mmWave Sensor module

DJ-xWR6843ISK-M

DJ-xWR6843ISK-M

Module board

Debug board

39mm*50mm	TI xWR6843	60~64GHz 45nm RFCMOS	ARM-Cortex R4F 200MHz	C674x DSP 600MHz	Radar hardware accelerator

Introduction

DJ-xWR6843ISK-M sensor module is designed and produced by Shenzhen haitianxiong Electronics Co., Ltd. based on the latest AWR/IWR6843 single chip 60GHz mmWave sensor of TI, the module is only 39mm × 50mm in size. The core module integrated includes AWR6843 (optional IWR6843) chip, PMIC, flash, EEPROM, temperature sensor, user led and crystal oscillator. A group of double row 30pin pins on the board lead out the functional signal interfaces required by JTAG, UART, SPI, I²C, sync and power supply applications, and PCB antenna on board.

DJ-xWR6843 sensor module has the characteristics of high integration and professional design, which is suitable for any millimeter wave radar products.

Debug board(optional)

DJ-xWR6843 sensor module can be installed on the simulation debugging board, which supports IWR6843 and AWR6843 sensor modules. It can be used for the evaluation of sensor module, software development and program burning. The size of debugging board is 39mm × 68mm.

xWR6843 chip introduction

xWR6843 chip can be divided into IWR6843 and AWR6843.

xWR6843 is an integrated monolithic millimeter wave sensor based on FMCW radar technology, which can work in the frequency band between 60GHz and 64ghz. Based on TI's low-power 45 nm RFCMOS process, the product achieves unprecedented integration in a very small size. Among them, IWR6843 is an ideal solution for power, self-monitoring and ultra precision radar systems in the industrial field. AWR6843 is an ideal solution to realize power, self-monitoring and ultra precision radar system in automobile field.

Classification：

Automotive mmWave radar(AWR) 6843:High precision automotive radar sensor. For obstacle detection, passenger detection, driver vital signs detection, etc.
Industrial mmWave radar(IWR) 6843:High precision industrial radar sensor. It is used for people counting, building safety, safety protection, liquid level transmitter, robot and traffic monitoring, etc. It can meet your needs of high precision range speed and angle information.

Application

IWR6843
- Measurement range temperature and speed in industry
- Automation
- Displacement sensing
- Gesture recognition
- Robotic
- Traffic monitoring
- Location awareness of adjacent targets
- Safety protection of factory automation
- People count
- Motion detection
- Occupancy detection

AWR6843
- Cabin interior induction
- Children detection
- Occupancy detection
- Safety belt reminder
- Gesture recognition
- Driver vital signs detection
- Collision detection

mmWave Sensor module

DJ-xWR6843ISK-M

IWR6843 Features

- ■ FMCW 收发器
  - Integrated PLL, Transmitter, Receiver, Baseband,and A2D
  - 60 to 64 GHz coverage with 4 GHz available bandwidth
  - Four receive channels
  - Three transmit channels
  - Supports 6-bit phase shifter
  - Ultra-accurate chirp engine based on fractional-N PLL
  - TX power::12dBm(10dBm)
  - RX noise figure:
    - ◆ 12 dB (14dB)
  - Phase noise at 1 MHz:
    - ◆ −93 dBc/Hz (92dBc/Hz)

- ■ Built-in calibration and self-test
  - ARM® Cortex®-R4F-based radio control system
  - Built-in firmware (ROM)
  - Self-calibrating system across frequency and temperature

- ■ C674x DSP for advanced signal processing

- ■ Hardware accelerator for FFT, filtering, and CFAR processing

- ■ ARM-R4F microcontroller for object detection, and interface control
  - Supports autonomous mode (loading user application from QSPI flash memory)

- ■ Internal memory with ECC
  - IWR6843: 1.75 MB, divided into MSS program RAM (512 KB), MSS data RAM (192 KB), DSP L1 RAM (64KB) and L2 RAM (256 KB), and L3 radar data cube RAM (768 KB)
  - Technical reference manual includes allowed size modifications

- ■ Other interfaces available to user application
  - Up to 6 ADC channels (low sample rate monitoring)
  - Up to 2 SPI ports
  - Up to 2 UARTs
  - 1 CAN-FD interface
  - I²C
  - GPIO
  - 2 lane LVDS interface for raw ADC data and debug instrumentation

