AC6329C Datasheet

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AC6329C Features

High performance 32-bit RISC CPU

- RISC 32-bit CPU
- DC-96MHz operation
- 73KB data RAM
- 8KB I-cache 2way
- 1KB Rocache 1way
- 64 Vectored interrupts
- 8 Levels interrupt priority

Flexible I/O

- 10 GPIO pins
- All GPIO pins can be programmable as input or output individually
- All GPIO pins are internal pull-up/pull-down selectable individually
- CMOS/TTL level schmitt triggered input
- External wake up/interrupt on all GPIOs

Peripheral Feature

- One Full Speed USB OTG controller
- Four Multi-function 32-bit timers, support capture and PWM mode
- Three full-duplex advanced UART(DMA)
- Three SPI interface supports host and device mode（DMA）
- One IIC interface supports host and device mode
- RTC,with alarm clock and time base to wake up the chip
- 16-bit PWM generator for motor driving
- Three IQ Encoder
- 6 channels 10-bit ADC

- 1 channel 8 levels Low Power Detector
- Embedded PMU support low power mode
- Watchdog
- Power-on reset

Bluetooth Feature

- CMOS single-chip fully-integrated radio and baseband
- Compliant with Bluetooth
- V5.3+BR+EDR+BLE specification
- Bluetooth Piconet and Scatternet support
- Meet class2 and class3 transmitting power requirement
- Support GFSK and $\pi/4$ DQPSK all packet types
- Provides +8dbm transmitting power
- Receiver with -92dBm sensitivity
- Support a2dp\avctp\avdtp\avrcp\hfp\spp\smp\att\gap\gatt\rfcomm\sdp\l2cap profile

