



**SF2170D**

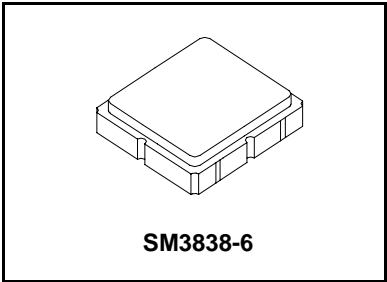
**165 MHz  
SAW Filter**

- **Low Insertion Loss**
- **3.8 X 3.8 X 1.0 mm Surface Mount Case**
- **Single-Ended Input/Output**
- **Complies with Directive 2002/95/EC (RoHS)**



**Absolute Maximum Ratings**

Rating	Value	Units
Maximum Incident Power in Passband	+10	dBm
Maximum DC Voltage between any 2 Terminals	30	VDC
Storage Temperature Range	-40 to +85	°C
Suitable for Lead-free Soldering - Maximum Soldering Profile	260°C for 30 s	



**Electrical Characteristics**

Characteristic	Sym	Notes	Min	Typ	Max	Units
Center Frequency	$f_0$	1		165		MHz
Source Impedance to Matching Network (single ended)				50		$\Omega$
Load Impedance to Matching Network (single ended)				50		$\Omega$
Passband Width			20	22		MHz
Rejection Referenced from Minimum Insertion Loss:						dB
10 MHz to 110 MHz			35	40		
127 MHz to 149 MHz			10	15		
190 to 210 MHz			30	40		
210 to 450 MHz		—	40	45		
Maximum Insertion Loss				9	10	dB
Insertion Loss Variation over -40 to 85 °C					1	dB
Amplitude Variation over 20 MHz Passband				1.0	1.5	dB <sub>p-p</sub>
Group Delay Variation over 20 MHz Passband				40	80	ns <sub>p-p</sub>
Absolute Group Delay at $f_0$				0.33		$\mu$ s
Input/Output Return Loss into Matching over 20 MHz BW			6	8		dB
Operating Temperature			-40		+85	°C

Case Style	SM3838-6 3.8 x 3.8 mm Nominal Footprint
Lid Symbolization (Y=year, WW=week, S=shift) dot=pin 1 indicator	865, YWWS
Standard Reel Quantity    Reel Size 7 Inch	1000 Pieces/Reel
Reel Size 13 Inch	3000 Pieces/Reel



**CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.**

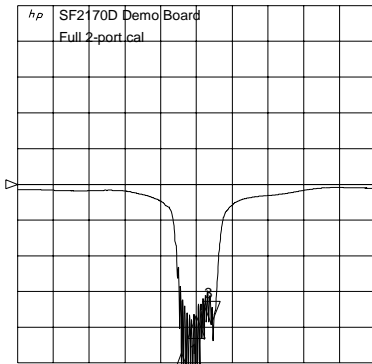
**Notes:**

1. Unless noted otherwise, all specifications apply over the operating temperature range with filter soldered to the specified demonstration board with impedance matching to 50  $\Omega$  and measured with 50  $\Omega$  network analyzer.
2. Unless noted otherwise, all frequency specifications are referenced to the nominal center frequency,  $f_c$ .
3. Rejection is measured as attenuation below the minimum IL point in the passband. Rejection in final user application is dependent on PCB layout and external impedance matching design. See Application Note No. 42 for details.
4. The design, manufacturing process, and specifications of this filter are subject to change.
5. Either Port 1 or Port 2 may be used for either input or output in the design. However, impedances and impedance matching may vary between Port 1 and Port 2, so that the filter must always be installed in one direction per the circuit design.
6. US and international patents may apply.
7. RFM, stylized RFM logo, and RF Monolithics, Inc. are registered trademarks of RF Monolithics, Inc.

