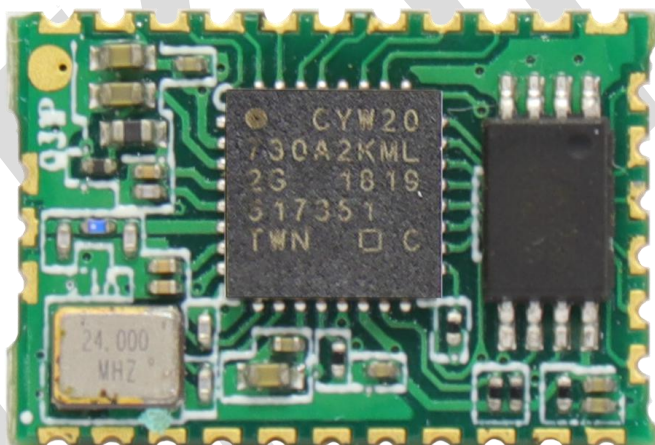


CB1730-Q31P

Bluetooth V5.1 Module



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1. Device Overview

1.1 Features

- Hardware implementation of programmable matrix scanning circuit
- Triaxial quadrature signal decoder
- 3D glasses shutter control
- Infrared signal modulation
- Adaptive frequency hopping
- Excellent sensitivity
- Enhanced control
- Bluetooth HID V1.0 and Bluetooth HID V1.1 Profiles
- Device ID Profile V1.3
- 10-bit ADC

1.2 Applications

- Bluetooth mouse
- Remote control
- Game Controller
- 3D glasses

1.3 Descriptions

The CB1730-Q31P module is built around CYW20730 A2 chipset and was newly certified with the Bluetooth V5.1 specification. The chipset CYW20730 A2 has integrated an ARM® Cortex™-M3 core with up to 48 MHz main frequency, a separate baseband processor, and a 2.4 GHz radio transceiver. The main components of this module include the CYW20730 BT SoC, a 24 MHz crystal, an EEPROM and an external antenna via an RF pin.

This module is highly suitable for Bluetooth mice and other Bluetooth human-computer interaction applications in terms of performance and cost effectiveness. The key features include low power consumption, high stability, the best-in-class interoperability, and fast connection & re-connection.

The CB1730-Q31P module runs the application code above the HCI layer with a rich set of peripheral interfaces including SPI, I2C, UART and the circuitry for programmable matrix scanning.

The module also includes a mouse signal decoder for automatically sampling two orthogonal signals generated by the raster mechanical mouse device, and the decoder can also work with an external analog quadrature signal IC to process a scroll wheel's sampling.

The CB1730-Q31P module provides a 2-wire BSC (Broadcom Serial Communications) interface that can be used to retrieve configuration information from an external EEPROM or to communicate with peripherals such as a trackball, a touchpad, or a motion tracking IC for cursor control.

The module has built-in processing logic for supporting 3D glasses, which can synchronize 3D signals on image devices such like TVs, and drive the charge pump and shutter lenses on and off. This logic runs with the rest of the chip in sleep mode, which greatly reduces power consumption.

