AC6329E Datasheet

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Version：V1.3

Date：2023.12.13

AC6329E 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

- 11 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)
- One 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 IO Encoder
- 5 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 V5.4+BR+EDR+BLE specification
- Bluetooth Piconet and Scatternet support
- Meet class2 and class3 transmitting power requirement
- Support GFSK and π/4 DQPSK all packet types
- Maximum +8dBm transmitting power
- EDR receiver with -93dBm sensitivity
- Support a2dp\avctp\avdtp\avrcp\hfp\spp\smp\att\gap\gatt\rfcomm\sdp\l2cap profile

Power Supply

- VDDIO is 1.8V to 3.4V

Packages

- SOP16

Temperature

- Operating temperature: -40℃ to +85℃
- Storage temperature: -65℃ to +150℃

1. Block Diagram

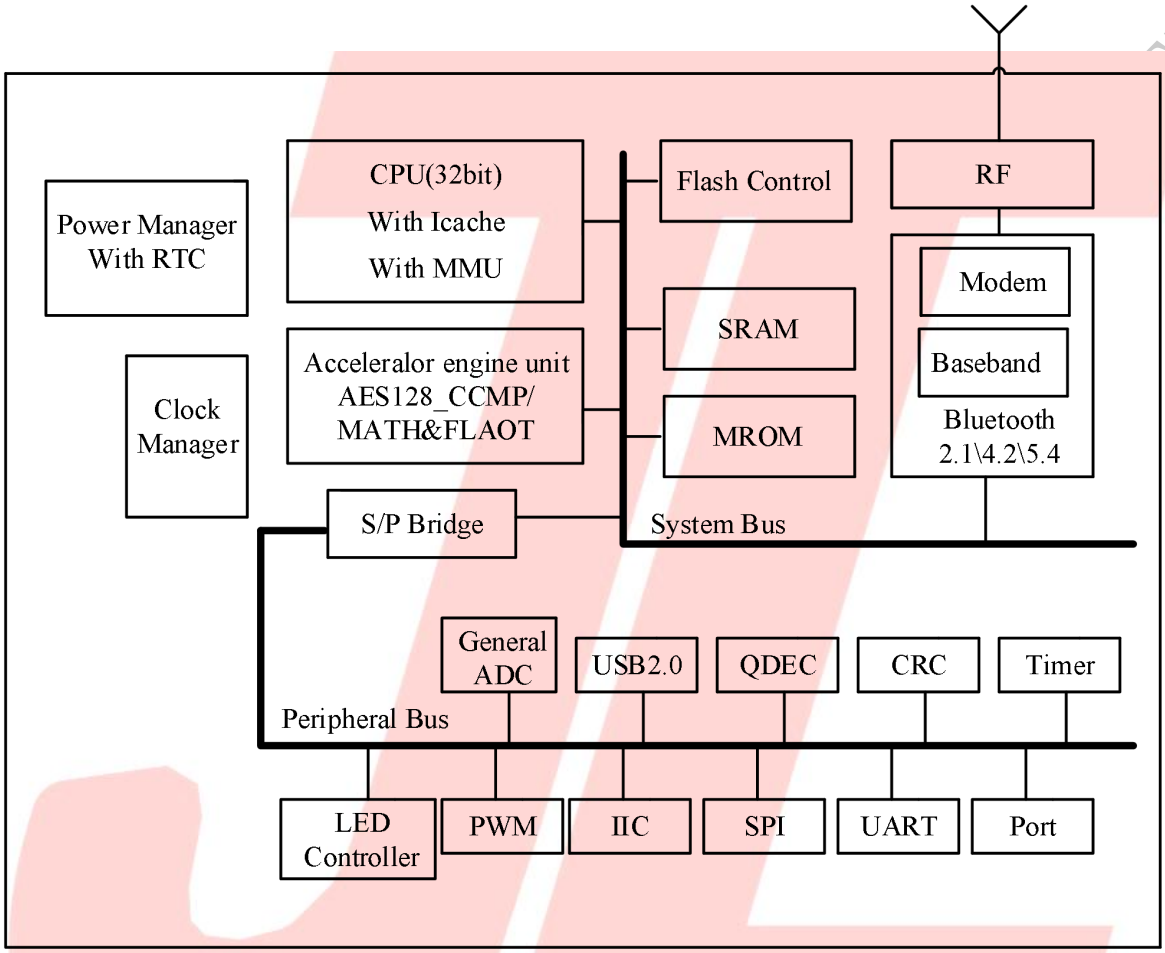


Figure 1-1 AC6329E_SOP16 Block Diagram

2. Pin Definition

2.1 Pin Assignment

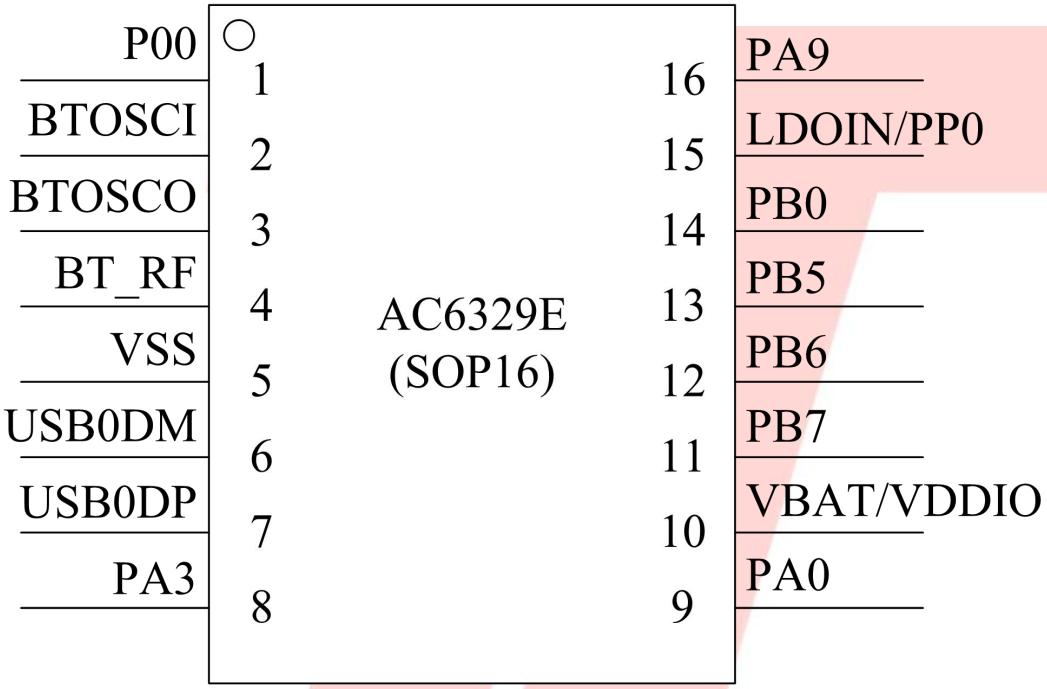


Figure 2-1 AC6329E_SOP16 Package Diagram

2.2 Pin Description

Table 2-1 AC6329E_SOP16 Pin Description

PIN NO.	Name	I/O Type	Function	Other Function
1	P00	I/O	GPIO (High Voltage)	
2	BTOSCI	I	BTOSCI	-
3	BTOSCO	O	BTOSCO	-
4	BT_RF	-	RF Antenna	-
5	VSS	P	GND	-
