meets theISO/IEC14443A/Bstandard13.56MHzContactless read-write card chip

main features

- Highly integrated ultra-low power consumption non-contact card reader chip, working in13.56MHz,

  Support various card reading and writing schemes driven by dual coils
- Wide operating voltage range, supply voltage2.0 ~ 5.5V
- Extremely low standby and scanning power consumption, effective card reading distance up to8 ~ 10cm
- support fullISO/IEC 14443 Type A/Type Bprotocol
- Communications that support high transfer rates:106kbit/s,212kbit/s,424kbit/s
- supported host interfaces,
  - ---- SPIinterface, speed10Mbit/s
  - ---- I^2Cinterface, the standard mode rate is100kbps/s
  - ---- UARTinterface, transfer rate1228.8kbit/s
- 64bytes sent and receivedFIFObuffer zone
- Programmable Timer
- Multiple power-saving modes such as hardware power-down, software power-down and transmitter power-down
- Built-in temperature sensor to automatically stop when chip temperature is too highRFemission
- Use independent multi-group power supply to avoid mutual interference between modules and improve work stability
- haveCRCand parity function, the built-inCRCcoprocessor, conforming toISO/1EC14443andCCITTprotocol
- internal oscillator, external27.12MHzthe crystal
- Supports low power card detection (LPCD)Function
- QFN32The package is further reducedPCBarea, reducing production costs

main application

- Card reader equipment in the financial field, ID card reader
- Smart home door locks, hotel locks, sauna cabinet locks and other non-contact card reading devices
- All kinds of contactless card reading equipment, bus card, campus card reader
- All kinds of non-contact access control systems, sign-in and attendance machines

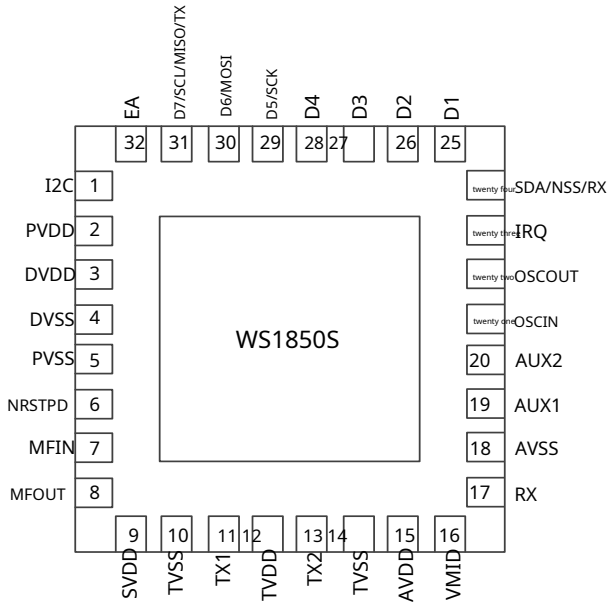
Chip Introduction

WS1850SIt is a low-voltage, low-cost product for the financial field and non-contact door locks, access control and various card reader applications. meets theISO/IEC 14443 Type A/Type Bagreement and work on13.56MHzRead-write card chip in high-frequency mode, with high integration and Features of ultra-low power consumption. It is especially suitable for applications requiring high-performance non-contact card reading data transmission while pursuing low cost.

1Pins and their descriptions

1.1Pin Diagram

WS1850SThe common pin spacing is0.5mmofQFN32Package form, pin definition as shown in the figure1shown.



