

UWB SR150 Module

Part Number : ASMOP1BO0N1

1. Main features

- Supports SHF UWB bands from 6.24 GHz to 8.24 GHz for worldwide use
- Programmable transmitter output power of up to +12dBm
- Data rates of 110 kbps, 850 kbps, 6.8 Mbps, 7.8 Mbps
- Supports 2-way ranging and TDOA measurement
- Supports Angle of Arrival (AoA) Measurement
- ARM® Cortex-M33 32-bit Processor
- Embedded PHY and MAC compatible with FiRa consortium specification
- One I2C Interface - interface to Secure Element (SE)
- One SPI Interface
- Up to 3 GPIOs
- Up to 4 timing-critical GPOs for T/R and antenna switching
- Single Typ. 3.3V supply
- Module and Shield CAN size : 13mm x 13mm x 2.7mm

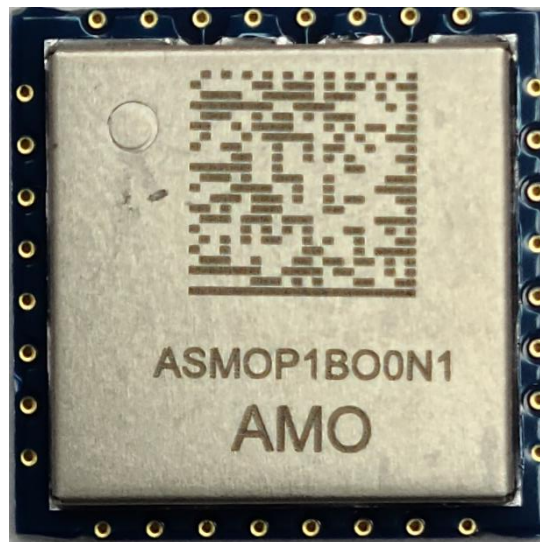


Figure 1. UWB SR150 Module(Top View)

2. Module Block Diagram

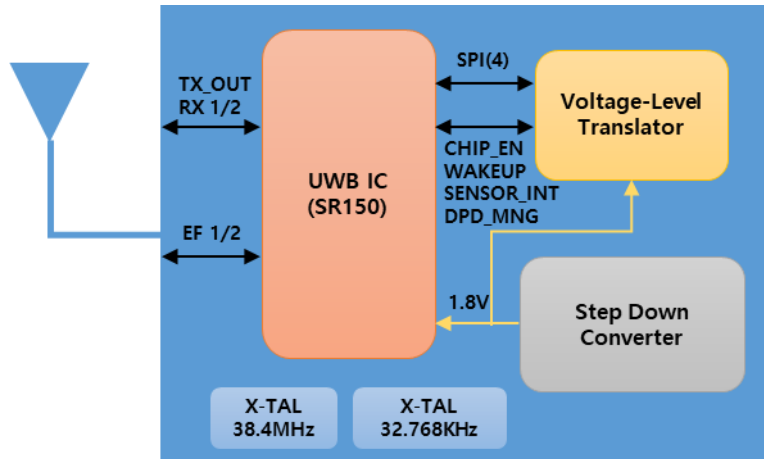


Figure 2. Block Diagram of UWB SR150 Module

3. UWB SR150 Module Pin Diagram

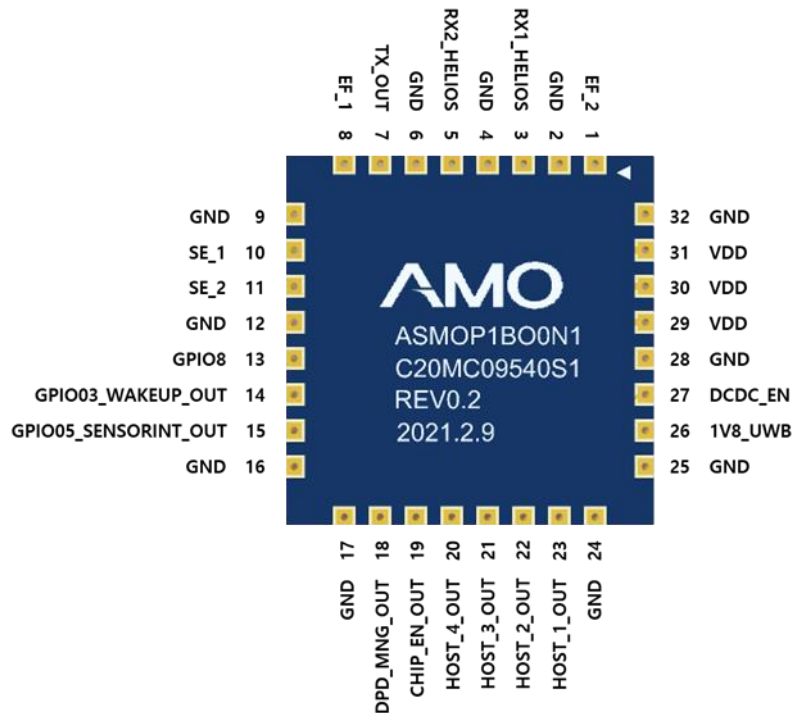


Figure 3 : Pinout Description(Bottom View)

