BTM256

Bluetooth Module Data Sheet

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Document Version:	V1.0
Release Date:	September 10, 2013

Revision History

Date	Version	Description	Author
2013-09-10	V1.0	**n** First Release	

CONTENT

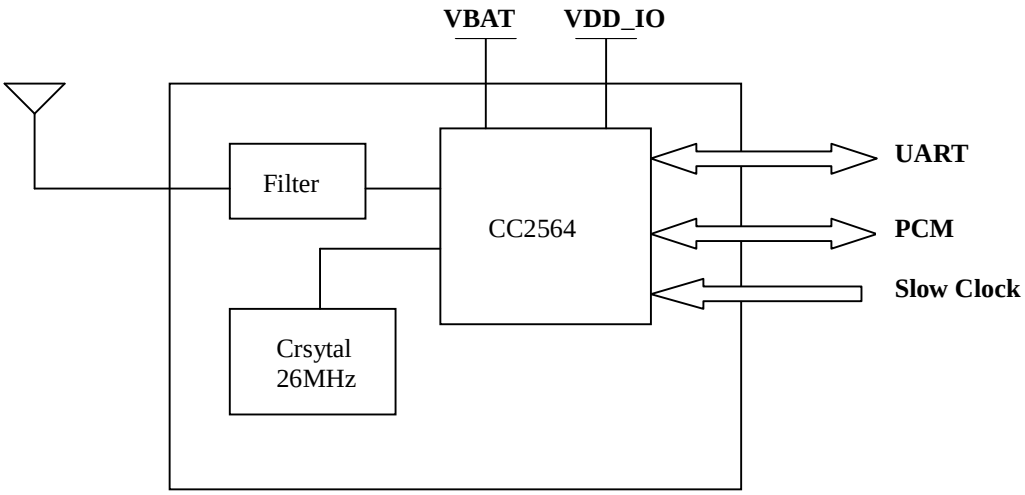
1. INTRODUCTION

The BTM256 Bluetooth® module is a perfect solution for smart phones and portable devices. It can be connected with any Bluetooth® devices in an operating range. It is slim and light so the designers can have better flexibilities for the product shapes.

The BTM256 Bluetooth® module complies with Bluetooth® specification version 4.0(dual mode). It supports multiple profiles.It supports maximum bluetooth data rates over HCI UART interface and provides audio PCM interface for bluetooth.

The detail information of BTM256 Bluetooth® module is presented in this document below.

1.1 Block Diagram



1.2 Features

- ü Small overall dimension(7mm x 7mm x 1.4mm)
- ü Bluetooth Specification V4.0(dual mode)
- ü Class 1.5 support(high output power)
- ü Support multiple profiles
- ü Small size with low power consumption
- ü Supports maximum Bluetooth data rates over HCI UART interface
- ü Lead Free design which is compliant with RoHS requirements
- ü Physical connection as SMD type
- ü No radio signal interference, support for 802.11 co-existence

