Description

The Reticon RF5611A is a five-pole Chebyshev high-pass filter with 30 dB per octave rolloff and less than 0.6 dB of pass-band ripple. The pinout configuration for this device is shown in Figure 1, and the package dimensions are given in Figure 4.

The RF5611A is a monolithic, switched-capacitor filter fabricated in Reticon's industry-proven double-poly NMOS process.

Note: These are MOS devices. Although static protection has been built into them MOS handling procedures should be followed.

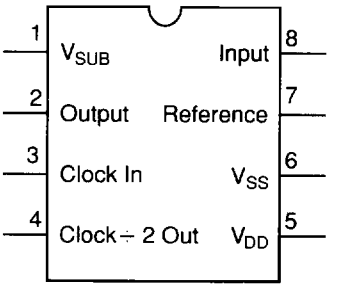

Figure 1. Pinout Configuration

Key Features

- Easy to use
- No external components required
- Small size: 8-pin mini-DIP
- Wide power supply range: ±5V to ±10V
- Dynamic Range: up to 80 dB
- Insertion loss: 0 dB, typical

Typical Applications

- Audio analysis
- Telecommunications
- Portable instrumentation
- Biomedical/Geophysical instrumentation
- Speech processing
- Tracking filters

Device Operation

The RF5611A is self-contained and requires only an external clock trigger (either TTL or CMOS) and power supplies. The device characteristic and operating parameters were obtained using the test configuration shown in Figure 2.

In certain applications, the output offset may be nulled out by varying the reference voltage, which will change the input trigger level and may require adjustment of clock voltage values. The reference input requires less than 100 µA of current and must always be well-filtered. A circuit that may be used to remove the output offset is shown in Figure 2.

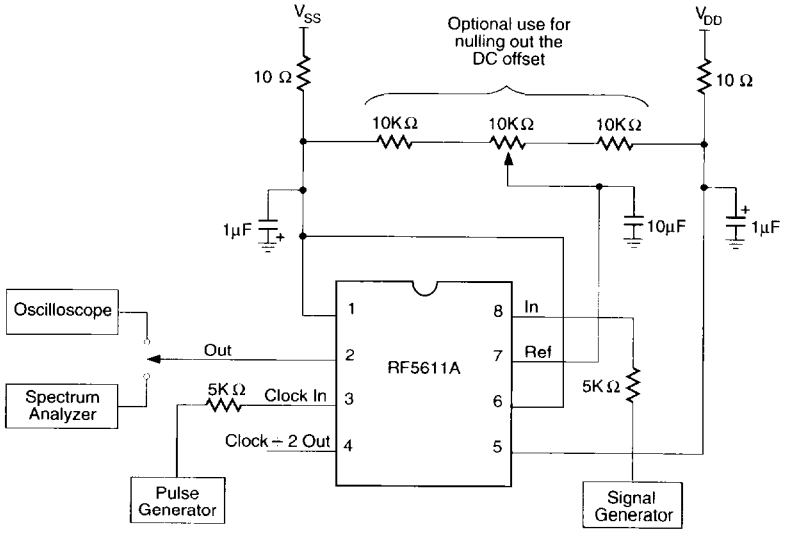

Figure 2. Test Circuit

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A divided-by-two clock output is also available. This output provides a square wave at the sample rate (one-half the clock rate) and may be used for triggering, summing out the sample rate residue, or driving additional filters, especially when filtering requirements are spaced by an octave.

Pre/Post Filtering Considerations

The typical sampling rate on the RF5611A is 250 times the corner frequency. (Note: Sampling rate = 1/2 input clock trigger rate.) Because these sample rates will be far from the frequencies of interest in most cases, antialiasing filtering will usually not be required. However, as with all sampling systems, frequencies or noise above half the sample rate will be aliased and may appear in the band of interest. If this is the case, an external antialiasing filter will be required on the input. A one- or two-pole Butterworth low-pass filter will usually suffice. An unstable clock frequency can also produce the effect of an aliased signal. In applications where sampling residue may affect system performance, a single-pole RC filter may be added to the output.

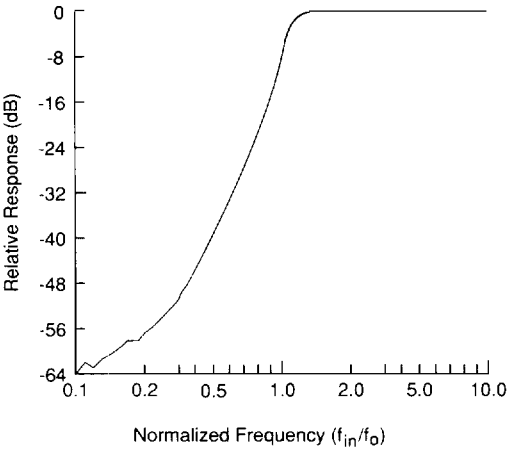

Figure 3. Frequency Response

Table 1. Absolute Minimum/Maximum Ratings

	Min	Max	Units
Input voltage - any terminal with respect to substrate, pin 1 (V_{SS})	-0.4	21	V
Output short-circuit duration - any terminal	Indefinite		
Operating temperature	0	70	°C
Storage temperature	-55	125	°C
Lead temperature (soldering, 10 sec.)		300	°C

Caution: Observe MOS handling and operating procedures

Note: This table shows stress ratings *exclusively*. Functional operation of this product under any conditions beyond those listed under standard operating conditions is not suggested by the table. Permanent damage may result if the device is subject to stresses beyond these absolute min/max values. Moreover, reliability may be diminished if the device is run for protracted periods at absolute maximum values.

