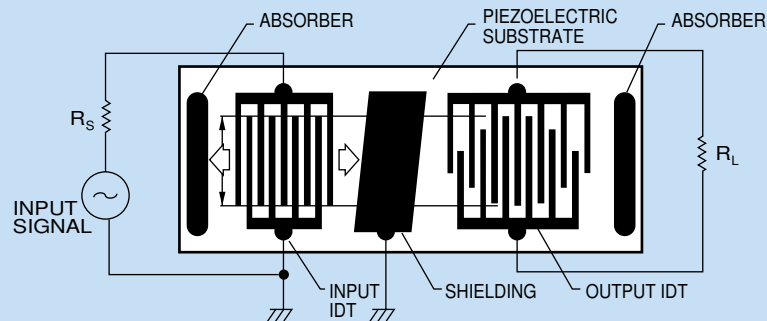


Figure 1

# SAW Filters - Broadcast Satellite/CATV Converter

## KAF Series

### Features

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

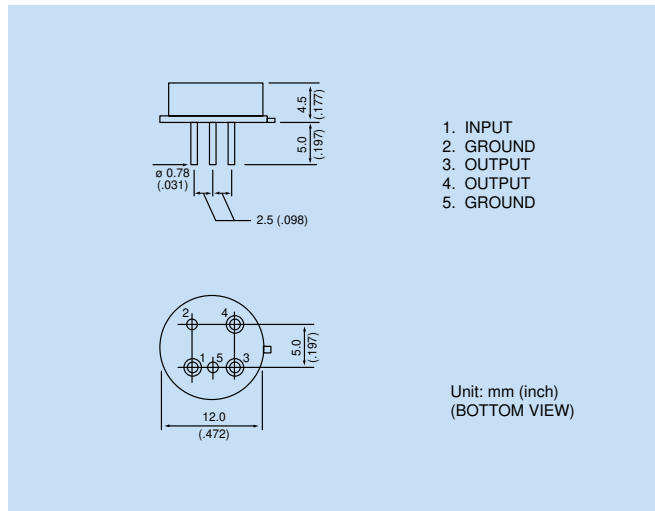
### How To Order

## KAF - 134 NR-MB

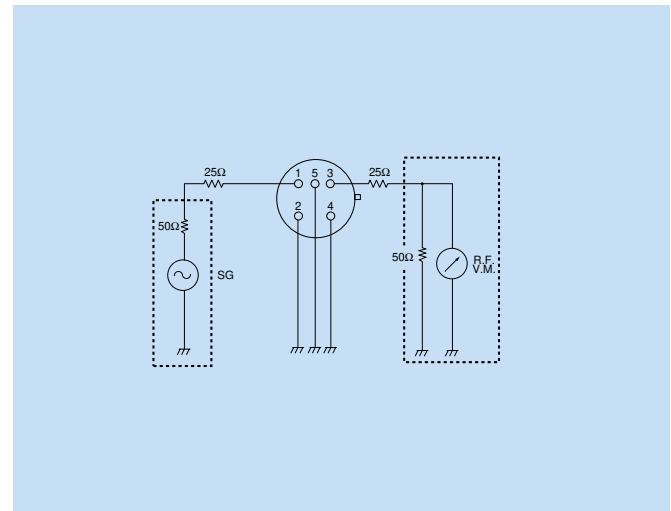
- ①      ②      ③

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

### Dimensions



### 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.<br>(10 to 100MHz) |                                   |
| KAF-70NR-WD  | 33 max.             | 70                     | 25 min.                | 34 max.                 |                      | ±30                       | 25 min.<br>(10 to 100MHz) |                                   |