6	USB0DM	I/O	GPIO (pull down)	IIC_SDA_A: IIC SDA(A); ADC11: ADC Channel 11; UART1_RXD: Uart1 Data In(D);
7	USB0DP	I/O	GPIO (pull down)	IIC_SCL_A: IIC SCL(A); ADC10: ADC Channel 10; UART1_TXD: Uart1 Data Out(D);
8	PA3	I/O	GPIO	CAP2: Timer2 Capture; IIC_SCL_D: IIC SCL(D); ADC1: ADC Channel 1; UART2_TXA: Uart2 Data Out(A); PWMCH0L;
9	PA0	I/O	GPIO (High Voltage)	CLKOUT1; UART2_TXB: Uart2 Data Out(B); UART2_RXB: Uart2 Data In(B); PWMCH0H;
10	VBAT	P	LDO Power	-
	VDDIO	P	IO Power 3.3V	-
11	PB7	I/O	GPIO (High Voltage)	SPI2_DOA: SPI2 Data Out(A); UART2_RXC: Uart2 Data In(C);
12	PB6	I/O	GPIO	SPI2_CLKA: SPI2 Clock(A) ; ADC12: ADC Channel 12; UART2_TXC: Uart2 Data Out(C); TMR3CK;
13	PB5	I/O	GPIO (High Voltage)	SPI2_DIA: SPI2 Data In(A); UART1_RXA: Uart1 Data In(A); PWMCH3L;

14	PB0	I/O	GPIO (High Voltage)	CLKOUT0; UART1_TXB: Uart1 Data Out(B); TMR2CK;
15	LDOIN/PP0	P	Charge Power 5V	PWM3: Timer3 PWM Output; UART0_TXD: Uart0 Data Out(D); UART0_RXD: Uart0 Data In(D);
16	PA9	I/O	GPIO (pull up)	Long Press Reset; ADC8: ADC Channel 8;

3. Electrical Characteristics

3.1 Absolute Maximum Ratings

Table 3-1

Symbol	Parameter	Min	Max	Unit
Topt	Operating temperature	-40	+85	℃
Tstg	Storage temperature	-65	+150	℃
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
LDOIN	Voltage Input	4.5	5.0	5.5	V	_
VDDIO	Voltage Input	1.8	3.0	3.4	V	
I_{VDDIO}	Loading current	_	_	60	mA	