picture1 QFN32Package Footprint

1.2Pin Description

surface1 WS1850SPin Description

serial number	name	type	describe
1	I2C	I	I2CInterface enable, active high
2	PVDD	PWR	Pin Power
3	DVDD	PWR	digital power
4	DVSS	PWR	digitally
5	PVSS	PWR	pin power ground
6	NRSTPD	I	Reset pin, low level reset
7	MFIN	I	MFsignal input
8	MFOUT	o	MFsignal output
9	SVDD	PWR	MFINandMFOUTpower supply
10	TVSS	PWR	transmitter ground
11	TX1	o	launcher1, the output modulated by13.56MHzenergy carrier signal
12	TVDD	PWR	Transmitter Power
13	TX2	o	launcher2, the output modulated by13.56MHzenergy carrier signal
14	TVSS	PWR	transmitter ground
15	AVDD	PWR	Analog power
16	VMID	PWR	internal reference voltage
17	RX	I	RFsignal input
18	AVSS	PWR	Simulated
19	AUX1	o	test pin
20	AUX2	o	test pin
twenty one	OSCIN	I	External27.12MHzCrystal, can also be connected to an external clock signal
twenty two	OSCOUT	o	External27.12MHzthe crystal
twenty three	IRQ	o	Interrupt signal pin, output interrupt signal.
twenty four	SDA/NSS/RX	I/O	digital communication interface /I2CofSDA/SPIslice select from slice /UART ofRX. Depends on the communication method chosen.
25	D1	I/O	Parallel communication interface /I2CSlave Address Select BitADDR_0
26	D2	I/O	Parallel communication interface /I2CSlave Address Select BitADDR_1
27	D3	I/O	Parallel communication interface /I2CSlave Address Select BitADDR_2
28	D4	I/O	Parallel communication interface /I2CSlave Address Select BitADDR_3

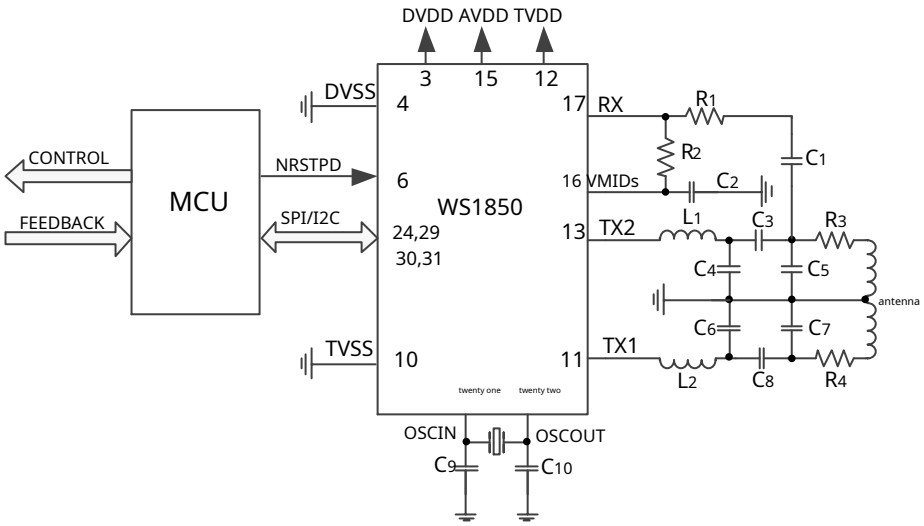
29	D5/ /SCK	I/O	Parallel communication interface /I2CSlave Address Select BitADDR_4 / SPI Interface clock input. Depends on the chosen communication method
30	D6/MOSI	I/0	Parallel communication interface /I2CSlave Address Select BitADDR_5
31	D7/SCL/MISO/TX	I/O	Parallel communication interface /I2Cfrom the sliceSCL/SPIoutput from /UART Output. Depends on the chosen communication method
32	EA	I	I2Caddress encoding enable

2 Application Block Diagram

picture2YesWS1850STypical application block diagram of card reader products. through withMCUfit, plus appropriate peripheral control and feedback

The circuit can realize various read-write card product solutions simply and conveniently, reduce production cost and debugging complexity, and obtain high performance and high

Speed stable and reliable contactless data transmission.