# Broadband Filter Response and Return Loss (through matching network)

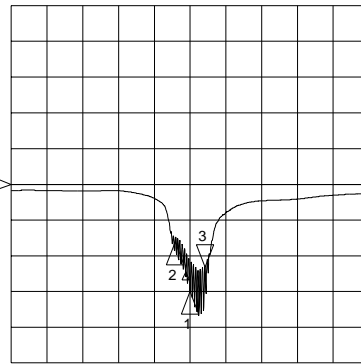
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CH1 LOG 5 dB/ REF 0 dB  
S11 3 : 5.2056 dB 20.000 000 MHz



CH1 Markers  
Δ REF=2  
mean : -20.948 dB  
s. dev : 5.2747 dB  
p-p : 29.591 dB

CH3 LOG 5 dB/ REF 0 dB  
S22 3 : -3.5658 dB 20.000 000 MHz

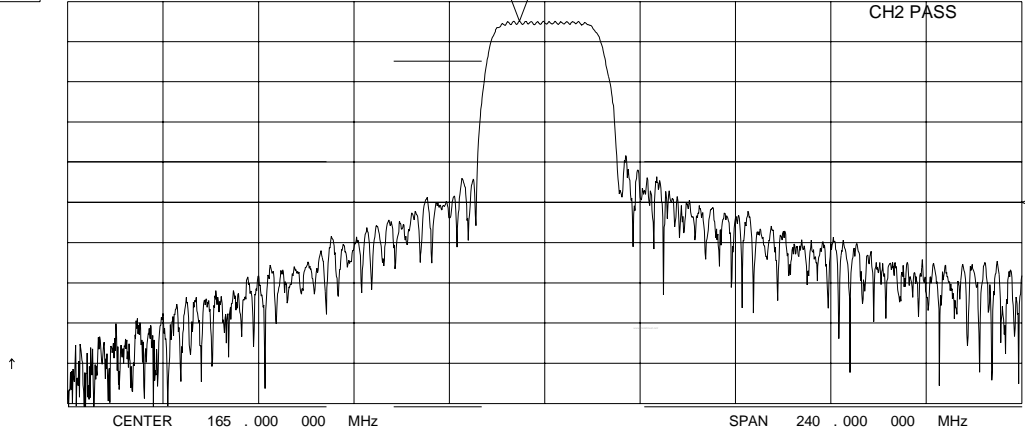


CH3 Markers  
Δ REF=2  
mean : -12.005 dB  
s. dev : 2.7750 dB  
p-p : 11.003 dB

CENTR 165.000 MHz Δ SPAN 240.000 MHz

CENTR 165.000 MHz SPAN 240.000 MHz

CH2 S21 LOG 10 dB/ REF -55 dB 1 : -9.8909 dB 158.700 000 MHz



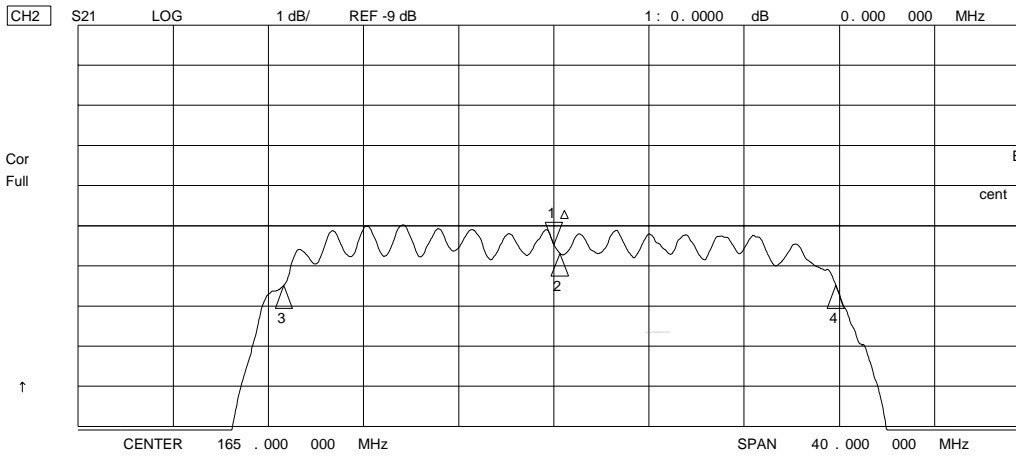
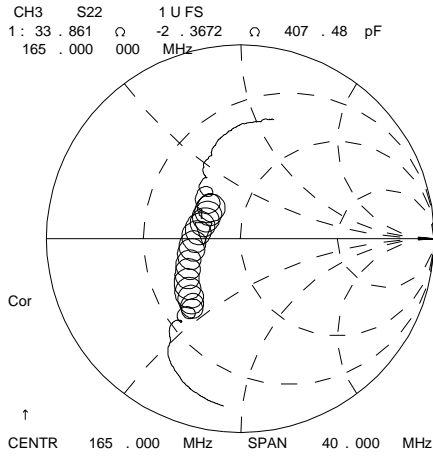
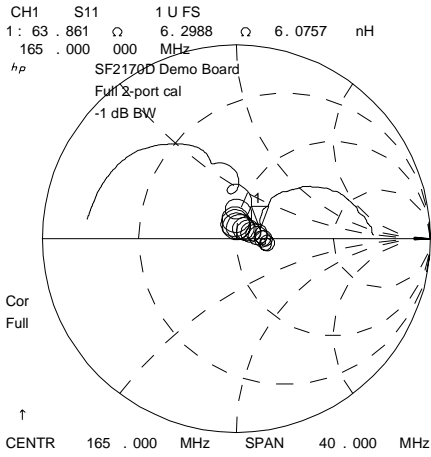
Max

