DOUBLE BALANCED MIXER AND OSCILLATOR — SA/NE602

Preliminary

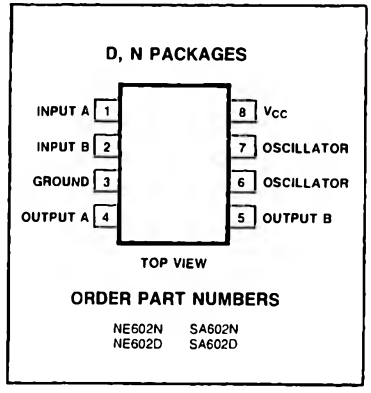
DESCRIPTION

The SA/NE602 is a monolithic Double Balanced Mixer with on-board oscillator and voltage regulator. The oscillator can be used as a buffer for external injection. The design is optimized for frequency conversion applications up to 200MHz and has excellent noise and 3rd order intermodulation performance. The SA/NE602 is available in a 8 lead dual in line plastic package and 8 lead SO (Surface mounted miniature package).

APPLICATIONS

- **HF and VHF frequency conversion**
- **Cellular radio mixer/oscillator**
- **Communication receivers**
- **Instrumentation frequency converters**
- **VHF walkie talkie**

PIN CONFIGURATION



ORDER PART NUMBERS

NE602N	SA602N
NE602D	SA602D

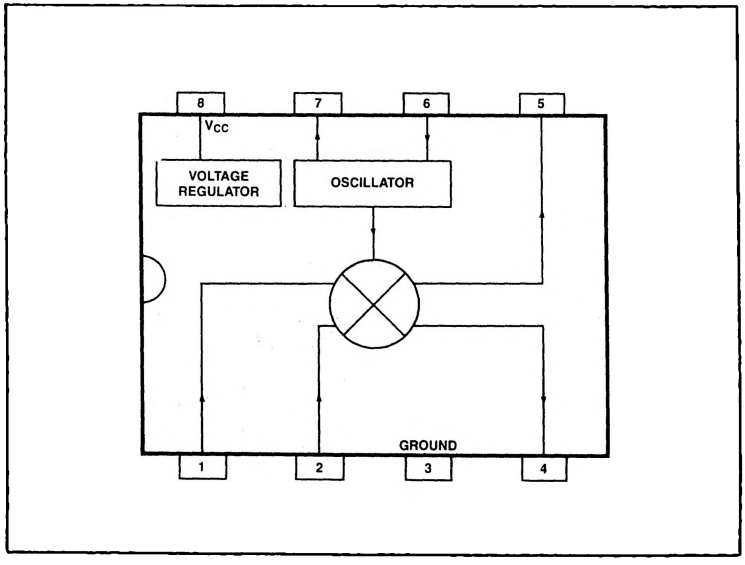
FEATURES

- **Low current consumption: 2.4mA typical**
- **High input and oscillator frequency operation up to 200MHz**
- **High third order intercept point: −15 dBm referred to matched input**
- **Excellent noise figure: 5.0dB typical at 45 MHz**
- **Low external count; suitable for crystal/ceramic filters**

ABSOLUTE MAXIMUM RATINGS

PARAMETER	RATING	UNIT
Maximum operating voltage	9	V
Storage temperature	−65 to +150	°C
Operating temperature		
NE602	0 to +70	°C
SA602	−40 to +85	°C

BLOCK DIAGRAM



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DC ELECTRICAL CHARACTERISTICS: T_A = 25°C, V_{CC} = 6V

SYMBOL AND PARAMETER	SA/NE602			UNIT
	Min	Typ	Max	
Power supply voltage range	4.5	—	8.0	V
D.C. current drain	—	2.4	2.7	mA
Input signal frequency	—	—	200	MHz
Oscillator frequency	—	—	200	MHz
Noise figure @ 45MHz	—	5.0	6	dB
Third order intercept point	—	−15	−17	dBm
Mixer input resistance	1.5	—	—	kΩ
Mixer input capacitance	—	3	3.5	pF
Mixer output resistance[1]	—	2 x 1.5	—	kΩ

NOTE:
1. Each output pin is internally connected to V_{CC} through a 1.5 (nominal) kΩ resistor.

CIRCUIT DESCRIPTION

The NE602 utilizes an active double balanced mixer. The RF input port (pins 1 and 2) can be used in either a symmetrical or an asymmetrical configuration. The RF input port has a resistance of 1.5KΩ shunted by 3.0pF. In order to be used as an asymmetrical configuration, one of the two input pins (1 or 2) must be bypassed to ground with a capacitor. The RF input port does not need any external bias and should not be DC grounded. An external DC path between pins 1 and 2 is allowed.

The local oscillator is an emmitter-follower circuit and is capable of many types of oscillator configurations. Pin 6 (oscillator base) and pin 7 (oscillator emitter) do not need any external bias circuitry, but only pin 6 may have a DC path to V_{CC}. Pin 6 can be used for external oscillator or for frequency synthesizer injection.

The NE602 output pins can be used in a single-ended or push-pull configuration. There are internal 1.5KΩ resistors connected to V_{CC} for each output pin (4 and 5); therefore no external bias is needed. Pins 4 and/or 5 may have a DC path to V_{CC}.

TYPICAL APPLICATION