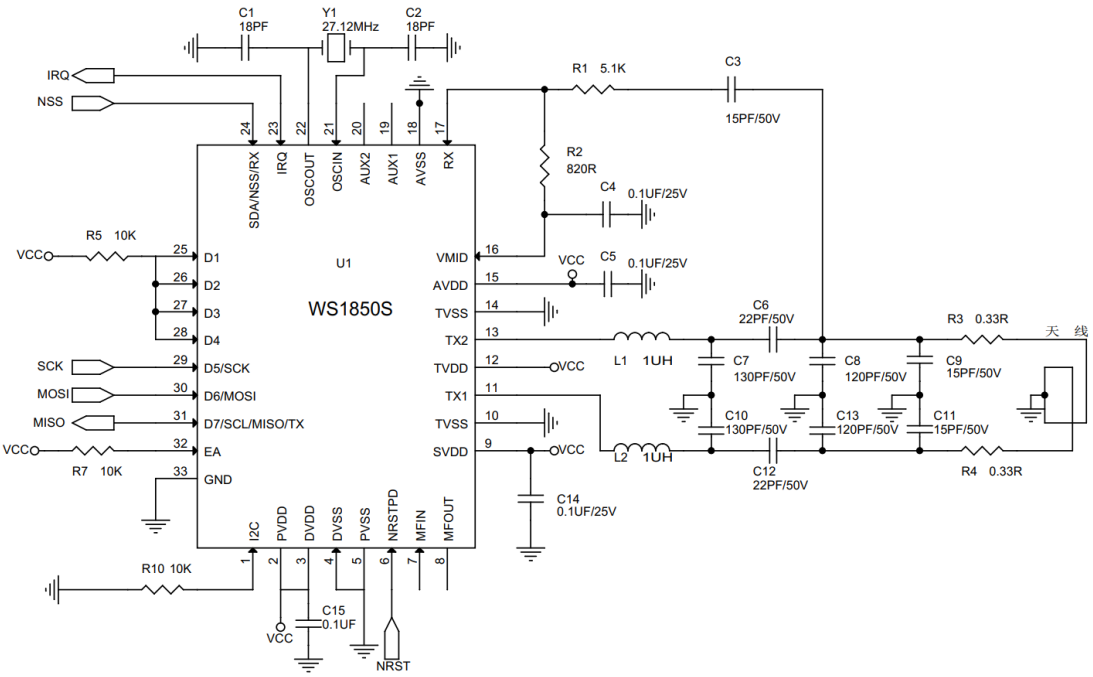


picture2Typical application block diagram of card reader

3 typical application

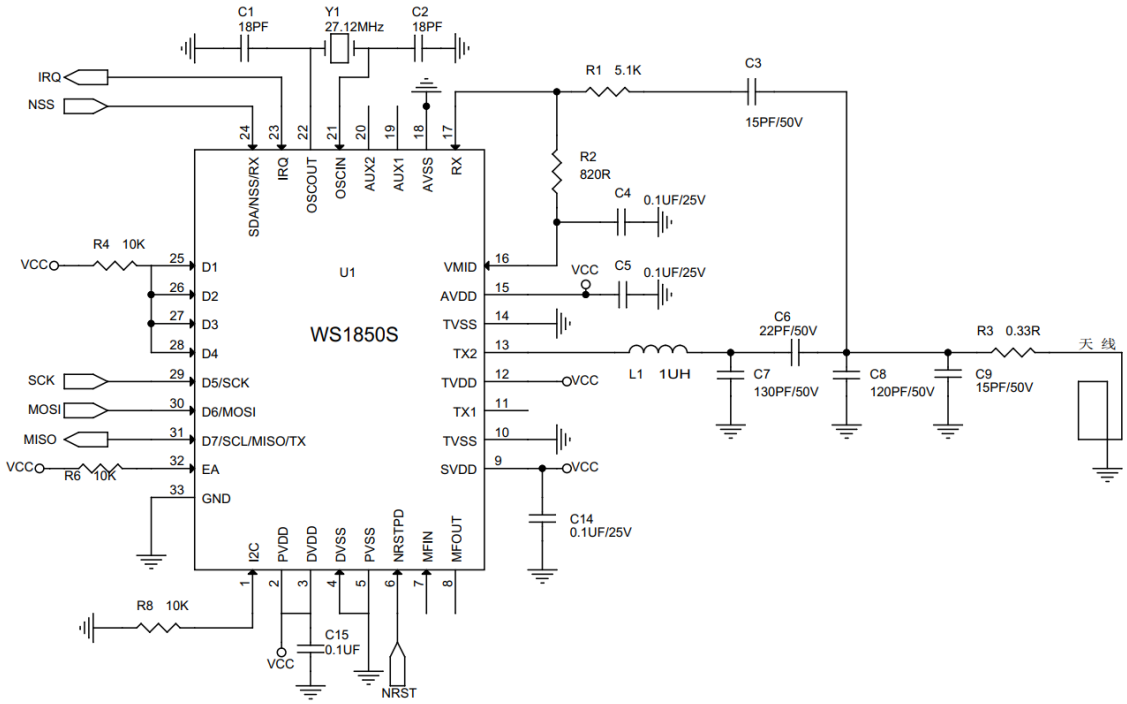
3.1Application circuit diagram

picture3YesWS1850SRecommended application circuit diagram, communication mode selectionSPI. In dual antenna mode, there is a tap in the middle of the coil that is grounded.pin33 Refers to the large pad on the bottom of the chip that needs to be well grounded. in the pictureC8,C9,C11,C13The value needs to be adjusted according to the actual situation.



picture3 WS1850SDual Antenna Application Circuit Diagram

picture4YesWS1850SSingle antenna application circuit diagram, communication mode selectionSPI.pin33Refers to the large pad on the bottom of the chip that needs to be well grounded. in the pictureC8,C9The value needs to be adjusted according to the actual situation.



picture4 WS1850SSingle Antenna Application Circuit Diagram