※ *Some features are optional for customization on demand.*

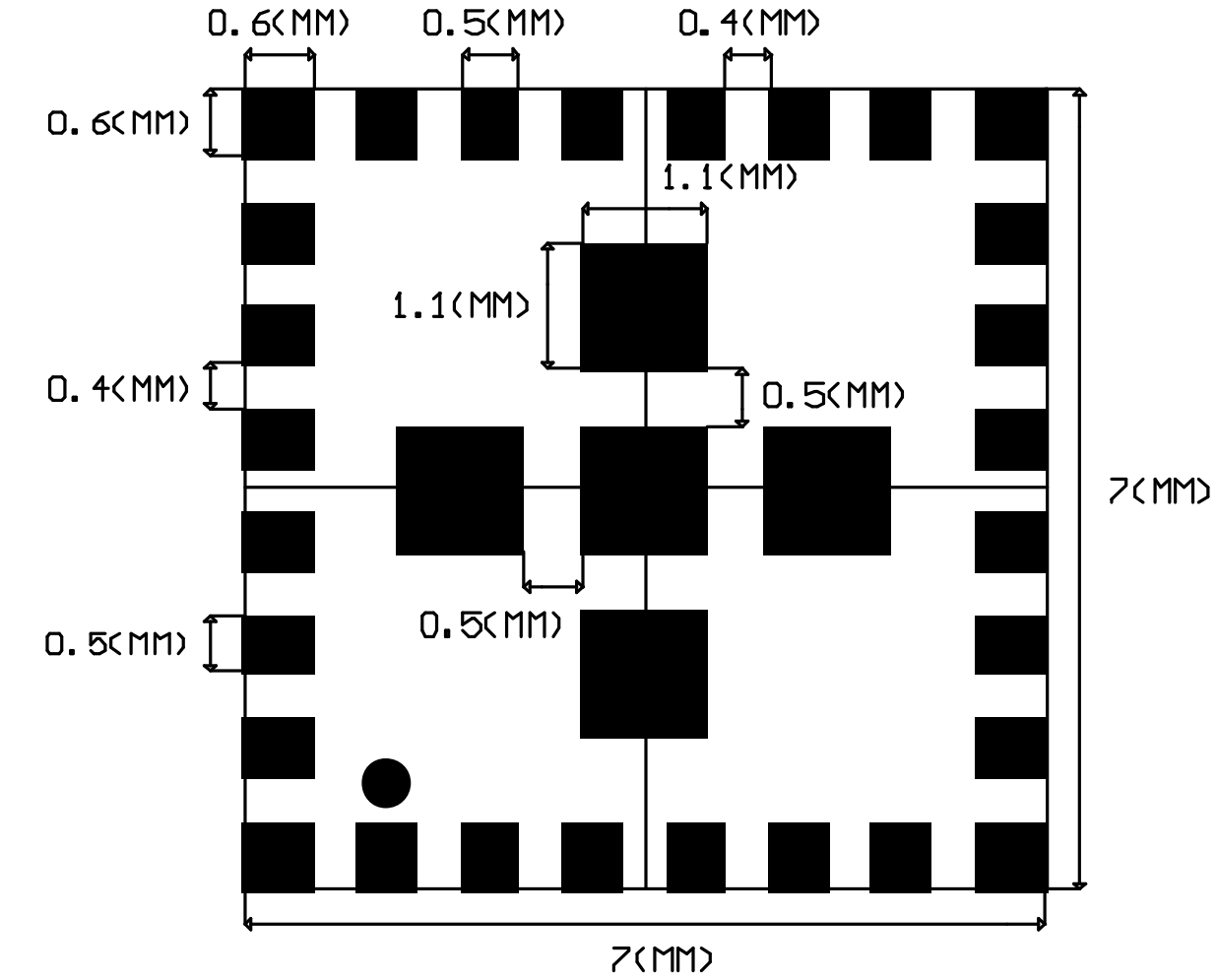
1.3 Application

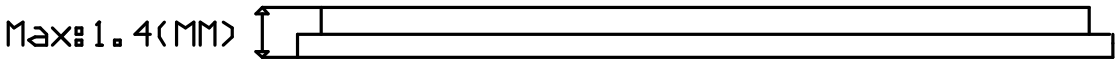
- ü Smart Phones
- ü MID
- ü Portable Devices
- ü High Quality Stereo Bluetooth Headsets
- ü High Quality Wired Stereo Headset and Headphones
- ü Bluetooth Speakers

