

Surface Acoustic Wave Filter (SAW Filter)



TQS-444F-7R

■ Features

- Miniature size : 5.2(W) x 4.5(D) x 1.55(H)mm
- High selectivity

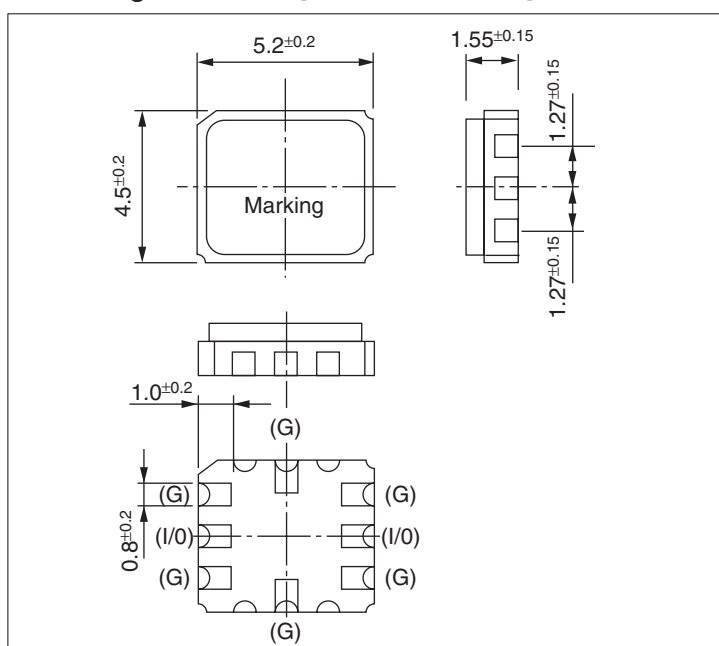
■ Application

- IF filter for Wireless LAN

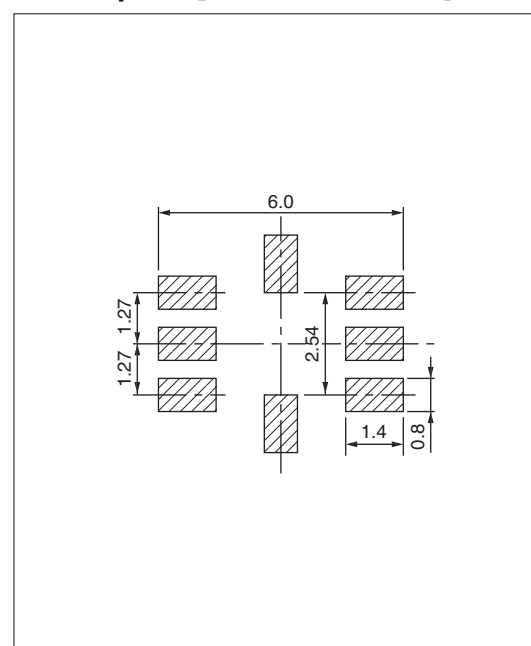
■ Specifications

Type	TQS-444F-7R
Nominal frequency [fo]	280 MHz
Pass band	fo ±8.5 MHz min.
Insertion loss	10.0 dB max.
Stop band attenuation fo ±38.8 MHz	50 dB min.
Terminating impedance	270 Ω // -5pF
Operating temperature range	-10 °C to +50 °C

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]



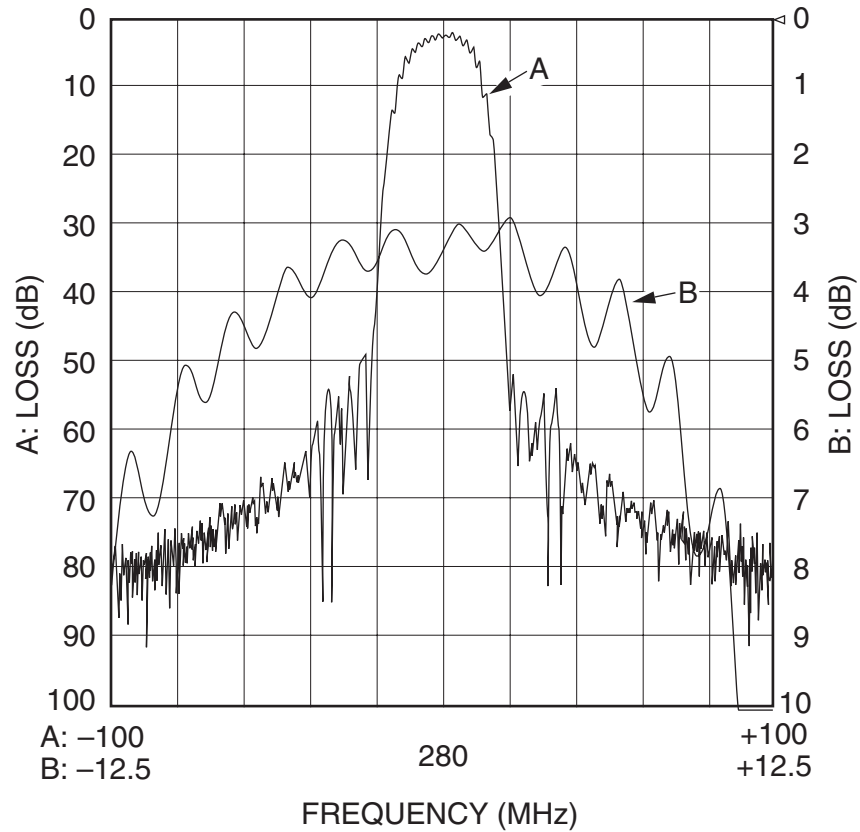
Surface Acoustic Wave Filter (SAW Filter)

TQS-444F-7R

280 MHz

IF Filter for Wireless LAN system

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-450A-7R

■ Features

- Miniature size : 5.2(W) x 4.5(D) x 1.55(H)mm
- High selectivity

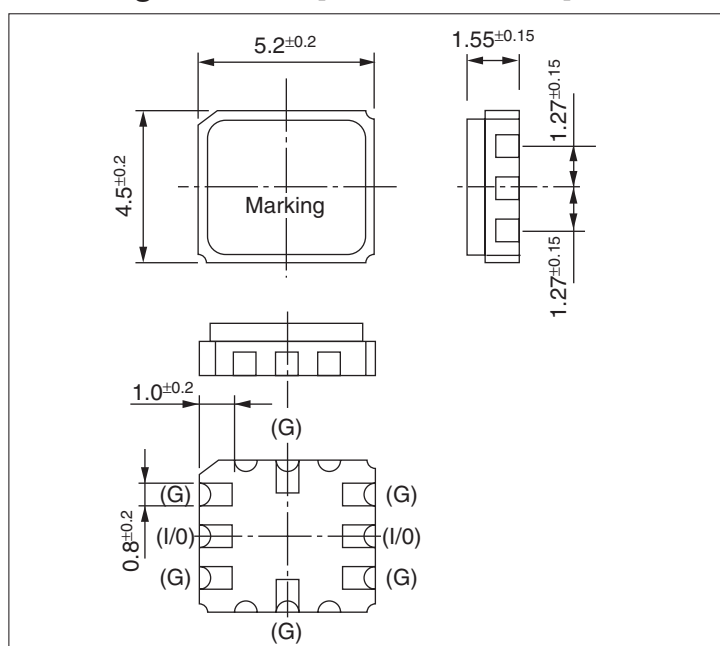
■ Application

- IF filter for Wireless LAN

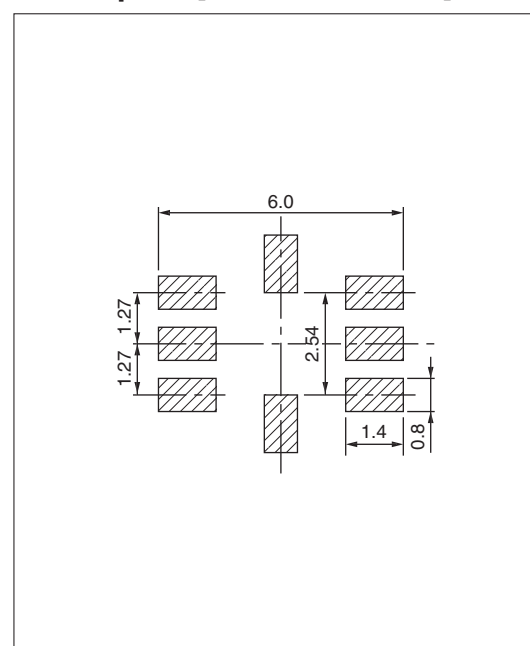
■ Specifications

Type	TQS-450A-7R
Nominal frequency [fo]	280 MHz
5dB Pass band	fo ±17 MHz min.
Insertion loss	8.5 dB max.
Group delay distortion	100 ns max.
Stop band attenuation	
fo -45 MHz	33 dB min.
fo +45 MHz	33 dB min.
Terminating impedance	480 Ω // -3.5pF
Operating temperature range	-10 °C to +50 °C

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]

