

AMO UWB Module(SR150)

Rev 0.3
(ASMOP1BO0N1)



Revision	Contents	Date
0.1	New	26th, October, 2020.
0.2	Revision	9th, February, 2021.
0.3	Revision	9th, June, 2021

9th, June, 2021

AMONSENSE Co., LTD.

Notes

The contents of this data sheet are subject to change without notice. Please confirm the specifications and delivery conditions when placing your order.

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1. Introduction

The UWB module is based on NXP's SR150 Ultra Wideband (UWB) transceiver IC. It integrates all RF circuitry, power management and clock circuitry in one module compliant to IEEE 802.15.4 HRP UWB PHY.

It can be used for 2-way ranging measurement and TDoA based one way ranging.

Embedded PHY and MAC compatible with FiRa consortium specification

1.1 Key Features

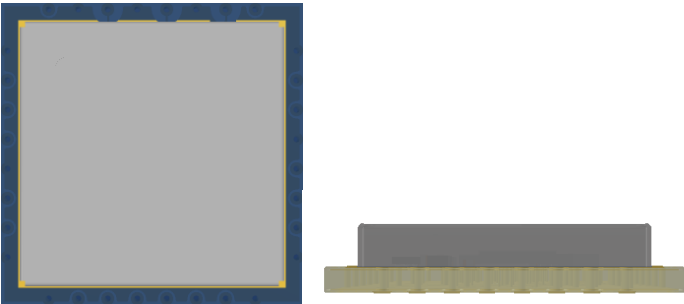
AMO UWB SR150 Module	
	
ANT Type	• External Antenna
Size	• 13mm x 13 mm x 2.7mm
Interface	• Host interface is SPI, Secure element interface is I2C
Main ICs	• SR150, ARM® Cortex-M33 32 Bit processor (SR150 is not customer programmable so these flash and RAM/ROM are not available to end customer.)
Reference Clocks	• 38.4MHz clock • 32.768KHz clock
Frequency Band	• 6.24 GHz ~ 8.24 GHz
Supply Voltage	• 3.0 to 3.6 (Typ. 3.3) V
Output Power	• MAX +12 dBm
Package	• Metal shield can

Table 1. Key Features

* Shield can size : 11.5mm x 11.5mm x 1.65mm

1.2 Applications

- ① IOT applications
- ② Consumer devices
- ③ Smart home devices
- ④ RTLS anchor etc.

2. Part Numbering

[Example]

