<GSUB-0001>

UWB SiP Module

Pb-free, halogen-free and RoHS compliant

Restricted

1. Security warning

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2. Publication history

Version	Date	Description	Author	Approved
0.1	2021.10.22	First release		
0.2	2021.10.31	Change structure diagram		
0.3	2021.12.18	Change block diagram and current consumption		

Content

1. Introduction

1.1 Functional Description

GSUB-0001 module is based on System-in-Package (SiP) technology which consists of a Qorvo DW3120 UWB transceiver, a crystal oscillator, two filters. All these components are integrated in a tiny package via 46-pins 6.2x5.8x1.2 mm^3 LGA with sputter technology to achieve EMI shielding. GSUB-0001 can be used to scheme location application for IOT devices.

The DW3120 is an Ultra Wide Band(UWB) low-power and low-cost transceiver IC compliant to IEEE802.15.4-2015 and IEEE802.15.4z (BPRF mode). It can be used in 2-way ranging, TDoA and PDoA systems to locate assets to an accuracy of 10 cm. Meanwhile, it supports 850 kbps, 6.8 Mbps and 27 Mbps data rates.

1.2 Hardware Features

- UWB：
  - IEEE802.15.4-2015 UWB
  - IEEE802.15.4Z (BPRF mode)
  - Supports channels 5 & 9 (6489.6MHz & 7987.2 MHz)
  - Supports 2-way ranging, TDOA and PDOA location schemes
  - Worldwide UWB Radio Regulatory complianc
  - Low power consumption
  - Data rates of 850 kbps, 6.8 Mbps and 27Mbps
  - Integrated HW AES 256

1.3 Applications

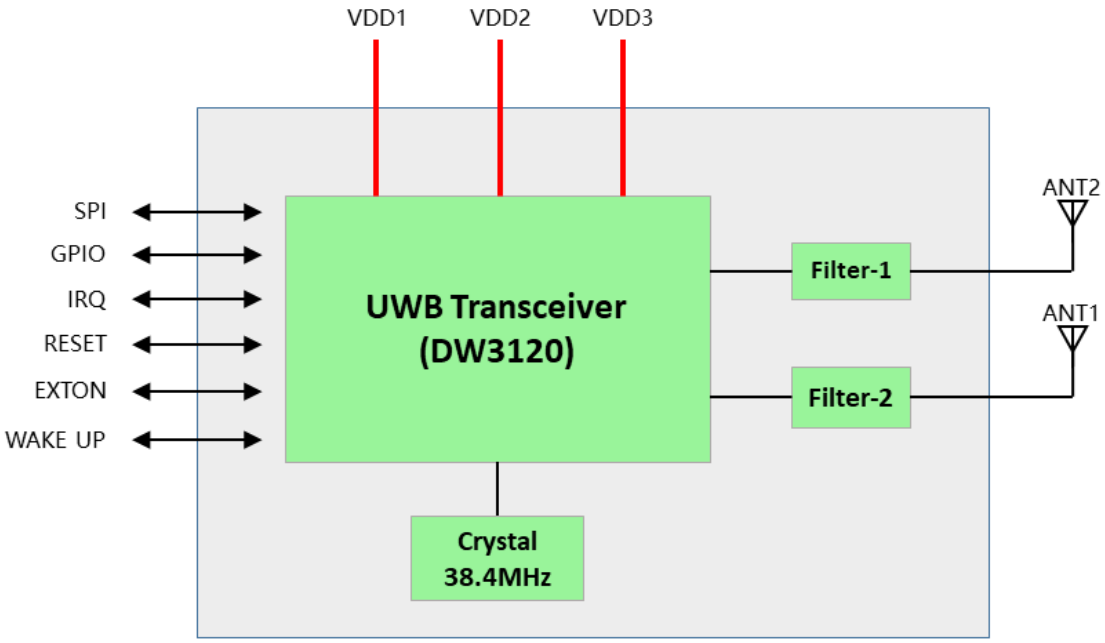
Precision real time location systems (RTLS) using two-way ranging, TDoA or PDoA schemes in a variety of markets:

- Healthcare
- Consumer
- Industrial
- Automotive

2. Part Number

Part Number	GSUB-0001

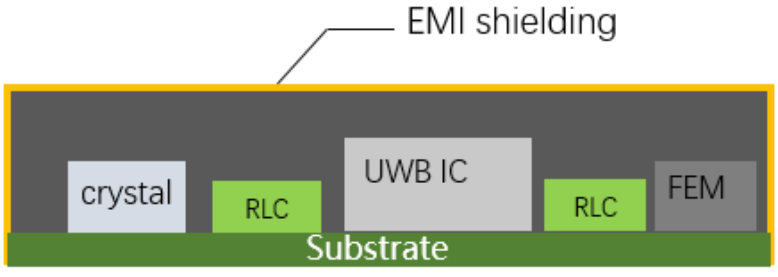
3. Block Diagram



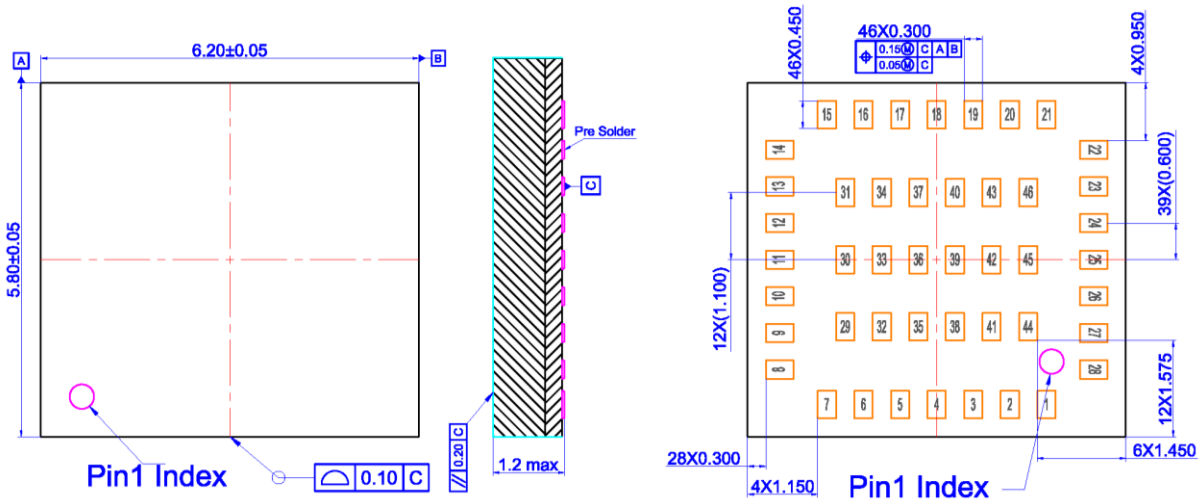
4. Certification Information（TBD）

5. Structure, Dimensions, Terminal Configurations and Marking

5.1 Structure



5.2 Dimensions



5.3 Terminal Configurations

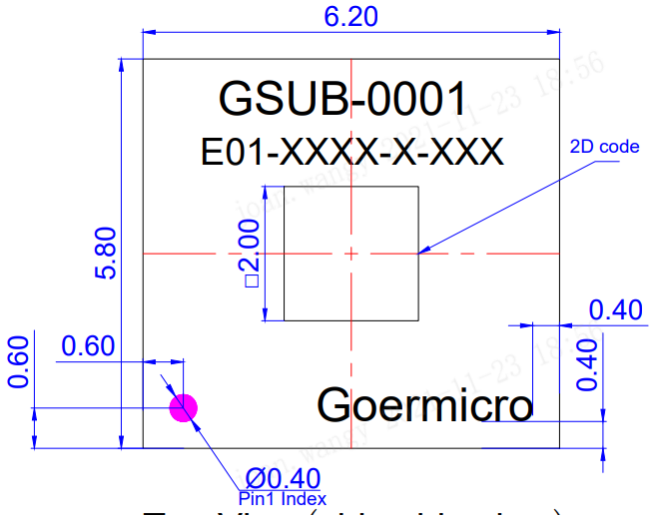
Pin NO.	Name of pin number	Function	Recommended usage
1	GND1	GND	
2	DW_IRQ	Interrupt Request output	
3	DW_GPIO4	GPIO	
4	DW_GPIO3	GPIO	
5	DW_GPIO6	GPIO	
6	DW_GPIO7	GPIO	
7	GND2	GND	
8	ANT2	RF port for antenna 2	
9	GND3	GND	
10	GND4	GND	
11	ANT1	RF port for antenna 1	
12	GND5	GND	
13	GND6	GND	
14	GND7	GND	
15	GND8	GND	
16	GND9	GND	
17	GND10	GND	
18	GND11	GND	
19	VDD3	VDD3(Power Input)	