# SAW Filters - 46/49 MHz Cordless Phone

## KAF Series

### Features

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

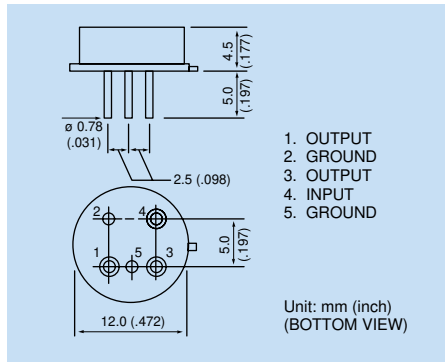
### How To Order

## KAF - 46 NR-ME

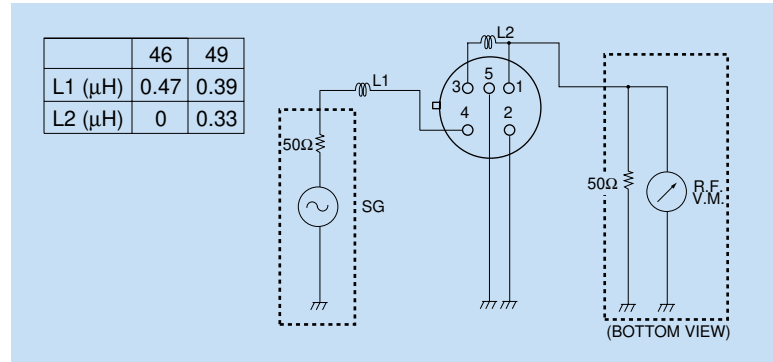
- ①      ②      ③

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

### Dimensions



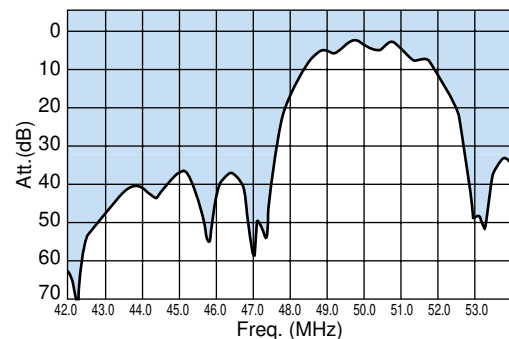
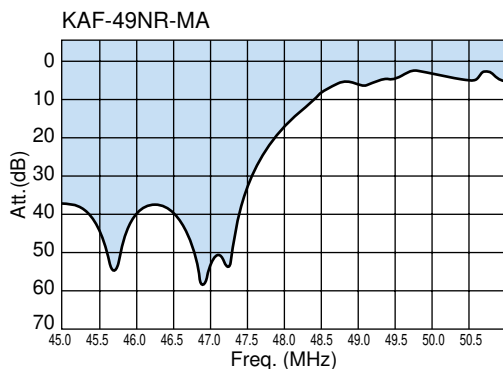
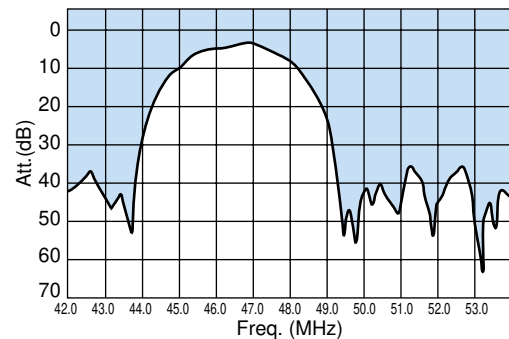
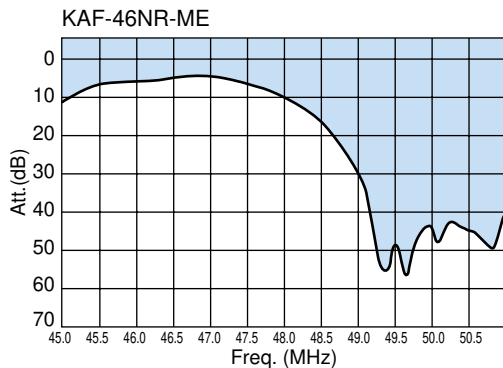
### Test Circuit KAF-46 NR-ME/KAF-49NR-MA



### 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

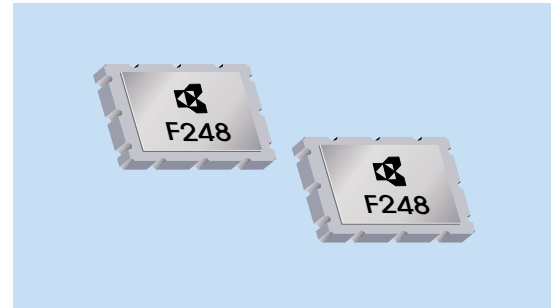
- 1) PHS

### How To Order

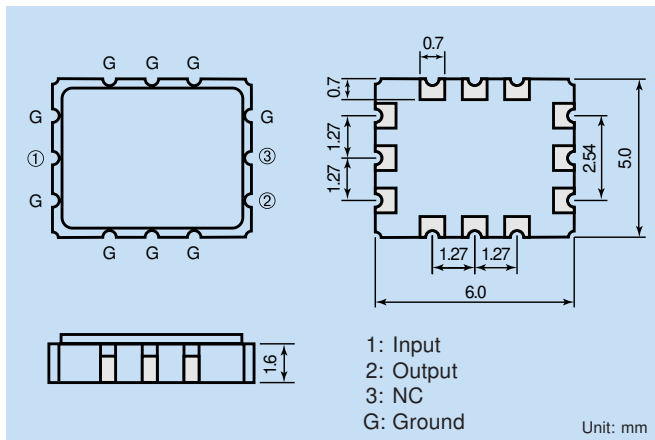
## PAFC 248 A

- ①      ②      ③

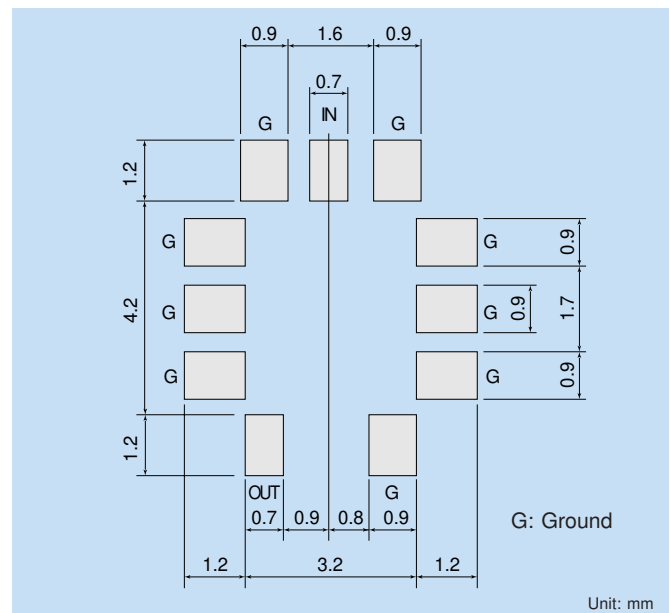
- ① Series
- ② Center frequency
- ③ Type



