AD152A Datasheet

Zhuhai Jieli Technology Co.,LTD

Version：V1.2

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AD152A Features

CPU Core

- 32-bit CPU,Built-in ICACH, can be connected to Flash for expansion of code
- The main frequency is up to 120MHz

Memory

- Built-in Nor Flash memory

Clock Source

- RC Clock frequency about 16MHz
- LRC(low power RC) clock frequency about 200KHz

Digital I/O

- Up to 13 programmable digital I/O pins
- General the IO supports pull-up(10k),pull-down(60k), strong,weak output,input and high impedance
- Up to 12 external interrupt/wake-up source(low power available,can be multiplexed to any I/O, with hardware filter)
- Input channel and Output channel, provide arbitrary IO input and output options for some modules

Digital peripherals

- Two UART Controllers(UART0/1) supports DMA and Flow Control
- Two SPI Controllers with DMA(SPI0/1) support master mode and slave mode
- Built-in Spi Flash to run code
- One SD host controller
- Three 32-bit Asynchronous Divider Timers
- One IIC Controller
- Four channel PWM output
- Infrared remote control decoder
- Watchdog

Analog Peripherals

- 0.5 watt Class-D audio amplifier output
- 10-bit high precision ADC
- Low voltage protection
- Power on reset

Operating Conditions

- Working voltage
  VBAT: 2.0v - 5.5v
  VDDIO: 2.0v - 3.4v
- Operating Temperature: -40°C to +85°C

