Lexiwave Technology (Hong Kong) Ltd.

LW106 315 MHz / 433 MHz ASK Receiver
Preliminary Data Sheet

Rev 0.3, August, 2006

Introduction

The LW106 is a superheterodyne amplitude-shift-keying (ASK) modulation (or On-Off keying, OOK) single chip receiver. It is designed to operate for low power device (LPD) applications. Industry commonly uses 315 MHz and 433 MHz for US and European market respectively. By changing a few external components, energy saving LW106 can support both bands at low cost.

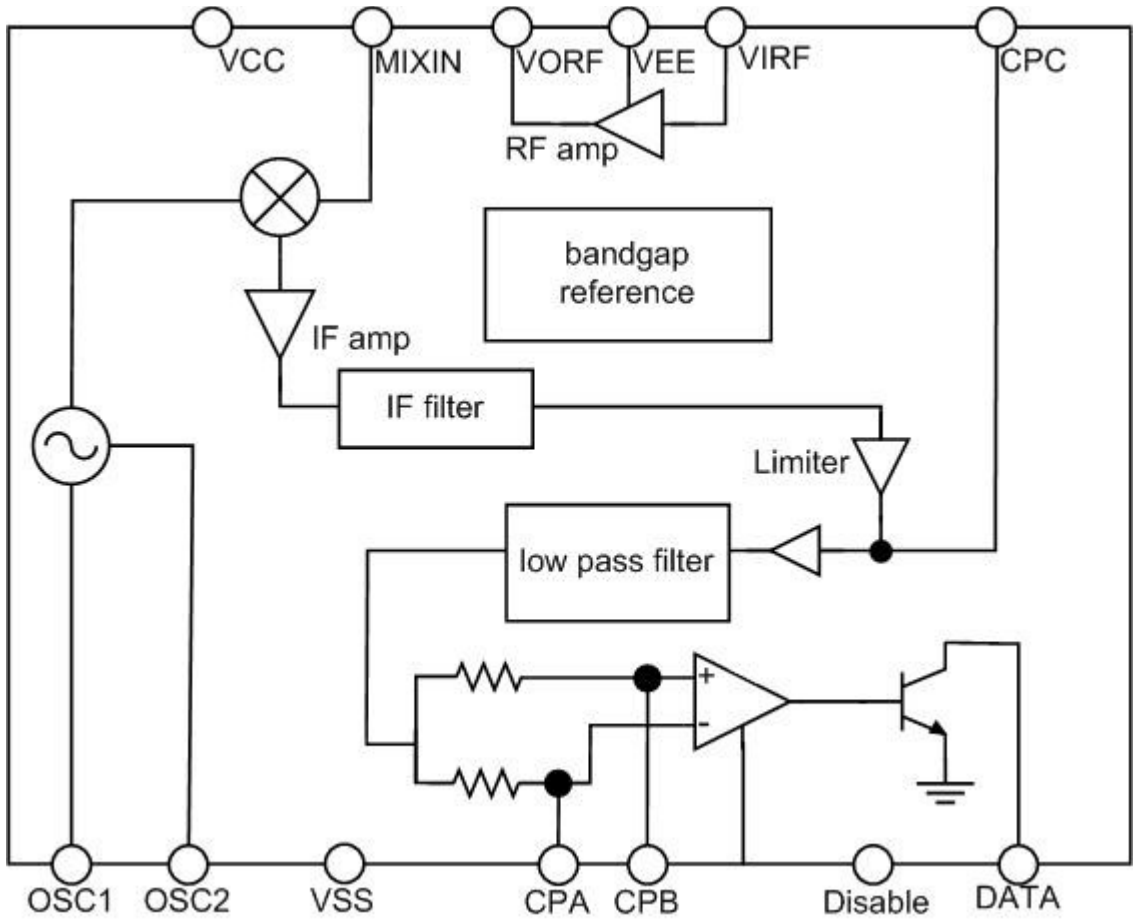
Features

- Frequency range from 300 MHz to 450 MHz
- High sensitivity
- Low power consumption
- Operate from - 20 °C to 85 °C
- Only require a few inexpensive external components
- Low cost
- Custom made digital decoder is available for cost and space saving
- SOP-18, SSOP-20 package or die form for PCB bonding