- ■ Hardware integrity up to SIL-2 targeted

- ■ Power management
  - Built-in LDO network for enhanced PSRR
  - I/Os support dual voltage 3.3 V/1.8 V

- ■ Clock source
  - 40.0 MHz crystal with internal oscillator
  - Supports external oscillator at 40 MHz
  - Supports externally driven clock (square/sine) at 40 MHz

- ■ Supports automotive temperature operating range
  - Junction temperature range of −40℃ to 105℃

AWR6843 Features

- ■ FMCW 收发器
  - Integrated PLL, Transmitter, Receiver, Baseband,and A2D
  - 60 to 64 GHz coverage with 4 GHz available bandwidth
  - Four receive channels
  - Three transmit channels
  - Supports 6-bit phase shifter
  - Ultra-accurate chirp engine based on fractional-N PLL
  - TX power::10dBm(12dBm)
  - RX noise figure:
    - ◆ 14 dB (12dB)
  - Phase noise at 1 MHz:
    - ◆ −92 dBc/Hz (93dBc/Hz)

- ■ Built-in calibration and self-test
  - ARM® Cortex®-R4F-based radio control system
  - Built-in firmware (ROM)
  - Self-calibrating system across frequency and temperature

- ■ C674x DSP for advanced signal processing

- ■ Hardware accelerator for FFT, filtering, and CFAR processing

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- ■ Other interfaces available to user application
  - Up to 6 ADC channels (low sample rate monitoring)
  - Up to 2 SPI ports
  - Up to 2 UARTs
  - 2 CAN-FD interface
  - I²C
  - GPIO
  - 2 lane LVDS interface for raw ADC data and debug instrumentation

- ■ Functional Safety-Compliant targeted
  - Developed for functional safety applications
  - Documentation will be 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

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  - I/Os support dual voltage 3.3 V/1.8 V

- ■ Clock source
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  - Supports externally driven clock (square/sine) at 40 MHz
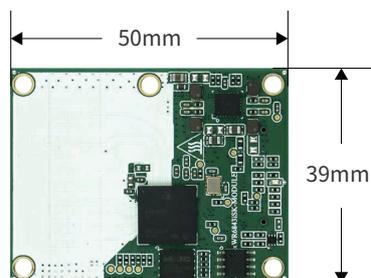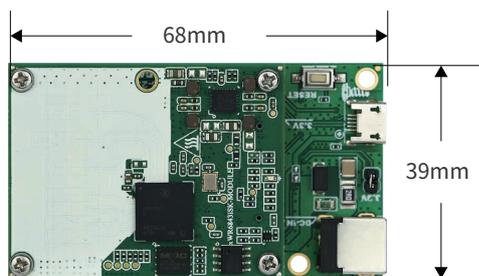
- ■ Supports automotive temperature operating range

Differences between DJ-xWR6843ISK-M and DJ-IWR6843ISK-ODS-M modules:

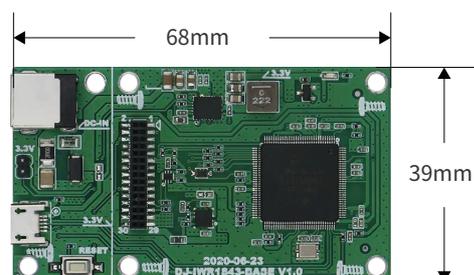|	DJ-xWR6843ISK-M	DJ-IWR6843ISK-ODS-M
support	AWR6843、IWR6843	IWR6843
Antenna form	With long distance antenna, isk standard antenna	With wide field antenna,ODS antenna

xWR6843 parameters

	IWR1843	AWR1843
Specifications	Industrial	Automotive
Frequency	60 - 64GHz	60 - 64GHz
CPU	ARM-Cortex R4F 200MHz	ARM-Cortex R4F 200MHz
DSP	C674x DSP @ 600MHz	C674x DSP 600MHz
RAM	1792	1792
Number of receiving antennas	4	4
Number of transmitting antennas	3	3
ADC sampling rate (Max)	25 MSPS	25 MSPS
Internal bus	I²C, QSPI,UART,GPIO	I²C, QSPI,UART,GPIO
Interface	Micro USB	Micro USB
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 ℃	-40 to 125 ℃
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

68mm   39mm

50mm   39mm 【Module board 】

68mm   39mm 【 Debug board 】