



复旦微电子

FM17550

Contactless Transceiver IC

Short Datasheet

Oct. 2016



INFORMATION IN THIS DOCUMENT IS INTENDED AS A REFERENCE TO ASSIST OUR CUSTOMERS IN THE SELECTION OF SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD PRODUCT BEST SUITED TO THE CUSTOMER'S APPLICATION; THEY DO NOT CONVEY ANY LICENSE UNDER ANY INTELLECTUAL PROPERTY RIGHTS, OR ANY OTHER RIGHTS, BELONGING TO SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD OR A THIRD PARTY.

WHEN USING THE INFORMATION CONTAINED IN THIS DOCUMENTS, PLEASE BE SURE TO EVALUATE ALL INFORMATION AS A TOTAL SYSTEM BEFORE MAKING A FINAL DECISION ON THE APPLICABILITY OF THE INFORMATION AND PRODUCTS.

PURCHASERS ARE SOLELY RESPONSIBLE FOR THE CHOICE, SELECTION AND USE OF THE SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD PRODUCTS AND SERVICES DESCRIBED HEREIN, AND SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD ASSUMES NO LIABILITY WHATSOEVER RELATING TO THE CHOICE, SELECTION OR USE OF THE SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD PRODUCTS AND SERVICES DESCRIBED HEREIN. UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZED SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD REPRESENTATIVE, SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE.

FUTURE ROUTINE REVISIONS WILL OCCUR WHEN APPROPRIATE, WITHOUT NOTICE. CONTACT SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD SALES OFFICE TO OBTAIN THE LATEST SPECIFICATIONS AND BEFORE PLACING YOUR PRODUCT ORDER. PLEASE ALSO PAY ATTENTION TO INFORMATION PUBLISHED BY SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD BY VARIOUS MEANS, INCLUDING SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD HOME PAGE ([HTTP://WWW.FMSH.COM/](http://www.fms.com/)).

PLEASE CONTACT SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD LOCAL SALES OFFICE FOR THE SPECIFICATION REGARDING THE INFORMATION IN THIS DOCUMENT OR SHANGHAI FUDAN MICROELECTRONICS GROUP CO., LTD PRODUCTS.

Trademarks

Shanghai Fudan Microelectronics Group Co., Ltd name and logo, the “复旦” logo are trademarks or registered trademarks of Shanghai Fudan Microelectronics Group Co., Ltd or its subsidiaries in China.

Shanghai Fudan Microelectronics Group Co., Ltd, Printed in the China, All Rights Reserved.



Contents

CONTENTS	3
1 PRODUCT OVERVIEW	4
1.1 INTRODUCTION.....	4
1.2 FEATURES.....	4
1.3 PINNING INFORMATION.....	5
1.3.1 QFN32 Pinning Assignment	5
1.3.2 Pin description	5
2 CHARACTERISTICS	7
2.1 LIMITING VALUES.....	7
2.2 REFERENCE DATA.....	7
3 ORDERING INFORMATION	8
REVISION HISTORY	9
SALES AND SERVICE	10

1 Product Overview

1.1 Introduction

The FM17550 is a highly integrated Transceiver IC for Contactless communication at 13.56MHz. The FM17550 Transceiver IC support Reader/Writer mode supporting ISO/IEC 14443A/B protocol.

The FM17550's internal transmitter part is able to drive a reader/writer antenna designed to communicate with ISO/IEC14443A/B cards and transponders without additional active circuitry. The receiver part provides a robust and efficient implementation of a demodulation and decoding circuitry for signals from ISO/IEC14443A/B compatible cards and transponders. The digital part handles the complete ISO/IEC 14443A/B framing and error detection. The FM17550 supports ISO/IEC14443A cards and transponders with transfer speeds from 106kbit/s to 424kbit/s in both directions. And can supports all layers of the ISO/IEC14443B reader/writer communication scheme, and provided that stardardized protocols, e.g. like ISO/IEC 14443-4 and/or ISO/IEC 14443B anticollision are correctly implemented.

