

□ MN101E01J, MN101E01K, MN101E01L, MN101E01M

| Type | MN101E01J | MN101E01K | MN101E01L | MN101E01M | MN101EF01M |
|------------------------------------|---|-----------|--------------------------------|-----------|--|
| Internal ROM type | Mask ROM | | | | FLASH |
| ROM (byte) | 192K | 256K | 320K | 384K | |
| RAM (byte) | 10K | | 14K | 20K | 24K |
| Package (Lead-free) | QFP100-P-1818B | | LQFP100-P-1414, QFP100-P-1818B | | |
| Minimum Instruction Execution Time | [Standard] 0.0625 μs (at 3.0 V to 3.6 V, 32 MHz) 0.1 μs (at 3.0 V to 3.6 V, 20 MHz) 62.5 μs (at 3.0 V to 3.6 V, 32 kHz) [Double speed] 0.10 μs (at 3.0 V to 3.6 V, 10 MHz) | | | | [Standard] 0.0625 μs (at 3.0 V to 3.6 V, 32 MHz) [Double speed] 0.10 μs (at 3.0 V to 3.6 V, 10 MHz) |

■ Interrupts

RESET, Watchdog, External 0 to 5, Timer 0 to 6, Timer 7 (2 systems), Time base, Serial 0 (2 systems), Serial 1 (2 systems), Serial 2, Serial 3, Serial 4 (2 systems), Automatic transfer finish, A/D conversion finish, Key interrupts (8 lines)

■ Timer Counter

Timer counter 0 : 8-bit × 1

(square-wave/8-bit PWM output, event count, generation of remote control carrier, pulse width measurement, generation of real time)

Clock source..... 1/2, 1/4 of system clock frequency; 1/1, 1/4, 1/16, 1/32, 1/64 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input

Interrupt source coincidence with compare register 0

Timer counter 1 : 8-bit × 1 (square-wave output, event count, synchronous output event)

Clock source..... 1/2, 1/8 of system clock frequency; 1/1, 1/4, 1/16, 1/64, 1/128 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input

Interrupt source coincidence with compare register 1

Timer counter 0, 1 can be cascade-connected.

Timer counter 2 : 8-bit × 1

(square-wave/8-bit PWM output, event count, synchronous output event, pulse width measurement generation of real time, serial baud rate timer)

Clock source..... 1/2, 1/4 of system clock frequency; 1/1, 1/4, 1/16, 1/32, 1/64 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input

Interrupt source coincidence with compare register 2

Timer counter 3 : 8-bit × 1

(square-wave output, event count, generation of remote control carrier, serial baud rate timer)

Clock source..... 1/2, 1/8 of system clock frequency; 1/1, 1/4, 1/16, 1/64, 1/128 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input

Interrupt source coincidence with compare register 3

Timer counter 2, 3 can be cascade-connected.

Timer counter 4 : 8-bit × 1

(square-wave/8-bit PWM output, event count, pulse width measurement, serial baud rate timer)

Clock source..... 1/2, 1/4 of system clock frequency; 1/1, 1/4, 1/16, 1/32, 1/64 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input frequency

Interrupt source coincidence with compare register 4

Timer counter 5 : 8-bit × 1 (square-wave output, event count, serial baud rate timer)

Clock source..... 1/2, 1/4 of system clock frequency; 1/1, 1/4, 1/16, 1/64, 1/128 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency; external clock input

Interrupt source coincidence with compare register 5

Timer counter 4, 5 can be cascade-connected.

Timer counter 6 : 8-bit freerun timer

Clock source..... 1/1 of system clock frequency; 1/1, 1/4096, 1/8192 of OSC oscillation clock frequency; 1/1, 1/4096, 1/8192 of XI oscillation clock frequency
 Interrupt source coincidence with compare register 6

Timer counter 7 : 16-bit × 1

(square-wave/16-bit PWM output, cycle / duty continuous variable, event count, synchronous output event, pulse width measurement, input capture)

Clock source..... 1/1, 1/2, 1/4, 1/16 of system clock frequency; 1/1, 1/2, 1/4, 1/16 of OSC oscillation clock frequency; 1/1, 1/2, 1/4, 1/16 of external clock input frequency
 Interrupt source coincidence with compare register 7 (2 lines)

Time base timer (one-minute count setting)

Clock source..... 1/1 of OSC oscillation clock frequency; 1/1 of XI oscillation clock frequency
 Interrupt source 1/128, 1/256, 1/512, 1/1024, 1/8192, 1/32768 of clock source frequency

Watchdog timer

Interrupt source 1/65536, 1/262144, 1/1048576, 1/4194304 of system clock frequency

■ **Serial interface**

Serial 0 : synchronous type/UART (full-duplex) × 1

Clock source..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 2, 4; 1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency

Serial 1 : synchronous type/UART (full-duplex) × 1

Clock source..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 4, 5; 1/2, 1/4, 1/8, 1/16, 1/64 of OSC oscillation clock frequency

Serial 2 : synchronous type/single-master I²C × 1

Clock source..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 2, 3; 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128 of OSC oscillation clock frequency

Serial 3 : synchronous type/single-master I²C × 1

Clock source..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 3, 5; 1/2, 1/4, 1/8, 1/16, 1/32, 1/64, 1/128 of OSC oscillation clock frequency

Serial 4 : synchronous type/UART (full-duplex) × 1

Clock source..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 2, 5 ; 1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency

■ **DMA controller**

Max. Transfer cycles : 255
 Starting factor : external request, various types of interrupt, software
 Transfer mode : 1-byte transfer, word transfer, burst transfer

■ **I/O Pins**

| | | |
|-----|----|---|
| I/O | 34 | (5 V IF port) Common use , Specified pull-up resistor available, Input/output selectable (bit unit) |
| | 50 | (3 V IF port) Common use , Specified pull-up resistor available, Input/output selectable (bit unit) |

■ **A/D converter**

10-bit × 8-ch. (with S/H)

■ **D/A converter**

8-bit × 1-ch.

