Highly Integrated Wireless MCU with CAN FD, Ethernet, USB, Motor Control, Graphics, Touch and Enhanced Security

PIC32CX-BZ6 and PIC32WM-BZ6

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Introduction

The PIC32-BZ6 family is a high-performance, low-power, integrated wireless microcontroller unit (MCU) powered by 128 MHz ARM® Cortex®-M4F processor. The PIC32-BZ6 family combines robust security features with extensive wireless connectivity options, including Bluetooth® and IEEE 802.15.4 protocols (Thread, Proprietary, MiWi).

With 2 MB of Flash and 512 KB of RAM, the PIC32-BZ6 family provides ample memory for complex applications, while its Secure Boot feature with an immutable root of trust ensures reliable and secure operation. Equipped with a rich set of peripherals, including analog and digital signal processing, communication interfaces, Quadrature Encoder Interface (QEI), and touch sensing, the PIC32-BZ6 family can support a wide range of applications.

The PIC32-BZ6 family consists of AEC-Q100 Grade 1 (125°C) qualified SoCs, PIC32CX-BZ6, and global regulatory certified, RF-ready modules, PIC32WM-BZ6x.

PIC32CX-BZ6 SoC Family Features

Operating Conditions

- 1.9–3.6V, −40°C to +125°C, DC to 128 MHz
  - AEC Q100 Grade 1 qualified with reduced parameters
- 1.9–3.6V, −40°C to +105°C, DC to 128 MHz
  - AEC Q100 Grade 2 qualified

Core: 128 MHz ARM Cortex-M4F

- 3.40 Coremark®/MHz (with IAR Compiler)
- 4 KB Combined Instruction Cache and Data Cache
- 8-Zone Memory Protection Unit (MPU)
- Thumb®-2 Instruction Set
- Digital Signal Processing Application-Specific Extension (ASE) Rev 2
- Nested Vector Interrupt Controller (NVIC)
- Embedded Trace Module (ETM) with Instruction Trace Stream
- CoreSight™ Embedded Trace Buffer (ETB)
- Trace Port Interface Unit (TPIU)
- IEEE 754-Compliant Single Precision Floating Point Unit (FPU)

Memories

- 64 KB ROM for Secure Boot
  - Support for asymmetric secure boot
- 3072-Bit eFuse
  - Secure boot key storage
  - Debug lock
- 2 MB On-Chip Self-Programmable Flash with:
  - Error Correction Code (ECC)
  - Prefetch module to speed up Flash accesses
  - 20k cycles endurance (100k cycles with erase retry option) and 20 years of data retention support
- 72 KB Boot Flash Memory (18 Pages, 17 Pages for Security Hash Enabled)
  - 64 KB for User boot code configuration
  - 8 KB for Flexible device configuration
- 512 KB Multi-Port Programmable QoS SRAM Main Memory
  - 256 KB of ECC RAM option
  - 32 KB of RAM space for CoreSight™ ETB debug usage when enabled
  - Up to 64 KB of SRAM can be retained in Backup mode
- Up to 4 KB of Tightly Coupled Memory (TCM)

System

- Power-on Reset (POR) and Brown-out Reset (BOR)
- Internal and External Clock Options
- Integrated 16 MHz Crystal Oscillator with ±30 ppm Stability and External Crystal Support
- External Interrupt Controller (EIC)
  - Up to four external interrupts
  - One non-maskable interrupt
- Extensive Debug and Trace Capabilities
  - 2-Wire Serial Wire Debug (SWD) programming and debugging interface
  - ETM trace interface pins for serial wire trace

Supported Connectivity Standards

- Bluetooth® Low Energy SDK Qualified against Bluetooth® Core 6.0
- IEEE 802.15.4 MAC/PHY SDK for Custom Protocol Support
- Capable of Zigbee® 3.0
- Thread 1.4

Power Supply

- System-on-chip (SoC) Uses Low Dropout (LDO)
- Integrated PMU with:
  - Buck (DC-DC/switching) mode; supports high power (PWM), low power (PSM)
  - Modular Linear Differential Operator (MLDO) mode
- Integrated On-Chip 1.5V LDO Regulator for eFuse
- Integrated On-Chip 1.2V Low Dropout Regulators
- POR and BOR on 3.3V and 1.2V Rails
- Run, Idle, Standby Sleep, Deep Sleep and Extreme Deep Sleep Modes
- SleepWalking Peripherals

2.4 GHz RF Transceiver

- Integrated 2.4 GHz Ultra Low-Power RF Transceiver Shared Between Bluetooth Low Energy and IEEE 802.15.4 Modems and Link (MAC) Controllers
- Integrated Transceiver (TRX) Switch and Balun with One Single-Ended Radio Frequency Input/Output (RFIO) for Transmit (TX)/ Receive (RX)
- Hardware Radio Arbiter with Programmable QoS:
  - The resolution is up to packet level
  - Based on shared transceiver and antenna
- High Efficiency Switching Power Amplifier (PA)
- Programmable Transmit Output Power Ranges from −24 dBm to +11 dBm with 1 dB Step Size
- Supported Data Rates:
  - Bluetooth Low Energy 6.0: 2 Mbps, 1 Mbps, 500 kbps and 125 kbps
  - IEEE 802.15.4: 250 kbps
  - Proprietary 2.4 GHz: 2 Mbps, 1 Mbps and 500 kbps

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Bluetooth

- Qualified against Bluetooth Core 6.0
- Up to +11 dBm Programmable Transmit Output Power
- Typical Receiver Power Sensitivity:
    - Bluetooth Low Energy at 2 Mbps: −95 dBm
    - Bluetooth Low Energy at 1 Mbps: −98 dBm
    - Bluetooth Low Energy at 125 Kbps: −108 dBm
    - Bluetooth Low Energy at 500 Kbps: −102 dBm
- Bluetooth Low Energy Supported Features:
    - Encrypted advertising data
    - Security level characteristic
    - Coding scheme selection
    - Connection subrating
    - Periodic advertising enhancement
    - Channel classification enhancement
    - Low energy power control
    - 2M uncoded PHY
    - Long range coded PHY
    - Channel selection algorithm #2
    - Advertising extensions, offloads CPU with hardware based scheduler
    - High duty cycle non-connectible advertising
    - Data length extensions
    - Secure connections
    - Privacy upgrades
    - Robust to interference with wideband RSSI detector
- ECDH P256 Hardware Engine for Bluetooth Pairing Link Key Generation
- AES128 Hardware Module for Real-Time Bluetooth Payload Data Encryption
- Bluetooth Qualification Test Facility (BQTF) Certification
- Supports SIG Defined/Custom Bluetooth Low Energy Profiles and Services
- Bluetooth Low Energy Profiles:
    - Bluetooth Low Energy peripheral and central roles
    - Bluetooth Low Energy APIs for application layer to implement standard or customized GATT based profiles/services
    - Alert notification service (Apple Notification Center Service (ANCS))
    - Proximity reporter and time information
    - Multi-link and multi-role
- Bluetooth Low Energy Services:
    - Provisioning
    - Over-the-Air firmware update (also known as OTA DFU)
    - Advertisement/Beacon
    - Personalized configuration
    - Alert notification service

IEEE 802.15.4

- Capable of Zigbee 3.0, Thread 1.4, and proprietary 802.15.4 protocol stacks
  Note: *Optional by firmware configuration.
- PLCP Service Data Unit (PSDU) Data Rate: 250 Kbps
    - Proprietary data rates: 500 Kbps, 1 Mbps and 2 Mbps
- Programmable RX Mode
    - RX sensitivity for 250 Kbps in Continuous mode: −103 dBm
    - RX sensitivity in RPC mode: −100 dBm
    - RPC mode provides lower power consumption in RX mode to support California Green Energy Specification at the system level
- TX Output Power up to +11 dBm
- Hardware Assisted MAC
    - Auto acknowledge
    - Auto retry
    - Channel access back-off
    - Automated Frame Check Sequence (FCS)
    - Automatic Address filtering
- SFD Detection; Spreading; De-spreading; Framing; CRC-16 Computation
- Independent TX/RX Buffers for Improved CPU Offloading
    - 128-byte TX and 128-byte RX frame buffer

