

PIC/DSPIC Microcontroller, Floating Point Unit, PIC32 Family PIC32MZ EF Series Microcontrollers

Manufacturers	<a href="#">Microchip Technology, Inc</a>
Package/Case	TQFP-144
Product Type	Embedded Processors & Controllers
RoHS	
Lifecycle	

Pin Number	Full Pin Name	Pin Number	Full Pin Name
1	AN0VREF10	37	PIC32MZH0RPP10R00
2	EB0AN0P0M0SR04	38	PIC32MZH0RPP10R07
3	EB0AN0P0M0SR05	39	REF0AN0P0M0SR05
4	EB0AN0P0M0SR06	40	REF0AN0P0M0SR06
5	EB0AN0P0M0SR07	41	ALDO
6	EB0AN0P0M0SR08	42	AREF
7	AN0VREF0R00	43	AN0VREF0R00
8	AN0VREF0R01	44	AN0VREF0R01
9	EB0VREF0	45	EB0VREF0
10	EB0VREF1	46	PH1
11	EB0VREF2	47	EB0VREF2
12	EB0VREF3	48	EB0VREF3
13	EB0VREF4	49	EB0VREF4
14	AN0VREF0R02	50	AN0VREF1
15	AN0VREF0R03	51	EB0VREF0
16	AN0VREF0R04	52	EB0VREF0
17	VDD	53	EB0VREF0
18	VDD	54	VDD
19	EB0VREF0	55	REF0VREF0
20	REF0VREF0	56	REF0VREF0
21	EB0AN0P0M0SR09	57	EB0AN0P0M0SR09
22	AN0VREF0R05	58	AN0VREF0
23	AN0VREF0R06	59	AN0VREF0
24	AN0VREF0R07	60	AN0VREF0
25	AN0VREF0R08	61	AN0VREF0R08
26	AN0VREF0R09	62	AN0VREF0R09
27	AN0VREF0R10	63	VDD
28	EB0VREF0	64	VDD
29	EB0VREF1	65	AN0VREF0R10
30	EB0VREF2	66	AN0VREF0R10
31	AN0VREF0R11	67	AN0VREF0R11
32	VDD	68	EB0VREF0
33	VDD	69	AN0VREF0R11
34	AN0VREF0R12	70	AN0VREF0R12
35	PIC32MZH0RPP10R08	71	OSC0VREF0

Note 1: The PIC32MZ2048EFM144-I/PH is a PIC32MZ2048EFM144-I/PH with a PIC32MZ2048EFM144-I/PH core.  
 Note 2: The PIC32MZ2048EFM144-I/PH is a PIC32MZ2048EFM144-I/PH with a PIC32MZ2048EFM144-I/PH core.  
 Note 3: The PIC32MZ2048EFM144-I/PH is a PIC32MZ2048EFM144-I/PH with a PIC32MZ2048EFM144-I/PH core.

Images are for reference only

Please submit RFQ for PIC32MZ2048EFM144-I/PH or [Email to us: sales@ovaga.com](mailto:sales@ovaga.com) We will contact you in 12 hours. [RFQ](#)

## General Description

### Features

- 200 MHz/330 DMIPS, MIPS Warrior M-class core
- DSP-enhanced core:
- Four 64-bit accumulators
- Single-cycle MAC, saturating and fractional math
- IEEE 754-compliant
- Dual Panel Flash for live update support
- FPU for fast single- and double-precision math
- 12-bit, 18 MSPS, 48-channel ADC module
- Memory Management Unit for optimum embedded OS execution
- microMIPS mode for up to 35% code compression
- CAN, UART, I2C, PMP, EBI, SQI & Analog Comparators

SPI/I2S interfaces for audio processing and playback

Hi-Speed USB 2.0 Device/Host/OTG

10/100 Mbps Ethernet MAC with MII and RMII interface

Crypto Engine with a RNG for data encryption/decryption and authentication (AES, 3DES, SHA, MD5, and HMAC)

Temperature Range: - 40°C to 85°C; - 40°C to 125°C

AEC-Q100 Qualified

Grade 1

Microcontroller Features

Operating voltage range of 2.2V to 3.6V

2MB Flash memory (plus an additional 160 KB of Boot Flash)

512KB SRAM memory

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

FPU for fast single- and double-precision math

Code-efficient (C and Assembly) architecture

Low-power management modes (Idle and Sleep)

Peripheral Features

50 MHz External Bus Interface (EBI)

50 MHz Serial Quad Interface (SQI)

Peripheral Pin Select (PPS) functionality to enable function remap

8 channels of hardware programmable DMA and 18 channels of dedicated DMA with automatic data size detection

