INTRODUCTION

The S1A0429A is a monolithic integrated circuit designed for filterless and coilless FM IF detector used in the cordless telephone.

It includes the external 2nd IF ceramic filter and the external discriminator in itself and that realized to be able to reduce the external parts extremely.
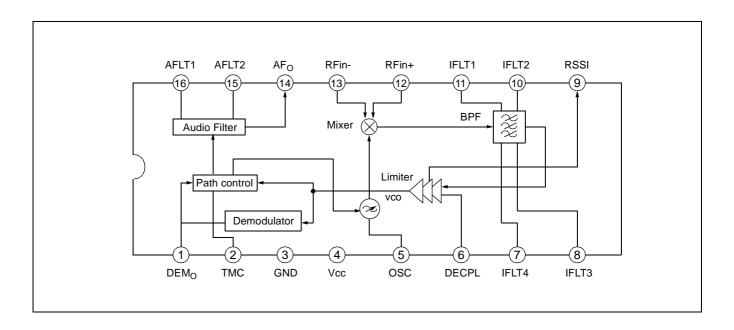
16−SOP−225

FEATURES

- Operating voltage range: 2.0 to 6.0V

- Typical supply current: 6.3mA at 3V

- Filterless & coilless FM IF detector

    — Excellent demodulation characteristics

    — Intermediate frequency is 76kHz

    — Include the IF band pass filter (active RC filter)

    — Include the phase shifter (for discriminator)

    — Dual feedback IF detect system (for the image rejection of mixer)

    — The only function to be tuned is the resonant frequency of the oscillator

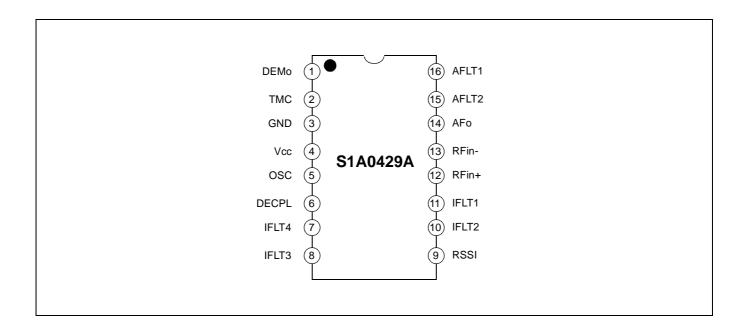   — Minimum number of external parts required

ORDERING INFORMATION

Device	Package	Operating Temperature
S1A0429A01-S0BA	16−SOP−225	− 10°C to +70°C

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BLOCK DIAGRAM

PIN CONFIGURATION

PIN DESCRIPTION

Pin No.	Symbol	Description
1	DEM_O	Demodulator output terminal, low pass filtering with the external capacitor
2	TMC	This terminal stabilizes the control of audio signal path with the external capacitor
3	GND	Ground
4	Vcc	Supply voltage
5	OSC	Local oscillator terminal The external local signal injection is possible as this terminal connects resister to Vcc
6	DECPL	Internal IF AMP (Limiter) de-coupling terminal for DC bias
7	IFLT4	IF band pass filter terminal for high cut-off frequency
8	IFLT3	IF band pass filter terminal for low cut-off frequency
9	RSSI	Received signal strength indicator
10	IFLT2	If band pass filter terminal for high cut-off frequency
11	IFLT1	If band pass filter terminal for low cut-off frequency
12	RFin+	Balanced input terminal of mixer
13	RFin-	Balanced input terminal of mixer
14	AF_O	Recovered audio output terminal
15	AFLT2	Audio signal band pass filter terminal for high cut-off frequency
16	AFLT1	Audio signal band pass filter terminal for low cut-off frequency

ABSOLUTE MAXIMUM RATINGS

Characteristics	Symbol	Value	Unit
Maximum supply voltage	Vcc	7	V
Operating temperature	T_{OPR}	−10 to +70	°C
Storage temperature	T_{STG}	−55 to +150	°C

