

# AMO UWB Module

## (SR040 with embedded antenna)

**Rev 0.3**  
(ASMOP1CO0A1)



Revision	Contents	Date
0.1	New	7th, September, 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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## Table Of Contents

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- 1. Introduction**
  - 1.1 Key Features
  - 1.2 Applications
  
- 2. Part Numbering**
  
- 3. Module Block Diagram**
  
- 4. Module Characteristics**
  - 4.1 Electrical Characteristics
  - 4.2 RF Characteristics
  
- 5. Module Package**
  - 5.1 Pinout Description
  - 5.2 Pin Description Box
  - 5.3 Module Dimensions or Footprint
  
- 6. Packing**
  
- 7. Soldering Condition**
  - 7.1 Manual Soldering – Pb Free
  - 7.2 Recommended Reflow Condition – Pb Free

## 1. Introduction

The UWB module is based on NXP's SR040 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

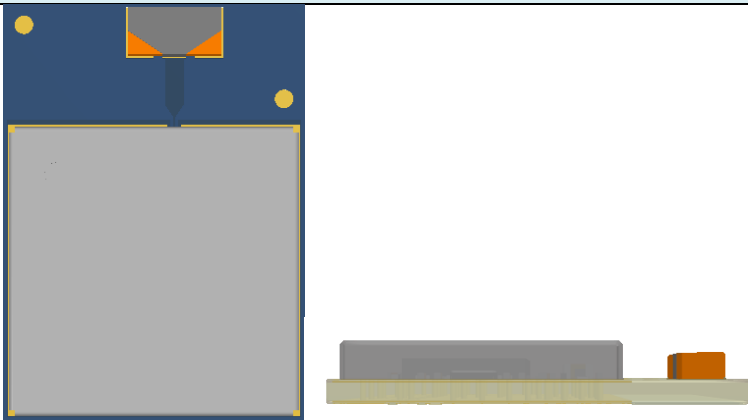
AMO UWB SR040 Module with embedded antenna	
	
<b>ANT Type</b>	• Internal Antenna
<b>Size</b>	• 13mm x 18 mm x 2.7mm
<b>Interface</b>	• SPI(Host)
<b>Main ICs</b>	• SR040, ARM® Cortex-M33 32 Bit processor (SR040 comes with onboard flash to accommodate fixed FW.)
<b>Reference Clocks</b>	• 55.2MHz clock
<b>Frequency Band</b>	• 6.24 GHz ~ 8.24 GHz
<b>Supply Voltage</b>	• 1.8 to 3.6 (Typ. 3.3) V
<b>Output Power</b>	• MAX +12 dBm
<b>Package</b>	• Metal shield can

Table 1. Key Features

\* Shield can size : 12.25mm x 12.25mm x 1.65mm

## 1.2 Applications

- ① IOT application
- ② UWB Trackers
- ③ UWB Tags

## 2. Part Numbering

[ Example ]

Device Family

AS MO P 1C O 0 A 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

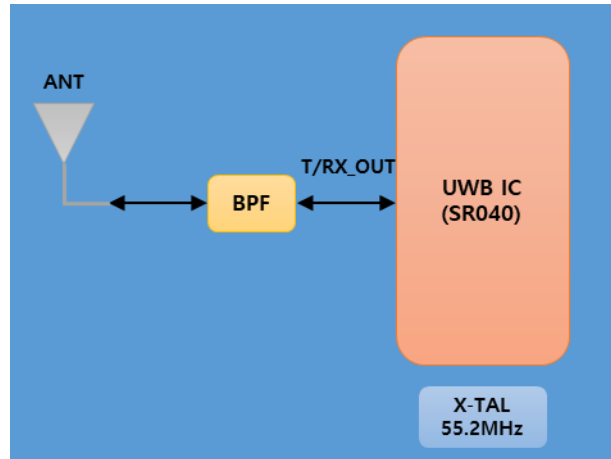


Figure 1. Block Diagram of AMO UWB Module

### 4. Module Characteristics

#### 4.1 Electrical Characteristics

Parameter	Min	Typ.	Max	Unit
Supply Voltage(VDD)	1.8	3.3	3.6	V
Operating Temperature	-30	25	+85	°C
RF Input Power(UWB signal)	-20	-	-	dBm
ESD (Human Body Model)			2000	V

Table 2. Absolute Maximum Ratings

## 4.2 RF Characteristics

- T = 25°C, VDD = 3.3 V (typ.)

