❑ MN101C78A

Type	MN101C78A	MN101CF78A
Internal ROM type	Mask ROM	FLASH
ROM (byte)	32K	
RAM (byte)	1.5K	
Package (Lead-free)	TQFP048-P-0707B	
Minimum Instruction Execution Time	0.100 µs (at 3.0 V to 3.6 V, 10 MHz) 0.118 µs (at 2.7 V to 3.6 V, 8.5 MHz) 0.235 µs (at 1.8 V to 3.6 V, 4.25 MHz)* 62.5 µs (at 1.8 V to 3.6 V, 32 kHz)* * The lower limit for operation guarantee for flash memory built-in type is 2.2 V.	

■ Interrupts

RESET, Watchdog, External 0 to 2, External 4 (key interrupt dedicated), Timer 0 to 3, Timer 6, Timer 7 (2 systems), Timer 8 (2 systems), Time base, Serial 0 (2 systems), Serial 1 (2 systems), Serial 3, Serial 4, A/D conversion finish

■ Timer Counter

Timer counter 0 : 8-bit × 1
(square-wave/8-bit PWM output, event count, generation of remote control carrier, simple pulse width measurement, added pluse (2-bit) system PWM output, real time output control)
(square-wave/PWM output to large current terminal P50 possible)
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 output, added pluse (2-bit) system PWM output, PWM output, serial transfer clock output, real time output control, event count, synchronous output event, simple pulse width measurement)
(square-wave/PWM output to large current terminal P52 possible)
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 transfer clock)
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 6 : 8-bit freerun timer
Clock source..... 1/1 of system clock frequency; 1/1, 1/128, 1/8192 of OSC oscillation clock frequency; 1/1, 1/128, 1/8192 of XI oscillation clock frequency
Interrupt source ..... coincidence with compare register 6

Timer counter 7 : 16-bit × 1
(square-wave output, 16-bit PWM output (cycle / duty continuous variable), event count, synchronous output event, pulse width measurement, input capture, real time output control, high performance IGBT output)
(square-wave/PWM output to large current terminal P51 possible)
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), input capture register

Timer counter 8 : 16 bit × 1
(square-wave/16-bit PWM output [duty continuous variable], event count, pulse width measurement, input capture)
(square-wave/PWM output to large current terminal P53 possible)
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 8 (2 lines), input capture register

Timer counters 7, 8 can be cascade-connected.
(square-wave output, PWM input capture, pluse width measurement is possible as a 32-bit timer.)

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 1 or 2; 1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency, external clock

Serial 1 : synchronous type/UART (full-duplex) × 1
Clock source..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 1 or 2; 1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency, external clock

Serial 3 : synchronous type/single-master I²C × 1
Clock source..... 1/2, 1/4 of system clock frequency; pulse output of timer counter 2 or 3; 1/2, 1/4, 1/16, 1/32 of OSC oscillation clock frequency, external clock

Serial 4 : I²C slave × 1 (Applicable for I²C high-speed transfer mode, 7bit/10bit address setting, general call)

■ I/O Pins

I/O	39	Common use , Specified pull-up resistor available, Input/output selectable (bit unit)

■ A/D converter

10-bit × 7-ch. (with S/H)

■ Display control function

LCD
12 segments × 4 commons (static, 1/2, 1/3, or 1/4 duty)
(usable if VLCD ≤ VDD)

■ Special Ports

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

■ Electrical Charactreistics (Supply current)

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDD1	fosc = 4.25 MHz (fs = fosc / 2), VDD = 3 V		0.6 (1.3)	1.1 (2.2)	mA
	IDD2	fx = 32 kHz (fs = fx / 2), VDD = 3 V		4 (46)	15 (90)	µA
Supply current at HALT	IDD3	fx = 32 kHz , VDD = 3 V, Ta = 25°C		2 (3)	5 (13)	µA
	IDD4	fx = 32 kHz , VDD = 3 V , Ta = –40°C to +85°C			10 (40)	µA
Supply current at STOP	IDD5	VDD = 3 V , Ta = 25°C			2 (3)	µA
	IDD6	VDD = 3 V , Ta = –40°C to +85°C			8 (30)	µA

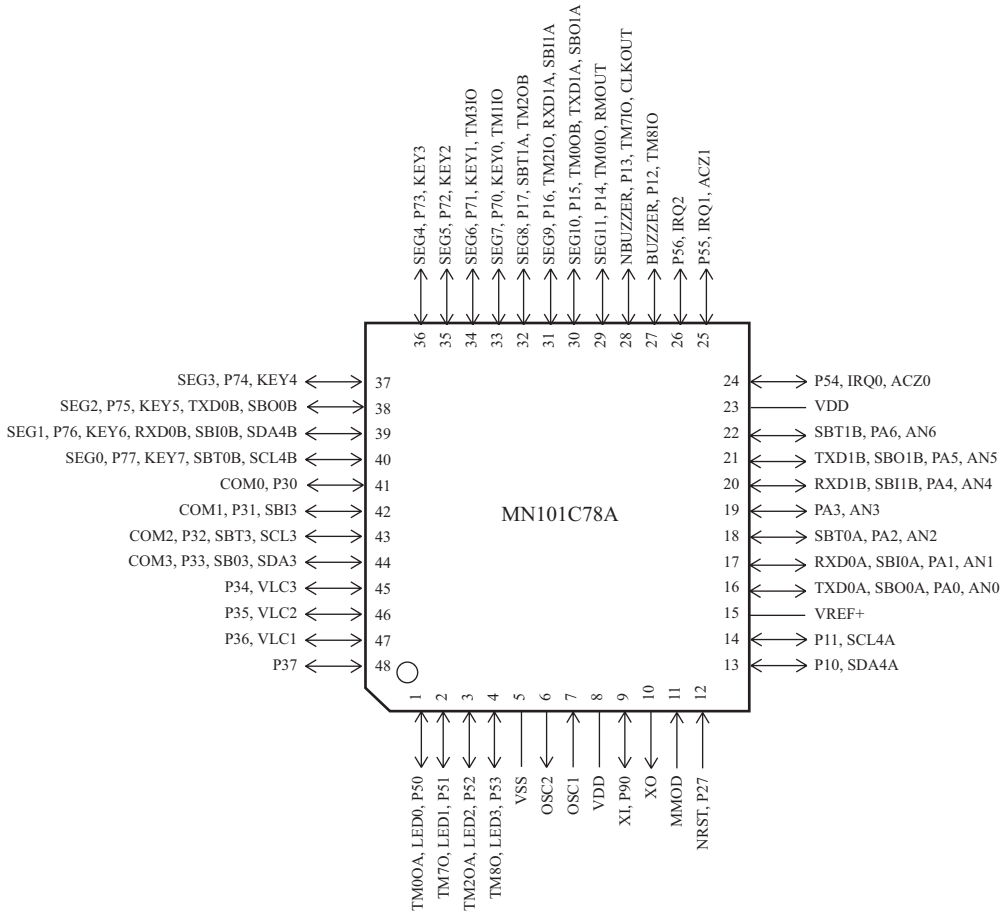
( ) : Flash memory built-in type

■ Development tools

In-circuit Emulator

PX-ICE101C/D+PX-PRB101C78-TQFP048-P-0707B-M

■ Pin Assignment



TQFP048-P-0707B

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