

SAX239

[30 – 520] MHz Tunable Bandpass Filter

Application

The SAX239 electronically tunable bandpass filter is designed for Tactical Communications Applications using binary weighted digital tunable capacitor arrays to cover greater than an octave bandwidth.

Features

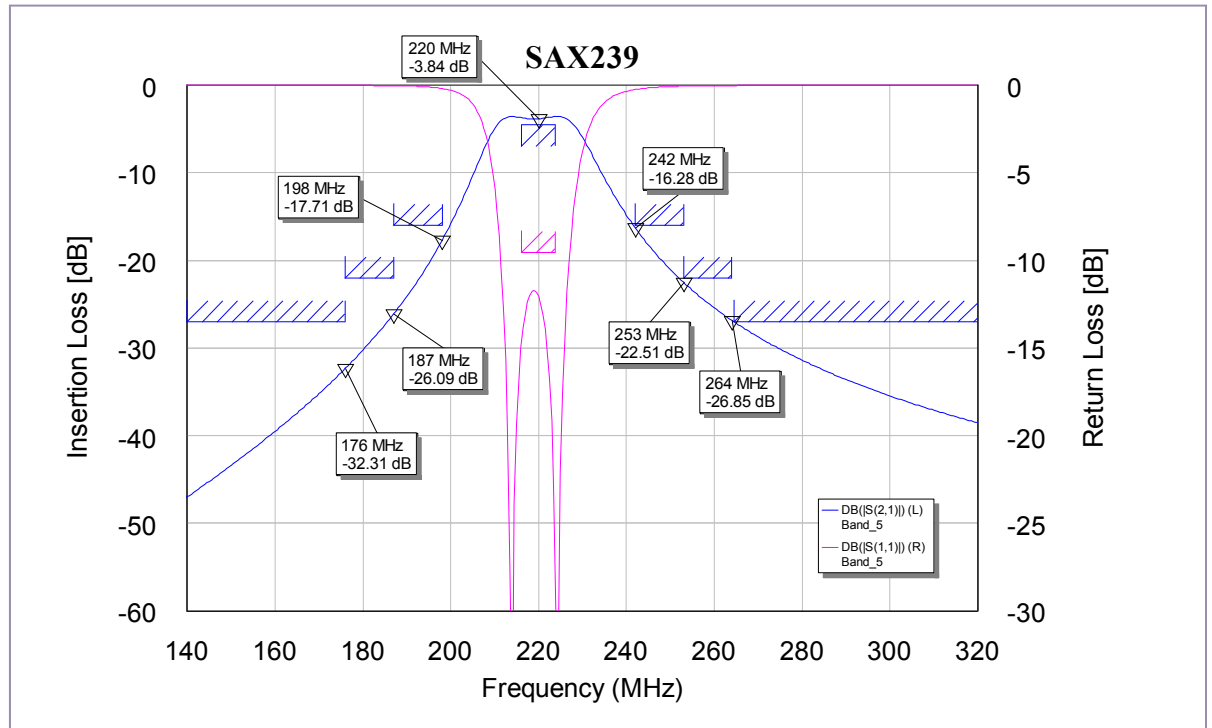
- Full Tactical Communications band resolutions
- Low insertion loss
- Fast tuning across band to 1.0 MHz resolution
- 33 dBm P1dB
- DC Power < 100 mW