Power Supply

- LDOIN is 4.5V to 5.5V
- VBAT is 1.8V to 4.5V
- VDDIO is 1.8V to 3.4V

Packages

- SOP16

Temperature

- Operating temperature: -40°C to +85°C
- Storage temperature: -65°C to +150°C

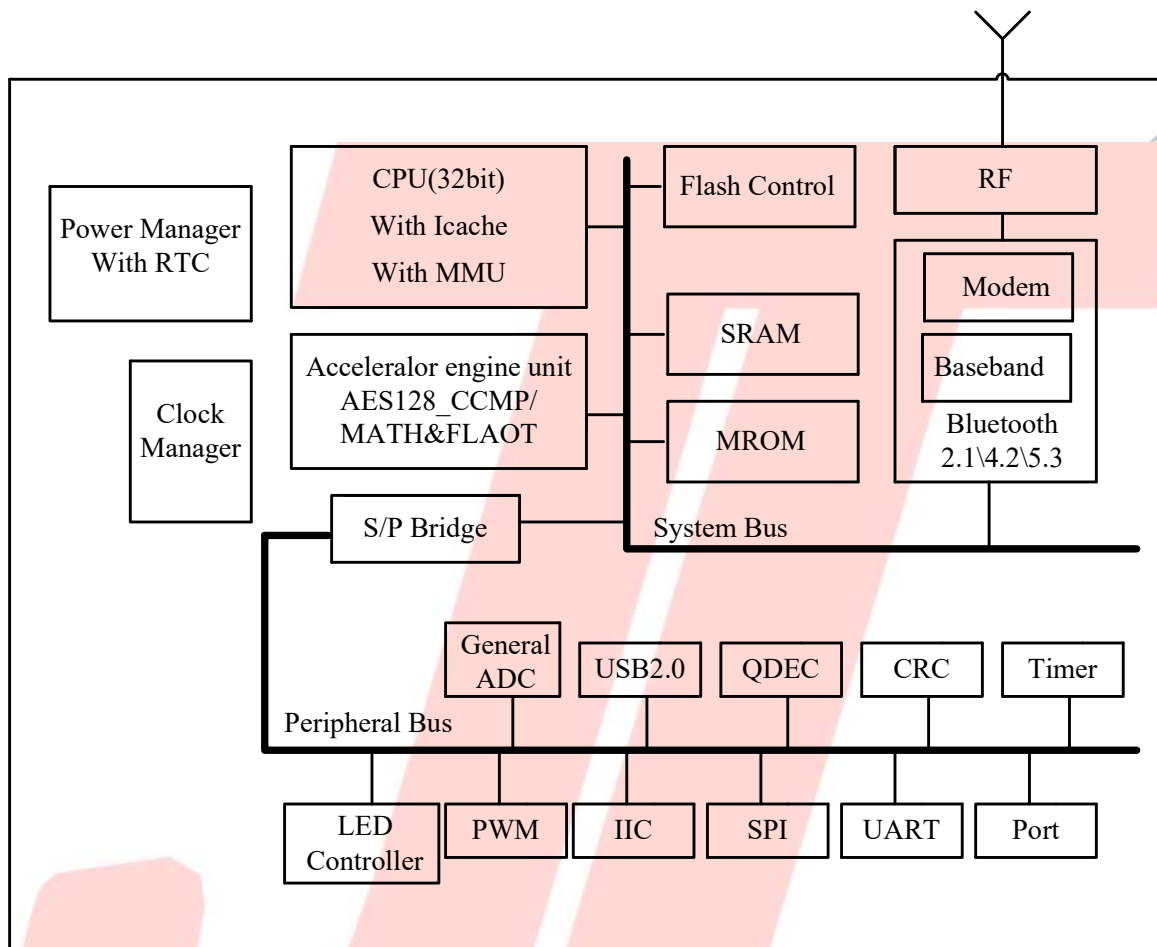# 1. Block Diagram

Figure 1-1   AC6329C_SOP16 Block Diagram

2. Pin Definition

2.1 Pin Assignment

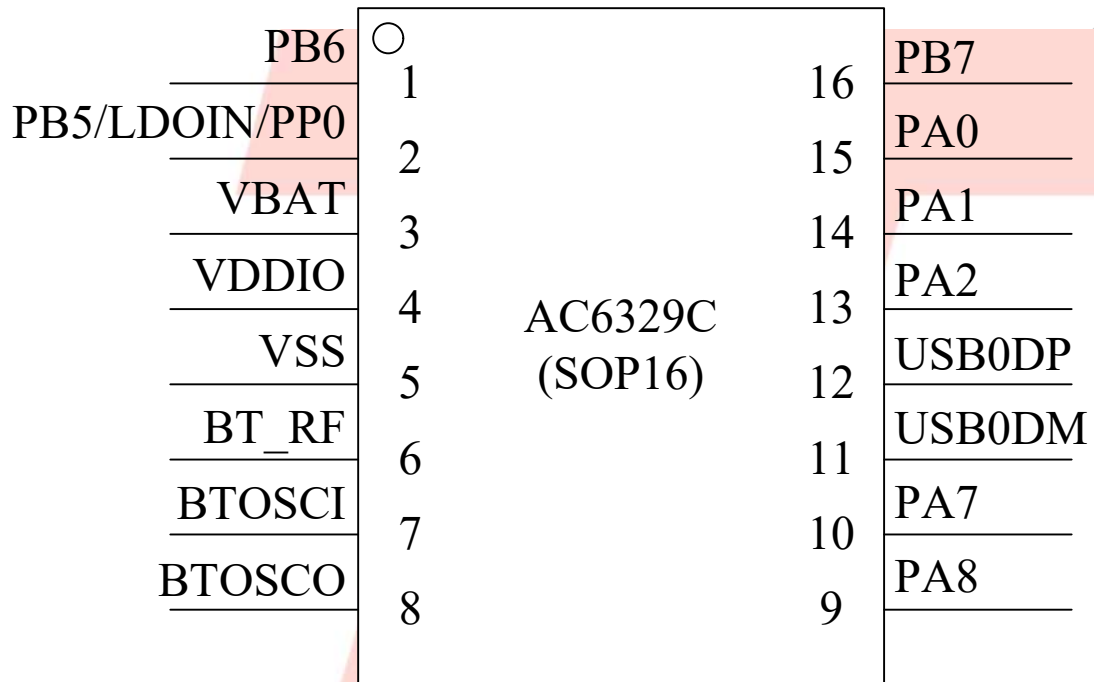**Figure 2-1   AC6329C_SOP16 Package Diagram**