3.3 IO Input/Output Electrical Logical Characteristics

Table 3-3

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

3.4 Internal Resistor Characteristics

Table 3-4

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. PA9 default pull up 2. USB0DM&USB0DP default pull down 3. Internal pull-up/pull-down resistance | accuracy ±20% 4. PA0,PB0,PB5,PB7,P00,PP0 can pull-up resistance to 5V
PA0,PB0, PB5,PB7, P00,PP0	8mA	10K	10K	
USB0DP	4mA	1.5K	15K	
USB0DM	4mA	180K	15K	

3.5 BT Characteristics

3.5.1 Transmitter

Basic Rate **Table 3-5**

Parameter		Min	Typ	Max	Unit	Test Conditions
RF Transmit Power		-	4	6	dBm	25℃, Power Supply VBAT=3.7V 2441MHz DH5
RF Power Control Range		-	20	-	dB	
20dB Bandwidth		-	950	-	KHz	
In-band spurious Emissions (BQB Test Mode RF_Tx Power=4dBm)	$F=F_0\pm1MHz$	-	-20	-	dBm	
	$F=F_0\pm2MHz$	-	-45	-	dBm	
	$F=F_0\pm3MHz$	-	-35	-	dBm	
	$F=F_0\pm>3MHz$	-	-40	-	dBm	

Enhanced Data Rate **Table 3-6**

Parameter		Min	Typ	Max	Unit	Test Conditions
Relative Power		-	-1	-	dB	25℃, Power Supply VBAT=3.7V 2441MHz 2DH5
π/4 DQPSK Modulation Accuracy	DEVM RMS	-	4	-	%	
	DEVM 99%	-	12	-	%	
	DEVM Peak	-	9	-	%	
In-band spurious Emissions (BQB Test Mode RF_Tx Power=4dBm)	$F=F_0\pm1MHz$	-	-4	-	dBm	
	$F=F_0\pm2MHz$	-	-30	-	dBm	
	$F=F_0\pm3MHz$	-	-30	-	dBm	
	$F=F_0\pm>3MHz$	-	-37	-	dBm	