Applications

- Remote controllers
- Security systems like car alarm
- Wireless door bells
- Garage openers
- radio controlled toys
- Monitoring systems
- RFID

Block Diagram



Pin Description

Pin no.	Symbol	Description
1	OSC1	Oscillator tank input
2	OSC2	Oscillator tank input
3	NC	No connection
4	CPA	Comparator input A
5	CPB	Comparator input B
6	VSS1	Supply voltage
7	VSS2	Supply voltage
8	DATA	Data output
9	DISABLE	Disable
10	CPC	Demodulation output
11	NC	No connection
12	VCC	Supply voltage
13	RSSI	RSSI monitor
14	VIRF	RF amplifier input
15	VEE	ground
16	VORF	RF amplifier output
17	MIXIN	Mixer input
18	VCC	Supply voltage

Electrical Characteristics

Maximum ratings

Rating	Symbol	Value	Unit
Power Supply Voltage	V_{BATT}	6	Vdc
RF Input Power	P_{max}	TBD	dBm
Junction Temperature	T_J	125	℃
Storage Temperature Range	T_{STg}	-55 to 125	℃

Recommended Operating Conditions

Characteristics	Value	Unit
Supply voltage	2.4 - 6	V
RF frequency range	300-440	MHz
Max data rate	10	Kbps

DC Electrical Characteristics

Characteristics	Minimum	Typical	Maximum	Unit
Standby current	5		10	μA
Operating current	3		4.5	mA
Input Current			+/- 1	μA
Input Low Voltage				V
Input High Voltage				V

AC Electrical Characteristics

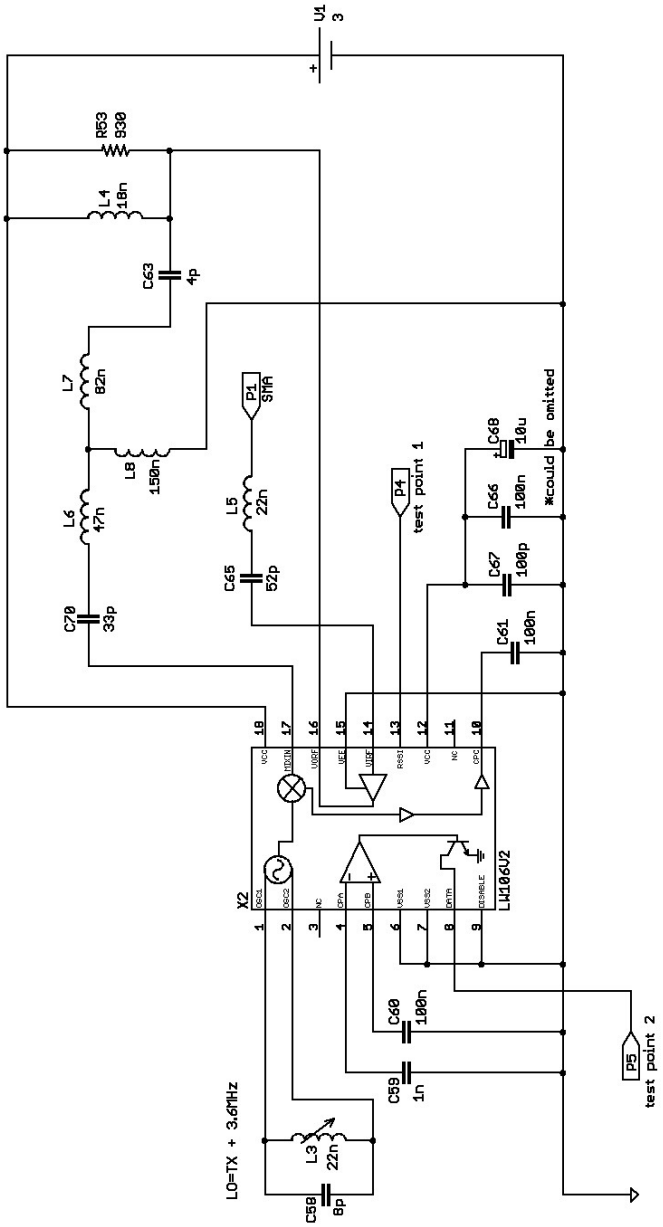
Characteristics	Minimum	Typical	Maximum	Unit
Sensitivity		TBD		dBm
Stabilization time			5	ms