### Shape and Dimension



### Recommended Land Pattern

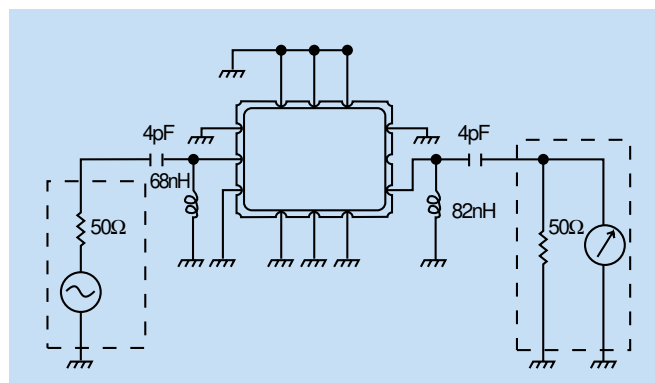


### Specifications

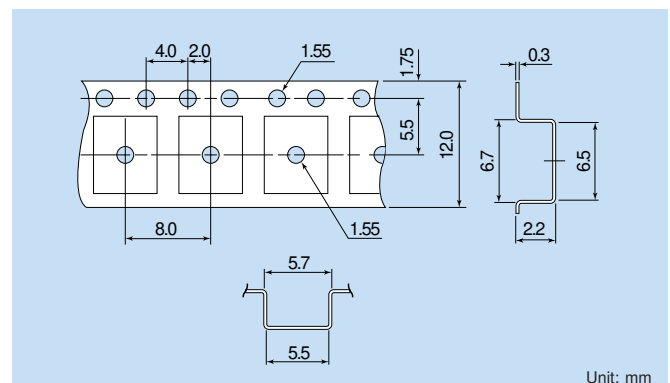
| Part Number                                  | PAFC248A                 | PAFC243A               |
|--|--------------------------|------------------------|
| Nominal Center Frequency                     | 248.45MHz                | 243.95MHz              |
| Insertion Loss                               | 4.0dB max.               | 4.0dB max.             |
| Passband Width (at 3dB)                      | ±130kHz min.             | ±130kHz 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 $\mu\text{s}$ max.   | 1.2 $\mu\text{s}$ 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

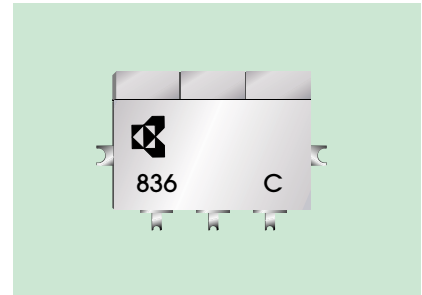
- 1) Surface mountable
- 2) Compact, with low insertion loss using high Q ceramics
- 3) Various passband widths available
- 4) High stability and reliability

### How to Order

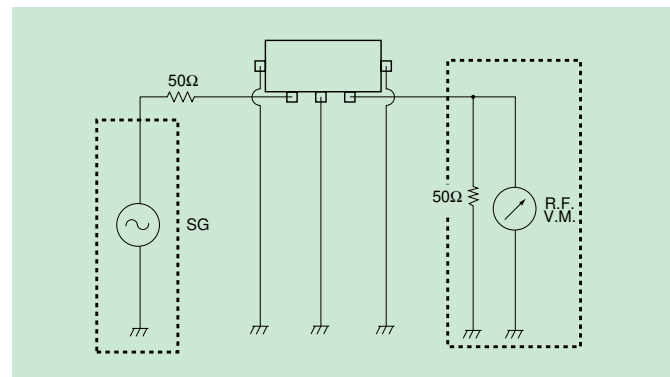
#### KDF - 914 PY 02 A

- ①      ②      ③      ④      ⑤

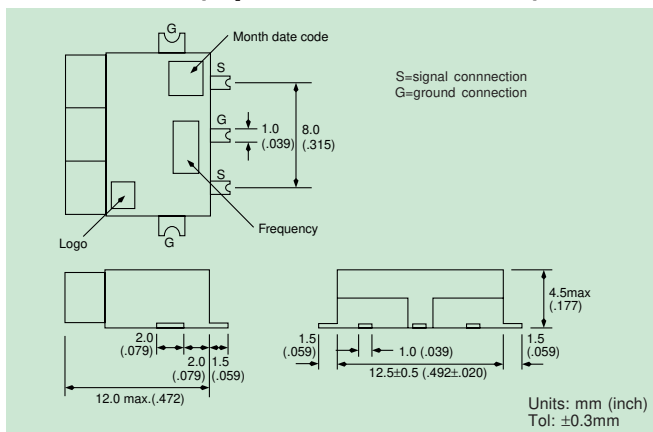
- ① Model (Kyocera Dielectric Filter)
- ② Center frequency
- ③ Number of poles (PY: 2-pole, RY: 3-pole)
- ④ Passband width
- ⑤ Type number



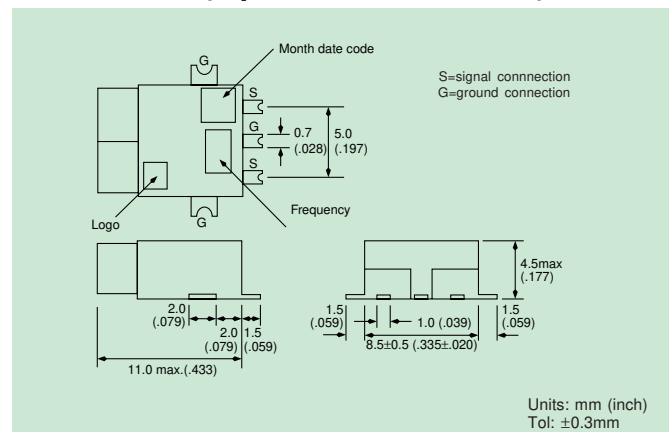
### Test Circuit



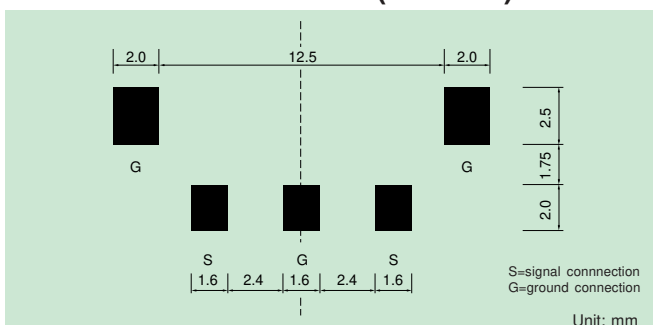
### Dimensions (3-pole KDF-RY series)



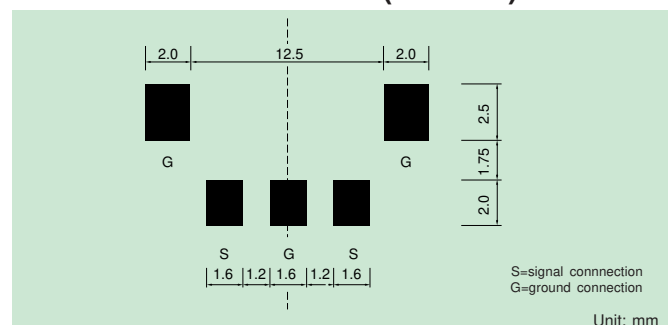
### Dimensions (2-pole KDF-PY series)



