☐ 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 evevt, 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

Panasonic

■ Electrical Charactreistics (Supply current)

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDD1	fosc = 32.0 MHz , VDD1 = 3.3 V , (fs = fosc/2)		11 (48)	30 (80)	mA
	IDD2	fosc = 20.0 MHz , VDD1 = 3.3 V , (fs = fosc/2)		8 (43)	22 (75)	mA
	IDD3	fosc = 32.768 kHz , VDD1 = 3.3 V , (fs = fosc/2)		30 (60)	120 (180)	μA
Supply current at HALT	IDD4	fx = 32.768 kHz , VDD1 = 3.3 V		12	30	μA
Supply current at STOP	IDD5	VDD1 = 3.3 V , Ta = 25°C		0.3	3.0	μA
	IDD6	VDD1 = 3.3 V , Ta = 85°C			80	μA

( ) : Flash memory built-in type

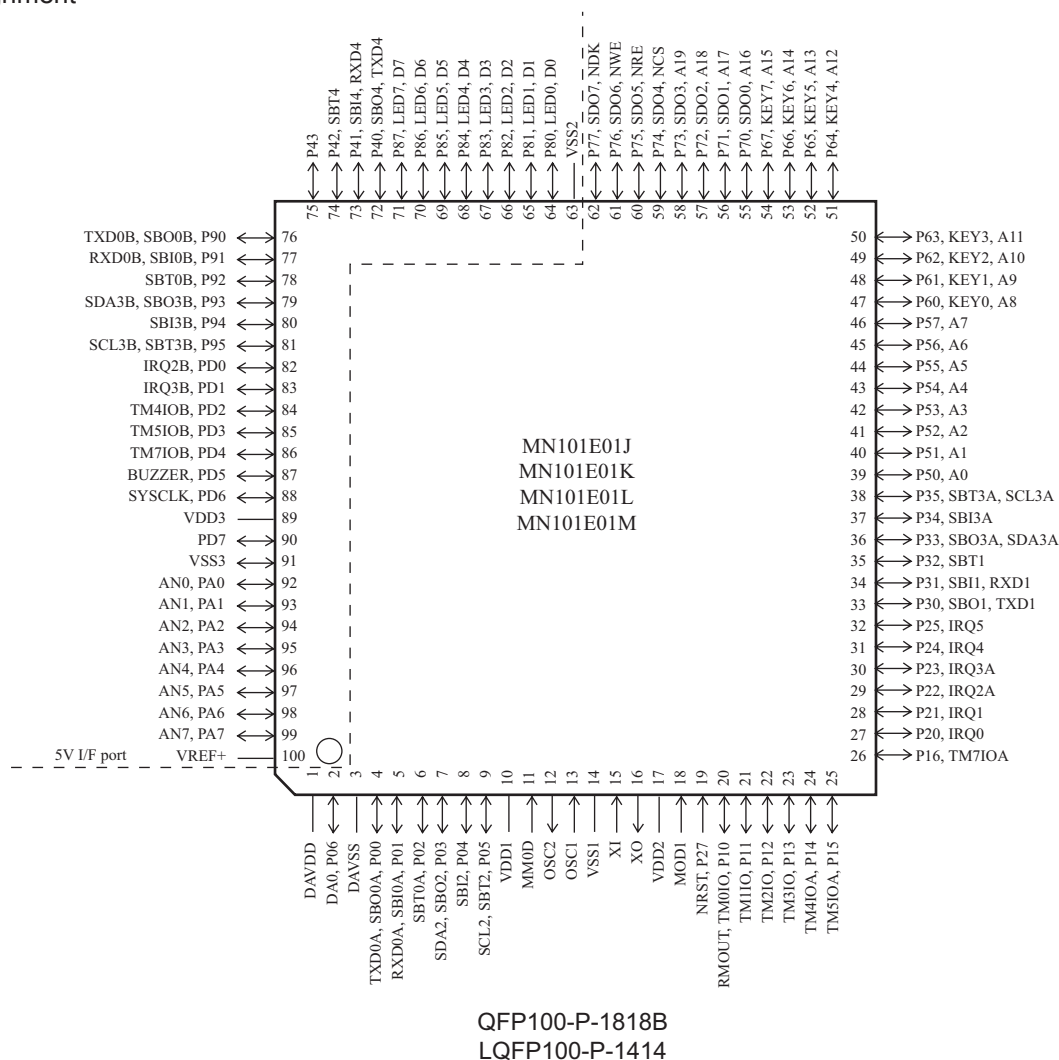## ■ Development tools
In-circuit Emulator
PX-ICE101E+PRBV101E01-QFP100-P-1818B
PX-ICE101E+PRBV101E01-LQFP100-P-1414

