

# Preliminary

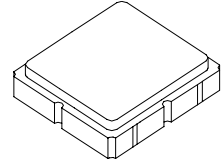


- Low Insertion Loss
- 3.8 X 3.8 X 1.0 mm Surface Mount Case
- Complies with Directive 2002/95/EC (RoHS)



**SF2139D**

**177.0 MHz  
SAW Filter**



**SM3838-6**

## Absolute Maximum Ratings

Rating	Value	Units
Maximum Incident Power in Passband	+10	dBm
Maximum DC Voltage Between any Two Terminals	30	VDC
Storage Temperature Range in Tape and Reel	-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	$f_c$	1		177		MHz
Source Impedance, Single Ended				50		$\Omega$
Load Impedance, Single Ended				50		$\Omega$
1 dB Bandwidth	$BW_1$		20	23.8		MHz
40 dB Bandwidth	$BW_{40}$			40	60	MHz
Template on the Amplitude, Reference is Minimum IL		10 to 149 MHz 209 to 350 MHz	38 37	40 39		dB
Maximum Insertion Loss	$IL_{MAX}$			7.0	9.0	dB
Amplitude Variation over 20 MHz Passband				1.1	1.5	dB <sub>p-p</sub>
Group Delay Variation over 20 MHz Passband				15	80	nSp-p
Absolute Group Delay at $f_c$				0.308		$\mu$ s
Input/Output Return loss over 20 MHz Passband			5	7		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	TBD, YWWS					
Standard Reel Quantity	Reel Size 7 Inch					1000 Pieces/Reel
	Reel Size 13 Inch					3000 Pieces/Reel



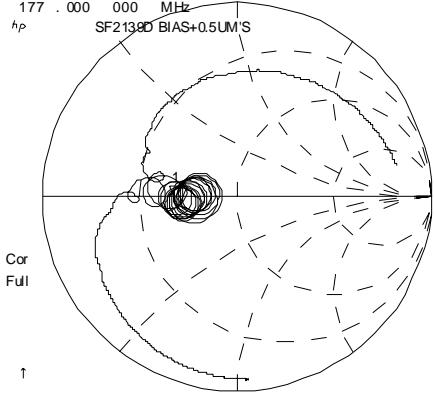
**CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.**

### Notes:

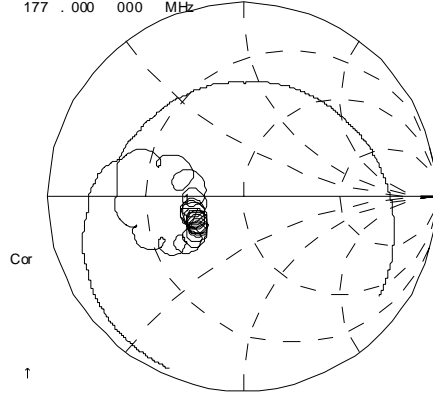
1. Unless noted otherwise, all specifications apply over the operating temperature range with filter soldered to the specified demonstration board with impedance matching to 50  $\Omega$  and measured with 50  $\Omega$  network analyzer.
2. Unless noted otherwise, all frequency specifications are referenced 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.

6 Mar 2009 11:18:17

CH1 S11 1 UFS  
1: 26.826  $\cap$  -3.6221  $\cap$  248.25 pF  
177.000 000 MHz  
SF2139D BIAS+0.5UM'S



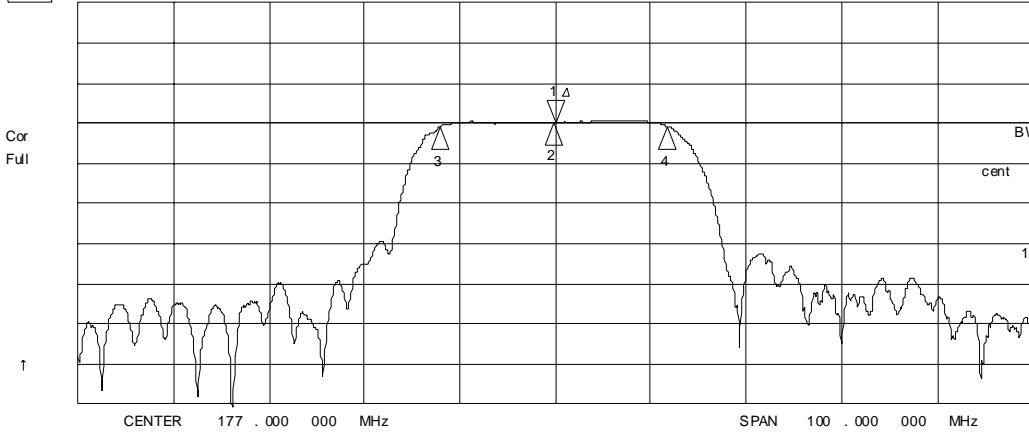
CH3 S22 1 UFS  
1: 27.332  $\cap$  -10.479  $\cap$  85.804 pF  
177.000 000 MHz