CENTR 165.000 000 MHz

SPAN 240.000 000 MHz

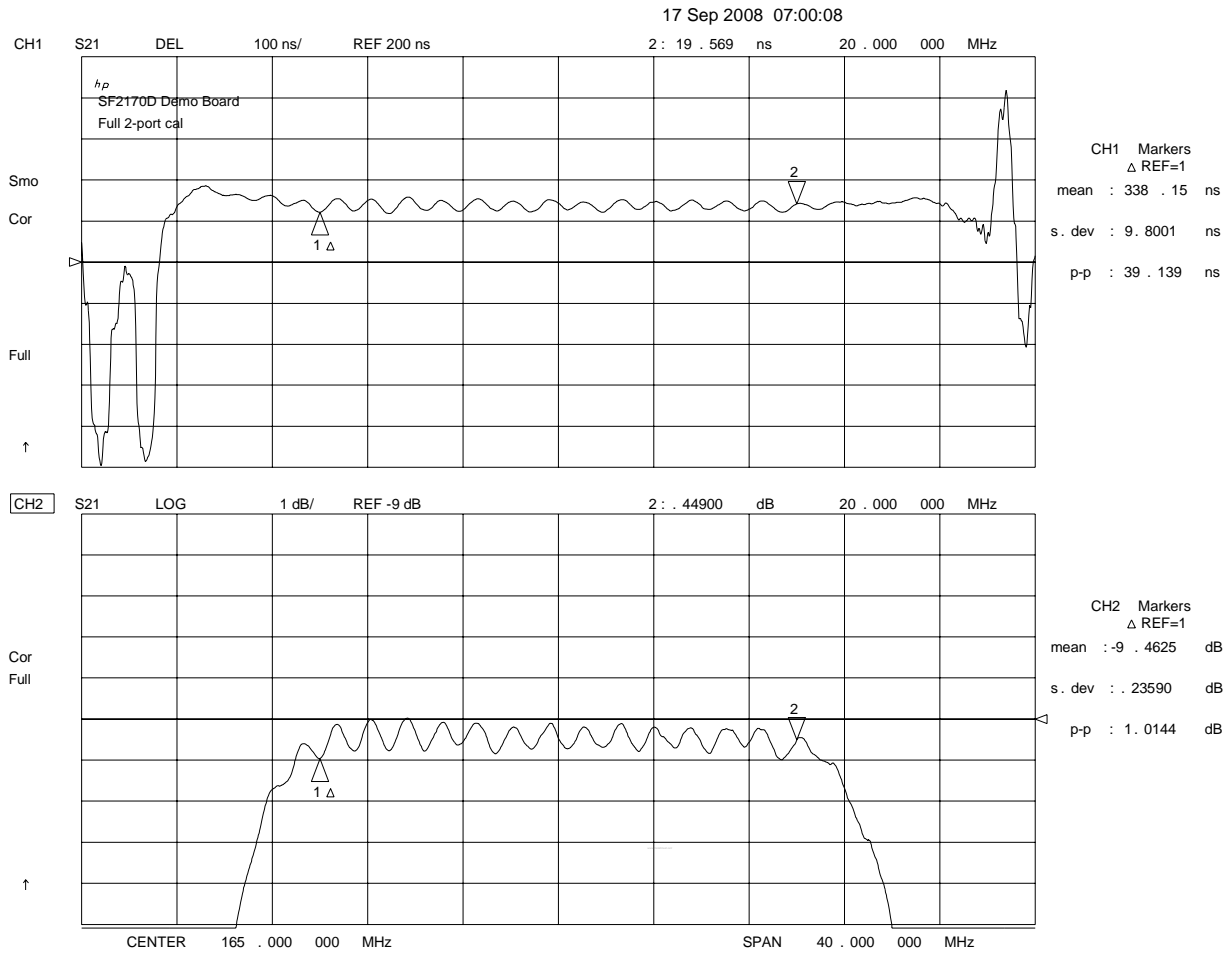
# Passband Amplitude and Impedance Detail

