

# □ MN101C78A

<b>Type</b>	MN101C78A (under development)
<b>ROM (×8-bit)</b>	32 K
<b>RAM (×8-bit)</b>	1.5 K
<b>Package</b>	TQFP048-P-0707B *Lead-free (under development), QFP044-P-1010F *Lead-free (under planning)
<b>Minimum Instruction Execution Time</b>	0.1 μs (at 3.0 V to 3.6 V, 10 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)
<b>Interrupts</b>	<ul style="list-style-type: none"> <li>• RESET • Watchdog • External 0 • External 1 • External 2 • External 4 (key interrupt dedicated) • Timer 0</li> <li>• Timer 1 • Timer 2 • Timer 3 • Timer 6 • Time base • Timer 7 (2 systems) • Timer 8 (2 systems)</li> <li>• Serial 0 (2 systems) • Serial 1 (2 systems) • Serial 3, Serial 4 • A/D conversion finish</li> </ul>
<b>Timer Counter</b>	<p>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)</p> <p>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</p> <p>Interrupt source ..... coincidence with compare register 0</p> <p>Timer counter 1 : 8-bit × 1 (square-wave output, event count, synchronous output event)</p> <p>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</p> <p>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 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)</p> <p>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</p> <p>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 transfer clock)</p> <p>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</p> <p>Interrupt source ..... coincidence with compare register 3</p> <p>Timer counter 2, 3 can be cascade-connected.</p> <p>Timer counter 6 : 8-bit freerun timer</p> <p>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</p> <p>Interrupt source ..... coincidence with compare register 6</p> <p>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)</p> <p>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</p> <p>Interrupt source ..... coincidence with compare register 7 (2 lines), input capture register</p>