20	VDD1	VDD1(Power Input)	
21	VDD2	VDD2(Power Input)	
22	GND12	GND	
23	GND13	GND	
24	DW_EXTON	External device enable	
25	RSTn_Ctrl	Reset pin	
26	DW_SPICLK	SPI slave clock input	
27	DW_SPIMISO	SPI slave data output	
28	DW_SPIMOSI	SPI slave data input	
29	GND14	GND	
30	GND15	GND	
31	GND16	GND	
32	DW_GPIO0	GPIO	
33	GND18	GND	
34	GND19	GND	
35	DW_GPIO2	GPIO	
36	GND20	GND	
37	GND21	GND	
38	DW_GPIO1	GPIO	
39	GND22	GND	
40	GND23	GND	
41	DW_GPIO5	GPIO	
42	GND24	GND	
43	GND25	GND	
44	DW_SPICSn	SPI Chip Select	
45	DW_WKUP	Wake Up	
46	GND26	GND	

Note:

1. For more information on standard drive, see GPIO — General purpose input/output in DW3120 datasheet.
2. GPIO pins are to be left OPEN if not used.

5.4 Marking



Top View (chip side view)

Marking	Content	Height	Font	Type
Logo	Goermicro	0.5	Arial	Laser
Projcet Name	GSUB-0001	0.5		
Version	E01	0.5		
Config Name	XXXX	0.5		
Strip No.	X（X=1,2,..9,A,Z)	0.5		
Unit No.	XXX(XXX=001,..., 350)	0.5		

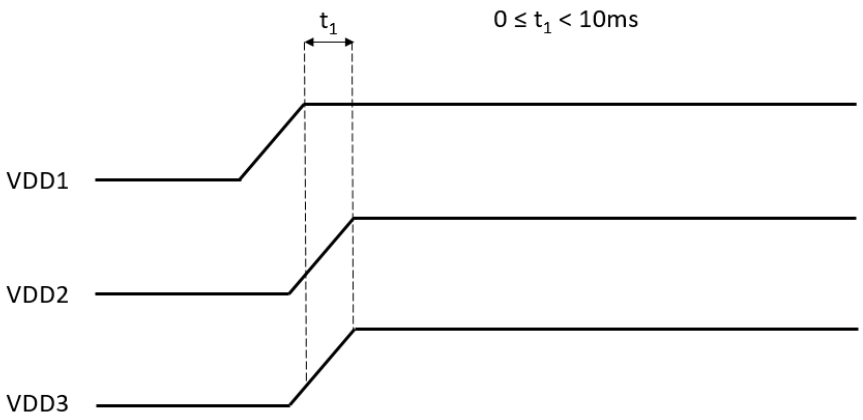
6. Absolute Maximum Ratings

Parameter		Min	Max	Unit
Storage Temperature		-40	85	℃
Supply Voltage	VDD1	-0.3	4.0	V
	VDD2	-0.3	4.0	V
	VDD3	-0.3	4.0	V

7. Operating Condition

Parameter		Min	Typ	Max	Unit
Operating Temperature		-40	25	85	℃
Supply Voltage	VDD1	1.62	3.0	3.6	V
	VDD2	2.4	3.0	3.6	V
	VDD3	1.5	3.0	3.6	V