3.5.2 Receiver

Basic Rate Table 3-7

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity		-	-91	-	dBm	25℃, Power Supply VBAT=3.7V 2441MHz DH5
Co-channel Interference Rejection		-	6	-	dB	
Adjacent Channel selectivity C/I	+1MHz	-	-7	-	dB	
	-1MHz	-	-7	-	dB	
	+2MHz	-	-37	-	dB	
	-2MHz	-	-39	-	dB	
	+3MHz	-	-32	-	dB	
	-3MHz	-	-43	-	dB	

Enhanced Data Rate Table 3-8

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity		-	-93	-	dBm	25℃, Power Supply VBAT=3.7V 2441MHz 2DH5
Co-channel Interference Rejection		-	8	-	dB	
Adjacent Channel selectivity C/I	+1MHz	-	-14	-	dB	
	-1MHz	-	-15	-	dB	
	+2MHz	-	-36	-	dB	
	-2MHz	-	-39	-	dB	
	+3MHz	-	-29	-	dB	
	-3MHz	-	-43	-	dB	

3.5.3 BLE

1M Data Rate **Table 3-9**

Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity		-	-95	-	dBm	25℃ Power Supply VBAT=3.7V 2440MHz
RF Transmit Power		-	6.5	8	dBm	
In-band Spurious Emission	|M-N|=2MHz	-	-35	-	dBm	
	|M-N|≥3MHz	-	-33	-	dBm	
Modulation Characteristics	Δf1 avg	-	250	-	KHz	
	Δf2 99%	-	210	-	KHz	
	Δf1avg/Δf2avg	-	0.9	-	/	
Carrier Frequency Offset		-15	-	+15	KHz	
Frequency Drift		-25	-	+25	KHz	
Frequency Drift Rate		-5	-	+5	KHz/50us	