1.4 Functional Block Diagram

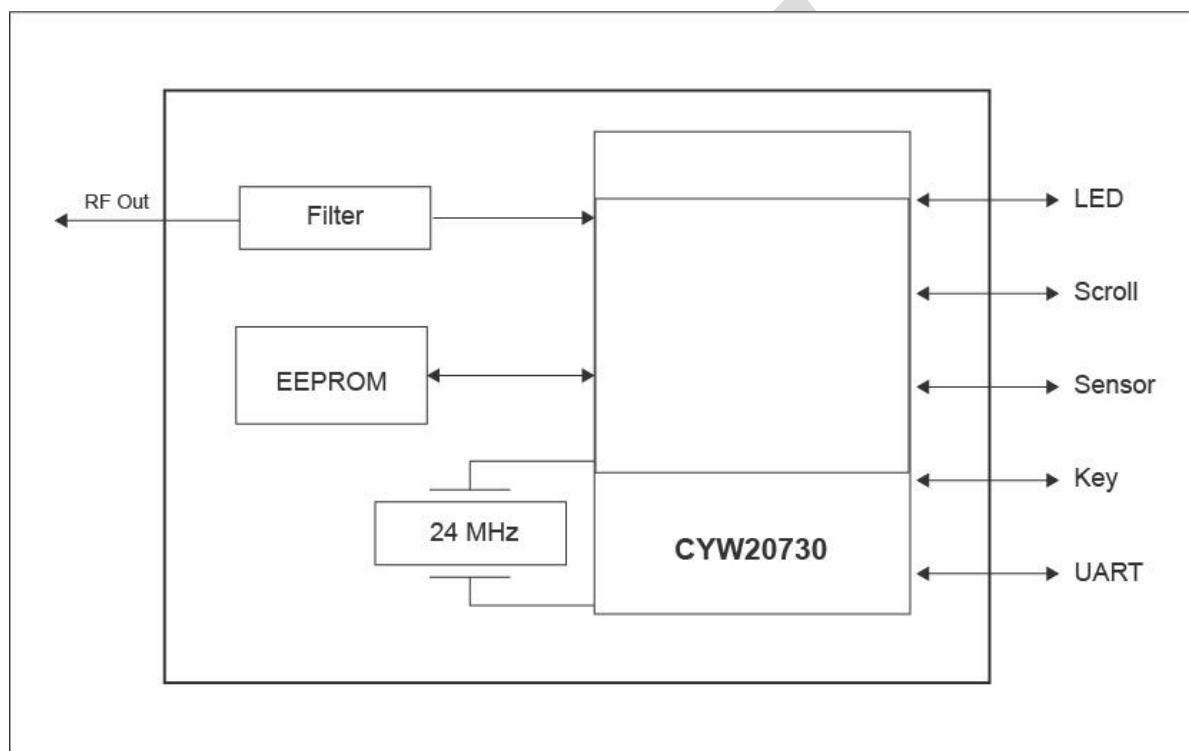


Figure 1. Block Diagram of CB1730-Q31P

2. Pin Configuration and Functions

2.1 Module Pin Diagram

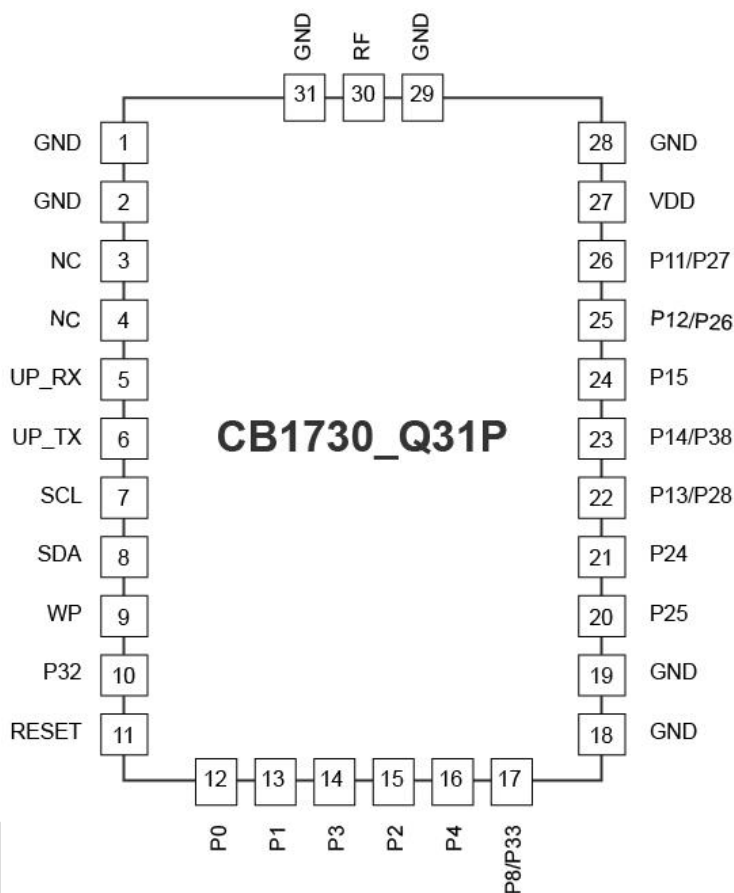


Figure 2. Pin Diagram of CB1730-Q31P

2.2 Pin Functions

Pin	Name	Default Direction	POR State	Description
1,2,18,19,28,29,31	GND	Input	N/A	Ground
3,4	NC	N/A	N/A	Not Connected
5	UP_RX	Input	PD	UART serial input: Serial data input for the HCI UART interface.
6	UP_TX	Output	PU	UART serial output: Serial data output for the HCI UART interface.
7	SCL	Output	PU	Clock signal for an external I2C device
8	SDA	Input/Output	PU	Data signal for an external I2C device
9	WP	Input	PU	EEPROM write protect
10	P32	Input	Floating	GPIO: P32, primary use for EEPROM write protect control
11	RESET	Input	PU	Active-low system reset with open-drain output and internal pull-up resistor.

12	P0	Input	Floating	GPIO: P0, Keyboard scan input (row): KSI0
13	P1	Input	Floating	GPIO: P1, Keyboard scan input (row): KSI1
14	P3	Input	Floating	GPIO: P3, Quadrature: QDX1
15	P2	Input	Floating	GPIO: P2, Quadrature: QDX0
16	P4	Input	Floating	GPIO: P4, SPI_2: MOSI (master and slave)
17	P8/P33	Input	Floating	GPIO: P8, Keyboard scan output (column): KSO0 GPIO: P33, A/D converter input
20	P25	Input	Floating	GPIO: P25, SPI MISO
21	P24	Input	Floating	GPIO: P24, SPI clock
22	P13/P28	Input	Floating	GPIO: P13, Keyboard scan output (column): KSO5 GPIO: P28, Quadrature signal control output QOC0
23	P14/P38	Input	Floating	GPIO: P14/P38, A/D converter input
24	P15	Input	Floating	GPIO: P15, Motion
25	P12/P26	Input	Floating	GPIO: P12, Keyboard scan output (column): KSO4 GPIO: P26, Current: 16mA
