

# □ MN101C77A, MN101C77C, MN101C77D, MN101C77F

Type	MN101C77A	MN101C77C	MN101C77D	MN101C77F	MN101CF77G
Internal ROM type	Mask ROM				FLASH
ROM (byte)	32K	48K	64K	96K	128K
RAM (byte)	1.5K	3K		6K	
Package (Lead-free)	LQFP064-P-1414	LQFP064-P-1414, TQFP064-P-1010C	LQFP064-P-1414	LQFP064-P-1414 (Under development)	LQFP064-P-1414, TQFP064-P-1010C
Minimum Instruction Execution Time			[Standard] 0.1 $\mu$ s (at 2.5 V to 3.6 V, 20 MHz)* 0.2 $\mu$ s (at 2.1 V to 3.6 V, 10 MHz)* 0.5 $\mu$ s (at 1.8 V to 3.6 V, 4 MHz)* 62.5 $\mu$ s (at 1.8 V to 3.6 V, 32 kHz)* [Double speed] 0.119 $\mu$ s (at 2.5 V to 3.6 V, 8.39 MHz)*		

\* The operation guarantee range for flash memory built-in type is 2.7 V to 3.6 V.

## ■ Interrupts

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

## ■ Timer Counter

Timer counter 0 : 8-bit  $\times$  1

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

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  $\times$  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 4 : 8-bit  $\times$  1

(square-wave/8-bit PWM output, event count, pulse width measurement, serial 1 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; 1/1 of external clock input frequency

Interrupt source ..... coincidence with compare register 4

Timer counter 5 : 8-bit  $\times$  1

(square-wave/8-bit PWM output, event count, pulse width measurement, serial 0 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; 1/1 of external clock input frequency

Interrupt source ..... coincidence with compare register 5

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  $\times$  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 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 5; 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; 1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency

Serial 3 : synchronous type/single-master I<sup>2</sup>C × 1

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

Serial 4 : I<sup>2</sup>C slave × 1 (Applicable for I<sup>2</sup>C high-speed transfer mode, 7 bit/10bit address setting, general call)

## ■ 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	53	Common use , Specified pull-up resistor available, Input/output selectable (bit unit)
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## ■ A/D converter

10-bit × 7-ch. (with S/H)

## ■ D/A converter

8-bit × 2-ch. (Serves as AD pin, as well)

## ■ 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	fosc = 20 MHz , VDD = 3.3 V, (fs = fosc/2)		6	12	mA
	IDD2	fosc = 8.39 MHz , VDD = 3.3 V, (fs = fosc/2)		3	6	mA
	IDD3	fx = 32.768 kHz , VDD = 3.3 V, (fs = fx/2)			40	μA
Supply current at HALT	IDD4	fx = 32.768 kHz , VDD = 3.3 V, Ta = 25°C		5	10	μA
	IDD5	fx = 32.768 kHz , VDD = 3.3 V			40	μA
Supply current at STOP	IDD6	VDD = 3.3 V, Ta = 25°C			2	μA
	IDD7	VDD = 3.3 V, Ta = 85°C			30	μA

(Ta = -40°C to +85°C , VDD = 1.8 V to 3.6 V , VSS = 0 V)

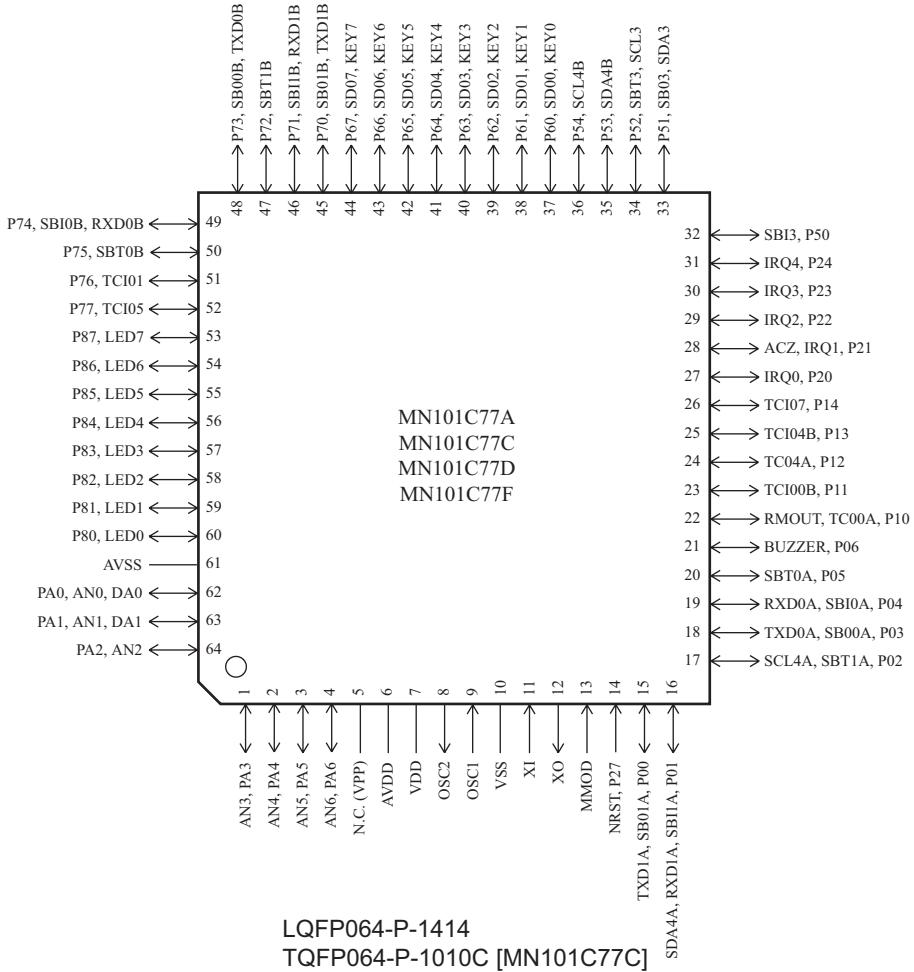
## ■ Development tools

In-circuit Emulator

PX-ICE101C/D+PX-PRB101C77-TQFP064-P-1010C

PX-ICE101C/D+PX-PRB101C77-LQFP064-P-1414

## ■ Pin Assignment



Note) N.C. serves as the VPP pin in the MN101CF77G, and cannot be used as a user pin.

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