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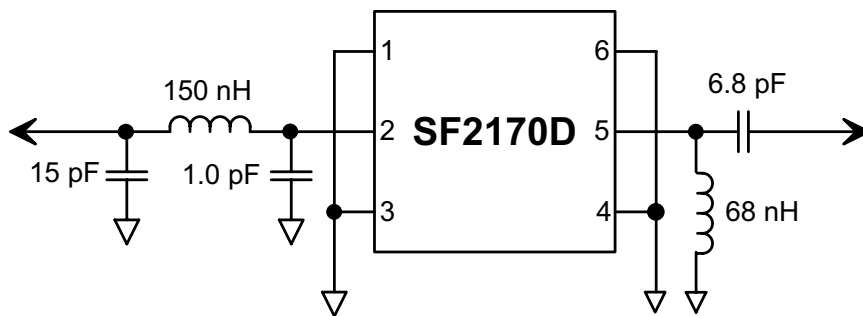


CH2 Markers  
 Δ REF=1  
 BW: 23 . 196777 MHz  
 cent : 165 . 256979 MHz  
 Q: 7 . 1241  
 1 loss : -9 . 4834 dB

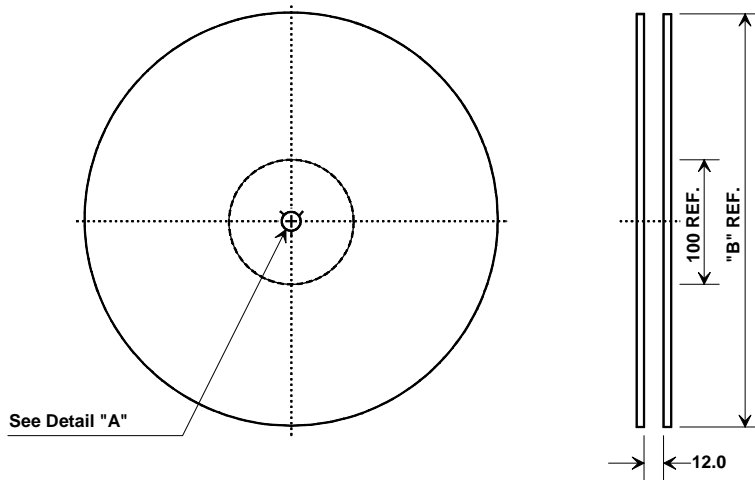
# Passband Group Delay and Amplitude Ripple