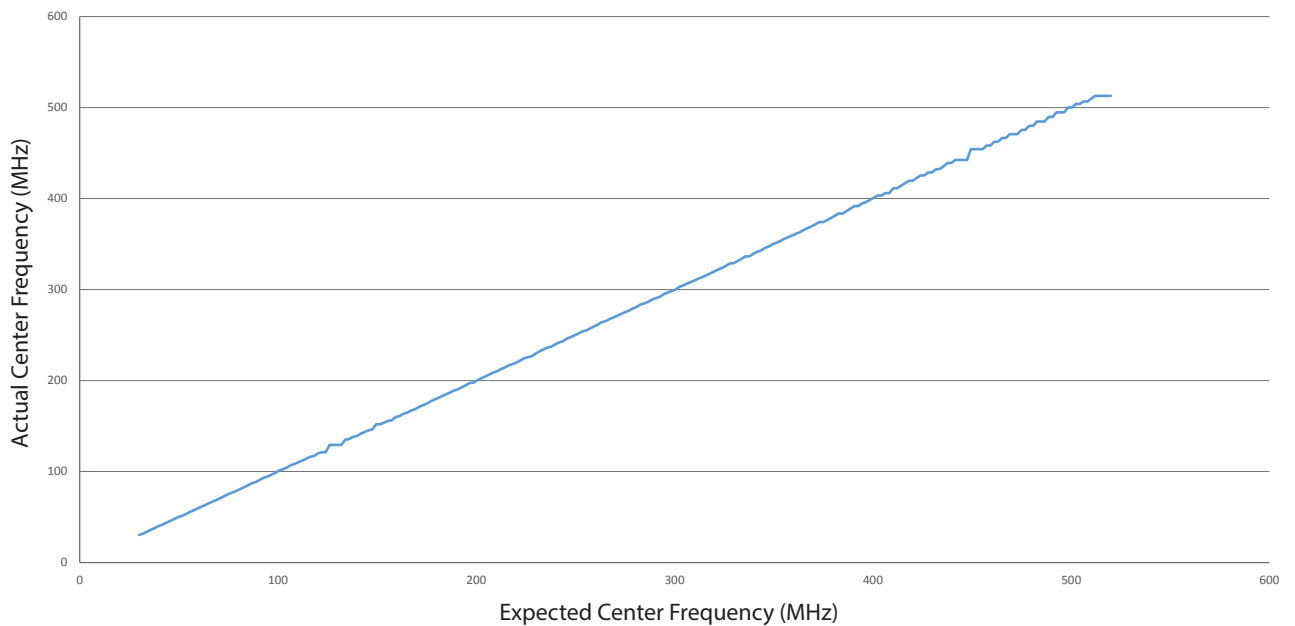
Specifications

Mechanical	Dimensions	[1.2 x 1.2 x 0.25] inches	
RF Power Handling	IIP3	+45 dBm	
	P1dB	+33 dBm	
Filter Performance	Tuning Range	[30 – 520] MHz	
	Input / Output Impedance	50 ohm	
	Tuning Step Size	1.0 MHz from (30-88) MHz 2.0 MHz from (90-520) MHz	
	Bandpass Bandwidth	3.5% typical	
	Insertion Loss @ fc	< 4.5 dB typical	
	Bandpass VSWR	1.5:1 typical, 2.0:1 max.	
	Rejection	Ftune +/- 10% > 15 dB typical Ftune +/- 15% > 22 dB Ftune +/- 20% > 27 dB 10 MHz to 0.5*Ftune > 40 dB [2*Ftune to 750] MHz > 35 dB [750 – 1000] MHz > 25 dB	
	Control & Interface	Tuning Control	Serial [SPI]
		DC Power	3.3V @ < 30 mA
		Tuning Speed	40 µs max. 25 µs typ.
Tuning Algorithm		Filter algorithm is binary equivalent of desired tune frequency (MHz)	
Environmental	Operating Temp.	[-40 to +85] C.	
	Vibration	Vehicular to MIL_STD_810G Method 514.6 Jet Fighter to MIL_STD_810F Method 514.5G	
<i>Full Environmental Qualification Report available upon request</i>			