■ **Special Ports**

Buzzer output, remote control carrier signal output, high-current drive port

■ **ROM Correction**

Correcting address designation : up to 3 addresses possible

Electrical Characteristics (Supply current)

| Parameter | Symbol | Condition | Limit | | | Unit |
|--------------------------|--------|--|-------|---------|-----------|---------------|
| | | | min | typ | max | |
| Operating supply current | IDD1 | $f_{osc} = 32.0 \text{ MHz}$, $V_{DD1} = 3.3 \text{ V}$, ($f_s = f_{osc}/2$) | | 11 (48) | 30 (80) | mA |
| | IDD2 | $f_{osc} = 20.0 \text{ MHz}$, $V_{DD1} = 3.3 \text{ V}$, ($f_s = f_{osc}/2$) | | 8 (43) | 22 (75) | mA |
| | IDD3 | $f_{osc} = 32.768 \text{ kHz}$, $V_{DD1} = 3.3 \text{ V}$, ($f_s = f_{osc}/2$) | | 30 (60) | 120 (180) | μA |
| Supply current at HALT | IDD4 | $f_x = 32.768 \text{ kHz}$, $V_{DD1} = 3.3 \text{ V}$ | | 12 | 30 | μA |
| Supply current at STOP | IDD5 | $V_{DD1} = 3.3 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 0.3 | 3.0 | μA |
| | IDD6 | $V_{DD1} = 3.3 \text{ V}$, $T_a = 85^\circ\text{C}$ | | | 80 | μA |

(): Flash memory built-in type

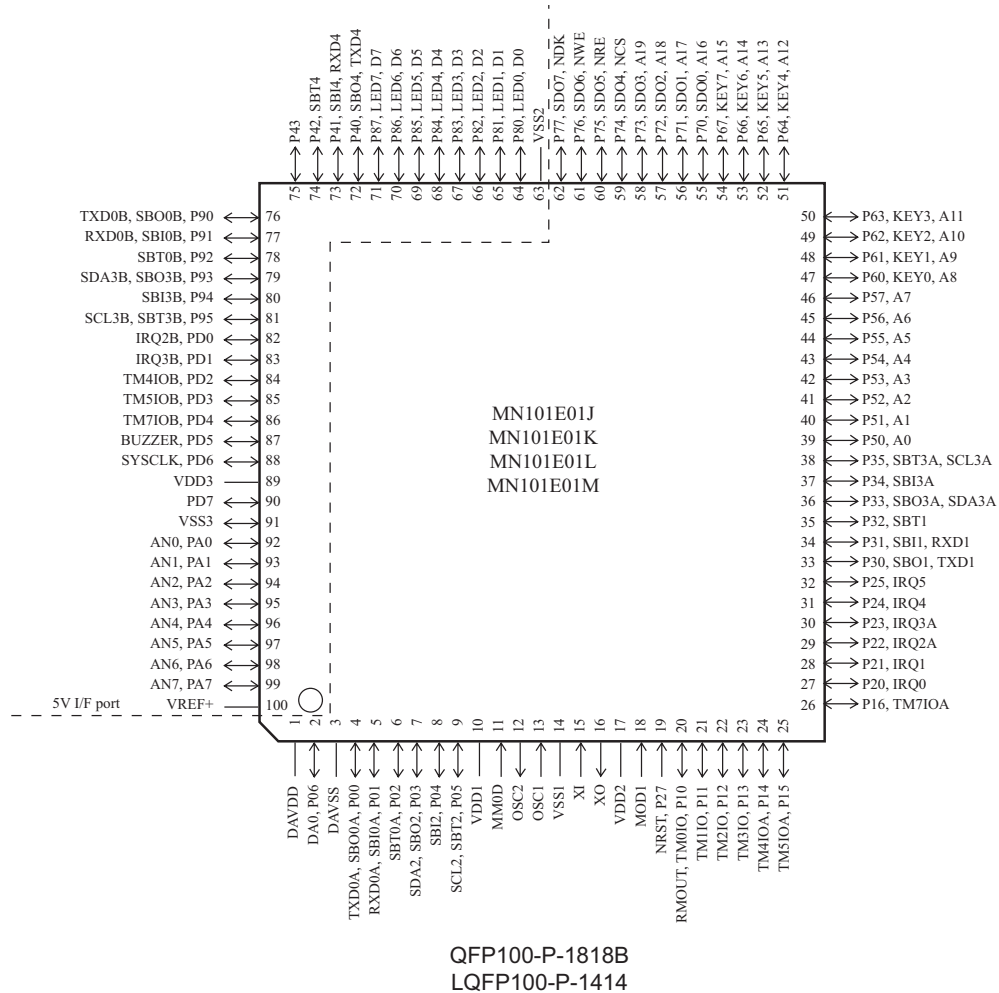
Development tools

In-circuit Emulator

PX-ICE101E+PRBV101E01-QFP100-P-1818B

PX-ICE101E+PRBV101E01-LQFP100-P-1414

Pin Assignment



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