Functional Descriptions

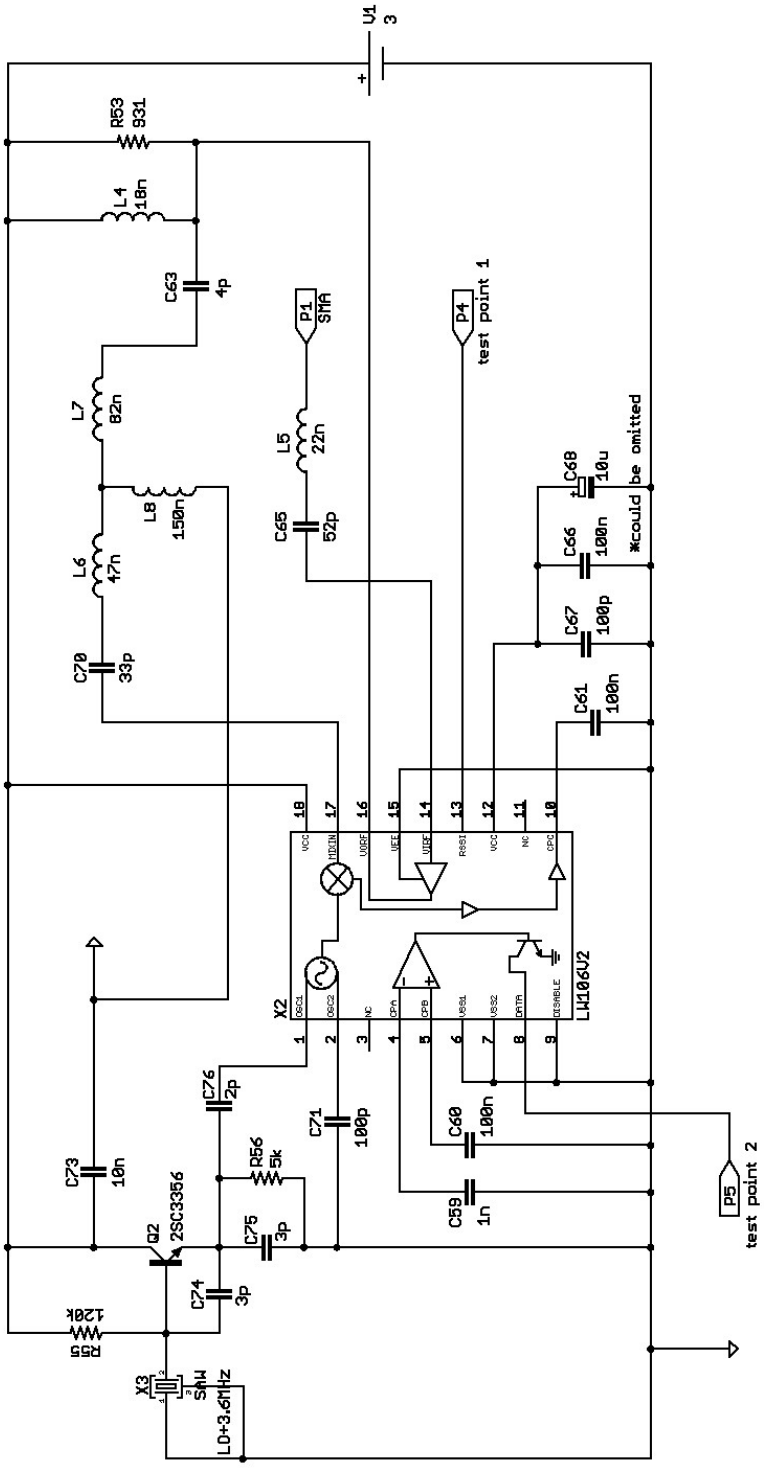
LW106 is a superheterodyne receiver. The signal received from antenna will be down converted to IF frequency of 3.6 MHz. After passing through filter and amplifier stages, the limiter will cut the excess amplification to obtain better shape of "ON" waveform. The output will be passed to a low pass filter in order to filter off the RF carrier. Since on-off keying is used, the waveform will be compared with voltage reference at a data comparator. It will then recover the transmitted "0" and "1" sequence. Besides, a bandgap reference is implemented inside the chip for stable operating conditions over temperature and supply voltage.

