OM6626

Bluetooth Low Energy Compliant & 2.4-GHz Proprietary System-on-Chip

V1.2

Datasheet

Table of Contents

Version History

Version	Revision	Date	Author	Reviewer
V0.0	Initial version	2023/11/29	QinRui	
V0.1	Update Power consumption and GPADC electrical specification	2023/12/09	QinRui	
V0.2	Update the name of OM6626	2023/12/25	Sdw	QinRui
V0.3	Change the order of OM626A and OM6626B	2024/1/2	Sdw	QinRui
V0.4	Update the describe of 2.2 Note1	2024/1/5	Sdw	QinRui
V0.5	Update the table 4.6 ,table 8.1 and figure 8.1	2024/1/11	Sdw	QinRui
V0.6	Change the pin definition of OM6626A	2024/3/5	Sdw	QinRui
V0.7	Update the package information of OM6626A	2024/3/22	Sdw	QinRui
V0.8	Update the TX Power	2024/4/7	Sdw	QinRui
V0.9	Add the note of size	2024/4/9	Sdw	QinRui
V1.0	Update the sensitivity	2024/4/25	Sdw	QinRui
V1.1	Update the table 4.5	2024/10/25	Sdw	QinRui
V1.2	Update the Link Controller	2024/11/12	Sdw	QinRui

1. Overview

1.1. Description

The OM6626 is a power-optimized true system-on-chip (SOC) solution for both Bluetooth low energy and proprietary 2.4GHz applications. It integrates a high performance and low power RF transceiver with Bluetooth base band and rich peripheral IO extension. OM6626 also integrates power management unit (PMU) to provide high-efficient power management. It targets 2.4GHz Bluetooth low energy systems, proprietary 2.4GHz systems, Human-Interface Devices (keyboard, mouse, and remote control), sports and leisure equipment, mobile phone accessories and consumer electronics.

OM6626 on-chip Bluetooth system compatible with version 5.4.

The chip integrates up to 64MHz high-performance MCU, DMA, GPIO, SPI, UART, Timer, Watchdog, supports 32MHz external crystal, integrates multi-purpose max 12-bit ADC.

The OM6626 integrates on chip 80K SRAM, 256-bit EFUSE and supports user defined IDE system on chip SFLASH MCU development and JTAG software upgrade.

1.2. Features

- RF transceiver
  - -98dBm sensitivity @ 1Mbps GFSK
  - -95dBm sensitivity @ 2Mbps GFSK
  - TX Power -30 to +8dBm
  - AGC (Auto Gain Control)
  - RSSI (1dB Resolution)
- CPU and debug interface
  - ARM® Cortex™-M4, max 64MHz
  - SWD interface
- Memory
  - EFUSE: 256-bit
  - SRAM: 80KB
  - Serial Flash: 1MB
  - I-Cache RAM: 8KB
- Clocks
  - 32MHz & 32.768kHz crystal oscillators
  - 32MHz & 32.768kHz RC oscillators
- Link Controller
  - BT 5.4 LE PHY, link controller
  - Proprietary 2.4-GHz link controller
- Power Management
  - Single power supply voltage: 1.71V ~ 3.6V
  - 3.4mA peak current in RX
  - 4.2mA peak current in TX (0dBm)

- 1.2uA in sleep mode (with 16K RAM retention, 32KHz RC)
- Integrated DCDC BUCK Converter

- Software
  - Compatible with Bluetooth 5.4
  - Supported data rates: 1Mbps, 2Mbps (BLE)
  - Multiple configurable air data rate from 25Kbps to 2Mbps (2.4G)
  - Supports mesh network
  - Sample applications and profiles
  - Supports OTA
- Peripherals
  - Up to 25 General Purpose I/O pins
  - 8 x DMA
  - 2 x UART
  - 1 x I2C interface (master only)
  - 2 x SPI interface
  - 1 x 16-bit Timer/Counter with 4 Compare/Capture/PWM channels
  - 2 x 16-bit Timer/Counter with 4 Compare/PWM channels (These two timers can combine to one 32-bit PWM timer)
  - 1 x 32-bit Real Time Counter with 3 Compare channels
  - 1 x 16-bit Low Energy Timer with 2 Compare/PWM channels
  - 1 x Watchdog Timer
  - 8 channels single-end 12-bit GPADC, up to 333.3ksps (precision and sample rate can be configured)
- Security
  - AES HW encryption
    - Support AES-256/AES-128 key
  - HW Random Number Generator
- Package and Work Environment
  - OM6626A: LGA28 3x3mm
  - OM6626B: QFN32 4x4mm
  - -40 ℃ ~ +85 ℃

1.3. System Function Block Diagram

OM6626 is a low power Bluetooth wireless transceiver chip. The chip integrates Bluetooth base band, PHY and proprietary 2.4GHz protocol. The MCU accesses system hardware resource by AHB bus, RAM, DMA, SFLASH, GPIO exchange data through AHB bus, and all other peripheral is accessed through AHB to APB Bridge and APB bus.

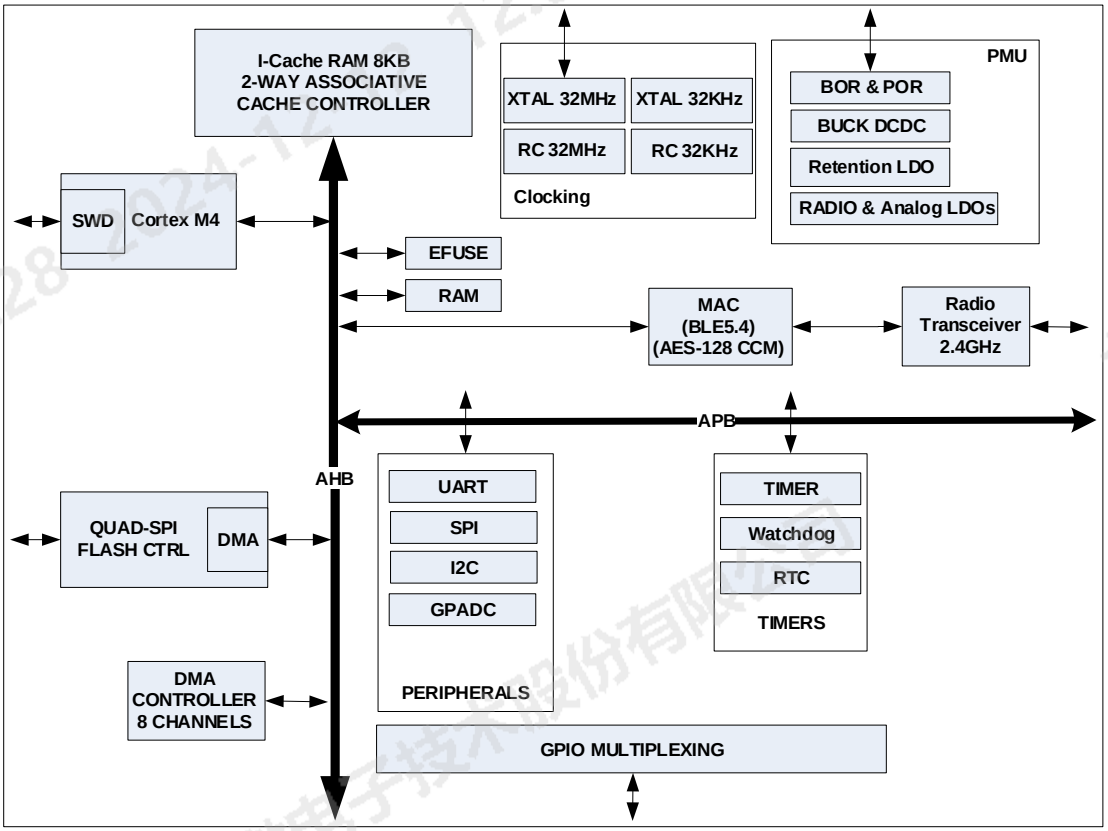

Figure 1.1 Block Diagram

1.4. Applications

The OM6626 integrated circuit has a fully integrated radio transceiver and base band processor for Bluetooth® Smart. It can be used as an application processor as well as a data pump in fully hosted systems.