1.2 Features

- **Supports ISO/IEC 14443A/M1 reader/writer mode**
- **Supports ISO/IEC 14443B reader/writer mode**
- **ISO/IEC14443A 106kbit/s and higher transfer speed at 212kbit/s and 424kbit/s**
- **Typical operating distance in reader/writer mode for communication to a ISO/IEC 14443A card up to 50mm (depending on the antenna size and tuning)**
- **Supports host interfaces**
 - ✧ SPI interface up to 10Mbit/s
 - ✧ I2C interface up to 400kbit/s in Fast Mode , and up to 3400kbit/s in High Speed Mode
 - ✧ Serial UART in different transfer speeds up to 1228.8kbit/s, framing according to the RS232 interface with voltage levels according pad voltage supply
- **Comfortable 64 byte send and receive FIFO-buffer**
- **Flexible interrupt modes**
- **Multiple low-power modes**
 - ✧ Soft power down mode
 - ✧ Hard power down mode
 - ✧ Deep power down mode (typical 1uA)
- **Low Power external Card Detect (LPCD) at Reader/writer mode**
- **Programmable timer**
- **Internal oscillator to connect 27.12MHz quartz**
- **Wide voltage supply: 2.2V ~ 3.6V**
- **Dedicated transmitter voltage supply up to 5.5V**
- **Integrated CRC Co-processor**
- **Programmable I/O pins**

1.3 Pinning information

1.3.1 QFN32 Pinning Assignment

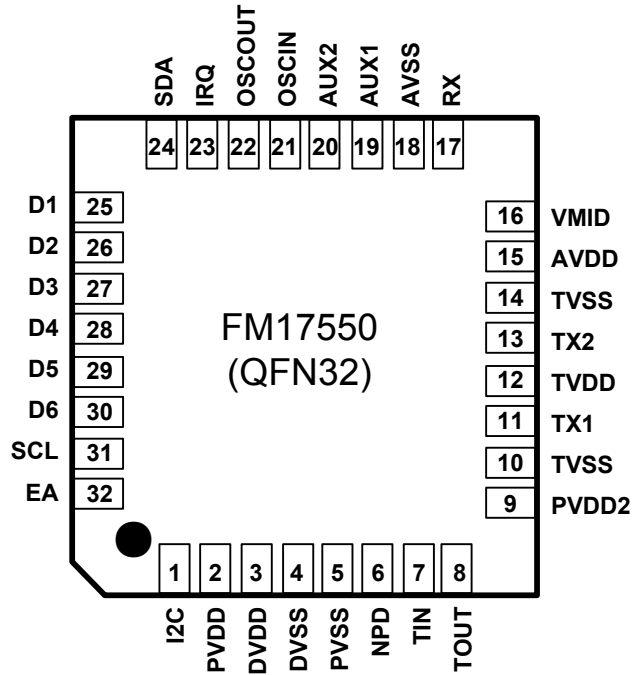


Fig 1-1 FM17550 QFN32 Pinning assignment

1.3.2 Pin description

Pin	Symbol	Type	Description
1	I2C	I	I2C-bus enable pin
2	PVDD	P	pin power supply
3	DVDD	P	chip power supply
4	DVSS	G	digital ground
5	PVSS	G	pin ground
6	NPD	I	power-down input, active low, reset chip when positive edge on NPD pin
7	TIN	I	test input
8	TOUT	O	test output
9	PVDD2	P	pin power supply for TIN and TOUT pin
10	TVSS	G	transmitter output 1 ground
11	TX1	O	transmitter 1 modulated 13.56MHz energy carrier output
12	TVDD	P	transmitter power supply
13	TX2	O	transmitter 2 modulated 13.56MHz energy carrier output
14	TVSS	G	transmitter output 2 ground
15	AVDD	P	analog power supply
16	VMID	P	internal reference voltage
17	RX	I	RF signal input
18	AVSS	G	analog ground



Pin	Symbol	Type	Description
19	AUX1	O	auxiliary outputs for test
20	AUX2	O	auxiliary outputs for test
21	OSCIN	I	crystal oscillator input; also input for externally generated clock (27.12MHz)
22	OSCOUT	O	crystal oscillator output
23	IRQ	O	interrupt request output, indicates an interrupt event
24	SDA	IO	I2C-bus serial data line input/output
	NSS	I	SPI signal input
	URX	I	UART input
25	D1	IO	test port
	ADR5	I	I2C-bus address 5 input
26	D2	IO	test port
	ADR4	I	I2C-bus address 4 input
27	D3	IO	test port
	ADR3	I	I2C-bus address 3 input
28	D4	IO	test port
	ADR2	I	I2C-bus address 2 input
29	D5	IO	test port
	ADR1	I	I2C-bus address 1 input
	SCK	I	SPI serial clock input
	DTRQ	O	UART request to send output to microcontroller
30	D6	IO	test port
	ADR0	I	I2C-bus address 0 input
	MOSI	I	SPI master out, slave in
	MX	O	UART output to microcontroller
31	SCL	I	I2C-bus clock input/output
	MISO	O	SPI master in, slave out
	UTX	O	UART data output to microcontroller
32	EA	I	external address input for coding I2C-bus address