CENTR 177.000 MHz SPAN 100.000 MHz

CENTR 177.000 MHz SPAN 100.000 MHz

CH2 S21 LOG 10 dB/ REF -7.698 dB 1: 0.0000 dB 0.000 000 MHz



CH2 Markers  
 $\Delta$  REF=1  
BW: 23.821404 MHz  
cent: 176.778603 MHz  
Q: 7.4210  
1 loss: -7.6958 dB

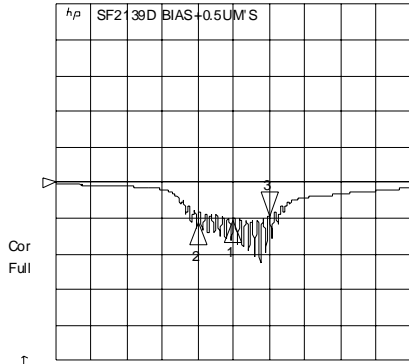
CENTER 177.000 000 MHz

SPAN 100.000 000 MHz

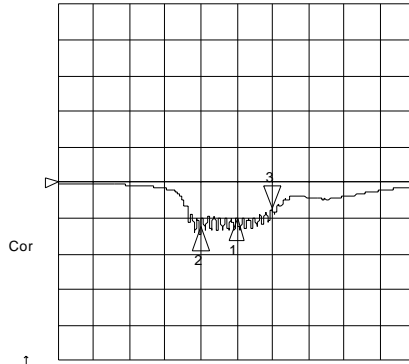
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CH1 LOG 10 dB/ REF 0 dB  
S11 3 :-9 .1614 dB 187 .000 000 MHz