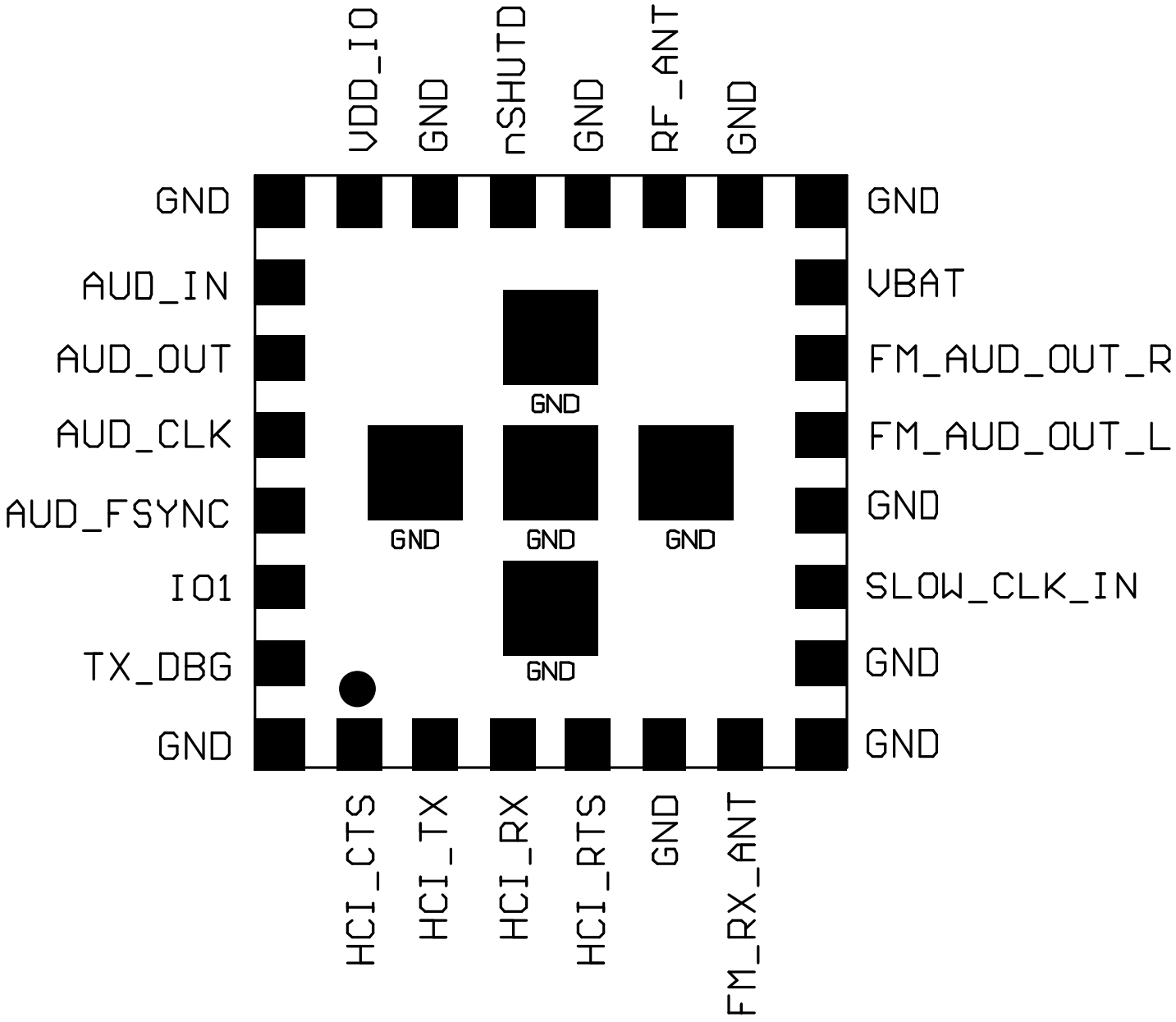
2. GENERAL SPECIFICATION

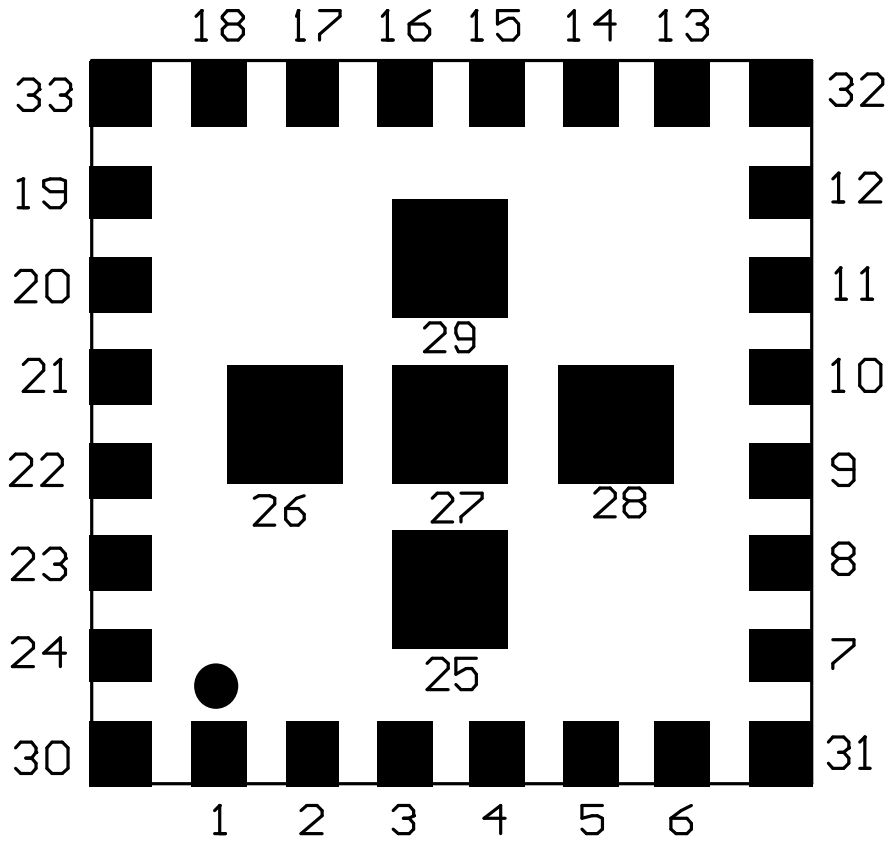
General Specification				
Chip Set	TI CC2564			
Module ID	BTM256			
BT Standard	Bluetooth® V4.0 specification			
Frequency Band	2.402GHz~2.480GHz ISM Band			
Modulation	FHSS,GFSK,DPSK,DQPSK			
Number of channels	79 channels for Classic Bluetooth 40 channels for Bluetooth Low Energy			
Baseband Crystal OSC	26MHz			
RF Input Impedance	50 ohms			
Host Interface	ı PCM ı HCI UART			
Profile	Multiple Profiles by Host Bluetooth Stack			
Operating Environment				
Temperature	-40ºC to +85ºC			
Humidity	10%~95% Non-Condensing			
Environmental	RoHS Compliant			
Bluetooth Specification				
Characteristics	Condition	TYP	BT Spec.	Unit
Output Power	Class 1.5	9.9	10.5	dBm
Modulation GFSK	dF1 avg	161	140 ~ 175	KHz
	dF2 max	129	>115	KHz
	$dF2_{avg}/dF1_{avg}$	86	80	%
Modulation EDR @ 8DPSK	RMS DEVM	5	13	%
	%99 DEVM	10	20	%
	Peaj DEVM	12	25	%
Sensitivity @ Dirty Tx On	GFSK@ BER=0.1%	-91	-70	dBm
	Π/4-DQPSK@ BER=0.1%	-91	-70	dBm
	8DPSK@ BER=0.1%	-84	-70	dBm
Maximum Input Level	GFSK@ BER=0.1%	-10	-20	dBm
	Π/4-DQPSK@ BER=0.1%	-10	-20	dBm
	8DPSK@ BER=0.1%	-10	-20	dBm