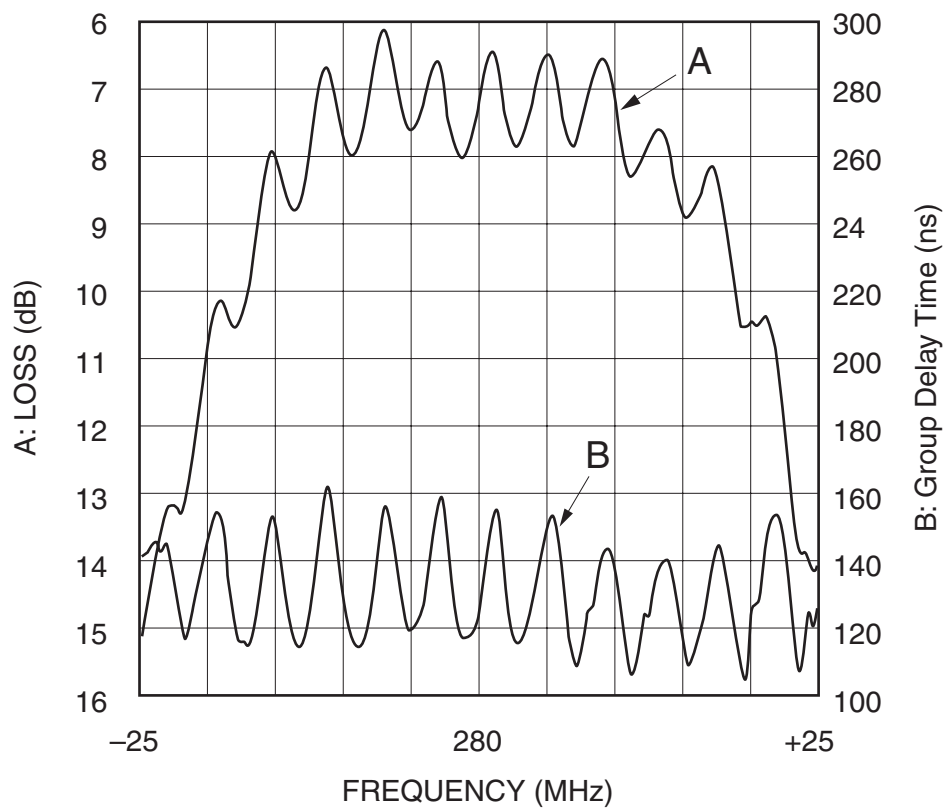
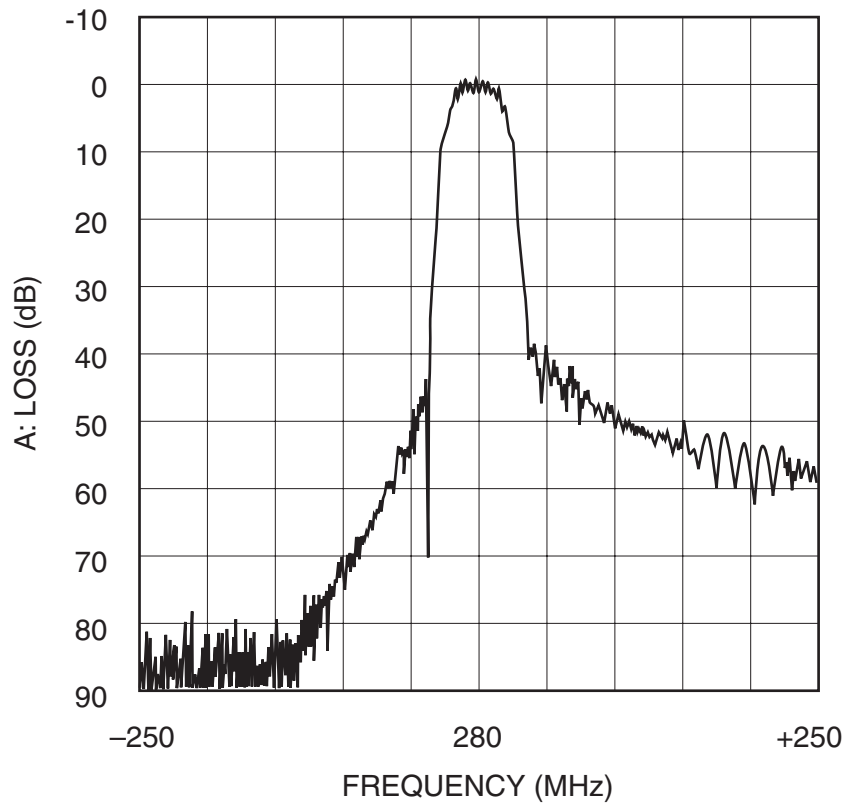


Surface Acoustic Wave Filter (SAW Filter)

TQS-450A-7R
280 MHz

IF Filter for Wireless LAN system

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-453C-7R

■ Features

- Miniature size : 5.2(W) x 4.5(D) x 1.55(H)mm
- High selectivity

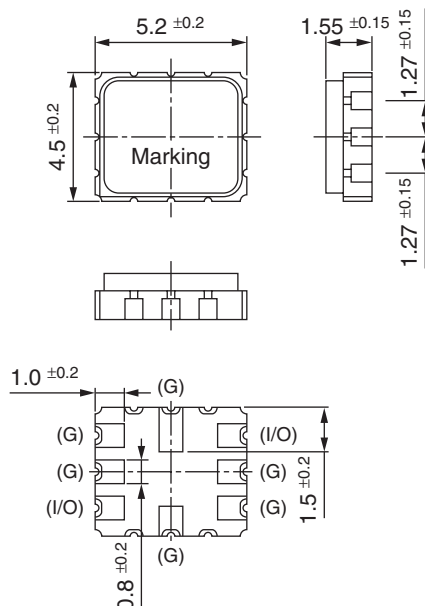
■ Application

- ETC system

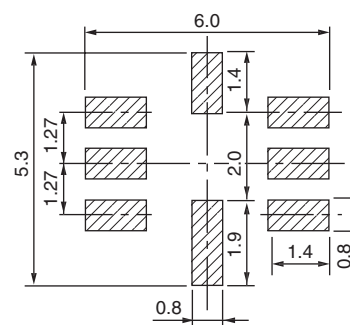
■ Specifications

Type	TQS-453C-7R
Nominal frequency [fo]	40 MHz
Pass band	fo ±2.5 MHz min.
Insertion loss	13.0 dB max.
Stop band attenuation fo ±10 MHz	35 dB min.
Terminating impedance	840 Ω // -7.7pF
Operating temperature range	-25 °C to +90 °C

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]



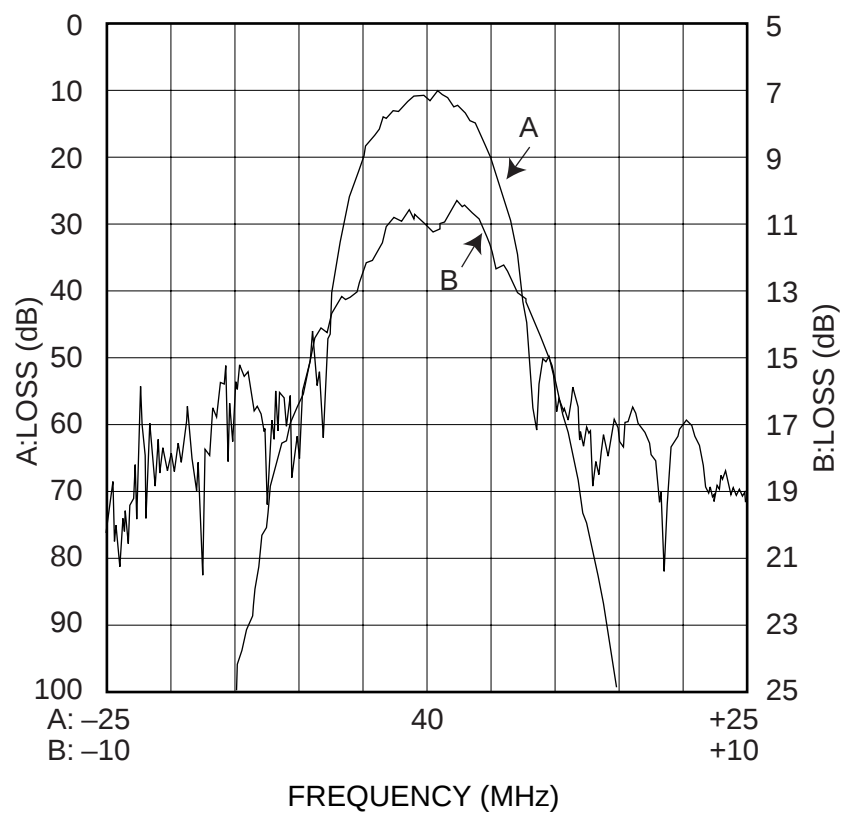
Surface Acoustic Wave Filter (SAW Filter)

TQS-453C-7R

40 MHz

IF Filter for ETC system

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-457A-7R

■ Features

- Miniature size : 5.2(W) x 4.5(D) x 1.55(H)mm
- High selectivity

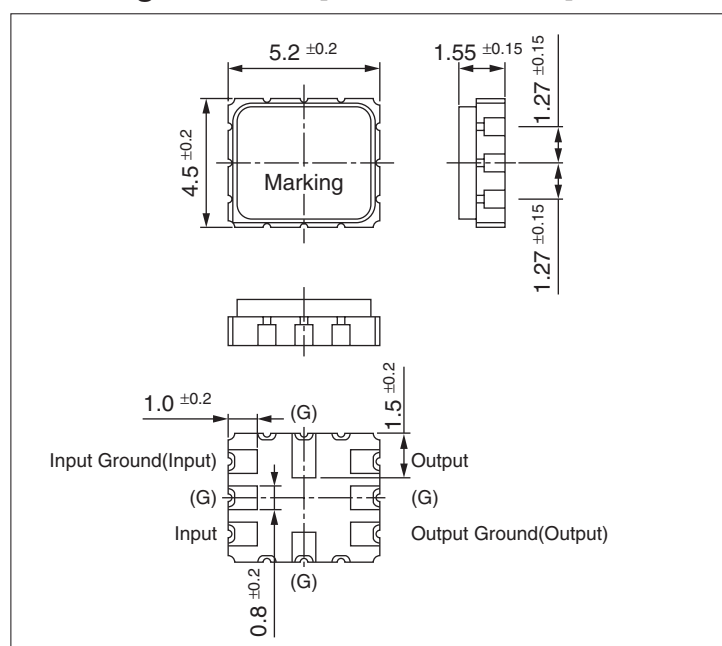
■ Application

- IF filter for Wireless LAN

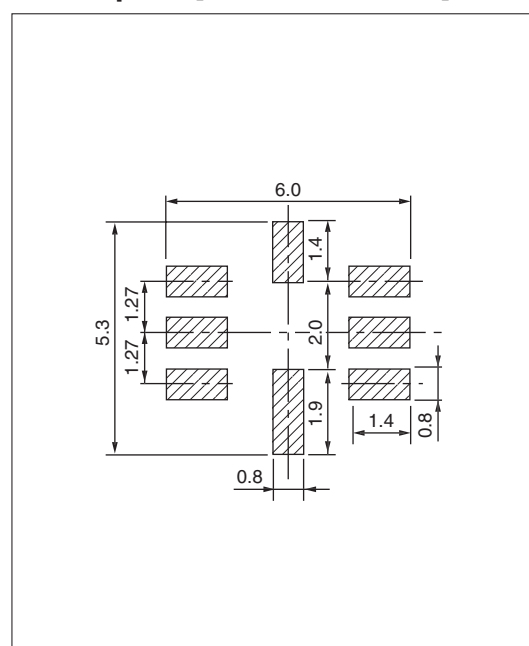
■ Specifications

Type	TQS-457A-7R
Nominal frequency [fo]	374 MHz
Pass band	fo ±8.5 MHz min.
Insertion loss	12.0 dB max.
Pass band ripple	1.5 dB max.
Group delay distortion	100 ns max.
Stop band attenuation fo ± (16.5 to 22) MHz fo ± (22 to 33) MHz fo ± (33 to 100) MHz	 30 dB min. 33 dB min. 38 dB min.
Terminating impedance	Input (Balanced or unbalanced) : 160 Ω // -8 pF Output (Balanced or unbalanced) : 50 Ω // -15 pF
Operating temperature range	-40 °C to +85 °C

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]