Figure 1.2 Applications

2. Pinout

2.1. Pin Diagram

The OM6626A is a 3mmx3mm LGA28 package. The chip pin definition is as below:

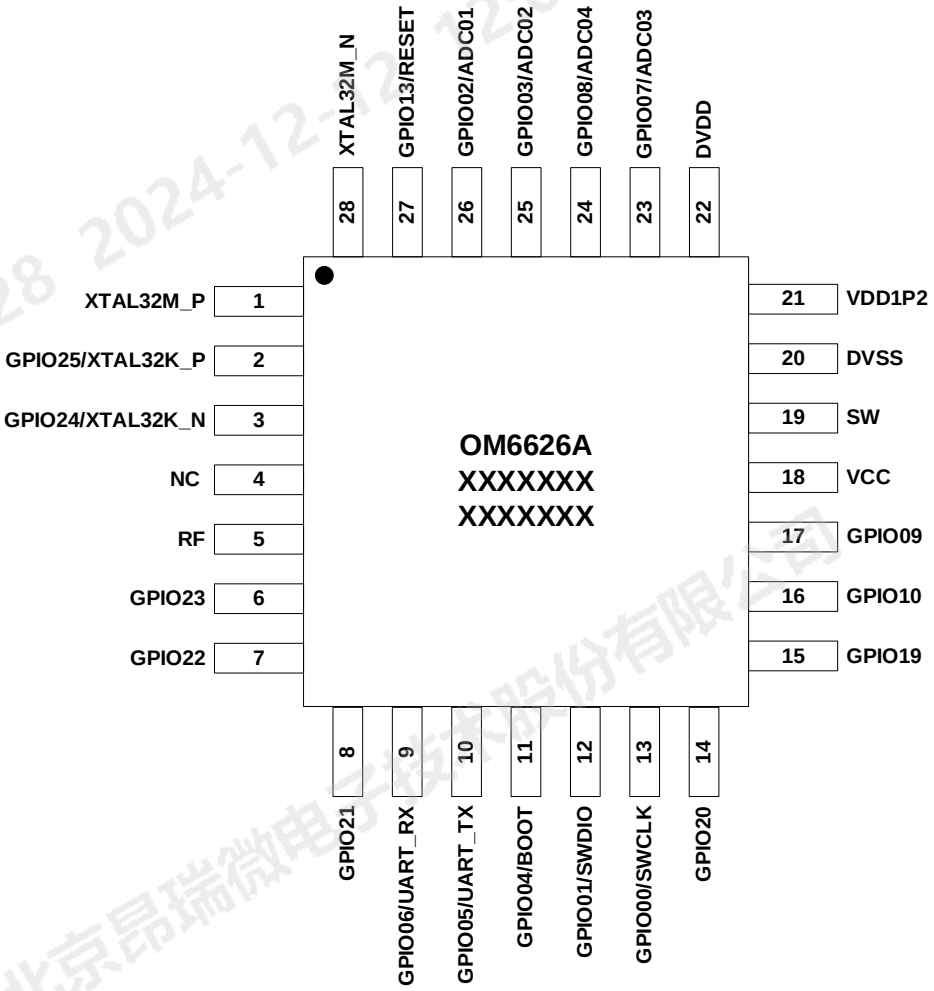

Figure 2.1 OM6626A chip pin definition

Note: The OM6626A has a pin in each corner (bottom view). Those pins are connected to the chip's EPAD (Pin29) internally.

The OM6626B is a 4mmx4mm QFN32 package. The chip pin definition is as below:

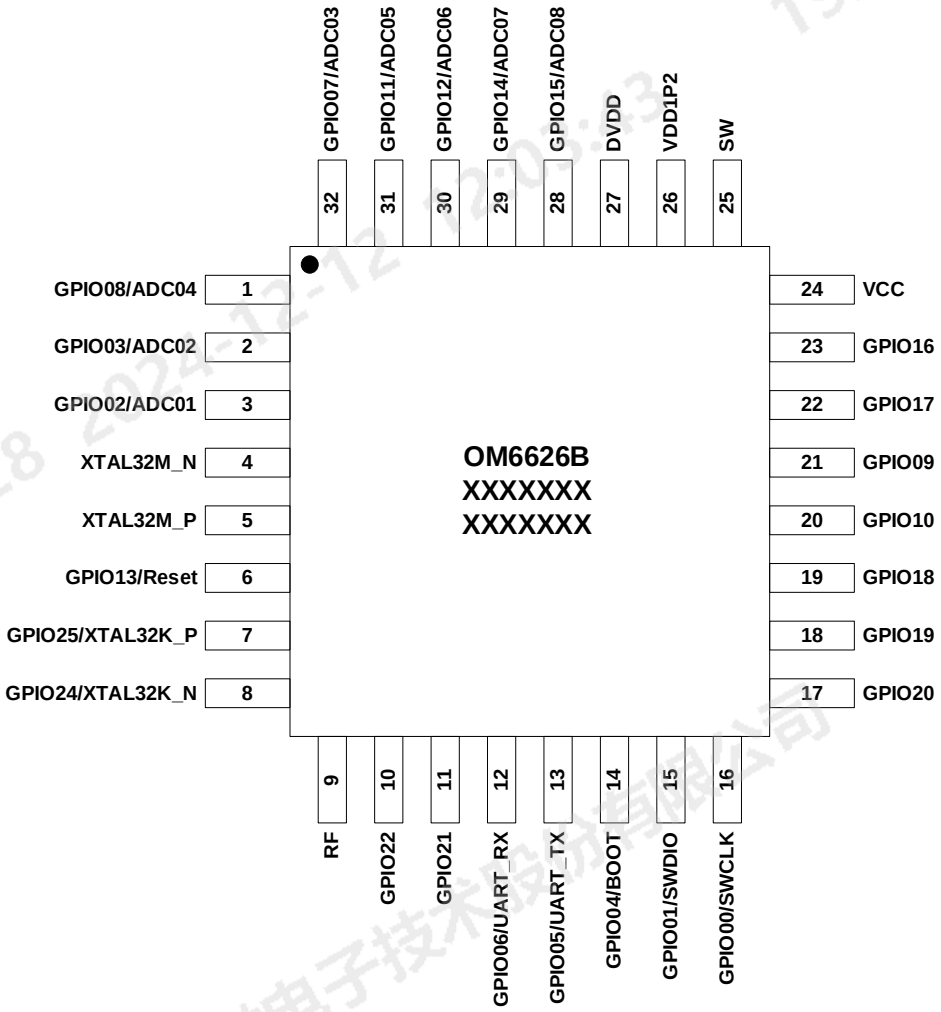

Figure 2.2 OM6626B chip pin definition

Note: The OM6626B has a pin in each corner (bottom view). Those pins are connected to the chip's EPAD (Pin33) internally.