26	P11/P27	Input	Floating	GPIO: P11, Keyboard scan output (column): KSO3 GPIO: P27, Current: 16mA
27	VDD	Input	N/A	Power supply
30	RF	Input/Output	N/A	RF antenna port

3. Specifications

3.1 Absolute Maximum Rating

Caution: This module contains static-sensitive components that can be easily damaged if not handled properly. Precautions need to be taken to prevent potential damages.

Parameter	Specification			Unit
	Min.	Typ.	Max.	
VDD	-0.3	3	3.6	V
VIO	-0.3	3	VDD + 0.3	V
Storage Temperature	-40	25	85	°C
Operating Temperature	0	25	70	°C

Model	Tolerance
Human Body Mode (HBM)	2000 V
Charged Device Mode (CDM)	400 V
Machine Mode (MM)	150 V

3.2 Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	V
Power Section					
DC Supply Voltage		1.75	-	3.6	V
Digital Level					
Input Low Voltage	V _{IL}	-	-	0.4	A
Input High Voltage	V _{IH}	0.75 × VDD	-		°C
Output Low Voltage	V _{OL}			0.4	V
Output High Voltage	V _{OH}	VDDO-0.4			V
Temperature					
Operating Temperature		0		70	°C
Storage Temperature		-40		85	°C

3.3 RF Characteristics

Parameters	Mode and Condition	Min.	Typ.	Max.	Unit
Frequency Range	-	2402	-	2480	MHz
RX Sensitivity (Standard)	GFSK, 0.1%BER, 1 Mbps	-	-88	-	dBm
RX Sensitivity (Low Current)	Average current when the device is in the receive state, 100% utilization of available slots.	-	-84	-	dBm
Output Power	-	-6	-	4	dBm
Power Variation	-	-	2	-	dB

3.4 Power Consumption Summary

Operation Mode	Conditions	Min.	Typ.	Max.	Unit
Receiving	Receiver and baseband are both operating, 100% ON.	-	26.6	-	mA
Transmitting	Transmitter and baseband are both operating, 100% On.	-	24 @ 2 dBm 19 @ 0 dBm	-	mA