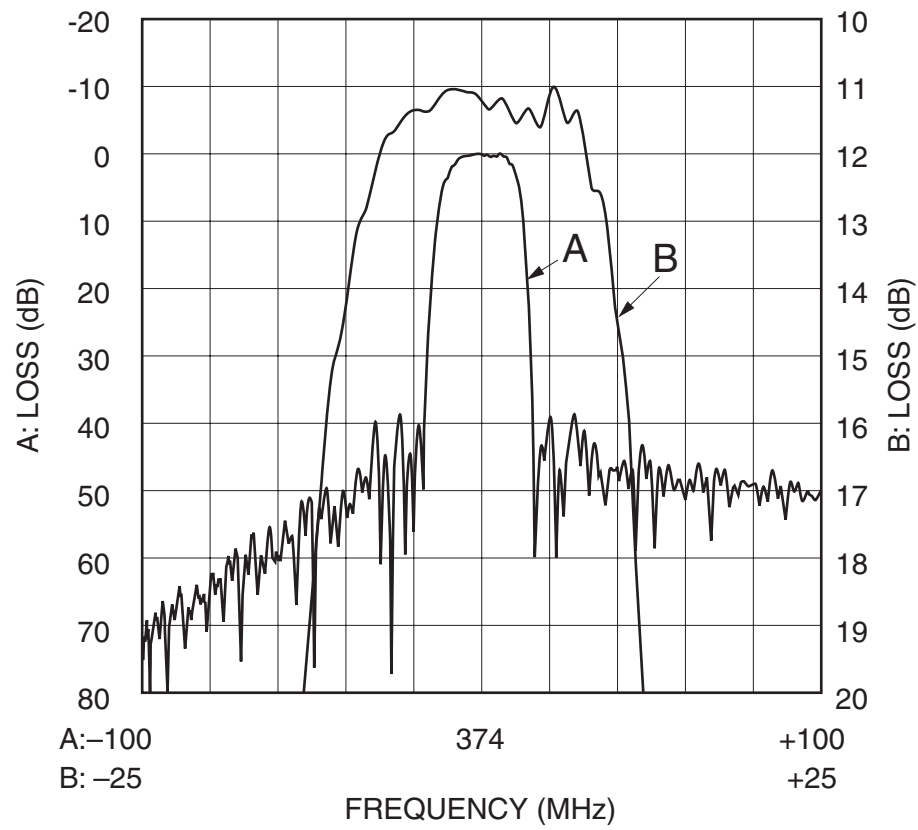
Surface Acoustic Wave Filter (SAW Filter)

TQS-457A-7R

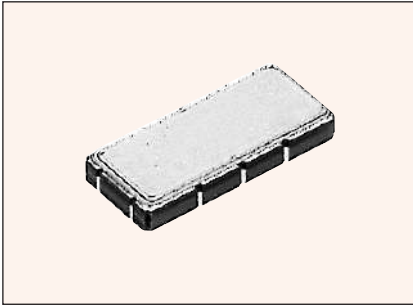
374 MHz

IF Filter for Wireless LAN system

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-458B-7R

Features

- Miniature size : 11.4(W) x 5.0(D) x 1.40(H)mm
- Low group delay distortion
- High selectivity

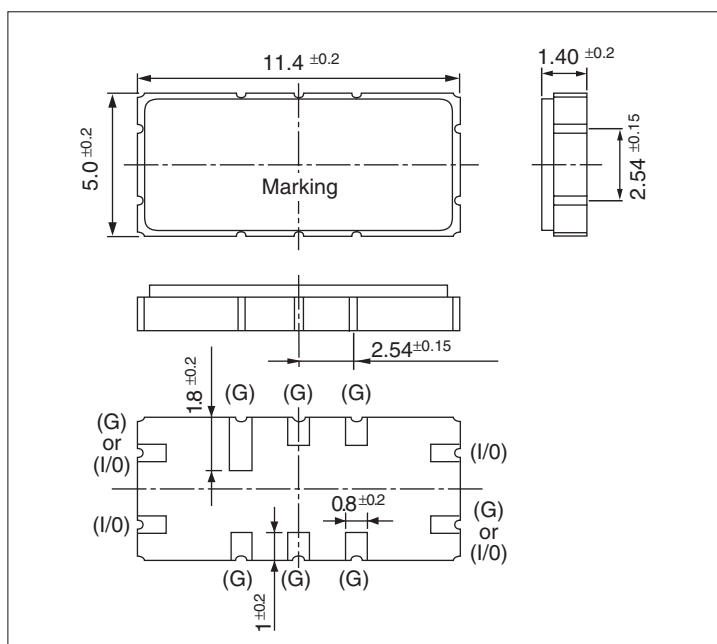
Application

- IF filter for Cellular Phone CDMA system

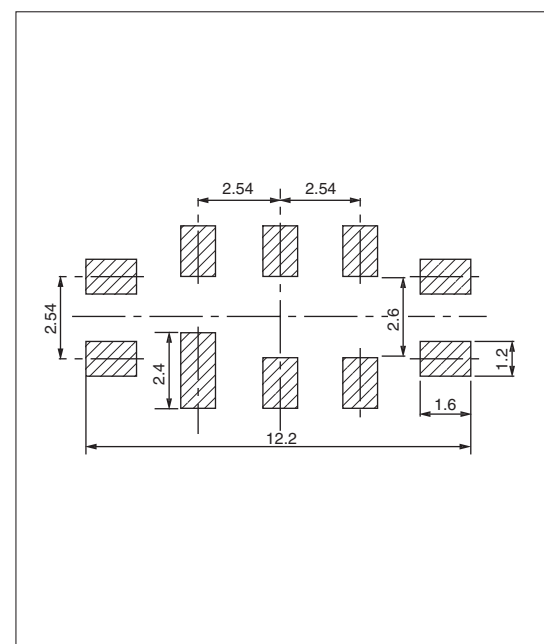
Specifications

Type	TQS-458B-7R
Nominal frequency (fo)	85.38 MHz
5dB Pass band (relative to loss at fo)	fo ±600 kHz min.
Insertion loss	10.5 dB max.
Amplitude ripple	1.0 dB max. (fo ±0.3 MHz)
Group delay distortion	400 ns max. (fo ±0.3 MHz)
Stop band attenuation (relative to loss at fo)	
fo ± 0.9 MHz	33 dB min.
fo ± 1.7 MHz	33 dB min.
fo ± 9 MHz to ± 50 MHz	45 dB min.
Terminating impedance	Input (Balanced or Unbalanced) : 1.8 kΩ // -10pF Output (Balanced or Unbalanced) : 1.5 kΩ // -9pF
Operating temperature range	-30 °C to +80 °C

Package Outlines [Dimensions in mm]



Footprint [Dimensions in mm]

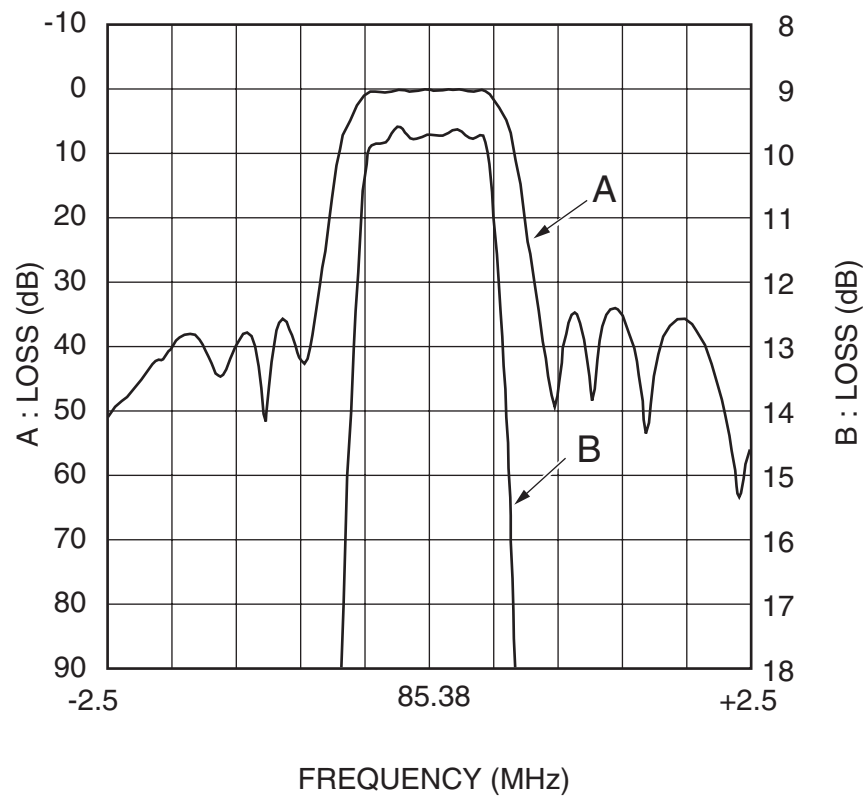


Surface Acoustic Wave Filter (SAW Filter)

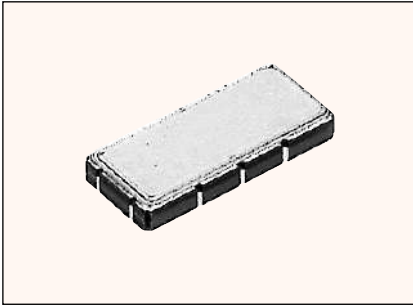
IF Filter for Cellular Phone
CDMA system

TQS-458B-7R
85.38 MHz

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-458F-7R

■ Features

- Miniature size : 11.4(W) x 5.0(D) x 1.40(H)mm
- Phase linearity improved model
- High selectivity

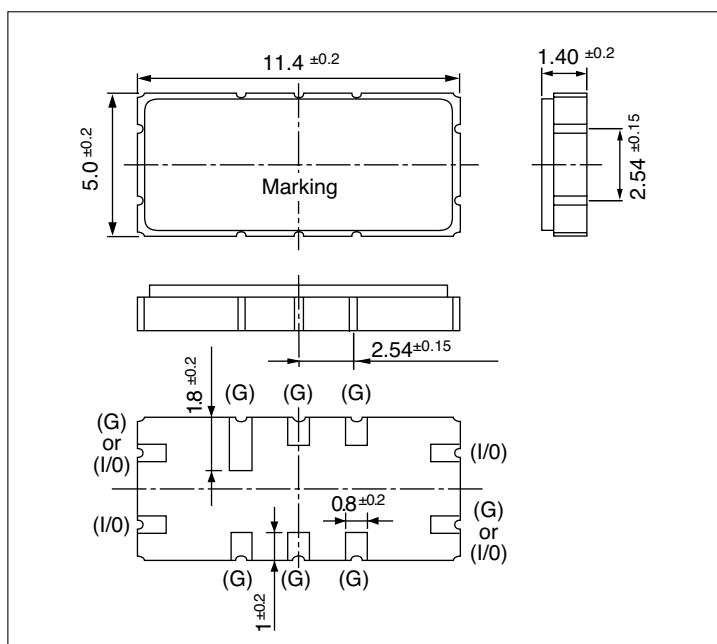
■ Application

- IF filter for Cellular Phone CDMA system

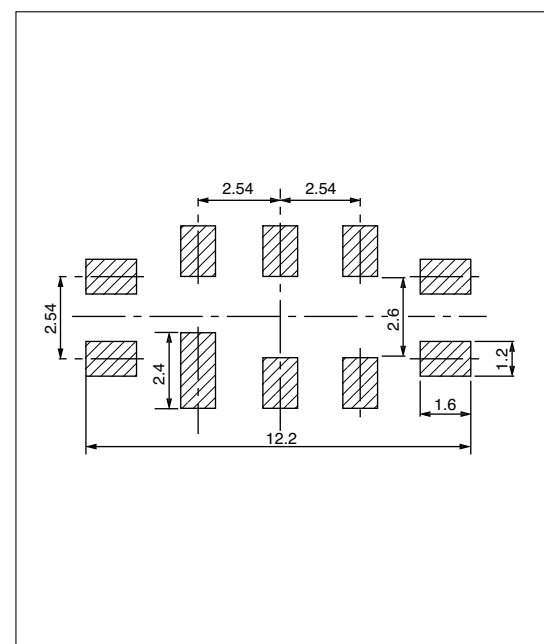
■ Specifications

Type		TQS-458F-7R
Nominal frequency [fo]		110 MHz
5dB Pass band (Relative to I.L. at fo)		fo ± 0.60 MHz min.
Insertion loss (at fo)		11.5 dB max.
Ripple (peak to peak within fo ± 300 kHz)		0.7 dB max.
Group delay distortion (within fo ± 300 kHz)		500 ns max.
Phase linearity (within fo ± 600 kHz)		1.5° RMS typ.
Stop band attenuation (Referred to I.L. at fo)		
at fo ± 0.9 MHz		33 dB min.
at fo ± 1.70 MHz		33 dB min.
at fo ± 9.00 MHz		40 dB min.
Terminating impedance	Input	Balanced or Unbalanced : 770 Ω // -15 pF
	Output	Balanced or Unbalanced : 1370 Ω // -12 pF
Operating temperature range		-20 °C to +75 °C