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 Power supply
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 1. Pin Description

4. Reference Circuit

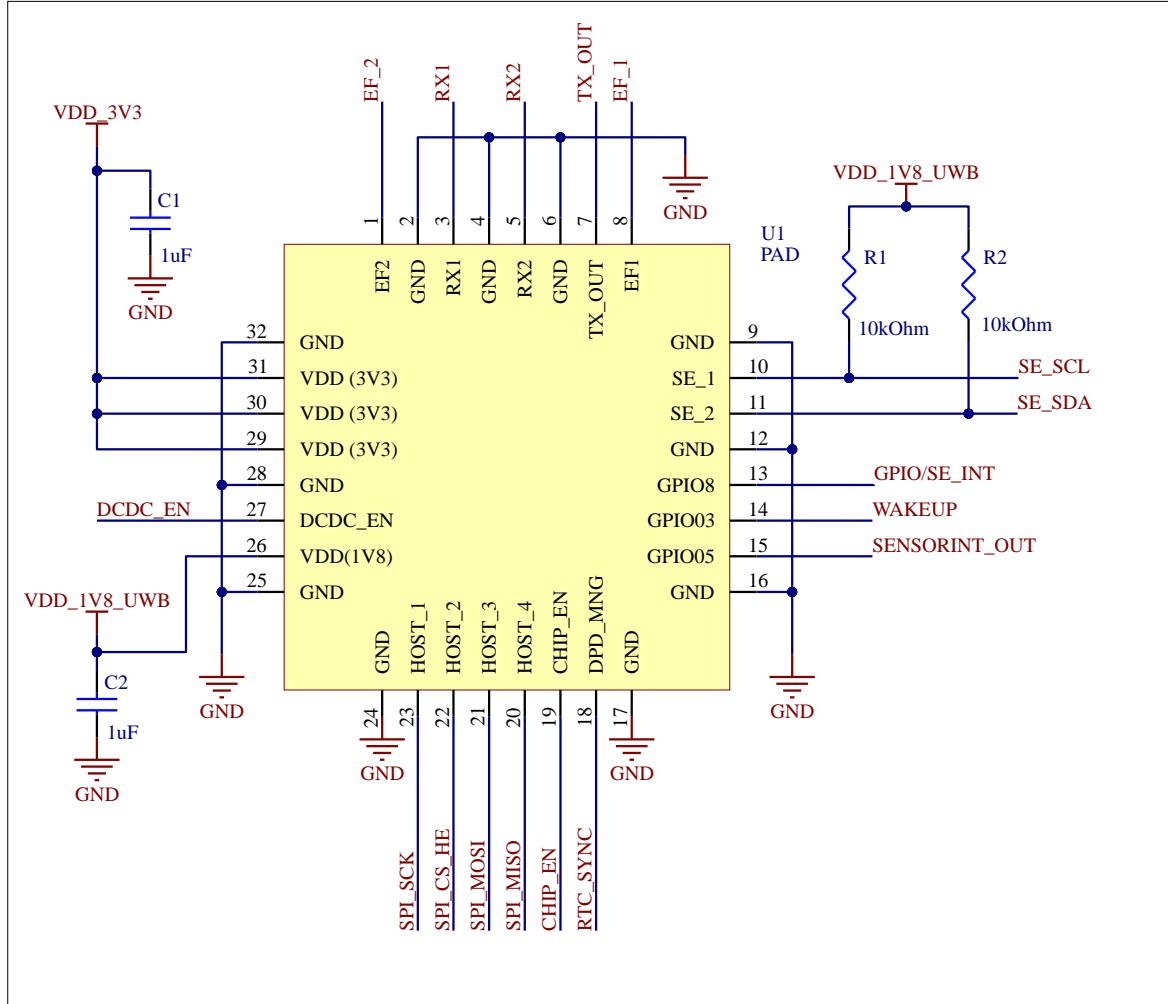


Figure 4 : UWB SR150 Module Reference Circuit

5. Host interface (SPI)

These connections are used for communication between host and SR150 via SPI bus.

