Features

- RF-in to Data-out fully integrated function
- RF OOK demodulation
- Single voltage supply operation of 4.5V to 5.5V
- Symbol rate 5Ksps
- Frequency Band: 300MHz ~ 450MHz
- High sensitivity: -97dBm @ 5V/5Ksps/0.1%BER/315, 433.92MHz
- Operation current consumption 3.5mA
- Integrated low noise amplifier
- Integrated super regenerative oscillator
- Package type: 8-pin SOP-EP

Applications

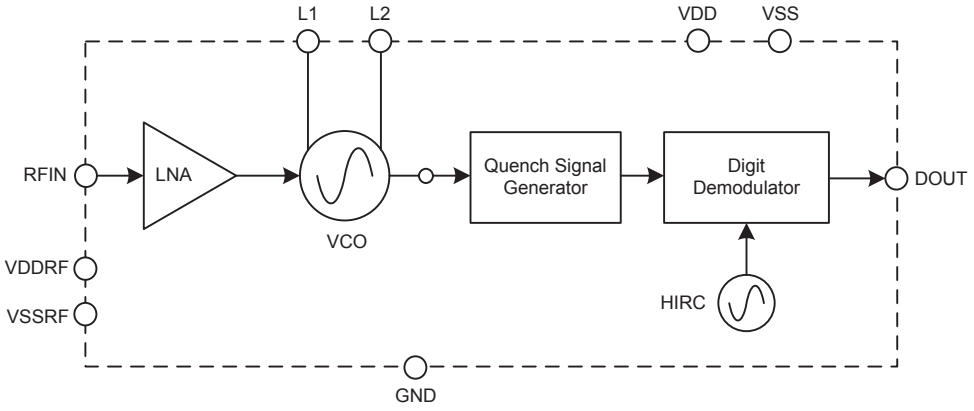
- Personal alarm systems
- Keyless entry systems
- Home appliance control
- Garage door controllers
- Home/office/car security systems
- Other remote control systems

General Description

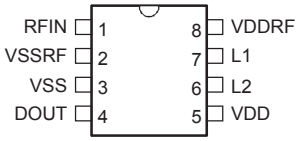
The BC2401 is a single chip OOK (On-Off keyed) RF receiver.

The device will convert this RF input into a digital output signal, making it a genuine RF-in to Data-out integrated device and providing an easy to use solution for UHF receiver implementation. With few external components and low-current power consumption features, it provides an ideal solution for low cost and power-sensitive applications, such as found in the automotive and consumer application area. The device contains a low-noise amplifier, a regenerative circuit, an integrated quench circuit and baseband data-recovery circuitry. The device is available in an 8-pin SOP-EP package type and specified for an extended temperature range of -40°C to +85°C.

Block Diagram



Pin Assignment



BC2401
8 SOP-EP-A

Pin Description

Pin No.	Pin Name	I/O	Description
1	RFIN	AI	RF signal input from antenna
2	VSSRF	PWR	Ground
3	VSS	PWR	Ground
4	DOUT	O	Rx demodulated data output
5	VDD	PWR	Digital positive power supply
6	L2	AI/AO	Local Oscillator – connected to external LC tank
7	LI	AI/AO	Local Oscillator – connected to external LC tank
8	VDDRF	PWR	RF positive power supply
9	GND	PWR	Expose pad

Note: I: Digital Input
O: Digital Output
AI: Analog Input
AO: Analog Output
PWR: Power

Absolute Maximum Ratings

Supply Voltage ..... V_{SS}-0.3V to 6.0V
Storage Temperature ..... 50°C to 125°C
Input Voltage ..... V_{SS}-0.3V to V_{DD}+0.3V
Operating Temperature ..... -40°C to 85°C
ESD HBM ..... ±5kV
RX Input Power 0dBm

Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

D.C. Characteristics

Ta=25°C

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
V_{DD}	Operating voltage	—	—	4.5	5.0	5.5	V
I_{DD}	Operating current	5V	Continuous Operation, f_{RX} = 433.92MHz	—	3.5	—	mA
I_{OH}	DOUT source current	5V	V_{OH} = 0.9V_{DD}	—	-7	—	mA
I_{OL}	DOUT sink current	5V	V_{OL} = 0.1V_{DD}	—	10	—	mA