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]

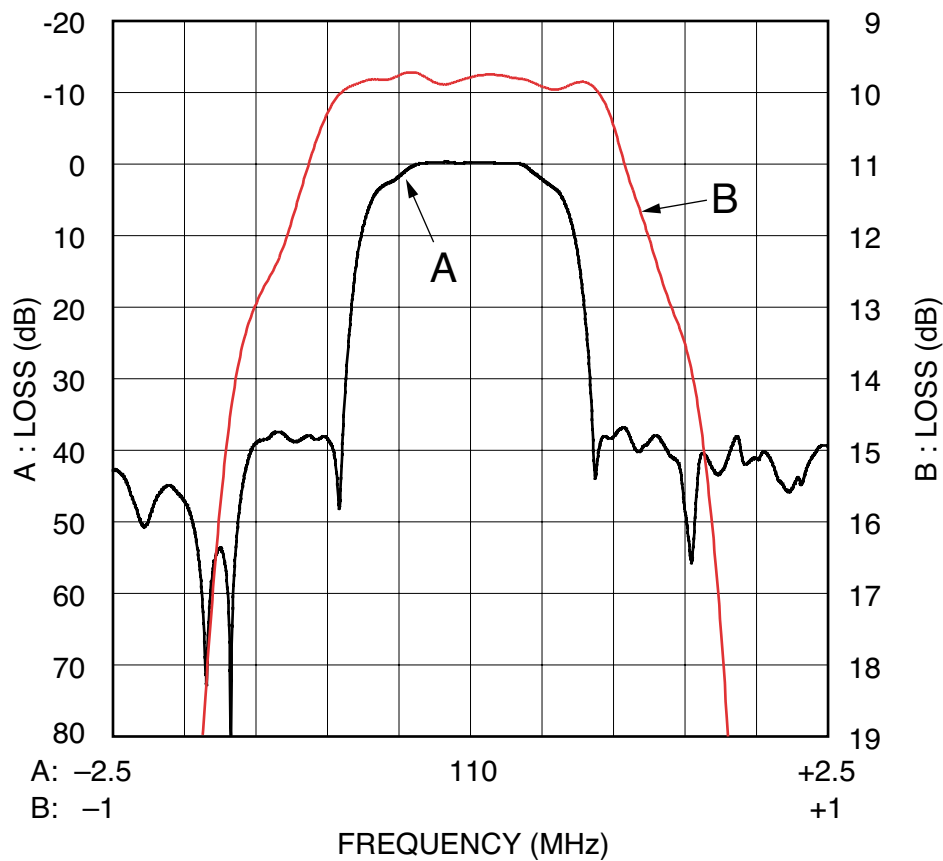


Surface Acoustic Wave Filter (SAW Filter)

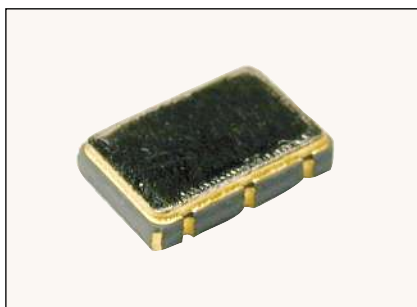
IF Filter (Phase linearity improved model) for Cellular Phone
CDMA system

TQS-458F-7R
110 MHz

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-459C-7R

Features

- Miniature size : 5.0(W) x 3.2(D) x 1.05(H)mm
- High selectivity

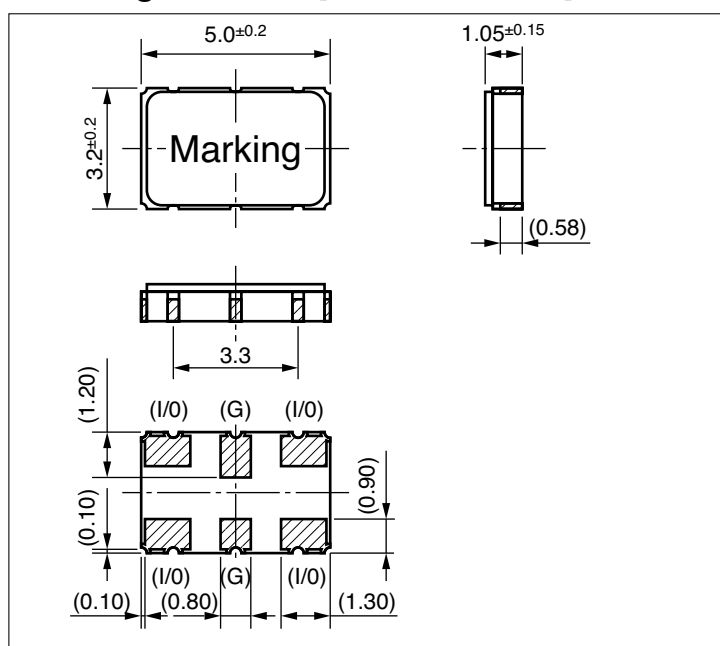
Specifications

Type		TQS-459C-7R
Nominal frequency [fo]		190 MHz
3dB Pass band (Relative to I.L. at fo)		fo ±1.92 MHz min.
Ripple (peak to peak within fo ± 1.92 MHz)		1.5 dB max.
Insertion loss (at fo)		8.0 dB max.
Group delay distortion (within fo ± 1.92 MHz)		130 ns max.
Effective Attenuation ^{Note.1)} (Referred to I.L. at fo) at fo ± 5 MHz± 1.92 MHz at fo ± 10 MHz± 1.92 MHz at fo ± 20 MHz± 1.92 MHz		23 dB min. 40 dB min. 40 dB min.
Terminating impedance	Input	Balanced or unbalanced : 325Ω// -16pF
	Output	Balanced or unbalanced : 276Ω// -12pF
Operating temperature range		-20 °C to +70 °C

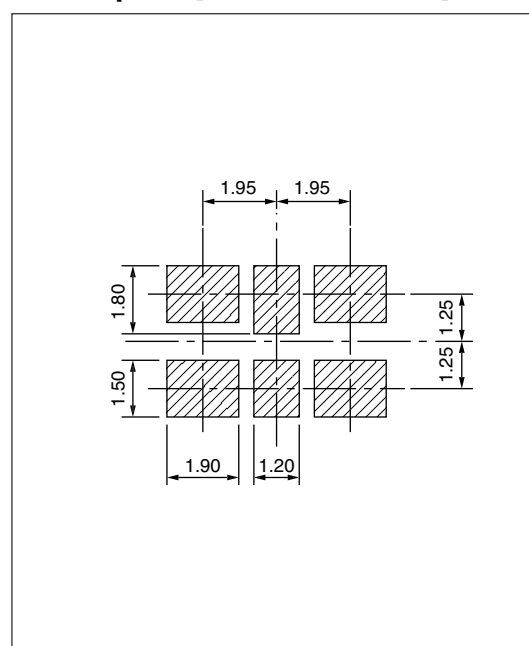
Note1.) The definition of Effective Attenuation
The Effective Attenuation is defined as logarithm of the root mean square of S_{21} absolute value, and is calculated with the equation below.

$$10 \log_{10} \frac{1}{n} \sum_{k=1}^n \{ \text{Re}(S_{21})^2 + \text{Im}(S_{21})^2 \}_k \quad (n : \text{number of point})$$

Package Outlines [Dimensions in mm]



Footprint [Dimensions in mm]

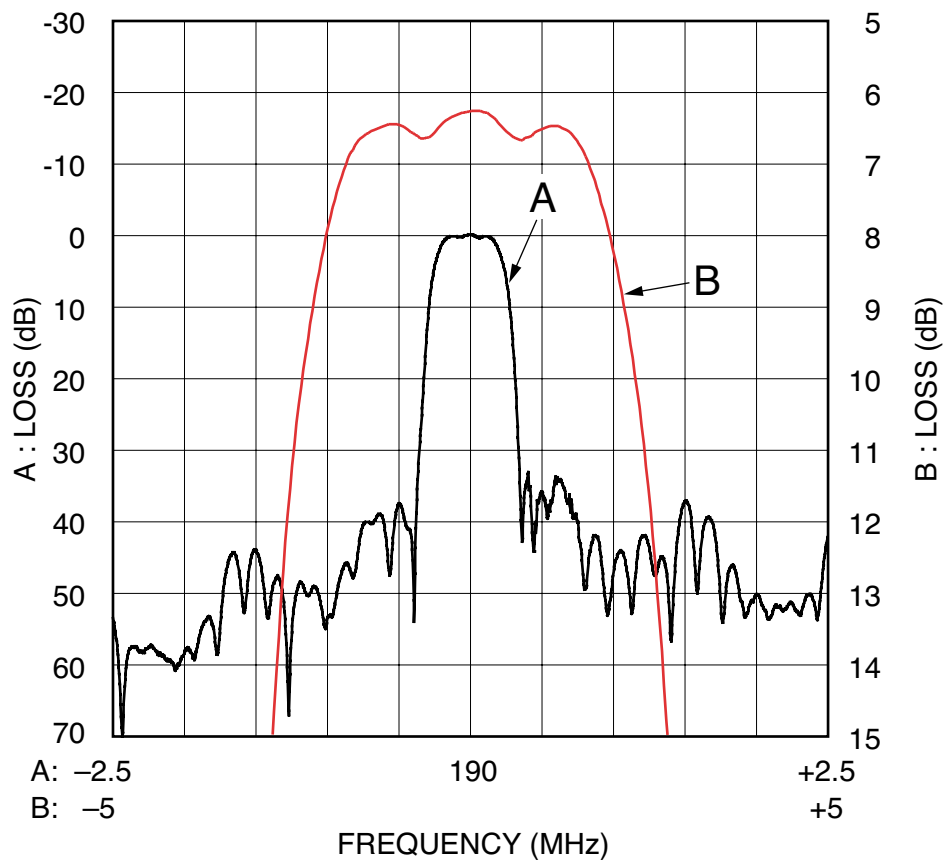


Surface Acoustic Wave Filter (SAW Filter)