Pin	functionality	HW connection when used	HW connection when NOT used
Host connection			
Host_1	SCK (Serial input Clock)	host	Must be connected
Host_2	NSS (Not Slave Select)	host	Must be connected
Host_3	MOSI (Master Out Slave In) Data input	host	Must be connected
Host_4	MISO (Master In Slave Out) Data output	host	Must be connected
GPIO05_SENSORINT	IRQ sent to the Host to let it know data are available for read	host	Must be connected
CHIPENABLE	connection for the HOST to disable/enable the chip	host	Must be connected
RTC_SYNC	DPD management	host	Must be connected
GPIO03	SPI Rx Handshake from Host to SR150	host	Must be connected

Table 2. Host interface

6. Secure Element (SE) interface

I2C Connections with SE for secure ranging are described below.

Pin	functionality
SE_1	SCL 10k pull up to VDD 1V8 to be tune according to I2C line shape analysis
SE_2	SDA (secure keys generated by SE exchange with Helios) 10k pull up to VDD 1V8 to be tune according to I2C line shape analysis
GPIO8	Host Secure Element interrupt (IRQ flag to indicate that data are ready to be shared via I2C)

Table 3. Secure Element (SE) interface

7. Antenna switch control GPIOs

Specific GPIOs are used for antenna switching. Fast switching antenna capability must be available offering the capability to switch the antenna between transmitted packets.

Pin	Supply reference	functionality
EF1 EF2	VDD_IO	High switching speed general purpose IO used for antenna external switches, switching time is dependent on the end control point, 125ns when controlled by ARM, 33ns when controlled by the DSP

Table 4. Antenna switch control GPIOs

8. Power interface

UWB SR150 Module needs several external power supplies to work.

Parameter	Min	Typ.	Max	Unit
Supply Voltage(VDD)	1.8	3.3	3.6	V

Table 5. Power interface

9. RF connections

SR150 has 2 RF inputs (RX1, RX2) and one RF output (TX). These 3 RF ports can be connected to 2 antennas. As TX and RX2 share one antenna, an RF SPDT switch is needed. The same RF switch is therefore implemented on RX1 path to guarantee the same path characteristics (insertion loss, electrical delay).

Below schematic depicts the connection from SR150 to the antenna. In this configuration ranging and 2D AoA are fulfilled.

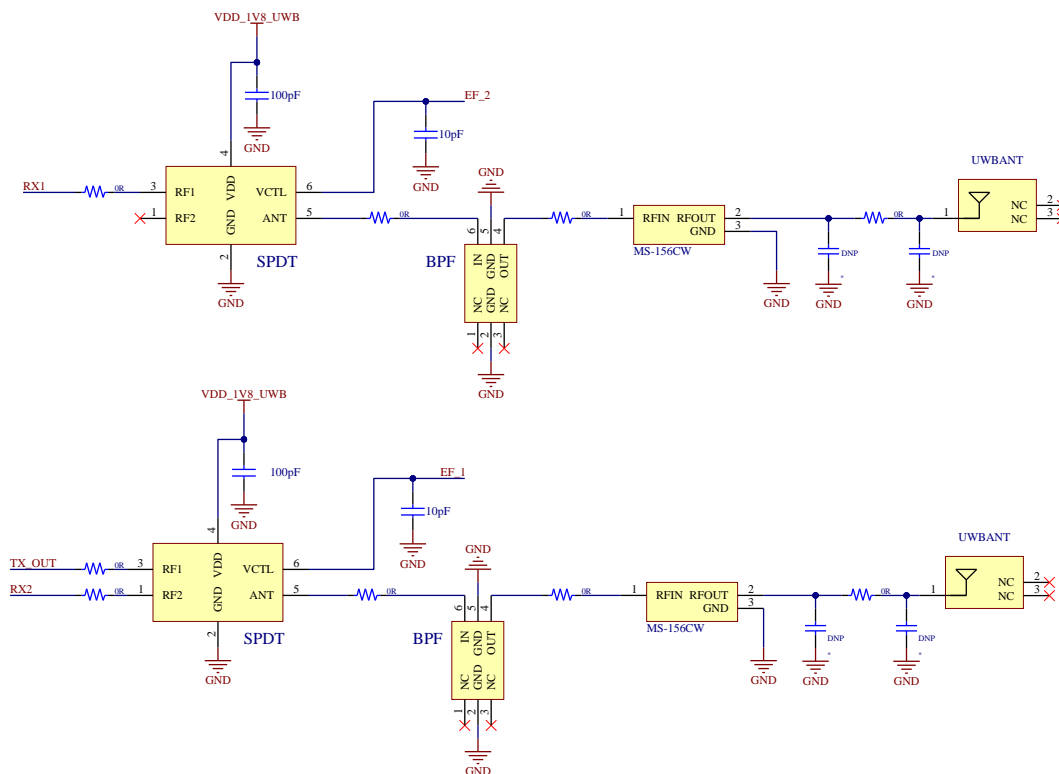


Figure 5 : UWB SR150 Module 2D AoA configuration