Parameter	Condition	Min	Typ.	Max	Unit
<b>Frequency Range</b>		6.24	-	8.24	GHz
<b>TX Output Power</b>	Programmable transmitter output power	-	12	-	dBm
<b>RF Sensitivity</b>	6.8 Mbps Data rate	-	-	-92	dBm
<b>Supply Current</b>	Hard Power Down State (HPD)	-	500	-	nA
	DPD State retention mode	-	550	-	uA
	DPD without state retention	-	5	-	uA
	Active State, CPU running	-	5.1	-	mA
<b>Current Consumption</b>	Active State RX	-	131		mA
	Active State TX 12dBm	-	115		mA
	SR040 is dedicated to battery operated UWB devices, embedded PMU enable operation from a coin cell battery				

\* Current limiter : Configurable current limit from 5 mA to 20 mA, in steps of 1 mA

Table 3. RF Characteristics

## 5. Module Package

### 5.1 Pinout Description

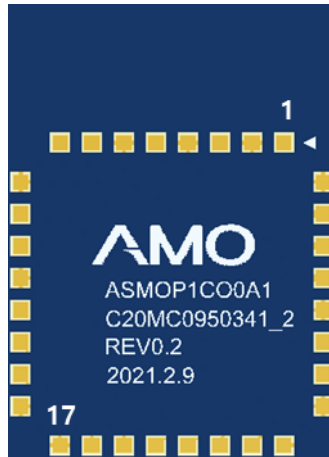


Figure 2 : Pinout Description(Bottom View)

### 5.2 Pin Description Box

PIN	PIN Name	PIN Type	Description
P1	NC		
P2	GND	G	Ground supply
P3	NC		
P4	GND	G	Ground supply
P5	RF_TX/RX1	RF	TX/RX
P6	GND	G	Ground supply
P7	NC		
P8	NC		
P9	GND	G	Ground supply
P10	NC		
P11	NC		
P12	GND	G	Ground supply
P13	NC		
P14	RST_N	I	Reset input
P15	RDY_N	I/O	Ready output
P16	GND	G	Ground supply
P17	GND	G	Ground supply

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P18	INT_N	I/O	Interrupt output
P19	PA_ENBL	I/O	Gating signal for an optional external PA
P20	SPI_MISO	I/O	MISO connection for the SPI host interface
P21	SPI_MOSI	I/O	MOSI connection for the SPI host interface
P22	SPI_CS	I/O	Slave select connection for the SPI host interface
P23	SPI_SCK	I/O	clock for the SPI host interface
P24	GND	G	Ground supply
P25	GND	G	Ground supply
P26	NC	P	
P27	NC	I/O	
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**