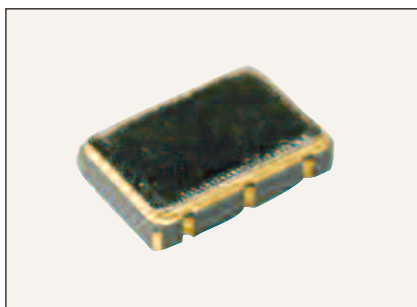
IF Filter for Cellular Phone
W-CDMA system (Rx)

TQS-459C-7R
190 MHz

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-460A-7R

Features

- Miniature size : 5.0(W) x 3.2(D) x 1.05(H)mm
- High selectivity
- Balanced I/O or Unbalanced I/O

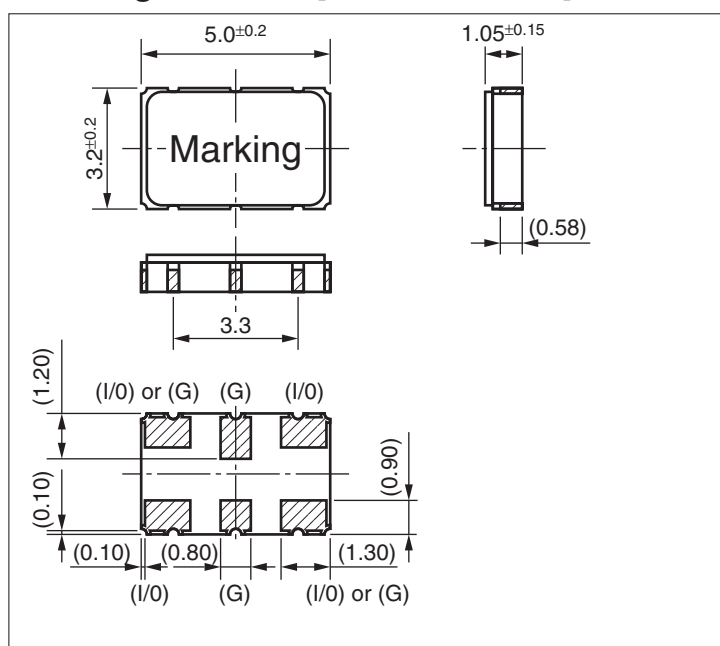
Application

- IF filter for W-CDMA

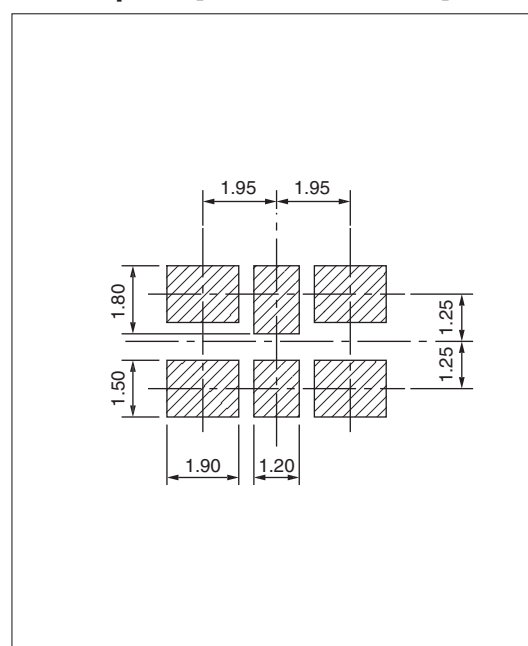
Specifications

Type		TQS-460A-7R
Nominal frequency [fo]		380 MHz
3dB Pass band (Relative to I.L. at fo)		4.20 MHz min.
Insertion loss (at fo)		12.0 dB max.
Passband ripple (within fo±1.50 MHz)		1.5 dB max.
Group delay distortion (within fo±1.50 MHz)		160 ns max.
Stop band attenuation (Referred to I.L. at fo)		
fo + 5 MHz		25 dB min.
fo - 5 MHz		30 dB min.
fo ± 10 MHz		40 dB min.
Terminating impedance	Input	Balanced or Unbalanced : 520 Ω // -4 pF
	Output	Balanced or Unbalanced : 360 Ω // -6 pF
Operating temperature range		-20 °C to +70 °C

Package Outlines [Dimensions in mm]



Footprint [Dimensions in mm]

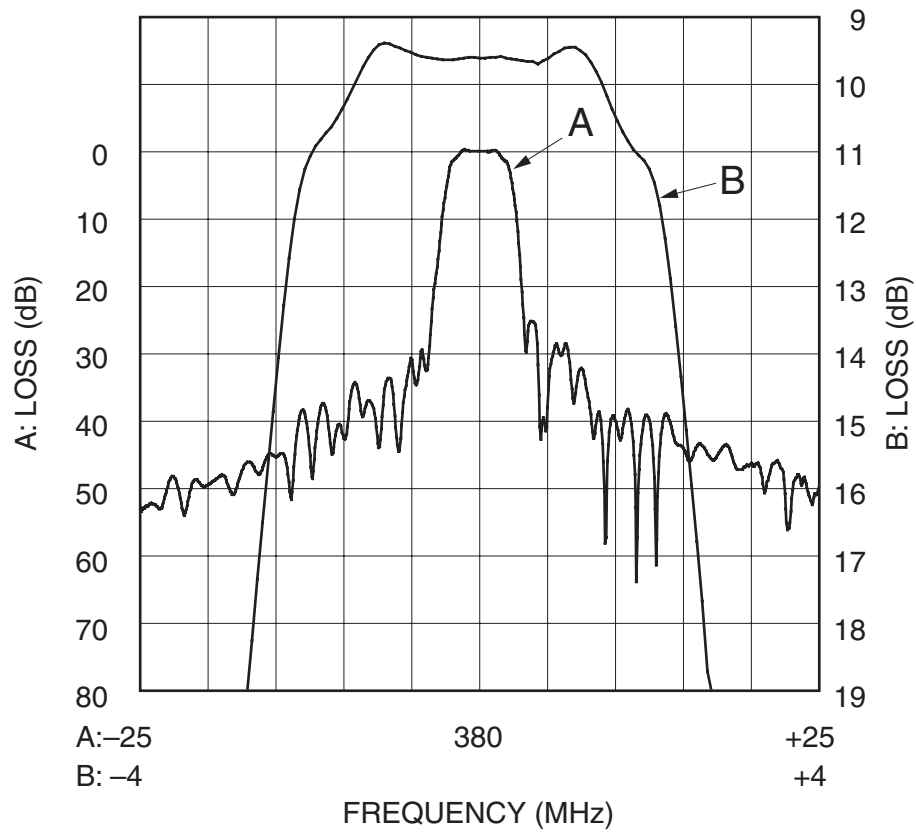


Surface Acoustic Wave Filter (SAW Filter)

IF Filter for Cellular Phone
W-CDMA system (Rx)

TQS-460A-7R
380 MHz

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-461E-7R

■ Features

- Miniature size : 7.0(W) x 5.0(D) x 1.5 max.(H)mm
- High attenuation
- High selectivity

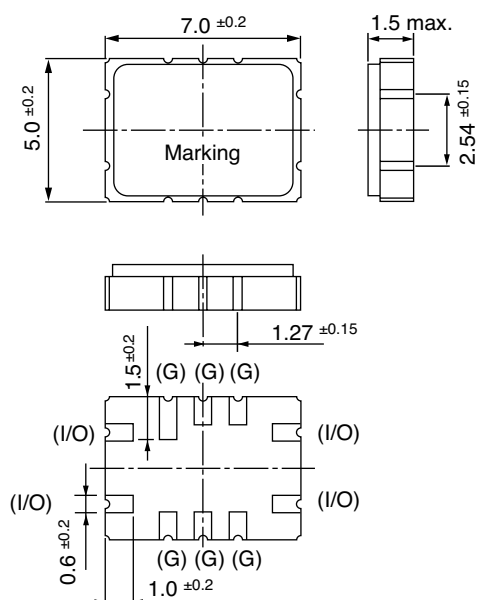
■ Application

- IF filter for Cellular Phone CDMA system

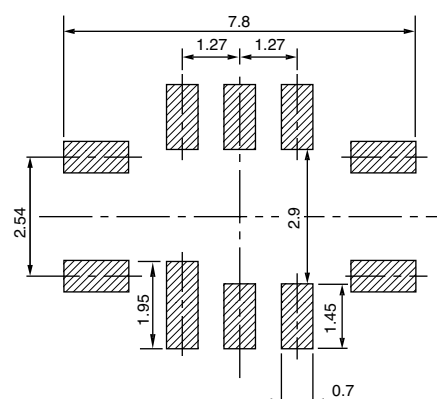
■ Specifications

Type		TQS-461E-7R
Nominal frequency [fo]		110 MHz
5dB Pass band (Relative to I.L. at fo)		fo ± 600 kHz min.
Insertion loss (at fo)		11.0 dB max.
Passband deviation (within fo±300 kHz)		1.5 dB max.
Group delay distortion (within fo±300 kHz)		500 ns max.
Phase linearity (within fo ± 615 kHz)		Typical 3.4°RMS
Stop band attenuation (Referred to I.L. at fo) at fo ± 0.9 MHz at fo ± 1.70 MHz at fo ± 9.00 MHz		33 dB min. 33 dB min. 40 dB min.
Terminating impedance	Input	Balanced or Unbalanced : 2.9k Ω // -7.4 pF
	Output	Balanced or Unbalanced : 2.2k Ω // -6.0 pF
Operating temperature range		-25 °C to +75 °C

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]