High Performance Peripherals

- 16-Channel Direct Memory Access Controller (DMAC)
    - Built-in Cyclic Redundancy Check (CRC) with memory CRC generation and monitors hardware support
- One QSPI
    - Execute-In-Place (XIP) support
    - Dedicated AHB memory zone

Low-Cost Controllerless (LCC) Graphics Solutions

- Supports RGB332 8-bit color with 480x272 TFT display
- I2C for maxTouch Control
- DMA and GPIO Pins for 8-bit Pixel Transmission and Synchronization [1]

Cryptography

- Standard AES Encryption and Decryption with Key Sizes of 128 bits, 192 bits and 256 bits with Hardware Accelerator
- Standard SHA Hash Algorithms, Including SHA-256 and SHA-384 with Hardware Supported
- RSA Encryption and Decryption with Key Sizes of 1024 bits and 2048 bits
- Elliptic Curve Digital Signature Algorithm (ECDSA) Using All Supported NIST Curves
- NIST 800-90B Compliant True Random Number Generator (TRNG)
- Integrated Scatter Gather DMA

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System Peripherals

- 32-Channel Event System
  - All channels can be connected to any event generator
  - All channels provide a pure asynchronous path
  - Twelve channels support synchronous and re-synchronous
- Six Serial Communication Interfaces (SERCOM), each Configurable to Operate as:
  - Universal Synchronous Asynchronous Receiver Transmitter (USART) with full duplex and single-wire half duplex configuration
    – ISO7816
    – Local Interconnect Network (LIN) Commander/Responder RS485
  - I²C up to 1 MHz
  - Serial Peripheral Interface (SPI)
    – SPI inter-byte space
- One SERCOM Configured as I²C-Only Interface
- Ten 16-Bit Timers/Counters (TC), Each Configurable as:
  - 16-bit TC with two compare/capture channels
  - 8-bit TC with two compare/capture channels
  - 32-bit TC with two compare/capture channels by pairing two TCs
- Two 24-Bit Timer/Counters for Control (TCC) with Extended Functions:
  - Up to six compare channels with optional complementary output
  - Generation of synchronized Pulse Width Modulation (PWM) pattern across port pins
  - Deterministic fault protection, fast decay and configurable dead-time between complementary output
  - Dithering to increase resolution up to 5 bits and reduce quantization error
- One 16-Bit Timer/Counters for Control (TCC) with Extended Functions:
  - Up to two compare channels with optional complementary output
- 34 PWM Channels: 6 Channels x 2 from 24-bit TCC, 2 Channels from 16-bit TCC, and 10 x 2 Channels from TC
- 32-Bit Real Time Counter (RTCC) with Clock/Calendar Function
  - Up to four wake-up pins with tamper detection and debouncing filter
- Watchdog Timer (WDT) with Window Mode
- Deadman Timer (DMT)
- Frequency Meter (FREQM)
- Configurable Custom Logic (CCL) with Two Look-up Table (LUT)
- One 7-Bit General Purpose Digital-to-Analog Converter (DAC)
- Two 12-Bit, up to 1 Msps Analog-to-Digital Converter (ADC) SAR Core with up to 19 Analog Channels:
  - Differential and single-ended input
  - Automatic offset and gain error compensation
- Up to Two Analog Comparator (AC) with Window Compare Function

- Up to 18 Capacitive Voltage Divider (CVD) Channels for Touch Button Support (Using Shared ADC SAR Core)
- One Temperature Sensor (Die Temperature) Built into Wireless Subsystem
- Two Controller Area Network with Flexible Data Rate (CAN-FD) Ports with Dedicated Direct Memory Access (DMA) and 16 Buffers, 16 Filters and 3 Masks
  - ISO11898-1:2015 and CAN FD 1.0 compliant, supports up to 64 data bytes
  - Arbitration bit rate up to 1 Mbps
  - Data bit rate up to 10 Mbps
- Supports USB Full-Speed and Low-Speed Compliance
  - Port with up to eight dedicated DMA channels
- Ethernet MAC (ETH)
  - Compatible with IEEE Standard 802.3
  - 10/100 Mbps Reduced Media Independent Interface (RMII) with dedicated DMA
  - 802.1AS and IEEE 1588-2008 Precision Time Protocol (PTP) compliant for precision clock synchronization and TSU support
  - IEEE802.3AZ/AF/PoE compliant for energy efficiency
  - Wake on Local Area Network (LAN) support
- One Quadrature Encoder Interface (QEI)

Oscillators

- 16 MHz, ±30 PPM Crystal/Resonator Oscillator or External Clock (POSC) for 2.4 GHz RF Transceiver
- Shared System Phase-Locked Loop (PLL) with RF Subsystem
- 50 MHz Ethernet Phase-Locked Loop (EPLL)
- 96 MHz USB Phase-Locked Loop (UPLL)
- 32.768 kHz Ultra-Low Power Internal Oscillator (LPRC)
- Higher Accuracy 32.768 kHz, ±250 ppm Clock Options
  - 32 kHz clock derived from POSC
  - 32.768 kHz crystal/resonator oscillator (SOSC)
  - External 32.768 kHz clock source
- 8 MHz Internal RC Oscillator (FRC)

I/O

- Peripheral Pin Select (PPS) Support
- 23 I/Os with high-current sink/source
- Configurable Open-Drain Output on Digital I/O Pins
- Up to 54 Programmable I/O Pins

DC Specification

- Electrostatic Discharge (ESD) Protection
  - Human Body Model (HBM): 2 kV (min)
  - Charged Device Model (CDM): 500V (min)
- Boot time[2][3]: ~7.1 ms

Package

- PIC32CX2501BZ62132
  - 132-pin DQFN
  - Size: 10 mm x 10 mm x 0.9 mm

Notes:

1. Detailed description is available in DS01387A.
2. The numbers are design targets only and subject to change after device characterization is complete.
3. The time from Reset release until control is transferred to the Flash without code authentication.

PIC32WM-BZ6 Module Features

The following section lists the PIC32WM-BZ6 Module-related features, which complement SoC features.

PIC32WM-BZ6 Module Variants

- PIC32WM-BZ6204 Based on PIC32CX2501BZ62132 SoC
  - PIC32WM-BZ6204UE (u.FL Antenna with Embedded Crypto)
  - PIC32WM-BZ6204UC (u.FL Antenna with Trust&GO)

Antenna

- External Antenna

Clock Management

- Integrated 16 MHz POSC

Advanced Analog

- Two 12-Bit ADC up to 1 Msps Conversion Rate
  - Up to 19 analog channels (PIC32WM-BZ6204)
- CVD Touch Support Using Shared ADC, with up to 18 Rx/Tx Channels for Touch Measurement
- 7-Bit General Purpose DAC

Input/Output

- Up to 54 GPIO Pins (PIC32WM-BZ6204)

Package and Operating Conditions

- PIC32WM-BZ6204 Module Package:
  - 83-pin SMD package with Shield CAN
  - Size: 15.5 mm x 20.7 mm x 2.8 mm
- Operating Conditions:
  - 1.9–3.6V
  - Operating temperature: -40ºC to +85ºC

To be Certified

- PIC32WM-BZ6204 Module Certified to FCC, ISED, CE, UKCA, MIC, KCC, NCC and SRRC Radio Regulations
- Bluetooth SIG
- RoHS and REACH Compliant