Six UART modules (25 Mbps): Supports LIN 1.2 and IrDA protocols

Two CAN modules 2.0B Active with DeviceNet addressing support

Six 4-wire SPI modules (50 Mbps)

SQI configurable as an additional SPI module (50 MHz)

Five I2C modules (up to 1 Mbaud) with SMBus support

Parallel Master Port (PMP)

Hardware Real-Time Clock and Calendar (RTCC)

Nine 16-bit Timers/Counters (four 16-bit pairs combine to create four 32-bit timers)

Nine Capture inputs and Nine Compare/PWM outputs

Audio/Graphics/Touch HMI Features

Graphics interface: EBI or PMP

Audio data communication: I2S, LJ, RJ, USB

Audio data control interface: SPI and I2C™

Audio data master clock: Fractional clock frequencies with USB synchronization

Advanced Analog Features

12-bit ADC Module:

18 Msps rate with 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 analog comparators with 32 programmable voltage references

Temperature sensor with  $\pm 2^{\circ}\text{C}$  accuracy

Debugger Development Support

In-circuit and in-application programming

4-wire MIPS® Enhanced JTAG interface

Unlimited program and 12 complex data breakpoints

IEEE 1149.2-compatible (JTAG) boundary scan

Non-intrusive hardware-based instruction trace

Integrated Software Libraries and Tools

MPLAB Harmony - PIC32 software development framework

C/C++ compiler with native DSP/fractional and FPU support

TCP/IP, USB, Graphics and mTouch middleware

MFi, Android and Bluetooth audio frameworks

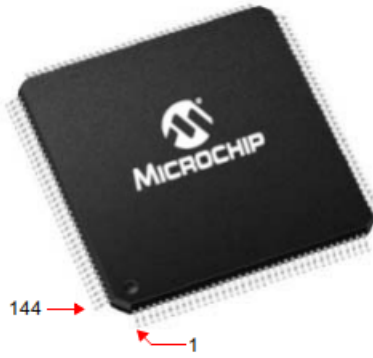
RTOS Kernels, Express Logic ThreadX, FreeRTOS, OPENRTOS, Micrium,  $\mu$ C/OS and SEGGER embOS

Pin Number	Full Pin Name	Pin Number	Full Pin Name
1	AN23/RG15	37	PGEC2/AN46/RPB6/RB6
2	EBIA5/AN34/PMA5/RA5	38	PGED2/AN47/RPB7/RB7
3	EBID5/AN17/RPE5/PMD5/RE5	39	VREF-ICVREF-/AN27/RA9
4	EBID6/AN16/PMD6/RE6	40	VREF+ICVREF+/AN28/RA10
5	EBID7/AN15/PMD7/RE7	41	AVDD
6	EBIA6/AN22/RPC1/PMA6/RC1	42	AVSS
7	AN35/ETXD0/RJ8	43	AN38/ETXD2/RH0
8	AN36/ETXD1/RJ9	44	AN39/ETXD3/RH1
9	EBIBS0/RJ12	45	EBIRP/RH2
10	EBIBS1/RJ10	46	RH3
11	EBIA12/AN21/RPC2/PMA12/RC2	47	EBIA10/AN48/RPB8/PMA10/RB8
12	EBIWE/AN20/RPC3/P/MWR/RC3	48	EBIA7/AN49/RPB9/PMA7/RB9
13	EBIOE/AN19/RPC4/PMRD/RC4	49	CVREFOUT/AN5/RPB10/RB10
14	AN14/C1IND/RPG6/SCK2/RG6	50	AN6/RB11
15	AN13/C1INC/RPG7/SDA4/RG7	51	EBIA1/PMA1/RK1
16	AN12/C2IND/RPG8/SCL4/RG8	52	EBIA3/PMA3/RK2
17	VSS	53	EBIA17/RK3
18	VDD	54	VSS
19	EBIA16/RK0	55	VDD
20	MCLR	56	TCK/AN29/RA1
21	EBIA2/AN11/C2INC/RPG9/PMA2/RG9	57	TDI/AN30/RPF13/SCK5/RF13
22	TMS/AN24/RA0	58	TDQ/AN31/RPF12/RF12
23	AN25/RPE8/RE8	59	AN7/RB12
24	AN26/RPE9/RE9	60	AN8/RB13
25	AN45/C1INA/RPB5/RB5	61	AN9/RPB14/SCK3/RB14
26	AN4/C1INB/RB4	62	AN10/RPB15/OCFB/RB15
27	AN37/ERXCLK/EREFCLK/RJ11	63	VSS
28	EBIA13/PMA13/RJ13	64	VDD
29	EBIA11/PMA11/RJ14	65	AN40/ERXERR/RH4
30	EBIA0/PMA0/RJ15	66	AN41/ERXD1/RH5
31	AN3/C2INA/RPB3/RB3	67	AN42/ERXD2/RH6
32	VSS	68	EBIA4/PMA4/RH7
33	VDD	69	AN32/RPD14/RD14
34	AN2/C2INB/RPB2/RB2	70	AN33/RPD15/SCK6/RD15
35	PGEC1/AN1/RPB1/RB1	71	OSC1/CLKVRC12