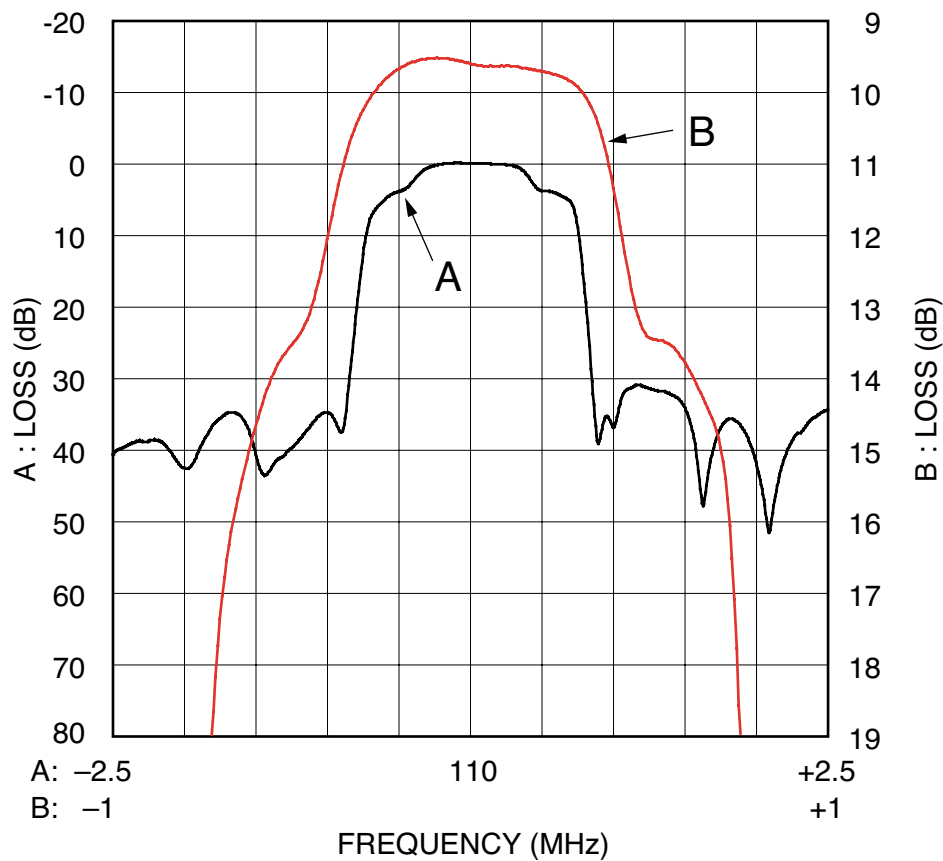


Surface Acoustic Wave Filter (SAW Filter)

IF Filter for Cellular Phone
CDMA system

TQS-461E-7R
110 MHz

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-461F-7R

■ Features

- Miniature size : 7.0(W) x 5.0(D) x 1.5 max.(H)mm
- High attenuation
- High selectivity

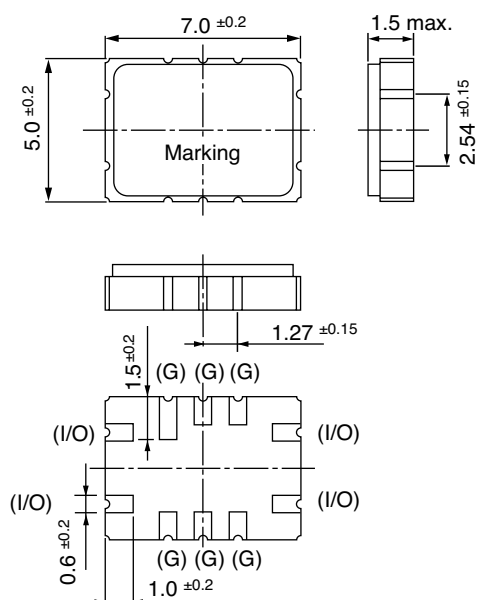
■ Application

- IF filter for Cellular Phone CDMA system

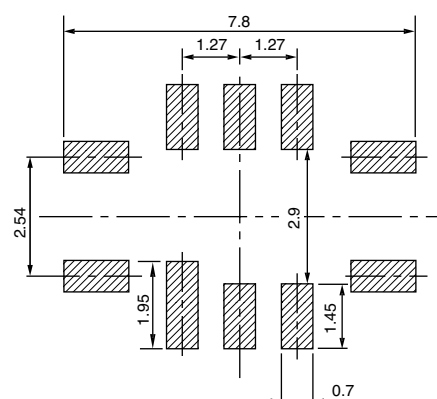
■ Specifications

Type	TQS-461F-7R
Nominal frequency [fo]	183.6 MHz
5dB Pass band (Relative to I.L. at fo)	fo ± 625 kHz min.
Insertion loss (at fo)	10.0 dB max.
Passband deviation (within fo±300 kHz)	1.5 dB max.
Passband ripple (within fo±300 kHz)	0.8 dB max.
Group delay distortion (within fo±300 kHz)	600 ns max.
Phase linearity (within fo ± 615 kHz)	Typical 2.5°RMS
Stop band attenuation (Referred to I.L. at fo) at fo ± 0.9 MHz at fo ± 1.25 MHz at fo ± 1.70 MHz at fo ± 2.05 MHz 10MHz to fo-9MHz fo+9MHz to fo+50MHz	 33 dB min. 33 dB min. 35 dB min. 35 dB min. 45 dB min. 40 dB min.
Terminating impedance	T.B.D.
Operating temperature range	-30 °C to +85 °C

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]

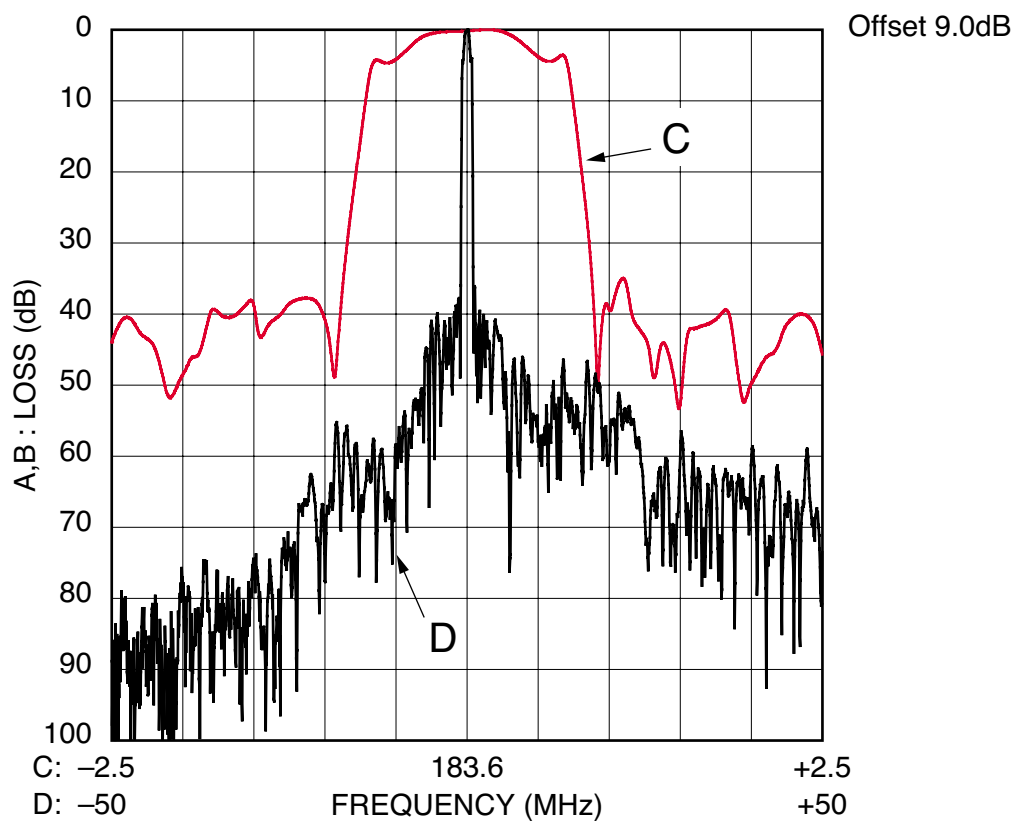
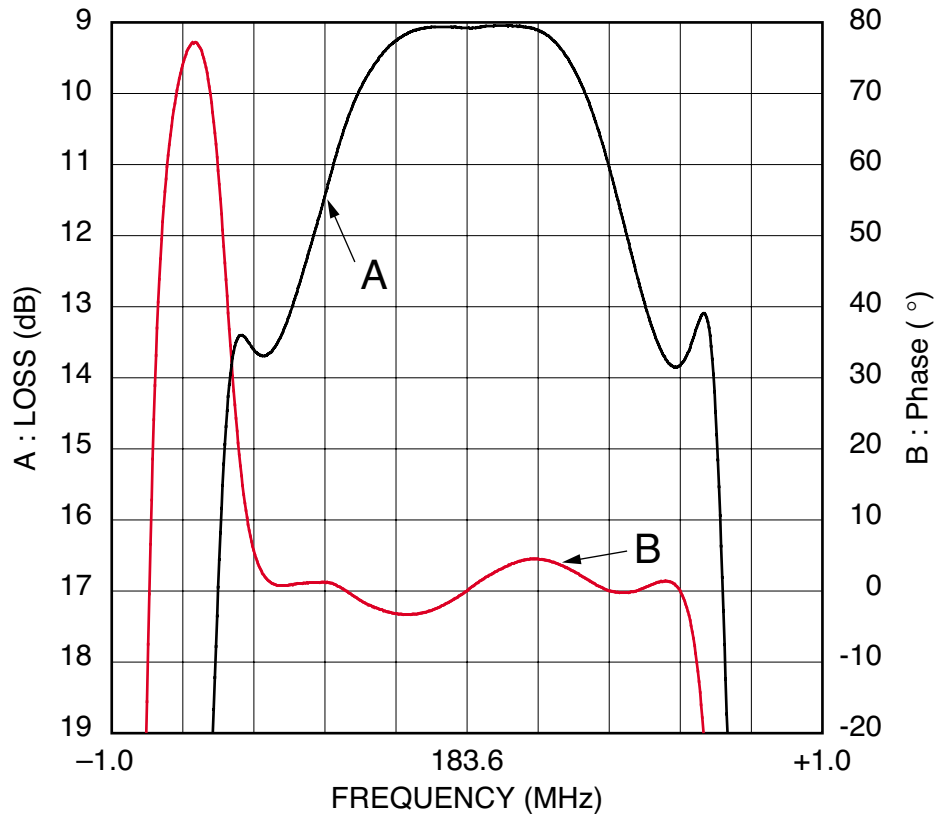


Surface Acoustic Wave Filter (SAW Filter)

IF Filter for Cellular Phone
CDMA system

TQS-461F-7R
183.6 MHz

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-461G-7R

■ Features

- Miniature size : 7.0(W) x 5.0(D) x 1.5 max.(H)mm
- High attenuation
- High selectivity

