PIC32MZ Embedded Connectivity with Floating Point Unit (EF) Family

32-bit MCUs (up to 2 MB Live-Update Flash and 512 KB SRAM) with FPU, Audio and Graphics Interfaces, HS USB, Ethernet, and Advanced Analog

Operating Conditions
- 2.1V to 3.6V, -40ºC to +85ºC, DC to 252 MHz
- 2.1V to 3.6V, -40ºC to +125ºC, DC to 180 MHz

Core: 252 MHz (up to 415 DMIPS) M-Class
- 16 KB I-Cache, 4 KB D-Cache
- FPU for 32-bit and 64-bit floating point math
- MMU for optimum embedded OS execution
- microMIPS™ mode for up to 35% smaller code size
- DSP-enhanced core:
  - Four 64-bit accumulators
  - Single-cycle MAC, saturating, and fractional math
  - IEEE 754-compliant
- Code-efficient (C and Assembly) architecture

Clock Management
- Programmable PLLs and oscillator clock sources
- Fail-Safe Clock Monitor (FSCM)
- Independent Watchdog Timers (WDT) and Deadman Timer (DMT)
- Fast wake-up and start-up

Power Management
- Low-power modes (Sleep and Idle)
- Integrated Power-on Reset (POR) and Brown-out Reset (BOR)

Memory Interfaces
- 50 MHz External Bus Interface (EBI)
- 50 MHz Serial Quad Interface (SQI)

Audio and Graphics Interfaces
- Graphics interfaces: EBI or PMP
- Audio data communication: I^2S, LJ, and RJ
- Audio control interfaces: SPI and I^2C
- Audio master clock: Fractional clock frequencies with USB synchronization

High-Speed (HS) Communication Interfaces (with Dedicated DMA)
- USB 2.0-compliant Hi-Speed On-The-Go (OTG) controller
- 10/100 Mbps Ethernet MAC with MII and RMII interface

Security Features
- Crypto Engine with RNG for data encryption/decryption and authentication (AES, 3DES, SHA, MD5, and HMAC)
- Advanced memory protection:
  - Peripheral and memory region access control

Direct Memory Access (DMA)
- Eight channels with automatic data size detection
- Programmable Cyclic Redundancy Check (CRC)

Advanced Analog Features
- 12-bit ADC module:
  - 18 Msps with up to six Sample and Hold (S&H) circuits (five dedicated and one shared)
  - Up to 48 analog inputs
  - Can operate during Sleep and Idle modes
  - Multiple trigger sources
  - Six Digital Comparators and six Digital Filters
- Two comparators with 32 programmable voltage references
- Temperature sensor with ±2ºC accuracy

Communication Interfaces
- Two CAN modules (with dedicated DMA channels):
  - 2.0B Active with DeviceNet™ addressing support
- Six UART modules (25 Mbps):
  - Supports up to LIN 2.1 and IrDA® protocols
- Six 4-wire SPI modules (up to 50 MHz)
- SQI configurable as an additional SPI module (50 MHz)
- Five I^2C modules (up to 1 Mbaud) with SMBus support
- Parallel Master Port (PMP)
- Peripheral Pin Select (PPS) to enable function remap

Timers/Output Compare/Input Capture
- Nine 16-bit or up to four 32-bit timers/counters
- Nine Output Compare (OC) modules
- Nine Input Capture (IC) modules
- Real-Time Clock and Calendar (RTCC) module

Input/Output
- 5V-tolerant pins with up to 32 mA source/sink
- Selectable open drain, pull-ups, pull-downs, and slew rate controls
- External interrupts on all I/O pins
- PPS to enable function remap

Qualification and Class B Support
- AEC-Q100 REVH (Grade 1 -40ºC to +125ºC)
- Class B Safety Library, IEC 60730 (planned)
- Back-up internal oscillator

Debugger Development Support
- In-circuit and in-application programming
- 4-wire MIPS® Enhanced JTAG interface
- Unlimited software and 12 complex breakpoints
- IEEE 1149.2-compatible (JTAG) boundary scan
- Non-intrusive hardware-based instruction trace

Software and Tools Support
- C/C++ compiler with native DSP/fractional and FPU support
- MPLAB® Harmony Integrated Software Framework
- TCP/IP, USB, Graphics, and mTouch™ middleware
- MFi, Android™, and Bluetooth® audio frameworks
- RTOS Kernels: Express Logic ThreadX, FreeRTOS™, OPENRTOS®, Micriµm® µC/OS™, and SEGGER embOS®

Packages

Type	QFN	TQFP			TFBGA		VTLA	LQFP
Pin Count	64	64	100	144	100	144	124	144
I/O Pins (up to)	53	53	78	120	78	120	98	120
Contact/Lead Pitch	0.50 mm	0.50 mm	0.40 mm	0.50 mm	0.40 mm	0.65 mm	0.50 mm	0.50 mm	0.50 mm
Dimensions	9x9x0.9 mm	10x10x1 mm	12x12x1 mm	14x14x1 mm	16x16x1 mm	7x7x1.2 mm	7x7x1.2 mm	9x9x0.9 mm	20x20x1.40 mm