

Durable Bluetooth® LE connections for safety critical applications

KW39/38/37 Bluetooth 5.0 Long-Range MCUs with High Reliability, CAN FD and LIN Bus Options

KW39/38/37 wireless MCUs feature AEC-Q100 Grade 2 and industrial qualifications along with Bluetooth long-range technology for exceptional durability and performance for safety-critical applications such as automotive, and industrial controls.

OVERVIEW

KW39/38/37 wireless MCUs integrate long-range capability with Bluetooth Low Energy version 5.0 and generic FSK radio. Achieving -105 dBM sensitivity with LE-coded 125 kbit/s data rate allows for connections in harsh environments and at extended distances. The innovative data stream buffer allows the capture of radio parameters without stalling processor or DMA operations. This capability enables high-accuracy measurements needed for distance and angle approximations. The radio supports up to 8 simultaneous secure connections in any master/slave combination allowing multiple authorized users to communicate with the device.

The KW38 MCU additionally integrates FlexCAN, helping enable seamless integration into an automobile's in-vehicle or industrial CAN communication network. The FlexCAN module can support CAN's flexible data rate (CAN FD) for increased bandwidth and lower latency.

TARGET APPLICATIONS

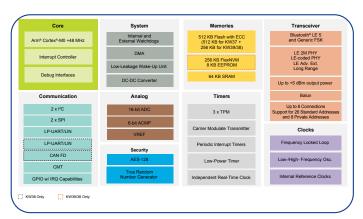
Automotive

- Car access
- Car sharing
- ▶ Passive entry/passive start (PEPS) systems
- In-vehicle sensors
- ▶ Wireless onboard diagnostic functions

Industrial

- ▶ Building control and monitoring
- Fire and safety
- ▶ Home and institutional healthcare
- Asset management and monitoring

KW39/38/37 WIRELESS MCU FAMILY BLOCK DIAGRAM





FEATURES

All MCUs in this family contain an integrated buck DC-DC converter that supports operating voltages from 2.1-3.6 V and helps to reduce significantly the peak current in receive and transmit modes to extend the useful life of a battery. At the same time, this family delivers an excellent link budget that helps ensure the longest range of communication and a high immunity to interference.

This family has up to 512 kB flash memory with ECC and 64 kB SRAM allowing plenty of space for protocol stacks, application profiles and custom user firmware. In addition, the radio can provide the necessary information in order to accurately estimate the distance (ranging) of a remote Bluetooth LE device to determine its position. For automotive applications, KW39A/38A/37A devices are AEC-Q100 Grade 2 qualified and are provided in 7 mm x 7 mm 48HVQFN packages with "wettable" flank package technology enabling optical inspection of soldering, helping to reduce cost and increase reliability.

ENABLEMENT

Take advantage of the complete enablement package that includes the fully certified Bluetooth LE 5.0 host and controller stacks, Bluetooth LE application profiles in source, generic FSK software protocol, RTOS, development tools and IDEs. These tools are designed for use with KW39/38/37 MCUs and are fully integrated in the MCUXpresso software and tools suite.

KW39/38/37 WIRELESS MCU FAMILY FEATURES AND BENEFITS

Features	Benefits	
Bluetooth® LE 5 long range, advertising extensions and high speed with 8 simultaneous connections	Supports simultaneous secure connections in any master/slave combination Keeps all connections alive for continuous monitoring	
-105 dBm typical Bluetooth® LE sensitivity in 125 kbit/s -98 dBm typical Bluetooth LE sensitivity in 1 Mbit/s -101 dBm typical generic FSK (at 250 kbit/s) sensitivity +5 dBm maximum output power	High link budget improves range and lowers cost by reducing the need for external power amplifiers Integrated balun enables smaller design and reduces system costs	
Ultra-low average currents for typical Bluetooth LE configurations	Extended battery life and opportunity for battery optimizations and energy harvesting	
Excellent selectivity and blocking	• Significantly improves operation in harsh 2.4 GHz environments	
48 MHz Arm® Cortex®-M0+ core Up to 512 kB flash memory with ECC 64 kB SRAM	High-performance, low-power core with adequate memory to run Bluetooth LE, generic FSK protocol stacks and application	
AES-128 accelerator True random number generator	Fast encryption/decryption utilizing hardware security algorithms for network commissioning and transmissions of supported protocols	
Buck DC-DC converter working from 2.1 V to 3.6 V	Supports a wide range of batteries from coincell to Lithium-ion	
16-bit analog-to-digital converter (ADC) 6-bit high-speed analog comparator (CMP)	Supports high-performance on-chip analog at the MCU level for sensor aggregation and other sophisticated applications	
CAN/CAN FD and LIN Bus	Enables easy integration into automotive in-vehicle and industrial networks	
7 x 7 mm "wettable" flanks 48HVQFN	Smaller size and low component count reduces cost. The wettable flanks package technology enables optical inspection of the soldering, reducing cost and increasing reliability.	

PART NUMBERS

Device	CAN FD	2 nd UART with LIN	8 KB EEPROM	Qualification Grade	Package
MKW37A512VFT4	N	N	N	AEC-Q100 Grade 2	7 x 7 48-pib HVQFN "Wettable"
MKW37Z512VFT4				Industrial	
MKW38A512VFT4	Y	Y	Υ	AEC-Q100 Grade 2	
MKW38Z512VFT4				Industrial	
MKW39A512VFT4	N	N	Υ	AEC-Q100 Grade 2	

DEVELOPMENT TOOLS

Board Name	Description
FRDM-KW38	Freedom development board for KW39/38/37 MCUs with 2.4 GHz Bluetooth® LE and generic FSK wireless connectivity and CAN/LIN connectivity solutions
USB-KW38	USB dongle for sniffer operations for KW39/38/37 wireless MCUs with 2.4 GHz Bluetooth LE and generic FSK

www.nxp.com/Wireless/KW38

NXP, the NXP logo and Kinetis are trademarks of NXP B.V. All other product or service names are the property of their respective owners. . The Bluetooth® word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. and any use of such marks by NXP Semiconductors is under license. Arm and Cortex are trademarks or registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. The related technology may be protected by any or all of patents, copyrights, designs and trade secrets. All rights reserved. © 2020 NXP B.V.