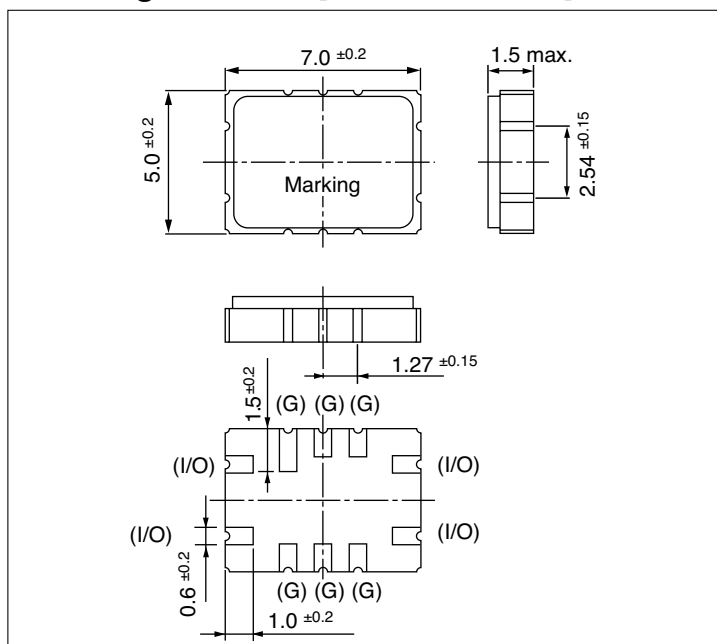
■ Specifications

Type		TQS-461G-7R
Nominal frequency [fo]		183.6 MHz
5dB Pass band (Relative to I.L. at fo)		fo ± 615 kHz min.
Insertion loss (at fo)		11.0 dB max. Including losses in matching circuit. Matching inductor size is 0603(inch).
Passband deviation (within fo±300 kHz)		1.2 dB max.
Passband ripple (within fo±300 kHz)		1.2 dB max.
Phase linearity (within fo ± 615 kHz)		Typical 2.2°RMS
Stop band attenuation (Referred to I.L. at fo)		
10MHz to fo-9MHz		45 dB min.
fo-9MHz to fo-0.9MHz		33 dB min.
fo+0.9MHz to fo+9MHz		33 dB min.
fo+9MHz to fo+25MHz		40 dB min.
fo+25MHz to fo+100MHz		45 dB min.
at fo ± 0.9 MHz		33 dB min.
at fo ±1.25 MHz, ±1.70 MHz, ±2.05 MHz		35 dB min.
Terminating impedance	Input	360 Ω // -11.4 pF
	Output	260 Ω // -17.3 pF
Operating temperature range		-30 °C to +85 °C

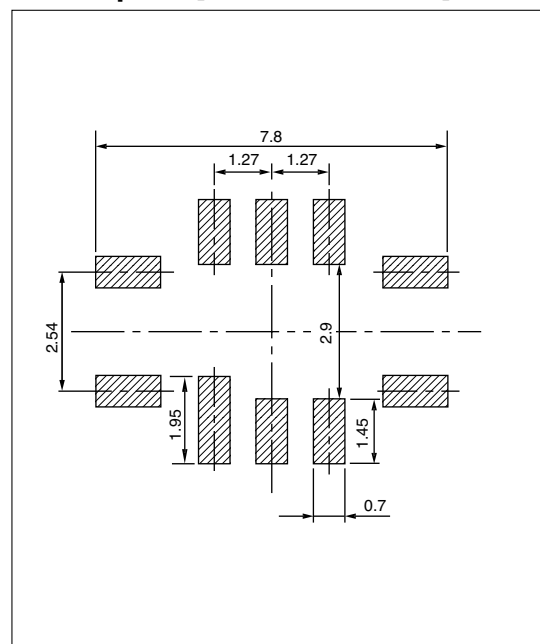
■ Application

- IF filter for Cellular Phone CDMA system

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]

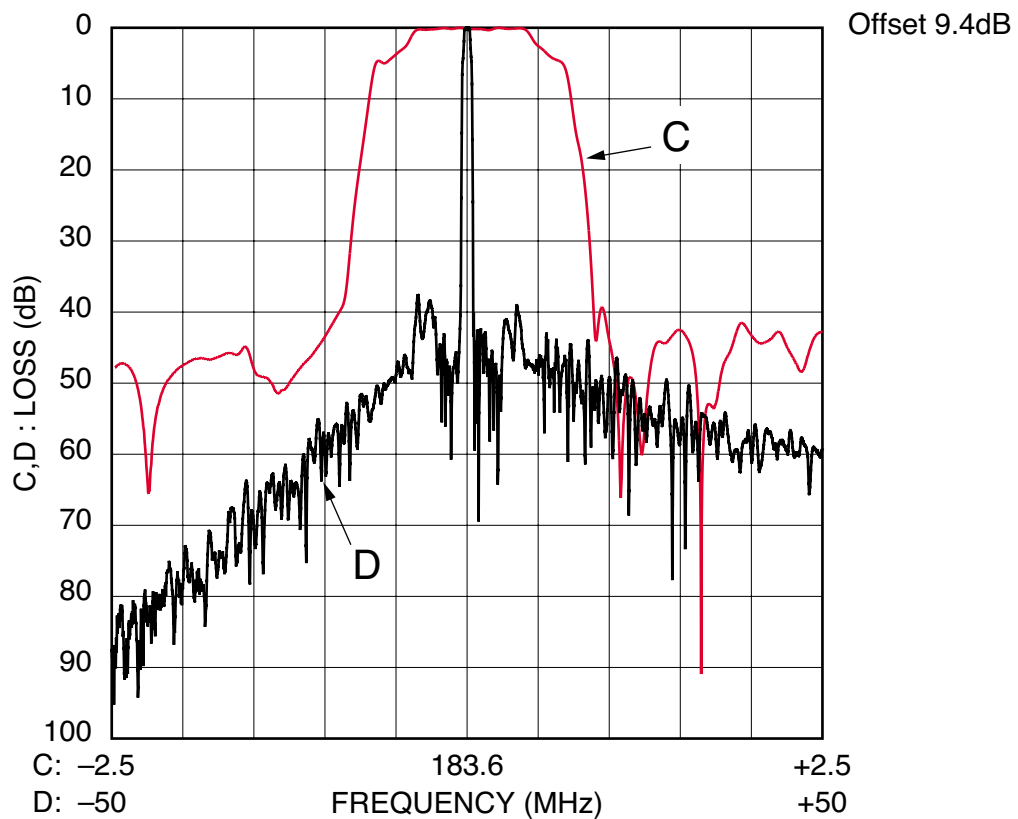
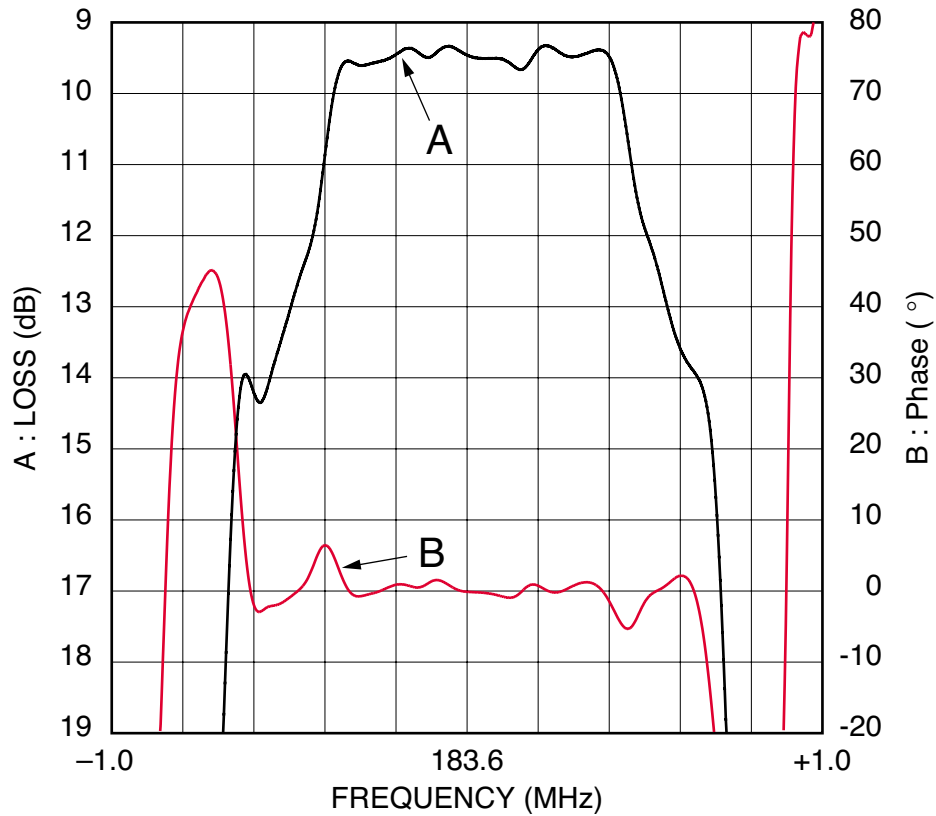


Surface Acoustic Wave Filter (SAW Filter)

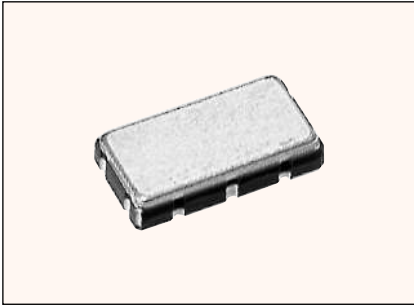
IF Filter for Cellular Phone
CDMA system

TQS-461G-7R
183.6 MHz

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-462A-7R

■ Features

- Miniature size : 9.1(W) x 4.8(D) x 1.55(H)mm
- High attenuation
- High selectivity

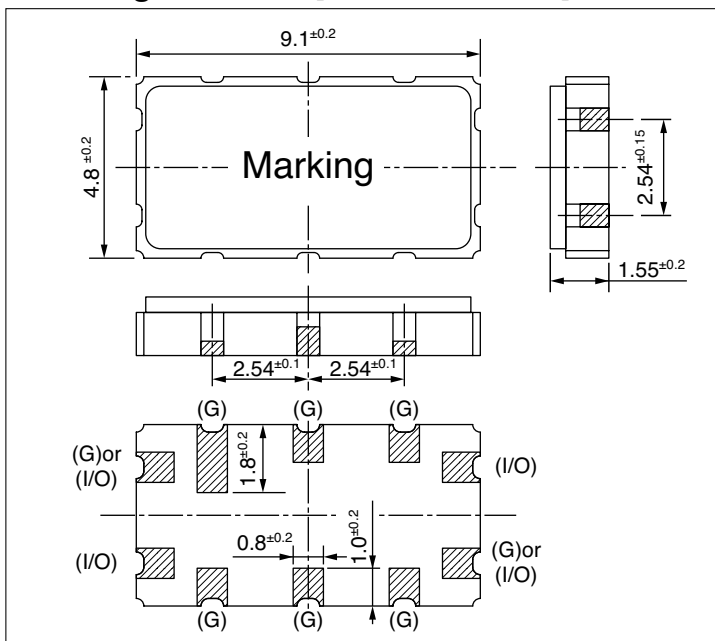
■ Application

- IF filter for Cellular Phone CDMA system

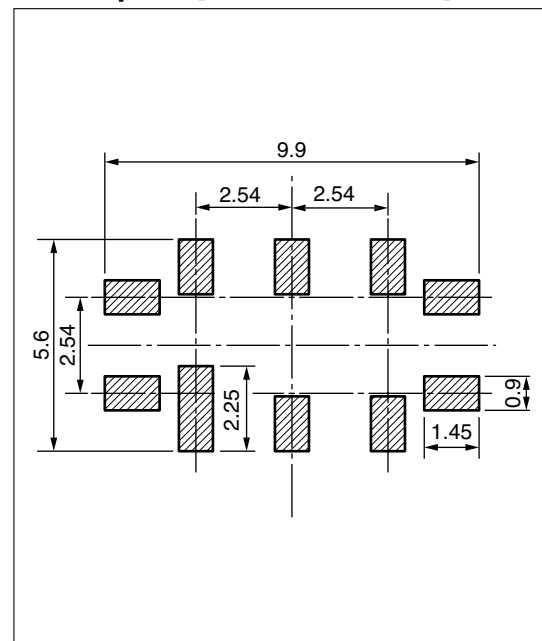
■ Specifications

Type	TQS-462A-7R	
Nominal frequency [fo]	183.6 MHz	
5dB Pass band (Relative to I.L. at fo)	fo ± 0.62 MHz min.	
Insertion loss (at fo)	9.0 dB max.	
Ripple (peak to peak within fo ± 300 kHz)	0.7 dB max.	
Group delay distortion (within fo ± 300 kHz)	0.6 μs max.	
Phase linearity (within fo ± 600 kHz)	4.0°RMS max.	
Stop band attenuation (Referred to I.L. at fo)		
at fo ± 0.9 MHz	33 dB min.	
at fo ± 1.25 MHz	33 dB min.	
at fo ± 1.70 MHz	33 dB min.	
at fo ± 2.05 MHz	33 dB min.	
at fo ± 9.00 MHz	40 dB min.	
Terminating impedance	Input	Balanced or Unbalanced : 500 Ω // -16 pF
	Output	Balanced or Unbalanced : 380 Ω // -14 pF
Operating temperature range	-30 °C to +85 °C	