### 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                      |                                       |                      |                           |   |
|                       | KDF931PY02A   | 931.0MHz                      | 3.0 max.                              | ±1.0 min.            | 2.0 max.                  | 24 min. at fn±45MHz                           |
|                       | 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                      |                                       |                      |                           |   |
|                       | KDF-915PY26A  | 915.0MHz                      | 2.5 max.                              | ±13.0 min.           | 2.5 max.                  | 20 min. at fn±77.5MHz                         |
| 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<br>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<br>45 min. at fn±210MHz |

# Surface Mount Dielectric Filters

## PDFB Series

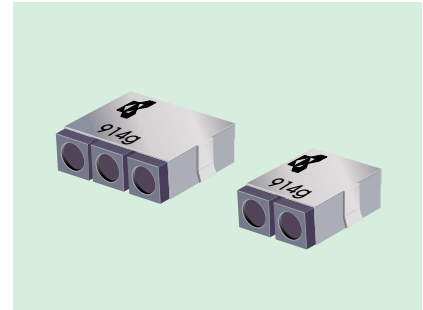
### Features

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

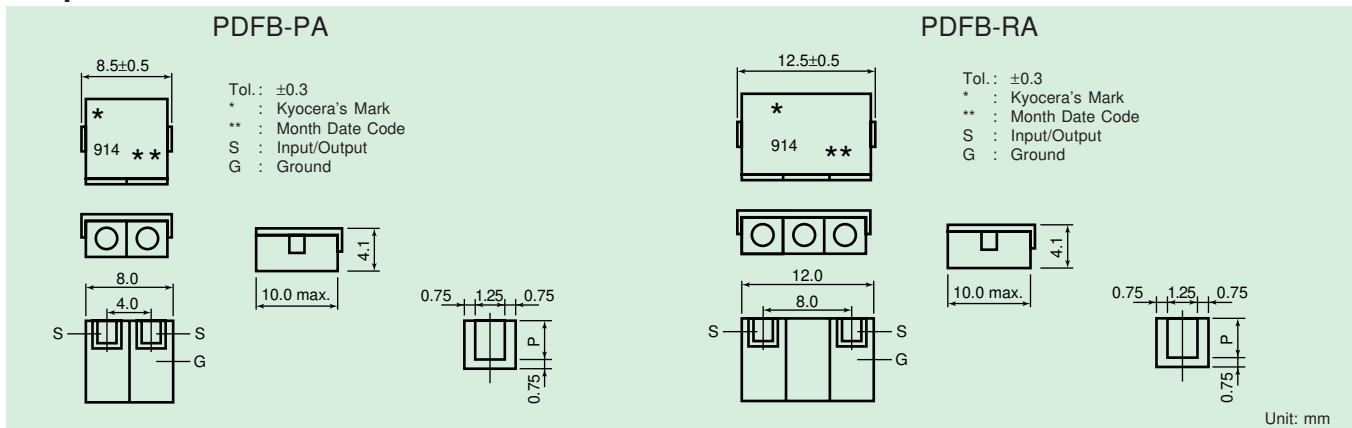
### How To Order

## PDFB 931 PA 002 R A

- ① ② ③ ④ ⑤ ⑥
- 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<br>7 min. |
|                       | PDFB881PA025RA | 881.5MHz                      |                                       |                      |                           |                         |
| GSM/NMT900            | PDFB902PA025RA | 902.5MHz                      | 2.5 max.                              | ±12.5 min.           | 2.5 max.                  | at fn±32.5MHz<br>7 min. |
|                       | PDFB947PA025RA | 947.5MHz                      |                                       |                      |                           |                         |
| Europe Cordless Phone | PDFB959PA002RA | 959.5MHz                      | 3.0 max.                              | ±1.0 min.            | 2.0 max.                  | at fn±45MHz<br>24 min.  |
|                       | PDFB914PA002RA | 914.5MHz                      |                                       |                      |                           |                         |
|                       | PDFB931PA002RA | 931.0MHz                      | 3.0 max.                              | ±1.0 min.            | 2.0 max.                  | at fn±45MHz<br>24 min.  |
|                       | PDFB886PA002RA | 886.0MHz                      |                                       |                      |                           |                         |
| US Cordless Phone     | PDFB903PA002RA | 903.0MHz                      | 3.0 max.                              | ±1.0 min.            | 2.0 max.                  | at fn±24MHz<br>13 min.  |
|                       | PDFB927PA002RA | 927.0MHz                      |                                       |                      |                           |                         |
|                       | PDFB915PA026RA | 915.0MHz                      | 2.5 max.                              | ±13.0 min.           | 2.5 max.                  | at fn±77.5MHz 20 min.   |

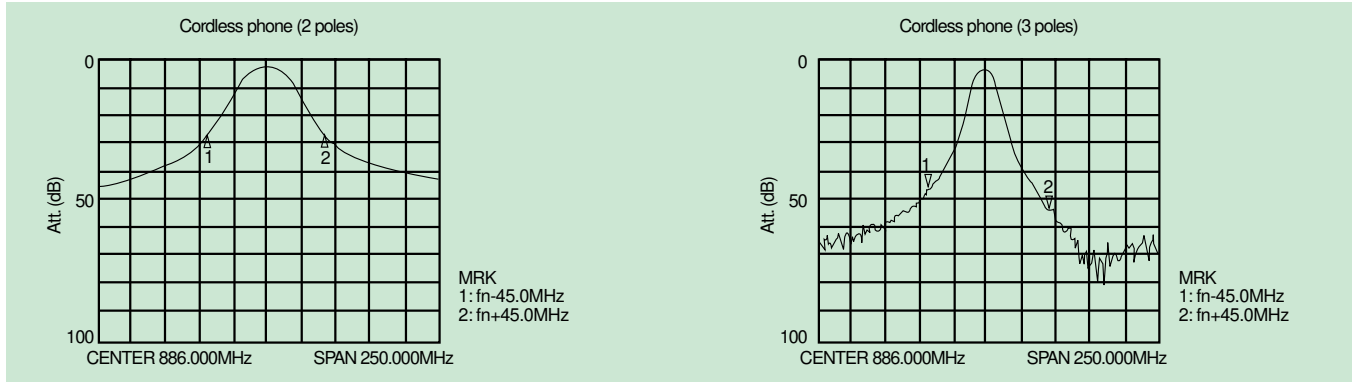
#### PDFB-RA Series (3-pole type)