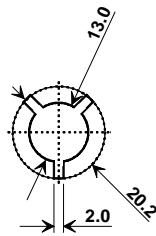
## SF2170D Demo Circuit



## Tape and Reel Specifications

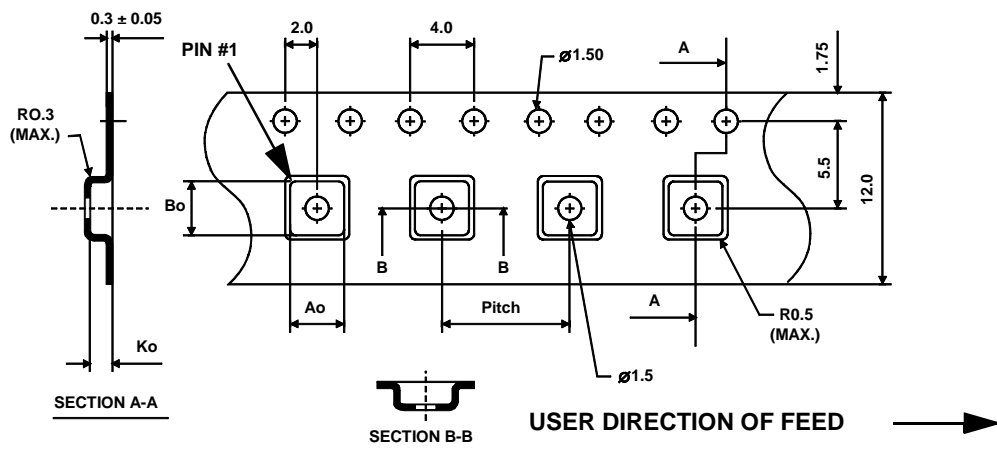


"B"		Quantity Per Reel
Inches	millimeters	
7	178	1000
13	330	3000



## COMPONENT ORIENTATION and DIMENSIONS

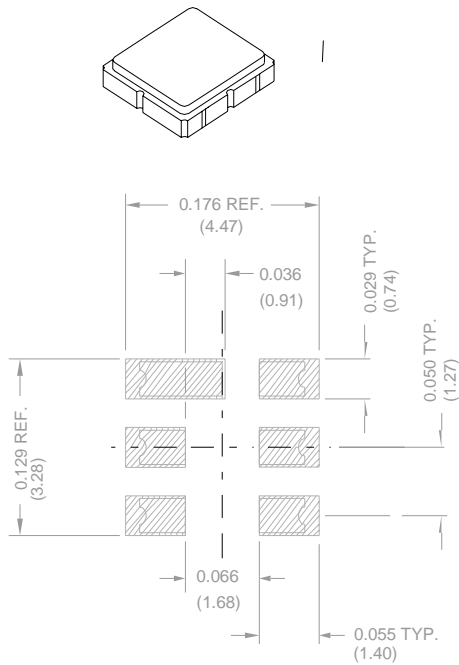
Carrier Tape Dimensions	
<b>Ao</b>	4.25 mm
<b>Bo</b>	4.25 mm
<b>Ko</b>	1.30 mm
<b>Pitch</b>	8.0 mm
<b>W</b>	12.0 mm



# SM3838-6 Case

## 6-Terminal Ceramic Surface-Mount Case

### 3.8 X 3.8 mm Nominal Footprint



PCB Footprint

Case Dimensions						
Dimension	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A	3.60	3.80	4.0	0.14	0.15	0.16
B	3.60	3.80	4.0	0.14	0.15	0.16
C	1.30	1.50	1.70	0.05	0.06	0.067
D	0.95	1.10	1.25	0.037	0.043	0.05
E	2.39	2.54	2.69	0.090	0.10	0.110
G	0.90	1.0	1.10	0.035	0.04	0.043
H	1.90	2.0	2.10	0.75	0.08	0.83
I	0.50	0.6	0.70	0.020	0.024	0.028
J	1.70	1.8	1.90	0.067	0.07	0.075

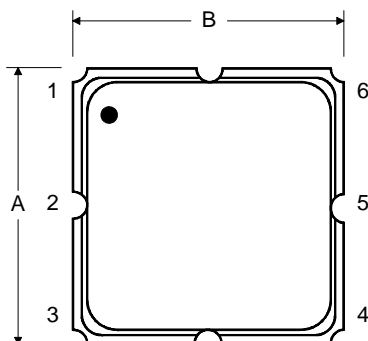
Electrical Connections		
Connection	Terminals	
Port 1	Single Ended Input	2
Port 2	Single Ended Output	5
	Ground	All others

**Single Ended Operation Only**

Dot indicates Pin 1

Materials	
Solder Pad Termination	Au plating 30 - 60 $\mu$ inches (76.2-152 $\mu$ m) over 80-200 $\mu$ inches (203-508 $\mu$ m) Ni.
Lid	Fe-Ni-Co Alloy Electroless Nickel Plate (8-11% Phosphorus) 100-200 $\mu$ inches Thick
Body	Al <sub>2</sub> O <sub>3</sub> Ceramic
Pb Free	

TOP VIEW



BOTTOM VIEW