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1. Configuration Summary

Table 1-1. PIC32CX-BZ6 and PIC32WM-BZ6 Family Features - Memory and Package

Device	Boot ROM Memory (KB)	Program Memory (KB)	Data Memory (KB)	EFUSE (Bits)	Pins	Package
PIC32CX2051BZ62132					132	DQFN
PIC32CX2051BZ62064	64	2048	512	3072	64	VQFN
PIC32CX2051BZ66048					48	QFN

Table 1-2. PIC32CX-BZ6 and PIC32WM-BZ6 Family Features - Peripherals

Device	SERCOM	TC (16-bit)/Compare (Channels)	TCC (24-bit/16-bit)	QEI	QSPI	USB2.0 OTG - FS / LS	CAN-FD	EMAC (10/100)	IEEE 1588 PTP	IEEE 802.3az (EEE)	DMA Channels	RTCC	CCL/LUT	WDT	DMT	Frequency Measurement	Event System (Channels)	External Interrupt Lines	GPIO Pins
PIC32CX2051BZ62132	7	10	2/1	1	Y	1	2	1	1	1	16	Y	1/2[1]	Y	Y	Y	32	4	54
PIC32CX2051BZ62064	7					1		1	1	1									42
PIC32CX2051BZ66048	5					0		0	0	0									29

Note:
1. CCL/LUT = 1/2, means 1 CCL with 2 LUT

Table 1-3. PIC32CX-BZ6 and PIC32WM-BZ6 Family Features - Analog, Security and Wireless

| Device	Analog					Security							Wireless			
	Analog Comparators/Channels	ADC 12-bit SAR Cores	ADC (Channels)	CVD	DAC	Temperature Sensor	AES	TRNG	SHA	Public Key Cryptography	ICM (SHA1/SHA224/SHA256)	Secure Hash Function	Root-of-Trust	Max TX Power (dBm)	Bluetooth®	802.15.4	BT/802.15.4 Co-existence (Radio Arbiter)
PIC32CX2051BZ62132			19	18													
PIC32CX2051BZ62064	Y	2	14	13	1	Y	Y	Y	Y	Y	Y	Y	Y	11	Y	Y	Y
PIC32CX2051BZ66048			9	8													

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2.   PIC32CX-BZ6 SoC Description

This chapter illustrates the block diagram of the PIC32CX-BZ6 SoC.

2.1.   PIC32CX-BZ6 SoC Block Diagram

The following figure illustrates the block diagram of the core and peripheral modules in the PIC32CX-BZ6 SoC.

**Figure 2-1.** PIC32CX-BZ6 SoC Block Diagram
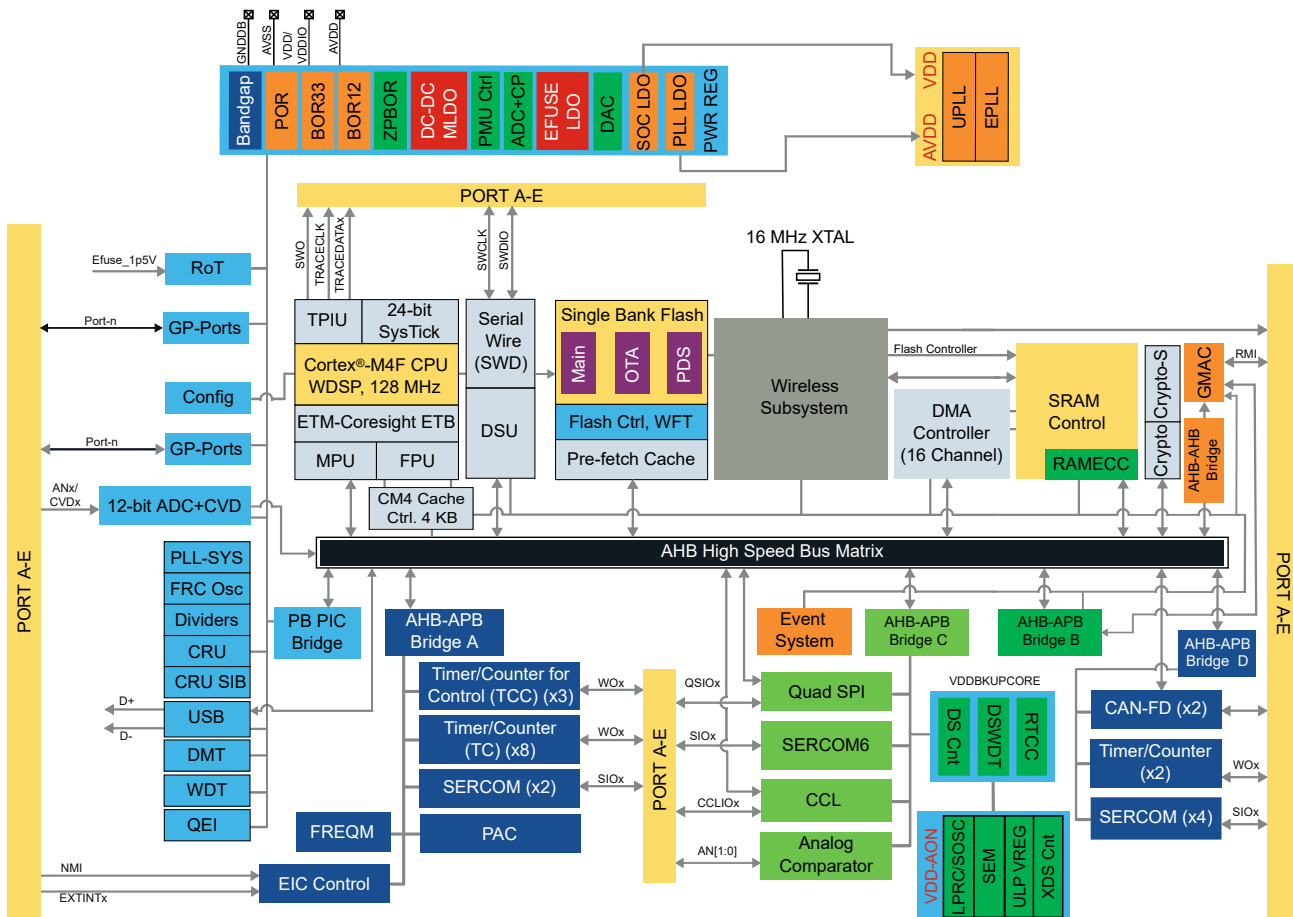
3.   PIC32WM-BZ6 Module Description

The PIC32WM-BZ6 modules are fully certified wireless modules built around PIC32CX-BZ6 SoC. The PIC32WM-BZ6 modules integrate a 16 MHz crystal, in addition to the circuits for power supply decoupling, RF matching and the U.FL connector for external antenna (PIC32WM-BZ6UE).

The operating voltage range for the PIC32WM-BZ6 Module is 1.9–3.6V. The following figure illustrates the PIC32WM-BZ6 Module block diagram and various peripherals supported by the module.