Package

- SOP16

Application

- Sound Toy
- Audio player

1 Pin Definition

1.1 Pin Assignment

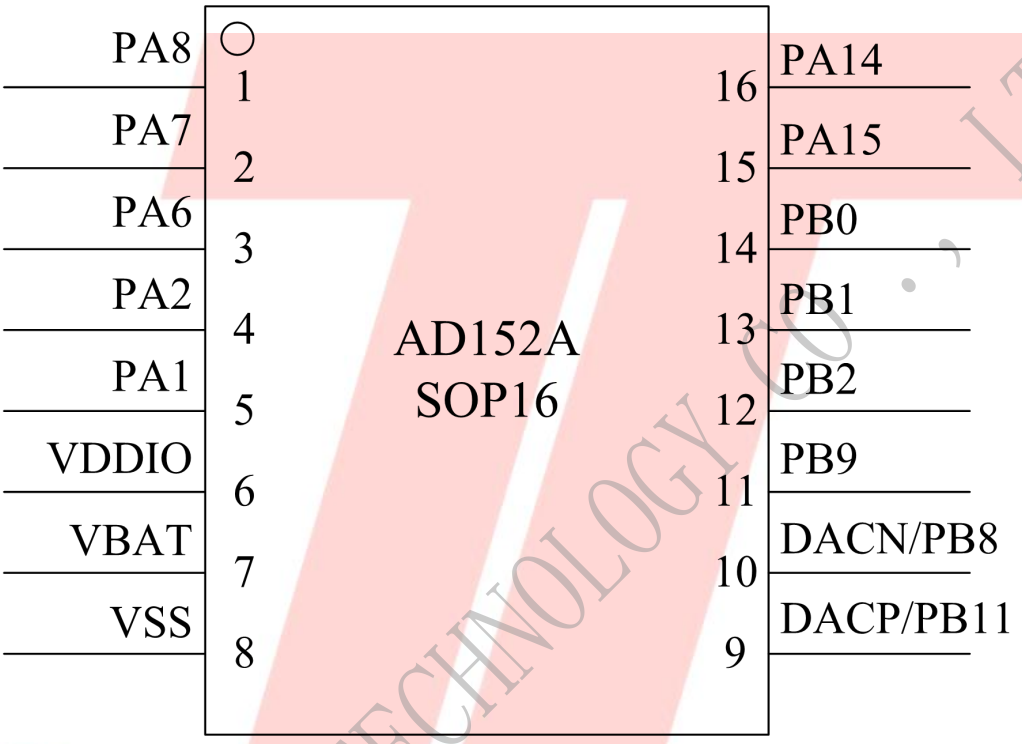


Figure 1-1 AD152A_SOP16 Package Diagram

1.2 Pin Description

Table 1-1 AD152A_SOP16 Pin Description

PIN NO.	Name	Type	Drive (mA)	Function	Description
1	PA8	I/O	8/64	GPIO	SPI1DIC:SPI1 Data In(C); SD0DATD:SD0 Data(D);
2	PA7	I/O	8/64	GPIO	ADC7:ADC Input Channel 7; SPI1DOC:SPI1 Data Out(C); SD0CMDD:SD0 Command(D); UART0RXA:Uart0 Data In(A); I2C_SDA(C); PWM1:PWM Channel1 Output;
3	PA6	I/O	8/64	GPIO	ADC6:ADC Input Channel 6; SPI1CLKC:SPI1 Clock(C); SD0CLKD:SD0 Clock(D); UART0TXA:Uart0 Data Out(A); I2C_SCL(C); TMR2:Timer2 Clock In; PWM0:PWM Channel0 Output;
4	PA2	I/O	8/64	GPIO	ADC2:ADC Input Channel 2; SPI0DOB(0):SPI0 Data0 Out(B); I2C_SDA(B); PWM2(A);
5	PA1	I/O	8/64	GPIO	ADC1:ADC Input Channel 1; SPI0CLKB:SPI0 Clock(B); UART0RXB:Uart0 Data In(B); I2C_SCL(B); CAP2:Timer2 Capture;
6	VDDIO	P	/		Digital Power; (Internal linear regulator output)
7	VBAT	P	/		Battery Power Supply;
8	VSS	G	/		Ground;
9	DACP	O	/		Class-D APA Positive Output;
	PB11	I/O	8	GPIO (High Voltage Resistance)	OSCIB:Crystal Oscillator Input(B);
10	DACN	O	/		Class-D APA Negative Output;
	PB8	I/O	8	GPIO (High Voltage Resistance)	SPI1CLKD:SPI1 Clock(D); I2C_SCL(D); OSCIA:Crystal Oscillator Input(A);

11	PB9	I/O	8	GPIO (High Voltage Resistance)	UART1TRXB:Uart1 Data In/Out(B); SPI1DOD:SPI0 Data Out(D); I2C_SDA(D); CAP1:Timer1 Capture;
12	PB2	I/O	8/64	GPIO	SPI1DIA:SPI1 Data In(A); SD0DATB:SD0 Data(B);
13	PB1	I/O	8/64	GPIO (pull down)	ADC11:ADC Input Channel 11; SPI1DOA:SPI1 Data Out(A); SD0CMDB:SD0 Command(B); I2C_SDA(A);
14	PB0	I/O	8/64	GPIO (pull down)	ADC10:ADC Input Channel 10; SPI1CLKA:SPI1 Clock(A); SD0CLKB:SD0 Clock(B); I2C_SCL(A);
15	PA15	I/O	8/64	GPIO	ADC9:ADC Input Channel 9; SPI1DOB:SPI1 Data Out(B); MCAP3:Motor Timer3 Capture;
16	PA14	I/O	8/64	GPIO	ADC8:ADC Input Channel 8; SPI1CLKB:SPI1 Clock(B); CAP0:Timer0 Capture; MCAP2:Motor Timer2 Capture;

2 Electrical Characteristics

2.1 Absolute Maximum Ratings

Table 2-1

Symbol	Parameter	Min	Max	Unit
Tamb	Ambient Temperature	-40	+85	°C
Tstg	Storage temperature	-65	+150	°C
VBAT	Supply Voltage	-0.3	5.5	V
$V_{VDDIO33}$	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.