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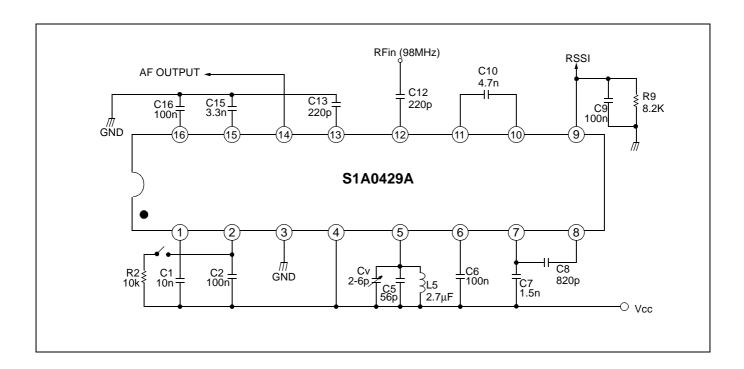## ELECTRICAL CHARACTERISTICS

(Vcc = 3V, fc = 98MHz, f_{DEV} = ± 22.5kHz, f_{MOD} = 1kHz, Ta = 25°C, VRFin = 150µVrms, unless otherwise specified)

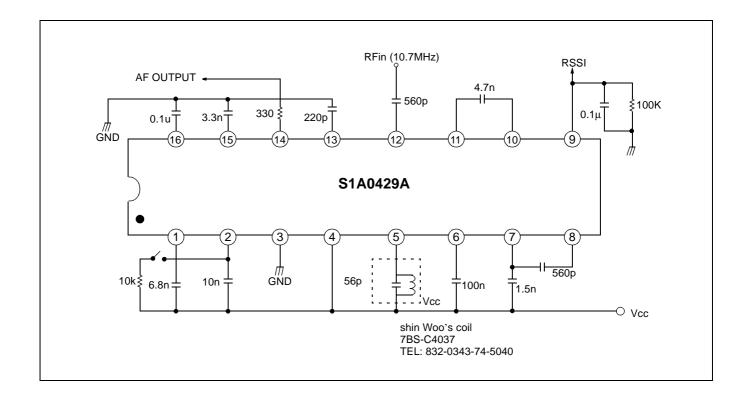| Characteristics	Symbol	Test conditions	Min.	Typ.	Max.	Unit
Current consumption	Icc	–	–	6.3	8.0	mA
Input for -3dB limiting	V_{LIM}	AFo = -3dB 0dB Ref = 150µVrms RFin	–	5.0	13	µVrms
S/N ratio	S/N	–	45	60	–	dB
Detector output distortion	THD_{DET}	–	–	0.7	–	%
Recovered audio output	$V_{O(RA)}$	–	–	90	–	mVrms
AM rejection ratio	AMRR	AM modulation = 30%	40	50	–	dB

TEST CIRCUIT

APPLICATION CIRCUIT

shin Woo's coil
7BS-C4037
TEL: 832-0343-74-5040

EXTERNAL PARTS DESCRIPTION (See Figure 3)

C1   Eliminates IF harmonics at the output of the demodulator.

C2   Stabilizes on/off switching of audio signal path.
             The function of path control block can controlled by audio on/off signal path from demodulator to audio filter
             If R2 is connected to PIN2, audio signal path is always on state.

C5, L5, Cv Determines the frequency of the local oscillator. Oscillated level can be suppressed with shunt resistor.
             The values of C5, L5 and Cv depend on the required tunning range.
             Decouples the DC feedback of limiter.

C6   Decouples the DC feedback of limiter.

C7, C8, C10 Determine the center frequency and bandwidth of active IF bandpass filter.
             This BPF determines selectivity characteristics and demodulated output distortion characteristics.
             C7, C10 determines the high cut-off frequency (f_{HP}).
             C8 determines the low cut-off frequency (f_{LP}).

$$f_{LP1} = \frac{1}{2\pi R_{i10}\sqrt{C_{i10}C_{10}}}$$

$$f_{HP2} = \frac{1}{2\pi R_{i7}C_7}$$

$$f_{LP2} = \frac{1}{2\pi R_{i8}C_8}$$

Internal parts

R_{i10} = 2.2kΩ, C_{i10} = 148pF

R_{i7} = 4.7kΩ

R_{i8} = 4.7kΩ

C9   Eliminates IF harmonics at the RSSI output.

R9   Determines RSSI slope which is inversely proportional to RFin(dBm), adjust the slope and level of RSSI output.

C15, C16 Determines the cut-off frequency of audio band pass filter
             C15 determines the high cut-off frequency (f_{HP}).
             C16 determines the low cut-off frequency (f_{LP}).

$$f_{HP} = \frac{1}{2\pi R_{i15}C_{15}}$$

$$f_{LP} = \frac{1}{2\pi R_{i16}C_{16}}$$

Internal parts

R_{i15} = 12.3kΩ

R_{i16} = 14kΩ

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