DM1	Average current when the device is in the transmit state, 100% utilization of available slots.	-	15.2	-	mA
DH1	Average current when the device is in the receiver state, 100% utilization of available slots.	-	16.67	-	mA
Sleep	Internal LPO is in use.	-	28.4	-	μA
HIDOFF	-	-	1.5	-	μA
Sniff Mode 11.25 ms	Slave	-	2.8	-	mA
Sniff Mode 22.5 ms	Slave	-	1.27	-	mA
Sniff Mode 60 ms	Slave	-	750	-	μA
Sniff Mode 100 ms	Slave	-	500	-	μA
Sniff Mode 495 ms	Slave	-	230	-	μA

4. Application, Implementation, and Layout

4.1 Application Diagram

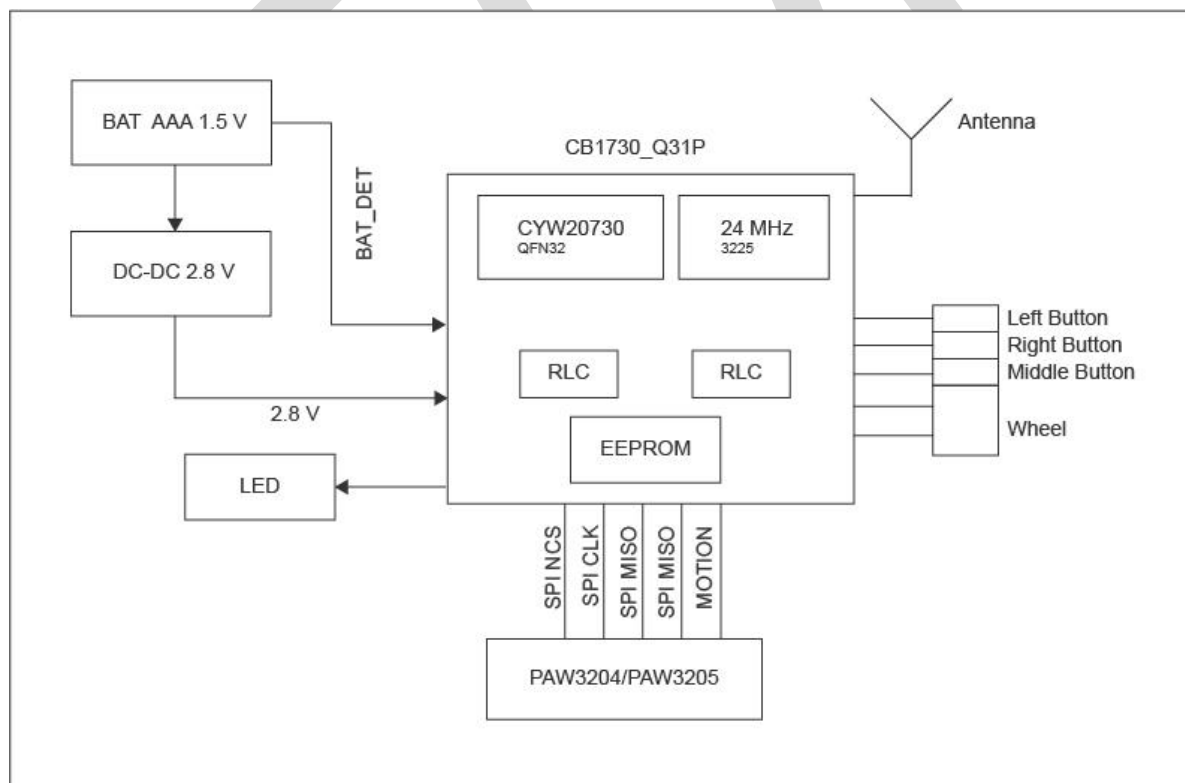


Figure 3. Application Block Diagram of CB1730-Q31P

4.2 Typical Application Circuit

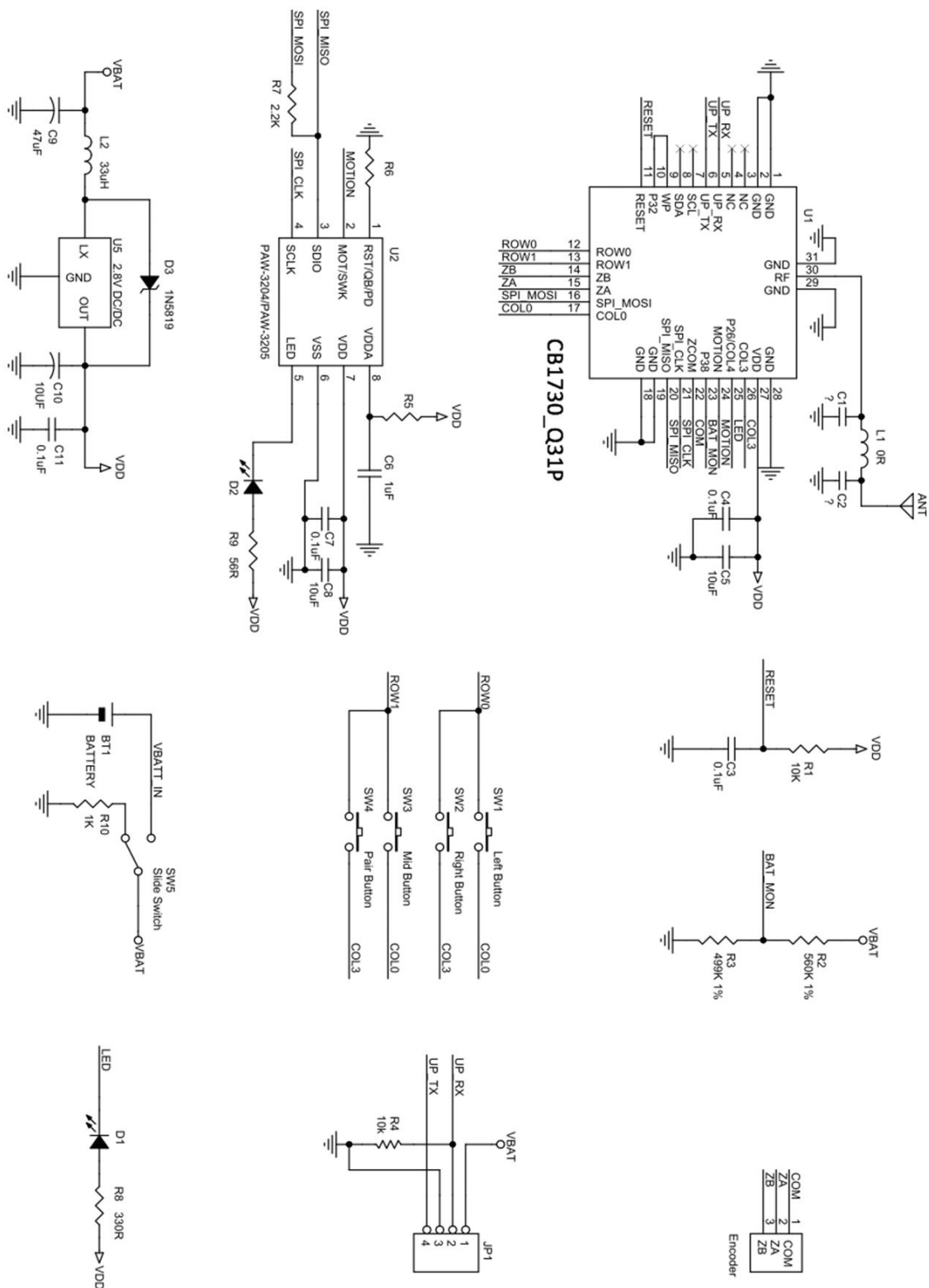


Figure 4. Bluetooth Mouse Schematic Using the Original PAW3204/PAW3205 Optical Sensor