2.2 Pin Description

Table 2-1   AC6329C_SOP16 Pin Description

PIN NO.	Name	I/O Type	Function	Other Function
1	PB6	I/O	GPIO	SPI2_CLKA: SPI2 Clock(A) ; ADC12: ADC Channel 12; UART2_TXC: Uart2 Data Out(C); TMR3CK;
2	PB5	I/O	GPIO (High Voltage)	SPI2_DIA: SPI2 Data In(A); UART1_RXA: Uart1 Data In(A); PWMCH3L;
	LDOIN/PP0	P	Charge Power 5V	PWM3: Timer3 PWM Output; UART0_TXD: Uart0 Data Out(D); UART0_RXD: Uart0 Data In(D);
3	VBAT	P	LDO Power	-
4	VDDIO	P	IO Power 3.3V	-
5	VSS	P	GND	-
6	BT_RF	-	RF Antenna	-
7	BTOSCI	I	BTOSCI	-
8	BTOSCO	O	BTOSCO	-
9	PA8	I/O	GPIO	TMR3: Timer3 Clock In; SPI1_DOA: SPI1 Data Out(A); IIC_SDA_C: IIC SDA(C); ADC4: ADC Channel 4; UART1_RXC: Uart1 Data In(C); PWMCH1L;
10	PA7	I/O	GPIO	TMR1: Timer1 Clock In; SPI1_CLKA: SPI1 Clock(A) ; IIC_SCL_C: IIC SCL(C); ADC3: ADC Channel 3; UART1_TXC: Uart1 Data Out(C); PWMCH1H;
11	USB0DM	I/O	GPIO (pull down)	SPI2_DOB: SPI2 Data Out(B); IIC_SDA_A: IIC SDA(A); ADC11: ADC Channel 11; UART1_RXD: Uart1 Data In(D);

12	USB0DP	I/O	GPIO (pull down)	SPI2_CLKB: SPI2 Clock(B); IIC_SCL_A: IIC SCL(A); ADC10: ADC Channel 10; UART1_TXD: Uart1 Data Out(D);
13	PA2	I/O	GPIO	CAP3: Timer3 Capture; Q-decoder0_1; UART0_RXC: Uart0 Data In(C); UART1_RTS;
14	PA1	I/O	GPIO	PWM0: Timer0 PWM Output; Q-decoder0_0; ADC0: ADC Channel 0; UART0_TXC: Uart0 Data Out(C); UART1_CTS;
15	PA0	I/O	GPIO (High Voltage)	CLKOUT1; UART2_TXB: Uart2 Data Out(B); UART2_RXB: Uart2 Data In(B); PWMCH0H;
16	PB7	I/O	GPIO (High Voltage)	SPI2_DOA: SPI2 Data Out(A); UART2_RXC: Uart2 Data In(C);

3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3-1

Symbol	Parameter	Min	Max	Unit
Topt	Operating temperature	-40	+85	°C
Tstg	Storage temperature	-65	+150	°C
VBAT	Supply Voltage	-0.3	4.5	V
LDOIN	Charge Input Voltage	-0.3	6	V
VDDIO	3.3V IO Input Voltage	-0.3	3.6	V

Note : The chip can be damaged by any stress in excess of the absolute maximum ratings listed below

3.2 Recommended Operating Conditions

Table 3-2

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
VBAT	Voltage Input	1.8	3.7	4.5	V	_
LDOIN	Voltage Input	4.5	5.0	5.5	V	_
VDDIO	Voltage output	1.8	3.0	3.4	V	VBAT= 4.2V, 60mA loading
BTAVDD	Voltage output	1	1.3	1.4	V	DC-DC mode: 40mA loading
I_{VDDIO}	Loading current	_	_	60	mA	VBAT = 4.2V

3.3 Battery Charge

Table 3-3

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
LDOIN	Charge Input Voltage	4.5	5	5.5	V	_
V_{Charge}	Charge Voltage	4.15	4.2	4.25	V	_
I_{Charge}	Charge Current	20		200	mA	Charge current at fast charge mode
I_{Trikl}	Trickle Charge Current	20	45	70	mA	$V_{BAT} < V_{Trikl}$

