❑ MN101C589 , MN101C58A

Type	MN101C589	MN101C58A
ROM (×8-bit)	24 K	32 K
RAM (×8-bit)	1.5 K	1.5 K
Package	LQFP064-P-1414 *Lead-free	
Minimum Instruction Execution Time	0.1 µs (at 4.5 V to 5.5 V, 20 MHz) 0.25 µs (at 2.7 V to 5.5 V, 8 MHz)*1 62.5 µs (at 2.0 V to 5.5 V, 32 kHz)*1,2	
Interrupts	• RESET • Watchdog • External 0 • External 1 • External 2 • External 4 (key interrupt dedicated) • Timer 0 • Timer 1 • Timer 2 • Timer 3 • Timer 6 • Time base • Timer 7 (2 systems) • Timer 8 (2 systems) • Serial 0 (2 systems) • A/D conversion finish	

*1 The lower limit for operation guarantee for flash memory built-in type is 4.5 V.

*2 The lower limit for operation guarantee for EPROM built-in type is 2.3 V.

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) (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, 1/8192, 1/32768 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, additional pulse type 10-bit PWM output, 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 0 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 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 output, IGBT/16-bit PWM output (cycle / duty continuous variable), event count, synchronous output evevt, pulse width measurement, input capture) (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)

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)

Timer Counter (Continue)

Clock source ····· 1/1, 1/2, 1/4, 1/16, 1/128 of system clock frequency;
1/1, 1/2, 1/4, 1/16, 1/128 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)

Timer counters 7, 8 can be cascade-connected.
(square-wave output, PWM, input capture, pulse 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 3;
1/2, 1/4, 1/16, 1/64 of OSC oscillation clock frequency

I/O Pins	**I/O**	46	• Common use • Specified pull-up resistor available • Input/output selectable (bit unit)
	Input	3	• Common use • Specified pull-up resistor available

A/D Inputs

10-bit × 8-ch. (with S/H)

LCD

24 segments × 4 commons (static, 1/2, 1/3, or 1/4 duty)
LCD power supply separated from VDD (usable if VDD ≤ VLCD ≤ 5.5 V)
LCD power step-up circuit contained (3/2, 2 and 3 times)
LCD power shunt resistance contained

Special Ports

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

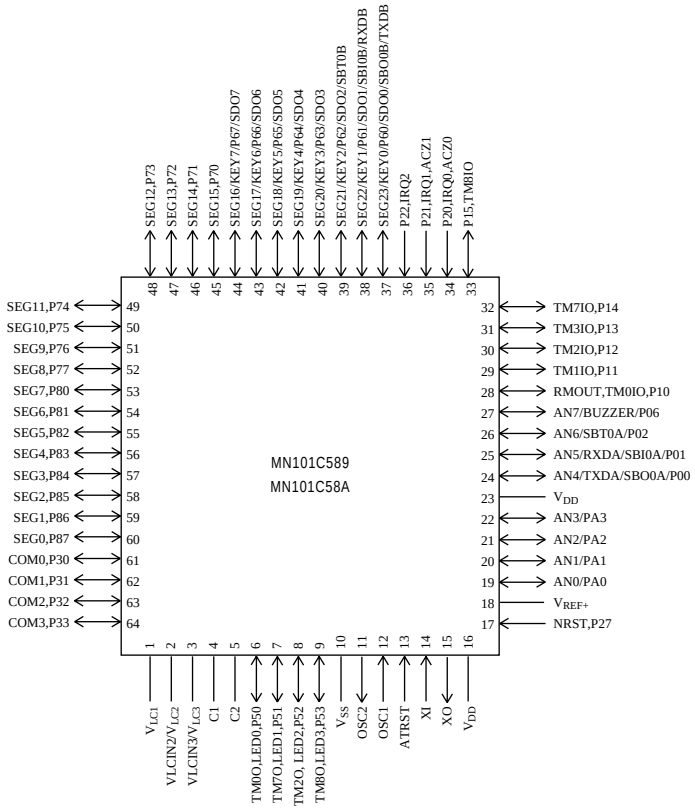
Electrical Characteristics

Supply current

Parameter	Symbol	Condition	Limit			Unit
			min	typ	max	
Operating supply current	IDD1	fosc = 20 MHz, VDD = 5 V		25	60	mA
	IDD2	fosc = 8 MHz, VDD = 5 V		10	25	mA
	IDD3	fx = 32 kHz, VDD = 3 V		30	100	µA
Supply current at HALT	IDD4	fx = 32 kHz, VDD = 3 V, Ta = 25°C		4	8	µA
	IDD5	fx = 32 kHz, VDD = 3 V, Ta = –40°C to +85°C			30	µA
Supply current at STOP	IDD6	VDD = 5 V, Ta = 25°C			2	µA
	IDD7	VDD = 5 V, Ta = –40°C to +85°C			50	µA

See the next page for pin assignment and support tool.

Pin Assignment



LQFP064-P-1414 *Lead-free

Support Tool

In-circuit Emulator	PX-ICE101C / D + PX-PRB101C58-LQFP064-P-1414-M	
EPROM Built-in Type	Type	MN101CP58A
	ROM (× 8-bit)	32 K
	RAM (× 8-bit)	1.5 K
	Minimum instruction execution time	0.1 µs (at 4.5 V to 5.5 V, 20 MHz) 0.25 µs (at 2.7 V to 5.5 V, 8 MHz) 62.5 µs (at 2.3 V to 5.5 V, 32 kHz)
	Package	LQFP064-P-1414 *Lead-free
Flash Memory Built-in Type	Type	MN101CF58D [ES (Engineering Sample) available]
	ROM (× 8-bit)	64 K
	RAM (× 8-bit)	2 K
	Minimum instruction execution time	0.1 µs (at 4.5 V to 5.5 V, 20 MHz) 0.25 µs (at 4.5 V to 5.5 V, 8 MHz) 62.5 µs (at 4.5 V to 5.5 V, 32 kHz)
	Package	LQFP064-P-1414 *Lead-free

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