Device Family

AS MO P 1B O 0 N 1

Company name

AS = AMOSENSE

Device type

MO = Module, DT = Tag, DA = Anchor

Type

P = PCB, F = FPCB, K = Package

Chipset

1B = SR150, 1C = SR040

Configuration

O = UWB Only, B = UWB + BLE(MCU), M = UWB + MCU

MCU Part number

0 = UWB Only, 1 = QN9090

Antenna

N = Non, A = Antenna, R = Receptacle, S = SMA

Version

1

Note : Provisional designation

3. Module Block Diagram

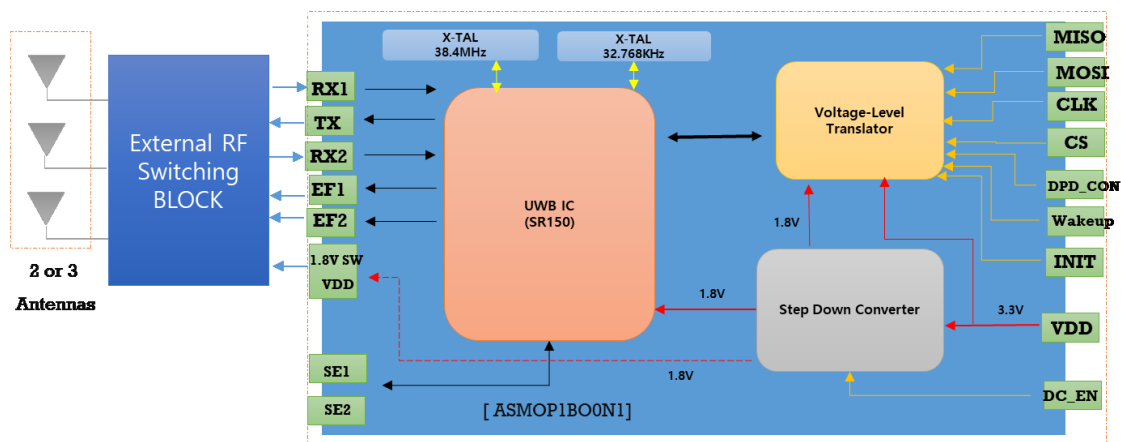


Figure 1. Block Diagram of AMO UWB Module

4. Module Characteristics

4.1 Electrical Characteristics

Parameter	Min	Typ.	Max	Unit
Supply Voltage(VDD)	3.0	3.3	3.6	V
Current Consumption			180	mA
Operating Temperature	-30	25	+85	°c
RF Input Power	-	-	7	dBm
ESD (Human Body Model)			2000	V

Table 2. Electrical Characteristics

4.2 RF Characteristics

- T = 25°C, VDD = 3.3 V (typ.)

Parameter	Condition	Min	Typ.	Max	Unit
Frequency Range		6.24	-	8.24	GHz
TX Output Power	CW		12		dBm
	CH5 during preamble peak		10.5		
	CH9 during preamble peak		11.5		
Data Rate		0.85	6.8	31.2	Mbps
AOA accuracy	SNR \geq 34dB at input	-3		+3	Deg
	26dB \leq SNR < 36dB at input	-10		+10	
ToF accuracy	LOS when STS is used	-10		+10	Cm
	NLOS when STS is used	-20		+20	
RF Sensitivity	Single / 6.8 Mbps		-93		dBm
	Dual / 6.8 Mbps		-94		

Table 3. RF Characteristics

5. Module Package

5.1 Pinout Description



Figure 2 : Pinout Description(Bottom View)

5.2 Pin Description Box

PIN	PIN Name	PIN Type	Description
P1	EF_2	I/O	External front-end Control 2
P2	GND	G	Ground supply
P3	RX1_HELIOS	I	RX1 IN
P4	GND	G	Ground supply
P5	RX2_HELIOS	RX	RX2 IN
P6	GND	G	Ground supply
P7	TX_OUT	O	TX OUT
P8	EF_1	I/O	External front-end Control 1
P9	GND	G	Ground supply
P10	SE_1	I/O	clock for the secure element I2C interface
P11	SE_2	I/O	SDA connection for secure element I2C interface
P12	GND	G	Ground supply
P13	GPIO8	I/O	GPIO8
P14	GPIO03_WAKEUP_OUT	I/O	Host wakeup
P15	GPIO05_SENSORINT_OUT	I/O	GPIO05
P16	GND	G	Ground supply
P17	GND	G	Ground supply
P18	DPD_MNG_OUT	I/O	Deep Power Down control
P19	CHIP_EN_OUT	I/O	connection for disabling/ enabling the chip
P20	HOST_4_OUT	I/O	MISO connection for the SPI host interface
P21	HOST_3_OUT	I/O	MOSI connection for the SPI host interface
P22	HOST_2_OUT	I/O	Slave select connection for the SPI host interface
P23	HOST_1_OUT	I/O	clock for the SPI host interface
P24	GND	G	Ground supply
P25	GND	G	Ground supply
P26	1V8_UWB	P	1.8V RF Switch Power output
P27	DCDC_EN	I/O	DC/DC Enable control
P28	GND	G	Ground supply
P29	VDD	P	3.3V Power supply
P30	VDD	P	3.3V Power supply
P31	VDD	P	3.3V Power supply
P32	GND	G	Ground supply