3.PHYSICAL CHARACTERISTIC






VDD_IO
GND
nSHUTD
GND
RF_ANT
GND
GND
AUD_IN
AUD_OUT
AUD_CLK
AUD_FSYNC
IO1
TX_DBG
GND
GND
VBAT
FM_AUD_OUT_R
FM_AUD_OUT_L
GND
SLOW_CLK_IN
GND
GND
GND
GND
GND
GND
HCI_CTS
HCI_TX
HCI_RX
HCI_RTS
GND
FM_RX_ANT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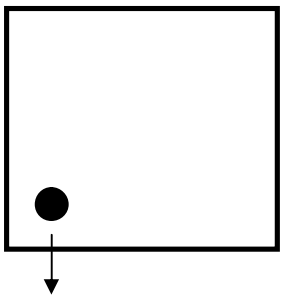
3.1 Pin Description

Pin#	Pin Name	Pad Type	Description
1	HCI_CTS	I	HCI UART clear-to-send.
2	HCI_TX	O	HCI UART data transmit
3	HCI_RX	I	HCI UART data receive
4	HCI_RTS	O	HCI UART request-to-send.
5	GND		Connect to Ground
6	FM_RX_ANT	I	No function, connect to ground
7	GND		Connect to Ground
8	SLOW_CLK_IN	I	32.768-kHz clock in
9	GND		Connect to Ground
10	FM_AUD_OUT_L	O	No function, not connected
11	FM_AUD_OUT_R	O	No function, not connected
12	VBAT	I	Battery voltage input(3.0-4.8V)
13	GND		Connect to Ground
14	BT_ANT	IO	Bluetooth RF IO
15	GND		Connect to Ground
16	nSHUTD	I	Shutdown input (active low).
17	GND		Connect to Ground
18	VDD_IO	I	I/O power supply 1.8 V Nom
19	AUD_IN	I	PCM data input. (NC if not used)
20	AUD_OUT	O	PCM data output. (NC if not used)
21	AUD_CLK	IO	PCM clock. (NC if not used)

22	AUD_FSYNC	IO	PCM frame synch. (NC if not used)
23	IO1	IO	BT_FUNCT1
24	TX_DBG	O	Logger output
25	GND		Connect to Ground
26	GND		Connect to Ground
27	GND		Connect to Ground
28	GND		Connect to Ground
29	GND		Connect to Ground
30	GND		Connect to Ground
31	GND		Connect to Ground
32	GND		Connect to Ground
33	GND		Connect to Ground