Figure 3-1. PIC32WM-BZ6 Module Block Diagram
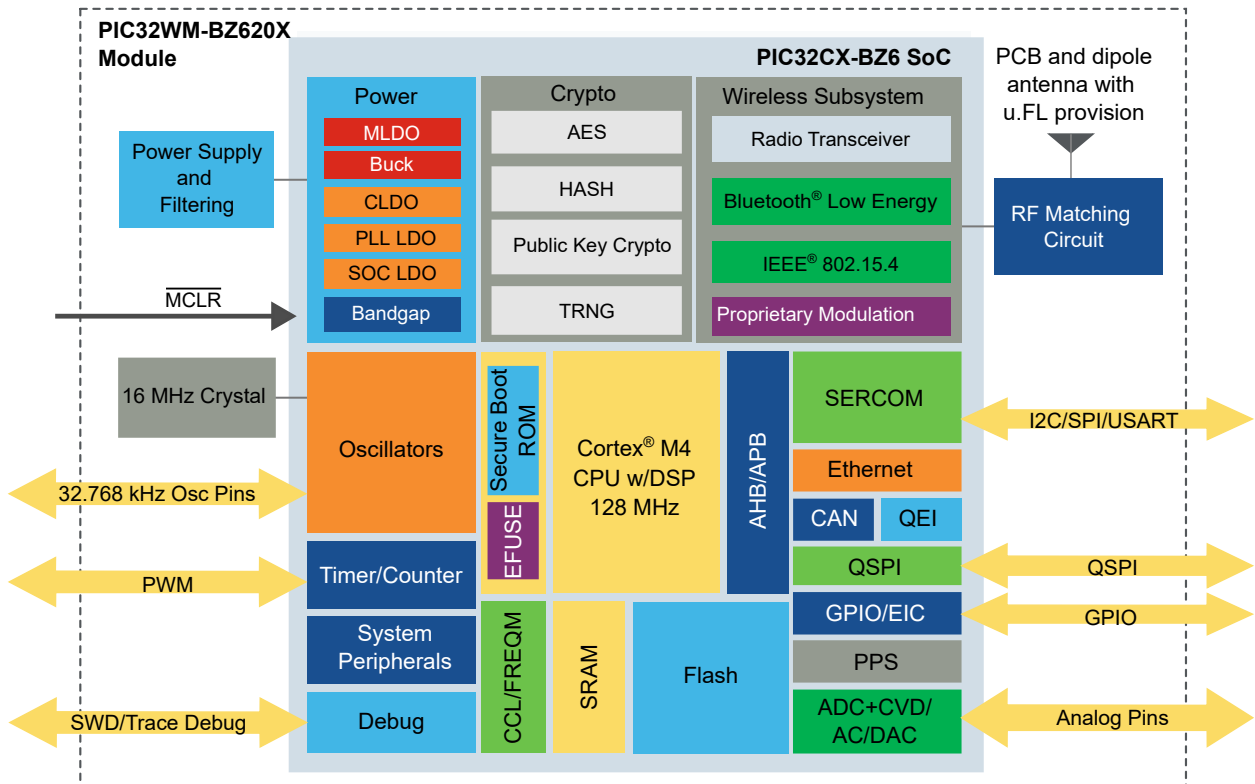
4. Pinout and Signal Descriptions List

This following table provides detailed signal names classified by the peripherals along with the device pinout for the PIC32CX-BZ6 and the PIC32WM-BZ6 Module.

Table 4-1. Pinout and Signal Descriptions List

SoC (PIC32CX2501BZ62132)	Module (PIC32WM-BZ6204)	Pin Name
A73[3]	A7, A10, A13, A24, A33, A42, A43, A49, B26	GND
A1	A34, A35, A36, A37, A38, A39, A40, A41, B30, B31, B32, B33	No connection
B1	—	No connection
A2	—	No connection
B2	A16	QSPI_DATA0/RTC_IN3/RPA0/IOCA0/RA0
A3	—	pmu_vddio/vpmu_vddc (PMU Core circuit power; 1.9–3.6V)[8]
B3	—	No connection
A4	B14	QSPI_SCK/RTC_IN2/RPA1/IOCA1/RA1
A5	A17	QSPI_DATA3/RTC_IN1/RPA2/IOCA2/RA2
B4	A12	SERCOM0_PAD0/RPA5/IOCA5/RA5
A6	B13	RPD0/IOCD0/RD0
B5	A15	RPD1/IOCD1/RD1
A7	—	FAVdd/VDDIO[8,9]
B6	—	No connection
A8	B10	SERCOM0_PAD1/RPA6/IOCA6/RA6
B7	—	No connection
A9	A19	VBUSON/SERCOM1_PAD0/TRCLK/RPA7/IOCA7/RA7
B8	—	No connection
A10	B17	CAN0_TX/SERCOM1_PAD1/RPA8/IOCA8/RA8
B9	—	No connection
A11	A20	CAN0_RX/RTC_IN0_ALT/SERCOM1_PAD2/RPA9/IOCA9/RA9
B10	—	No connection
A12	A25, B22	VDDIO[8,9]
B11	—	No connection
A13	B19	RTC_OUT_ALT/SERCOM1_PAD3/RPA10/IOCA10/RA10
B12	B15	QSPI_DATA1/RPB12/IOCB12/RB12
A14	A27	GMAC_GCRS_DV/RPE2/IOCE2/RE2
A15	A26	GMAC_GTXEN/RPC9/IOCC9/RC9
B13	B23	GMAC_GRXER/RPC8/IOCC8/RC8
A16	A23	RPC10/IOCC10/RC10
B14	A22	RPE3/IOCE3/RE3
A17	—	No connection
B15	—	No connection
A18	—	No connection
A19	—	No connection
B16	—	No connection
A20	—	No connection

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Table 4-1. Pinout and Signal Descriptions List (continued)

SoC (PIC32CX2501BZ62132)	Module (PIC32WM-BZ6204)	Pin Name
B17	B28	INT0/SERCOM0_PAD2/CM4_SWDIO/RPB9/IOCB9/RB9
A21	B16	RTC_EVENT/QSPI_CS/RPB13/IOCB13/RB13
B18	A21	USBID/RTC_OUT/SERCOM0_PAD3/RPA4/IOCA4/RA4
A22	A32	CM4_SWCLK/RPB8/IOCB8/RB8
B19	B25	GMAC_GRX0/I2C_SERCOM_PAD1/ANN0/RPA14/IOCA14/RA14
A23	A29	GMAC_GRX1/I2C_SERCOM_PAD0/RPA13/IOCA13/RA13
A24	—	VDDIO[8,9]
B20	—	VDDIO[8,9]
A25	A30	GMAC_GREFCLKOUT/SERCOM2_PAD3/RPC1/IOCC1/RC1
B21	A31	GMAC_GTX0/SERCOM2_PAD2/RPC0/IOCC0/RC0
A26	B27	GMAC_GTX1/SERCOM2_PAD1/RPE1/IOCE1/RE1
B22	B20	SERCOM2_PAD0/RPE0/IOCE0/RE0
A27	A18	ANA0/QSPI_DATA2/RPB11/IOCB11/RB11
B23	—	No connection
A28	B21	USBOEN/AN0/RPB10/IOCB10/RB10
B24	—	No connection
A29	—	No connection
B25	—	No connection
A30	—	No connection
B26	—	No connection
A31	—	CLDO_IN (Secondary digital power supply; 1.2V ± 5%) Connect this pin to CLDO_OUT pin with 1 µF capacitor to ground
B27	—	No connection
A32	—	xo_n
B28	—	No connection
A33	—	xo_p
B29	—	No connection
A34	—	VDD_RF (RF block power supply) Connect this pin to RFLDO_OUT pin with 1 µF to ground
B30	—	No connection
A35	—	No connection
A36	—	No connection
A37	—	No connection
A38	—	No connection
B31	—	No connection
A39	—	CLDO_OUT (Core LDO power supply; 1.2V ± 5%) Connect this pin to a 1 µF decoupling capacitor
B32	—	No connection
A40	—	RFLDO_OUT (RF LDO power supply; 1.2V) Connect this pin to VDD_RF pin with a 1 µF decoupling capacitor
B33	—	No connection
A41	—	CLDO_BUCK (RF/DIG CLDO supply); Filtered version of PMU output; connect 1 µF decoupling capacitor
B34	—	No connection

Table 4-1. Pinout and Signal Descriptions List (continued)

