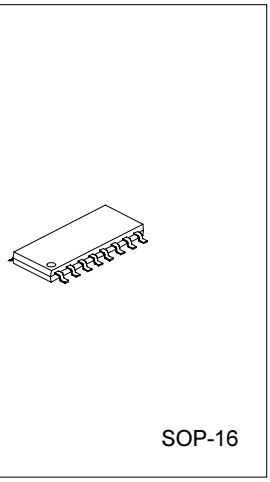
Silan
Semiconductors

SA1088

FM RECEIVER CIRCUIT FOR BATTERY SUPPLY



DESCRIPTION

The SA1088 is a bipolar integrated circuit for use in mono portable and pocket radios. It is used when a minimum of perpheral components (of small dimensions and low costs) is important. The circuit contains a frequency-locked-loop(FLL) system with an intermediate frequency(IF) of about 70kHz. Selectivity is achieved by active RC-filters. De-tuning related to the IF and too weak input signal is suppressed by the mute circuit.

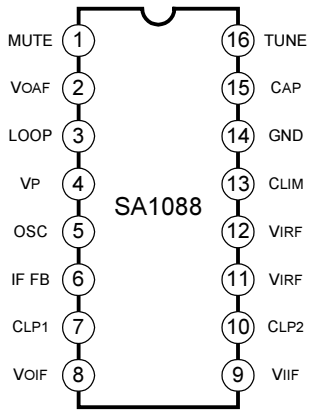
FEATURES

* Equipped with all stages of a mono receiver from antenna to audio output.
* Mute Circuit
* Search tuning with a single varicap diode
* Mechanical tuning with integrating AFC
* AM application supported
* Power supply polarity protection
* Power supply voltage down to 1.8V