2.2 PMU Characteristics

Table 2-2

Symbol	Parameter	Min	Typ	Max	Unit	Test Conditions
VBAT	Voltage Input	2.0	3.7	5.5	V	_
V_{VDDIO}	Voltage output	2.0	3.0	3.4	V	VBAT = 3.7V, 100mA loading
I_{VDDIO}	Loading current	_	_	100	mA	VBAT=3.7V

2.3 IO Input/Output Electrical Logical Characteristics

Table 2-3

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

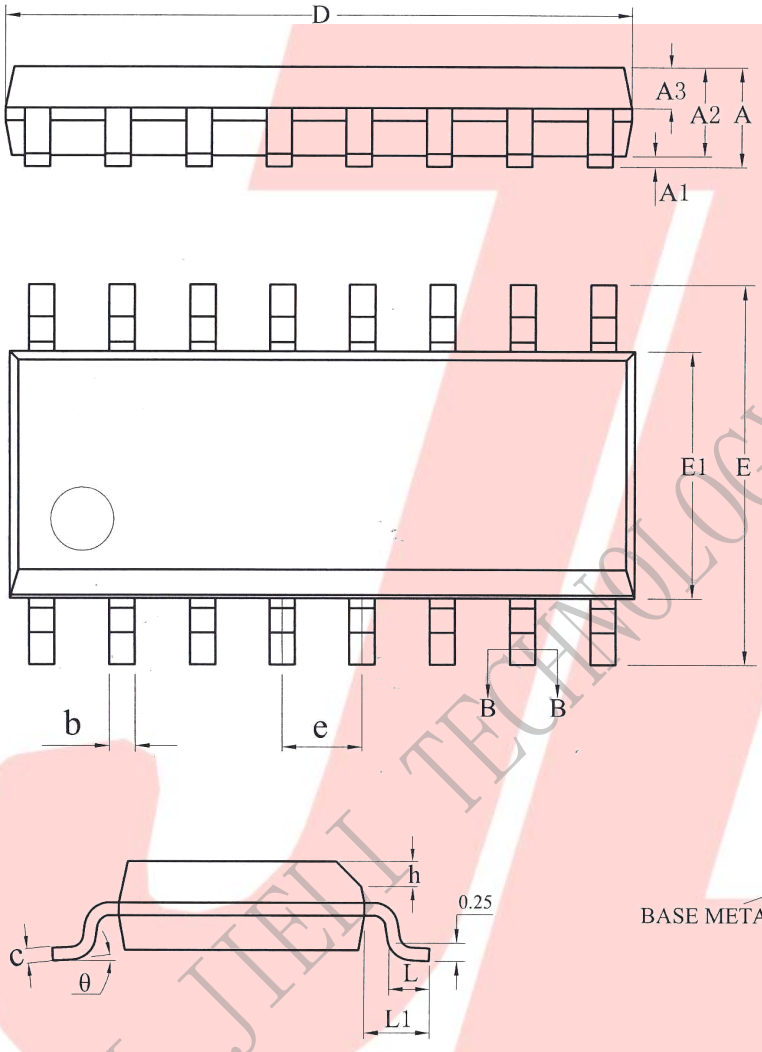
2.4 Internal Resistor Characteristics

Table 2-4

Port	General Output	High Drive	Internal Pull-Up Resistor	Internal Pull-Down Resistor	Comment
PA0~PA12 PB0~PB7	8mA	64mA	10K	60K	1、PA0 default pull up 2、PB0 & PB1 default pull down 3、internal pull-up/pull-down resistance | accuracy ±20%
PB8,PB9, PB11	8mA	–	10K	60K	

3 Package Information

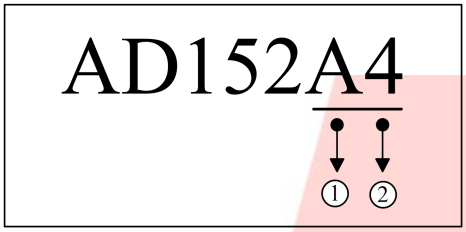
3.1 SOP16



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 3-1. AD152A_SOP16 Package

4 Package Type Specification



①Represents different packages

②Represents different memory sizes

0: No memory

2: 2Mbit Flash

4: 4Mbit Flash

5 Revision History

Date	Revision	Description
2021.03.18	V1.0	Initial Release.
2021.08.23	V1.1	Modify the pin definition.
2023.03.21	V1.2	Modify the Features.