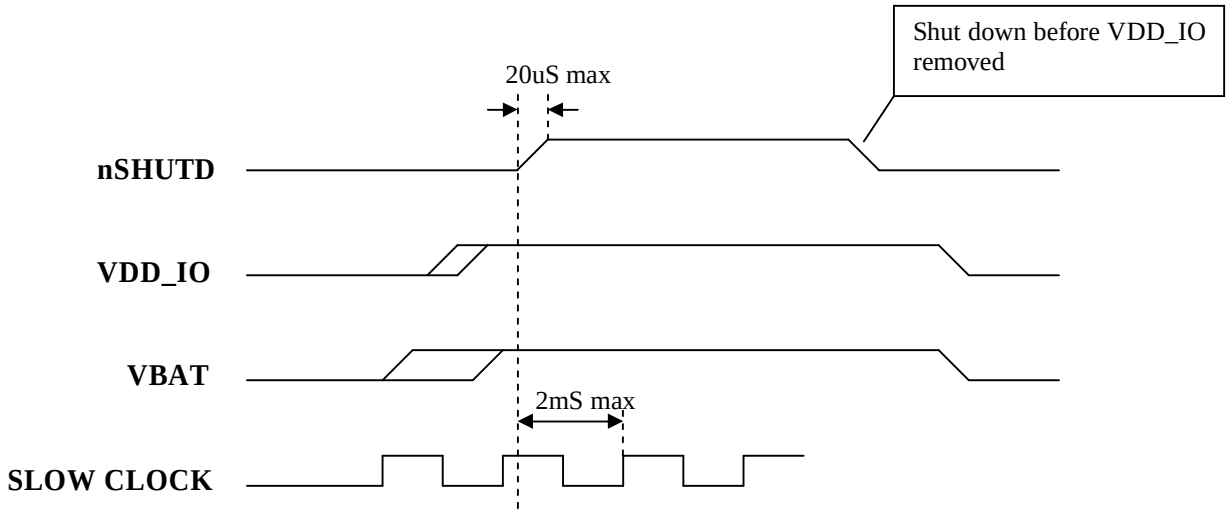
3.2 Marking Description



4. PHYSICAL INTERFACE

4.1 Power

Device Power Up/Down Sequencing



nSHUTD Requirements

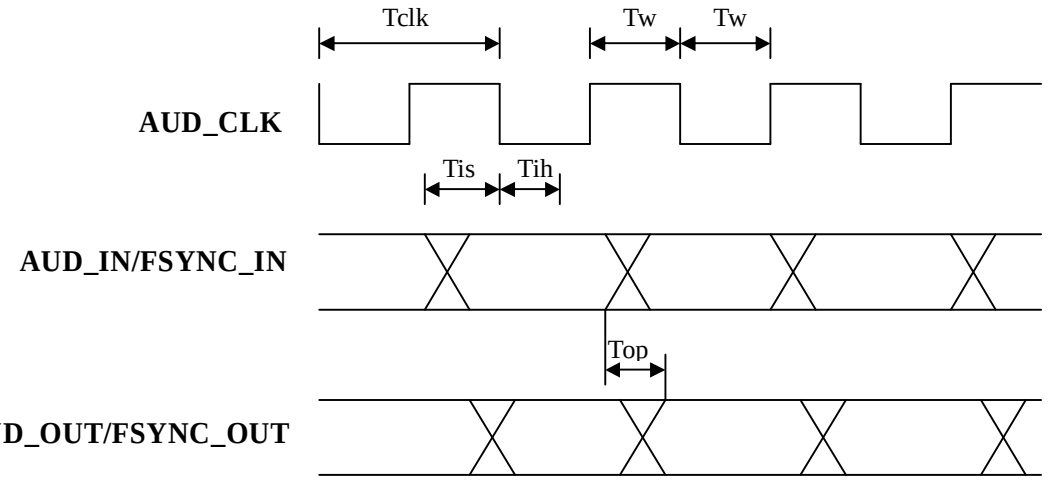
Parameter	Sym	Min.	Max.	Unit
Operation mode level	Vih	1.42	1.98	V
Shutdown mode level	Vil	0	0.4	V
Minimum time for nSHUT_DOWN low to reset the device		5		ms
Rise/fall times	Tr/Tf		20	us

4.2 External clock reference

External Slow Clock signal characteristics

Characteristics	Condition	Sym	Min	Typ	Max	Unit
Input slow clock frequency				32768		Hz
Input slow clock accuracy					+/-250	ppm
Input transition time tr/tf-10% to 90%		tr/tf			100	ns
Frequency input duty cycle			15%	50%	85%	
Phase noise	At 1KHz_				-125	dBc/Hz
Jitter	Integrated over 300 to 15000Hz				1	Hz
Slow clock input voltage limits	Square wave, DC coupled	Vih	0.65*VDD_IO		VDD_IO	V peak
		Vil	0		0.35*VDD_IO	V peak
Input impedance			1			Mohm
Input capacitance					5	pF