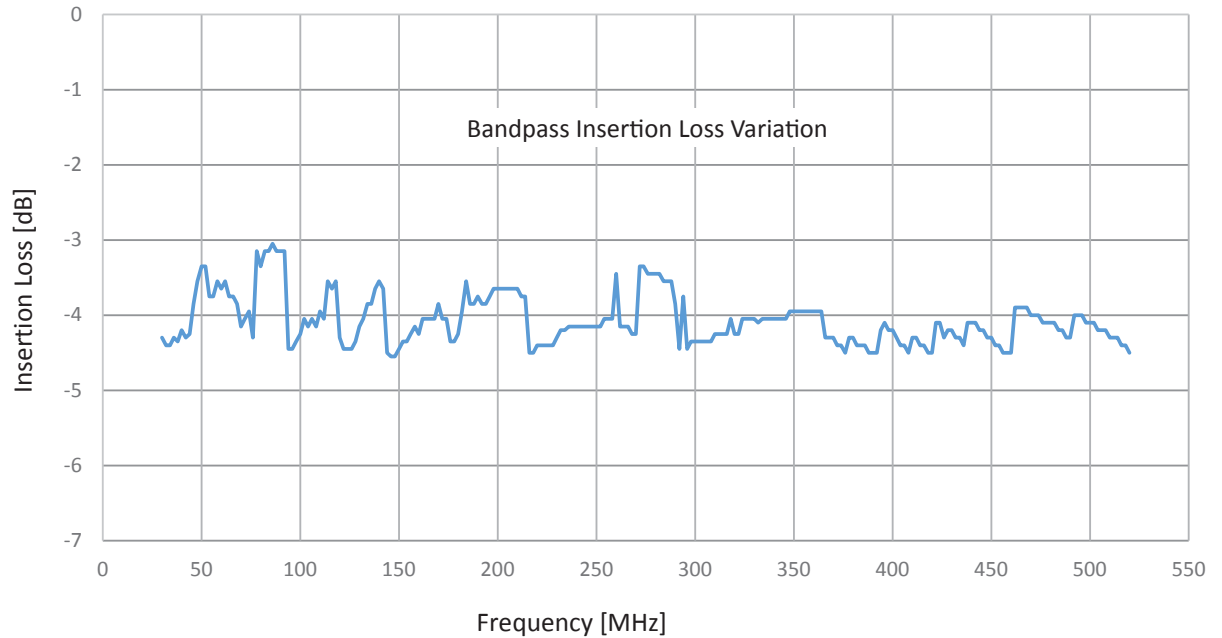
SAX239 Bandpass Data



SAX239 Tuning Accuracy



SAX239 Bandpass Insertions per Frequency Word



SAX239 SPI Communication Interface

The SAX239 Tunable Filter is controlled as a slave SPI device.

The control registers are write only so there are only three SPI signals required:

- CS input: When CS is low, the SPI bus is enabled.
When CS is high, signals on the other SPI inputs are ignored.
- SCLK: Serial data clock generated by the SPI bus master.
- MOSI: Data from master to slave (Master Out, Slave In).

The timing of the SPI bus is:

- The base value of the clock is low (0).
- The SAX239 reads the incoming data (MOSI) on the rising edge of the clock SCLK.
- The maximum allowed SCLK rate is 1.0 MHz.

A single 16-bit tuning word is transmitted to the filter.

The filter will begin to tune to the new frequency upon receipt of the last of the 16 bits.

The valid range of tuning bytes in this mode is 0x001E to 0x0208 (30 to 520 decimal).

The SAX239 will tune to the frequency equivalent to the binary tuning word (in MHz).

For tuning words from 89 to 519, the LSB will be set to zero, resulting in 2 MHz frequency resolution.

The figure below shows the SPI bus set command operation:

- The SPI bus master sets CS low and generates the SCLK.
- The master sends a 16-bit filter select word (MSB first) on the MOSI line.
- After the last clock pulse, the SPI bus master sets CS high.