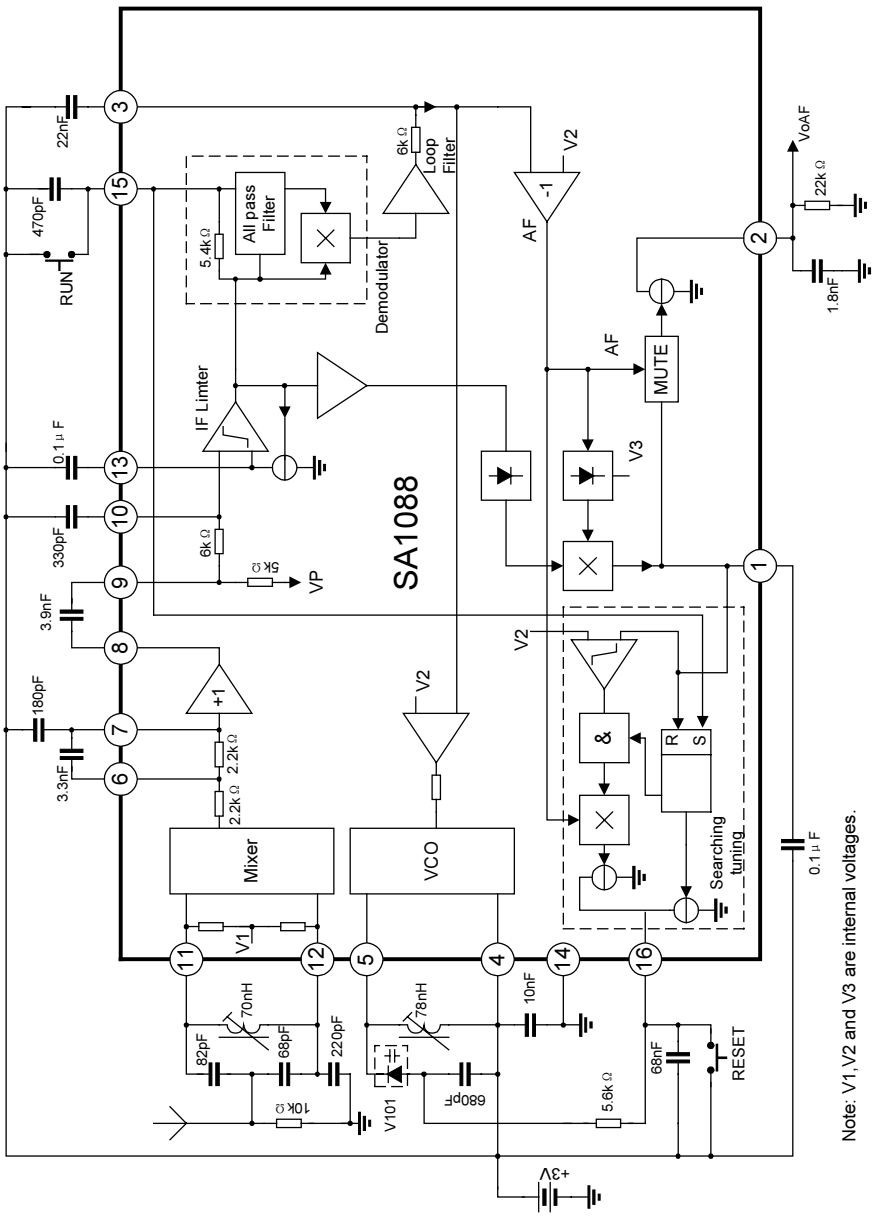
APPLICATION

1. Mechanical tuning: This is possible with or without integrated AFC circuit
2. Electrical tuning: This is realized by one directional(band-up) search tuning facility, including RESET to the lower-band limit.

PIN CONFIGURATIONS



BLOCK DIAGRAM



Note: V1,V2 and V3 are internal voltages.

Fig.1 Block Dirgram and Application Circuit for Search Tuning.

ABSOLUTE MAXIMUM RATINGS

Characteristic	Symbol	Value	Unit
Supply Voltage	V_P	5	V
Operating Temperature	Tamb	-10 ~ +70	°C
Storage Temperature	Tstg	-55 ~ +150	°C

DC ELECTRICAL CHARACTERISTICS

(Tamb=25°C,V_P=3V ,Unless otherwise specified)

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
Supply Voltage(pin 4)	V_P		1.8	3.0	5.0	V
Supply Current(Pin 4)	I_P		4.2	5.2	6.6	mA
DC voltage of pin 1	V1		2.50	2.55	2.60	V
DC voltage of pin 3	V3		2.64	2.69	2.74	V
DC voltage of pin 6 and 7	V6,7		2.38	2.44	2.50	V
DC voltage of pin 8	V8		1.60	1.67	1.74	V
DC voltage of pin 9,10 and 13	V9,10,13		2.42	2.47	2.52	V
DC voltage of pin 11 and 12	V11,12		0.91	0.94	0.98	V
DC voltage of pin 15	V15		2.06	2.12	2.18	V
AF output current on pin 2	I2		45	60	80	μA
Oscillator current on pin 5	I5		275	375	500	μA

AC ELECTRICAL CHARACTERISTICS

Tamb=25°C,Vp=3V,Firf=96MHz modulated with Δf=±22.5kHz and fm=1kHz deviation;EMF=0.3mV(e.m.f. at a sourse impedance of 75Ω),and measurement taken in fig.3 Unless otherwise specified

Parameter	Symbol	Test conditions	Min	Typ	Max	Unit
RF Sensitivityinput voltage	Vi(rms)	V_{oAF}=-3dB;V_{oAF}=0dB at Vi=1mV;see Fig. 2				
		Mute OFF		3	6	μV
		Mute ON	3	6	12	μV
		(S+N)/N=26dB		5	10	μV
Signal handling		THD<10%,Δf=±75kHz	100	200	—	mV
Signal-to -noise ratio	(S+N)/N	See fig.2	52	56	—	dB
Total Harmonic distortion	THD	Δf=±22.5kHz	—	1	1.4	%
		Δf=±75kHz		2.4	3.3	%
AM suppression of output voltage	AMS	FM: 1kHz; ±75kHz AM: 1kHz; MOD=80%	47	52		dB
Ripple rejection	RR	ΔVp=100mVrms,f=1kHz	7	10		dB
Audio output signal	Vo(rms)	R_L=22kΩ	60	85	120	mV
Search Tuning(with V101 and C16=0.1μF) See Fig.1						
Minimum output voltage on pin 16	V16	Limiting point		Vp-1.85		V
Tuning steepness	ΔV/Δt	Voltage at pin 16	95	210	420	mV/sec
Oscillator steepness	Δfosc/Δ t		1.25	2.83	5.6	MHz/sec
AFC steepness	ΔI_{AFC}/ΔV3	Voltage at pin 3	4.75	9.5	19	μs