SoC (PIC32CX2501BZ62132)	Module (PIC32WM-BZ6204)	Pin Name
A42	—	BUCK_PA (RF PA supply); Filtered version of PMU output; connect a 1 µF decoupling capacitor
B35	—	No connection
A43	—	RF_IO
B36	—	No connection
A44	—	No connection
B37	A45	CVDT0/CVDRP16/CVD16/AN16/RPD2/IOCD2/RD2
A45	A44	CVDT14/CVDRP14/CVD14/AN14/RPE6/IOCE6/RE6
B38	B18	ANB0/RPE5/IOCE5/RE5
A46	A14	RPE4/IOCE4/RE4
B39	B6	RPC11/IOCC11/RC11
A47	—	VDDIO[8,9]
B40	B4	CVDT2/CVDR2/CVD2/AN2[5]/RPB6/IOCB6/RB6
A48	B12	RTC_IN0/ANN1/DACOUT/RPA3/IOCA3/RA3
B41	B2	AC_AIN0/CVDT6/CVDRP6/CVD6/AN6/RPB2/IOCB2/RB2
A49	B3	CVDT8/CVDRP8/CVD8/AN8[5]/RPB4/IOCB4/RB4
B42	A48	CVDT9/CVDRP9/CVD9/AN9/RPD3/IOCD3/RD3
A50	A46	CVDT11/CVDRP11/CVD11/AN11/RPD5/IOCD5/RD5
B43	A3	AC_AIN1/CVDT7/CVDR7/CVD7/AN7/RPB3/IOCB3/RB3
A51	A47	VBUS
B44	—	No connection
A52	A1	AVdd
B45	B29	RPA15/IOCA15/RA15
A53	—	No connection
A54	—	No connection
A55	—	No connection
A56	—	No connection
B46	A5	LVDIN/CVDT3/CVDRP3/CVD3/AN3/CM4_SWO/RPB7/IOCB7/RB7
A57	A11	CVDT10/CVDRP10/CVD10/AN10/RPD4/IOCD4/RD4
B47	—	No connection
A58	—	VDDIO/VUSB3V3[8,9]
B48	B8	CVDT16/CVDRP17/CVD17/AN17/RPB15/IOCB15/RB15
A59	A9	CVDT17/CVDRP18/CVD18/AN18/RPB14/IOCB14/RB14
B49	B1	AC_AIN2/CVDT4/CVDRP4/CVD4/AN4/RPB0/IOCB0/RB0
B50	—	No connection
A60	B5	D+
B51	A2	AC_AIN3/CVDT5/CVDRP5/CVD5/AN5/RPB1/IOCB1/RB1
A61	A6	D-
B52	—	No connection
A62	—	PLL_VDD Connect to SOC_LDO_VDD with 100 nF to ground
A63	—	SOC_LDO_VDD
B53	—	No connection
A64	—	SOC_LDO_VDD

Table 4-1. Pinout and Signal Descriptions List (continued)

SoC (PIC32CX2501BZ62132)	Module (PIC32WM-BZ6204)	Pin Name
B54	—	No connection
A65	A28	GMAC_GMDIO/CVDT12/CVDRP12/CVD12/AN12/RPD6/IOCD6/RD6
B55	B24	GMAC_GMDC/CVDT13/CVDRP13/CVD13/AN13/RPD7/IOCD7/RD7
A66	B9	CVDT15/CVDRP15/CVD15/AN15/RPC7/IOCC7/RC7
B56	A4	CVDT1/CVDRP1/CVD1/AN1[5]/RPB5/IOCB5/RB5
A67	B11	MCLR
B57	B7	SOSCI/RPA11/RA11[4]
A68	A8	SOSCO/RPA12/RA12[4]
A69	—	PMU_MLDO_OUT
B58	—	No connection
A70	—	vpmu_vddp[8]
B59	—	No connection
A71	—	No connection
B60	—	PMU_BK_LX Connect 4.7 µH shielded inductor with 10 µF and 100 nF decoupling capacitor
A72	—	No connection

Notes:

1. The remappable peripherals can use all GPIOs (RPAn, RPBn, RPCn, RPDn, and RPEn) via PPS.

2. All GPIOs (RPAn, RPBn, RPCn, RPDn, and RPEn) can be used for I/O Change Notification (IOCAn, IOCBn, IOCCn, IOCDn, and IOCEn).

3. Connect the metal paddle at the bottom of the device to the system ground.

4. If not using SOSC, use this pin as an input-only pin.

5. JTAG is the default functionality on these pins. It is recommended to write '0' to the CFGCON0.JTAGEN register during application initialization to use these pins for regular GPIO functionality.

6. A pull-up resistor (10K) on the SWCLK pin is critical for reliable operation.

7. For more details on power supply pin connections and the filtering components, refer to the Design Package available on the product page.

8. Provide filtered version of main supply input.

9. Connect a 100 nF decoupling capacitor to this pin.

10. These I/O pins are 5.5V tolerant: NMCLR, PA0, PA1, PA2, PA4, PA5, PA6, PA7, PA8, PA10, PA13, PA15, PB3, PB12, PB13, PC0, PC1, PC8, PC9, PC10, PC11, PD0, PD1, PE0, PE1, PE2, PE3 and PE4.

    All other I/O pins are 3.3V tolerant.

5.   Packaging Information

This chapter provides information on package markings, dimension and footprint of the PIC32CX-BZ6 and the PIC32WM-BZ6 family.

5.1.   PIC32CX-BZ6 SoC Packaging Information

For the most current package drawings, see the Microchip Packaging Specification located at www.microchip.com/en-us/support/package-drawings.

5.1.1.   PIC32CX-BZ6 SoC Package Marking

Figure 5-1. PIC32CX2501BZ62132 Package Marking

132L VQFN-DR 10x10   **Example**
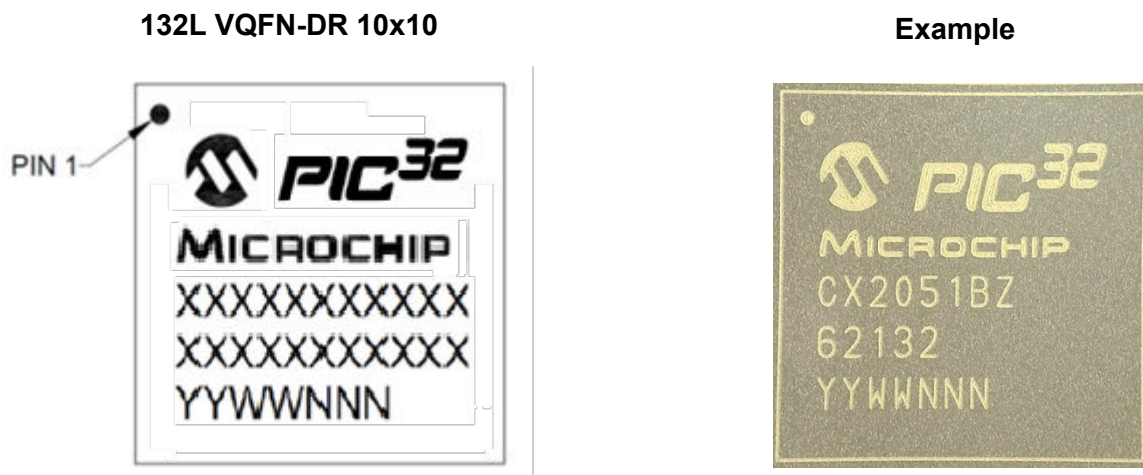
Legend:
XX...X: Customer–specific information
Year code (last digit of calendar year)
YY: Year code (last 2 digits of calendar year)
WW: Week code (week of January 1 is week "01")
NNN: Alphanumeric traceability code
Pb–free JEDEC designator for Matte Tin (Sn)

Note:
In the event of the full Microchip part number cannot be marked on one line, it will be carried over to the next line, thus limiting the number of available characters for the customer-specific information.