| 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<br>12 min. |
|                       | PDFB881RA025RA | 881.5MHz                      |                                       |                      |                           |                          |
| E-TACS                | PDFB888RA033RA | 888.5MHz                      | 3.0 max.                              | ±16.5 min.           | 2.0 max.                  | at fn±28.5MHz<br>5 min.  |
|                       | PDFB933RA033RA | 933.5MHz                      |                                       |                      |                           |                          |
| GSM/NMT900            | PDFB902RA025RA | 902.5MHz                      | 3.0 max.                              | ±12.5 min.           | 2.0 max.                  | at fn±32.5MHz<br>12 min. |
|                       | PDFB947RA025RA | 947.5MHz                      |                                       |                      |                           |                          |
| Europe Cordless Phone | PDFB959RA002RA | 959.5MHz                      | 5.0 max.                              | ±1.0 in              | 2.0 max.                  | at fn±45MHz<br>40 min.   |
|                       | PDFB914RA002RA | 914.5MHz                      |                                       |                      |                           |                          |
|                       | PDFB931RA002RA | 931.0MHz                      | 5.0 max.                              | ±1.0 min.            | 2.0 max.                  | at fn±45MHz<br>40 min.   |
|                       | PDFB886RA002RA | 886.0MHz                      |                                       |                      |                           |                          |
| US Cordless Phone     | PDFB903RA002RA | 903.0MHz                      | 5.0 max.                              | ±1.0 min.            | 2.0 max.                  | at fn±24MHz<br>25 min.   |
|                       | PDFB927RA002RA | 927.0MHz                      |                                       |                      |                           |                          |
|                       | PDFB915RA026RA | 915.0MHz                      | 3.0 max.                              | ±13.0 min.           | 2.0 max.                  | at fn±32.5MHz 12 min.    |