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]

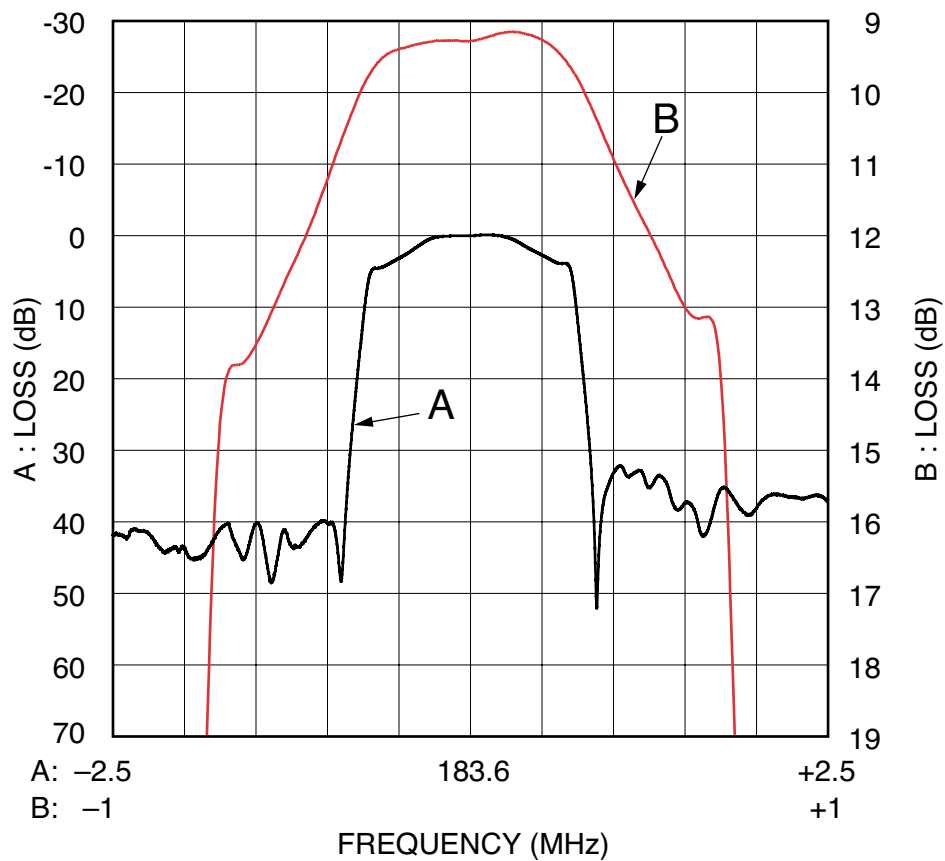


Surface Acoustic Wave Filter (SAW Filter)

IF Filter for Cellular Phone
CDMA system

TQS-462A-7R
183.6 MHz

■ Electrical Data



Surface Acoustic Wave Filter (SAW Filter)



TQS-462B-7R

■ Features

- Miniature size : 9.1(W) x 4.8(D) x 1.55(H)mm
- High attenuation
- High selectivity

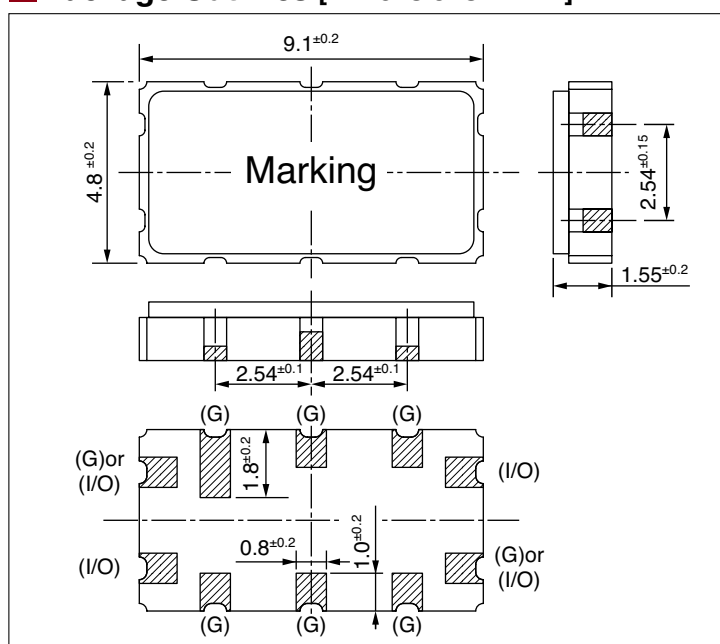
■ Application

- IF filter for Cellular Phone CDMA system

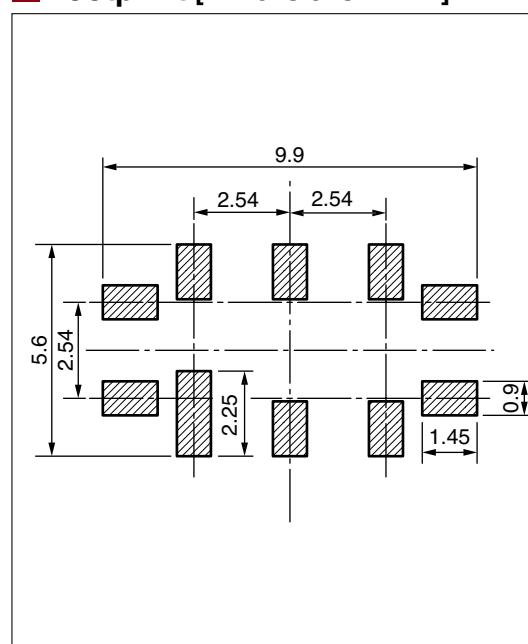
■ Specifications

Type	TQS-462B-7R	
Nominal frequency [fo]	183.6 MHz	
5dB Pass band (Relative to I.L. at fo)	fo ± 610 kHz min.	
Insertion loss (at fo)	11.0 dB max.	
Passband deviation (within fo±300 kHz)	0.8 dB max.	
Phase linearity (within fo ± 615 kHz)	3.2°RMS max.	
Stop band attenuation (Referred to I.L. at fo)		
at fo ± 0.9 MHz	33 dB min.	
at fo ± 1.25 MHz	35 dB min.	
at fo ± 1.70 MHz	35 dB min.	
at fo ± 2.05 MHz	35 dB min.	
f < fo-9.00 MHz or f > fo+9.00 MHz	40 dB min.	
Terminating impedance	Input	Balanced or Unbalanced : 660 Ω // -12.7 pF
	Output	Balanced or Unbalanced : 720 Ω // -13.8 pF
Operating temperature range	-30 °C to +85 °C	

■ Package Outlines [Dimensions in mm]



■ Footprint [Dimensions in mm]

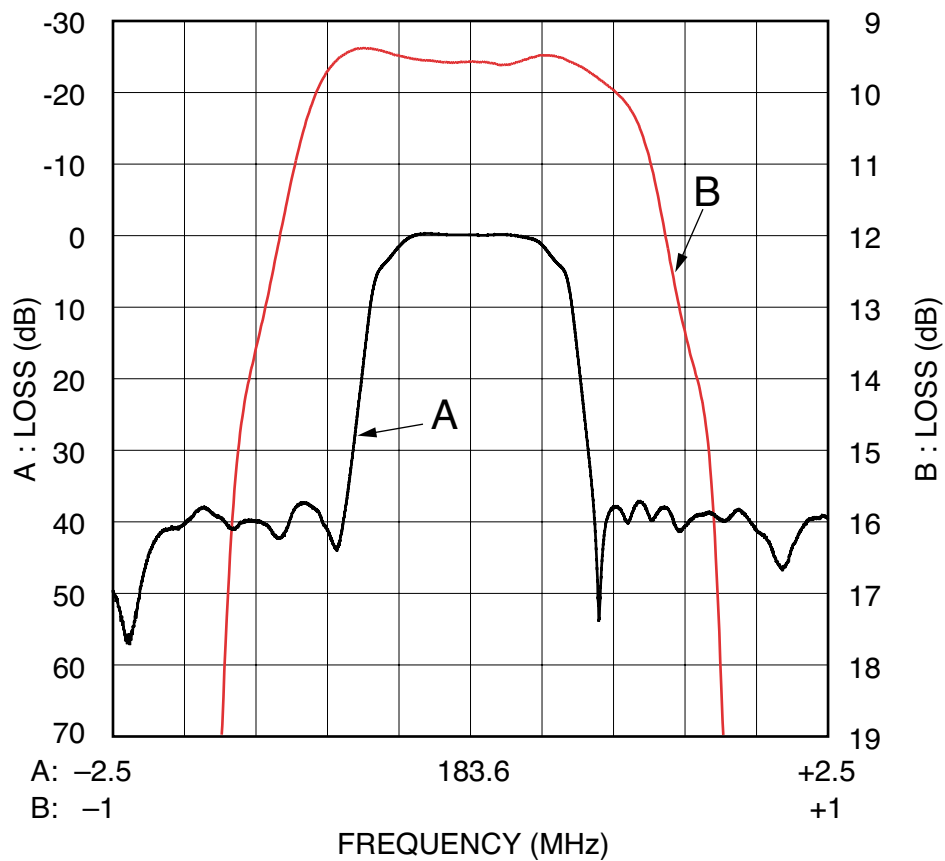


Surface Acoustic Wave Filter (SAW Filter)

IF Filter for Cellular Phone
CDMA system

TQS-462B-7R
183.6 MHz

■ Electrical Data





Surface Acoustic Wave Filter (SAW Filter)

IF Filter for Cellular Phone
CDMA system

TQS-465AA-7R
183.6 MHz

■ Electrical Data