2.2. Pin Description

Name	Pin	Type	Description	Note
XTAL32M_P	1	Analog	32M crystal oscillator P input	
GPIO25/ XTAL32K_P	2	Digital/Analog	Digital GPIO/32.768K crystal oscillator P input	Note 1
GPIO24/ XTAL32K_N	3	Digital/Analog	Digital GPIO/32.768K crystal oscillator N input	Note 1
NC	4	NC	NC	
RF	5	Analog	RF input/output	
GPIO23	6	Digital	Digital GPIO	Note 1
GPIO22	7	Digital	Digital GPIO	Note 1
GPIO21	8	Digital	Digital GPIO	Note 1
GPIO06/UART_RX	9	Digital	Digital GPIO/UART_RX	Note 1
GPIO05/UART_TX	10	Digital	Digital GPIO/UART_TX	Note 1
GPIO04/BOOT	11	Digital	Digital GPIO/BOOT	Note 1
GPIO01/SWDIO	12	Digital	Digital GPIO/SWDIO	Note 1
GPIO00/SWCLK	13	Digital	Digital GPIO/SWCLK	Note 1
GPIO20	14	Digital	Digital GPIO	Note 1
GPIO19	15	Digital	Digital GPIO	Note 1
GPIO10	16	Digital	Digital GPIO	Note 1
GPIO09	17	Digital	Digital GPIO	Note 1
VCC	18	Power	Power supply	
SW	19	Analog	DCDC output connected to external inductance	
DVSS	20	Power	Ground for digital	
VDD1P2	21	Power	Internal DCDC/LDO generated power supply	
DVDD	22	Power	Internal LDO generated power supply for digital core	
GPIO07/ADC03	23	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO08/ADC04	24	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO03/ADC02	25	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO02/ADC01	26	Digital/Analo	Digital GPIO/GPADC	Note 1

		g		
GPIO13/Reset	27	Digital	Digital GPIO/Reset	Note 1/ (**)
XTAL32M_N	28	Analog	32M crystal oscillator N input	

Table 2.1 OM6626A pin definition

Name	Pin	Type	Description	Note
GPIO08/ADC04	1	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO03/ADC02	2	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO02/ADC01	3	Digital/Analog	Digital GPIO/GPADC	Note 1
XTAL32M_N	4	Analog	32M crystal oscillator N input	
XTAL32M_P	5	Analog	32M crystal oscillator P input	
GPIO13/Reset	6	Digital	Digital GPIO/Reset	Note 1/ (**)
GPIO25/ XTAL32K_P	7	Digital/Analog	Digital GPIO/ 32.768K crystal oscillator P input	Note 1
GPIO24/ XTAL32K_N	8	Digital/Analog	Digital GPIO/ 32.768K crystal oscillator N input	Note 1
RF	9	Analog	RF input/output	
GPIO22	10	Digital	Digital GPIO	Note 1
GPIO21	11	Digital	Digital GPIO	Note 1
GPIO06/UART_RX	12	Digital	Digital GPIO/UART_RX	Note 1
GPIO05/UART_TX	13	Digital	Digital GPIO/UART_TX	Note 1
GPIO04/BOOT	14	Digital	Digital GPIO/BOOT	Note 1
GPIO01/SWDIO	15	Digital	Digital GPIO/SWDIO	Note 1
GPIO00/SWCLK	16	Digital	Digital GPIO/SWCLK	Note 1
GPIO20	17	Digital	Digital GPIO	Note 1
GPIO19	18	Digital	Digital GPIO	Note 1
GPIO18	19	Digital	Digital GPIO	Note 1
GPIO10	20	Digital	Digital GPIO	Note 1
GPIO09	21	Digital	Digital GPIO	Note 1
GPIO17	22	Digital	Digital GPIO	Note 1
GPIO16	23	Digital	Digital GPIO	Note 1
VCC	24	Power	Power supply	
SW	25	Analog	DCDC output connected to external inductance	
VDD1P2	26	Power	Internal DCDC/LDO generated	

			power supply	
DVDD	27	Power	Internal LDO generated power supply for digital core	
GPIO15/ADC08	28	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO14/ADC07	29	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO12/ADC06	30	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO11/ADC05	31	Digital/Analog	Digital GPIO/GPADC	Note 1
GPIO07/ADC03	32	Digital/Analog	Digital GPIO/GPADC	Note 1

Table 2.2 OM6626B pin definition

Note 1: Refer to the pinmux diagram for the mapping between digital peripherals and GPIO.
(**): To ensure the Reset function, the pull-down time of RSTB pin should be greater than 40us.

3. Recommended Operation Conditions

3.1. Absolute Maximum Ratings

Parameter	Min	Typ	Max	Unit
Supply voltage (VCC)	-0.3	-	3.9	V
Maximum Junction Temperature	-40	-	125	ºC
Storage Temperature	-40	-	125	ºC

Table 3.1 Absolute Maximum Ratings

3.2. Normal Operating Conditions

Rating	Min	Typ	Max	Unit
Operation Temperature	-40	-	85	ºC
Digital Core supply voltage	0.9	1.0	1.1	V
Supply voltage (VCC)	1.71	3.3	3.6	V
I/O voltage	VCC	VCC	VCC	V

Table 3.2 Normal Operating Conditions

3.3. ESD Characteristic

Parameter	Condition	Min	Typ	Max	Unit
Human Body Mode (HBM)	Test method: ESDA/JEDEC JS-001-2017	-	4000	-	V
Machine Mode (MM)	All pins, test method: JESD22 -A115C	-	200	-	V
Charge Device Mode (CDM)	All pins, test method: ESDA/JEDEC JS-002-2018	-	1000	-	V