■ Pin Assignment


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                                                                        P43 — 75
                                                                 P42, SBT4 — 74
                                                           P41, SBI4, RXD4 — 73
                                                           P40, SBO4, TXD4 — 72
                                                             P87, LED7, D7 — 71
                                                             P86, LED6, D6 — 70
                                                             P85, LED5, D5 — 69
                                                             P84, LED4, D4 — 68
                                                             P83, LED3, D3 — 67
                                                             P82, LED2, D2 — 66
                                                             P81, LED1, D1 — 65
                                                             P80, LED0, D0 — 64
                                                                      VSS2 — 63
                                                             P77, SDO7, NDK — 62
                                                             P76, SDO6, NWE — 61
                                                             P75, SDO5, NRE — 60
                                                             P74, SDO4, NCS — 59
                                                             P73, SDO3, A19 — 58
                                                             P72, SDO2, A18 — 57
                                                             P71, SDO1, A17 — 56
                                                             P70, SDO0, A16 — 55
                                                             P67, KEY7, A15 — 54
                                                             P66, KEY6, A14 — 53
                                                             P65, KEY5, A13 — 52
                                                             P64, KEY4, A12 — 51
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TXD0B, SBO0B, P90 ←→ 76   50 ←→ P63, KEY3, A11
RXD0B, SBI0B, P91 ←→ 77   49 ←→ P62, KEY2, A10
SBT0B, P92 ←→ 78   48 ←→ P61, KEY1, A9
SDA3B, SBO3B, P93 ←→ 79   47 ←→ P60, KEY0, A8
SBI3B, P94 ←→ 80   46 ←→ P57, A7
SCL3B, SBT3B, P95 ←→ 81   45 ←→ P56, A6
IRQ2B, PD0 ←→ 82   44 ←→ P55, A5
IRQ3B, PD1 ←→ 83   43 ←→ P54, A4
TM4IOB, PD2 ←→ 84   42 ←→ P53, A3
TM5IOB, PD3 ←→ 85   MN101E01J   41 ←→ P52, A2
TM7IOB, PD4 ←→ 86   MN101E01K   40 ←→ P51, A1
BUZZER, PD5 ←→ 87   MN101E01L   39 ←→ P50, A0
SYSCLK, PD6 ←→ 88   MN101E01M   38 ←→ P35, SBT3A, SCL3A
VDD3 — 89   37 ←→ P34, SBI3A
PD7 ←→ 90   36 ←→ P33, SBO3A, SDA3A
VSS3 ←→ 91   35 ←→ P32, SBT1
AN0, PA0 ←→ 92   34 ←→ P31, SBI1, RXD1
AN1, PA1 ←→ 93   33 ←→ P30, SBO1, TXD1
AN2, PA2 ←→ 94   32 ←→ P25, IRQ5
AN3, PA3 ←→ 95   31 ←→ P24, IRQ4
AN4, PA4 ←→ 96   30 ←→ P23, IRQ3A
AN5, PA5 ←→ 97   29 ←→ P22, IRQ2A
AN6, PA6 ←→ 98   28 ←→ P21, IRQ1
AN7, PA7 ←→ 99   27 ←→ P20, IRQ0
5V I/F port VREF+ — 100   26 ←→ P16, TM7IOA

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    DAVDD — 1
    DA0, P06 — 2
    DAVSS — 3
    TXD0A, SBO0A, P00 — 4
    RXD0A, SBI0A, P01 — 5
    SBT0A, P02 — 6
    SDA2, SBO2, P03 — 7
    SBI2, P04 — 8
    SCL2, SBT2, P05 — 9
    VDD1 — 10
    MM0D — 11
    OSC2 — 12
    OSC1 — 13
    VSS1 — 14
    XI — 15
    XO — 16
    VDD2 — 17
    MOD1 — 18
    NRST, P27 — 19
    RMOUT, TM0IO, P10 — 20
    TM1IO, P11 — 21
    TM2IO, P12 — 22
    TM3IO, P13 — 23
    TM4IOA, P14 — 24
    TM5IOA, P15 — 25
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QFP100-P-1818B
LQFP100-P-1414