2M Data Rate **Table 3-10**

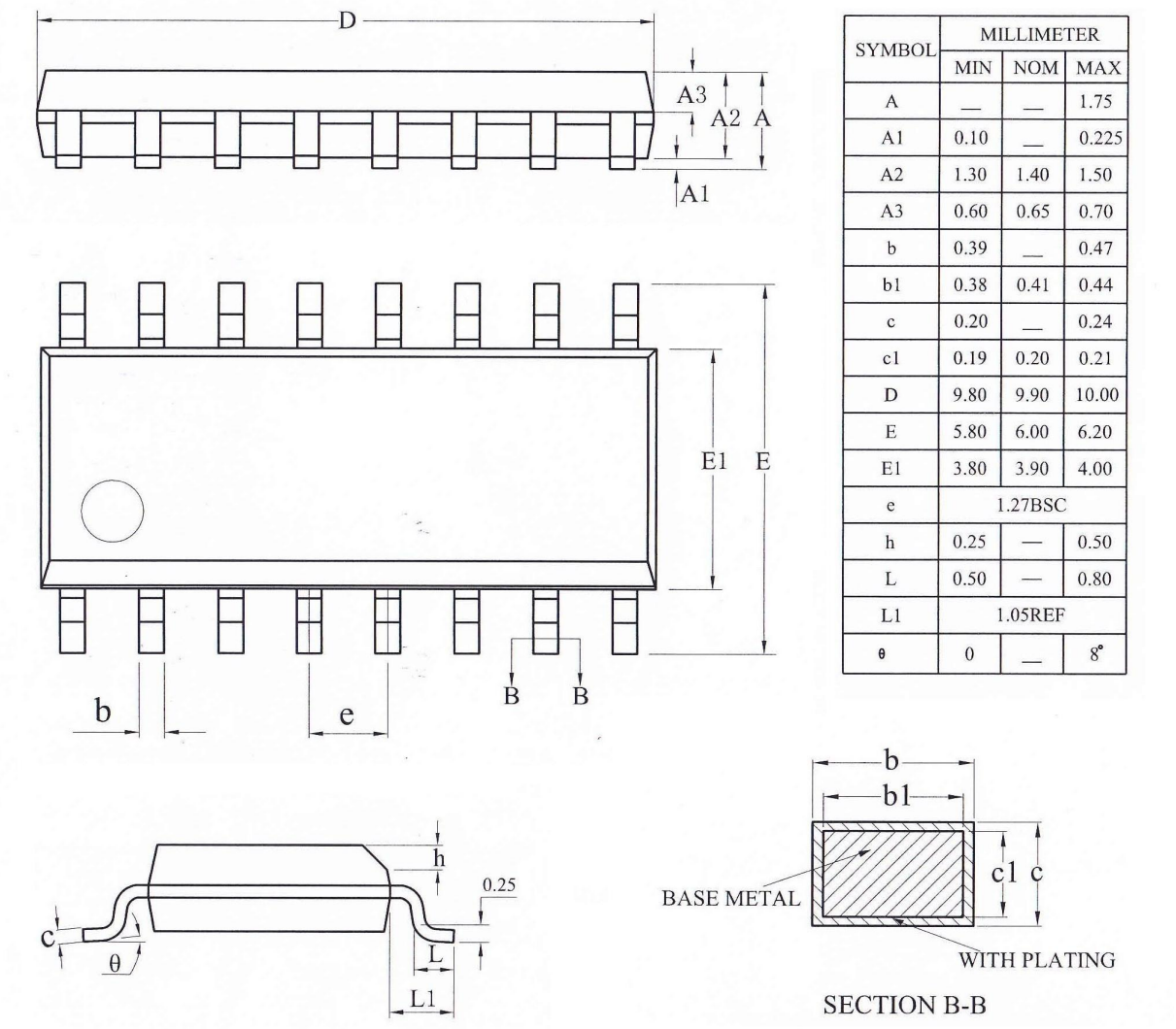
Parameter		Min	Typ	Max	Unit	Test Conditions
Sensitivity		-	-92	-	dBm	25℃ Power Supply VBAT=3.7V 2440MHz
RF Transmit Power		-	6.5	8	dBm	
In-band Spurious Emission	|M-N|=4MHz	-	-40	-	dBm	
	|M-N|=5MHz	-	-40	-	dBm	
	|M-N|≥6MHz	-	-40	-	dBm	
Modulation Characteristics	Δf1 avg	-	500	-	KHz	
	Δf2 99%	-	430	-	KHz	
	Δf1avg/Δf2avg	-	0.9	-	/	
Carrier Frequency Offset		-20	-	+20	KHz	
Frequency Drift		-25	-	+25	KHz	
Frequency Drift Rate		-5	-	+5	KHz/50us	

Long Range **Table 3-11**

Parameter	Min	Typ	Max	Unit	Test Conditions
Sensitivity LE 125K(S8)	-	-102	-	dBm	VBAT=3.7V,25℃ 2440MHz
Sensitivity LE 500K(S2)	-	-99	-	dBm	

4. Package Information

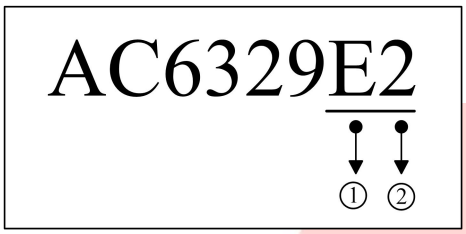
4.1 SOP16(9.9mm*6mm)



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 AC6329E_SOP16 Package

5. Package Type Specification



①Represents different packages

②Represents different memory sizes

2: 2Mbit Flash

6. Revision History

Date	Revision	Description
2021.03.18	V1.0	Initial Release
2022.07.19	V1.1	Update Bluetooth Feature
2023.11.28	V1.2	Add BLE parameter
2023.12.13	V1.3	Update Bluetooth Feature