Table 3.3 ESD Characteristic

4. PMU

4.1. Power Management

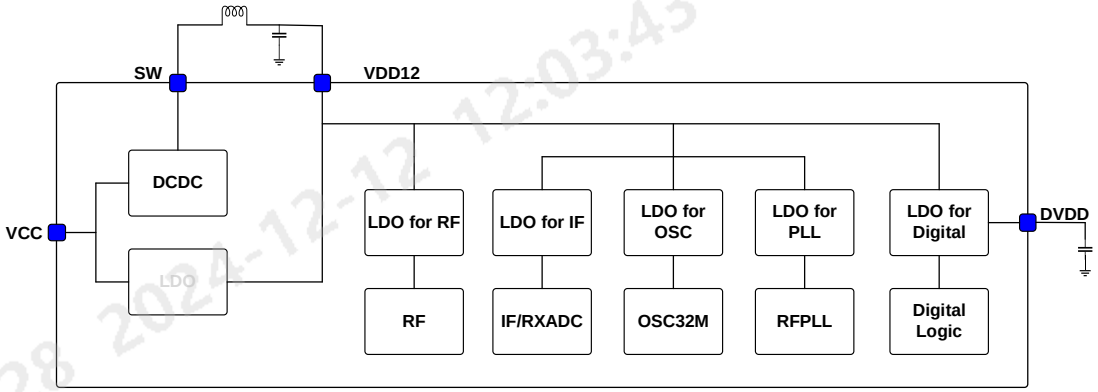

Figure 4.1 DC-DC Mode

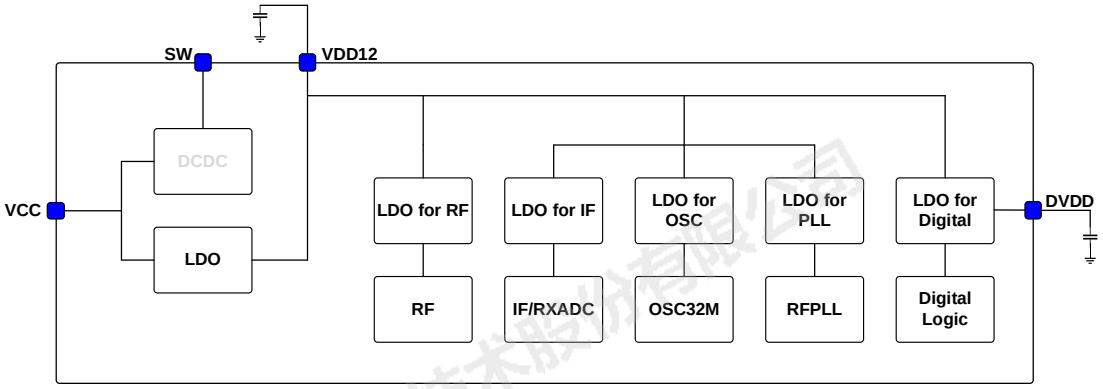

Figure 4.2 LDO Mode

The main supply voltage is connected to the VCC pins. The system contains one main supply regulator stage, which has the following regulator type options:

- Low-dropout regulator (LDO)
- Buck regulator (DC/DC)

4.1.1. Main Voltage Regulator

By default, the LDO regulator is enabled and the DC/DC regulator is disabled. When DC/DC converter is enabled, the corresponding LDO regulator is disabled. External LC filters must be connected for DC/DC regulator if it is being used. The advantage of using DC/DC regulator is that the overall power consumption is normally reduced as the efficiency of such a regulator is higher than that of LDO. The efficiency gained by using DC/DC regulator is best seen when the regulator voltage drops (difference between input and output voltage) is high. The efficiency of internal regulators varies with the supply voltage and the current drawn from the regulators.

4.1.2. Digital LDO Regulator

DVDD can be regulated from digital main LDO or retention LDO. Digital main LDO is powered from main voltage regulator, and retention LDO is powered from VCC pin.

In normal mode, DVDD is regulated from digital main LDO. In retention mode, digital main LDO is powered off, and DVDD is regulated from low power retention LDO.

4.1.3. GPIO Levels

The GPIO high reference voltage is equal to the level on the VCC pin.

4.1.4. Flash Power Supply

The internal Flash is powered from VCC pin, which can be powered off by power switch.

4.1.5. Power Supply Monitor

The power supply monitor enables monitoring of the connected power supply.

Th power supply monitor provides the following functionality:

- Power-on reset: signals the circuit when a supply is connected
- Brownout reset detector: holds the system in reset when the voltage is too low for safe operation
- Optional power-fail comparator: signals the application when the supply voltages drop below a configured threshold

Using the power-fail comparator is optional. When enabled, it can provide an early warning to the CPU of an impending power supply failure. When the supply voltage falls below the defined threshold, the power-fail comparator generates an event that can be used by an application to prepare for power failure. This event is also generated when the supply voltage is already below the threshold at the time the power-fail comparator is enabled, or if the threshold is reconfigured to a level above the supply voltage. The comparator features a hysteresis of VHYST.

To save power, the power-fail comparator is not active in retention mode.

4.1.6. Power Mode

The Power Management Unit (PMU) manages transitions of power modes in the device. Each power mode defines which peripherals and features are available and the amount of current the device consumes. The PMU can also be used to implement voltage scaling and turn off the power to unused RAM blocks to optimize the power consumption.

4.1.6.1. Normal Mode

Normal mode is the default state after power-on reset. In normal mode, all functional blocks such as the CPU or peripherals can be in IDLE or RUN mode, depending on the configuration set by the software and the state of the application executing.

The system can switch the appropriate internal power sources on and off, depending on the amount of power needed at any given time. The power requirement of a peripheral is directly related to its activity level, and the activity level of a peripheral fluctuates when specific tasks are triggered or evens are generated.

4.1.6.2. Retention Mode

Retention mode is the deep power saving mode the system can enter. In this mode, the system's core functionality is powered down and all ongoing tasks are terminated.

When in retention mode, the device can be woken up through one of the following signals:

- GPIO
- RTC
- BLE
- PMU Timer
- LPTimer

The system is reset when it wakes up from retention mode.

One or more RAM sections can be retained in retention mode.

4.2. DC-DC Converter

Symbol	Description	Min	Typ	Max	Unit
Input Voltage	V_{IN}	1.8		3.6	V
V_{DCDC}	Output Voltage	1.1	1.25	1.45	V
I_{LOAD}	Load Current	-	-	50	mA
$T_{STARTUP}$	Startup Time	-	-	300	us
V_{RIPP}	Voltage Ripples[1]	-	10	-	mV
E_{FF}	Efficiency[2]	-	90	-	%
L_{DCDC}	External inductance		10		uH
C_{LOAD}	External Load Capacitor		4.7		μF

Table 4.1 DC-DC Converter Specifications

Note1: Using 10uH inductance and 4.7uF Capacitor.

Note2: Loading current is 10mA.

4.3. Digital LDO

Digital LDO regulates the supply power to all the Digital Logic and Memory blocks.

Parameter	Symbol	Min	Typ	Max	Unit
Input Voltage	V_{IN}		1.25		V
Output Voltage	V_{OUT}	0.9	1.0	1.1	V
External Load Capacitor	C_{LOAD}		1.0		μF

Table 4.2 Digital Core LDO Specifications

4.4. POR

Power-on Reset (POR) circuit holds the system at reset while the supply reaches the required voltage level.

Parameter	Symbol	Min	Typ	Max	Unit	Comment
Power-On Release Voltage	$V_{POR,ON}$		1.5		V	
Power-On Reset Voltage	$V_{POR,OFF}$		1.45		V	

Table 4.3 POR Specifications

4.5. Power Fail Comparator/BOR

Parameter	Symbol	Min	Typ	Max	Unit	Comment
Power Warning Threshold	V_{POF}	1.8		2.5	V	
Threshold Voltage Step	V_{STEP}		0.1		V	
Threshold Voltage Tolerance	V_{POFTOL}	-5		5	%	
Threshold Voltage Hysteresis	V_{POFHYS}	40	50	60	mV	
Brownout Release Voltage	$V_{BOR, ON}$	1.58	1.65	1.72	V	
Brownout Reset voltage	$V_{BOR, OFF}$	1.56	1.63	1.70	V	

Table 4.4 Power Fail Comparator Specifications

4.6. Current Consumption

A set of current consumption scenarios are provided to show the typical current drawn from VCC supply. The default VCC voltage is 3.3V. Each scenario specifies a set of operations and conditions applying to the given scenario.