A.C. Characteristics

Ta=25°C, Freq. band=315/433MHz and R_L=50Ω load matched

Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
		V_{DD}	Conditions				
P_{SENS}	Receiver sensitivity	5V	f_{RX} = 315/433.92MHz, Symbol rate = 5Ksps, BER is 0.1% (PN9 data) Instrument: keysight E4438C	—	-97	—	dBm
t_{ON}	Start-up time	5V	Time for valid signal detection after power on	—	5	—	mS
f_{RX}	Receiver Input Frequency Range	—	—	—	315	—	MHz
				—	433	—	MHz
BW	RX Bandwidth	5V	—	—	1	—	MHz
SR	Symbol Rate	5V	50% duty cycle	—	5	—	Ksps

Functional Description

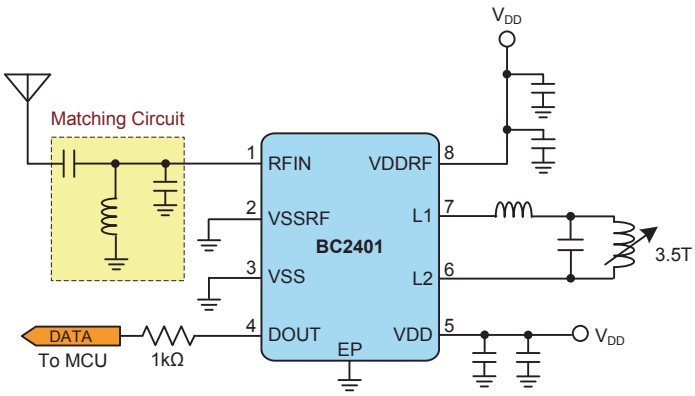
The device is a single chip OOK (ON-OFF Keyed) RF receiver IC. It is in effect a genuine RF antenna-in to digital data-out fully integrated IC. As all the RF and IF circuitry are integrated within the device this results in a huge reduction in the required number of external components. Having such a high degree of functional integration greatly reduces both product and manufacturing costs and provides higher reliability. The simple connection of an antenna, and some tuned LC circuits allows the device to detect RF at its resonant frequency. Then by using an internal low noise amplifier and super-regeneration techniques, the demodulator can generate data on the digital data output pin.

An antenna matching circuit is supplied on the RFIN pin and an LC tank circuit is connected to the L1 and L2 pins to generate the local oscillator frequency. A fully internal high frequency oscillator in the device is used to demodulate the data from the intermediate frequency signal, thus eliminated the need for any further filtering components. The addition of a decoupling capacitor on each of the power is then all that is needed to complete the circuit.

The device is supplied in an 8-pin package making it suitable for applications where space may be limited.

Application Circuits

315MHz Application Circuit



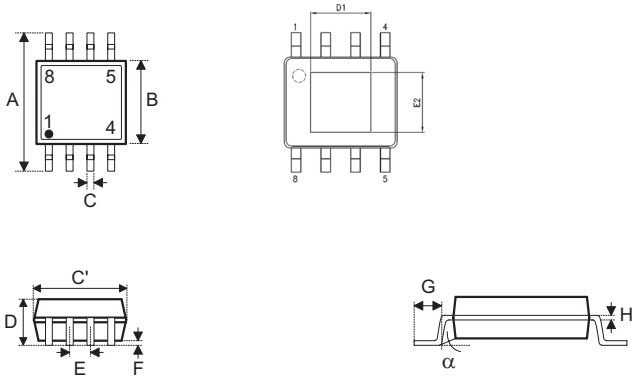
Package Information

Note that the package information provided here is for consultation purposes only. As this information may be updated at regular intervals users are reminded to consult the Holtek website for the latest version of the Package/Carton Information.

Additional supplementary information with regard to packaging is listed below. Click on the relevant section to be transferred to the relevant website page.

- Package Information (include Outline Dimensions, Product Tape and Reel Specifications)
- The Operation Instruction of Packing Materials
- Carton information

8-pin SOP (150mil) Outline Dimensions (Exposed Pad)



Symbol	Dimensions in inch		
	Min.	Nom.	Max.
A	—	0.236 BSC	—
B	—	0.154 BSC	—
C	0.012	—	0.020
C'	—	0.193 BSC	—
D	—	—	0.069
D1	0.059	—	—
E	—	0.050 BSC	—
E2	0.039	—	—
F	0.004	—	0.010
G	0.016	—	0.050
H	0.004	—	0.010
α	0°	—	8°

Symbol	Dimensions in mm		
	Min.	Nom.	Max.
A	—	6.00 BSC	—
B	—	3.90 BSC	—
C	0.31	—	0.51
C'	—	4.90 BSC	—
D	—	—	1.75
D1	1.50	—	—
E	—	1.27 BSC	—
E2	1.00	—	—
F	0.10	—	0.25
G	0.40	—	1.27
H	0.10	—	0.25
α	0°	—	8°