Table 1-1 FM17550 QFN32 PIN description

2 Characteristics

2.1 Limiting Values

Parameter	最小值	最大值	单位
AVDD,DVDD,PVDD,PVDD2	-0.5	4.0	V
TVDD	-0.5	6.0	V
ESD (HBM)		2K	V
ESD (CDM)		500	V

Table 2-1 FM17550 Limiting values

2.2 Reference Data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_A	Working temperature		-40		+85	°C
AVDD	Analog supply voltage		2.2	3.0	3.6	V
DVDD ^[1]	Digital supply voltage		2.2	3.0	3.6	V
TVDD ^[2]	Transmitter supply voltage		2.2	3.0	5.5	V
PVDD ^[3]	Pin supply voltage		1.7		3.6	V
PVDD2 ^[4]	Test pin supply voltage		1.7		3.6	V
I_{DPD}	Deep power-down current	AVDD=DVDD=TVDD=P VDD=3V NPD=0, enter DPD		1	10	uA
I_{HPD}	Hard power-down current (register retention)	AVDD=DVDD=TVDD=P VDD=3V NPD=0, enter HPD		2	12	uA
I_{SPD}	Soft power-down current	AVDD=DVDD=TVDD=P VDD=3V enter SPD mode		35	60	uA
$I_{LPCD}^{[6]}$	LPCD current	AVDD=DVDD=TVDD=P VDD=3V enter LPCD mode		2	6	uA
I_{AVDD}	analog supply current	AVDD=3V, receiver switched on		10	13	mA
		AVDD=3V, receiver switched off		6	8	mA
$I_{TVDD}^{[5]}$	TVDD supply current	continuous wave $V_{TVDD}=3.0V$		60	100	mA

Table 2-2 FM17550 Reference data

- [1] AVDD and DVDD must always be the same voltage.
 [2] TVDD must always be the same or higher voltage than AVDD.
 [3] PVDD must always be the same or lower voltage than AVDD.
 [4] PVDD2 is better the same voltage with PVDD
 [5] I_{TVDD} depends on TVDD and the external circuit connected to pins TX1 and TX2.
 [6] I_{LPCD} in Tab2-2 is the current of LPCD-T1 stage. The actual average current of LPCD mode depend on the configurations of LPCD mode.
 [7] I_{DPD} 、 I_{HPD} 、 I_{SPD} 、 I_{LPCD} is the total current for all supplies.



3 Ordering information

Device number	Package	Wrap	Operating Environment
FM17550-QNA-A-G	QFN32	tray	(-40℃ ~ +85℃)



Revision history

Version	Publication date	Pages	Paragraph or Illustration	Revise Description
1.0	Feb.2015	11		initial version
1.1	Jul.2015	11		modify reference data
1.2	Nov.2015	11		modify reference data
1.3	Oct.2016	10		Change PIN31 name from D7 to SCL



Sales and Service

Shanghai Fudan Microelectronics Group Co., Ltd.

Address: Bldg No. 4, 127 Guotai Rd,
Shanghai City China.

Postcode: 200433

Tel: (86-021) 6565 5050

Fax: (86-021) 6565 9115

Shanghai Fudan Microelectronics (HK) Co., Ltd.

Address: Unit 506, 5/F., East Ocean Centre, 98 Granville Road, Tsimshatsui East, Kowloon, Hong Kong

Tel: (852) 2116 3288 2116 3338

Fax: (852) 2116 0882

Beijing Office

Address: Room 423, Bldg B, Gehua Building,
1 QingLong Hutong, Dongzhimen Alley north Street,
Dongcheng District, Beijing City, China.

Postcode: 100007

Tel: (86-010) 8418 6608

Fax: (86-010) 8418 6211

Shenzhen Office

Address: Room.1301, Century Bldg, No. 4002, Shengtingyuan Hotel, Huaqiang Rd (North),
Shenzhen City, China.

Postcode: 518028

Tel: (86-0755) 8335 0911 8335 1011 8335 2011 8335 0611

Fax: (86-0755) 8335 9011

Shanghai Fudan Microelectronics (HK) Ltd Taiwan Representative Office

Address: Unit 1225, 12F., No 252, Sec.1 Neihu Rd., Neihu Dist., Taipei City 114, Taiwan

Tel : (886-2) 7721 1889

Fax: (886-2) 7722 3888

Shanghai Fudan Microelectronics (HK) Ltd Singapore Representative Office

Address : 237, Alexandra Road, #07-01 The Alexcier, Singapore 159929

Tel : (65) 6472 3688

Fax: (65) 6472 3669

Shanghai Fudan Microelectronics Group Co., Ltd NA Office

Address :2490 W. Ray Road Suite#2

Chandler, AZ 85224 USA

Tel : (480) 857-6500 ext 18

Web Site: <http://www.fmsh.com/>