4.6.1. Sleep

Symbol	Description	Min	Typ	Max	Unit
$I_{SLEEP\_RAMOFF\_GPIO}$	No RAM retention, wake on by GPIO		0.8		uA
$I_{SLEEP\_RAMOFF\_RTC}$	No RAM retention, wake on by RC		1.0		uA
$I_{SLEEP\_RAMON\_GPIO}$	16K RAM retention, wake on by GPIO		1.0		uA
$I_{SLEEP\_RAMON\_RTC}$	16K RAM retention, wake on by RC		1.2		uA

Table 4.5 Sleep Current Characteristic

4.6.2. CPU Running

Symbol	Description	Min	Typ	Max	Unit
I_{CPU0_64M}	CPU read/write RAM@64MHz		1.92		mA
I_{CPU1_64M}	CPU while(1)@64MHz		2.17		mA
I_{CPU0_32M}	CPU read/write RAM@32MHz		1.17		mA
I_{CPU1_32M}	CPU while(1)@32MHz		1.25		mA

Table 4.6 CPU Running Current Characteristic

4.6.3. Radio Transmitting/Receiving

Symbol	Description	Min	Typ	Max	Unit
I_{RADIO_TX0}	Radio transmitting@4dbm output power, 1Mbps				mA
I_{RADIO_TX1}	Radio transmitting@0dbm output power, 1Mbps		4.2		mA
I_{RADIO_RX0}	Radio receiving, 1Mbps		3.4		mA

Table 4.7 Radio Transmitting/Receiving Current Characteristic

5. Clock

5.1. Introduction

The system clocks can be supplied from various internal or external high and low frequencies oscillators.

5.2. Main Features

- 32MHz crystal oscillator, using external 32 MHz crystal
- 32MHz RC oscillator
- 64MHz oscillator synthesized from 32MHz crystal oscillator or 32MHz RC oscillator
- 32.768 kHz crystal oscillator, using external 32.768 kHz crystal
- 32.768 kHz RC oscillator

5.3. Electrical Specification

Parameter	Symbol	Min	Typ	Max	Unit
32MHz crystal oscillator					
External crystal frequency	f_{XTAL}		32		MHz
Load capacitance	C_L			12	pF
Shunt capacitance	C_0			5	pF
Equivalent series resistance	R_S			80	Ω
32.768KHz crystal oscillator					
External crystal frequency	f_{XTAL}		32.768		kHz
Load capacitance	C_L			12	pF
Shunt capacitance	C_0			2	pF
Equivalent series resistance	R_S			80	kΩ
32.768KHz RC oscillator					
Nominal frequency	f_{NOM}		32.768		kHz
Frequency tolerance	f_{TOL}			±500	ppm

Table 5.1 Clock Characteristic

6. Communication Subsystem

6.1. Supported Features

OM6626 on-chip Bluetooth system compatible with Bluetooth standard.

6.2. Radio Transceiver

The Radio Transceiver implements the RF part of the Bluetooth Low Energy protocol. Together with the Bluetooth PHY layer, this provides a reliable wireless communication. All RF blocks are supplied by on-chip low-drop out-regulators (LDO's). The Bluetooth LE radio comprises the Receiver, Transmitter, Synthesizer, RX/TX combiner block, and Biasing LDO's.

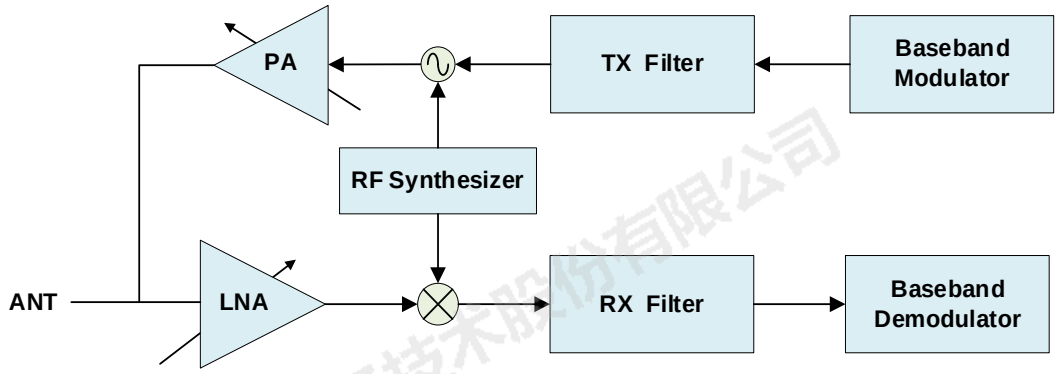

Figure 6.1 RF Block Diagram

6.2.1. Bluetooth Radio Receiver

The OM6626 receiver is a low IF down conversion architecture. The RF signal passes first through an integrated transformer, which is shared between receiver and transmitter. The transformer drives a differential variable-gain LNA, which amplifies the signal before it passes through a low-IF down conversion mixer stage. Following the mixer is a third-order complex BPF, which performs channel selection and image rejection. The IF signal is then digitized by two SAR ADCs before further signal processing in the digital domain.

6.2.2. Bluetooth Radio Transmitter

The OM6626 transmitter is a direct modulating architecture. The digital base-band signals directly modulate VCO and divider of PLL, which is called two-point modulation. After a 3-stage class-D power amplifier, the radio signal is output through antenna.

6.2.3. Frequency Synthesizer

The OM6626 Frequency synthesizer is fully integrated sigma-delta fractional-N PLL to lock the VCO to a reference crystal oscillator. The synthesizer uses several integrated linear regulators for better isolation to the blocks respectively.

6.3. Bluetooth Baseband Unit

The BLE (Bluetooth Low Energy) core is a qualified Bluetooth baseband controller compatible with Bluetooth Smart specification and it includes packet encoding/ decoding and frame scheduling.

6.3.1. Main Features

- All device classes support (Broadcaster, Central, Observer, Peripheral)
- All packet types (Advertising/Data/Control)
- Encryption (AES/CCM)
- Bit stream processing (CRC, Whitening)
- Frequency Hopping calculation
- Low power modes supporting 32.768kHz

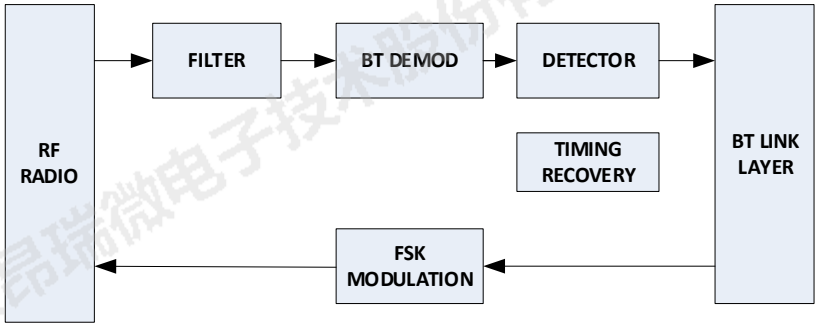

Figure 6.2 BT Baseband

6.4. Performance

6.4.1. BLE Receiver Performance

[Supply Voltage = 3.3V @ 25℃]

