Introduction

LW107 is a highly integrated circuit used in pocket and portable mono radios. It is used with minimum external components with small size and low cost. The circuit employs a frequency-locked-loop (FLL) system to perform automatic channel searching. Selectivity is achieved by active RC-filter with Intermediate Frequency (IF) of about 70 KHz. Noise due to de-tuning and weak input signal is suppressed by the mute circuit.

Features

- Single chip solution with all stages of a mono receiver from antenna to audio output
- Mute circuit
- Search tuning with a single varactor
- Mechanical tuning with integrating AFC
- AM application supported
- Power supply polarity protection
- Power supply voltage down to 2.4 V
- ESD protection

Applications

- Mechanical tuning with or without integrating AFC circuit
- Electrical tuning by one directional (band-up) search tuning facility, including RESET to the lower-band limit.

Quick Reference Data

SYMBOL	PARAMETER	CONDITION	MIN	TYP.	MAX.	UNIT
V_P	supply voltage		2.4	3	5	V
I_P	supply current		3.5	5	6	mA
f_{iRF}	radio input frequency		0.5	-	110	MHz
$V_{i(rms)}$	RF sensitivity input voltage (RMS value)	V_{oAF} = –3 dB; V_{oAF} = 0 dB at V_i = 1 mV; mute off	-	3	6	μV
	signal handling	$\Delta f = \pm 75$ kHz; THD < 10%	100	200	-	mV
$V_{o(rms)}$	audio output signal (RMS value)	R_L = 22 kΩ	60	85	120	mV
T_{amb}	operating ambient temperature		-10	-	+70	°C

Ordering Information

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
LW107	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1