Table 4. Pin Description

5.3 Module Dimension or Footprint

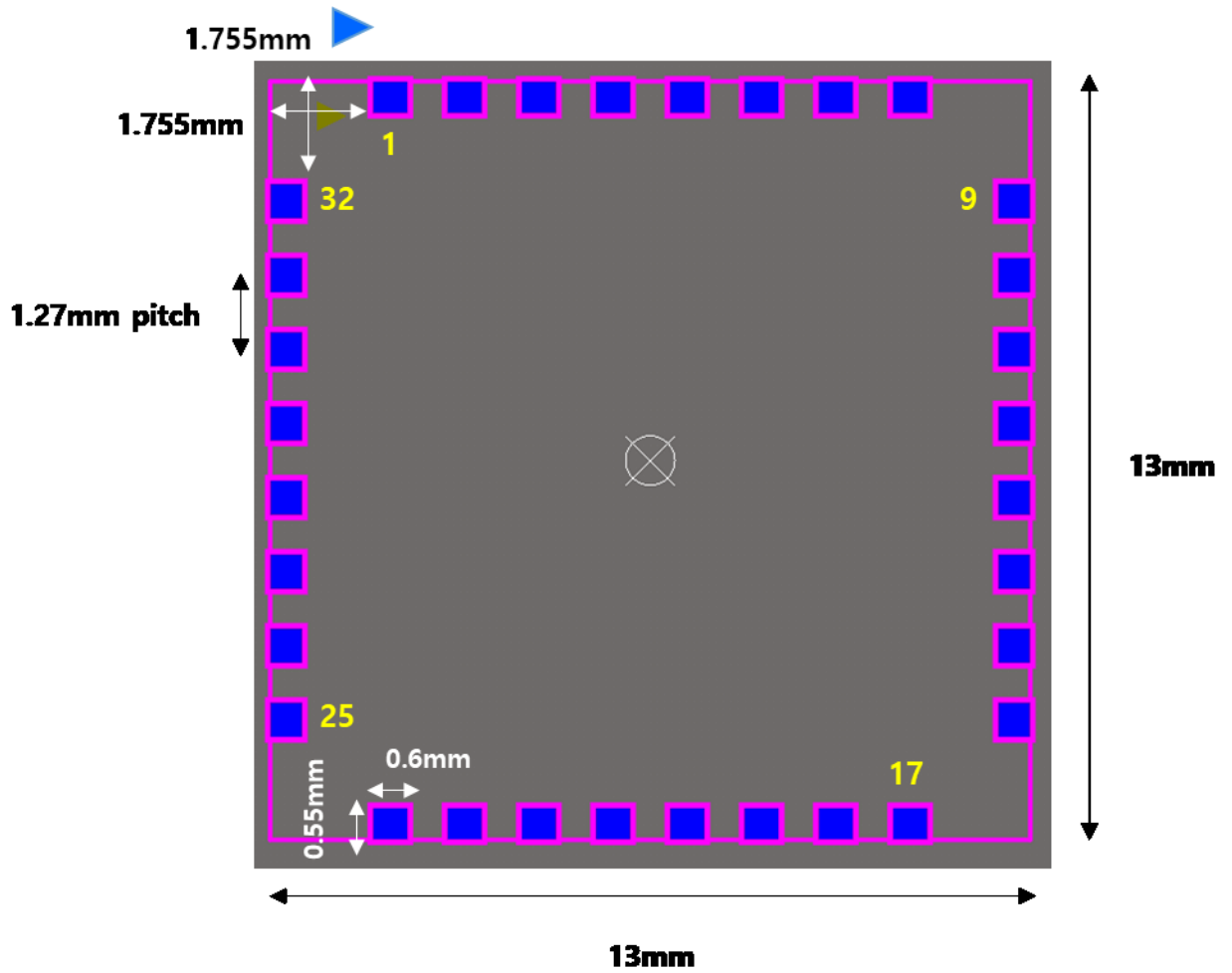


Figure 3. Pin Dimension or Footprint (TOP View)

6. Packing

Description	Data
Module Dimension	13mm*13mm*2.7mm
Reel Carrier Pocket	24W*20P
Reel Cover Tape	21.3mm*480m
Module Quantity	1K