8. Power Up Sequence



9. DC / RF Characteristics

Conditions: 25℃, VDD1,VDD2 and VDD3 = 3.0V

Current consumption

Items	Status	Min	Typ	Max	Unit
DEEP SLEEP mode	DEEP SLEEP mode		260		nA
SLEEP mode	SLEEP mode		850		nA
IDLE mode channel 5	IDLE_PLL mode		19		mA
IDLE mode channel 9	IDLE_PLL mode		33		mA
IDLE_RC mode	IDLE_RC mode		8		mA
Current consumption@ continuous TX/RX	TX CH5(nominal power@ -41.3dBm/MHz)		48		mA
	TX CH5(maximum power@-32dBm/MHz)		59		mA
	TX CH9(nominal power@ -41.3dBm/MHz)		59		mA
	TX CH9(maximum power@-32dBm/MHz)		64		mA
	RX CH5		72		mA
	RX CH9		88		mA

Receiver Characteristics (UWB)

Items	Min.	Typ.	Max.	Unit
Frequency range	6000		8500	MHz
Center Frequency Channel 5		6489.6		MHz
Channel bandwidths		499.2		MHz
Minimum Input Level Sensitivity				
Data Rate 850 kbps (PER < 1%)		-100		dBm/500MHz
Data Rate 6.8 Mbps (PER < 1%)		-92		dBm/500MHz
Data Rate 27 Mbps (PER < 1%)		TBD		dBm/500MHz

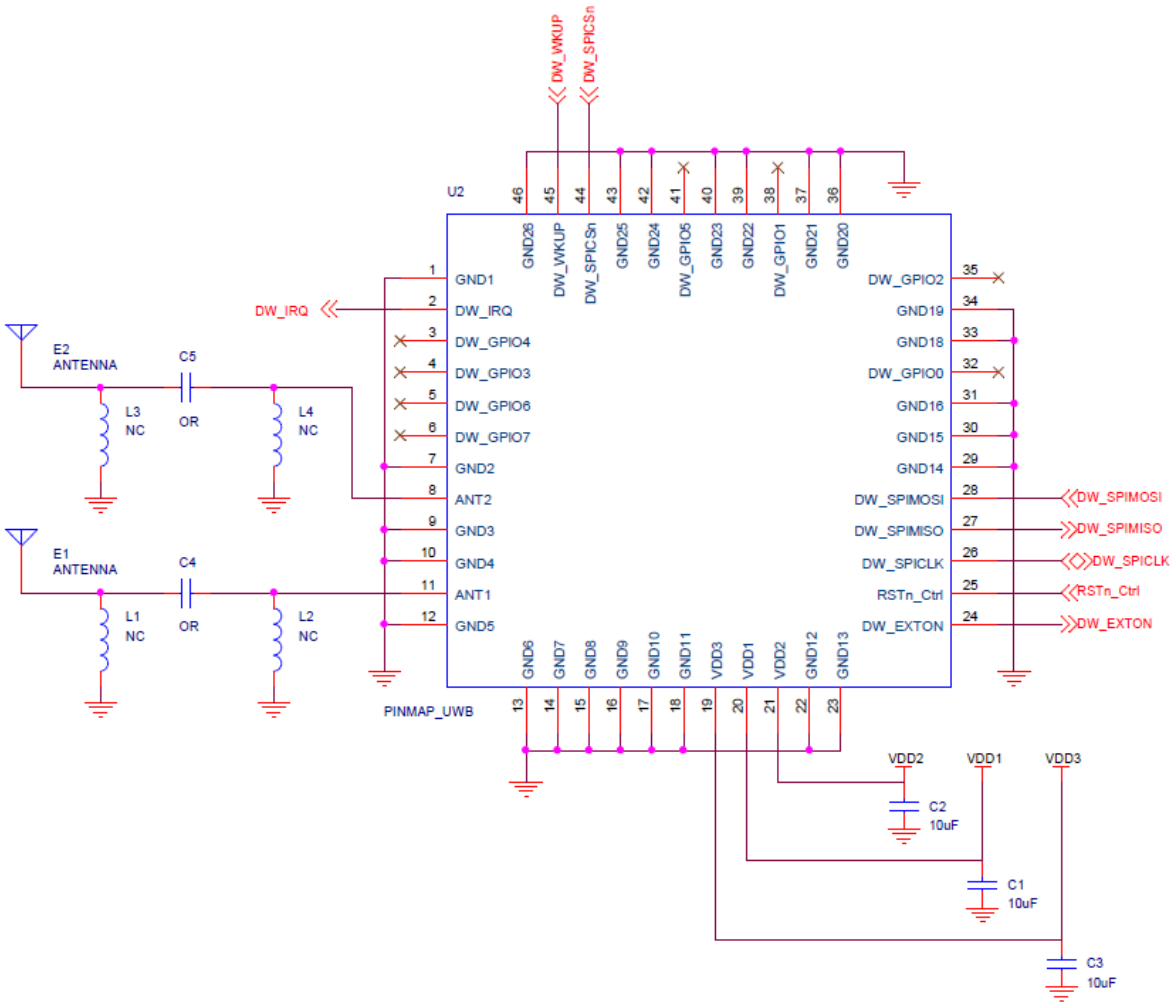
Items	Min.	Typ.	Max.	Unit
Frequency range	6000		8500	MHz
Center Frequency Channel 9		6489.6		MHz
Channel bandwidths		499.2		MHz
Minimum Input Level Sensitivity				
Data Rate 850 kbps (PER < 1%)		-99		dBm/500MHz
Data Rate 6.8 Mbps (PER < 1%)		-91		dBm/500MHz
Data Rate 27 Mbps (PER < 1%)		TBD		dBm/500MHz