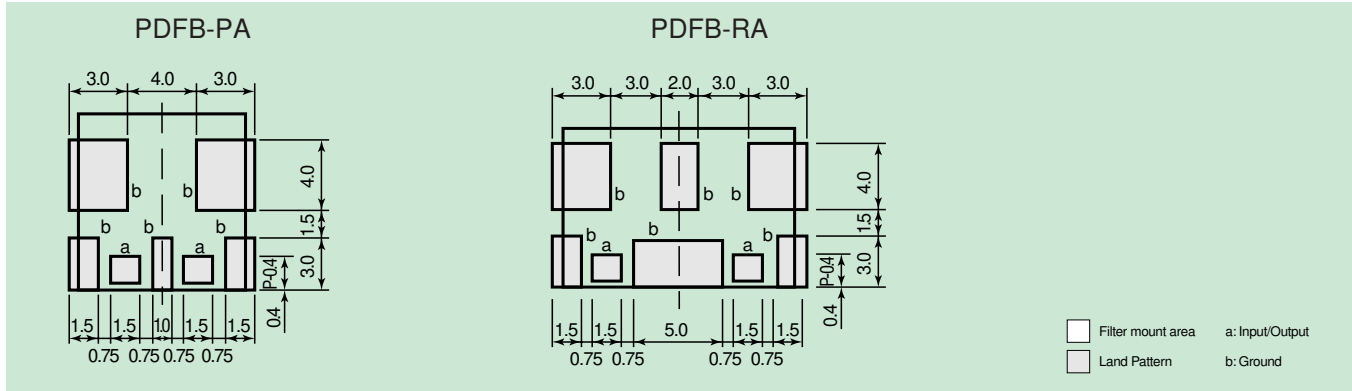
# Surface Mount Dielectric Filters

## PDFB Series

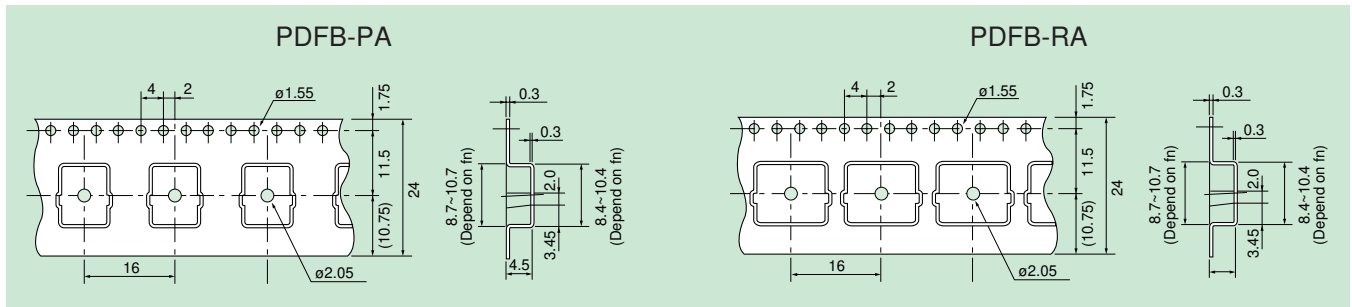
### Frequency Characteristics



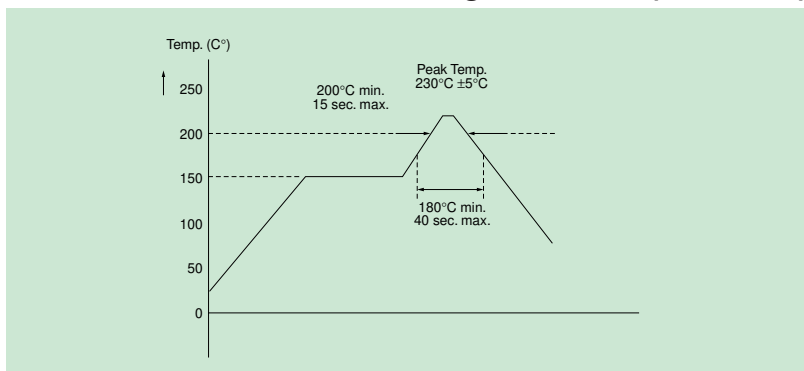
### Recommended Land Pattern



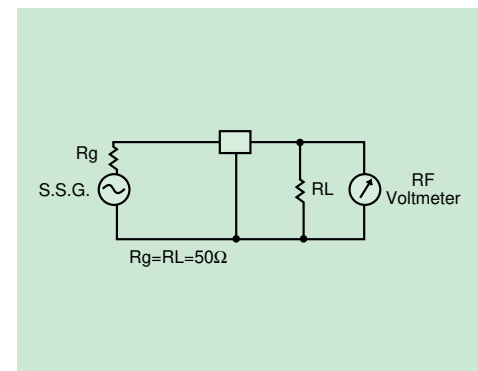
### Taping Dimension



### Recommended Reflow Soldering Condition (IR Reflow)



### Test Circuit



# Surface Mount Dielectric Filters - PHS/DECT

## PDFB Series

### Features

- 1) Ultra miniature
- 2) High selectivity

### Applications

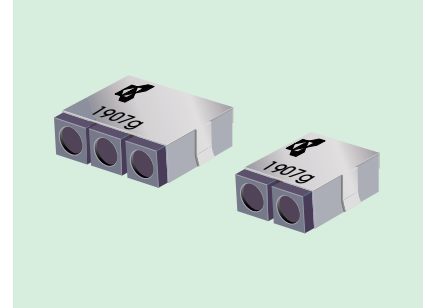
- 1) Japan digital cordless phone system (PHS)
- 2) European digital cordless phone (DECT)

### How To Order

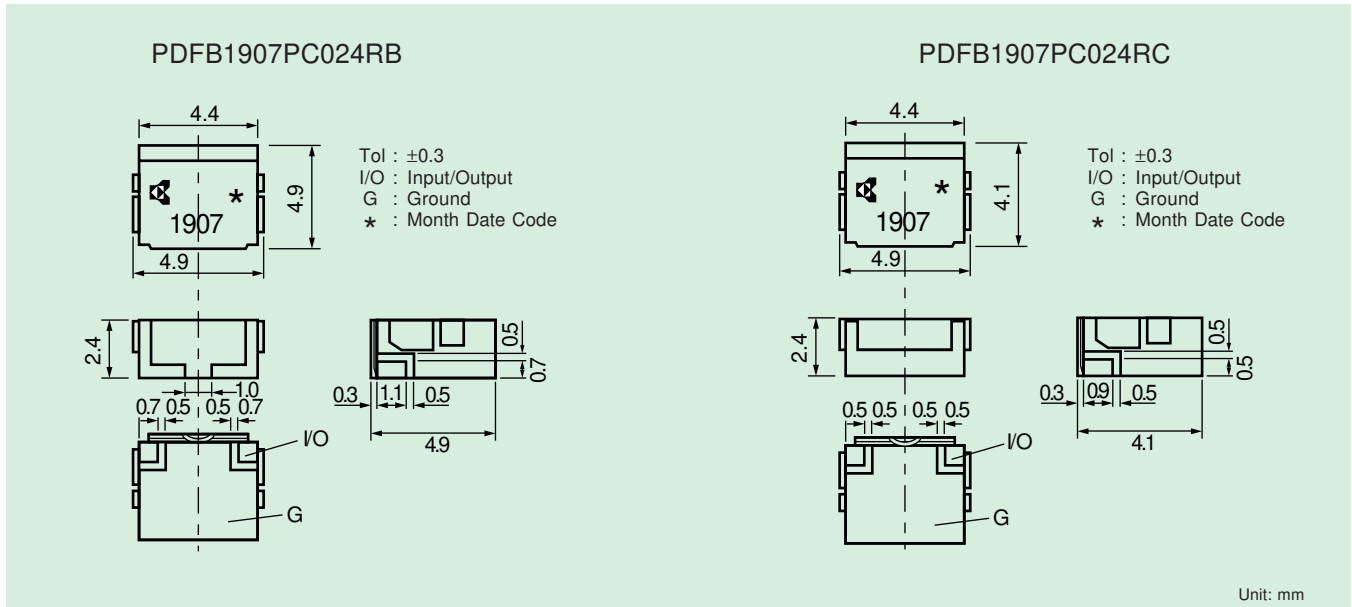
## PDFB 1907 P C 024 R B

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.       |
|                                  | fn-250MHz       | 15dB min.       |
|                                  | fn-125MHz       | —               |
|                                  | fn+250MHz       | 7dB 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       |