3.4 IO Input/Output Electrical Logical Characteristics

Table 3-4

IO input characteristics						
Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
V_{IL}	Low-Level Input Voltage	-0.3	–	0.3* VDDIO	V	VDDIO = 3.3V
V_{IH}	High-Level Input Voltage	0.7* VDDIO	–	VDDIO+0.3	V	VDDIO = 3.3V
IO output characteristics						
V_{OL}	Low-Level Output Voltage	–	–	0.33	V	VDDIO = 3.3V
V_{OH}	High-Level Output Voltage	2.7	–	–	V	VDDIO = 3.3V

3.5 Internal Resistor Characteristics

Table 3-5

Port	Drive Strength	Internal Pull-Up Resistor	Internal Pull-Down Resistor	Comment
PA1-PA9, PB6,	drive_select[11] 24mA drive_select[10] 24mA (with 120ohm res) drive_select[01] 8mA drive_select[00] 8mA (with 120ohm res)	10K	10K	1. USB0DM&USB0DP default pull down 2. Internal pull-up/pull-down resistance | accuracy ±20% 5.PA0,PB5,PB7 can pull-up resistance to 5V
PA0,PB5, PB7,	8mA	10K	10K	
USB0DP	4mA	1.5K	15K	
USB0DM	4mA	180K	15K	

3.6 BT Characteristics

3.6.1 Transmitter

Basic Data Rate   Table 3-6

Parameter		Min	Typ	Max	Unit	Test Conditions
RF Transmit Power			4	6	dBm	25℃, Power Supply VBAT=5V 2441MHz
RF Power Control Range			20		dB	
20dB Bandwidth			950		KHz	
Adjacent Channel Transmit Power	+2MHz		-40		dBm	
	-2MHz		-38		dBm	
	+3MHz		-44		dBm	
	-3MHz		-35		dBm	

Enhanced Data Rate   Table 3-7

Parameter		Min	Typ	Max	Unit	Test Conditions
Relative Power			-1		dB	25℃, Power Supply VBAT=5V 2441MHz
π/4 DQPSK Modulation Accuracy	DEVM RMS		7		%	
	DEVM 99%		12		%	
	DEVM Peak		17		%	
Adjacent Channel Transmit Power	+2MHz		-40		dBm	
	-2MHz		-38		dBm	
	+3MHz		-44		dBm	
	-3MHz		-35		dBm	

3.6.2 Receiver

Basic Data Rate   Table 3-8

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity			-92		dBm	25℃, Power Supply VBAT=5V 2441MHz
Co-channel Interference Rejection			-9		dB	
Adjacent Channel Interference Rejection	+1MHz		+5		dB	
	-1MHz		+2		dB	
	+2MHz		+37		dB	
	-2MHz		+36		dB	
	+3MHz		+40		dB	
	-3MHz		+35		dB	

Enhanced Data Rate   Table 3-9

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity			-92		dBm	25℃, Power Supply VBAT=5V 2441MHz
Co-channel Interference Rejection			-9		dB	
Adjacent Channel Interference Rejection	+1MHz		+5		dB	
	-1MHz		+2		dB	
	+2MHz		+37		dB	
	-2MHz		+36		dB	
	+3MHz		+40		dB	
	-3MHz		+35		dB	