<b>Timer Counter (Continue)</b>	<p>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)</p> <p>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</p> <p>Interrupt source ..... coincidence with compare register 8 (2 lines), input capture register</p> <p>Timer counters 7, 8 can be cascade-connected. (square-wave output, PWM input capture, pluse width measurement is possible as a 32-bit timer.)</p> <p>Time base timer (one-minute count setting)</p> <p>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</p> <p>Watchdog timer</p> <p>Interrupt source ..... 1/65536, 1/262144, 1/1048576 of system clock frequency</p>
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<b>Serial Interface</b>	<p>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</p> <p>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</p> <p>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 2 or 3; 1/2, 1/4, 1/16, 1/32 of OSC oscillation clock frequency, external clock</p> <p>Serial 4 : I<sup>2</sup>C slave × 1 Applicable for I<sup>2</sup>C high-speed transfer mode, 7bit/10bit address setting, general call</p>
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<b>I/O Pins</b>	<b>I/O</b>	40 (35)	<ul style="list-style-type: none"> <li>• Common use</li> <li>• Specified pull-up resistor available</li> <li>• Input/output selectable (bit unit)</li> </ul> <p>( ) : QFP044-P-1010F</p>
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<b>A/D Inputs</b>	10-bit × 8-ch. (with S/H)
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<b>LCD</b>	12 segments × 4 commons (static, 1/2, 1/3, or 1/4 duty) (usable if VLCD ≤ VDD)
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<b>Special Ports</b>	Buzzer output, remote control carrier signal output, high-current drive port
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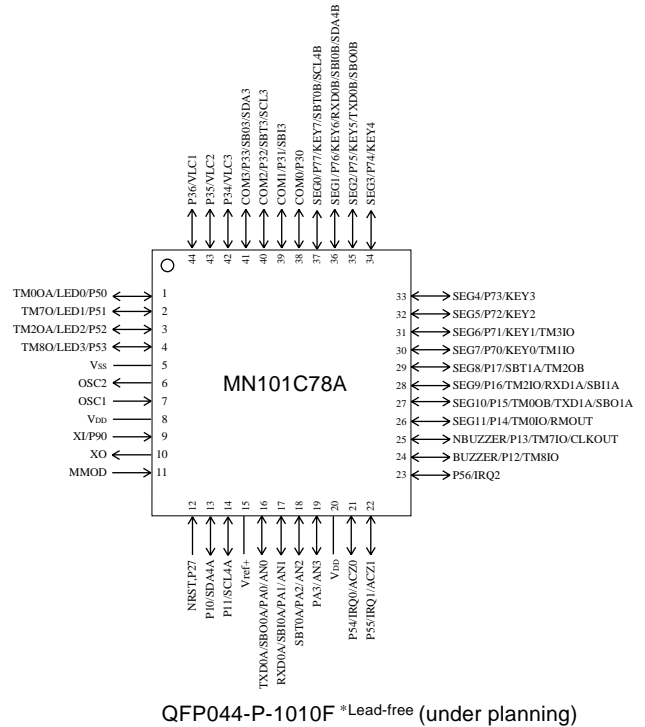
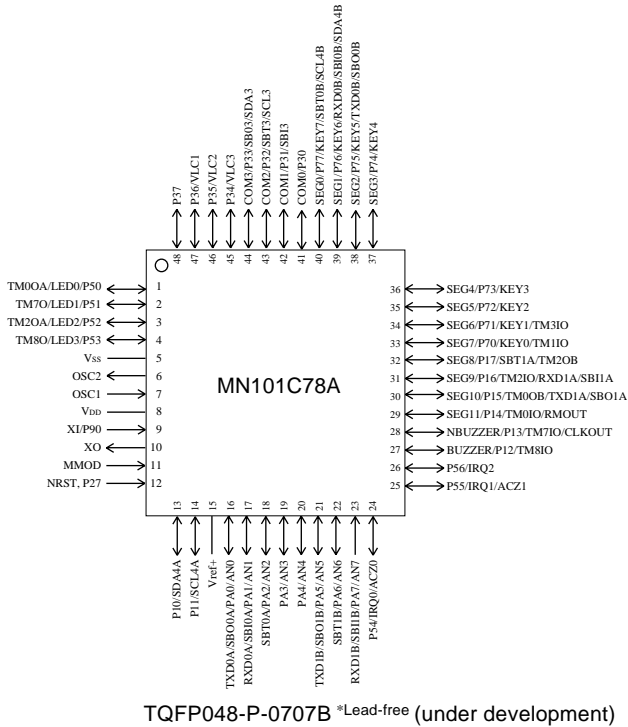
**Electrical Characteristics**

**Supply current**

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operatingsupplycurrent	IDD1	fosc = 4 MHz, VDD = 3 V		1	2	mA
	IDD2	fx = 32 kHz, VDD = 3 V		4	15	μA
SupplycurrentatHALT	IDD3	fx = 32 kHz, VDD = 3 V, Ta = 25°C		2	10	μA
	IDD4	fx = 32 kHz, VDD = 3 V, Ta = -40°C to +85°C			40	μA
SupplycurrentatSTOP	IDD5	VDD = 3 V, Ta = 25°C			2	μA
	IDD6	VDD = 3 V, Ta = -40°C to +85°C			30	μA

See the next page for pin assignment and support tool.

## Pin Assignment



## Support Tool

### In-circuit Emulator

PX-ICE101C / D + PX-PRB101C78-TQFP048-P-0707B-M (under development)  
 PX-ICE101C / D + PX-PRB101C78-QFP044-P-1010F-M (under planning)

### Flash Memory Built-in Type

Type	MN101CF78A (under development)
ROM (× 8-bit)	32 K
RAM (× 8-bit)	1.5 K
Minimum instruction execution time	0.1 μs (at 3.0 V to 3.6 V, 10 MHz)
	0.235 μs (at 2.7 V to 3.6 V, 4 MHz)
	62.5 μs (at 2.7 V to 3.6 V, 32 kHz)
Package	TQFP048-P-0707B *Lead-free (under development)



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