Application Example

A. Low-cost configuration using LC resonator



B. Highly stable configuration using SAW resonator



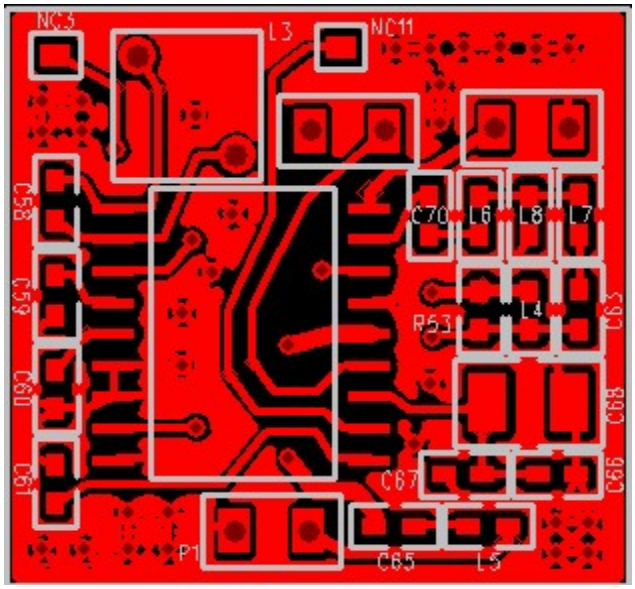
Evaluation Board

- Based on application example A (Low-cost configuration using LC resonator)

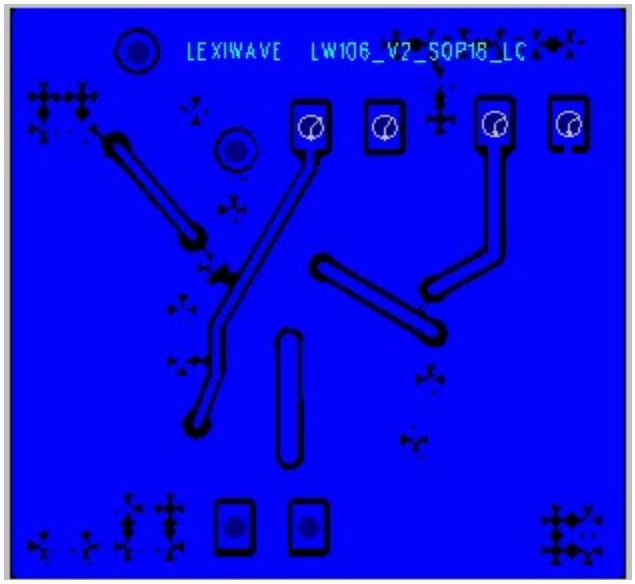
External Components:

Part	Value	Package
C58	8 pF	0603
C59	1 nF	0603
C60	100 nF	0603
C61	100 nF	0603
C63	4 pF	0603
C65	52 pF	0603
C66	100 nF	0603
C67	100 pF	0603
C68	10 uF	1210
C70	33 pF	0603
L4	18 nH	0603
L5	22 nH	0603
L6	47 nH	0603
L7	82 nH	0603
L8	150 nH	0603
R53	930 Ω	0603
L3	22 nH	Variable, 4 T

PCB Layout:



LW106V2-SOP18-LC PCB Top Layer



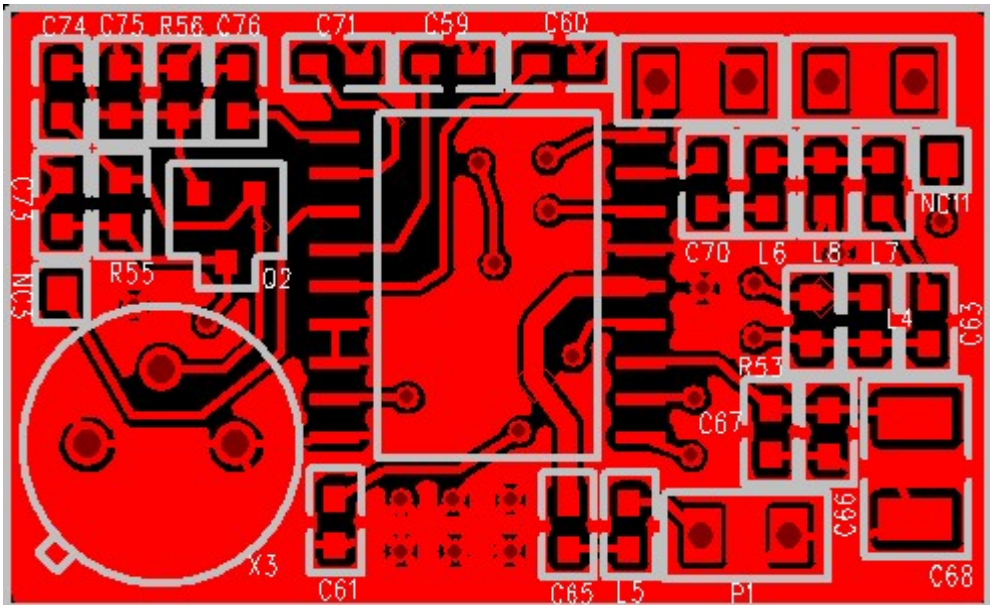
LW106V2-SOP18-LC PCB Bottom Layer

- Based on application example B (Highly stable configuration using SAW resonator)

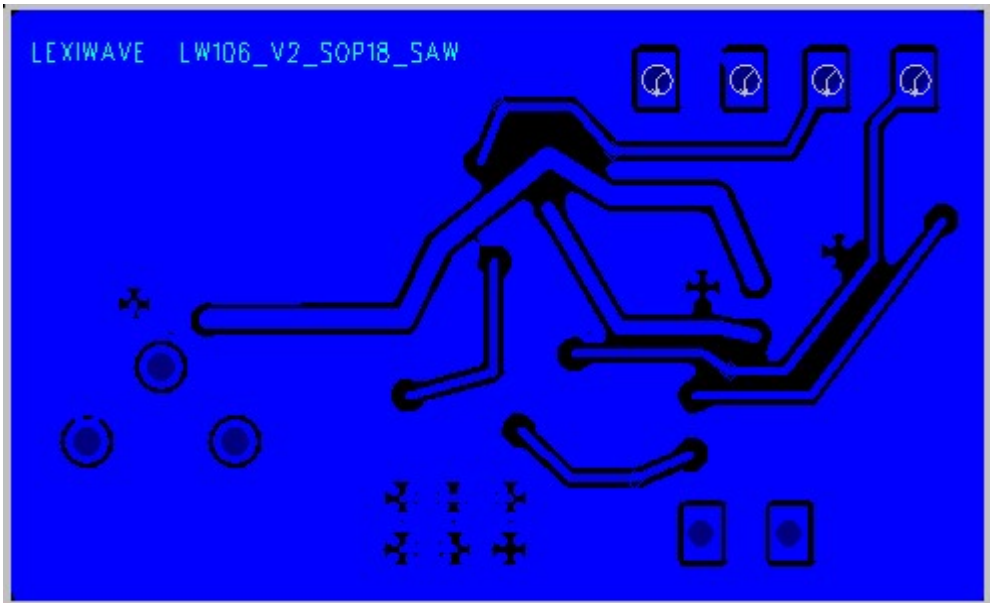
External Components:

Part	Value	Package
C59	1 nF	0603
C60	100 nF	0603
C61	100 nF	0603
C63	4 pF	0603
C65	52 pF	0603
C66	100 nF	0603
C67	100 pF	0603
C68	10 uF	1210
C70	33 pF	0603
C71	100 pF	0603
C73	10 nF	0603
C74	3 pF	0603
C75	3 pF	0603
C76	2 pF	0603
L4	18 nH	0603
L5	22 nH	0603
L6	47 nH	0603
L7	82 nH	0603
L8	150 nH	0603
R53	931 Ω	0603
R55	120 kΩ	0603
R56	5 kΩ	0603
Q2	2SC3356, NEC	SMD
X3	SAW, HDR433M, Mobicon	lead

PCB Layout:



LW106V2-SOP18-SAW PCB Top Layer



LW106V2-SOP18-SAW PCB Bottom Layer