LOW POWER FM IF SYSTEM

Preliminary

DESCRIPTION

The SA/NE604 is a monolithic low power FM IF system incorporating two limiting intermediate frequency amplifiers, quadrature detector, muting, logarithmic signal strength indicator, and voltage regulator. The SA/NE604 is available in a 16 lead dual-in-line plastic package and 16 lead SO (surface mounted miniature package).

FEATURES

- Low power consumption: 2.3mA typical
- Logarithmic Received Signal Strength Indicator (RSSI) with a dynamic range in excess of 90dB
- · Separate data output
- Audio output with muting
- Low external count; suitable for crystal/ceramic filters
- Excellent sensitivity: $1.5\mu V$ across input pins (0.27 μV into 50Ω matching network) for 12dB SINAD (Signal to Noise and Distortion ratio) at 455kHz

ABSOLUTE MAXIMUM RATINGS

SYMBOL AND PARAMETER	RATING	UNIT	
Maximum operating voltage	9	v	
Storage temperature	- 65 to + 150	°C	
Operating temperature			
NE604	0 to +70	°C	
SA604	-40 to +85	°C	

BLOCK DIAGRAM



APPLICATIONS

- Cellular Radio FM IF
- Communications receivers
- Intermediate frequency amplification and detection up to 10.7MHz
- RF level meter
- Spectrum analyzer

PIN CONFIGURATION



SA/NE604

TYPICAL APPLICATION

LOW POWER FM IF SYSTEM

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ELECTRICAL CHARACTERISTICS $T_A = 25^{\circ}C$, $V_{CC} = +6$ volts, unless otherwise stated.

SYMBOL AND PARAMETER	SA/NE604		4	
	Min	Тур	Max	
Power supply voltage range	4.5	•	8.0	v
D.C. current drain	-	2.3	2.7	mA
I.F. frequency	-		10.7	MHz
RSSI range	TBD	90		dB
RSSI accuracy	-	<u>+</u> 1.5		dB
I.F. input impedance	1.5	-	-	kΩ
1.F. output impedance	1.0		-	kΩ
Limiter input impedance	1.5			kΩ
Quadrature detector data output impedance	50	-	-	kΩ
Muted audio out impedance	· ·	50	-	kΩ
Mute - switch input threshold (on) (off)	1.7	-	- 1.0	V V

CIRCUIT DESCRIPTION

The SA/NE604's IF amplifier has a gain of 30dB, bandwidth of 15MHz, with an input impedance of 1.5K Ω and an output impedance of 1.0K Ω . The limiter has a gain of 60dB, bandwidth of 15MHz, and an input impedance of 1.5K Ω . An interstage filter between the IF Amplifier and Limiter is recommended to reduce wideband noise. The quadrature detector input (pin 8) impedance is 40K Ω .

The data (unmuted output) and audio (muted output) both have $50K\Omega$ output impedance and their detected signals are 180 degrees out of phase with each other. The mute input (pin 3) has a very high impedance and is compatible with three and five volt CMOS and TTL levels. Little or no DC level shift occurs after muting when the quadrature detector is adjusted to the IF center frequency. Muting will attenuate the audio signal by more than 60dB and no voltage spikes will be generated by muting.

The logarithmic signal strength indicator is a current source output with maximum source current of 50 microamps. The signal strength indicator's transfer function is approximately 10 microamp per 20dB and is independent of fr frequency. The interstage filter must have a 6dB insertion loss to optimize slope linearity.

Pins 1, 16, 15, 14, 12, 11, 10, 9, and 8 do not need external bias and should not have a DC path.



Signetics