Although devices are internally gate-protected to minimize the possibility of static damage, MOS handling precautions should be observed. Do not apply instantaneous supply voltages to the device or insert or remove device from socket while under power. Use decoupling networks to suppress power supply turn-off/ on switching transients and ripple. Applying AC signals or clock to device with power off may exceed negative limit.

Table 2. Device Characteristics and Operating Range Limits [1]

Parameter	Conditions & Comments	Sym	Min	Typ	Max	Units
Supply voltages		V_{DD}	+5		+10	V
		V_{SS}	-5		-10	V
Quiescent current	No load	I_Q		12	16	mA
Clock frequency	$f_c = 2(f_s)$	f_c	5		2500	kHz
Clock pulse width		T_{cp}	200		$(10^9/f_c)$-200	nsec
Clock to corner ratio [2]		f_c/f_o	485	500	515	
Corner frequency		f_o	10		5000	Hz
Maximum output signal	V_{in}=4 V_{rms}, no load	V_o	3.8			V_{rms}
Input impedance(s)		R_i		10		MΩ
		C_i			15	pF
Load impedance(s)		R_L	10			KΩ
		C_L			50	pF
Dynamic output impedance		R_o		10	250	Ω

Notes:

[1] V_{DD} = +10V, V_{SS} = -10V, f_c = 500 kHz, T = 25°C

[2] Performance degrades at temperatures above 25°C

Table 3. Performance Standards [1]

Parameter	Conditions & Comments	Sym	Min	Typ	Max	Units
Output noise		e_n			1.0	mV_{rms}
Dynamic range		DR	62			dB
Total harmonic distortion		THD			0.3	%
Insertion loss [2]			-0.4	0	0.4	dB
Clock feedthrough				30	60	mV_{rms}
Passband ripple					0.2	dB
Output DC offset [2]			-0.6	0.1	0.6	V

Notes:

[1] V_{DD} = +10V, V_{SS} = -10V, f_C = 500 kHz, T = 25°C

[2] Performance degrades at temperatures above 25°C

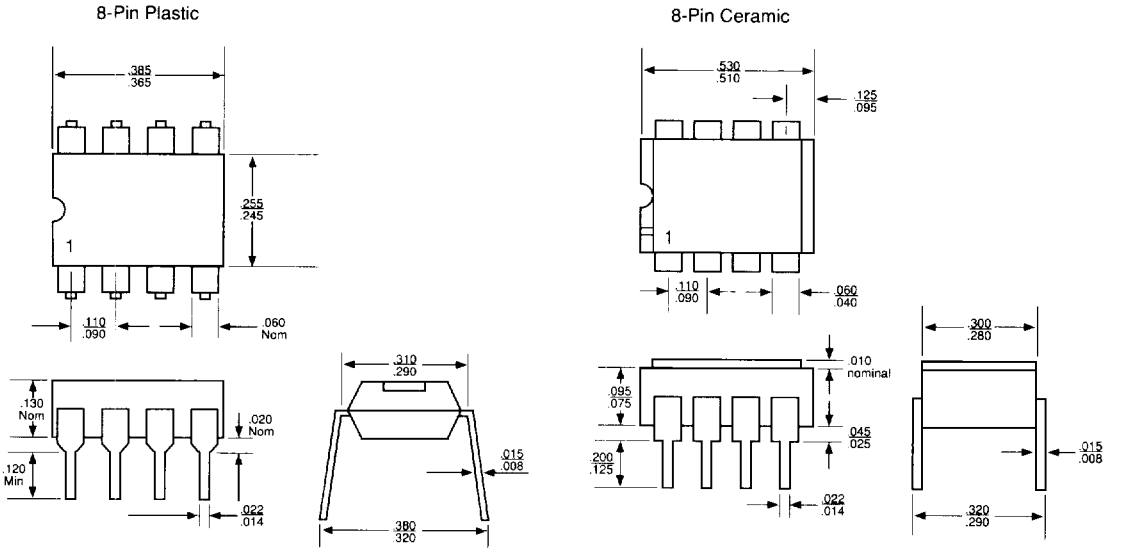

Figure 4. Package Dimensions

Ordering Information

Part Number	Description
RF5611ANP-011	5-pole Chebyshev high-pass filter, 8-pin plastic package
RF5611ANB-011	5-pole Chebyshev high-pass filter, 8-pin ceramic hermetic package