- Note**
- 1: The RPN pins can be used by remappable peripherals. See [Table 1](#) for the available peripherals and [Section 12.4 "Peripheral Pin Select \(PPS\)"](#) for restrictions.
  - 2: Every I/O port pin (RAx-RKx) can be used as a change notification pin (CNAx-CNKx). See [Section 12.0 "I/O Ports"](#) for more information.
  - 3: Shaded pins are 5V tolerant.

### 144-PIN LQFP AND TQFP (TOP VIEW)

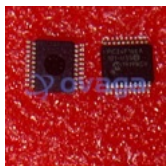
PIC32MZ0512EF(E/F/K)144  
 PIC32MZ1024EF(G/H/M)144  
 PIC32MZ1024EF(E/F/K)144  
 PIC32MZ2048EF(G/H/M)144



Pin Number	Full Pin Name
36	PGED1/AN0/RPB0/RB0
73	Vbus
74	Vusb3v3
75	Vss
76	D-
77	D+
78	RPF3/USBID/RF3
79	SDA3/RPF2/RF2
80	SCL3/RPF8/RF8
81	ERXD0/RH8
82	ERXD3/RH9
83	ECOL/RH10
84	EBIRDY2/RH11
85	SCL2/RA2
86	EBIRDY1/SDA2/RA3
87	EBIA14/PMCS1/PMA14/RA4
88	Vdd
89	Vss
90	EBIA9/RPF4/SDA5/PMA9/RF4
91	EBIA8/RPF5/SCL5/PMA8/RF5
92	EBIA18/RK4
93	EBIA19/RK5
94	EBIA20/RK6
95	RPA14/SCL1/RA14
96	RPA15/SDA1/RA15
97	EBIA15/RPD9/PMCS2/PMA15/RD9
98	RPD10/SCK4/RD10
99	EMDC/RPD11/RD11
100	ECRS/RH12
101	ERXDV/ECRS/DV/RH13
102	RH14
103	EBIA23/RH15
104	RPD0/RTCC/INT0/RD0
105	SOSC/RPC13/RC13
106	SOSCORPC14/T1CKRC14
107	Vdd
108	Vss

Pin Number	Full Pin Name
72	OSC2/CLK0/RC15
109	RPD1/SCK1/RD1
110	EBID14/RPD2/PMD14/RD2
111	EBID15/RPD3/PMD15/RD3
112	EBID12/RPD12/PMD12/RD12
113	EBID13/PMD13/RD13
114	ETXERR/RJ0
115	EMDIO/RJ1
116	EBIRDY3/RJ2
117	EBIA22/RJ3
118	SQICS0/RPD4/RD4
119	SQICS1/RPD5/RD5
120	ETXEN/RPD6/RD6
121	ETXCLK/RPD7/RD7
122	Vdd
123	Vss
124	EBID11/RPF0/PMD11/RF0
125	EBID10/RPF1/PMD10/RF1
126	EBIA21/RK7
127	EBID9/RPG1/PMD9/RG1
128	EBID8/RPG0/PMD8/RG0
129	TRCLK/SQICLK/RA6
130	TRD3/SQID3/RA7
131	EBICS0/RJ4
132	EBICS1/RJ5
133	EBICS2/RJ6
134	EBICS3/RJ7
135	EBID0/PMD0/RE0
136	Vss
137	Vdd
138	EBID1/PMD1/RE1
139	TRD2/SQID2/RG14
140	TRD1/SQID1/RG12
141	TRD0/SQID0/RG13
142	EBID2/PMD2/RE2
143	EBID3/RPE3/PMD3/RE3
144	EBID4/AN18/PMD4/RE4

### Related Products



#### [PIC24F16KA101-I/SS](#)

Microchip Technology, Inc  
 SSOP-20



#### [PIC16F1936-I/SS](#)

Microchip Technology, Inc  
 SSOP-28



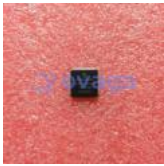
#### [PIC16F1938-I/SP](#)

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#### [PIC18F23K22-I/SP](#)

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