

# □ MN101E01K, MN101E01L, MN101E01M

Type	MN101E01K	MN101E01L	MN101E01M (under planning)
<b>ROM (×8-bit)</b> External memory can be expanded	256 K	320 K	384 K
<b>RAM (×8-bit)</b> External memory can be expanded	10 K	14 K	24 K
<b>Package</b>	QFP100-P-1818B *Lead-free		
<b>Minimum Instruction Execution Time</b>	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) 125 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) 62.5 μs (at 3.0 V to 3.6 V, 32 kHz)	
<b>Interrupts</b>	• RESET • Watchdog • External 0 • External 1 • External 2 • External 3 • External 4 • External 5 • Timer 0 • Timer 1 • Timer 2 • Timer 3 • Timer 4 • Timer 5 • Timer 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)		
<b>Timer Counter</b>	<p>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</p> <p>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</p> <p>Timer counter 0, 1 can be cascade-connected.</p> <p>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</p> <p>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</p> <p>Timer counter 2, 3 can be cascade-connected.</p> <p>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</p> <p>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</p>		

<b>Timer Counter (Continue)</b>	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
	DMA controller (automatic data transfer) Max. Transfer cycles ..... 255 Starting factor ..... external request, various types of interrupt, software Transfer mode ..... 1-byte transfer, word transfer, burst transfer

<b>Serial Interface</b>	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/simple I <sup>2</sup> C × 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/simple I <sup>2</sup> C × 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

<b>I/O Pins</b>	<b>I/O</b>	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)

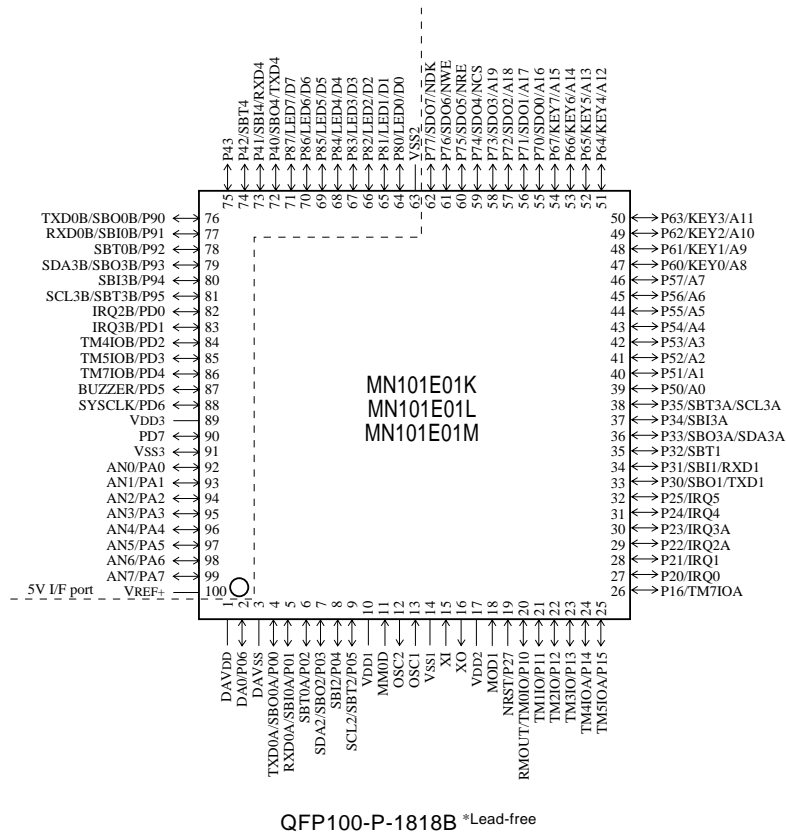
<b>A/D Inputs</b>	10-bit × 8-ch. (with S/H)
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<b>D/A Outputs</b>	8-bit × 1-ch.
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<b>Special Ports</b>	Buzzer output, remote control carrier signal output, high-current drive port
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See the next page for electrical characteristics, pin assignment and support tool.

## Pin Assignment



## Support Tool

<b>In-circuit Emulator</b>	Under development	
<b>Flash Memory Built-in Type</b>	Type	MN101EF01M (ES available)
	ROM (× 8-bit)	384 K
	RAM (× 8-bit)	24 K
	Minimum instruction execution time	Standard: 0.625 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)
	Package	QFP100-P-1818B *Lead-free

**MN101E01K, MN101E01L, MN101E01M □**

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