Table 5. Reel Packing Description

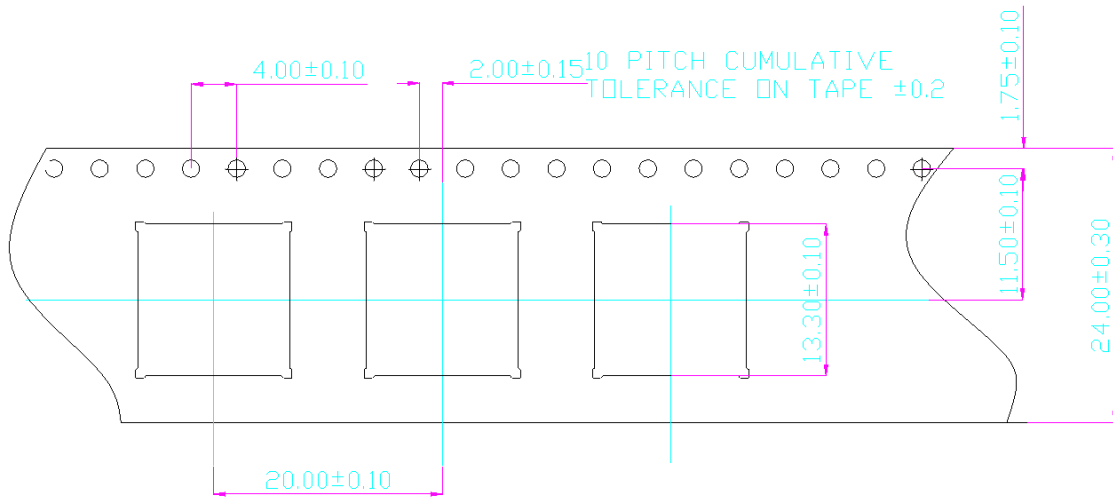


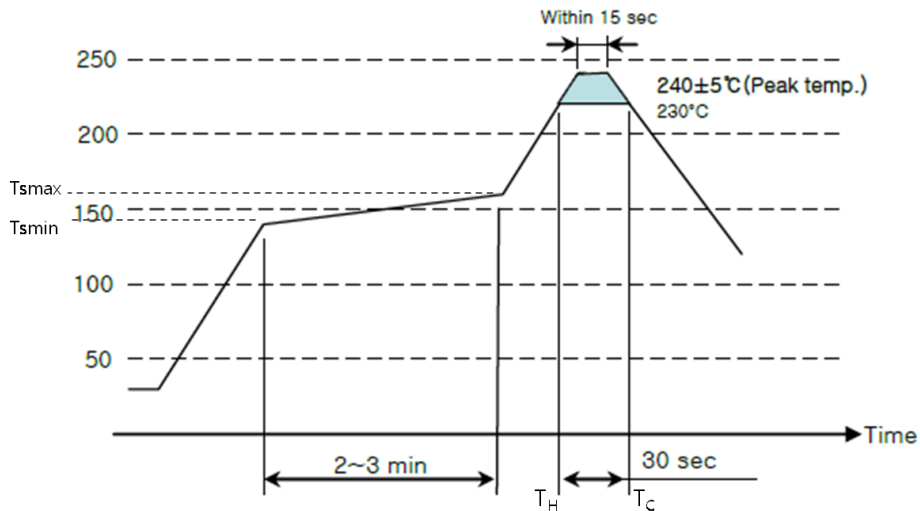
Figure 4. Reel Packing

7. Soldering Condition

7.1 Manual Soldering – Pb Free

- ① Soldering Temperature: $360^{\circ}\text{C} \pm 5^{\circ}\text{C}$, 5sec max.
(Solder : Sn /Ag /Cu : 96.5 /3.0 /0.5)
- ② Moisture sensitivity precautions, as indicated on the packing, must be respected at all times

7.2 Recommended Reflow Condition – Pb Free



Profile Feature	Pb-Free Assembly
Preheat	
-Temperature Min (T_{smin})	-140°C
-Temperature Typical ($T_{stypical}$)	-150°C
-Temperature Max (T_{smax})	-160°C
-Time T_{smin} to T_{smax}	-2 ~ 3 min
Peak Temperature	240±5°C
Time of actual peak temperature	Max. 15 seconds

Heating to Cool	
-Temperature Heating (T_H)	-230°C
-Temperature Cool (T_C)	-230°C
-Time T_H to T_C	-30 seconds