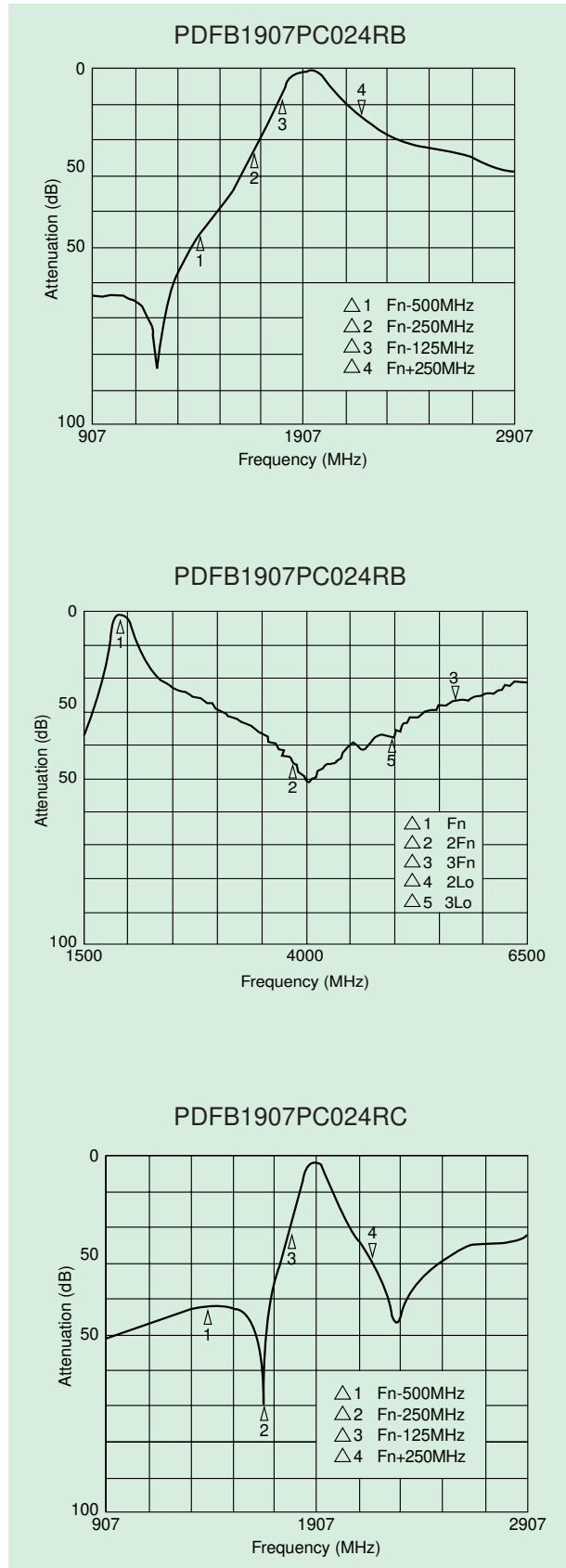
#### DECT

| 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       |           |

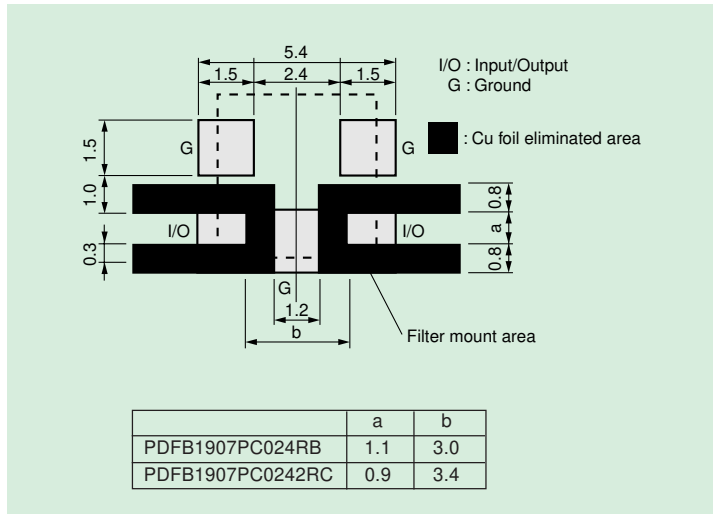
# Surface Mount Dielectric Filters - PHS/DECT

## PDFB Series

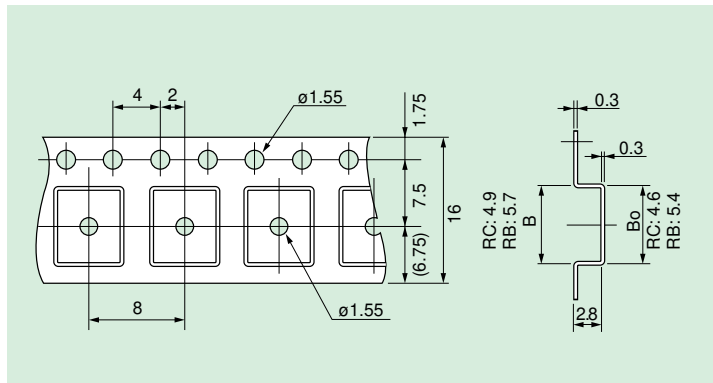
### Frequency Characteristics



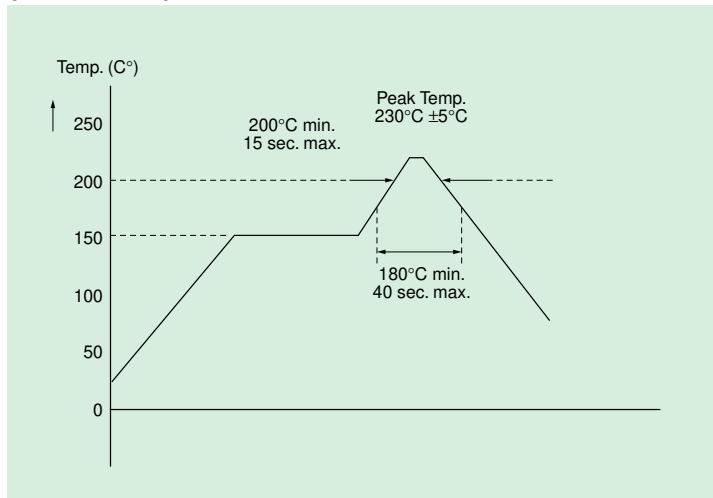
### Recommended Land Pattern



### 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

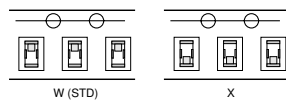
- 1) Personal computers, LBP  
:Clock output (signal) line  
:I/O line (ex. video signal line such as VGA, XGA)
- 2) Digital cellular phones
- 3) Other high speed digital circuits, for example digital TV, VTR