5.1.2.   PIC32CX-BZ6 SoC Packaging Dimension

This section provides the package dimension details of the PIC32CX-BZ6 SoC.

5.1.2.1. PIC32CX2501BZ62132 SoC Packaging Dimension

132-Lead Very Thin Plastic Quad Flat, No Lead Package (3WW) - 10x10x0.9 mm Body [VQFN]
**Dual Row Terminals; Saw Singulated**

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging
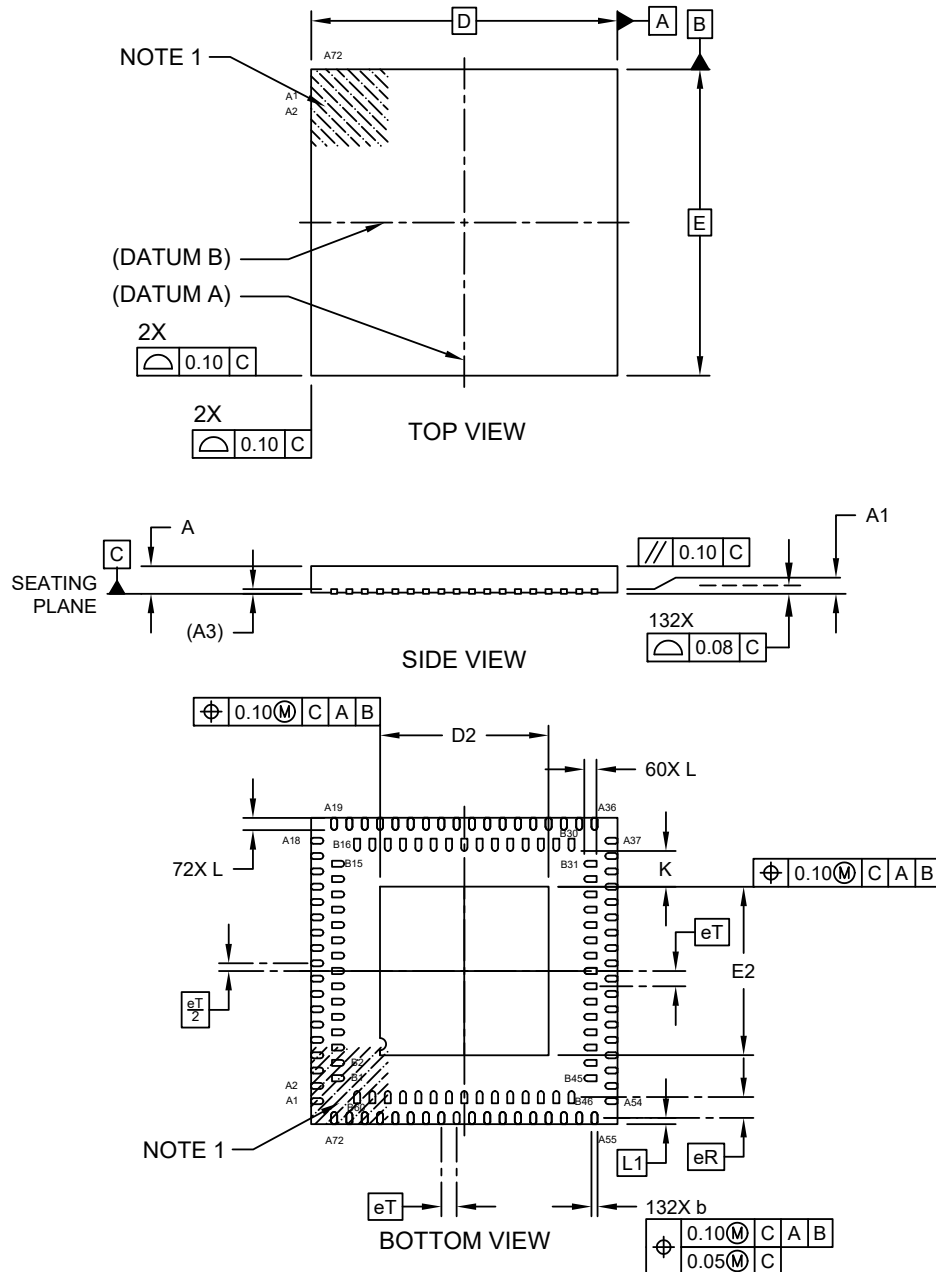
Microchip Technology Drawing C04-575 Rev C Sheet 1 of 2

132-Lead Very Thin Plastic Quad Flat, No Lead Package (3WW) - 10x10x0.9 mm Body [VQFN]
Dual Row Terminals; Saw Singulated

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging
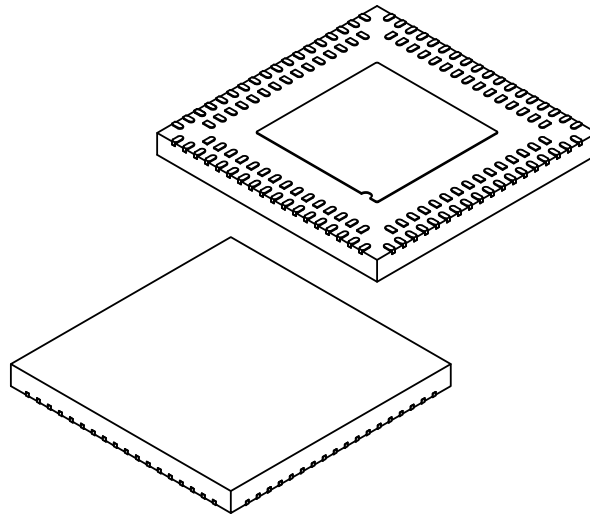
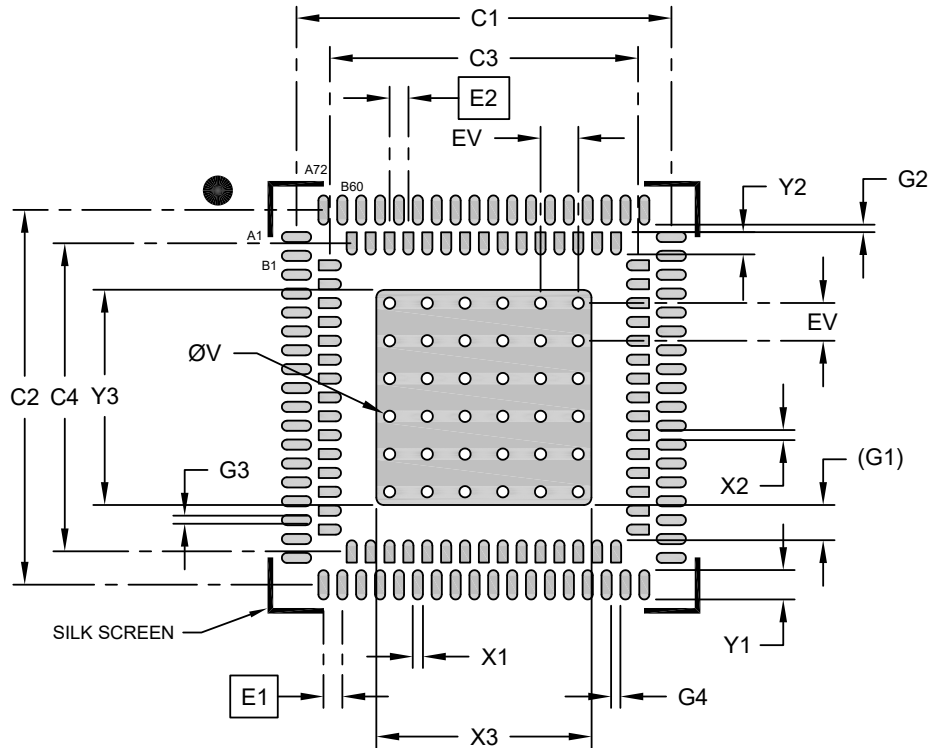|	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		132	
Pitch	eT		0.50 BSC	
Outer Row Center to Inner Row Center	eR		0.65 BSC	
Overall Height	A	0.80	0.85	0.90
Standoff	A1	0.00	0.01	0.05
Terminal Thickness	A3		0.152 REF	
Overall Length	D		10.00 BSC	
Exposed Pad Length	D2	5.40	5.50	5.60
Overall Width	E		10.00 BSC	
Exposed Pad Width	E2	5.40	5.50	5.60
Terminal Width	b	0.17	0.22	0.27
Terminal Length	L	0.30	0.40	0.50
Inner Row Terminal Length	L2	0.30	0.40	0.50
Terminal-to-Exposed-Pad	K	0.20	–	–

