

39mm*50mm

TI
xWR1843

76~81GHz
45nm RFCMOS

ARM-Cortex
R4F 200MHz

C674x
DSP 600MHz

2048KB
QSPI Flash

Introduction

The DJ-xWR1843 is a radar module developed by Shenzhen Haitianxiong Electronics Co., Ltd. based on Texas Instruments' xWR1843 millimeter wave radar sensor. The module size is only 39mm*50mm. The module integrates IWR1843 or AWR1843 chip, PMIC, Flash, Temperature Sensor, Micro USB and crystal oscillator, a set of dual-row pins on the board, lead to JTAG, UART, SPI, I²C, SYNC and power supply and other required functional signal interfaces, on-board PCB antenna.

The XDS110 simulation debugging board matched with the module is used for the evaluation and development of the xWR1843 sensor. Its size is 39mm*68mm.

xWR1843 chip introduction

[xWR1843 chip can be divided into IWR1843 and AWR1843.](#)

Same:

The xWR1843 device is an radar sensor capable of operation in the 76 to 81 GHz band, and has continuous chirp up to 4GHz. The device is built with TI's low-power 45nm RFCMOS process and enables unprecedented levels of integration in an extremely small form factor. The xWR1843 is an ideal solution for low-power, self-monitored, ultra-accurate radar systems.

The xWR1843 device is a self-contained FMCW radar sensor single-chip solution. Because it adopts TI's low-power 45nm RFCMOS process, a chip with built-in PLL, A2D converter and 3Tx, 4Rx systems is constructed. It integrates the DSP subsystem and hardware acceleration module (HWA). The DSP subsystem adopts high-performance c674x DSP of TI for radar signal processing. The hardware acceleration module helps to save MIPS on DSP and realize higher level algorithm. The device includes a ARM-R4F processor subsystem, which is responsible for radio configuration, control, and calibration.

Different:

IWR1843 is mainly used in the industrial field, and can be used in building automation, factory automation, UAV, material processing, traffic monitoring and monitoring, etc.; while AWR1843 is more inclined to the automotive category, and its chip has an additional integrated automobile interface that can provide users with programming.

Application

IWR1843

- Area scanner
- Intelligent / automatic door opening device
- Gesture recognition
- Range measurement
- Remote personnel detection
- People counting
- Robotics
- Traffic monitoring
- Vital signs

IWR1843

- Vital signs
- Short range radar
- Mid range radar
- Obstacle detection
- Occupancy detection
- Automatic parting
- Identify multiple gestures
- Mid range radar beamsteering

IWR1843 sensor characteristics

- FMCW transceiver
 - Integrated PLL, Transmitter, Receiver, Baseband, and A2D
 - 76 to 81 GHz coverage with 4 GHz available bandwidth
 - Four receive channels
 - Three transmit channels
 - Ultra-accurate chirp engine based on fractional-N PLL
 - TX power: 12 dBm
 - RX noise figure:
 - 14 dB (76 to 77 GHz)
 - 15 dB (77 to 81 GHz)
 - Phase noise at 1 MHz
 - -95 dBc/Hz (76 to 77 GHz)
 - -93 dBc/Hz (77 to 81 GHz)
- Built-in calibration and self-test (monitoring)
 - ARM® Cortex®-R4F-based radio control system
 - Built-in firmware (ROM)
 - Self-calibrating system across frequency and temperature
- C674x DSP for FMCW signal processing
- On-chip Memory: 2MB
- Cortex-R4F microcontroller for object tracking and classification, AUTOSAR, and interface control
 - Supports autonomous mode (loading user application from QSPI flash memory)
- Integrated peripherals
 - Internal memories With ECC
- IWR1843 advanced features
 - Embedded self-monitoring with no host processor involvement
 - Complex baseband architecture
 - Embedded interference detection capability
 - Programmable phase rotators in transmit path to enable beam forming
- Power management
 - Built-in LDO network for enhanced PSRR
 - I/Os support dual voltage 3.3 V/1.8 V
- Clock source
 - Supports external oscillator at 40 MHz
 - Supports externally driven clock (square/sine) at 40 MHz
 - Supports 40 MHz crystal connection with load capacitors
- Easy hardware design
 - 0.65-mm pitch, 161-pin 10.4 mm × 10.4 mm flip chip BGA package for easy assembly and lowcost PCB design
 - Small solution size