PIN DESCRIPTIONS

Pin No.	Symbol	Description	Pin No.	Symbol	Description
1	MUTE	Mute output	9	V_{iIF}	IF input to limiter amplifier
2	V_{OAF}	Audio frequency output signal	10	C_{LP2}	Low-pass capacitor of IF limiter amplifier
3	LOOP	AF loop filter	11	V_{IRF}	Radio frequency input
4	Vp	Supply voltage	12	V_{IRF}	Radio frequency input
5	OSC	Oscillator resonat circuit	13	C_{LIM}	Limiter offset voltage capacitor
6	IF FB	IF feedback	14	GND	Ground
7	C_{LP1}	Low-pass capacitor of 1dB amplifier	15	C_{AP}	All-pass filter capacitor.input for search tuning
8	V_{OIF}	IF output to external coupling capacitor(high-pass)	16	TUNE	Electrical tuning/AFC output

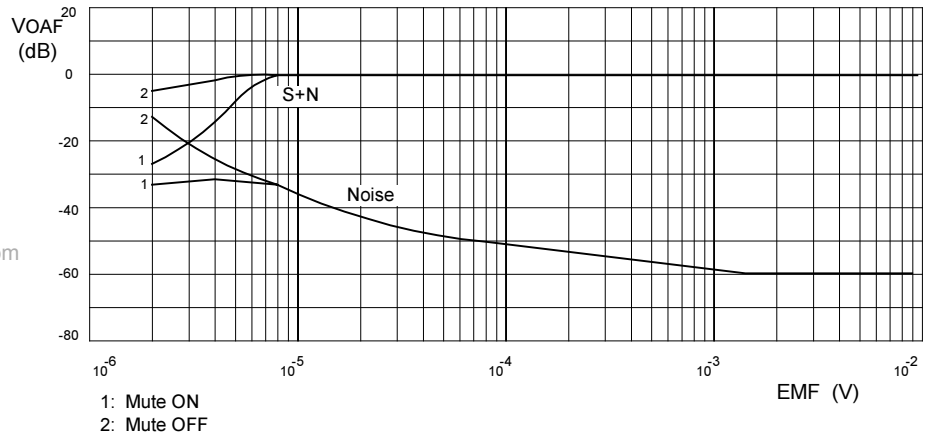


Fig. 2 Input sensitivity

TEST AND APPLICATION CIRCUIT

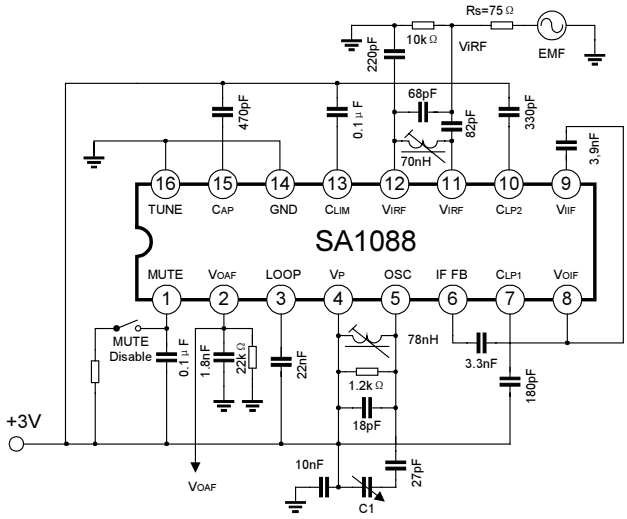


Fig. 3 Test circuit and application for mechanical tuning

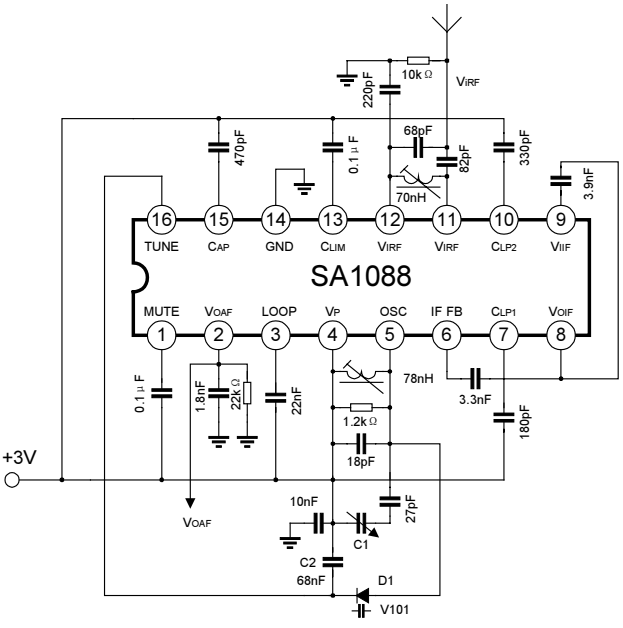


Fig. 4 Application circuit with AFC for mechanical tuning

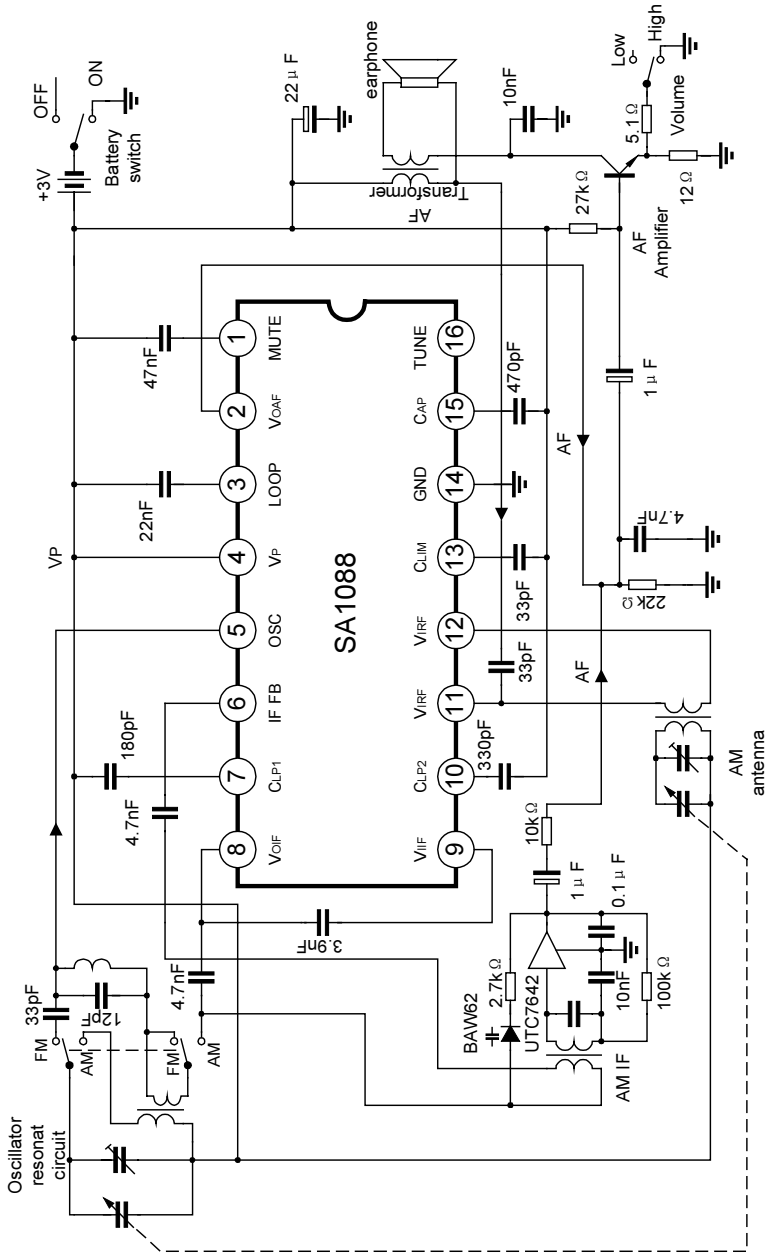


Fig.5 AM application circuit

PACKAGE OUTLINE

SOP-16-225-1.27 UNIT:mm