4.3 Audio Codec/PCM



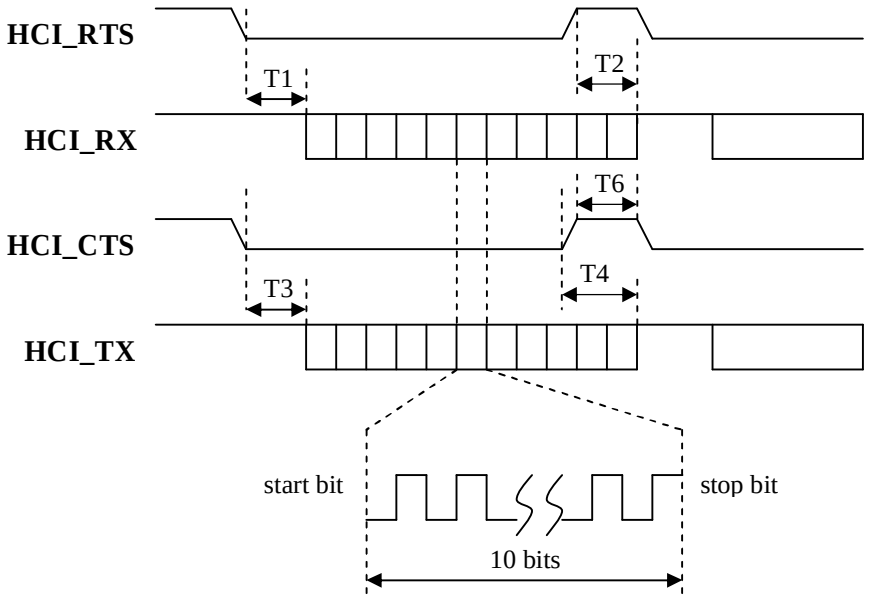
4.3.1 PCM Maste

Symbol	Parameter	Condition	Min	Max	Unit
Tclk	Cycle time		62.5(16MHz)		ns
Tw	High or low pulse width		40% of Tclk		
Tis	AUD_IN setup time		8		
Tih	AUD_IN hold time		0		
Tis	AUD_FSYNC setup time		8		
Tih	AUD_FSYNC hold time		0		
Top	AUD_OUT propagation time	40pF load	0	21	

4.3.2 PCM Slave

Symbol	Parameter	Condition	Min	Max	Unit
Tclk	Cycle time		62.5(16MHz)		ns
Tw	High or low pulse width		40% of Tclk		
Tis	AUD_IN setup time		8		
Tih	AUD_IN hold time		0		
Tis	AUD_FSYNC setup time		8		
Tih	AUD_FSYNC hold time		0		

4.4 UART Interface Timing



Symbol	Characteristics	Condition	Min	Type	Max	Unit
	Baudrate		37.5		4000	kbps
	Baudrate accuracy		-2.5%		1.5%	
T3	CTS low to TX_DATA on		0	2		us
T4	CTS high to TX_DATA off	Hardware flow contoll			1	byte
T6	CTS-high pulse width		1			bit
T1	RTS low to RX_DATA on		0	2		us
T2	RTS high to RX_DATA off				16	byte

5. ELECTRICAL CHARACTERISTIC

5.1 Absolute Maximum Ratings

Symbol	Description	Min	Max	Unit
VBAT	Input Supply Voltage	-0.5	5.5	V
VDD_IO	Digital Bluetooth I/O Voltage	-0.5	2.145	V