4. Package Information

4.1 SOP16(4mm*4mm)

SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.47
b1	0.38	0.41	0.44
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	9.80	9.90	10.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
h	0.25	—	0.50
L	0.50	—	0.80
L1	1.05REF		
θ	0	—	8°
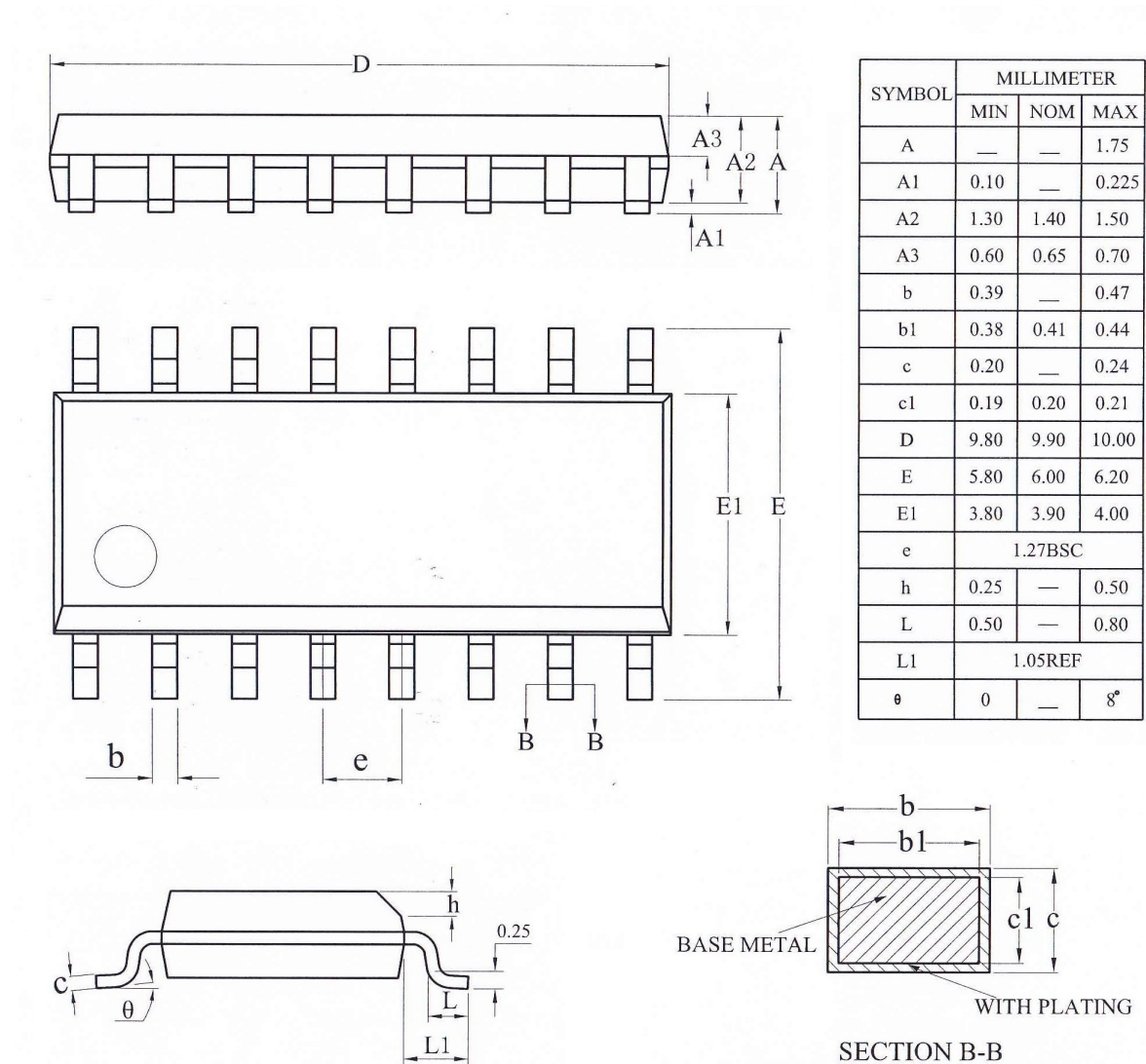
Figure 4-1   AC6329C_SOP16 Package

5. Package Type Specification

AC6329C4
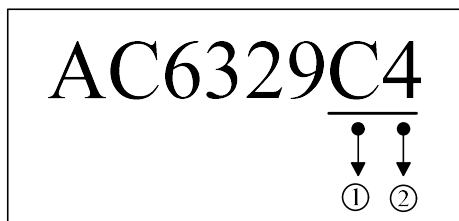
①Represents different packages

②Represents different memory sizes

    2: 2Mbit Flash

    4: 4Mbit Flash

6. Revision History

Date	Revision	Description
2021.03.17	V1.0	Initial Release
2022.05.30	V1.0	Update Bluetooth specification