Notes:

1. Pin 1 visual index feature may vary, but must be located within the hatched area.
2. Package is saw singulated
3. Dimensioning and tolerancing per ASME Y14.5M
    BSC: Basic Dimension. Theoretically exact value shown without tolerances.
    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-575 Rev C Sheet 2 of 2

132-Lead Very Thin Plastic Quad Flat, No Lead Package (3WW) - 10x10x0.9 mm Body [VQFN] Dual Row Terminals; Saw Singulated

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

RECOMMENDED LAND PATTERN

|	Units	MILLIMETERS					Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX		Dimension Limits		MIN	NOM	MAX
Outer Contact Pitch	E1	0.50 BSC			Inner Contact Pad Spacing	C4		8.16	
Inner Contact Pitch	E2	0.50 BSC			Outer Contact Pad Length (X72)	Y1			0.78
Outer Contact Pad Width (X72)	X1			0.30	Inner Contact Pad Length (X60)	Y2			0.59
Inner Contact Pad Width (X60)	X2			0.30	Contact Pad to Center Pad (X60)	G1	1.20 REF		
Optional Center Pad Width	X3			5.60	Inner Pad Row to Outer Pad Row	G2	0.20		
Optional Center Pad Length	Y3			5.60	Contact Pad to Contact Pad (X68)	G3	0.20		
Outer Contact Pad Spacing	C1		9.93		Contact Pad to Contact Pad (X56)	G4	0.20		
Outer Contact Pad Spacing	C2		9.93		Thermal Via Diameter	V		0.30	
Inner Contact Pad Spacing	C3		8.16		Thermal Via Pitch	EV		1.00	

Notes:

1. Dimensioning and tolerancing per ASME Y14.5M

    BSC: Basic Dimension. Theoretically exact value shown without tolerances.

2. For best soldering results, thermal vias, if used, should be filled or tented to avoid solder loss during reflow process

Microchip Technology Drawing C04-2575 Rev. C

5.2. PIC32WM-BZ6 Module Packaging Information

5.2.1. PIC32WM-BZ6204 Packaging Marking

Figure 5-2. PIC32WM-BZ6204 Package Marking

MODULE with SHIELD

BOTTOM
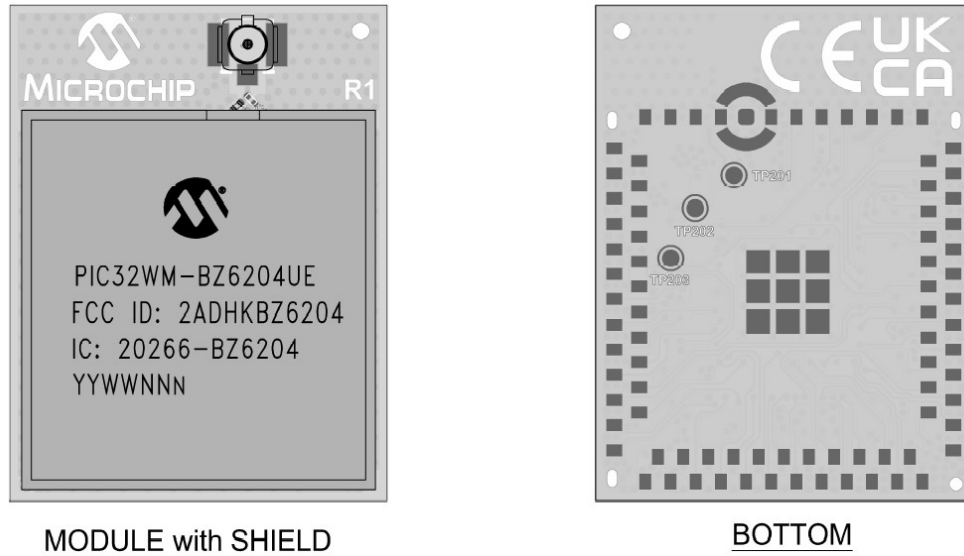
Legend
YY: Year code (last 2 digits of calendar year)
WW: Week code (week of January 1 is week "01")
NNN: Alphanumeric traceability code

5.2.2. PIC32WM-BZ6 Module Packaging Dimension

This section provides the package dimension details of the PIC32WM-BZ6 Module.

5.2.2.1. PIC32WM-BZ6204 Module Packaging Dimension

**82L-PCB Module (6TW) - 19x25x2.75mm - [MODULE] with Metal Shield and Coaxial Connector**

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging

TOP VIEW

SIDE VIEW

BOTTOM VIEW
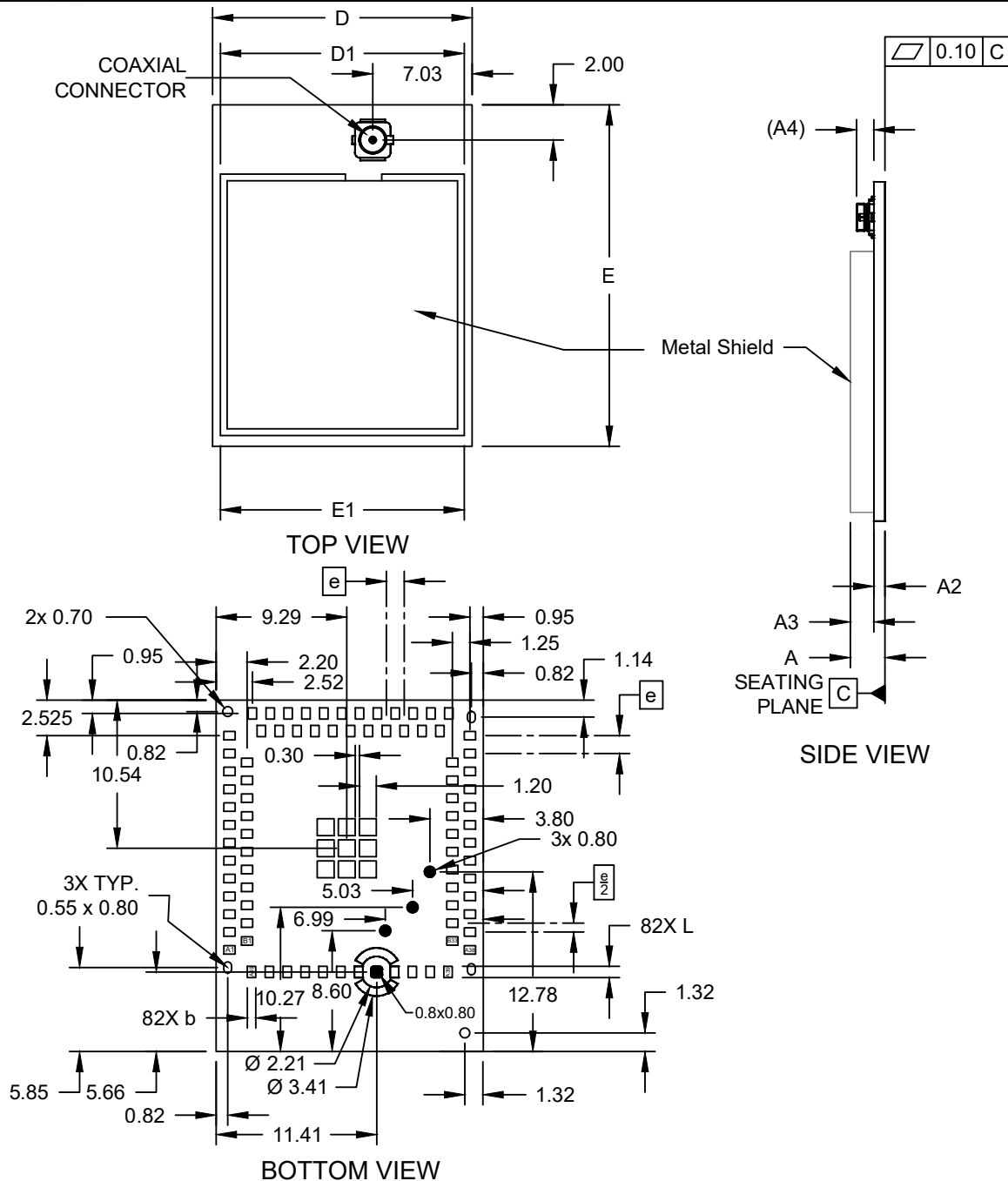
Microchip Technology Drawing C04-00633 Rev D Sheet 1 of 2