Parameter		Min	Typ	Max	Unit
Sensitivity, uncoded data at 1Ms/s			-98		dBm
Sensitivity, uncoded data at 2Ms/s			-95		dBm
Maximum received signal		-	0		dBm
C/I co-channel Sensitivity, uncoded data at 1Ms/s		-	6		dB
C/I co-channel Sensitivity, uncoded data at 2Ms/s			6		dB
Adjacent channel selectivity C/I Note: F0=2440MHz	F = F0+1MHz, uncoded data at 1Ms/s	-	-5		dB
	F = F0 -1MHz, uncoded data at 1Ms/s	-	-4		dB
	F = F0+2MHz, uncoded data at 1Ms/s	-	-42		dB
	F = F0-2MHz, uncoded data at 1Ms/s (Image)	-	-32		dB
	F = F0+3MHz, uncoded data at 1Ms/s	-	-52		dB
	F = F0-3MHz, uncoded data at 1Ms/s	-	-48		dB
	F = F0+2MHz, uncoded data at 2Ms/s	-	-8		dB
	F = F0 -2MHz, uncoded data at 2Ms/s	-	-9		dB
	F = F0+4MHz, uncoded data at 2Ms/s	-	-40		dB
	F = F0-4MHz, uncoded data at 2Ms/s (Image)	-	-34		dB
	F = F0+6MHz, uncoded data at 2Ms/s	-	-54		dB
	F = F0-6MHz, uncoded data at 2Ms/s	-	-52		dB

Table 6.1 BLE Receiver Performance

6.4.2. BLE Transmitter Performance

[Supply Voltage = 3.3V @ 25℃]

Parameter		Min	Typ	Max	Unit
RF power control range		-30	0	8	dBm
ACP Note: F0=2440MHz	F = F0±2MHz		-48		dBm
	F = F0±>3MHz		-50		dBm
Δf1avg maximum modulation (uncoded data at 1Ms/s)		225	250	275	kHz
Δf1avg maximum modulation (uncoded data at 2Ms/s)					kHz
Δf2max maximum modulation (uncoded data at 1Ms/s)		185	200		
Δf2max maximum modulation (uncoded data at 2Ms/s)					
Δf2avg/Δf1avg (uncoded data at 1Ms/s)		0.8	0.84		
Δf2avg/Δf1avg (uncoded data at 2Ms/s)					
Frequency Accuracy (uncoded data at 1Ms/s)		-150	7	150	kHz
Frequency Accuracy (uncoded data at 2Ms/s)					kHz
Frequency Offset (uncoded data at 1Ms/s)		-150	-7	150	KHz
Frequency Offset (uncoded data at 2Ms/s)					KHz
Frequency Drift (uncoded data at 1Ms/s)		-50	-12	50	KHz
Frequency Drift (uncoded data at 2Ms/s)					KHz
Frequency Drift rate (uncoded data at 1Ms/s)		-20	-10	20	KHz/50us
Frequency Drift rate (uncoded data at 2Ms/s)					KHz/50us
Initial Frequency Drift (uncoded data at 1Ms/s)		-23	-9	23	KHz
Initial Frequency Drift (uncoded data at 2Ms/s)					KHz
2nd harmonic distortion			-45		dBm
3rd harmonic distortion			-50		dBm

Table 6.2 BLE Transmitter Performance

7. GPADC

7.1. Introduction

The OM6626 is equipped with a high-speed low power 12-bit general purpose Analog-to-Digital Converter (GPADC). It can operate in unipolar (single ended) mode.

7.2. Main Feature

- 12-bit dynamic ADC with 3us conversion time
- Maximum sampling rate 333.3ksample/s
- Single-ended input
- 8x single-ended external input channels
- Battery monitoring function
- Temperature monitoring function
- Offset and gain calibration
- Support voltage input range: 0~VCC

7.3. Function Description

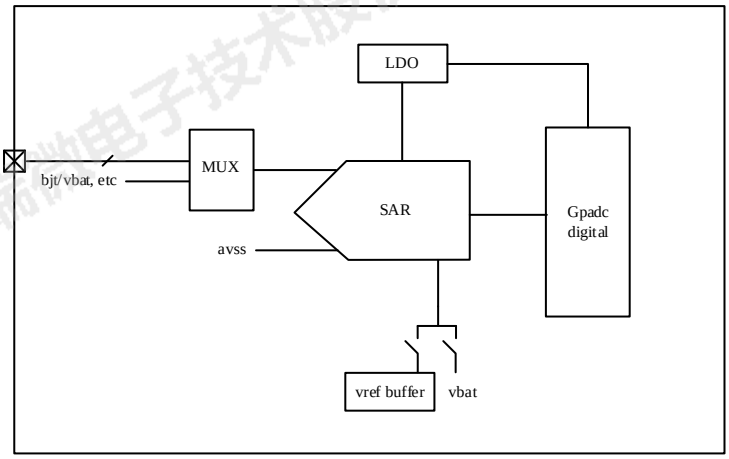

Figure 7.1 GPADC Block Diagram

The analog MUX selects the input voltages to detect the temperature, supply voltage, and external voltage.

7.4. Electrical Specification

Symbol	Description	Min	Typ	Max	Unit
V_{AVDD}	Main analog supply	1.71		3.6	V
V_{IN}	Input range	0		V_{AVDD}	

I_{ADC}	Current consumption		400		uA
F_{SAMPLE}	throughput rate			333.3	ksps
DNL	Differential non-linearity				LSB
INL	Integral non-linearity				LSB
ENOB	Effective number of bits				
	F_{SAMPLE}=333.3ksps/256		11.9		bits
	F_{SAMPLE}=333.3ksps/64		11.3		bits
	F_{SAMPLE}=333.3ksps/8		10.8		bits
	F_{SAMPLE}=333.3ksps		9.6		bits
SNDR	Signal to noise + distortion ratio				
	F_{SAMPLE}=333.3ksps/256		73.4		dB
	F_{SAMPLE}=333.3ksps/64		69.9		dB
	F_{SAMPLE}=333.3ksps/8		66.7		dB
	F_{SAMPLE}=333.3ksps		59.3		dB
V_{OS}	Offset error (Calibrated)				
GE	Gain error				%

Table 7.1 GPADC Specifications

8. Package Information

8.1. LGA28

The OM6626A has the LGA28 package, the information is as below:

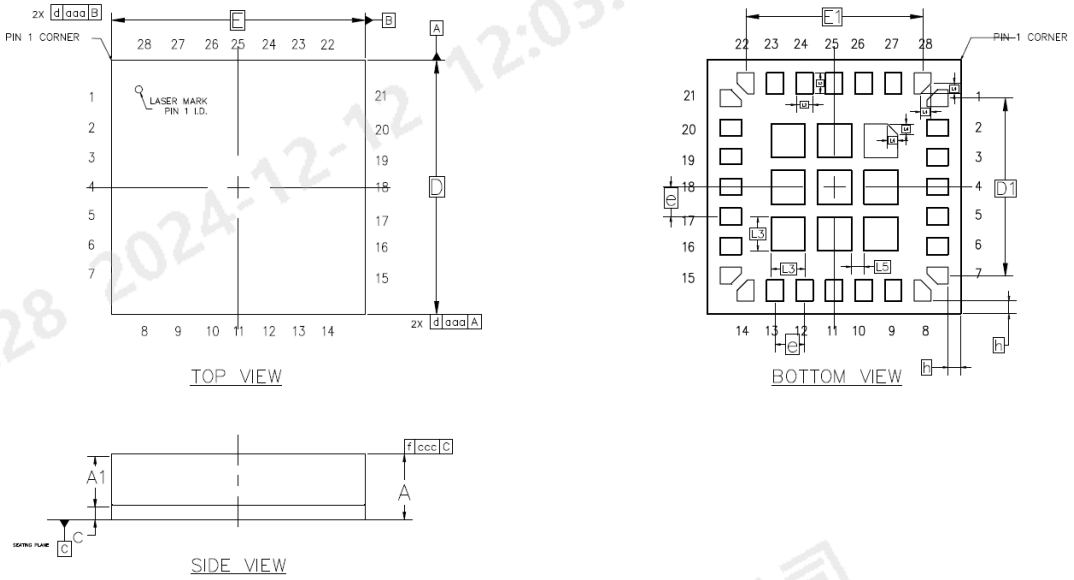

Figure 8.1 OM6626A LGA28 package

SYMBOL	MILLMETER		
	MIN	NOM	MAX
A	0.715	0.775	0.835
A1		0.60 BASIC	
c	0.145	0.175	0.205
D	2.90	3.00	3.10
D1		2.100 BASIC	
E	2.90	3.00	3.10
E1		2.100 BASIC	
e		0.350 BASIC	
L1	0.200	0.250	0.300
L2	0.150	0.200	0.250
L3	0.350	0.400	0.450
L4	0.075	0.125	0.175
L5		0.150 REF	
h		0.150 REF	
aaa		0.100	
ccc		0.080	

Table 8.1 OM6626A LGA28 package

Note: The above dimensions are the design values of the factory's process capability, excluding the raw edge dimensions.

8.2. QFN32

The OM6626B has the QFN32 package, the information is as below:

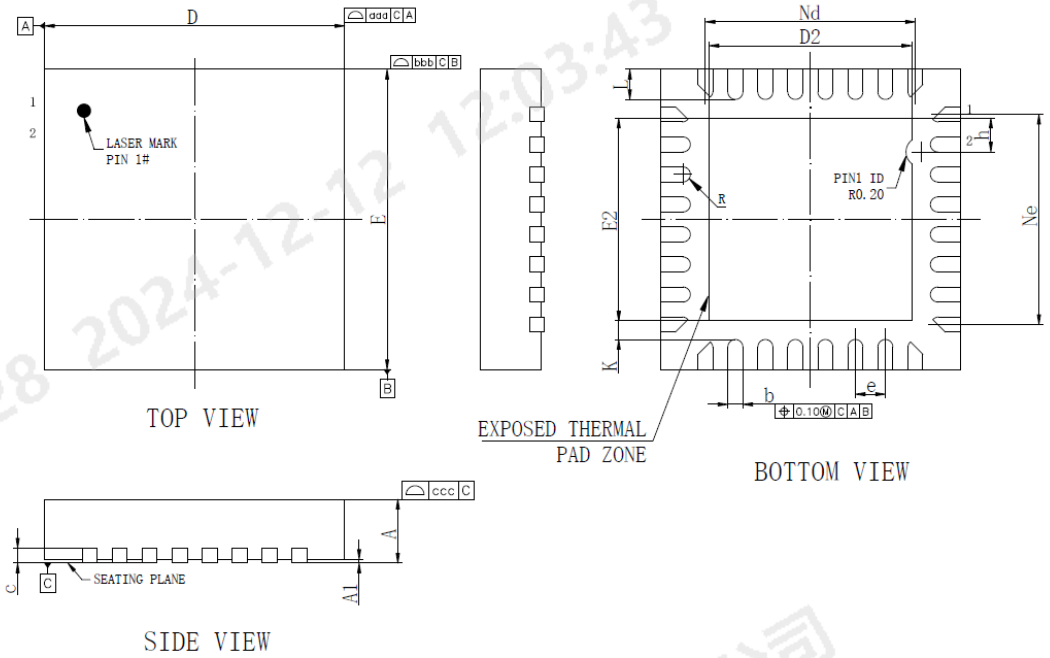

Figure 8.2 OM6626B QFN32 package

SYMBOL	MILLMETER		
	MIN	NOM	MAX
A	0.80	0.85	0.90
A1	0	0.02	0.05
b	0.15	0.20	0.25
c	0.18	0.20	0.25
D	3.90	4.00	4.10
D2	2.65	2.70	2.75
e	0.40BSC		
Nd	2.80BSC		
K	0.25Ref		
E	3.90	4.00	4.10
E2	2.65	2.70	2.75
Ne	2.80BSC		
L	0.35	0.40	0.45
h	0.40	0.45	0.50
R	0.08	0.10	0.15
aaa	0.10		
bbb	0.10		
ccc	0.05		

Table 8.2 OM6626B QFN32 package

Note: The above dimensions are the design values of the factory's process capability, excluding the raw edge dimensions.

9. Ordering Information

OM6626 offers devices below for different application requirement.

Part No.	Type	Package Size	Packing	MOQ (PCS)	MPQ (PCS)	Status
OM6626A	LGA-28L	3*3mm 0.35mm Pitch	Tape/Reel	3000	3000	CS
OM6626B	QFN-32L	4*4mm 0.4mm Pitch	Tape/Reel	3000	3000	CS

Table 9.1 OM6626 Ordering Information

10. Tape and Reel Information

10.1. Tape Orientation

General orientation of OM6626x package in the carrier tape.

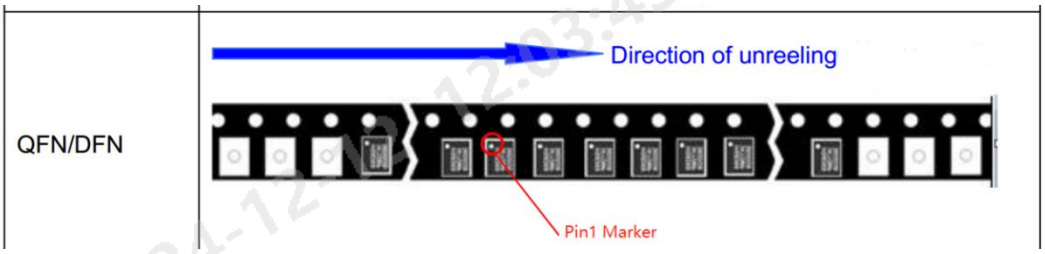

Figure 10.1 OM6626x Tape Orientation

10.2. Tape and Reel Dimensions

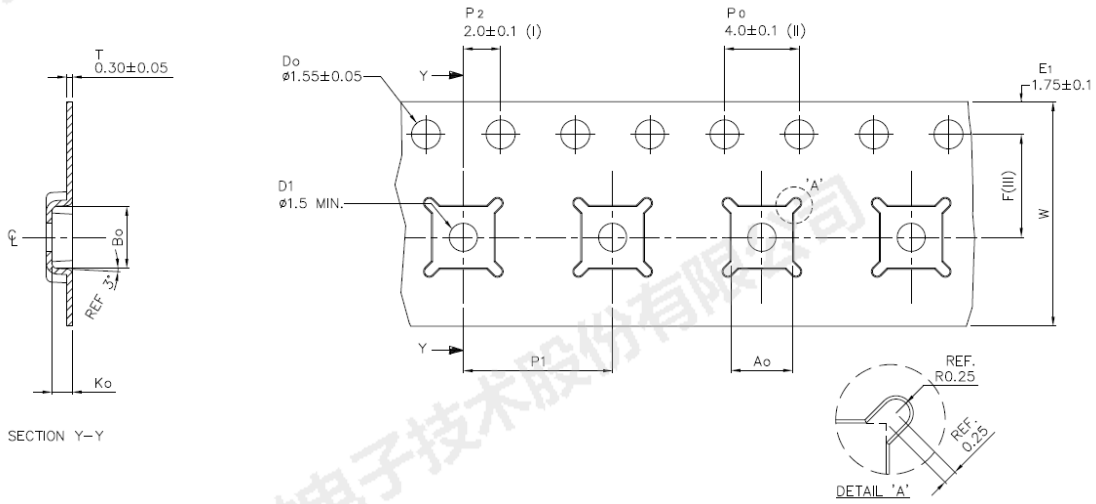

Figure 10.2 OM6626A Tape and Reel Dimensions

Common Size:

Appearance	Size / mm
E	1.75 ± 0.10
F	5.50 ± 0.10
P2	2.00 ± 0.10
D0	1.55 ± 0.05
D1	1.50 MIN.
P0	4.00 ± 0.10
10P0	40.00 ± 0.20

Table 10.1 OM6626A Common Size

Bag Size:

Appearance	Size / mm
A0	3.30 ± 0.10
B0	3.30 ± 0.10
K0	1.10 ± 0.10

P1	8.00 ± 0.10
W	12.00 ± 0.30
T	3.00 ± 0.05

Table 10.2 OM6626A Bag Size

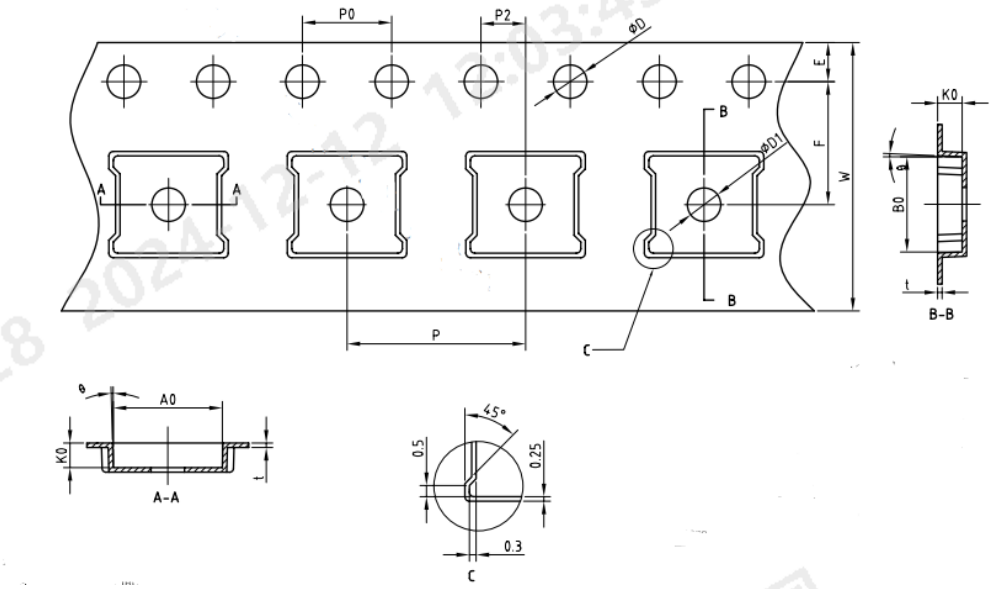

Figure 10.3 OM6626B Tape and Reel Dimensions

Common Size:

Appearance	Size / mm
E	1.75 ± 0.10
F	5.50 ± 0.05
P2	2.00 ± 0.10
D	1.55 ± 0.05
D1	$1.50_{0}^{+0.25}$
P0	4.00 ± 0.10
10P0	40.00 ± 0.20

Table 10.3 OM6626B Common Size

Bag Size:

Appearance	Size / mm
W	12.00 ± 0.30
P	8.00 ± 0.10
A0	4.30 ± 0.10
B0	4.30 ± 0.10
K0	1.10 ± 0.10
t	0.30 ± 0.05
θ	3° TYP

Table 10.4 OM6626B Bag Size

11. Glossary and Abbreviations

Name	Description
ADC	Analog to Digital Converter
AGC	Automatic Gain Control
AON	Always-on
APB	Advanced Peripheral Bus
BB	Base band
BLE	Bluetooth Low Energy
BOD	Brown-out Detector
IFS	Inter Frame Spacing
LDO	Low Dropout
LNA	Low Noise Amplifier
LPD	Low Power Domain
NVM	Non-volatile memory
PLL	Phase Locked Loop
PMU	Power Management Unit
RNG	RING Oscillator
SOC	System-on-chip
TPMS	Tire pressure monitor system
W1C	Write 1 to clear
XO	Crystal Oscillator
Typ	Typical
SNR	Signal to Noise Ratio
PA	Power Amplifier
IRQ	Interrupt Request
LSB	Least Significant Bit
MSB	Most Significant Bit
DFE	Digital Front End

Table 11.1 Glossary and Abbreviations

12. Declaration of No Harmful Substances

This part is compliant with 2005/20/EC packaging directive, 1907/ 2006/ EC REACH directive and the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Lead free
- Halogen Free (Chlorine, Bromine)
- SVHC Free

Sales and Service

Beijing OnMicro Electornics Co., Ltd.

5th. Floor, No.1 Building, No.1 Shangdi No.7 Street, Hai Dian District, Beijing, China, 100085

Tel: +86-10-82858804

Fax: +86-10-82858761

Shanghai Onmicro Electronics Co., Ltd.

Unit 01, 5th Floor, Building 5, No. 666 Shengxia Road and No. 122 Yindong Road, China (Shanghai) Pilot Free Trade Zone

Tel: +86-21-60137655

Fax: +86-21-60137656

Guangzhou Onmicro Electronics Co., Ltd.

Room 1002, Building A, No.18, Kexue Avenue, Huangpu District, Guangzhou, China, 510670

Tel: +86-20-82038985

Shenzhen Onmicro Electronics Co., Ltd.

Room 801-810, East Building, Skyworth Semiconductor Building, GaoXin South 4th Road, Yuehai Street, Nanshan District, Shenzhen, China

Tel: +86-755-26542255

Fax: +86-755-86360696

Hong Kong Onmicro Electronics Limited

Office D, 20/F, Kings Wing Plaza 2, No.1 On Kwan Street, Sha Tin, N.T., Hong Kong, 999077

Tel: +86-10-82858804

OnMicro International Sales Office

Sales: William Zhong Tel: +1 (609) 454-0017(US)

Email: William.Zhong@onmicro.com.cn

Technical Support: Sheldon Xu Tel: +1 (908) 884-3771(US)

Email: Sheldon.Xu@onmicro.com.cn

Important Notice

The information provided herein by OnMicro is believed to be reliable; however, OnMicro makes no warranties regarding the information and assumes no responsibility or liability whatsoever for the use of the information. Customers should be aware that all information contained herein is subject to change without notice. Unless explicitly specified, OnMicro products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would cause severe personal injury or death.