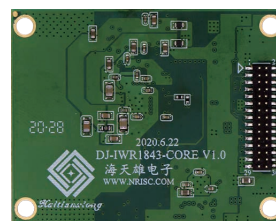
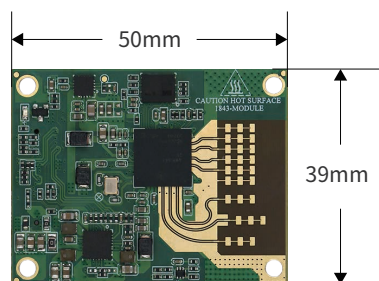
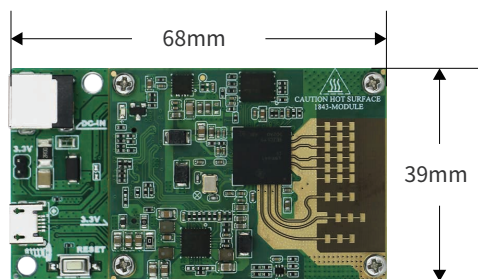
AWR1843 sensor characteristics

- FMCW transceiver
 - Integrated PLL, Transmitter, Receiver, Baseband, and A2D
 - 76 to 81 GHz coverage with 4 GHz available bandwidth
 - Four receive channels
 - Three transmit channels
 - Ultra-accurate chirp engine based on fractional-N PLL
 - TX power: 12 dBm
 - RX noise figure:
 - 14 dB (76 to 77 GHz)
 - 15 dB (77 to 81 GHz)
 - Phase noise at 1 MHz
 - -95 dBc/Hz (76 to 77 GHz)
 - -93 dBc/Hz (77 to 81 GHz)
- Built-in calibration and self-test (monitoring)
 - ARM® Cortex®-R4F-based radio control system
 - Built-in firmware (ROM)
 - Self-calibrating system across frequency and temperature
- C674x DSP for FMCW signal processing
- On-chip Memory: 2MB
- Cortex-R4F microcontroller for object tracking and classification, AUTOSAR, and interface control
 - Supports autonomous mode (loading user application from QSPI flash memory)
- Integrated peripherals
 - Internal memories With ECC
- Functional Safety-Compliant targeted
 - Developed for functional safety applications
 - Documentation is available to aid ISO 26262 functional safety system design
 - Hardware integrity up to ASIL B targeted
 - Safety-related certification
 - ISO 26262 certification by TUV Sud planned
- AEC-Q100 qualified
- AWR1843 advanced features
 - Embedded self-monitoring with no host processor involvement
 - Complex baseband architecture
 - Embedded interference detection capability
 - Programmable phase rotators in transmit path to enable beam forming
- Power management
 - Built-in LDO network for enhanced PSRR
 - I/Os support dual voltage 3.3 V/1.8 V
- Clock source
 - Supports external oscillator at 40 MHz
 - Supports externally driven clock (square/sine) at 40 MHz
 - Supports 40 MHz crystal connection with load capacitors
- Easy hardware design
 - 0.65-mm pitch, 161-pin 10.4 mm × 10.4 mm flip chip BGA package for easy assembly and lowcost PCB design
 - Small solution size
- Supports automotive temperature operating range

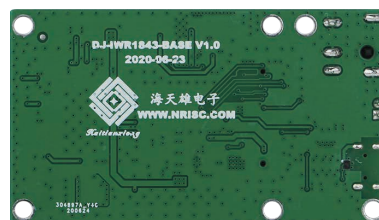
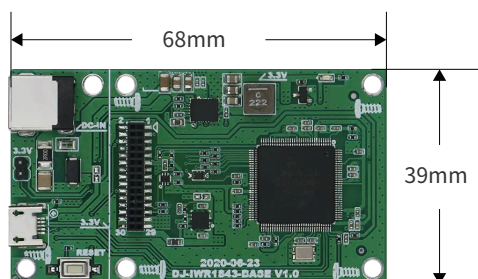
xWR1843 parameters

	IWR1843	AWR1843
CPU	ARM-Cortex R4F 200MHz	ARM-Cortex R4F 200MHz
DSP	C674x DSP 600MHz	C674x DSP 600MHz
RAM	2048KB QSPI Flash	2048KB QSPI Flash
Number of receiving antennas	4	4
Number of transmitting antennas	3	3
ADC sampling rate (Max)	25 MSPS	25 MSPS
Internal bus	JTAG, I ² C, SPI, UART	JTAG, I ² C, SPI, UART
Interface	Micro USB	Micro USB
Sensor	1 * Temperature Sensor	1 * Temperature Sensor
Hardware accelerators	Radar hardware accelerator	Radar hardware accelerator
Connector	30Pin, Connect emulator xds110	30Pin, Connect emulator xds110
Power Supply	DC 12V	DC 12V
Operating temperature range	-40 to 105 °C	-40 to 125 °C
Size	Module board:39mm*50mm Debug board:39mm*68mm	Module board:39mm*50mm Debug board:39mm*68mm
TI functional safety category	Functional Safety-Compliant	Functional Safety-Compliant

Appearance&Size



【xWR1843】



【XDS110】