3.2Communication method selection

WS1850SThree communication methods can be selected, namelySPI,I2CandUART. The selection method is as shown in the table2shown

surface2 WS1850SThe choice of communication method

Different Interface Connection Methods				
WS1850S		Interface Type		
pin number	Pin name	UART	SPI	I2C
1	I2C	0	0	1
32	EA	0	1	EA
31	D7	TX	MISO	SCL
30	D6	MX	MOSI	ADDR_5
29	D5	DTRQ	SCK	ADDR_4
28	D4	-	-	ADDR_3
27	D3	-	-	ADDR_2
26	D2	-	-	ADDR_1
25	D1	-	-	ADDR_0
twenty four	SDA	RX	NSS	SDA

4 electrical characteristics

4.1working conditions

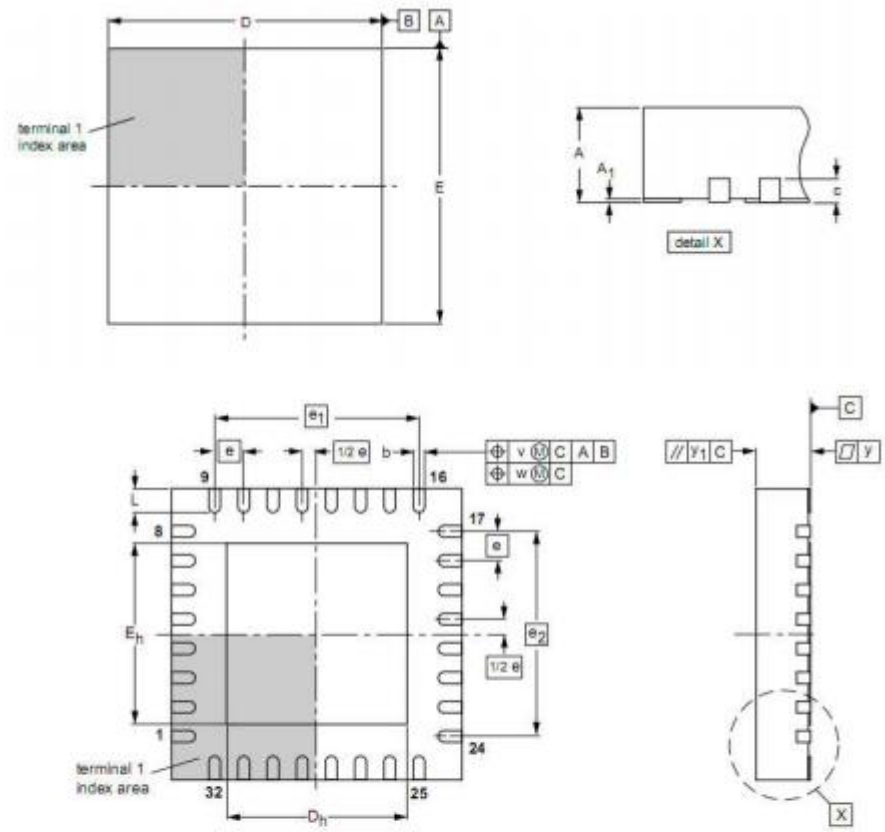
symbol	parameter	condition	the smallest	typical	maximum	unit
DVDD	Digital supply voltage	PVSS=DVSS=AVSS=TVSS=0V PVDD=DVDD<=AVDD<=TVDD	2.0	3.3	5.5	V
AVDD	Analog supply voltage					
TVDD	Transmitter supply voltage					
PVDD	Pin supply voltage	PVSS=DVSS=AVSS=TVSS=0V PVDD=DVDD<=AVDD<=TVDD	2.0	3.3	5.5	V
TA	Operating temperature		- 40		+85	℃