Table 1

5.2 Recommended Operating Ratings

Symbol	Min.	Typ.	Max.	Unit
VBAT	2.2	3.3	4.8	V
VDD_IO	1.62	1.8	1.92	V

Table 2

5.3 Power consumptions

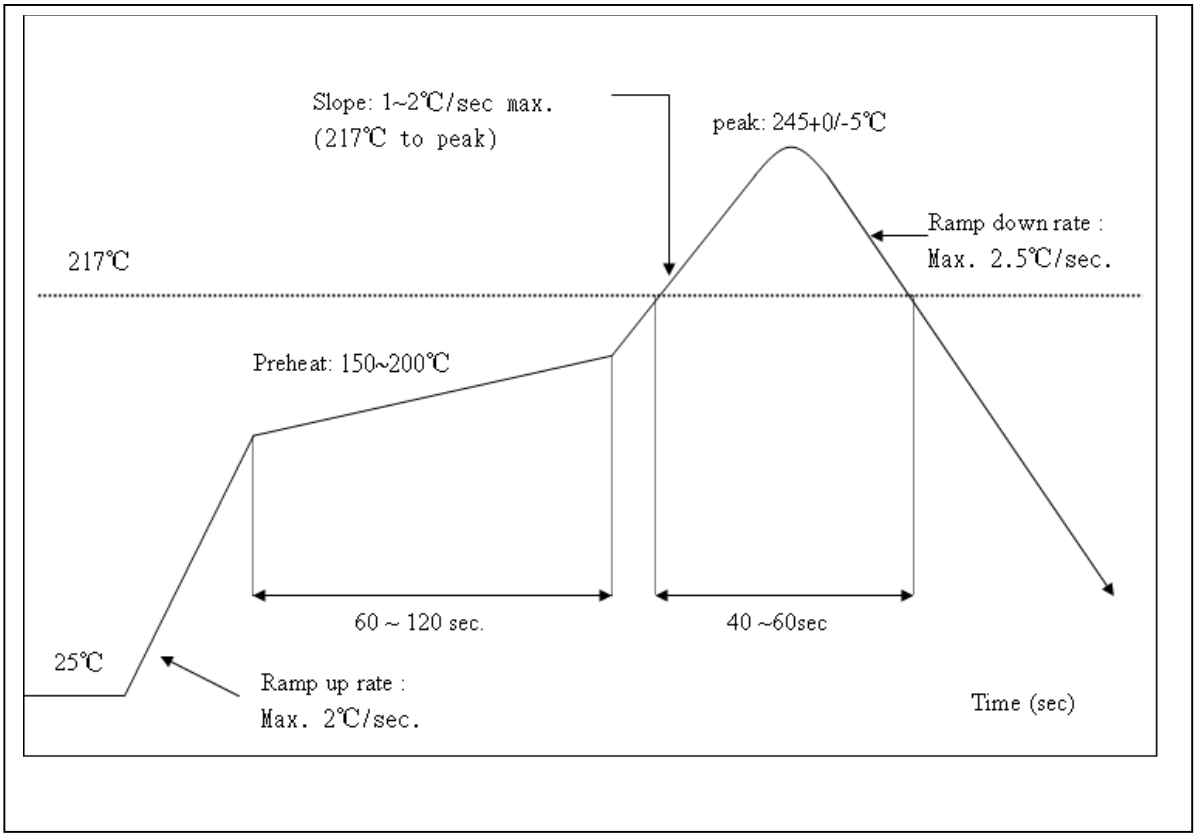
Test conditions: VBAT=3.3V; Temp=25 ºC

Current @ VBAT

Item	Typ.(Target)	Max.	Unit
idle + sleep	0.04		mA
ACL	27		mA
ACL sniff	6.8		mA
ACL sniff + sleep	0.04	0.6 (peak)	mA
eSCO 2EV3(ACL connection on)	30		mA
eSCO 2EV3 + ACL sniff	13.5		mA
eSCO 2EV3 + ACL sniff + sleep	11.1	12.2	mA
Inquiry_scan and page_scan	398		μA
Inquiry_scan	99		μA
page_scan	256		μA
Adertising,nonconnectable (one time/1s)	107		μA
Adertising,discoverable (one time/1s)	113		μA
Scanning (one time/1s)	319		μA
Connected (master role) (one time/500ms)	125		μA

6. RECOMMENDED TEMPERATURE REFLOW PROFILE

The soldering profile depends on various parameters necessitating a set up for each application. The data here is given only for guidance on solder reflow.
Peak Temperature : <250°C
Number of Times : _2 times



7. PACKAGING INFORMATION

1. BLUETOOTH® Module: BTM256

3. Dimension