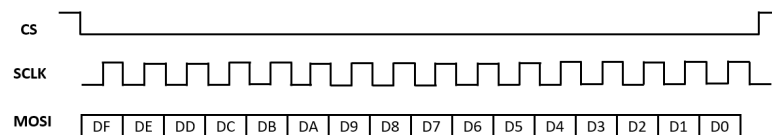
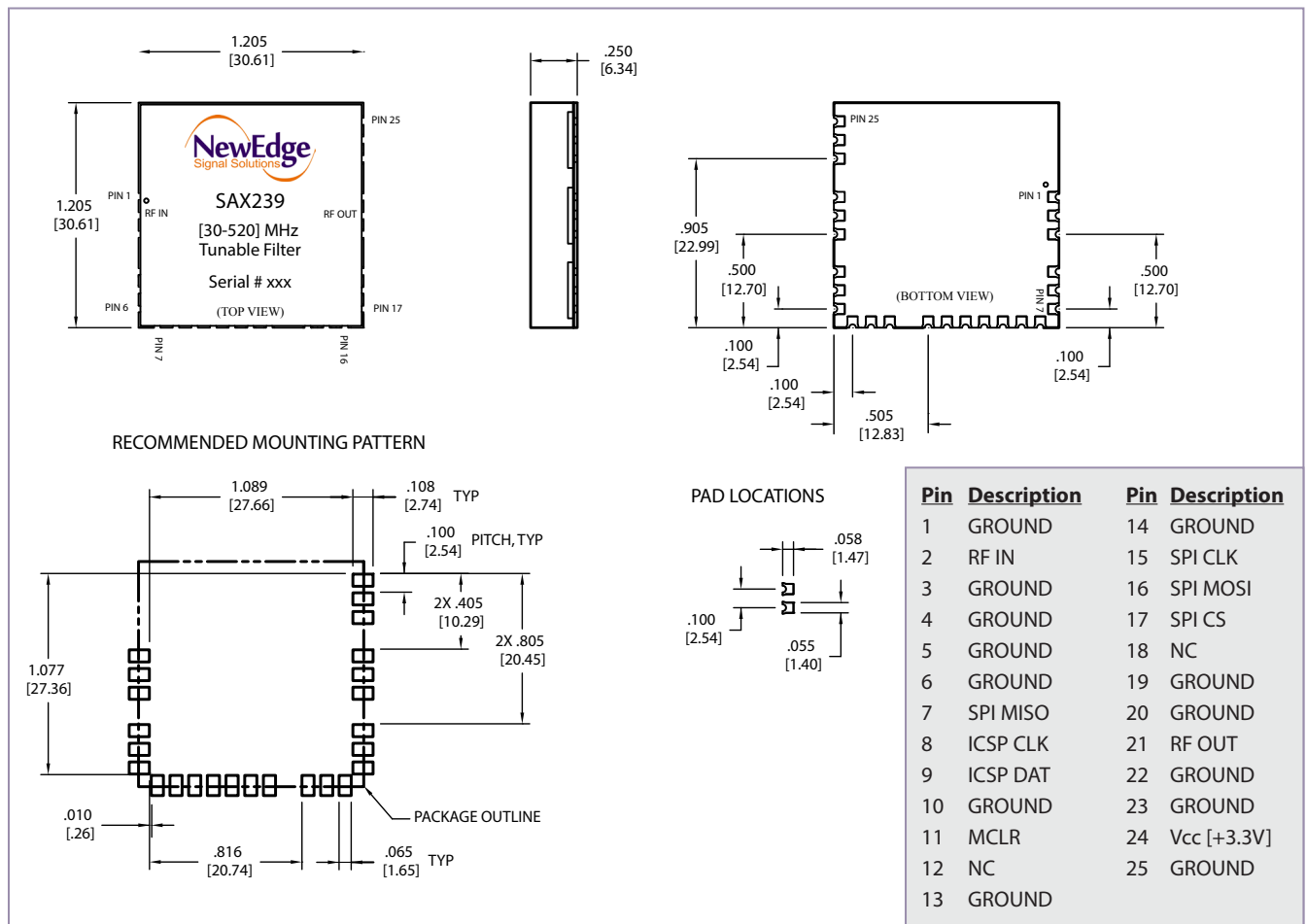


Figure 1. SAX239 SPI Control Interface



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