82L-PCB Module (6TW) - 19x25x2.75 mm - [MODULE] with Metal Shield and Coaxial Connector

Note:	For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging
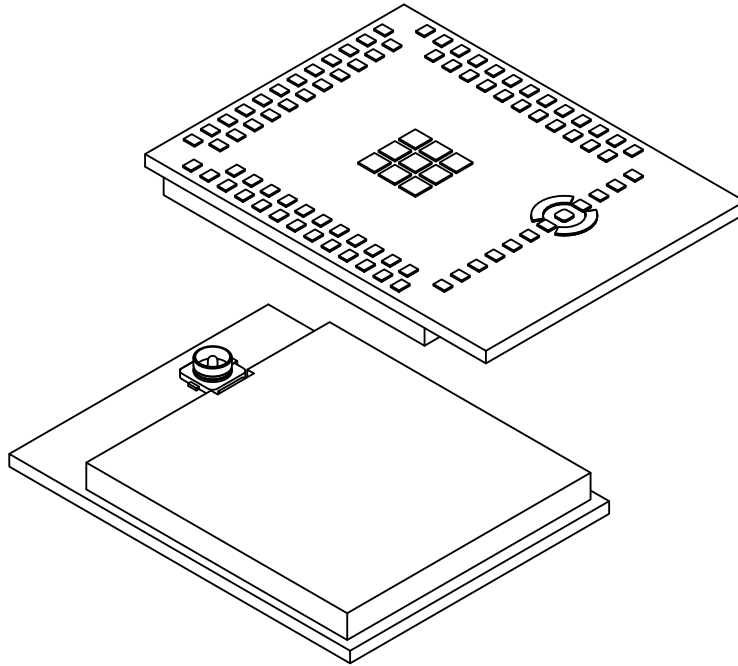
Units		MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Number of Terminals	N		82	
Terminal Pitch	e		1.27 BSC	
Overall Height	A	2.60	2.75	2.90
PCB Thickness	A2	0.70	0.80	0.90
Shield Height	A3	1.80	1.85	1.90
Coaxial Connector Height	A4		1.25 REF	
Overall Length	D	18.90	19.00	19.10
Overall Width	E	24.90	25.00	25.05
Shield Length	D1	17.45	17.50	17.55
Shield Width	E1	18.74	18.79	18.84
Terminal Width	b	0.50	0.60	0.70
Terminal Length	L	0.70	0.80	0.90

Notes:

1. All Dimensions are in Millimeters
    BSC: Basic Dimension. Theoretically exact value shown without tolerances.
    REF: Reference Dimension, usually without tolerance, for information purposes only.

Microchip Technology Drawing C04-00633 Rev D Sheet 2 of 2

MICROCHIP

82L-PCB Module (6TW) - 19x25x2.75mm - [MODULE] with Metal Shield and Coaxial Connector

Note: For the most current package drawings, please see the Microchip Packaging Specification located at http://www.microchip.com/packaging
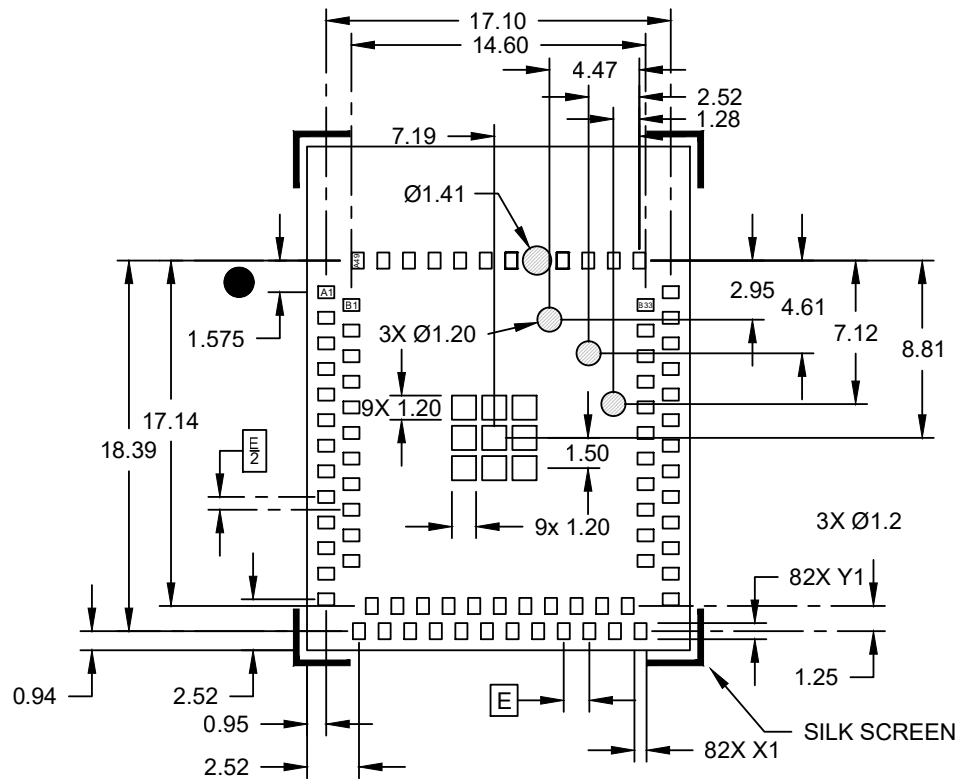
RECOMMENDED LAND PATTERN

	Units	MILLIMETERS		
Dimension Limits		MIN	NOM	MAX
Contact Pitch	E	1.27 BSC		
Contact Pad Width (Xnn)	X1			0.70
Contact Pad Length (Xnn)	Y1			1.00

Copper Keep-Out Area for Test Point

Notes:
1. Dimensioning and tolerancing per ASME Y14.5M
   BSC: Basic Dimension. Theoretically exact value shown without tolerances.
2. For best soldering results, please refer to IPC-7093.

Microchip Technology Drawing C04-02633 Rev D

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