# ❑ MN1020012A / 0012AFA / 0012-3V

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| **Type** | **MN1020012A / 0012AFA / 0012-3V** |
| **ROM (x8-bit / x16-bit)**<br>**RAM (x8-bit / x16-bit)** | Maximum 16M in total (Special Register 1K, Reserve Space 3K included)<br>External ROM, RAM |
| **Minimum Instruction Execution Time** | **MN1020012A / 0012AFA : 100ns (at 4.5 to 5.5V, 20MHz)**<br>**MN1020012-3V : 200ns (at 3.0 to 3.6V, 10MHz)** |
| **Interrupts** | • RESET • Watchdog • Timer Counter 0 to 9 • Timer Counter 10 to 12<br>• Timer Counter 10 to 12 Compare Capture A • Timer Counter 10 to 12 Compare Capture B<br>• DMA 0 to 7 Transfer finish • External 0 to 3 • Serial ch 0, 1 Transmission • Serial ch 0, 1Reception<br>• $\overline{KI}$ Pin (OR) • A/D Conversion finish |
| **Timer Counter** | **Timer Counter 0,2 to 6 : 8-bit x 1** (Timer Output, Event Count)<br>Clock Source .....1/(1 to 256) of System Clock, External Clock<br>Interrupt Source .....Underflow of Timer Counter 0,2 to 6<br><br>**Timer Counter 7 : 8-bit x 1** (Timer Output, Event Count, A/D Conversion Start up)<br>Clock Source .....1/(1 to 256) of System Clock, External Clock<br>Interrupt Source .....Underflow of Timer Counter 7<br><br>**Timer Counter 1 : 8-bit x 1** (Timer Output, Event Count, Synchronous Output [4-bit x 2ch])<br>Clock Source .....1/(1 to 256) of System Clock, External Clock<br>Interrupt Source .....Underflow of Timer Counter 1<br><br>**Timer Counter 8,9 : 8-bit x 1** (Timer Output, Event Count, UART Baud Rate Generator, Synchronous Serial Clock Generator)<br>Clock Source .....1/(1 to 256) of System Clock, External Clock<br>Interrupt Source .....Underflow of Timer Counter 8,9<br><br>**Timer Counter 10,11 : 16-bit x 1** (Timer Output, Event Count, Input Capture, Output Compare, PWM Output, 2-Phase Encoder Input)<br>Clock Source .....1/(1 to 256) of System Clock, External Clock<br>Interrupt Source .....Coincidence with Compare Capture A or at Capture, Coincidence with Compare Capture B or at Capture, Underflow of Timer Counter 10,11<br><br>**Timer Counter 12 : 16-bit x 1** (Timer Output, Event Count, Input Capture, Output Compare, PWM Output, Synchronous Output [4-bit x 2ch])<br>Clock Source .....1/(1 to 256) of System Clock, External Clock<br>Interrupt Source .....Coincidence with Compare Capture A or at Capture, Coincidence with Compare Capture B or at Capture<br><br>Connectable Timer Counter 0 to 9 |
| **Serial Interface** | **Serial 0 : 7,8-bit x 1** (Common use with UART, Transfer direction of MSB/LSB selectable)<br>Clock Source .....1/8 of Timer Counter 8, 1/8 of Timer Counter 9, External Clock<br><br>**Serial 1 : 7,8-bit x 1** (Common use with UART, Transfer direction of MSB/LSB selectable)<br>Clock Source .....1/8 of Timer Counter 8, 1/8 of Timer Counter 9, External Clock<br><br>**UART x 2** (Common use with Serial 0, 1) |

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| **I/O Pins** | **I/O** | **25** | • Common use : 25 (by -bit) |
| | **Input** | **4** | • Common use : 4 |

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| **A/D Inputs** | 8-bit x 8ch (with S/H) |
| **PWM** | 16-bit x 3ch |
| **Special Ports** | 2 (4-state Synchronous Output) |

## Notes

DRAM Reflesh Controler, DMA Controller, DRAM High Speed Page Mode Support

## Package

MN1020012A : QFP128-P-1818
MN1020012AFA / 0012-3V : LQFP128-P-1818B

## Electrical Characteristics

**A/D Characteristics (MN1020012A / 0012AFA)**

| Parameter | Symbol | Condition | Limit | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| A/D Conversion Absolute Error | | AVDD=5V, AVSS=0V | | | ±3 | LSB |
| A/D Conversion Time | | | 4.0 | | | µs |
| Analog Input Voltage | VIA | | VSS | | VDD | V |

**(Ta=25°C, VDD=5.0V, VSS=0V)**

**A/D Characteristics (MN1020012-3V)**

| Parameter | Symbol | Condition | Limit | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| A/D Conversion Absolute Error | | AVDD=3.3V, AVSS=0V | | | ±3 | LSB |
| A/D Conversion Time | | | 8.0 | | | µs |
| Analog Input Voltage | VIA | | VSS | | VDD | V |

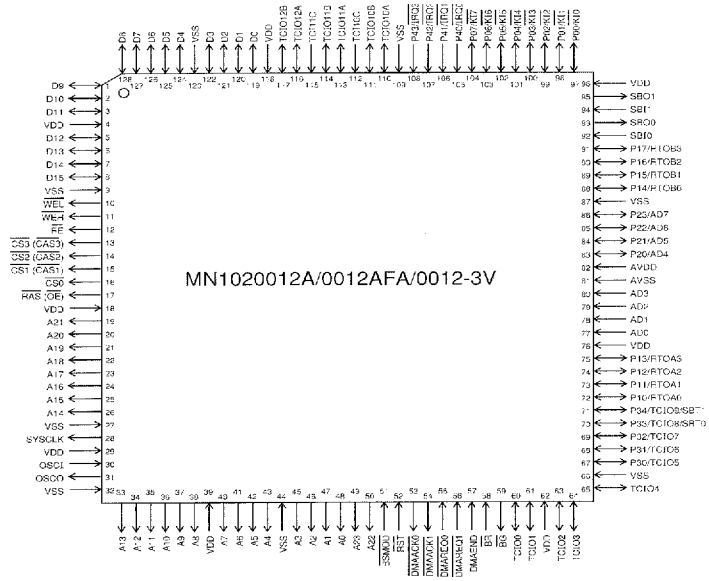
**(Ta=25°C, VDD=3.3V, VSS=0V)**

# Support Tool

## In-Circuit Emulator

PX-ICE102L00 + PX-PRB1020012
PARTNER - EX1020012

## Pin Assignment




QFP128-P-1818 (MN1020012A)
LQFP128-P-1818B (MN1020012AFA / 0012-3V)