4.2Electrical parameters

symbol	parameter	condition	the smallest	typical	maximum	unit
3.3Velectrical characteristics						
I_{HPD}	Hard power down current	AVDD=DVDD=TVDD=PVDD=3.3V NRSTPD=LOW	—	0.02	—	uA
I_{SPD}	Soft power-down current	AVDD=DVDD=TVDD=PVDD=3.3V RFlevel detector on	—	0.5	—	uA
I_{IDLE}	idle current	AVDD=DVDD=TVDD=PVDD=3.3V	—	2.4	—	mA
I_{DVDD}	Digital supply current	DVDD=3.3V	—	1.97	—	mA
I_{AVDD}	Analog supply current	AVDD=3.3V, bitRCVOff=0	—	1.98	—	mA
	Analog supply current	AVDD=3.3V, bitRCVOff=1	—	1.95	—	mA
I_{TVDD}	Transmitter supply current	Continuously transmit carrier,TVDD=3.3V	—	60	100	mA
V_{Ripple}	Anti-power supply ripple				400	mV
V_{noise}	Immunity to Random Power Supply Noise				1600	mV
R_{TX}	TXoutput resistance			25		Ω
V_{RX}	RXinput sensitivity	f_{SUB}=848kHz		0.5		mVrms
R_{Rx}	Rxinput resistance			50		KΩ
V_{POR}	Power-on reset voltage			1.5		V
T_{OSU}	Crystal startup time			700		us
5Velectrical characteristics						
I_{HPD}	Hard power down current	AVDD=DVDD=TVDD=PVDD=5V NRSTPD=LOW	—	0.02	—	uA
I_{SPD}	Soft power-down current	AVDD=DVDD=TVDD=PVDD=5V RFlevel detector on	—	0.6	—	uA

I_{IDLE}	idle current	AVDD=DVDD=TVDD=PVDD=5V	—	2.5	—	mA
I_{DVDD}	Digital supply current	DVDD=5V	—	2.2	—	mA
I_{AVDD}	Analog supply current	AVDD=5V, bitRCVOff=0	—	2.1	—	mA
	Analog supply current	AVDD=5V, bitRCVOff=1	—	2.07	—	mA
I_{TVDD}	Transmitter supply current	Continuously transmit carrier,TVDD=5V	—	90	150	mA
V_{Ripple}	Anti-power supply ripple				300	mV
V_{noise}	Immunity to Random Power Supply Noise				1600	mV
R_{TX}	TXoutput resistance			20		Ω
V_{RX}	RXinput sensitivity	f_{SUB}=848kHz		0.5		mVrms
R_{Rx}	Rxinput resistance			50		KΩ
V_{POR}	Power-on reset voltage			1.5		V
T_{OSU}	Crystal startup time			700		us

5 encapsulation



DIMENSIONS (mm are the original dimensions)

UNIT	A(1) max.	A_1	b	c	D(1)	D_h	E(1)	E_h	e	e_1	e_2	L	v	w	y	y_1
mm	1	0.05 0.00	0.30 0.18	0.2	5.1 4.9	3.25 2.95	5.1 4.9	3.25 2.95	0.5	3.5	3.5	0.5 0.3	0.1	0.05	0.05	0.1

QFN32 封装尺寸

32-Pin QFN Package