CHB LOG 10 dB/ REF 0 dB  
S22 3 :-7 .3876 dB 187 .000 000 MHz



CH1 Markers  
1 :-10 .318 dB  
177 .000 MHz  
2 :-11 .047 dB  
167 .000 MHz

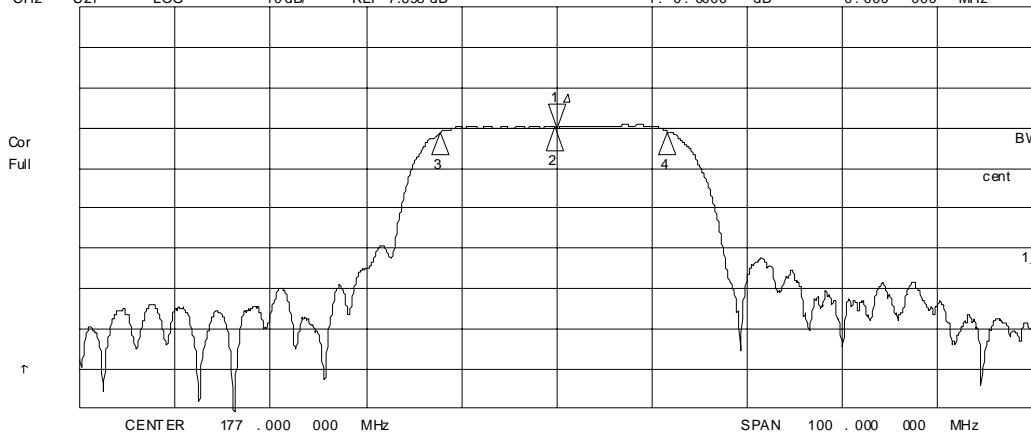


CH3 Markers  
1 :-9 .8974 dB  
177 .000 MHz  
2 :-12 .421 dB  
167 .000 MHz

CENTR 177 .000 MHz SPAN 100 .000 MHz

CENTR 177 .000 MHz SPAN 100 .000 MHz

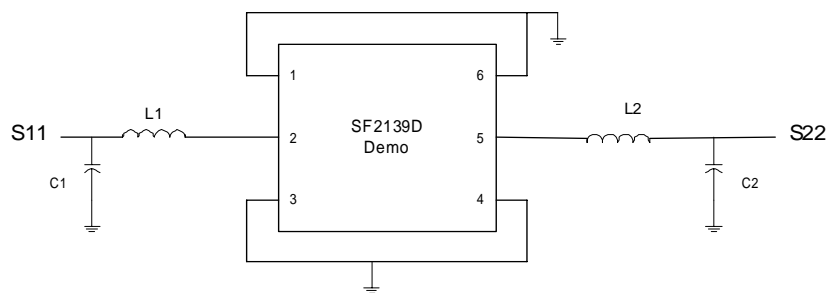
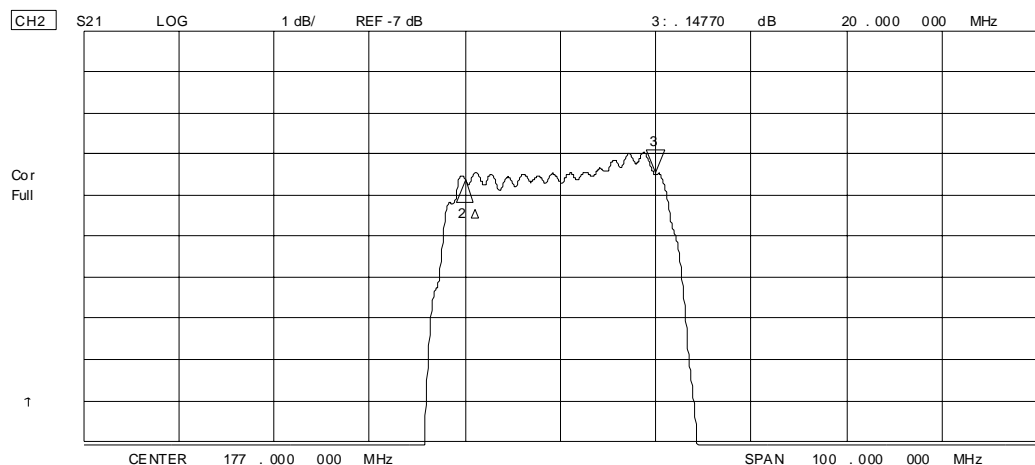
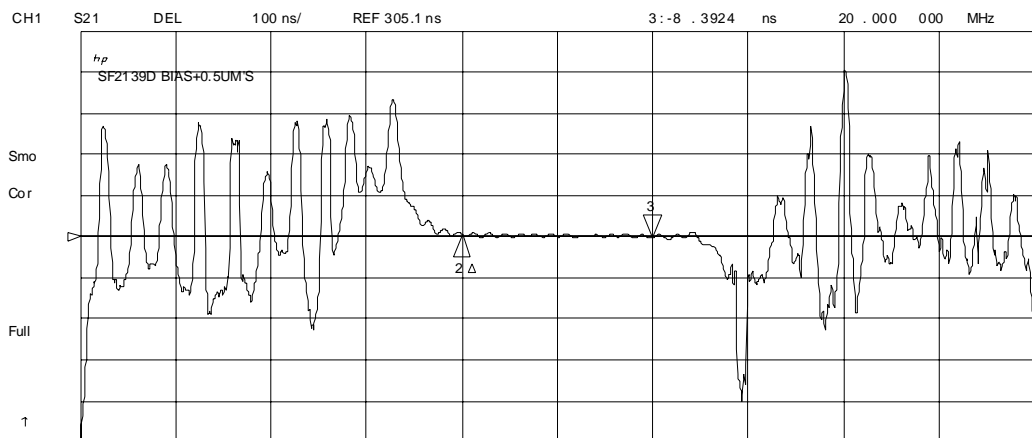
CH2 S21 LOG 10 dB/ REF -7.698 dB 1: 0.000 dB 0.000 000 MHz



CH2 Markers  
Δ REF=1  
BW: 23 .827048 MHz  
cent : 176 .778625 MHz  
Q: 7 .4192  
1 loss : -7 .7004 dB

CENTR 177 .000 000 MHz SPAN 100 .000 000 MHz

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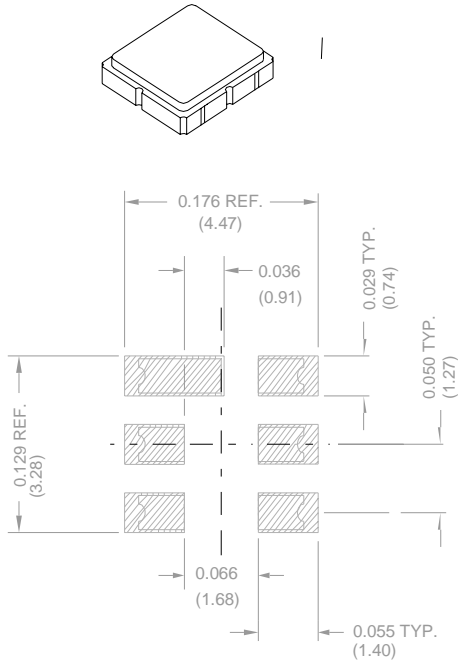


- PCB: 401-1720-002  
 L1: 501-0782-121 0805CS, 120 nH  
 L2: 501-0782-101 0805CS, 100 nH  
 C1: 500-1275-068 0805CS, 6.8 pF  
 C2: 500-1275-150 0805CS, 15 pF



# SM3838-6 Case

## 6-Terminal Ceramic Surface-Mount Case 3.8 X 3.8 mm Nominal Footprint



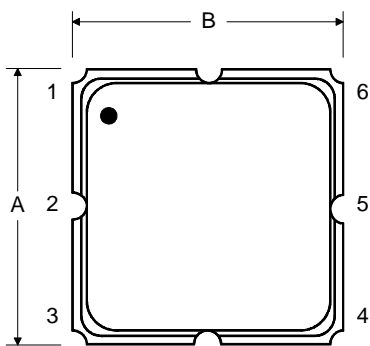
PCB Footprint

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
<b>Single-ended Operation Only</b>		
Dot indicates Pin 1		

Materials	
Solder Pad Plating	0.3 to 1.0 $\mu\text{m}$ Gold over 1.27 to 8.89 $\mu\text{m}$ Nickel
Lid Plating	2.0 to 3.0 $\mu\text{m}$ Nickel
Body	$\text{Al}_2\text{O}_3$ Ceramic
Pb Free	

TOP VIEW



BOTTOM VIEW