Transmitter Characteristics (UWB)

Items	Min.	Typ.	Max.	Unit
Frequency range	6250		8250	MHz
Center Frequency Channel 5		6489.6		
Center Frequency Channel 9		7987.2		
Channel bandwidths		499.2		MHz
Output Power spectral density (programmable)*1			-41.3	dBm/MHz
Output Chanel Power		-18.5		dBm
Output Power variation with temperature		TBD		dB/℃
Output Power variation with voltage		TBD		dB/V

*Using the pre-loaded embedded firmware of the 2AB module, otherwise see the DW3000 datasheet.

10. Reference Circuit

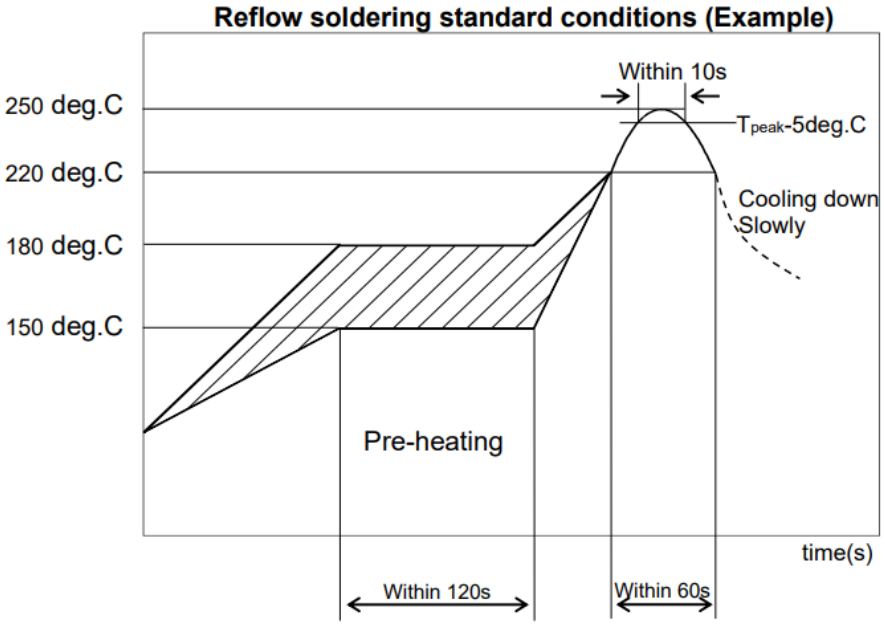


11. Other Specification and Methods

Soldering Conditions

The recommendation conditions of soldering are as in the following figure.

Soldering must be carried out by the mentioned conditions to prevent products from damage. Set up the highest temperature of reflow within 260 °C. Contact Goertek Microelectronics before use if concerning other soldering conditions.



Please use the reflow within 2 times.

Use rosin type flux or weakly active flux with a chlorine content of 0.2 wt % or less.

12. Tape and Reel Packing

TBD