5. Mechanical and Package

5.1 Module Size

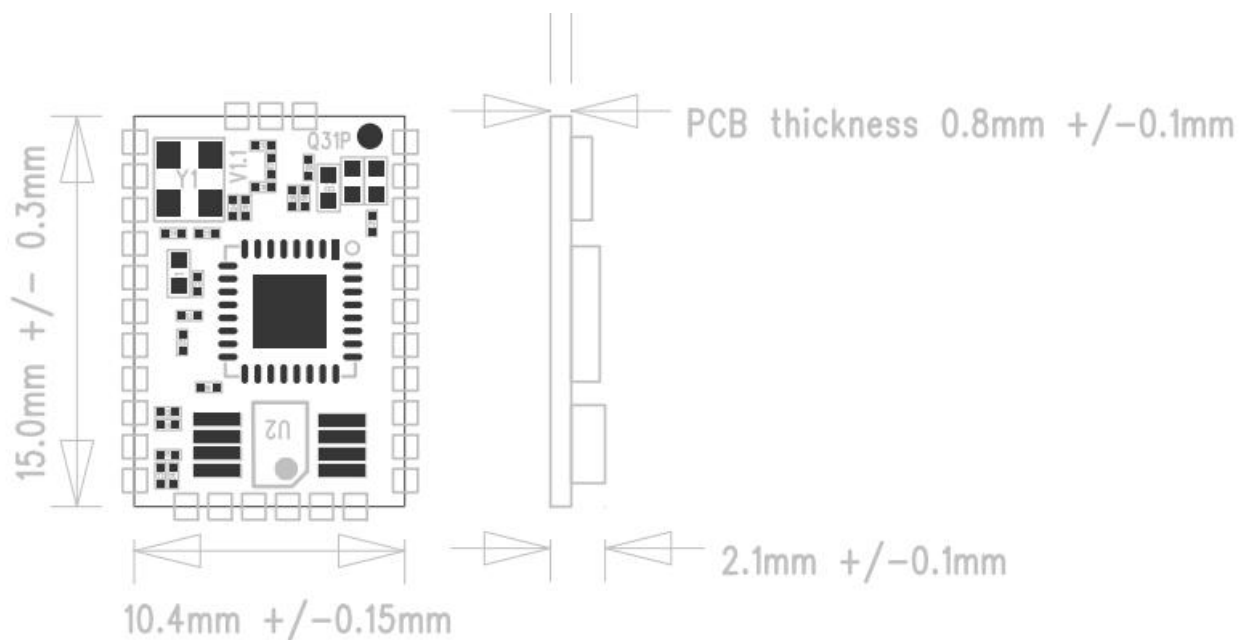


Figure 5. Module Size of CB1730-Q31P

5.2 Recommended PCB Footprint

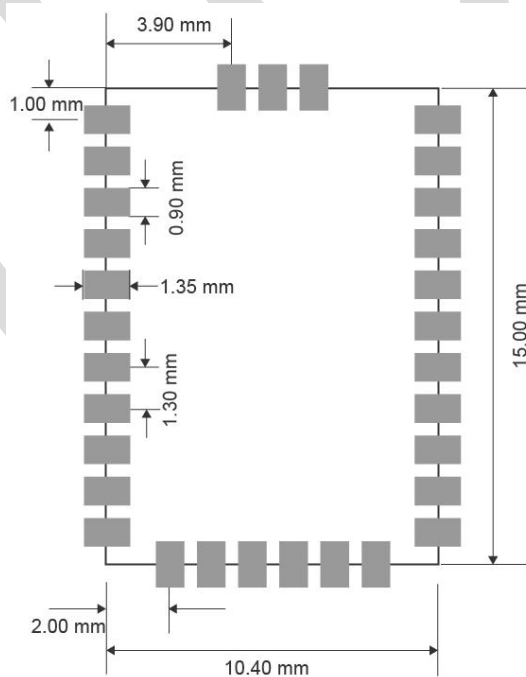


Figure 6. Recommended PCB Footprint of CB1730-Q31P

5.3 Package Information

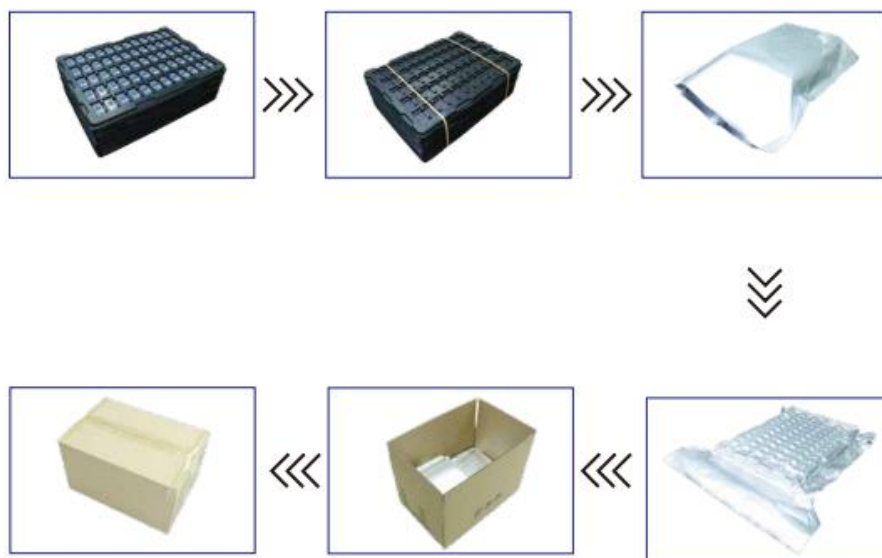


Figure 7. Packaging Information of CB1730-Q31P

6. Thermal Reflow

Referred to IPC/JEDEC standard.

Peak temperature: <250°C

Number of times: ≤2

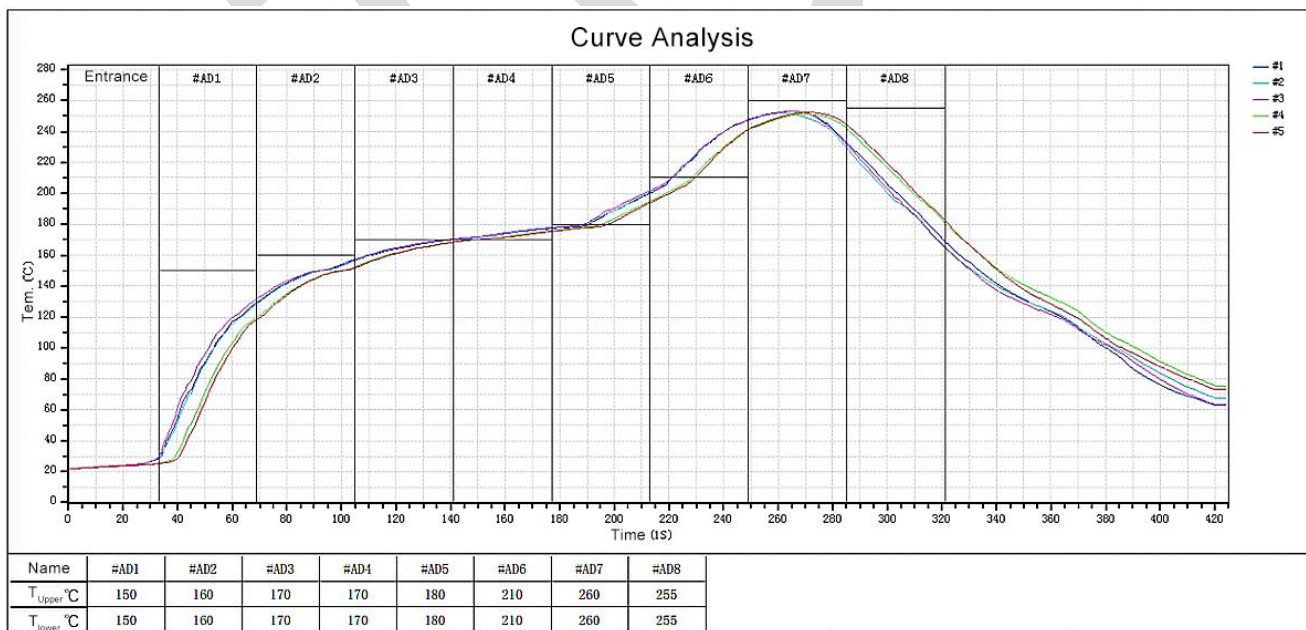


Figure 8. Recommended Reflow for Lead Free Solder

Note: The module is recommended not to go through reflow oven twice..

7. Ordering Information

Part NO.	Working Voltage(VDD)	Operating Temperature	Shielding Cover	Remark
CB1730-Q31P	1.8V-3.6V	0°C--70°C	Not Included	-

8. Revision History

Version	Change Content	Reviser	Date
V1.0	The Draft Version	Bob Li	2017.07.05
V1.1	Modified the Chipset from BCM20730 to CYW20730	Bob Li	2018.08.01
V1.2	Edited the English Version	Bob Li	2019.07.09
V2.0	Added Module Size and Ordering Information	Bob Li	2020.05.12