### How To Order

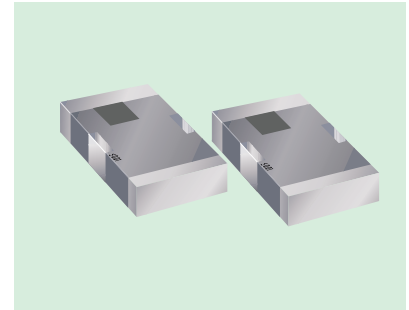
## KNF 32 050 -W 2

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

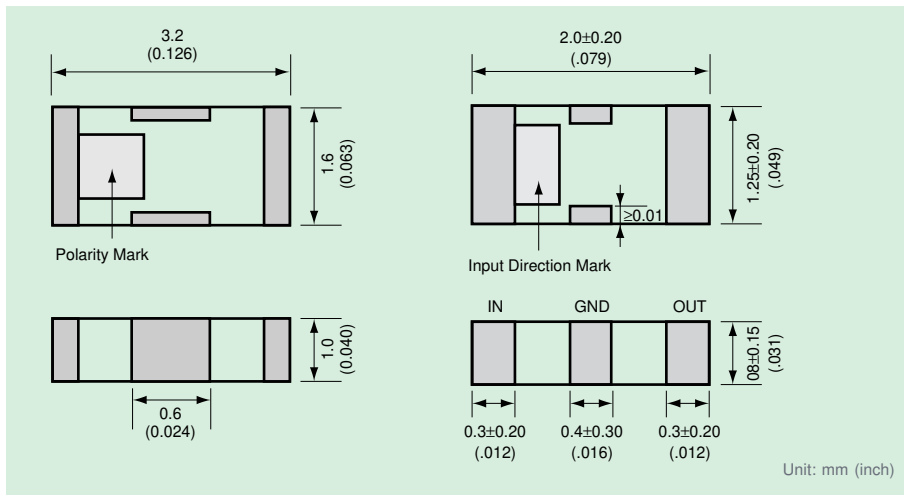
### ④ Taping direction (X, Y)



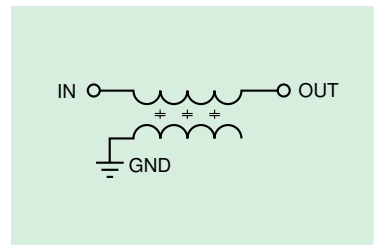
- ### ⑤ Quantity per reel:
- 2=2000p, 3=3000p



### Shape and Dimensions



### Equivalent Circuit

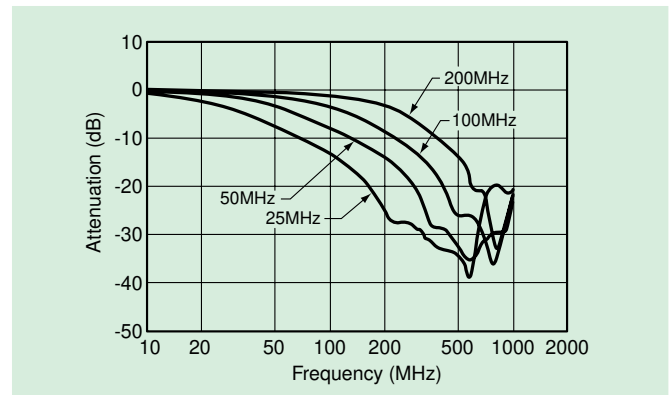


### Specifications

| 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

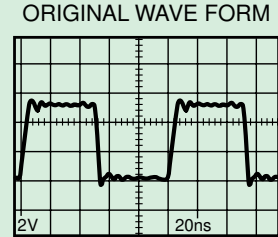
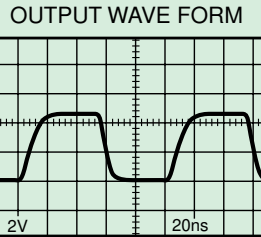
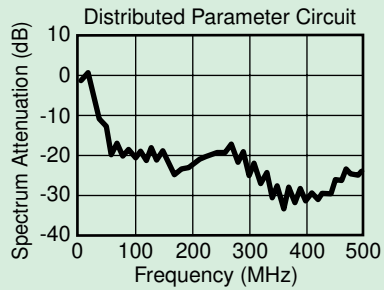


# EMI Noise Filters

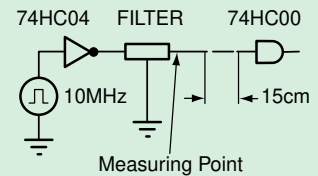
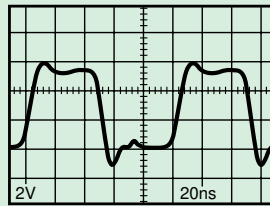
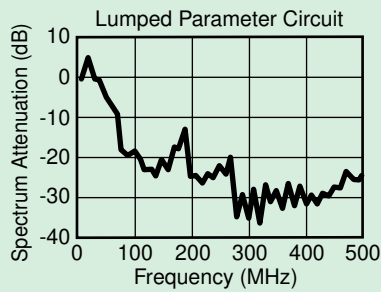
## KNF 32 Series

### Typical Example of Suppression

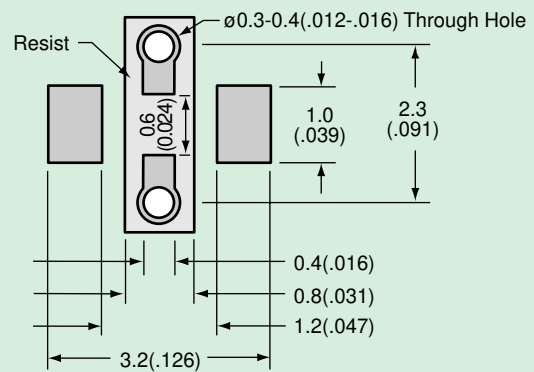
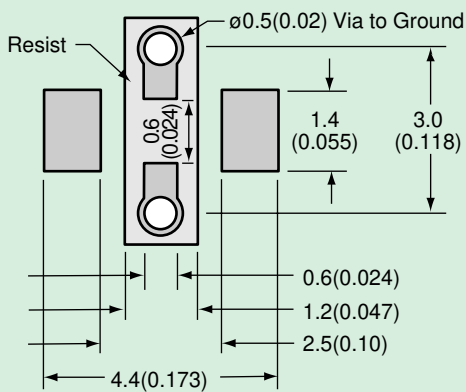
KC KNF32050



LC Filter



### Land Pattern



Unit: mm (inch)



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