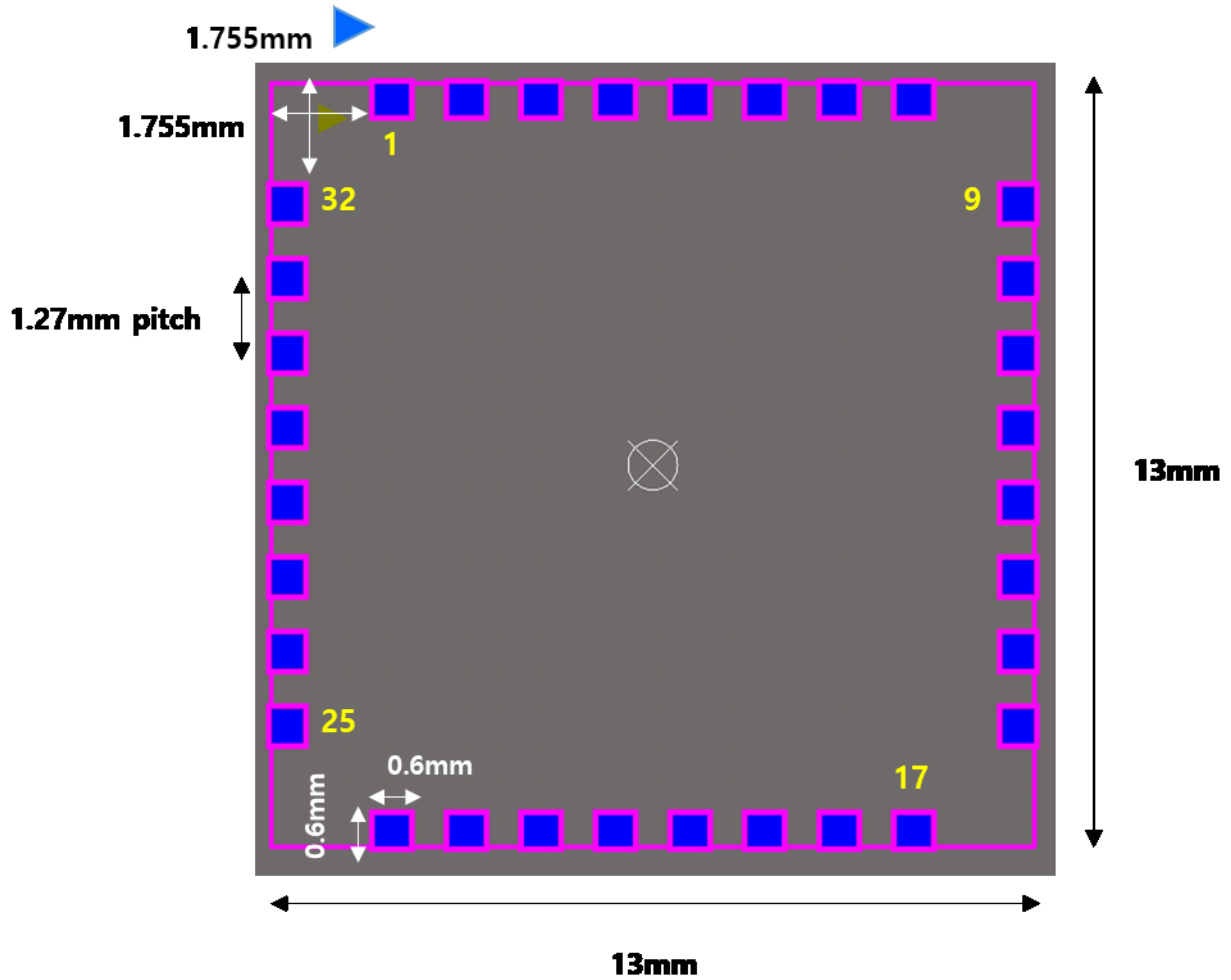


Figure 3. Pin Dimension or Footprint (TOP View)

## 6. Packing

Description	Data
Module Dimension	13mm*18mm*2.7mm
Reel Carrier Pocket	32W*20P
Reel Cover Tape	25.5mm*480m
Module Quantity	1K

Table 5. Reel Packing Description

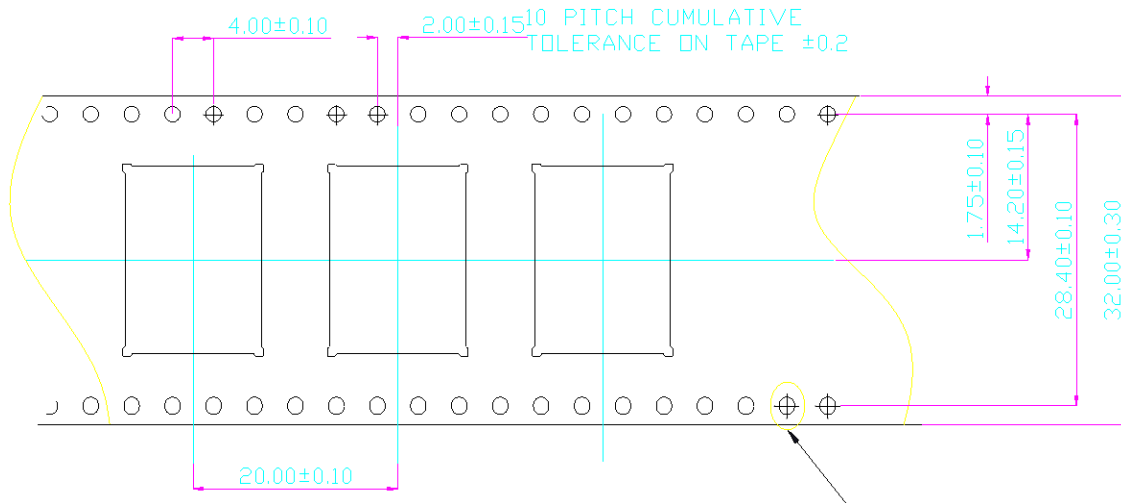


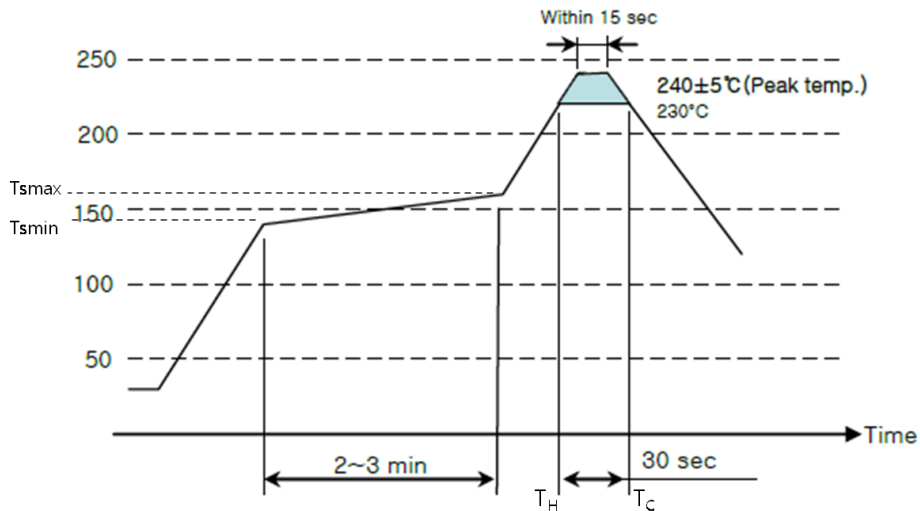
Figure 4. Reel Packing

## 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