Block Diagram and Application Circuit

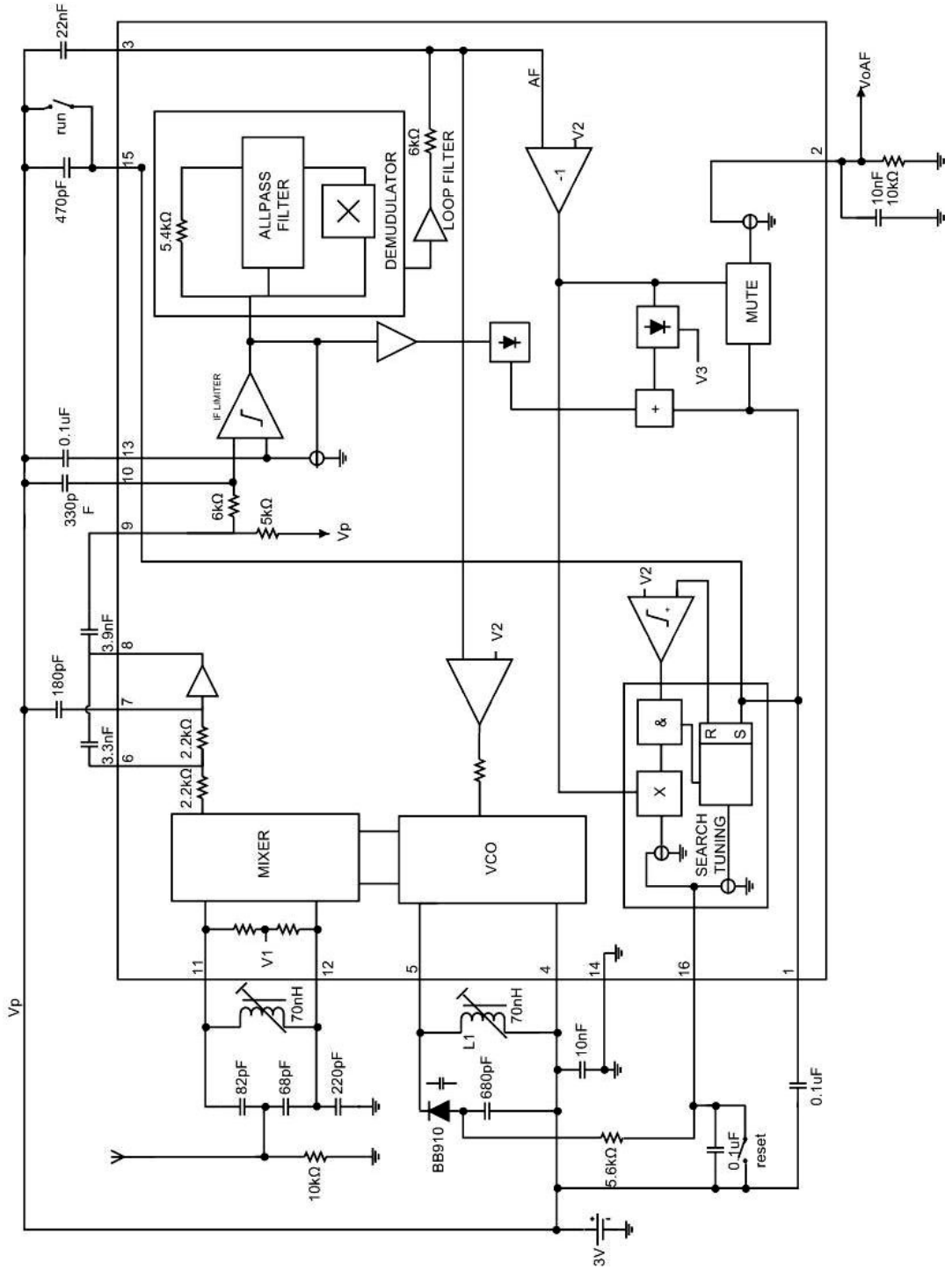

Fig.1 Block diagram and application circuit for search tuning.

Pin Description

SYMBOL	PIN	DESCRIPTION
MUTE	1	mute output
V_{oAF}	2	audio frequency output signal
LOOP	3	AF loop filter
V_P	4	+3 V supply voltage
OSC	5	oscillator resonant circuit
IFFB	6	IF feedback
C_{LP1}	7	low-pass capacitor of 1 dB amplifier
V_{oIF}	8	IF output to external coupling capacitor (high-pass)
V_{iIF}	9	IF input to limiter amplifier
C_{LP2}	10	low-pass capacitor of IF limiter amplifier
V_{iRF}	11	radio frequency input
V_{iRF}	12	radio frequency input
C_{LIM}	13	limiter offset voltage capacitor
GND	14	ground (0 V)
C_{AP}	15	All-pass filter capacitor/input for search tuning
TUNE	16	electrical tuning/AFC output

Limiting Values

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_P	Supply voltage	0	6	V
T_{stg}	Storage temperature	-55	+155	°C
T_{amb}	Operating ambient temperature	-10	+70	°C

DC Characteristics

VP = 3 V; Tamb = 25 °C; unless otherwise specified.

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
V_P	supply voltage (pin 4)	2.4	3	5	V
I_P	supply current (pin 4)	3.5	5	6	mA
V_1	DC voltage on pin 1	2.60	2.65	2.70	V
V_3	DC voltage on pin 3	2.60	2.65	2.70	V
$V_{6, 7}$	DC voltage on pins 6 and 7	2.30	2.45	2.50	V
V_8	DC voltage on pin 8	1.60	1.67	1.74	V
$V_{9, 10, 13}$	DC voltage on pins 9, 10 and 13	2.40	2.45	2.60	V
$V_{11, 12}$	DC voltage on pins 11 and 12	0.91	0.94	0.98	V
V_{15}	DC voltage on pin 15	2.06	2.12	2.18	V
I_2	AF output current on pin 2	45	60	80	μA
I_5	oscillator current on pin 5	300	350	400	μA

AC Characteristics

VP = 3 V; Tamb = 25 °C; fiRF = 96 MHz modulated with fmod = 1 kHz and ±22.5 kHz deviation; Vi = 400 μV (measured as EMF; RS = 75 Ω)

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{i(rms)}$	RF sensitivity input voltage (RMS value)	V_{oAF} = –3 dB; V_{oAF} = 0 dB at V_i = 1 mV				
		mute off	-	3	6	μV
		mute on	3	6	12	μV
	Signal handling	Δf = ±75 kHz; THD < 10%	100	200	-	mV
(S+N)/N	Signal plus noise-to-noise ratio		52	56	-	dB
THD	Total harmonic distortion	Δf = ±22.5 kHz	-	1	1.5	%
		Δf = ±75 kHz	-	2.5	3.0	%
α_{AM}	AM suppression	FM: 1 kHz; ±75 kHz; AM: 1 kHz; m = 0.8	47	52	-	dB
RR_{1000}	Ripple rejection	100 mV RMS ripple on V_P; f = 1 kHz	7	10	-	dB
$V_{o(rms)}$	audio output signal (RMS value)	R_L = 22 kΩ	60	85	120	mV
Search tuning (with BB910 and C_{16} = 0.1 μF) see Fig.1						
V_{16}	minimum output voltage on pin 16	limiting point	-	V_P – 1.85	-	V
ΔV/Δt	tuning steepness	voltage at pin 16	95	210	420	mV/s
$\Delta f_{osc}/\Delta t$	oscillator steepness		1.25	2.83	5.6	MHz/s
$\Delta I_{AFC}/\Delta V_3$	AFC steepness	voltage at pin 3	4.75	9.5	19	μS